

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

Tender No. HLL/IDN/IMPCL/2013-14/03/R

Request for Proposal (RFP)
for

**Modernization, Up-Gradation & Expansion of existing Plant Facilities at Indian
Medicines Pharmaceutical Corporation Limited (IMPCL) - Mohan, District: Almora
(Uttarakhand)
Package III- HVAC works**

**THE COMPLETE TENDER DOCUMENTS CONSIST OF THE
FOLLOWING:**

- **Volume- I (NIB & ITB)**
- **Volume-II (GCC & SCC)**
- **Volume-III (Tech. Specs)**
- **Volume-IV (BOQ)**



B-14A, Sector – 62,
NOIDA (UP) -201307

Phone no: 0120-4071500, Fax no: 0120-4071513

(January, 2014)

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

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(Uttarakhand)
Package III- HVAC works**

Issued To: _____
(Contractor)

Signature of officer issuing the Documents _____

Designation _____

Date of Issue _____.

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Medicines Pharmaceutical Corporation Limited (IMPCL) - Mohan, District: Almora
(Uttarakhand)**

Package III- HVAC works

Volume I

- **Notice Inviting Bidders**
- **Instructions to Bidders**



B-14A, Sector – 62,
NOIDA (UP) -201307

Phone no: 0120-4071500, Fax no: 0120-4071513

(January, 2014)

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED
MINISTRY OF HEALTH & FAMILY WELFARE (DEPT. OF AYUSH)
Government of India

PRESS NOTICE

HLL Lifecare Limited, for and on behalf of Indian Medicines Pharmaceutical Corporation Limited, Almora, Uttarakhand, Ministry of Health & Family Welfare, Govt. of India, invites sealed tenders, from eligible and qualified tenderers for supply / work under this tender covers fabrication, manufacture, assembly, testing and installation at consignee site with all documentation required for compliance of WHO-cGMP pharmaceutical machineries & equipment including furniture for the tenders at Sr. No. 1,2 & 3 and for Sr. No.4 as per tender documents:

Interested eligible bidders may submit their bids in Bid Documents to be purchased from the office of HLL on all working days after paying in the form of a Demand Draft. In case of Bids at Sr. no.1, 2&3 Bid documents can also be downloaded from the website (s) www.lifecarehll.com , www.eprocure.gov.in and www.impclmohan.nic.in.

Sl. No.	Tender No.	Dates of sale of tender enquiry documents	Date & Time of Pre-tender Meeting	Closing date & time for receipt of Tender
1	HLL/PCD/IMPCL-04(RT)/13-14	07.01.2014 to 07.02.2014	16.01.2014 at 11am.	10.02.2014 at 2pm.
2	HLL/PCD/IMPCL-03/13-14	07.01.2014 to 10.02.2014	16.01.2014 at 2pm.	11.02.2014 at 2pm.
3	HLL/PCD/IMPCL-02/13-14	07.01.2014 to 11.02.2014	16.01.2014 at 3pm.	12.02.2014 at 2pm.
4	HVAC Work: Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt. Almora, Uttarakhand via Ram Nagar: Package III- HVAC works. Tender No. HLL/IDN/IMPCL/2013-14/03/R	07.01.2014 to 16.01.2014	18.01.2014 12:00 Hrs	22.01.14 at 3PM

Prospective bidders are advised to regularly browse the above referred websites for any corrigendum/amendments, if any, issued subsequently. No Separate advertisement will be published in this regard.

HLL Lifecare Limited

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED
MINISTRY OF HEALTH & FAMILY WELFARE (DEPT. OF AYUSH)
Government of India

NOTICE INVITING TENDER

Item Rate Tenders are invited on behalf of the **Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL)** from eligible contractors as per eligibility criteria laid down from eligible contractors/firms for the following work:

Tender No.	Name of work & Location	Estimated cost (Rs.)	Completion period	Date of issue of tender document from	Last date of submission (at HLL Noida)	Bid Security / EMD (Rs. In Lacs)
Tender No. HLL/IDN/IMPCL/HVAC/2013-14/03/R	Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt. Almora , Utrakhand via Ram Nagar: Package III- HVAC works.	Rs.7,04,18,264/-	Five (05) Months	07.01.2014 to 16.01.2014	22.01.14 at 3PM	Rs. 14,08,365/-

The complete set of Tender Documents comprising four Volumes (Vol. I to IV) including Pre-qualification Criteria (Vol-I) has been made available at HLL website www.lifecarehll.com , www.impclmohan.nic.in and CPP Portal. The interested applicant contractors/firms may check their eligibility for the tender. Complete set of Tender Documents along with Tender Drawings are available at the office of HLL Lifecare Limited, B-14A Sector-62, Noida-201307.

The interested applicant contractors/firms after checking their prequalification status should purchase the complete set of tender documents comprising of Volumes I,II, III, and IV and CD containing Tender Drawings in person or through Post from the office of HLL Lifecare Limited, B-14A Sector-62,Noida-201307 on any working day as mentioned above on written request mentioning the name & description of work along with a non-refundable fee of Rs.8,000/-(Rupees Eight thousand only), including service tax, through demand draft in favour of HLL Lifecare Limited payable at New Delhi. All the bidders who have earlier purchased the Bid documents, are also requested to collect revised Bid documents from above mentioned address free of cost.

The tender documents obtained from HLL Lifecare Limited Noida office , signed by the authorised representative of the applicant contractors/ firms shall only be submitted complete in all respects along with requisite Bid Security in the form of Bank Guarantee from a Scheduled Bank as per format given in the Tender Documents in favour of

HLL Lifecare Limited /Demand Draft of a Scheduled Bank in favour of HLL Lifecare Limited Payable at New Delhi on or before due date and time as mentioned above at HLL Office B-14A, Sector-62, Noida-201307. IMPCL/HLL reserves the right to accept or reject any application without assigning any reason or incurring any liability whatsoever.

Prospective bidders are advised to regularly scan through HLL & IMPCL web sites as corrigendum/amendments etc., if any, will be notified on the HLL, IMPCL & CPP Portal web sites and separate advertisement will not be made for the same.

Vice President-(ID)

HLL Lifecare Limited

B-14A, Sector-62, NOIDA 201307

**For & On behalf of IMPCL under Department of “AYUSH”,
MoHFW, Government of India**

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INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED
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DISCLAIMER

This document has been prepared by HLL Lifecare Limited, On behalf of IMPCL Under Department of “AYUSH”, MoHFW, Government of India. The information is provided to prospective Bidders, who are interested to Bid for “Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttarakhand via Ram Nagar: Package III- HVAC works”. This document is neither an agreement, nor an offer or invitation to perform work of any kind to any party. The purpose of this document is to provide interested parties with information to assist the preparation of their Bid. While IMPCL/HLL have taken due care in the preparation of the information contained herein, and believe it to be complete and accurate, neither any of their authorities or agencies nor any of their respective officers, employees, agents or advisors give any warranty or make any representations, expressed or implied as to the completeness or accuracy of the information contained in this document or any information which may be provided in association with it.

Further, IMPCL /HLL does not claim that the information is exhaustive. Respondents to this document are required to make their own inquiry/ survey and will be required to confirm, in writing, that they have done so and they did not rely solely on the information given herein.

IMPCL /HLL reserves the right not to proceed with the Project or to change the configuration of the Project, to alter the timetable reflected in this document or to change the process or procedure to be applied. It also reserves the right to decline to discuss the Project further with any respondent. No reimbursement of cost of any type or on any account will be made to persons or entities submitting their Bid.

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED**(A GOVERNMENT OF INDIA ENTERPRISE)**

Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan , Distt: Almora , Uttrakhand via Ram Nagar: Package III- HVAC works

Definitions:

1. **“Application”** shall mean the response submitted by interested parties.
2. **“BID/ Tender”** shall mean documents issued by IMPCL/HLL to the prospective Bidder. The word “Tender” is synonymous with “Bid”
3. **“Project”** shall mean **“Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works”**
4. **“Site”** shall mean the place where the works under the Project are to be carried out and the details of which are provided in this document.
5. **“Bid Security/ Earnest Money”** shall mean the amount to be deposited by the Tenderer with the Tender.
6. **“Bid Validity”** shall mean the period for which the Bids shall remain valid.
7. **“Bidder”** shall mean the party participating in the Tendering process pursuant to and in accordance with the terms of this document.
8. **“Contract Agreement”** shall mean the agreement to be signed between the Successful Tenderer and the competent authority on behalf of IMPCL/ their authorized representative.
9. **“Contract Price”** shall mean the financial bid of the Successful Tenderer as accepted by the Client.
10. **“Client/Owner/IMPCL”** shall mean Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt: Almora, Uttrakhand via Ram Nagar.
11. **“Employer/Principal Employer”** shall mean Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt: Almora, Uttrakhand via Ram Nagar.
12. **“HLL”** shall mean **HLL Lifecare Limited** appointed by IMPCL as Project Consultant for the project.
13. **Engineer in Charge (EIC)** means the authorized representative nominated by IMPCL/ HLL.
14. **“Evaluation Committee”** shall mean the committee constituted by IMPCL / HLL for the evaluation of the bids.

15. **“Successful Tenderer”** shall mean the Tenderer declared technically and financially successful for the Project and with whom, the Contract Agreement shall be signed.
16. **“Letter of Award”** shall mean the letter issued by the Client/HLL to the Successful Tenderer inviting him to sign the Contract Agreement.
17. **“Date of commencement of work”** shall mean the date of Start as specified in the Schedule “F” or the date of handing over of the site, whichever is later in accordance with the phasing if any, as indicated in the tender document.
18. **“Performance Security”** shall mean the amount to be paid by the Successful Tenderer as per relevant clause mentioned elsewhere.
19. **“Similar Works”** as defined in qualifying criteria.
20. **“NIT”** means Notice Inviting Tender. The word “Notice Inviting Tenders” is synonymous with “Notice Inviting Bids (NIB)”.
21. **“Defects Liability Period/ Maintenance Period”** means the period after completion of the Project during which the Client /HLL or their authorized representative / Engineer-in –charge that will notify to the Contractor any defect noticed in the work and the Contractor is liable for rectification of such defects. Proof of dispatch of letter notifying the defect/ intimating the representative of Contractor at site on the last date of Defect liability period will make the Contractor liable for rectify all such defects.

SECTION-I
NOTICE INVITING TENDER

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan , Distt: Almora , Uttrakhand via Ram Nagar: Package III- HVAC works

1.0 Item Rate Tenders are invited on behalf of the Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL) from eligible contractors as per eligibility criteria laid down from eligible contractors/firms for the work “Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan , Distt: Almora , Uttrakhand via Ram Nagar: Package III- HVAC Works

1.1 The work is estimated to cost as given in Table - I. This estimate, however, is merely a rough guide. Vice President (VP), Infrastructure Development (ID), HLL Lifecare Limited, B-14-A, Sector-62 Noida-201307 will deal with all the matters relating to invitation of tenders. Any clarification shall be sought from VP (ID), HLL Lifecare Limited on Tele-Fax 0120-4071627. The NIT and other details are also available on the following websites: www.lifecarehll.com , www.impclmohan.nic.in and CPP Portal

1.2 TABLE– I

A	Tender No.	HLL/IDN/IMPCL/2013-14/03 /R
B	Name of work & Location	Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt: Almora, Uttrakhand via Ram Nagar: Package III- HVAC Works
C	Estimated cost (Rs.)	Rs. 7,04,18,264/-
D	Completion period	Five (05) Months
E	Cost of tender documents	Rs.8000/- (including service tax) by DD in favour of HLL Lifecare Limited payable at New Delhi
F	Period for issue of tender document	From 07.01.2014 to 16.01.2014 between 11.00 Hours & 16.00 Hours every day except 2 nd & 4 th Saturday, Sunday and Public Holidays.
G	Last date for receipt of request for issue of tender document	Till 16.01.2014 (15: 00 Hrs.)
H	Pre bid meeting	On 18.01.2014 at 12.00 Hrs
I	Bid Security / EMD (Rs.)	Rs.14,08,365/-
J	Bid Validity	180 days
K	Last date of submission of Bids (at HLL Noida)	22.01.2014 at 15.00 Hrs
L	Date of opening of Technical Bids	22.01.2014 at 15.30 Hrs
M	Date of opening of Price Bids	To be intimated at appropriate stage

- 1.3 Pre bid conference will be held in the Conference Room, HLL Lifecare Ltd. B-14, Sector-62, NOIDA-201307 or any other venue as decided in future for which intimation will be published on web site. VP (ID), HLL Lifecare Ltd. may also be contacted.

1.4 Eligibility Criteria:

Tenders will be issued to all intending & eligible Contractors/Firms. However, the Tenderer should meet the following minimum eligibility criteria:

- (a) The tenderers must be in existence as a contracting firm at least since last 7 years ending last day of the month previous to the one in which applications are invited.
- (b) Experience should be in the name of the tendering company and not in subsidiary/ associate company/ group of companies.
- (c) **(i)** Experience of having successfully completed works as detailed below during the last 7 years ending last day of the month previous to the one in which applications are invited:-

Three similar completed works each costing not less than the amount equal to 40% of the estimated cost put to tender (rounded to nearest Rs. 10 Lac).

Or

Two similar completed works each costing not less than the amount equal to 60% of the estimated cost put to tender (rounded to nearest Rs. 10 Lac).

Or

One similar completed work of cost not less than the amount equal to 80% of the estimated cost put to tender (rounded to nearest Rs. 10 Lac).

- (d) **“Similar Works”** shall mean similar HVAC (Heating, Ventilation & Air conditioning) works in Pharmaceutical Industries.
- (e) JV/ Consortium are not permitted.
- (f) The value of executed works shall be brought to current costing level by enhancing the actual value of work at simple rate of 7% per annum; calculated from the date of completion to the last date of receipt of applications for tender.
- (g) **Turnover:** Average annual financial turnover on construction works should be at least 50 % of the estimated cost during the immediate last three consecutive financial years. The turnover will be considered only for bidding company and not for group of companies or subsidiary company etc.
- (h) **Profit / Loss:** The Company should have positive Net Worth and should have not occurred loss in more than 2 years in last 5 years ending F.Y. 2012-13 duly certified by the Chartered Accountant.
- (i) **Solvency Certificate:** Solvency of the amount equal to 40% of the estimated cost of the work.
- (j) The bidding capacity of the contractor should be equal to or more than the estimated cost of the work put to tender. The bidding capacity shall be worked out by the formula:

Bidding Capacity= (A*N*2)-B

Where

A= Maximum Value of construction works executed in any one year during the last 7 years taking in to account the completed as well as work in progress.

N= Number of years prescribed for completion of work for which bids has been invited.

B= Value of existing commitments and ongoing works to be completed during the period of completion of work for which bids have been invited.

- 1.5 The time allowed for carrying out the work will be as mentioned in Table-I above effective from the date of start as defined in schedule 'F' or from the first date of handing over of the site, whichever is later & in accordance with the phasing / milestones, indicated in the tender documents.
- 1.6 (i) The site for the work is located at **Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt: Almora, Uttarakhand via Ram Nagar.**
 (ii) The tender architectural, structural and schematic drawings for the work are available. The working architectural and structural drawings shall be made available in phased manner, as per requirement of the same as per approved programme of completion submitted by the contractor after award of work.
- 1.7 Tender documents consisting of plans, specifications, the schedule of quantities of the various classes of work to be done and the set of terms & Conditions of contract to be complied with by the contractor whose tender may be accepted and other necessary documents, can be obtained from the office of HLL Lifecare Ltd., B-14A, Sector-62, NOIDA-201307 as per schedule in Table 1 above.
- 1.8 The interested applicants/contractors/firms after checking their prequalification status should purchase the complete set of tender documents comprising of Vol. I, II, III, and IV and CD containing Tender Drawings in person or through Post from the office of HLL Lifecare Limited, B-14A, Sector-62, Noida-201307 on any working day as mentioned above on written request mentioning the name & description of work along with a non refundable fee as at Table-1 above through demand draft in favour of HLL Lifecare Limited payable at New Delhi.
- 1.9 Interested applicant contractors/firms may like to attend the pre bid meeting which is scheduled to be held at HLL Office B-14A, Sector-62, Noida-201307 as at Table-1 above.
- 1.10 The tender documents obtained from HLL Lifecare Limited Noida office, signed by the authorized Representative of the Applicant/ Contractor/ Firm shall only be submitted in complete in all respect along with requisite Bid Security in the form of Bank Guarantee from a Scheduled Bank as per format given in the Tender Documents in favour of HLL Lifecare Limited /Demand Draft of a Scheduled Bank in favour of HLL Lifecare Limited Payable at New Delhi on or before due date and time as mentioned above at HLL Office B-14A, Sector-62, Noida-201307.
- 1.11 The tenders are invited in two bid systems i.e. Technical Bid and Financial Bid placed in separate envelopes, the Earnest Money (EMD) shall be placed in separate sealed envelope, and, each marked "Technical Bid", "Financial Bid" and "Earnest Money" respectively. All three envelopes shall be submitted

together in another sealed envelope with the name of work and due date of opening written on envelope, which will be received and the Bids will be opened, as per schedule at Table 1 above, in the presence of bidders or their authorized representatives who may choose to attend, in the office of HLL Lifecare Limited, B-14A, Sector-62 Noida-201307. If such nominated date for opening of bid is subsequently declared as a public holiday, the next official working day shall be deemed as the date of opening of the bids. Technical Bid of only those tenderers/bidders shall be opened, whose earnest money, placed in the EMD envelope, is found to be in order.

- 1.12 The bidder, whose bid is accepted, will be required to furnish performance guarantee for a value of 5% of the accepted tendered amount within the period in the schedule-‘F’. This Bank Guarantee shall be in the given format in the favour of HLL Lifecare Limited, Noida as per form C.
- 1.13 In case the contractor fails to deposit the said performance guarantee within the period as indicated in schedule -‘F’, including the extended period, if any, the earnest money deposited by the contractor shall be forfeited automatically without any notice to the contractor.
- 1.14 Evaluation of performance: - Evaluation of past performance of contractors forming part of the eligibility criteria quoted by them in their Technical Bid shall be done by Client/HLL. If required, the works executed by the bidders who otherwise qualify may be inspected by a committee or any other authority as decided by Client/HLL.
- 1.15 The brief description of the work is as follows:-

Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt: Almora , Uttarakhand via Ram Nagar: Package III- HVAC works

The scope of work involves HVAC works in following buildings:

- (i) Utility Block , Staff Facility , Workers facility
 - (ii) Capsule & Churan Block
 - (iii) Chawyanprash Block
 - (iv) Tablet & Pills block.
 - (v) Services Block
- 1.16 Copies of other drawings and documents pertaining to the works will be available for seeing by bidders at the office of HLL Lifecare Ltd B14A, Sector 62, Noida-201307 during the period of sale of Tender Documents on all working days.
 - 1.17 Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A bidder shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The bidder shall be responsible for arranging and maintaining at its own cost all materials, tools & plants, water, electricity, access, facilities for workers and all other services required for executing the work unless otherwise

specifically provided for in the contract documents. Submission of a tender by a bidder implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the works to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Client/ HLL and local conditions and other factors having a bearing on the execution of the work.

- 1.18 The competent authority of Client/HLL does not bind itself to accept the lowest or any other tender and reserves to itself the authority to reject any or all the tenders received without the assigning of any reason. All tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the bidder shall be summarily rejected.
- 1.19 Canvassing whether directly or indirectly, in connection with tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection.
- 1.20 The competent authority of IMPCL/ HLL reserves the right to accept or reject any or all the tenders without assigning any reason, No Bidder shall have any cause of action or claim against the IMPCL/ HLL for rejection of his tender.
- 1.21 The competent authority of IMPCL/HLL reserves to himself the right of accepting the whole or any part of the tender and the bidder shall be bound to perform the same at the rate quoted.
- 1.22 The contractor shall not be permitted to tender for works in case his near relative is Gazetted officer in Ministry of Health and Family Welfare / IMPCL or in the Managerial cadre of HLL and is directly dealing with the Project. Any breach of this condition by the contractor would disqualify him from tendering.
- 1.23 No Engineer of Gazetted rank or other Gazetted officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the tender or engagement in the contractor's service.
- 1.24 The tender for the works shall remain open for acceptance for a period of 180 days from the date of opening of tenders. If any bidder withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the department, then the IMPCL/ HLL shall, without prejudice to any other right or remedy, be at liberty to forfeit 100% of the said earnest money as aforesaid. Further the bidder shall not be allowed to participate in the re – tendering process of the work.
- 1.25 Bidder should either himself meet the eligibility conditions for the respective E&M components including internal Electrical works or otherwise he will have to associate a specialized agency of appropriate class meeting the eligibility requirements as per CPWD norms eligible to bid for these respective components individually. However if an approved contractor list is available for any specialized work in CPWD within the estimated cost of said specialized work or sub-head then the successful bidder/ contractor shall have to select a subcontractor for the said specialized work from the CPWD list for approval of

IMPCL/HLL. The bidder should submit an undertaking as per **form ‘H’** in their technical bids for his association towards undertaking respective components mentioned in para 1.15 above.

1.26 Before undertaking any of the specialized works e.g. placing supply orders for Electrical panel etc., written approval of EIC shall be required.

1.27 Registration/License:

- a) The tenderer/bidder should have Works Contract Tax/VAT Registration with the appropriate Authorities. In case of non-registration at the time of submission of bid, they will have to submit an undertaking that they will get themselves registered with the concerned authorities if they are awarded work.
- b) The tenderer/bidder should have registration with EPFO and ESIC. In case of non-registration at the time of submission of bid, they will have to submit an undertaking that they will get themselves registered with the concerned authorities if they are awarded work.

1.28 The tenderer/bidder will indemnify IMPCL/HLL, as the case may be, against all penal action that may be levied/elected by any concerned authority for default in any labour regulation/ PF/ ESI and other statutory requirements of the relevant Acts/ Laws related to the work of the contractor and will bear the legal charges, if any, and will pay the legal charges/dues directly to the concerned authority. An undertaking in this regard is required to be submitted by applicants' along with prequalification.

1.29 The Contractor must not have been blacklisted/ penalized by any government agency or public sector undertaking or judicial authority/arbitration body.

1.30 Submission of Bids

A Bid document consists of :

- a. **Volume – I (Notice Inviting Tender(NIT), Instruction to Bidders(ITB))**
- b. **Volume – II (General Conditions of Contract (GCC) & Special Conditions of Contract (SCC))**
- c. **Volume-III(Technical Specifications(TS))**
- d. **Volume – IV (Bill of Quantities(BOQ))**

Tenderer/bidder may obtain clarification, if any, in respect of this document from the office of the Vice President (ID-North) HLL Lifecare Ltd B14A, Sector 62, Noida -201307 till two days before Pre bid meeting.

B Sealing and Marking of Bids: The Tenderers shall submit their Tenders in two parts i.e. TECHNICAL BID and FINANCIAL BID in two separate sealed envelopes. Both these envelopes with Earnest Money Deposit(EMD) envelope will be kept in another sealed envelope duly marked as Tender for work of **“Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan , Distt: Almora , Uttrakhand via Ram Nagar: Package III- HVAC works”** due for opening on 22.01.2014 at 15:30 hours. The documents forming part of Technical bid and Financial bid has been explained in clause 2.3.6 & 2.3.7 of Instruction to Bidders (ITB) here-in-after.

- 1.31 This Notice Inviting bid shall form a part of the contract document. The successful Tenderer / contractor, on acceptance of his tender by the Accepting Authority, shall, within 15 days from the stipulated date of start of the work, sign the contract consisting of :-

The notice inviting tender, all the documents including General Conditions of the Contract, Special Conditions of Contract, Specifications, Bill of Quantities and drawings, if any, which form part of the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto.

**Signature of Authorized Representative of IMPCL
For & On behalf of IMPCL**

**Managing Director,
Indian Medicines Pharmaceuticals Corporation Limited,
Mohan, Distt Almora, Uttrakhand via Ramnagar**

SECTION-II
INSTRUCTIONS TO BIDDERS (ITB)

2.0 Introduction:

Indian Medicines Pharmaceutical Corporation Limited, Mohan (A Government of India Enterprise) under Department of “AYUSH” (MoHFW), Government of India (GOI) proposes “**Modernization, Up-gradation & Expansion of Existing Plant Facilities at IMPCL, Mohan, Uttrakhand via Ram Nagar :Package III- HVAC works**”

2.1 Eligibility Criteria: As per Notice inviting Bids

2.2 Disqualification. Even if a Contractor meets the eligibility criteria, IMPCL/HLL may, at their discretion and at any stage during the selection process or execution of the Project, order disqualification of the contractor, if the Contractor has:

- 2.2.1 Made misleading or false representations in the forms, statements and attachments submitted; or
- 2.2.2 The Contractor has been blacklisted by any government agency even after bids have been opened.

2.3 BID Documents:

2.3.1 Contents of BID Documents

BID Document shall consist of the documents listed in this document along with any schedules, addendum or corrigendum etc. issued by IMPCL/HLL for the purpose.

2.3.2 Pre-Bid Conference

The purpose of the Pre bid meeting will be to clarify issues/ doubts on any matter that may arise before bidding. IMPCL /HLL shall conduct pre-Bid meeting(s) at the time and venue mentioned in Notice Inviting Bid.

2.3.3 Clarifications

A prospective Contractor requiring any clarification with regards to the BID document may notify Vice President (ID) HLL Lifecare Ltd B14A, Sector 62, Noida, in writing or by tele-fax at the mailing address indicated in Notice Inviting Bid. Vice President (ID) will respond in writing to any request for clarification which should be received at least two days prior to the date of Pre bid meeting. Copies of the response (including an explanation on the query but without identifying the source of the inquiry) will be sent to all prospective Bidders to whom, the BID has been issued and also uploaded on the HLL website <http://www.lifecarehll.com> , www.impclmohan.nic.in and CPP Portal. Only written communications/clarifications shall be considered as valid.

2.3.4 Amendment to BID Document

- i. At any time prior to the submission of Bids, IMPCL / HLL may, for any reason, whether at its own initiative or in response to a clarification or query raised by prospective Bidders, modify the BID by an amendment.

- ii. The said amendment in the form of the addendum/ corrigendum will be sent to all prospective Bidders to whom, the BID has been issued on or before the last date mentioned in Notice Inviting Bid. This communication will be in writing or by tele-fax and the same shall be binding on the Bidders. Prospective Bidders should promptly acknowledge receipt of the addendum/ corrigendum by Tele-fax/courier to client. The amendments would also be available on the HLL website <http://www.lifecarehll.com>, www.impclmohan.nic.in and CPP Portal. The prospective Bidders are advised to regularly visit these websites to ensure that they are aware of the amendments. The addendum (s) / corrigendum(s) issued will form part of the BID documents.
- iii. In order to afford prospective Bidders reasonable time for preparing their Bids after taking into account such amendments, the IMPCL may, at its discretion, extend the deadline for the submission of Bids.
- iv. The above information will be placed on the HLL website <http://www.lifecarehll.com>, www.impclmohan.nic.in and CPP Portal and it will be the responsibility of the bidders to read.

2.3.5 Preparation of Bid:

a) Bidder's responsibility:

- i. The Bidder is solely responsible for the details of his Bid
- ii. The Bidder is expected to examine carefully all the contents of BID document as mentioned in Notice Inviting Bids including instructions, conditions, forms, terms, etc and take them fully into account before submitting his bid. Bids, which do not satisfy all the requirements, as detailed in these documents, are liable to be rejected as being unresponsive.
- iii. The Bidder shall be deemed to have inspected the Site and its surroundings and taken into account all relevant factors pertaining to the Site, while preparing and submitting the Bid.

b) Project Inspection and Site Visit

Any Site information given in this BID is for guidance only. The Bidder is advised to visit and examine the Site of works and its surroundings at his/their cost and obtain at his/their own responsibility, any information that they may consider necessary for preparing the Bid and entering into a Contract with the Client, including availability of electricity, water and drainage, where applicable.

IMPCL/HLL shall not be liable for such visits costs, regardless the outcome of the selection process.

c) Documents Comprising the Bid

d) Bidder shall submit their Bids in two packages namely the technical package and the financial package. The contents of the technical and financial package are as mentioned hereinafter i.e. Clause 2.3.6 & 2.3.7.

e) **Alternative Proposal by bidders:**

Bidders shall submit offers that comply with the requirement of the bidding documents, including basic technical design as indicated in the drawing and specifications. Alternative bids/proposals will not be considered.

2.3.6 **Contents of Technical Package:**

The Technical package, clearly labeled as “**TECHNICAL PACKAGE**”, has to be submitted in two parts, Part-I shall consist of information for responsiveness and other information about Bidder, as required and Part -II shall be the Technical Bid.

a) Part –I shall comprise the following :

- i. **Form of Bid and Appendix (Form A) for the Bid**
- ii. **Checklist for the enclosed documents as per the format attached (Annexure I)**
- iii. **Bid Security, in original, in a separate envelope, sealed and duly marked “Bid Security” as per the format attached (Form B),**
- iv. **Format for Performance Security Bank Guarantee (Form C)**
- v. **Format for Contract Agreement (Form D)**
- vi. **Power of attorney (Form E) in favour of the person signing the Bid**
- vii. **Litigation History (Form G)**
- viii. **Affidavit for engaging specialized agencies (Form H)**
- ix. **Affidavit by Bidder (Form K)**

b) Part –II shall comprise the followings :

- i. **Form “T-1” (Financial Information)**
- ii. **Form “T-1-B”(Certificate from a Scheduled Bank)**
- iii. **Form “T-2” (Details of works)**
- iv. **Form “T-3” (Project under execution or awarded)**
- v. **Form “T-4” (Performance Report of Works)**
- vi. **Form “T-5” (Structure and Organization)**
- vii. **Form “T-6” (Details of Technical & Administrative personnel)**
- viii. **Form “T-7” (Details of Construction Plant for carrying out the work)**
- c) Initialed BID document, as listed in Notice Inviting Bids excluding the Bill of Quantities (Volume–IV) including amendment(s)/addendum(s)/Corrigendum(s)/Clarification(s) issued, if any, related to other than the Bill of Quantities.

2.3.7 Contents of Financial Package

The financial package VOLUME IV- BILL OF QUANTITY including amendment(s) / addendum(s)/ Corrigendum(s) / Clarification(s) issued, if any, related to the Bill of Quantities, clearly labeled as “FINANCIAL PACKAGE” will contain the following:

i. **Financial Bid**

The financial package should be submitted, in a separate sealed envelope. These prices should include all costs associated with the Project including any out of pocket / mobilization expenses, taxes, charges, levies, cess, VAT, including Service tax etc. as applicable till the date of NIT. In case Government levies/modifies any tax subsequently, the same will be adjusted plus/ minus as the case may be.

2.3.8 Bid Submission

i. **Language of Bid**

The Bid and all related correspondence and documents relating to the Project shall be in English language.

ii. **Currency of Bid**

Bid prices shall be quoted in Indian Rupees only. The amount mentioned elsewhere in the bid document will also deemed to be in Indian Rupees unless otherwise mentioned.

iii. **EMD/Bid Security**

- a) The Bidder shall enclose EMD with their Bid for an amount, as mentioned in Notice Inviting Bids.
- b) The EMD will be in the form of a bank guarantee from a scheduled commercial bank in India. The format of the bank guarantee shall be as per Form B. Bank guarantees should be irrevocable and operative for a period as mentioned in Notice inviting Bid. The Bid Security shall be endorsed/pledged in favour of HLL Life Care Limited, B-14A, Sector -62 Noida-201307 and should be valid for a period of six months from date of submission of bids and shall be submitted in a separate envelope super-scribed “**Bid Security for Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan , Distt: Almora , Uttrakhand via Ram Nagar: Package III- HVAC Works**”
- c) Bids not accompanied by EMD, shall be treated as non-responsive, and will be summarily rejected by the MoHFW.
- d) The Bid Security of the Successful Bidder shall be returned upon the Bidder executing the Contract Agreement and submitting the required Performance Security.
- e) The Bid Security shall be forfeited if a bidder withdraws his bid during the period of bid validity or in the case of the successful bidder, if he fails to furnish the necessary performance security or enter into the Contract within the specified time limit.

iv. **Extension of Bid Validity**

Prior to the expiry of the original Bid Validity Period, IMPCL/HLL may, at its discretion, request Bidders to extend the Bid Validity Period for a specified additional period.

v. **Format and Signing of Bid**

- a. Bid documents (technical package/ bid Part I and II and financial package/ bid) shall be stamped and signed on all pages by a person duly authorized to sign the Bid documents. The Bidder shall also submit a power of attorney authorizing the person signing the documents.
- b. Entries to be filled in by the Bidder shall be typed or written in indelible ink.
- c. The complete Bid shall be without alterations, overwriting, interlineations or erasures except those to accord with instructions issued by IMPCL/ HLL, or as necessary to correct errors made by the Bidder. All amendments/corrections shall be initialed by the person or persons signing the Bid.
- d. All witnesses and sureties shall be persons of status and probity and their full names, occupations and addresses shall be written below their signatures.

vi. **Sealing and Marking of Bids**

The Bid shall be submitted in accordance with the procedure detailed herein. Specified documents shall be enclosed in envelope of appropriate size each of which shall be sealed.

- a. Each Bid will be submitted in two sets one marked “Original” **and** the other marked “Copy” (Copy should be the photocopy of ‘original’).

Each set containing the two packages, TECHNICAL BID and FINANCIAL BID shall be sealed in two separate envelopes **clearly** marked as “TECHNICAL BID” and “FINANCIAL BID “.The two envelopes along with envelope of EMD/ Bid Security shall be wrapped in an outer envelope addressed to The Vice President (ID-North) HLL Lifecare Ltd.,B14A, Sector 62, NOIDA-201307, duly super scribing on top “Bid for **Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan , Distt: Almora , Uttrakhand via Ram Nagar: Package III- HVAC Works**” and date and time of opening of the Bid_____”. The envelope should also bear the name and address of the Bidder.

vii. **Submission of Bids**

Bids should be submitted to:

**Managing Director,
Indian Medicines Pharmaceutical Corporation Ltd.
C/o
Vice President (ID)
HLL Lifecare Ltd
B14A, Sector 62, Noida-201307**

The last date for submission of completed Bids is given in Notice Inviting Bids. The IMPCL/HLL may, at their discretion, extend this date, in which case all rights and obligations of the IMPCL/HLL and the Bidder shall thereafter be subjected to the revised date as extended. If revised date for submission of Bid is subsequently declared as a public holiday, the next official working day shall be deemed as the date for submission of Bid.

- viii. The bids shall be submitted by hand or through registered post or courier service at the address mentioned above so as to reach before scheduled Date & time of submission of tenders. IMPCL/HLL shall not take any cognizance and shall not be responsible for any delay/ loss in transit or non-submission of the Bid in time.
- ix. The bids sent telegraphically or through other means of transmission (Tele-fax, E-mail etc.), which cannot be delivered in a sealed envelope, shall be treated as defective, invalid and shall stand rejected.
- x. **Modifications / Substitution / Withdrawal of Bids**
 - (a) No modification or substitution of the submitted Bid shall be allowed.
 - (b) A Bidder may withdraw its submitted Bid, provided that written notice of the withdrawal is received by IMPCL/HLL before the last date for submission of Bids. In case a Bidder wants to resubmit his Bid, he shall submit a fresh Bid following all the applicable conditions. Re-submission will not be permitted more than once and till last date and time of submission as notified.
 - (c) Only a single copy of the withdrawal notice shall be prepared and each page of the notice shall be signed and stamped by the authorized signatory. The notice shall be duly marked "WITHDRAWAL". This withdrawal notice will be opened at the time of opening of bid and not earlier. The signature of GPA holder will be verified and in case both are same then only withdrawal will be considered.
- xi. **Bid Due Date**
 - a. Bids should be received in the office of the Vice President (ID) HLL Lifecare Ltd., NOIDA at the address mentioned in this document, on or before the stipulated/ extended time and date as specified in Notice Inviting Bids.
 - b. IMPCL/HLL may, in exceptional circumstances, and at its sole discretion, extend the receipt & opening of Bids by issuing an addendum.

xii. **Late Bids**

Any Bid received in office of the Vice President(ID) HLL Lifecare Ltd., NOIDA at the address mentioned above after the deadline prescribed for submission of Bids in Notice Inviting Bids/extended data as the case may be, will not be considered and will be returned unopened to the Bidder.

2.3.9 Power of Attorney:

Bidders shall submit, along with Part 1 of the technical Bid, a power of attorney (PoA), on a stamp paper of appropriate value, in favour of the person signing the Bid documents authorizing him to sign the Bid documents, make corrections/ modifications thereto and interacting with IMPCL/ HLL and act as the contact person. The format for the power of attorney shall be as per form E of BID. In case bids are signed by Managing Director/ Director/Partner/ Proprietor himself, power of attorney is not required.

2.3.10 Bid Opening and Evaluation:**Bid Opening**

- i. The Bids will be opened in the presence of Bidders or their authorized representatives who may choose to attend on date & time as mentioned in Notice Inviting Bids. If such nominated date for opening of Bid is subsequently declared as a public holiday, the next official working day shall be deemed as the date of opening of the Bid.
- ii. Bids for which an acceptable notice of withdrawal has been submitted shall not be opened.
- iii. Bids which have not complied with one or more of the foregoing instructions may not be considered.
- iv. On opening of the main Bid envelopes, it will be checked if they contain Technical & Financial Bids and envelope of EMD/ Bid Security as detailed above.
- v. First technical package of the Bid will only be opened which will be checked for completeness and confirmation of submission of Bid Processing Fees and the requisite Bid Security. If the documents do not meet the requirements of the BID, a note will be recorded.
- vi. After technical evaluation of all bids, the financial bid of all responsive Bidders will be opened on date & time considered appropriate by IMPCL/HLL after notifying all concerned.

2.3.11 Determination of Responsiveness

- i. Prior to opening & evaluation of Financial Bids, MoHFW/HLL will determine whether each Technical Bid is responsive to the requirements of NIB.
- ii. For the purpose of this clause, a responsive Bid is one which:
 - a. Is packed, signed, sealed and marked
 - b. Is accompanied by the power(s) of attorney if required
 - c. Contains all the information as requested in NIB
 - d. Contains information in same/similar formats as those specified in NIB
 - e. the validity period of the offer is as per NIB
 - f. Is accompanied by the Bid Processing Fee (in case not paid in cash in advance).
 - g. Is accompanied by the Bid Security/ EMD,

- h. Conforms to eligibility criteria and all the terms, conditions and specifications of NIB without material deviation or reservation. "Deviation" may include exceptions and exclusions. A material deviation or reservation is one which affects substantial way, the scope, quality, performance or administration of the works to be undertaken by the Bidder under the Contract, or which limits in a substantial way, Client's rights or the Bidder's obligations under the Contract as provided for in NIB and/ or is of an essential condition, the ramifications of which would unfairly affect the competitive position of other Bidders.
- iii. If a Technical Bid is not substantially responsive to the requirements of NIB, it will be rejected by IMPCL/HLL. The decision of the IMPCL/HLL in this regard shall be final and binding. The financial Packages of non-responsive Bidders shall be returned unopened.

2.3.12 Evaluation of Bids

- i. IMPCL/HLL would subsequently examine and evaluate Financial Bids of responsive Bidders, as per the criteria set out in this document. Form "T-8"
- ii. IMPCL/ HLL reserves the right to reject any Bid if:
 - a. At any time, a material misrepresentation is made or uncovered; **or**
 - b. The Bidder does not respond within the stipulated time to requests for supplemental information/ clarifications required for the evaluation of the Bid.
 - c. It is found that the information provided is not true or incorrect or facts/ material for the evaluation have been suppressed.
 - d. If the bidder has not quoted rates for any part of the bid.

2.3.13 Clarification of Bids

- i. Evaluation of technical Bids submitted by Bidders shall be undertaken based on details submitted therein only. Bidder shall not be allowed to submit on their own, additional information or material subsequent to the date of submission and such material / information, if submitted, will be disregarded. It is therefore essential that all details are submitted by the Bidder comprehensively, accurately and specifically in their technical Bid, avoiding vague interpretations. However, Evaluation Committee, if it so desires, reserves the right to seek any clarification from the Bidders on the information provided in the technical package. The request for clarifications and the response shall be in writing, or by tele-fax. No change / addition in the information or substance of the Bid shall be sought, offered or permitted.
- ii. To assist in the examination, evaluation and comparison of the financial Bid, Bid Evaluation Committee may ask Bidders individually for clarifications. The request for clarification and the response shall be in writing or by tele-fax. No change in the price or substance of the Bid shall be sought, offered or permitted except as required to confirm correction of arithmetical errors observed by the Evaluation Committee during the evaluation of Bids. IMPCL /HLL reserves the right to negotiate with the lowest bidder, if considered appropriate.

2.3.14**(a) Process to be Confidential**

- i. Except the public opening of the Bids, information relating to the examination, clarification, evaluation and comparison of Bids and recommendations concerning the award of Contract shall not be disclosed to Bidders or other persons not officially concerned with such process.
- ii. Any effort by a Bidder to influence IMPCL /HLL Evaluation Committee in the process of examination, clarification, evaluation and comparison of Bids and in decisions concerning award of Contract, shall result in the rejection of the Bid.

(b) Client/HLL's right to accept any Bid and to reject any or all Bids

- i. Notwithstanding anything above, IMPCL /HLL reserves the right to accept or reject any Bid at any time prior to award of Contract without thereby incurring any liability to the affected Bidder or Bidders.
- ii. IMPCL /HLL reserves the right to cancel/annul the selection process, at any stage prior to the award of the Contract, in larger public interest, on account of the following:
 - a) In case no Bid/ a single Bid is received.
 - b) Occurrence of any event due to which it is not possible to proceed with the selection process
 - c) An evidence of a possible collaboration/mischief on part of Bidders, impacting the competition and transparency of the selection process,
 - d) Any other reason, which in the opinion of the Client necessitates the cancellation of the selection process.
- iii. On occurrence of any such event, IMPCL /HLL shall notify all the Bidders within 7 days of such decision. IMPCL /HLL shall also promptly return the Bid Security submitted by the Bidders within 15 days of issue of such notice. IMPCL /HLL is not obligated to provide any reason or clarification to any Bidder on this account. IMPCL's liability under this clause is restricted to returning the Bid Security and no other reimbursements of costs/ expenses of any type shall be made by the Client/HLL on this account.
- iv. The Client further reserves the right to re-Bid the process or get the work done by a Government agency or Quasi Government agency if the Client is of the opinion that the Bids received are not economically or otherwise feasible or not acceptable due to reasons in sub clauses (a) to (d) above.

2.3.15 Award of Contract**a. Award Criteria**

IMPCL /HLL or its assignees or any agency appointed by them will declare the Bidder ranked L1 as Successful Bidder and proceed to issue Letter of

Award (LOA) as per the procedure mentioned in the NIB and terms and conditions set out in this NIB document.

b. Notification of Award

- i. IMPCL /HLL will issue the Letter of Award to the Successful Bidder, notifying him of being declared successful and the intent to sign the Contract Agreement with him. This letter (hereinafter and in the Conditions of Contract called 'the Letter of Award') shall mention the sum which IMPCL /HLL will pay to the Contractor in consideration of the completion and guarantee of the work to be performed by them, as prescribed therein (hereinafter and in the conditions of Contract called 'the Contract Price'). No correspondence will be entertained by IMPCL /HLL from the unsuccessful Bidders.
- ii. The Letter of Award shall form part of the Contract.
- iii. Upon submission of Performance Security by the Successful Bidder, IMPCL /HLL will promptly notify the other Bidders and discharge / return their Bid securities.

c. Performance Security

- i. The Successful Bidder shall furnish to IMPCL /HLL or its assignees or any agency appointed by them, towards Performance Security, a bank guarantee for an amount of 5% of the total Contract Price, in accordance with the provisions in the General Conditions of Contract and remaining 5% shall be retained from the running bills. The bank guarantee has to be from a scheduled commercial bank based in India. The format for bank guarantee shall be as per Form-C provided in this BID. The Performance Security shall be furnished within the time limit specified in Notice Inviting Bids.
- ii. The Bank Guarantee should be valid up to 6 (six) months beyond the Defects Liability Period.
- iii. Failure of the Successful Bidder to submit the required Performance Security shall constitute sufficient grounds for the annulment of decision to award the Contract and forfeiture of the Bid Security.

d. Signing of Agreement

- (i) Prior to the signing of the Contract Agreement, the Successful Bidder shall submit Performance Security.
- (ii) IMPCL /HLL shall prepare the Contract Agreement in the Proforma (Form D) included in this document, duly incorporating all the terms of agreement between the two parties. The Successful Bidder will be required to execute the Contract Agreement within 30 days from the date of issue of the Letter of Award.
- (iii) The Contract Agreement should be duly signed by IMPCL /HLL or its assignees or any agency appointed by them and Contractor through their authorized signatories.
- (iv) The Contractor shall also be required to sign the integrity agreement with the IMPCL /HLL or its assignees.
- (v) In case the Successful Bidder does not sign the Contract Agreement, IMPCL /HLL reserves the right to cancel the further process, forfeit any Bid Security and/or Performance Security, as the case may be, submitted by the Successful Bidder and either re-Bid or proceed in any other manner as it may deem fit.

e. Sub-contracting

- i. The Contractor shall not sub-contract the whole of the works. The Contractor shall not subcontract any part of the work without notifying and getting prior approval from the IMPCL /HLL.
- ii. The Contractor shall be responsible for observance, by all sub-contractors, of all the provisions of the Contract Agreement. The Contractor shall be responsible for the acts or defaults of any sub-contractor, his representatives or employees, as fully as if they were the acts or defaults of the Successful Bidder, his representatives or employees. The Contractor shall provide IMPCL /HLL the details of all the sub contracts including terms and conditions of the contracts entered with them. The Contractor shall be solely responsible for the performance of the sub-contractors and for making payments to them.

f. Defects Liability Period

- i. The Defects Liability Period shall be up to 12 months from the date of issue of completion certificate /taking over by IMPCL /HLL.
- ii. The Contractor shall, at its own risk and cost, make good, any defects, complete any leftover work as noticed and notified by IMPCL /HLL during defects liability period.

g. Ownership of the Designs and Drawings

- i. All copyright and other proprietary rights in the Works shall vest and stand assigned to IMPCL /HLL and IMPCL /HLL shall consequently own, absolutely and exclusively on a worldwide basis, the whole of property, rights, title and interest including all copyright in the Works, present or future, vested or contingent, generally and without limitation, for the whole term of the copyright, including the right to modify and/or make any alterations to the Works and all the above rights shall not lapse even if such rights are not exercised by IMPCL / HLL during the terms of the copyright and the Contractor shall be required/obliged to execute any deeds/ documents, as may be required or considered necessary, by IMPCL /HLL to give effect to and secure the above mentioned rights for IMPCL /HLL in the Works. For the purpose of this clause, the term "Works" shall include all "works" covered by the copyright Act 1957 created by the Contractor at the inception of, during the course of and until the completion of the Project and also includes any work created directly or indirectly in the performance of the obligations of the Contractor in connection with the Project.
- ii. The Contractor shall not use or allow anyone to use these drawings, designs, documents and software without the prior written permission of the Client/HLL and any such act without the permission of the Client/HLL shall constitute violation of Intellectual Property Rights.
- iii. Even in the event of stoppage / cancellation of the selection process, all documents /designs/ drawings submitted by the contractor / Bidder to the IMPCL /HLL on or before the cancellation of the selection process shall become the property of the Client and the Bidders shall have no claim on such documents/design.

h. Right to modify the design

The Client/HLL shall have the right to modify the design prepared by the Contractor. The Contractor shall comply with any such instructions by the Engineer-in-Charge or the Client/HLL and suitably modify the design and submit the same to the Client for approval.

- i.** All amendments/ addendum shall be made available at Ministry's and HLL's Web site. It will be the responsibility of the bidder to see the web site regularly and update.

SECTION-III
INTEGRITY PACT

To,

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.....,
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Sub: Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt: Almora, Uttrakhand via Ram Nagar: Package III- HVAC Works.

(NIT No. HLL/IDN/IMPCL/HVAC/2013-14/03/R)

Dear Sir,

It is hereby declared that IMPCL/HLL is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the Bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the tenderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement and signing of the same shall be deemed as acceptance and signing of the Integrity Agreement on behalf of the IMPCL/HLL.

Yours faithfully

Managing Director

Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL),

Mohan, Distt: Almora,

Uttrakhand

Via

RamNagar

To

**Managing Director
Indian Medicines Pharmaceutical Corporation Ltd.
C/o
Vice President (ID-North)
HLL Lifecare Ltd
B14A, Sector 62, NOIDA-201307**

Sub: Submission of Tenders for Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan , Distt: Almora , Uttarakhand via Ram Nagar: Package III- HVAC Works.
(NIT No. HLL/IDN/IMPCL/2013-14/03/R)

Dear Sir,

I/We acknowledge that IMPCL/HLL is committed to follow the principles thereof as enumerated in the Integrity Agreement enclosed with the tender/bid document.

I/We agree that the Notice Inviting Tender (NIT) is an invitation to offer made on the condition that I/We will sign the enclosed integrity Agreement, which is an integral part of tender documents, failing which I/We will stand disqualified from the tendering process. I/We acknowledge that THE MAKING OF THE BID SHALL BE REGARDED AS AN UNCONDITIONAL AND ABSOLUTE ACCEPTANCE of this condition of the NIT.

I/We confirm acceptance and compliance with the Integrity Agreement in letter and spirit and further agree that execution of the said Integrity Agreement shall be separate and distinct from the main contract, which will come into existence when tender/bid is finally accepted by IMPCL/HLL. I/We acknowledge and accept the duration of the Integrity Agreement, which shall be in the line with Article 1 of the enclosed Integrity Agreement.

I/We acknowledge that in the event of my/our failure to sign and accept the Integrity Agreement, while submitting the tender/bid, IMPCL/HLL shall have unqualified, absolute and unfettered right to disqualify the tenderer/bidder and reject the tender/bid in accordance with terms and conditions of the tender/bid.

Yours faithfully

(Duly authorized signatory of the Bidder)

To be signed by the bidder and same signatory competent / authorised to sign the relevant contract on behalf of IMPCL/HLL.

INTEGRITY AGREEMENT

This Integrity Agreement is made at on thisday of 20.....

BETWEEN

Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL) represented through the Managing Director, Indian Medicines Pharmaceutical Corporation Ltd., Nirman Bhawan, New Delhi-110011 (Hereinafter referred as the '**Principal/Owner**', which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

AND

.....(Name and Address of the Individual/ firm/Company) through..... (Hereinafter referred to as the (Details of duly authorized signatory) '**Bidder/Contractor**' and which expression shall unless repugnant to the meaning or context hereof include its successors and permitted assigns)

Preamble

WHEREAS the Principal/Owner has floated the Tender (NIT No. Tender No. HLL/IDN/IMPCL/HVAC/2013-14/03/R) (hereinafter referred to as "**Tender/Bid**") and intends to award, under laid down organizational procedure, contract for the Tenders for Modernization of IMPCL Mohan -Package III- HVAC works etc. , hereinafter referred to as the "**Contract**".

AND WHEREAS the Principal/Owner values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/transparency in its relation with its Bidder(s) and Contractor(s).

AND WHEREAS to meet the purpose aforesaid both the parties have agreed to enter into this Integrity Agreement (hereinafter referred to as "**Integrity Pact**" or "**Pact**"), the terms and conditions of which shall also be read as integral part and parcel of the Tender/Bid documents and Contract between the parties.

NOW, THEREFORE, in consideration of mutual covenants contained in this Pact, the parties hereby agree as follows and this Pact witnesses as under:

Article 1: Commitment of the Principal/Owner

- 1) The Principal/Owner commits itself to take all measures necessary to prevent corruption and to observe the following principles:
 - (a) No employee of the Principal/Owner, personally or through any of his/her family members, will in connection with the Tender, or the execution of the Contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - (b) The Principal/Owner will, during the Tender process, treat all Bidder(s) with equity and reason. The Principal/Owner will, in particular, before and during the Tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the Tender process or the Contract execution.

- (c) The Principal/Owner shall endeavour to exclude from the Tender process any person, whose conduct in the past has been of biased nature.
- 2) If the Principal/Owner obtains information on the conduct of any of its employees which is a criminal offence under the Indian Penal code (IPC)/Prevention of Corruption Act, 1988 (PC Act) or is in violation of the principles herein mentioned or if there be a substantive suspicion in this regard, the Principal/Owner will inform the Chief Vigilance Officer and in addition can also initiate disciplinary actions as per its internal laid down policies and procedures.

Article 2: Commitment of the Bidder(s)/Contractor(s)

- 1) It is required that each Bidder/Contractor (including their respective officers, employees and agents) adhere to the highest ethical standards, and report to the Government / Department all suspected acts of **fraud or corruption or Coercion or Collusion** of which it has knowledge or becomes aware, during the tendering process and throughout the negotiation or award of a contract.
- 2) The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the Tender process and during the Contract execution:
 - a) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal/Owner's employees involved in the Tender process or execution of the Contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the Tender process or during the execution of the Contract.
 - b) The Bidder(s)/Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to cartelize in the bidding process.
 - c) The Bidder(s)/ Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further the Bidder(s)/Contract(s) will not use improperly, (for the purpose of competition or personal gain), or pass on to others, any information or documents provided by the Principal /Owner as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
 - d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the names and addresses of agents/representatives in India, if any. Similarly Bidder(s)/ Contractor(s) of Indian Nationality shall disclose names and addresses of foreign agents/ representatives, if any. Either the Indian agent on behalf of the foreign principal or the foreign principal directly could bid in a tender but not both. Further, in cases where an agent participate in a tender on behalf of one manufacturer, he shall not be allowed to quote on behalf of another manufacturer along with the first manufacturer in a subsequent/parallel tender for the same item.
 - e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the Contract.

- 3) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.
- 4) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm indulge in fraudulent practice means a willful misrepresentation or omission of facts or submission of fake/forged documents in order to induce public official to act in reliance thereof, with the purpose of obtaining unjust advantage by or causing damage to justified interest of others and/or to influence the procurement process to the detriment of the Government interests.
- 5) The Bidder(s)/Contractor(s) will not, directly or through any other person or firm use Coercive Practices (means the act of obtaining something, compelling an action or influencing a decision through intimidation, threat or the use of force directly or indirectly, where potential or actual injury may befall upon a person, his/ her reputation or property to influence their participation in the tendering process).

Article 3: Consequences of Breach

Without prejudice to any rights that may be available to the Principal/Owner under law or the Contract or its established policies and laid down procedures, the Principal/Owner shall have the following rights in case of breach of this Integrity Pact by the Bidder(s)/Contractor(s) and the Bidder/ Contractor accepts and undertakes to respect and uphold the Principal/ Owner's absolute right:

- 1) If the Bidder(s)/Contractor(s), either before award or during execution of Contract has committed a transgression through a violation of Article 2 above or in any other form, such as to put his reliability or credibility in question, the Principal/Owner after giving 14 days' notice to the contractor shall have powers to disqualify the Bidder(s)/Contractor(s) from the Tender process or terminate/determine the Contract, if already executed or exclude the Bidder/Contractor from future contract award processes. The imposition and duration of the exclusion will be determined by the severity of transgression and determined by the Principal /Owner. **Such exclusion may be forever or for a limited period as decided by the Principal /Owner.**
- 2) **Forfeiture of EMD/Performance Guarantee/Security Deposit:** If the Principal / Owner has disqualified the Bidder(s) from the Tender process prior to the award of the Contract or terminated/determined the Contract or has accrued the right to terminate/determine the Contract according to Article 3(1), the Principal/ Owner apart from exercising any legal rights that may have accrued to the Principal/ Owner, may in its considered opinion forfeit the entire amount of Earnest Money Deposit, Performance Guarantee and Security Deposit of the Bidder/ Contractor.
- 3) **Criminal Liability:** If the Principal/Owner obtains knowledge of conduct of a Bidder or Contractor, or of an employee or a representative or an associate of a Bidder or Contractor which constitutes corruption within the meaning of IPC Act, or if the Principal/ Owner has substantive suspicion in this regard, the Principal/Owner will inform the same to law enforcing agencies for further investigation.

Article 4: Previous Transgression

- 1) The Bidder declares that no previous transgressions occurred in the last 5 years with any other Company in any country confirming to the anticorruption approach or with Central Government or State Government or any other Central/State Public Sector Enterprises in India that could justify his exclusion from the Tender process.
- 2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the Tender process or action can be taken for banning of business dealings/ holiday listing of the Bidder/ Contractor as deemed fit by the Principal/ Owner.
- 3) If the Bidder/Contractor can prove that he has resorted / recouped the damage caused by him and has installed a suitable corruption prevention system, the Principal/Owner may, at its own discretion, revoke the exclusion prematurely.

Article 5: Equal Treatment of all Bidders/Contractors/Subcontractors

- 1) The Bidder(s)/Contractor(s) undertake(s) to demand from all subcontractors a commitment in conformity with this Integrity Pact. The Bidder/Contractor shall be responsible for any violation(s) of the principles laid down in this agreement/Pact by any of its Sub- contractors/sub-vendors.
- 2) The Principal/Owner will enter into Pacts on identical terms as this one with all Bidders and Contractors.
- 3) The Principal/Owner will disqualify Bidders, who do not submit, the duly signed Pact between the Principal/Owner and the bidder, along with the Tender or violate its provisions at any stage of the Tender process, from the Tender process.

Article 6- Duration of the Pact

This Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 12 months after the completion of work/handing over of works under the contract or till the continuation of defect liability period and Operation & Maintenance period, whichever is more and for all other bidders, till the Contract has been awarded.

If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged/determined by the Competent Authority, IMPCL/HLL.

Article 7- Other Provisions

- 1) This Pact is subject to Indian Law, place of performance and jurisdiction in the National Capital Territory of DELHI.
- 2) Changes and supplements need to be made in writing. Side agreements have not been made.
- 3) If the Contractor is a partnership or a consortium, this Pact must be signed by all the partners or by one or more partner holding power of attorney signed by all partners and consortium members. In case of a Company, the Pact must be signed by a representative duly authorized by board resolution.
- 4) Should one or several provisions of this Pact turn out to be invalid; the remainder of this Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.
- 5) It is agreed term and condition that any dispute or difference arising between the parties with regard to the terms of this Integrity Agreement / Pact, any action

taken by the Owner/Principal in accordance with this **Integrity Agreement/ Pact or interpretation thereof shall not be subject to arbitration.**

Article 8- LEGAL AND PRIOR RIGHTS

All rights and remedies of the parties hereto shall be in addition to all the other legal rights and remedies belonging to such parties under the Contract and/or law and the same shall be deemed to be cumulative and not alternative to such legal rights and remedies aforesaid. For the sake of brevity, both the Parties agree that this Integrity Pact will have precedence over the Tender/Contact documents with regard any of the provisions covered under this Integrity Pact.

IN WITNESS WHEREOF the parties have signed and executed this Integrity Pact at the place and date first above mentioned in the presence of following witnesses:

..... (For and on behalf of Principal/Owner)

..... (For and on behalf of Bidder/Contractor)

WITNESSES:

1..... (signature, name and address)

2..... (signature, name and address)

Place:

Date:

SECTION-IV **SCOPE OF WORK**

1. Project constitutes “Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttarakhand via Ram Nagar: Package III- HVAC works ”. The Project site is available and located **Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt Almora, Uttarakhand via Ram Nagar.**
2. The Contractor is to build as per detailed engineering design and drawing prepared separately.
3. The activities to be carried out for the completion of the Project shall include the following and any additional activities incidental to these:
 - i. Subject works as specified.
 - ii. Services as per drawings
 - iii. Co-ordination with concerned statutory authorities for obtaining all approvals / permissions / NOCs/ permits of the statutory / local / governmental agencies required in relation with the subject work only.
 - iv. Submission of the completion (i.e. ‘as-built’) drawings and other related documents, both a hard copy and the soft copy in Auto CAD pertaining to all the components of the building e.g. HVAC etc.
 - v. Co-ordination with statutory authorities/ local bodies/Governmental agencies for obtaining occupancy certificate and related NOC’s from statutory/ local/ governmental agencies related to service connections required in relation with the subject work only.
 - vi. Payments for statutory approvals as per the approved norms will be reimbursed by the IMPCL/HLL as per actual payments on production of payment receipts.
 - vii. On account of security consideration and residential areas in the vicinity, there could be some restrictions on the working hours, movement of vehicles for transportation of materials and location of labour camp. The contractor shall be bound to follow all such restrictions and adjust the programme for execution of work accordingly.
 - viii. The contractor has to ensure co-ordination with the authorities to maintain smooth disruption free working during the execution of subject work. This may require working rescheduling the normal working hours, working in restricted period etc. Nothing extra shall be payable on this account.
 - ix. He shall also ensure that all work sites within the complex are properly cordoned off by means of barricades and screens upto a height of 3.0 m above ground level. The contractor shall use painted CGI sheets which are in good condition mounted on steel props.
 - x. Stacking of materials and excavated earth including its disposal shall be done as per the directions of the Engineer-in-Charge. Double handling of materials or excavated earth if required shall have to be done by the contractor at his own cost.

4. Approvals Required

The Contractor shall co-ordinate with relevant statutory authorities for obtaining all necessary approvals from Municipal and other local bodies including Municipal bodies in relation with subject work only. Statutory payment on this account will be reimbursed by the client at actual on production of payment receipts.

The approvals shall include the following in addition to any other approvals which may be required for the project.

- Installation Permit if required
- NOC from Chief Fire Officer if required for subject work only

Client/HLL may, at the written request of the Contractor, assist him in obtaining the approvals from relevant authorities. However any such request by the Contractor shall not bind the Client/HLL in any manner.

SECTION V

EVALUATION PROCESS

5.1 Evaluation Process:

The Bids will be evaluated in the following stages:

- i. Stage 1- Technical Evaluation
- ii. Stage 2- Financial Evaluation.

5.2 Stage 1-Technical Evaluation

- i. The technical Bids shall be evaluated as per criteria mentioned in the NIB.
- ii. The technical Bid shall be evaluated by the Evaluation Committee based on the qualification criteria laid down. The financial Bid of only those Bidders who are technically qualified shall be opened.
- iii. The financial Bids of Bidders whose technical Bids are found unacceptable shall be returned unopened.
- iv. IMPCL/HLL shall notify all the technically qualified Bidders of their technical qualification indicating the date, time and venue for opening of financial Bids.

5.3 Stage II-Financial Evaluation

- i. The financial bid of all the eligible bidders i.e. whose technical bids are found in order, shall be opened the decision of IMPCL/HLL will be final and binding.
- ii. The date and time of opening of financial bids shall be decided by the client/HLL which will be intimated to all eligible bidders.
- iii. Evaluation Committee shall open the financial Bid of the technically qualified Bidders in the presence of the Bidders/their authorized representative, who choose to attend, at the scheduled date and time.
- iv. On opening the financial Bids, the Evaluation Committee shall read out the financial Bid to all the Bidders and note the same.
- v. The Evaluation Committee shall correct arithmetic errors, if any and sign the same. If any discrepancy is found between the amount in figures and the amount in words, the amount in words shall prevail, for calculating/ correcting amounts of such items.
- vi. Only rates quoted shall be considered. Any tender containing percentage below/above the rates quoted is liable to be rejected. Rates quoted by the contractor in item rate tender in figures and words shall be accurately filled in so that there is no discrepancy in the rates written in figures and words. However, if a discrepancy is found, the rates, which correspond with the amount worked out by the contractor, shall, unless otherwise proved, be taken as correct. If the amount of an item is not worked out by the contractor or it does not correspond with the rates written either in figures or in words then the rates quoted by the contractor in words shall be taken as correct. Where the rates quoted by the contractor in figures and in words tally but the amount is not worked out correctly, the rates quoted by the contractor will, unless otherwise proved, be taken as correct and not the amount.
- vii. Use of correcting fluid, anywhere in tender document is not permitted. Such tender is liable for rejection.

- viii. In event no rate has been quoted for any item(s), leaving space both in figures(s), word(s), and amount blank, it will be presumed that the contractor has included the cost of this/these item(s), in other items and rate for such item(s) will be considered as zero and work will be required to be executed accordingly.
- ix. All rates shall be quoted on the tender form. The amount for each item should be worked out and requisite totals given. Special care should be taken to write the rates in figures as well as in words and the amount in figures only, in such a way that interpolation is not possible. The total amount should be written both in figures and in words. In case of figures, the word 'Rs.' should be written before the figure of rupees and word 'P' after the decimal figures, e.g. 'Rs. 2.15 P' and in case of words, the word, 'Rupees' should precede and the word 'Paise' should be written at the end. Unless the rate is in whole rupees and followed by the word 'only' it should invariably be upto two decimal places. While quoting the rate in schedule of quantities, the word 'only' should be written closely following the amount and it should not be written in the next line.
- x. In the case of any tender where unit rate of any item/items appear unrealistic, such tender will be considered as unbalanced and in case the tender is unable to provide satisfactory explanation, such a tender is liable to be disqualified and rejected.
- xi. All the financial Bids shall be ranked according to the financial Bid with the Bidder quoting the least amount ranked L1, Bidder quoting next higher figure as L2 and so on.
- xii. L1 will be treated as Successful Bidder and his offer will be processed further.

5.4 Letter of Award:

The Successful Bidder would be notified in writing by IMPCL/HLL by issuing the Letter of Award (LOA) in favour of the successful Bidder.

Annexure -I Checklist

CHECK LIST OF DOCUMENTS TO BE SUBMITTED WITH THE BID

TECHNICAL PACKAGE - Part 1			
Sl. No.	Name of Document	No. of sets to be submitted	No. of sets submitted
1	Form of Bid and Appendix thereof (Form A)	Original	
2	Bid Security (Form B) in separate sealed envelope	Original & Copy	
3	Power of attorney for individuals signing on behalf of Bidders (Form E)	Original & Copy	
4	Initialed BID documents	Original	
TECHNICAL PACKAGE - Part 2			
1	Form “T-1” (Financial Information)		
2	Form “T-2” (Details of works..... as on NIT Publishing date)		
3	Form “T-3” (Project under execution of award)		
4	Form “T-4” (Performance Report of Works)		
5	Form “T-5” (Structure and Organization)		
6	Form “T-6” (Details of Technical & Administrative personnel)		
7	Form “T-7” (Details of Construction Plant for carrying out the work)		
8	Form T-8 Criteria for Evaluation of Performance		
FINANCIAL PACKAGE COMPRISING OF:			
1	Financial bid in separate sealed cover		
Note:- i. Package-I: Number of sets to be submitted under technical package: Part-1 & Part-2 ii. Package-II : Financial Package shall be “Original & Copy” i.e. two numbers.			

Form A-Form of Bid and AppendixFORM OF BID

Name of the Work: Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works.

To
Managing Director,
Indian Medicines Pharmaceutical Corporation Ltd.
C/o
Vice President (ID)
HLL Lifecare Ltd
B14A, Sector 62,
NOIDA -201307

Sub : Submission of Proposal

Having visited the Site, ascertained the Site conditions and examined the General Conditions of Contract as well as Special Conditions of Contract, Notice Inviting Bids, Instructions to Bidders etc. and addenda for the above project, we the undersigned, are pleased to submit our technical and financial Bid along with relevant documents.

1. We acknowledge that the Appendix forms an integral part of the Bid.
2. While preparing this Bid, we have gathered our own information and conducted our own inquiry/survey to our satisfaction and we did not rely solely on the information provided in this BID. We shall not hold IMPCL/HLL responsible on any account in this regard.
3. We undertake, if our Bid is accepted, we shall commence the works within the stipulated time and to complete the whole of the works comprised in the Contract within the stipulated time calculated from the start date.
4. If our Bid is accepted, we will furnish a bank guarantee as Performance security for the due performance of the Contract. The amount and form of such guarantee or bond will be in accordance with as given in the General Conditions of the Contract.
5. We are aware that in the event of delay in execution of the Project, beyond the agreed timelines due to reasons attributable to us, liquidated damages shall be recovered from us as per the conditions of the contract.
6. Our Bid is valid for your acceptance for a period of 180 days from the last date of submission of the Bid or any extension thereto by us.
7. We agree to the General Conditions of Contract and Special Conditions of Contract and the terms and conditions mentioned in the NIB.
8. We declare and confirm that before submission of this Bid no agent, middleman or any intermediary has been, or will be engaged to provide any services, or any other item of work related to the award of this Contract. We further confirm and declare that

no agency commission or any payment, which may be construed as an agency commission has been, or will be, paid and that the Bid price does not include any such amount. We acknowledge the right of IMPCL/HLL to declare our Bid to be non-compliant and if the Contract has been awarded to declare the Contract null and void, if it finds anything contrary to this declaration.

9. We understand that you are not bound to accept the lowest or any Bid you may receive.
10. If our Bid is accepted we understand that we are to be held solely responsible for the due performance of the Contract.

11. We enclose;

- a. All documents as per the checklist
- b. Bank guarantee for Rs _____ (Rupees _____ only) issued by _____ (name of the bank) valid until _____ towards EMD/Bid Security.

- Note:
- i. The Appendix forms part of the Bid
 - ii. Bidders are required to fill up all the blank spaces in this form of Bid and

Appendix.

Dated this.....day of.....**2014**

Signature

Name..... in the capacity of

duly authorized to sign Bids for and on behalf of.....

Address

.....

.....

Witness – Signature

Name

Address

.....

.....

Appendix**Form A****APPENDIX TO THE FORM OF BID**

i.	Amount of bank guarantee as Performance Guarantee to be deposited by successful bidder	5 percent of the Total Contract Price to be deposited as per Clause 1 of GCC.
ii.	Amount of Security Deposit to be recovered from bills of the successful bidder	5% to be retained from the running bills as per Clause 1A of GCC.
iii.	Date for commencement of work	30 days from letter of award.
iv.	Time for completion	05 Months from date of Commencement of work and thereafter 12 months of Defect Liability Period
v.	Amount of liquidated damages in case of extension of completion date due to delays by the Contractor	As given in General Conditions of Contract
vi.	Defects Liability Period from the date of issue of Taking-over certificate / Completion Certificate	12 months
vii.	Period of validity of Performance Security	180 days beyond Defects Liability Period

Signature
(Authorized Signatory)

Date

Place

.....

Name

Address

Form BFORMAT FOR EMD (BID SECURITY)

KNOW ALL MEN by these presents that we (Name of Bank) having our registered office at (Name of country) (hereinafter called “the Bank”) are bound unto HLL Lifecare Limited, B-14A, Sector-62, Noida-201307 U.P., in the sum of Rs. _____ for which payment will and truly to be made to the said Client (IMPCL /HLL), the bank binds itself, its successors and assigns by these presents.

WHEREAS.....(Name of Bidder) (hereinafter called “the Bidder”) has submitted its Bid dated _____ for **“Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works”**

AND WHEREAS the Bidder is required to furnish a bank guarantee for the sum of Rs. _____ (Rupees _____ Only) as Bid Security against the Bidder’s offer as aforesaid.

AND WHEREAS _____ (Name of Bank) have, at the request of the Bidder, agreed to give this guarantee as hereinafter contained.

1. We further agree as follows :

- 1.1 That the client (IMPCL /HLL), may without affecting this guarantee grant time or other indulgence to or negotiate further with the Bidder in regard to the conditions contained in the said Bid and thereby modify these conditions or add thereto any further conditions as may be mutually agreed upon between the client (IMPCL /HLL) and the Bidder.
- 1.2 That the guarantee herein before contained shall not be affected by any change in the constitution of our bank or in the constitution of the Bidder.
- 1.3 That any account settled between the client (IMPCL /HLL) and the Bidder shall be conclusive evidence against us of the amount due hereunder and shall not be questioned by us.
- 1.4 That this guarantee commences from the date hereof and shall remain in force till _____ (date to be filled up)
- 1.5 That the expression ‘the Bidder’ and ‘the Bank’ herein used shall, unless such an interpretation is repugnant to the subject or context, include their respective successors and assigns.

2. The conditions of this obligation are :

- a) if the Bidder withdraws his Bid during the period of Bid Validity, or
- b) if the Bidder does not accept the correction of his Bid Price as corrected by the evaluation committee
- c) if the Bidder having been notified of the acceptance of his Bid by the client (IMPCL /HLL) during the period of Bid Validity :

- i. fails or refuses to furnish the required Performance Security for the amount equal to 5% of the Contract price and/ or
- ii. fails or refuses to enter into a Contract within 30 days of issue of Letter of Award by the Client (IMPCL/HLL)

We undertake to pay to the client (IMPCL/HLL) up to the above amount upon receipt of his first written demand, without the client (IMPCL/HLL) having to substantiate his demand provided that in his demand the client (IMPCL/HLL) will note that the amount claimed by him is due to him owing to the occurrence of any one or more of the conditions (a), (b), (c) mentioned above, specifying the occurred condition or conditions.

	Signature of Authorized Official of the Bank
Signature of the witness	Name of Official Designation
Name of the Witness	Stamp/Seal of the Bank
Address of the Witness	

Form-C**FORM OF PERFORMANCE SECURITY BANK GUARANTEE**

This deed of guarantee made this day of _____ between Bank of _____ (hereinafter called the “Bank”) of the one part, and INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED(IMPCL MOHAN) A GOVERNMENT OF INDIA ENTERPRISE under Department of “AYUSH”, MoHFW Government of India, of the other part.

Whereas IMPCL/HLL has awarded the Contract **for** “Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works ” to _____ (Name of the Contractor)

AND WHEREAS the Contractor is bound by the said Contract to submit to IMPCL/HLL a Performance Security for a total amount of Rs. _____ (Rupees _____ only) (Amount in figures and words).

1. Now we the undersigned _____ (Name of the Bank) being fully authorized to sign and to incur obligations for and on behalf of and in the name of _____ (Full name of Bank), hereby declare that the said Bank will guarantee IMPCL/HLL the full amount of Rs. _____ (Rupees _____ only) (Amount in figures and Words) as stated above.
2. After the Contractor has signed the afore mentioned Contract with IMPCL/HLL, the Bank is engaged to pay IMPCL/HLL, any amount up to and inclusive of the aforementioned full amount upon written order from IMPCL/HLL to indemnify IMPCL/HLL for any liability of damage resulting from any defects or shortcomings of the Contractor or the debts he may have incurred to any parties involved in the works under the Contract mentioned above, whether these defects or shortcomings or debts are actual or estimated or expected. The Bank will deliver the money required by IMPCL immediately on demand without delay without reference to the Contractor and without the necessity of a previous notice or of judicial or administrative procedures and without it being necessary to prove to the Bank the liability or damages resulting from any defects or shortcomings or debts of the Contractor. The Bank shall pay to IMPCL/HLL any money so demanded not withstanding any dispute/disputes raised by the Contractor in any suit or proceedings pending before any Court, Tribunal or Arbitrator/s relating thereto and the liability under this guarantee shall be absolute and unequivocal.
3. This guarantee is valid till _____ (date to be mentioned) (six months beyond the end of expected Defects Liability Period or the extended period, thereof)

At any time during the period in which this guarantee is still valid, if IMPCL/HLL agrees to grant a time extension to the Contractor or if the Contractor fails to

complete the Works within the time of completion as stated in the Contract, or fails to discharge himself of the liability or damages or debts as stated under Para 2, above, it is understood that the Bank will extend this Guarantee under the same conditions for the required time on demand by IMPCL/HLL and at the cost of the Contractor.

4. The Guarantee shall be interpreted in accordance with the laws of India.
5. The Bank represents that this Bank Guarantee has been established in such form and with such content that is fully enforceable in accordance with its terms as against the Guarantor Bank in the manner provided herein.
6. This Bank Guarantee shall not be affected in any manner by reason of merger, amalgamation, restructuring or any other change in the Constitution of the guarantor Bank or of the Contractor.
7. The neglect or forbearance of IMPCL/HLL in enforcement of payment of any moneys, the payment whereof is intended to be hereby secured or the giving of time by IMPCL/HLL for the payment hereof shall in no way relieve the bank of their liability under this deed.
8. The expressions "IMPCL/HLL", "the Bank" and "the Contractor" herein before used shall include their respective successors and assigns.

In witness where of I/We of the bank have signed and sealed this guarantee on the ---
----- day of ----- (Month) **2014** being herewith duly authorized.

For and on behalf of

The.....Bank.

Signature of authorized bank official

Name:

Designation:

Stamp/Seal of the Bank:

Signed, sealed and delivered for and on behalf of the Bank by the above
named _____ in the presence of :

Witness 1

Signature

Name

Address

Witness 2

Signature

Name

Address

Form D**(To be furnished on a Non Judicial Stamp Paper of appropriate value)****FORM OF CONTRACT AGREEMENT**

This agreement is made at **New Delhi** on the ---- day of ----- 2014 between Indian Medicines Pharmaceutical Corporation Ltd hereinafter called “IMPCL”/ HLL Lifecare Limited hereinafter called “HLL” on the **First Part.**

Second Part

M/s ----- a Company incorporated under the Companies Act 1956 having Head Office at -----, (hereinafter called the “Contractor” which expression unless repugnant to the context shall mean and include its successors-in-interest assigns etc.) of the **Second Part.**

Whereas IMPCL is desirous that certain works should be executed, for “**for “Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt Almora, Uttarakhand via Ram Nagar: Package III- HVAC works”** hereinafter called the “The Project” and has accepted a Tender submitted by the contractor for the execution and completion of such works as well as guarantee of such works and the remedying of defects therein. NOW THIS AGREEMENT WITNESSETH as follows:

In this agreement words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

The following documents shall be deemed to form and be read and construed as part of this agreement Viz.

- 2.1 **Volume – I (NIT & ITB)**
 - Notice Inviting Tender
 - Instruction to Bidders
 - 2.2 **Volume- II (GCC and SCC)**
 - General Conditions of Contract(GCC)
 - Special Conditions of Contract (SCC)
 - 2.3 **Volume – III (TS)**
 - Technical Specifications(TS)
 - 2.4 **Volume – IV (BOQ)**
 - (Financial bid and Bill of Quantities)
 - 2.5 **All the correspondence till award of contract i.e. addendum, LOA etc.**
 - 2.6 **Technical and Financial bids submitted by bidder.**
3. In consideration of the payment to be made by IMPCL/HLL to the Contractor as hereinafter mentioned, the Contractor hereby covenants with MoHFW to execute and

complete the Project **“for** “Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works ”and remedy and defects therein in conformity in all respects with the provisions of the Contract.

IMPCL hereby covenants to pay the Contractor in consideration of the execution and completion of the Project and the remedying of defects therein, the total Contract Price of Rs. -----

----- only) being the sum stated in the Letter of Award (LOA) subject to such additions thereto or deductions there from as may be made under the provisions of the Contract at the times and in the manner prescribed by the Contract.

4. OBLIGATION OF THE CONTRACTOR

The Contractor shall ensure full compliance with tax laws of India with regard to this Contract and shall be solely responsible for the same. The contractor shall keep IMPCL/HLL fully indemnified against liability of tax, interest, penalty etc, of the Contractor in respect thereof, which may arise.

IN WITNESS OF WHEREOF the parties hereto have caused their respective common seals to be hereunto affixed / (or have hereunto set their respective hands and seals) the day and year first above written.

For and on behalf of the Contractor

For and on behalf of IMPCL/HLL

Signature of the authorized official
official

Signature of the authorized

Name of the Contractor

Name of the authorized official

Stamp / Seal of the Contractor
official

Stamp / Seal of authorized

SIGNED, SEALED AND DELIVERED

By the said

By the Said

On behalf of the Contractor in
the presence of:

On behalf of IMPCL in
the Presence of

Witness _____

Witness _____

Name _____

Name _____

Address _____

Address _____

Form EFormat for Power of Attorney for authorized signatory**FORMAT FOR POWER OF ATTORNEY FOR SIGNING OF PROPOSAL**

Know all men by these presents,
We.....(Name of the Tenderer and address of
their registered office) do hereby constitute, appoint and authorize Mr /
Ms.....(name and residential address of Power of Attorney
holder) who is presently employed with us and holding the position of
.....

As our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to our Bid for the Project and submission of all documents and providing information / responses to IMPCL/HLL, representing us in all matters before IMPCL/HLL, and generally dealing with IMPCL/HLL in all matters in connection with our proposal for the said Project.

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

Signature:

Name and Designation:

FORM G**LITIGATION DETAILS****Court cases/ Arbitration**

Bidder should provide information on any history of litigation or arbitration resulting from contracts executed in the last five years or currently under execution.

Name of Bidder							
Year	Name of Work	Name of Client with Address	Title of the Court case / Arbitration	Detail of the Court case / Arbitration	Status (Pending/ Decided)	Disputed amount (current value in INR)	Actual Awarded Amount (in INR)

Authorized Signature of bidder with stamp

FORM H
(Not Applicable)

UNDERTAKING

We _____ do hereby undertake to engage a specialized agency after approval of IMPCL/HLL Lifecare Limited for undertaking the execution of _____ work components of **“for “Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works”** whose minimum qualifications shall be as under:

- A. Average annual financial turnover shall be at least 50 % of the estimated cost during the immediate last three consecutive financial years i.e, 2010-11, 2011-12, 2012-13 of respective work components.
- B. Experience of having successfully completed work components during the last 7 years ending last day of the month previous to the one in which applications are invited:-
 - Three similar completed works each costing not less than the amount equal to 40% of the estimated cost put to tender (rounded to nearest Rs. 10 Lac).
 - Or
 - Two similar completed works each costing not less than the amount equal to 60% of the estimated cost put to tender (rounded to nearest Rs. 10 Lac).
 - Or
 - One similar completed work of cost not less than the amount equal to 80% of the estimated cost put to tender (rounded to nearest Rs. 10 Lac).
- C. The specialized agencies shall have a valid license from competent authority in the respective field.
- D. I/We shall be solely responsible for quality and successful execution/performance of the completed works by such agencies.
- E. I shall enter into work specific agreement/ MoU with the agency/ agencies approved by IMPCL/HLL, supply a copy of such MoU/ Agreement to IMPCL/HLL and retain them till completion of works in the said field.

Authorized Signature of bidder with stamp

Form K
AFFIDAVIT

I, the undersigned, do hereby certify that the statements made in the required attachments are true and correct.

The undersigned also hereby certifies that our firm M/S have neither abandoned any contract awarded to us nor such work have been rescinded, during last five years prior to date of application.

The undersigned hereby authorize (s) and request (s) any bank , person, firm or corporation to furnish pertinent information deemed necessary and requested by the IMPCL/HLL to verify this statement or regarding my (our) competence and general reputation.

The under signed understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the IMPCL/HLL.

Signed by the Authorized officer of the firm

FORM 'T-1'**FINANCIAL INFORMATION**

- 1. Financial Analysis**-Details to be furnished duly supported by figures in balance sheet/ profit & loss account for the last five years duly certified by the Chartered Accountant, as submitted by the applicant to the Income tax Department (Copies to be attached) and duly certified by the Chartered Accountant mentioning the membership number issued by ICAI along with full address.
- i) Gross Annual Turnover on construction works** for last five years ending 31.03.2013
- ii) Profit / Loss** for last five years ending 31.03.2013

Financial arrangements for carrying out the proposed work. Solvency certificate from Bankers of the **bidder in the prescribed Form "T-1 B"**.

Signature of Chartered
Accountant with Seal

Signature of Applicant

FORM 'T-1 B'**FORM OF BANKERS' CERTIFICATE FROM A SCHEDULED BANK**

This is to certify that to the best of our knowledge and information that M/s./Shri having marginally noted address, a customer of our bank are/is respectable and can be treated as good for any engagement upto a limit of Rs. (Rupees.....). This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature)
For the Bank

NOTE:-

- (1) Bankers certificates should be on letter head of the Bank, sealed in cover addressed to tendering authority.
- (2) In case of partnership firm, certificate should include names of all partners as recorded with the bank.

FORM - 'T - 2'**DETAILS OF WORKS OF SIMILAR NATURE COMPLETED**

**DURING THE LAST SEVEN YEARS ENDING LAST DAY OF THE
MONTH PREVIOUS TO THE ONE IN WHICH THE BIDS ARE
INVITED**

Sl. No	Name of Work/ Project& location	Owner of sponsoring Organization	Cost of Work In Lakh)*	Date of Commencement As per contract	Stipulated Date of completion	Actual date of completion	Litigation/ Arbitration Pending/ in Progress with details**	Name & address/ Telephone No. of officer to whom reference may be made	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

* Indicate gross amount claimed and amount awarded by the Arbitrator.

** Copy of work orders of the above works should also be submitted

Signature of Applicant

FORM 'T - 3'**PROJECT UNDER EXECUTION OR AWARDED**

Sl. No	Name of Work/ Project & location	Owner of sponsoring Organization	Cost of Work	Date of Commencement As per contract	Stipulated Date of completion	Up-to-date Percentage Progress of work	Slow Progress, If any, & reasons thereof	Name & address/ Telephone No. of officer to whom reference may be made	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Certified that above lists of works is complete and no work has been left out and that the information given is correct to my knowledge and belief.

Signature of Applicant

FORM 'T - 4'

**PERFORMANCE REPORT OF WORKS from Owner/Sponsoring organization/
Department
REFERRED TO IN FORM "T-2" TO "T-3"**

01.	Name of work / Project & Location	
02.	Agreement No.	
03.	Awarded Cost	
04.	Executed Cost	
05.	Date of Start	
06.	Date of completion :	
	i) Stipulated date of completion	
	ii) Actual date of completion	
07.	Amount of compensation levied for delayed completion, if any	
08.	Amount of reduced rate items, if any	
09.	Structures of Building Executed	
	a) No of Stories	
	b) Total height of building	
	c) Type of Structure	
10	Scope of Work	
	HVAC Works	
11.	Performance Report :	
	a) Qualify of work	Very Good / Good / Fair / Poor
	b) Financial soundness	Very Good / Good / Fair / Poor
	c) Technical Proficiency	Very Good / Good / Fair / Poor
	d) Resourcefulness	Very Good / Good / Fair / Poor
	e) General behavior	Very Good / Good / Fair / Poor

Dated: _____

Signatures of

Authorized Signatory

Official Seal of owner/sponsoring organization/ Department

Form 'T – 5'
STRUCTURE & ORGANIZATION

1.	Name & Address of the applicant	
2.	Telephone No. / Telex / Fax No.	
3.	Legal status of the applicant (attach copies of original document defining the legal status)	
	a) An Individual	
	b) A proprietary firm	
	c) A firm in partnership	
	d) A limited company or Corporation	
4.	Particulars of registration with various Government bodies (<i>attach attested photocopy</i>)	
5.	<u>Organization / Place of Registration :</u>	
	1.	
	2.	
	3.	
6.	Particulars of registration with (<i>attach attested photocopy</i>)	
	1. EPFO	
	2. ESIC	
7.	Names and Titles of Directors & Officers with designation to be concerned with this work	
8.	Designation of individuals authorized to act for the organization.	
9.	Was the applicant ever required to suspend construction for a period of more than six months continuously after commencement? If so, give the name of the project and reasons of suspension of work.	
10.	Has the applicant or any constituent partner in case of partnership firm, ever abandoned the awarded work before its completion? If so, give name of the project and reasons for abandonment.	
11.	Has the applicant or any constituent partner in case of partnership firm, ever been debarred/ black-listed for Bidding in any organization at any time? If so, give details.	
12.	Has the applicant or any constituent partner in case of partnership firm, ever been convicted by a Court of Law? If so, give details.	
13.	In which field of Civil Engineering construction the applicant has specialization and interest?	
14.	Any other information considered necessary but not included above.	

Signature of Applicant

Form 'T – 6'

**DETAILS OF TECHNICAL & ADMINISTRATIVE
PERSONNEL PROPOSED TO BE EMPLOYED FOR THE WORK**

Sl. No	Designation	Total Number	Number Available F or this Work	Name	Qualification	Professional experience and details of work carried out	How these would be involved in this work	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)

FORM 'T - 7'
(Not applicable)

**DETAILS OF CONSTRUCTION PLANT AND EQUIPMENT OWNED & LIKELY TO
BE USED IN CARRYING OUT THE WORK**

Sl.No.	Name of Equipment	Nos.	Capacity of Type	Age	Condition	Ownership Status			Current Location	Remarks
						Presently owned	Leased	To be Purchase		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Pneumatic equipment :										
1	Air compressors (diesel)									
Dewatering equipment										
1	Pump (diesel)									
2	Pump (electric)									
Power equipment :										
1	Diesel generators									
Any other equipment/s : Like crane, tower lifts etc										

(Signature of Bidder)

FORM 'T-8'**CRITERIA FOR EVALUATION OF THE PERFORMANCE OF CONTRACTORS
FOR PRE- ELIGIBILITY**

ATTRIBUTES			EVALUATION				
(a)	Financial Strength (20 Marks)		60% marks for minimum eligibility criteria				
	Average Annual Turnover (16 Marks)		100% marks for twice the minimum eligibility criteria or more				
	Solvency Certificate (4 Marks)		In between (i) & (ii) – on pro rata basis				
(b)	Experience of similar class of works (25 marks)		60% marks for minimum eligibility criteria				
			100% marks for twice the minimum eligibility criteria or more				
			In between (i) & (ii) – on pro rata basis				
(c)	Performance on works (Time over run) (25 Marks)						
	Parameter	Calculation for Point	Score			Maximum Points	
	If TOR=		1.0	1.5	2.0	>2.50	25
	(i) Without Levy of compensation		25	20	15	10	
	(ii) With Levy of compensation		25	10	0	-5	
	(Iii) Levy of compensation not decided		25	15	0	0	
	TOR = AT/ ST, where AT = Actual Time; ST = Stipulated Time						
	Note:- Marks for value in between the stages indicated above is to be determined by straight line variation method.						
(d)	Performance of Works (Quality) (15 Marks)		Performance			Marks	
			Very Good			15	
			Good			10	
			Fair			5	
			Poor			0	
(e)	Personnel & Establishment (15 Marks)						
	i	Graduate Engineer with 20 Years' experience	1 marks for each – max. 6 marks				
	ii	Graduate Engineer with 15 Years' experience	0.75 marks for each – max. 6 marks				
	iii	Graduate Engineer with 10 Years' experience/ Engineer (Diploma Holder) with 15 Years' experience	0.50 marks for each – max. 3 marks				
	Bidders qualifying the initial criteria as set out in para 1.4 of Section 1 will be evaluated for following criteria by scoring method on the basis of details furnished by them.						
a	Financial strength (Form 'A' & 'B') –		Maximum 20 marks				
b	Experience in similar nature of work during last five years (Form 'C')		Maximum 25 marks				
c	Performance on works (Form 'E') – Time over run		Maximum 25 marks				
d	Performance on works (Form 'E') – Quality		Maximum 15 marks				

e	Personnel and Establishment (Form “F” & “G”)	Maximum 15 marks
	Total -	100 marks
	Details of Technical & Administrative personnel employed with the firm should be given in the format T-6 and the bidder should indicate no. of technical / administrative personnel which will be deployed for the project.	
	The IMPCL/HLL reserves the right to fix a benchmark based on the above marking criteria for deciding the technical responsiveness of the bidder.	

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

TenderNo.HLL/IDN/IMPCL/2013-14/03/R

Request for Proposal (RFP)
for

**Modernization, Up-Gradation & Expansion of existing Plant Facilities at Indian
Medicines Pharmaceutical Corporation Limited (IMPCL) - Mohan, District: Almora
(Uttarakhand)
Package III- HVAC works**

Volume-II (GCC & SCC)

- **Vol.II- General Conditions of Contract**



B-14A, Sector – 62,
NOIDA (UP) -201307

Phone no: 0120-4071500, Fax no: 0120-4071513

(January, 2014)

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Section -1**CONDITIONS OF CONTRACT****Definitions**

1. The **Contract** means the documents forming the tender and acceptance thereof and the formal agreement executed between the competent authority as indicated in Schedule 'F' on behalf of the President of India and the Contractor, together with the documents referred to therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Engineer-in-charge and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.
2. In the contract the following expressions shall, unless the context otherwise requires, have the meanings, thereby respectively assigned to them:-
 - i) The **Accepting Authority** shall mean the authority mentioned in Schedule 'F'.
 - ii) The **Contractor** shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.
 - iii) **"Employer/Principal Employer"** shall mean Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt: Almora ,Uttarakhand via Ram Nagar.
 - iv) The **Engineer-in-charge (EIC)** means the Engineer / Officer as mentioned in Schedule 'F' hereunder, authorized by the Department i.e. IMPCL/HLL, who shall supervise and be in charge of the work.
 - v) The **President** means the President of India and his successors.
 - vi) The **Government or Government of India** shall mean the President of India represented by officials of MoHFW.
 - vii) The MoHFW means Ministry of Health & Family Welfare, Government of India.
 - viii) **"Client/Owner/IMPCL"** shall mean Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan, Distt: Almora, Uttarakhand via Ram Nagar.
 - ix) represented by a Designated Officer
 - x) The **Consultant/ Project Consultant** shall mean consultant appointed by the Client for implementing of the Project i.e. HLL Lifecare limited, having its corporate office at HLL Bhavan, Poojappura, Thiruvannathapuram-695012, Kerala (HLL).
 - xi) The **site** shall mean the land/ or place on, into or through which work is to be executed under the contract or any adjacent land , path or street through which work is to be executed under the contract or any adjacent land, path or street which may be located or used for the purpose of carrying out the contract.
 - xii) The **Expected risk are** risks due to riots(other than those on account of the contractor's employees), war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion revolution, insurrection, military or usurped power, any act of Government, damage from aircraft, acts of God, such as earthquake, lighting and unprecedented floods, and other causes over which the contractor has no control and accepted as such by the Accepting Authority or causes solely due to use or occupation by Government of the part of the works in respect of which a certificate of completion has been issued or a cause solely due to Government's faulty design of work.

- xiii) **Market rate** shall be the rate as decided by Engineer-in-charge on the basis of the cost of materials and labour at the site where the work is to be executed plus the percentage mentioned in Schedule 'F' to cover, all overheads and profits.
- xiv) **Specifications** means the specification mentioned in Schedule 'F', and, included and / or referred to in the Tender document and any modification thereof or addition thereto as may from time to time be issued to the Contractor.
- xv) **District Specifications** means the specifications followed by the State Government in the area where the work is to be executed.
- xvi) **Schedule(s)** referred to in these conditions shall mean the relevant schedule(s) annexed to the tender papers or the standard Schedule of Rates of the Government mentioned in Schedule 'F' hereunder, with the amendments thereto issued upto the date of receipt of the tender.
- xvii) The **work(s)** shall, unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional.
- xviii) **Tendered Value** means the value of the entire work as stipulated in the letter of award.
- xix) **Bill of Quantities or Schedule of items** means the schedule and quantities of items, materials and rates, summaries etc. priced and completed and as finally accepted.
- xx) **Month** means calendar month without regard to the number of days worked or not worked in that month.
- xxi) **Week** means seven calendar days without regard to the number of hours worked or not worked in any day in that week.
- xxii) **Day** means a calendar day of 24 hours (beginning and ending at 00 hrs. and 24 hrs. Respectively) irrespective of number of hours worked or not worked in that day.
- xxiii) **Act of Insolvency** shall mean any Act of Insolvency as defined by the Presidency Towns Insolvency Act or Provincial Insolvency Act or any Act amending such original.
- xxiv) **Approved** means approved in writing, including subsequent written information of previous verbal approval and "approval" means approval in writing, including as aforesaid.
- xxv) **As directed** means the direction given by the Engineer In-Charge/Client/ Consultant.
- xxvi) **Constructional Plant** means all appliances or things of whatsoever nature required in or about the execution or maintenance of the Works but does not include materials or other things intended to form or forming part of the Works.
- xxvii) **Material** means the materials, apparatus, equipment, fittings, fixtures and all such other materials, which are incorporated in the work.
- xxviii) **Drawings** means the drawings prepared and issued by the Consultant and referred to in the tender and specifications and any modification of such drawings and such other drawings, calculations and technical information of a like nature as may, from time to time, be issued by the Consultant.
- xxix) **I.S.** means latest revision of particular 'Indian Standards' specification issued by Bureau of Indian Standards.
- xxx) **Notice in writing or written notice** shall mean notice in written, typed or printed characters, sent (unless delivered personally or otherwise proved to have been received) by registered post to the site office/ last known private or business address or registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.
- xxxi) **Permanent Works** means the permanent works to be executed (including Plant) in accordance with the Contract.

- xxxii) **Temporary Works** means all temporary works of every kind required in or about the execution and completion or maintenance of the Works and the remedying of any defects therein.
- xxxiii) **Urgent Works** means any urgent works which in the opinion of the Client and/or Consultant becomes necessary at the time of execution and/or during the progress of work to obviate any risk of accident or failure or to obviate any risk of damage to the structure of services or required to accelerate the progress of the work for which becomes necessary for safety and security or for any other reason the Client and or Consultant may find it necessary.
- xxxiv) **Net Prices** If in arriving at the contract amount or contract sum, the Contractor shall have added or deducted from the total amount of the items in the Tender any sum, either as a percentage or otherwise, then the net price of any item in the tender shall be the sum arrived at by adding to or deducting from the actual figure appearing in the Tender as the price of that item and similar percentage or proportionate sum provided always that in determining the percentage or proportion of the sum so added or deducted by the Contractor, the total amount of any Prime cost items and provisional sums of money shall be deducted from the total amount of the tender. The expression “net rates” or “net prices” when used with reference to the contract or accounts shall be held to mean rates or prices so arrived at.

Scope and performance

3. Where the context so requires, words imparting the singular only also include the plural or vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.
4. Heading and Marginal notes to these General Conditions of Contract shall not be deemed to form part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.
5. The contractor shall be furnished, free of cost one certified copy of the contract documents except standard specifications, Schedule of rates and such other printed and published documents, together with all drawings as may be forming part of the tender papers. None of these documents shall be used for any purpose other than that of this contract.

Languages & Law

6. The ruling language in which the Contract and related aspects shall be drawn up shall be English only. Law means- law as applicable to site of work.

Works to be carried out

7. The work to be carried out under the contract shall, except as otherwise provided in these conditions, include all labour, materials, tools, plants, equipment and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The description given in the Schedule of Quantities shall, unless otherwise stated, be held to include wastage of materials, cartage and carriage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labour necessary in and for the full entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles.

Sufficiency of tender

8. The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and price quoted in the Schedule of Quantities, which rates and price shall, except as otherwise provided, cover all his obligations under the contract and all matters and things necessary for the proper completion and maintenance of the works.

Discrepancies and Adjustment of errors

9. The several documents forming the contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawings and figured dimensions in preference to scale and specific conditions in preference to general

conditions.

- 9.1 In the case of discrepancy between the Schedule of Quantities, the Specifications and /or the Drawings, the following order of preference shall be observed.
- a) Description of Schedule of Quantities
 - b) Particular specification and Specific Condition, if any.
 - c) Drawings
 - d) CPWD Specifications
 - e) Indian Standard Specifications of B.I.S.
 - f) For items not covered by any of the above, the work shall be done, as per sound engineering practices and as directed by the Engineer-in-charge.
- 9.2 If there are varying or conflicting provisions made in any one document forming Part of the contract, Accepting Authority shall be deciding authority with regard to the intention of the document and his decision shall be final and binding on the Contractor.
- 9.3 Any error in description, quantity or rate in schedule of quantities or any omission there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligation under the contract.

Errors, Omissions and Discrepancies

- 10.1 In case of errors, omissions and /or disagreement between written and scaled dimensions on the drawings or between the drawings and specifications, etc. the following order of precedence shall apply:
- i. Between scaled and written dimension (or description) on drawing, written dimension shall be adopted.
 - ii. Between the written or shown description or dimensions in the drawings and the corresponding one in the specification, the former shall be taken as correct.
 - iii. Between the written description of the item in the specifications and descriptions in the Bill of Quantities of the same item, the latter shall be adopted.
- 10.2 Between the duplicate/subsequent copies of the tender and original tender, the original tender shall be taken as correct.
- 10.3 All documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguity or discrepancies in conditions or specifications the same shall be explained and adjusted by Engineer-in-charge. In case the Contractor does not agree with the explanation given by the Engineer-in-charge, then the matter, on his written notice, will be referred to the Client and his decision shall be final and binding to the contractor.
- 10.4 In all cases of omissions and /or doubts or discrepancies in any of the items or specifications, a reference shall be made to the Engineer-in-Charge. Elucidation, elaboration or decision of the Engineer-in-charge shall be considered as authentic. The Contractor shall be held responsible for any error that may occur in the work through lack of such reference and precaution.
- 10.5 Any dispute arising due to typing mistakes/ omissions in the document shall be mutually discussed between Contractor and Engineer-in-charge and the decision of the Engineer-in-charge will be final and binding on the contractor in the matter.

Signing of Contract

11. The successful tenderer/contractor, on acceptance of his tender by the Accepting Authority, shall, within 30 days from the date of issue of LOA for the work, sign the contract consisting of documents as specified.
12. No payment for the work done will be made unless contract is signed by the contractor.

SECTION -2
CLAUSES OF CONTRACT

CLAUSE 1 Performance Guarantee

- (i) The contractor shall submit an irrevocable Performance Guarantee of 5% (Five per-cent) of the tendered value in addition to other deposits mentioned elsewhere in the contract for his proper performance of the contract agreement, (not withstanding and / or without prejudice to any other provisions in the contract) within period specified in Schedule 'F' from the date of issue of letter of acceptance. This period can be further extended by the Engineer-in-Charge upto a maximum period as specified in schedule 'F' on written request of the contractor stating the reason for delays in procuring the Performance Guarantee, to the satisfaction of the Engineer-in-Charge. This guarantee shall be in the form of Cash (in case guarantee amount is less than Rs. 10,000/-) or Banker's Cheque of any scheduled bank/ Demand Draft of any scheduled bank/ Pay Order of any scheduled bank (in case guarantee amount is less than Rs. 1,00,000/-) or Guarantee Bonds of any Scheduled Bank or the State Bank of India in accordance with the form annexed hereto.
- (ii) The Performance Guarantee shall be initially valid upto the stipulated date of completion of the Defect Liability Period plus 180 days beyond that. In case the time for completion of work gets enlarged, the contractor shall get the validity of Performance Guarantee extended to cover such enlarged time for completion of work. After recording of the completion certificate for the work including the defect liability period by the Engineer-in-charge, the performance guarantee shall be returned to the contractor, without any interest.
- (iii) The Engineer-in-Charge shall not make a claim under the performance guarantee except for amounts to which the President of India is entitled under the contract (not withstanding and / or without prejudice to any other provisions in the contract agreement) in the event of:
 - a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-Charge may claim the full amount of the Performance Guarantee.
 - b) Failure by the contractor to pay President of India any amount due, either as agreed by the contractor or determined under any of the Clauses / Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer- in-Charge.
- (iv) In the event of the Contract being determined or rescinded under provision of any of the Clause / Condition of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of the President of India.

CLAUSE 1A Recovery of Security Deposit

The person / persons whose tender(s) may be accepted (hereinafter called the contractor) shall permit Government at the time of making any payment to him for work done under the contract to deduct a sum at the rate of 5% of the gross amount of each running bill till the sum along with the sum already deposited as earnest money, will amount to security deposit of 5% of the tendered value of the work. Earnest Money if deposited in the form of FDR/DD shall be adjusted first in the Security Deposit and further recovery of the Security Deposit shall commence only when the upto date amount of Security Deposit starts exceeding the Earnest Money. Such deductions will be made and held by Government by way of Security Deposit unless he / they has / have deposited the amount of Security at the rate mentioned above in case.

All compensations or the other sums of money payable by the contractor under the terms of this contract may be deducted from, or paid by the sale of a sufficient part of his security deposit or from the interest arising there from, or from any sums which may be due to or may become due to the contractor by Government on any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions or sale as aforesaid the contractor shall within 10 days make good in cash or fixed deposit receipt tendered by the state Bank of India

or by Scheduled Banks or Government Securities (if deposited for more than 12 months) endorsed in favour of the Engineer-in-Charge, any sum or sums which may have been deducted from, or raised by sale of his security deposit or any part thereof. The security deposit shall be collected from the running bills of the contractor at the rates mentioned above and the Earnest money deposited at the time of tenders will be treated as part of the Security Deposit.

The security deposit as deducted above can be released against bank guarantee issued by a scheduled bank, on its accumulations to a minimum of Rs.5 lakh subject to the condition that amount of such bank guarantee, except last one, shall not be less than Rs.5 lakh. Provided further that the validity of bank guarantee including the one given against the earnest money shall be in conformity with provisions contained in clause 17 which shall be extended from time to time depending upon extension of contract granted under provisions of Clause 2 and Clause 5.

CLAUSE 2 Compensation for Delay

If the contractor fails to maintain the required progress in terms of clause 5 or to complete the work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the Government on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below as the authority specified in schedule 'F' (whose decision in writing shall be final and binding) may decide on the amount of the tendered value of the work for every completed day / month (as applicable) that the progress remains below that specified in Clause 5 or that the work remains incomplete.

This will also apply to items or group of items for which a separate period of completion has been specified.

Compensation for delay of work

- (i) 1% of tendered value per month, to be computed on a per day basis, for delays up to 3 months.
- (ii) 2% of tendered value, to be computed on a per day basis, per month for delays thereafter i.e. 4 to 6 months, i.e., a delay of 6 months will entail Compensation of 9%.

Provided always that the total amount of compensation for delay beyond 6 months to be paid under this Condition shall not exceed 10% of the Tendered value of the item or group of items of work for which a separate period of completion is originally given.

The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the Government. In case, the contractor does not achieve a particular milestone mentioned in schedule 'F', or the re-scheduled milestone(s) in terms of Clause 5.4, the amount shown against that milestone shall be withheld, to be adjusted against the compensation levied at the final grant of Extension of Time. With-holding of this amount on failure to achieve a milestone, shall be automatic without any notice to the contractor. However, if the contractor catches up with the progress of work on the subsequent milestone(s), the withheld amount shall be released. In case the contractor fails to make up for the delay in subsequent milestone(s), amount mentioned against each milestone missed subsequently also shall be withheld. However, no interest, whatsoever, shall be payable on such withheld amount.

CLAUSE 2A Incentive for early completion

In case, the contractor completes the work ahead of updated stipulated date of completion considering the effect of extra work (to be calculated on pro-rata basis as cost of extra work X stipulated period/ tendered cost), a bonus @ 1% (one per cent) of the tendered value per month computed on per day basis, shall be payable to the contractor, subject to a maximum limit of 5% (five per cent) of the tendered value. This shall be decided by the authority as indicated in Schedule 'F' whose decision shall be final and binding on the Contractor and conveyed to the contractor by the Engineer-in-charge. The amount of bonus/incentive, if payable, shall be paid along with final bill after completion of work. Provided always that provision of the Clause 2A shall be applicable only when so provided in 'Scheduled F'.

CLAUSE 3 When Contract can be Determined

Subject to other provisions contained in this clause, the Client may, without prejudice to his any other rights or remedy against the contractor in respect of any delay, inferior workmanship, any claims for damages and / or any other provisions of this contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases:

- (i) If the contractor having been given by the Engineer-in-Charge a notice in writing to rectify reconstruct or replace any defective work or that the work is being performed in an inefficient or otherwise improper or un-workmanlike manner shall omit to comply with the requirement of such notice for a period of seven days thereafter.
- (ii) If the contractor has, without reasonable cause, suspended the progress of the work or has failed to proceed with the work with due diligence so that in the opinion of the Engineer-in-Charge (which shall be final and binding) he will be unable to secure completion of the work by the date for completion and continues to do so after a notice in writing of seven days from the Engineer-in-Charge.
- (iii) If the contractor fails to complete the work within the stipulated date or items of work with individual date of completion, if any stipulated, on or before such date(s) of completion and does not complete them within the period specified in a notice given in writing in that behalf by the Engineer-in-Charge.
- (iv) If the Contractor persistently neglects to carry out his obligations under the contract and / or commits default in complying with any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is given to him in that behalf by the Engineer-in-Charge.
- (v) If the contractor shall offer or give or agree to give to any person in Government service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract for Government.
- (vi) If the contractor shall enter into a contract with Government in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission and the terms of payment thereof have been previously disclosed in writing to the Engineer-in-Charge.
- (vii) If the contractor shall obtain a contract with Government as a result of wrong tendering or other non-bonafide methods of competitive tendering.
- (viii) If the contractor being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any Insolvency Act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors.
- (ix) If the contractor being a company shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager on behalf of a creditor shall be appointed or if circumstances shall arise which entitle the court or the creditor to appoint a receiver or a manager or which entitle the court to make a winding up order.
- (x) If the contractor shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days.
- (xi) If the contractor assigns, transfers, sublets (engagement of labour on a piece- work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer, sublet or otherwise parts with the entire works or any portion thereof without the prior written approval of the Engineer-in-Charge.
- (xii) When the work contractor has made himself liable for action under any of the cases aforesaid,

the Client on behalf of the President of India shall have powers:

- (a) To determine the contract as aforesaid (of which termination notice in writing to the contractor under the hand of the Engineer-in-Charge shall be conclusive evidence). Upon such determination, the Earnest Money Deposit, Security Deposit already recovered and Performance Guarantee under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the Government.
- (b) After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part thereof, as shall be un-executed out of his hands and to give it to another contractor to complete the work. The contractor, whose contract is determined as above, shall not be allowed to participate in the tendering process for the balance work.

In the event of above courses being adopted by the Client, the contractor shall have no claim to compensation for any loss sustained by him by reasons of his having purchased or procured any materials or entered into any engagement or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provision aforesaid, the contractor shall not be entitled to recover or be paid any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-Charge has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

CLAUSE 3A

In case, the work cannot be started due to reasons not within the control of the contractor within 1/8th of the stipulated time for completion of work, either party may close the contract. In such eventuality, the Earnest Money Deposit and the Performance Guarantee of the contractor shall be refunded, but no payment on account of interest, loss of profit or damages etc. shall be payable at all.

CLAUSE 4 Contractor liable to pay Compensation even if action not taken under Clause 3

In any case in which any of the powers conferred upon the Client by Clause-3 thereof, shall have become exercisable and the same are not exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor and the liability of the contractor for compensation shall remain unaffected. In the event of the Client putting in force all or any of the power vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the contractor, take possession of (or at the sole discretion of the Engineer-in-Charge which shall be final and binding on the contractor) use as on hire (the amount of the hire money being also in the final determination of the Engineer-in-Charge) all or any tools, plant, materials and stores, in or upon the works, or the site thereof belonging to the contractor, or procured by the contractor and intended to be used for the execution of the work / or any part thereof, paying or allowing for the same in account at the contract rates, or in the case of these not being applicable, at current market rates to be certified by the Engineer-in-Charge, whose certificate thereof shall be final, and binding on the contractor, clerk of the works, foreman or other authorized agent to remove such tools, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the contractor failing to comply with any such requisition, the Engineer-in-Charge may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and his risk in all respects and the certificate of the Engineer-in-Charge as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the contractor.

CLAUSE 5 Time and Extension for Delay

The time allowed for execution of the Works as specified in the Schedule 'F' or the extended time in accordance with these conditions shall be the essence of the Contract. The execution of the works

shall commence from such time period as mentioned in schedule 'F' or from the date of handing over of the site whichever is later. If the Contractor commits default in commencing the execution of the work as aforesaid, Department shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the earnest money & performance guarantee absolutely.

5.1 As soon as possible after the Contract is concluded, the Contractor shall submit a Time and Progress Chart for each mile stone and get it approved by the Engineer-in-charge. The Chart shall be prepared in direct relation to the time stated in the Contract documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Engineer-in-Charge and the Contractor within the limitations of time imposed in the Contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programme has been agreed upon) complete the work as per mile stones given in Schedule 'F'.

5.2 If the work(s) be delayed by: -

- (i) Force majeure, or
- (ii) Abnormally bad weather, or
- (iii) Serious loss or damage by fire, or
- (iv) Civil commotion, local commotion of workmen, strike or lockout, affecting any of the traders employed on the work, or
- (v) Delay on the part of other contractors or tradesmen engaged by Department in executing work not forming part of the Contract, or
- (vi) Non-availability of stores, which are the responsibility of Department to supply, or
- (vii) Non-availability or break down of tools and Plant to be supplied or supplied by Department or
- (viii) Any other cause which, in the absolute discretion of the Engineer-in- Charge is beyond the Contractor's control.

then upon the happening of any such event causing delay, the Contractor shall immediately give notice thereof in writing to the Engineer-in-Charge but shall nevertheless use constantly his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-Charge to proceed with the works.

5.3 Request for rescheduling of Milestones and extension of time, to be eligible for consideration, shall be made by the Contractor in writing within fourteen days of the happening of the event causing delay on the prescribed form. The contractor may also, if practicable, indicate in such a request the period for which extension is desired.

5.4 In any such case the authority as indicated in Schedule F may give a fair and reasonable extension of time and reschedule the milestones for completion of work. Such extension shall be communicated to the Contractor by the Engineer- in-Charge in writing within 3 months of the date of receipt of such request. Non application by the contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the authority as indicated in Schedule F and this shall be binding on the contractor.

CLAUSE 6 Measurements of Work Done

Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement, the value in accordance with the contract of work done.

All measurement of all items having value shall be entered in Measurement Book and / or level field book so that a complete record is obtained of all works performed under the contract.

All measurements and levels shall be taken jointly by Engineer-in-Charge or his authorized

representative and by the contractor or his authorized representative from time to time during the progress of the work and such measurements shall be signed and dated by the Engineer-in-Charge and the contractor or their representatives in token of their acceptance. If the contractor objects to any of the measurements recorded, a note shall be made to that effect with reason and signed by both the parties.

If for any reason the contractor or his authorized representative is not available and the work of recording measurements is suspended by the Engineer-in-Charge or his representative, the Engineer-in-Charge and the Department shall not entertain any claim from contractor for any loss or damages on this account. If the contractor or his authorized representative does not remain present at the time of such measurements after the contractor or his authorized representative has been given a notice in writing three (3) days in advance or fails to countersign or to record objection within a week from the date of the measurement, then such measurements recorded in his absence by the Engineer-in-Charge or his representative shall be deemed to be accepted by the Contractor.

The contractor shall, without extra charge, provide all assistance with every appliance, labour and other things necessary for measurements and recording levels.

Except where any general or detailed description of the work expressly shows to the contrary, measurements shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available, then a mutually agreed method shall be followed.

The contractor shall give, not less than seven days' notice to the Engineer-in-Charge or his authorized representative in-charge of the work, before covering up or otherwise placing beyond the reach of measurement any work in order that the same may be measured and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of measurement and shall not cover up and placed beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in-charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of measurements without such notice having been given or the Engineer-in-Charge's or his authorized representative's consent being obtained in writing, the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded jointly or otherwise as aforesaid and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.

It is also a term of this contract that recording of measurements of any item of work in the measurement book and / or its payment in the interim, on account or final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

CLAUSE 6A Computerized Measurement Book

Engineer-in-Charge shall, except as otherwise provided, ascertain and determine by measurement the value of work done in accordance with the contract.

All measurements of all items having financial value shall be entered by the contractor and compiled in the shape of the Computerized Measurement Book having pages A-4 size as per the format of the CPWD so that a complete record is obtained of all the items of works performed under the contract.

All such measurements and levels recorded by the contractor or his authorized representative from time to time, during the progress of the work, shall be got checked by the contractor from the

Engineer-in-Charge or his authorized representative as per interval or program fixed in consultation with Engineer-in-Charge or his authorized representative. After the necessary corrections made by the Engineer-in-Charge or his authorized representative, the measurement sheets shall be returned to the contractor for incorporating the corrections and for resubmission to the Engineer-in-Charge or his authorized representative for the dated signatures by the Engineer-in-Charge and the contractor or their representatives in token of their acceptance.

Whenever bill is due for payment the contractor would initially submit draft computerized measurement sheets and these measurements would be got checked / test checked from the Engineer-in-Charge and / or his authorized representative. The contractor will, thereafter incorporate such changes as may be done during these checks / test checks in his draft computerized measurements, and submit to the department a computerized measurement book, duly bound, and with its pages machine numbered. The Engineer-in-Charge and / or his authorized representative would thereafter check this MB, and record the necessary certificates for their checks / tests checks.

The final, fair computerized measurement book given by the contractor, duly bound, with its pages machine numbered, should be 100% correct, and no cutting or over-writing in the measurements would thereafter be allowed. If at all any error is noticed, the contractor shall have to submit a fresh computerized MB with its pages duly machine numbered and bound, after getting the earlier MB cancelled by the department. Thereafter, the MB shall be taken in the Project Cell established at site, and allotted a number as per the Register of Computerized MBs. This should be done before the corresponding bill is submitted to the Project Cell for payment. The contractor shall submit two spare copies of such computerized MB's for the purpose of reference and record by the various officers of the Engineer-in-charge or his authorized representative or the Department.

The contractor shall also submit to the Engineer-in-charge or his authorized representative separately his computerized Abstract of Cost and the bill based on these measurements, duly bound, and its pages machine numbered along with two spare copies of the "bill. Thereafter, this bill will be processed by the Project Cell and allotted a number as per the computerized record in the same way as done for the measurement book meant for measurements.

The contractor shall, without extra charge, provide all assistance with every appliance, labour computer, printer and its consumable and other things necessary for checking of measurement / levels as per required by the Engineer-in-Charge or his representative.

Except where any general or detailed description of the work expressly shows to the contrary, measurement shall be taken in accordance with the procedure set forth in the specifications notwithstanding any provision in the relevant Standard Method of measurement or any general or local custom. In the case of items which are not covered by specifications, measurements shall be taken in accordance with the relevant standard method of measurement issued by the Bureau of Indian Standards and if for any item no such standard is available then a mutually agreed method shall be followed.

The contractor shall give not less than seven days' notice to the Engineer-in-Charge or his authorized representative in charge of the work before covering up or otherwise placing beyond the reach of checking and / or test checking and / or test checking the measurement of any work in order that the same may be checked and / or test checked and correct dimensions thereof be taken before the same is covered up or placed beyond the reach of checking and / or test checking measurement and shall not cover up and place beyond reach of measurement any work without consent in writing of the Engineer-in-Charge or his authorized representative in-charge of the work who shall within the aforesaid period of seven days inspect the work, and if any work shall be covered up or placed beyond the reach of checking and/or test checking measurements without such notice having been given or the Engineer-in-Charge's or his authorized representative's consent being obtained in writing the same shall be uncovered at the Contractor's expense, or in default thereof no payment or allowance shall be made for such work or the materials with which the same was executed.

Engineer-in-Charge or his authorized representative may cause either themselves or through another officer of the department to check the measurements recorded by contractor and all provisions stipulated herein above shall be applicable to such checking of measurements or levels.

It is also a term of this contract that checking and / or test checking the measurements of any item of work in the measurement book and / or its payment in the interim, on account of final bill shall not be considered as conclusive evidence as to the sufficiency of any work or material to which it relates nor shall it relieve the contractor from liabilities from any over measurement or defects noticed till completion of the defects liability period.

CLAUSE 7 Payment on Intermediate Certificate to be Regarded as Advances

No payment shall be made for work, estimated to cost Rs. Twenty Thousand or less till after the whole of the work shall have been completed and certificate of completion given. For works estimated to cost over Rs. Twenty thousand, the interim or running account bills shall be submitted by the contractor for the work executed on the basis of such recorded measurements on the format as approved by the Engineer-in-Charge in triplicate on or before the date of every month fixed for the same by the Engineer-in-Charge. The contractor shall not be entitled to be paid any such interim payment if the gross work done together with net payment / adjustment of advances for material collected, if any, since the last such payment is less than the amount specified in Schedule 'F', in which case the interim bill shall be prepared on the appointed date of the month after the requisite progress is achieved. Engineer-in-Charge shall arrange to have the bill verified by taking or causing to be taken, where necessary, the requisite measurements of the work. In the event of the failure of the contractor to submit the bills, Engineer-in-Charge shall prepare or cause to be prepared such bills in which event no claims whatsoever due to delays on payment including that of interest shall be payable to the contractor. Payment on account of amount admissible shall be made by the Engineer-in-Charge certifying the sum to which the contractor is considered entitled by way of interim payment at such rates as decided by the Engineer-in-Charge. The amount admissible shall be paid within thirty days after the day of certification of the bill by the Engineer-in-Charge or his authorised representative together with the account of the material issued by the department, or dismantled materials, if any along with all required supporting documents.

All such interim payments shall be regarded as payment by way of advances against final payment only and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be rejected, removed, taken away and reconstructed or re-erected. Any certificate given by the Engineer-in-Charge relating to the work done or materials delivered forming part of such payment, may be modified or corrected by any subsequent such certificate(s) or by the final certificate and shall not by itself be conclusive evidence that any work or materials to which it relates is / are in accordance with the contract and specifications. Any such interim payment, or any part thereof shall not in any respect conclude, determine or affect in any way powers of the Engineer-in-Charge under the contract or any of such payments be treated as final settlement and adjustment of accounts or in any way vary or affect the contract.

Pending consideration of extension of date of completion, interim payments shall continue to be made as herein provided without prejudice to the right of the department to take action under the terms of this contract for delay in the completion of work, if the extension of date of completion is not granted by the competent authority.

However, the Engineer-in-Charge in his sole discretion on the basis of a certificate from the his authorized representative in-charge of the work at site make interim advance payments at 75% of the assessed value, without detailed measurements, against the monthly bill for work done. The advance payment so allowed shall be adjusted in the subsequent interim bill by taking detailed measurements thereof.

CLAUSE 8 Completion Certificate and Completion Plans

Within ten days of the completion of the work, the contractor shall give notice of such completion to the Engineer-in-Charge and within thirty days of the receipt of such notice the Engineer-in-Charge shall inspect the work and if there is no defect in the work, shall furnish the contractor with a final certificate of completion, otherwise a provisional certificate of physical completion indicating defects (a) to be rectified by the contractor and / or (b) for which payment will be made at reduced rates, shall be issued. But no final certificate of completion shall be issued, nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall be executed all scaffolding, surplus materials, rubbish and all

huts and sanitary arrangements required for his / their work people on the site in connection with the execution of the works as shall have been erected or constructed by the contractor(s) and cleaned off the dirt from all wood work, doors, windows, walls, floor or other parts of the building, in, upon, or about which the work is to be executed or of which he may have had possession for the purpose of the execution; thereof, and not until the work shall have been measured by the Engineer-in-Charge. If the contractor shall fail to comply with the requirements of this Clause as to removal of scaffolding, surplus materials and rubbish and all huts and sanitary arrangements as aforesaid and cleaning off dirt on or before the date fixed for the completion of work, the Engineer-in-Charge may at the expense of the contractor remove such scaffolding, surplus materials and rubbish etc. and dispose of the same as he thinks fit and clean off such dirt as aforesaid, and the contractor shall have no claim in respect of scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

CLAUSE 8A Contractor to keep Site Clean

When the annual repairs and maintenance of works are carried out, the splashes and droppings from white washing, colour washing, painting etc., on walls, floor, windows, etc shall be removed and the surface cleaned simultaneously with the completion of these items of work in the individual rooms, quarters or premises etc. where the work is done without waiting for the actual completion of all the other items of work in the contract. In case the contractor fails to comply with the requirements of this clause, the Engineer-in-Charge shall have the right to get this work done at the cost of the contractor either departmentally or through any other agency. Before taking such action the Engineer-in-Charge shall give ten days' notice in writing to the contractor.

CLAUSE 8B Completion Plans to be Submitted by the Contractor

The contractor shall submit completion plan required as specification mentioned in Schedule "F" within thirty days of the completion of the work.

In case, the contractor fails to submit the completion plans as aforesaid, he shall be liable to pay a sum equivalent to 2.5% of the value of the work subject to a ceiling of Rs.50,00,000 (Rs. Fifty lakhs only) as may be fixed by the Engineer-in-charge and in this respect the decision of the Engineer-in-charge shall be final and binding on the contractor.

CLAUSE 9 Payment of Final Bill

The final bill shall be submitted by the contractor in the same manner as specified in interim bills within three months of physical completion of the work or within one month of the date of the final certificate of completion furnished by the Engineer-in-Charge whichever is earlier. No further claims shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payment of those items of the bill in respect of which there is no dispute and of items in dispute, for quantities and rates as approved by Engineer-in-Charge, will, as far as possible be made within the period of six months reckoned from the date of receipt of the bill by the Engineer-in-Charge or his authorized Engineer, complete with account of materials issued by the Department and dismantled materials along with all supporting documents.

CLAUSE 9A Payment of Contractor's Bills to Bank

Payments due to the contractor may, if so desired by him, be made to his bank, registered financial, co-operative or thrift societies or recognized financial institutions instead of direct to him provided that the contractor furnishes to the Engineer-in-Charge (1) an authorization in the form of a legally valid document such as a power of attorney conferring authority on the bank; registered financial, co-operative or thrift societies or recognized financial institutions to receive payments and (2) his own acceptance of the correctness of the amount made out as being due to him by Government or his signature on the bill or other claim preferred against Government before settlement by the Engineer-in-Charge of the account or claim by payment to the bank, registered financial, co-operative or thrift societies or recognized financial institutions. While the receipt given by such banks; registered financial, co-operative or thrift societies or recognized financial institutions shall constitute a full and sufficient discharge for the payment, the contractor shall whenever possible present his bills duly receipted and discharged through his bank, registered financial, co-operative or thrift societies or recognized financial institutions.

Nothing herein contained shall operate to create in favour of the bank; registered financial, co-operative or thrift societies or recognized financial institutions any rights or equities vis-à-vis the President Of India.

CLAUSE 10 Materials supplied by the HLL / Government

Materials which HLL/ Government will supply are shown in Schedule 'B' which also stipulates quantum, place of issue and rate(s) to be charged in respect thereof. The contractor shall be bound to procure them from the Engineer-in-Charge.

As soon as the work is awarded, the contractor shall finalize the programme for the completion of work as per clause 5 of this contract and shall give his estimates of materials required on the basis of drawings/or schedule of quantities of the work. The Contractor shall give in writing his requirement to the Engineer-in-Charge which shall be issued to him keeping in view the progress of work as assessed by the Engineer-in- Charge, in accordance with the agreed phased programme of work indicating monthly requirements of various materials. The contractor shall place his indent in writing for issue of such materials at least 7 days in advance of his requirement.

Such materials shall be supplied for the purpose of the contract only and the value of the materials so supplied at the rates specified in the aforesaid schedule shall be set off or deducted, as and when materials are consumed in items of work (including normal wastage) for which payment is being made to the contractor, from any sum then due or which may therefore become due to the contractor under the contract or otherwise or from the security deposit. At the time of submission of bills, the contractor shall certify that balance of materials supplied is available at site in original good condition.

The contractor shall submit along with every running bill (on account or interim bill) material wise reconciliation statements supported by complete calculations reconciling total issue, total consumption and certified balance (diameter/section-wise in the case of steel) and resulting variations and reasons therefore. Engineer-in-Charge shall (whose decision shall be final and binding on the contractor) be within his rights to follow the procedure of recovery in clause 42 at any stage of the work if reconciliation is not found to be satisfactory.

The contractor shall bear the cost of getting the material issued, loading, transporting to site, unloading, storing under cover as required, cutting assembling and joining the several parts together as necessary. Notwithstanding anything to the contrary contained in any other clause of the contract and (or the CPWD Code) all stores/materials so supplied to the contractor or procured with the assistance of the Government shall remain the absolute property of Government and the contractor shall be the trustee of the stores/materials, and the said stores/materials shall not be removed/disposed off from the site of the work on any account and shall be at all times open to inspection by the Engineer-in-Charge or his authorized agent. Any such stores/materials remaining unused shall be returned to the Engineer-in-Charge in as good a condition in which they were originally supplied at a place directed by him, at a place of issue or any other place specified by him as he shall require, but in case it is decided not to take back the stores/materials the contractor shall have no claim for compensation on any account of such stores/materials so supplied to him as aforesaid and not used by him or for any wastage in or damage to in such stores/materials.

On being required to return the stores/materials, the contractor shall hand over the stores/materials on being paid or credited such price as the Engineer-in-Charge shall determine, having due regard to the condition of the stores/materials. The price allowed for credit to the contractor, however, shall be at the prevailing market rate not exceeding the amount charged to him, excluding the storage charge, if any. The decision of the Engineer-in-Charge shall be final and conclusive. In the event of breach of the aforesaid condition, the contractor shall in addition to throwing himself open to account for contravention of the terms of the licenses or permit and/or for criminal breach of trust, be liable to Government for all advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach. Provided that the contractor shall in no case be entitled to any compensation or damages on account of any delay in supply or non-supply thereof all or any such materials and stores provided further that the contractor shall be bound to execute the entire work if the materials are supplied by the Government within the original scheduled time for completion of the work plus 50% thereof or schedule time plus 6 months

whichever is more if the time of completion of work exceeds 12 months, but if a part of the materials only has been supplied within the aforesaid period, then the contractor shall be bound to do so much of the work as may be possible with the materials and stores supplied in the aforesaid period. For the completion of the rest of the work, the contractor shall be entitled to such extension of time as may be determined by the Engineer-in-Charge whose decision in this regard shall be final and binding on the contractor.

The contractor shall see that only the required quantities of materials are got issued. Any such material remaining unused and in perfectly good/original condition at the time of completion or determination of the contract shall be returned to the Engineer-in-Charge at the stores from which it was issued or at a place directed by him by a notice in writing. The contractor shall not be entitled for loading, transporting, unloading and stacking of such unused material except for the extra lead, if any involved, beyond the original place of issue.

CLAUSE 10A Materials to be provided by the Contractor

The contractor shall, at his own expense, provide all materials, required for the works, other than those which are stipulated to be supplied by the Government.

The contractor shall, at his own expense and without delay, supply to the Engineer-in-Charge or his authorized representative samples of materials to be used on the work and shall get these approved in advance. All such materials to be provided by the Contractor shall be in conformity with the specifications laid down or referred to in the contract. The contractor shall, if requested by the Engineer-in-Charge furnish proof, to the satisfaction of the Engineer-in-Charge that the materials so comply. The Engineer-in-Charge or his authorized representative shall within thirty days of supply of samples or within such further period as he may require intimate to the Contractor in writing whether samples are approved by him or not. If samples are not approved, the Contractor shall forthwith arrange to supply to the Engineer-in-Charge or his authorized representative for his approval, fresh samples complying with the specifications laid down in the contract. When materials are required to be tested in accordance with specifications, approval of the Engineer-in-Charge shall be issued after the test results are received.

The Contractor shall at his risk and cost submit the samples of materials to be tested or analyzed and shall not make use of or incorporate in the work any materials represented by the samples until the required tests or analysis have been made and materials finally accepted by the Engineer-in-Charge. The Contractor shall not be eligible for any claim or compensation either arising out of any delay in the work or due to any corrective measures required to be taken on account of and as a result of testing of materials.

The contractor shall, at his risk and cost, make all arrangements and shall provide all facilities as the Engineer-in-Charge or his authorized representative may require for collecting, and preparing the required number of samples for such tests at such time and to such place or places as may be directed by the Engineer-in-Charge or his authorized representative and bear all charges and cost of testing unless specifically provided for otherwise elsewhere in the contract or specifications. The Engineer-in-Charge or his authorized representative shall at all times have access to the works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the works and the contractor shall afford every facility and every assistance in obtaining the right to such access.

The Engineer-in-Charge shall have full powers to require the removal from the premises of all materials which in his opinion are not in accordance with the specifications and in case of default, the Engineer-in-Charge shall be at liberty to employ at the expense of the contractor, other persons to remove the same without being answerable or accountable for any loss or damage that may happen or arise to such materials. The Engineer-in-Charge shall also have full powers to require other proper materials to be substituted thereof and in case of default, the Engineer-in-Charge may cause the same to be supplied and all costs which may attend such removal and substitution shall be borne by the Contractor.

Wherever different pattern/ design/ quality of materials with same specifications/ make as specified in the contract is available in the market, Engineer-in-Charge will be sole authority to decide pattern/ design/ quality of the material which shall be final and binding on the contractor.

The contractor shall at his own expense, provide a material testing lab at the site for conducting

routine field tests. The lab shall be equipped atleast with the testing equipment as specified in schedule F. In addition, equipment for carrying out various tests (except chemical analysis) on basic materials i.e. cement, fine aggregate, coarse aggregate & bricks shall be kept in the site lab. Contractor shall employ sufficient manpower to ensure that all tests are carried out in accordance with the periodicity specified in relevant IS.

CLAUSE 10B Secured Advance on Non-perishable Materials

- (i) The contractor, on signing an indenture in the form to be specified by the Engineer-in-Charge, shall be entitled to be paid during the progress of the execution of the work upto 90% of the assessed value of any materials or an amount not exceeding 90% of the material element cost in the tendered rate of the finished item of work, whichever is lower which are in the opinion of the Engineer-in-Charge non-perishable, non-fragile and non-combustible and are in accordance with the contract and which have been brought on the site in connection therewith and are adequately stored and/or protected against damage by weather or other causes but which have not at the time of advance been incorporated in the works. When materials on account of which an advance has been made under this sub-clause are incorporated in the work, the amount of such advance shall be recovered/deducted from the next payment made under any of the clause or clauses of this contract.

Such secured advance shall also be payable on other items of perishable nature, fragile and combustible with the approval of the Engineer-in-Charge provided the contractor provides a comprehensive insurance cover for the full cost of such materials. The decision of the Engineer-in-Charge shall be final and binding on the contractor in this matter. No secured advance, shall however, be paid on high-risk materials such as ordinary glass, sand, petrol, diesel etc.

(ii) Mobilization Advance

Mobilization advance not exceeding 10% of the tendered value may be given, if requested by the contractor in writing within one month of the order to commence the work. Such advance shall be in two or more instalments to be determined by the Engineer-in-Charge at his sole discretion. The first instalment of such advance shall be released by the Engineer-in-Charge to the contractor on a request made by the contractor to the Engineer-in-Charge in this behalf. The second and subsequent instalments shall be released by the Engineer-in-Charge only after the Contractor furnishes a proof of the satisfactory utilization of the earlier instalments to the entire satisfaction of the Engineer-in-Charge.

Before any instalment of advance is released, the Contractor shall execute a Bank Guarantee Bond from Scheduled Bank for the amount of advance & valid for the Contract Period. This shall be kept renewed from time to time to cover the balance amount and likely period of complete recovery, together with interest.

Provided always the provision of Clause 10 B (ii) shall be applicable only when so provided in 'Schedule F'.

(iii) Plant Machinery & Shuttering Material Advance

An advance for plant, machinery & shuttering material required for the work and brought to site by the contractor may be given if requested by the contractor in writing within one month of bringing such plant and machinery to site. Such advance shall be given on such plant and machinery, which in the opinion of the Engineer-in-Charge will add to the expeditious execution of work and improve the quality of work. The amount of advance shall be restricted to 5% per-cent of the tender value. In the case of new plant and equipment to be purchased for the work, the advance shall be restricted to 90% of the price of such new plant and equipment paid by the contractor for which the contractor shall produce evidence satisfactory to the Engineer-in-Charge. In the case of second hand and used plants and equipment, the amount of such advance shall be limited to 50% of the depreciated value of plant and equipment as may be decided by the Engineer-in-Charge. The contractor shall, if so required by the Engineer-in-Charge, submit the statement of value of such old plant and equipment duly approved by a Registered Valuer recognized by the

Central board of Direct Taxes under the Income-Tax Act, 1961. No such advance shall be paid on any plant and equipment of perishable nature and on any plant and equipment of a value less than Rs.50,000/- Seventy five per cent of such amount of advance shall be paid after the plant & equipment is brought to site and balance twenty five per-cent on successfully commissioning the same.

Leasing of equipment shall be considered at par with purchase of equipment and shall be covered by tripartite agreement with the following:

1. Leasing company which gives certificate of agreeing to lease equipment to the contractor.
2. Engineer-in-Charge, and
3. The contractor.

This advance shall further be subject to the condition that such plant and equipment (a) are considered by the Engineer-in-Charge to be necessary for the works; (b) and are in working order and are maintained in working order; (c) hypothecated to the Government as specified by the Engineer-in-Charge before the payment of advance is released. The contractor shall not be permitted to remove from the site such hypothecated plant and equipment without the prior written permission of the Engineer-in-Charge. The contractor shall be responsible for maintaining such plant and equipment in good working order during the entire period of hypothecation failing which such advance shall be entirely recovered in lump sum. For this purpose, steel scaffolding and form work shall be treated as plant and equipment.

The contractor shall insure the Plant and Machinery for which mobilization advance is sought and given, for a sum sufficient to provide for their replacement at site. Any amounts not recovered from the insurer will be borne by the contractor.

Provided always the provision of Clause 10 B (iii) shall be applicable only when so provided in 'Schedule F'.

(iv) Interest & Recovery

The mobilization advance and plant and machinery advance in (ii) & (iii) above bear simple interest at the rate of 10 per cent per annum and shall be calculated from the date of payment to the date of recovery, both days inclusive, on the outstanding amount of advance. Recovery of such sums advanced shall be made by the deduction from the contractors bills commencing after first ten per cent of the gross value of the work is executed and paid, on pro-rata percentage basis to the gross value of the work billed beyond 10% in such a way that the entire advance is recovered by the time eighty per cent of the gross value of the contract is executed and paid, together with interest due on the entire outstanding amount upto the date of recovery of the instalment. However, the net upto date interest on the mobilization advance and plant and machinery advance in (ii) & (iii) above would be deducted from all payments released to the Contractors beginning the first interim certificate.

- (v) If the circumstances are considered reasonable by the Engineer-in-Charge, the period mentioned in (ii) and (iii) for request by the contractor in writing for grant of mobilization advance and plant and equipment advance may be extended in the discretion of the Engineer-in-Charge.
- (vi) The said Bank Guarantee for advances shall initially be made for the full amount and valid for the contract period, and be kept renewed from time to time to cover the balance amount and likely period of complete recovery together with interest.

CLAUSE 10C Payment on Account of Increase in Prices/Wages due to Statutory Order(s)

If after submission of the tender, the price of any material incorporated in the works (excluding the materials covered under Clause 10CA and not being a material supplied from the Engineer-in-Charge's stores in accordance with Clause 10 thereof) and/or wages of labour increases as a direct result of the coming into force of any fresh law, or statutory rule or order (but not due to

any changes in sales tax/VAT) beyond the prices/wages prevailing at the time of the last stipulated date of receipt of tenders including extensions, if any, for the work during contract period including the justified period extended under the provisions of Clause 5 of the Contract without any action under Clause 2, then the amount of contract shall accordingly be varied and provided further that any such increase shall be limited to the price/wages prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less.

If after submission of the tender, the price of any material incorporated in the works (excluding the materials covered under Clause 10CA and not being a material supplied from the Engineer-in-Charge's stores in accordance with Clause 10 thereof) and/or wages of labour as prevailing at the time of last stipulated date of receipt of tender including extensions, if any, is decreased as a direct result of the coming into force of any fresh law or statutory rules or order (but not due to any changes in sales tax/VAT), Government shall in respect of materials incorporated in the works (excluding the materials covered under Clause 10CA and not being materials supplied from the Engineer-in-Charge's stores in accordance with Clause-10 hereof) and/or labour engaged on the execution of the work after the date of coming into force of such law statutory rule or order be entitled to deduct from the dues of the contractor, such amount as shall be equivalent to the difference between the prices of the materials and/or wages as prevailed at the time of the last stipulated date for receipt of tenders including extensions if any for the work and the prices of materials and/or wages of labour on the coming into force of such law, statutory rule or order. This will be applicable for the Contract period including the justified period extended under the provisions of Clause 5 of the Contract without any action under Clause 2.

Engineer-in-charge may call books of account and other relevant documents from the contractor to satisfy himself about reasonability of increase in prices of materials and wages.

The Contractor shall, within a reasonable time of his becoming aware of any alteration in the price of any such materials and/or wages of labour, give notice thereof to the Engineer-in-Charge stating that the same is given pursuant to this condition together with all information relating thereto which he may be in position to supply.

For this purpose, the labour component of the work executed during the period under consideration shall be the percentage as specified in Schedule F, of the value of work done during that period and the increase/decrease in labour shall be considered on the minimum daily wages in rupees of any unskilled adult male mazdoor, fixed under any law, statutory rule or order.

CLAUSES 10 CA Payment due to variation in prices of materials after receipt of tender

If after submission of the tender, the price of materials specified in Schedule F increases/decreases beyond the price(s) prevailing at the time of the last stipulated date for receipt of tenders (including extensions, if any) for the work, then the amount of the contract shall accordingly be varied and provided further that any such variations shall be effected for stipulated period of Contract including the justified period extended under the provisions of clause 5 of the contract without any action under Clause 2.

However for work done/during the justified period extended as above, it will be limited to indices prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less.

The increase/decrease in prices of cement, steel reinforcement and structural steel shall be determined by the Price Indices issued by the Director General (Works), CPWD. For other items provided in the Schedule 'F', these shall be determined by the All India Wholesale Price Indices of Materials as published by economic Advisor to government of India, Ministry of commerce and Industry and base price for cement, steel reinforcement and structural steel as issued under the authority of Director General (Works) CPWD applicable for Delhi including Noida, Gurgaon, Faridabad & Ghaziabad and for other places as issued under the authority of the Zonal Chief Engineer, CPWD and base price of other materials issued by concerned Zonal Chief Engineer as indicated in Schedule 'F' as valid on the last stipulated date of receipt of tender, including extension if any and for the period under consideration. In case, price index of a particular material is not issued by Ministry of Commerce and Industry, then the price index of

nearest similar material as indicated in Schedule 'F' shall be followed.

The amount of the contract shall accordingly be varied for all such materials and will be worked out as per the formula given below for individual material:-

Adjustment for component of individual material

Where,

$$V = \frac{P \times Q \times CI - CI_0}{CI_0}$$

V = Variation in material cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

P = Base Price of material as mentioned in Schedule 'F'.

Q = Quantity of material brought at site for bonafide use in the works since previous bill.

CI₀ = Price Index for cement, steel reinforcement bars and structural steel as issued by the DG(W), CPWD as valid on the last stipulated date of receipt of tenders including extensions, if any. For other items, if any, provided in Schedule 'F', All India wholesale Price Index for the material as published by the economic Advisor to government of India, Ministry of Industry and Commerce as valid on the last stipulated date of receipt of tenders including extensions, if any.

CI = Price Index for cement, steel reinforcement bars and structural steel as issued by the DG(W), CPWD for the period under consideration. For other items, if any, provided in Schedule 'F' All India Wholesale Price Index for the material for period under consideration as published by Economic advisor to Government of India, Ministry of Industry and Commerce.

Note:

- (i) In respect of the justified period extended under the provisions of clause 5 of the contract without any action under clause 2, the index prevailing at the time of stipulated date of completion or the prevailing index of the period under consideration, whichever is less, shall be considered.

Provided always that provisions of preceding clause 10 C shall not be applicable in respect of Materials covered in this clause.

- (ii) If during the progress of work or at the time of completion of work, it is noticed that any material brought to site is in excess of requirement, then amount of escalation if paid earlier on such excess quantity of material shall be recovered on the basis of cost indices as applied at the time of payment of escalation or as prevailing at the time of effecting recovery, whichever is higher.

CLAUSE 10 CC (As per Schedule-F)

Payment due to Increase/Decrease in Prices/Wages (excluding materials covered under clause 10CA) after Receipt of Tender for Works

If the prices of materials (not being materials supplied or services rendered at fixed prices by the department in accordance with clause 10 & 34 thereof) and/or wages of labour required for execution of the work increase the contractor shall be compensated for such increase as per provisions detailed below and the amount of the contract shall accordingly be varied, subject to the condition that such compensation for escalation in prices and wages shall be available only for the work done during the stipulated period of the contract including the justified period extended under the provisions of clause 5 of the contract without any action under clause 2. However, for the work done during the justified period extended as above, the compensation as detailed below will be limited to prices/wages prevailing at the time of stipulated date of completion or as prevailing for the period under consideration, whichever is less. No such compensation shall be payable for a work for which the stipulated period of completion is equal to or less than the time as specified in Schedule F. Such compensation for escalation in the prices of materials and labour, when due, shall be worked out based on the following provisions:-

- (i) The base date for working out such escalation shall be the last stipulated date of receipt of tenders including extension, if any.
- (ii) The cost of work on which escalation will be payable shall be reckoned as below:
- Gross value of work done upto this quarter: (A)
 - Gross Value of work done upto the last quarter: (B)
 - Gross value of work done since previous quarter (A-B): (C)
 - Full assessed value of Secured Advance (excluding materials covered under clause 10CA) fresh paid in this quarter: (D)
 - Full assessed value of Secured Advance (excluding materials covered under clause 10CA) recovered in this quarter: (E)
 - Full assessed value of Secured Advance for which escalation is payable in this quarter (D-E): (F)
 - Advance payment made during this quarter: (G)
 - Advance payment recovered during this quarter: (H)
 - Advance payment for which escalation is payable in this quarter (G-H): (I)
 - Extra Items/deviated quantities of items paid as per Clause 12 based on prevailing market rates during this quarter: (J)

$$\text{Then, } M = C + F + I - J$$

$$N = 0.85 M$$

- Less cost of material supplied by the department as per Clause 10 and recovered during the quarter: (K)
- Less cost of services rendered at fixed charges as per Clause 34 and recovered during the quarter (L)

Cost of work for which escalation is applicable: $W = M - (K + L)$

- (iii) Components of materials (except cement, reinforcement bars, structural steel or others materials covered under clause 10CA), labour, P.O.L., etc. shall be pre- determined for every work and incorporated in the conditions of contract attached to the tender papers included in Schedule 'F'. The decision of the Engineer-in- Charge in working out such percentage shall be binding on the contractors.
- (iv) The compensation for escalation for other materials (excluding cement, reinforcement bars, structural steel or others materials covered under clause 10CA) P.O.L. shall be worked as per the formula given below:-

Adjustment for civil component (except cement, reinforcement bars, structural steel or others materials covered under clause 10CA)/electrical component of construction '**Materials**'

$$V_m = W \times \frac{X_m}{100} \times \frac{MI - MI_0}{MI_0}$$

VM = Variation in material cost i.e. increase or decrease in the amount in rupees to be paid or recovered.

W = Cost of work done worked out as indicated in sub-para (ii) of Clause 10CC.

XM = Component of 'materials' (except cement, reinforcement bars, structural steel or others materials covered under clause 10CA) expressed as per-cent of the total value of work.

MI = All India Wholesale Price Index for civil component/electrical component* of construction material as worked out on the basis of All India Wholesale Price Index for Individual commodities/Group Items for the period under consideration as published by Economic Advisor to Govt. Of India, Ministry of Industry & Commerce and applying weight ages to the Individual

Commodities/Group Items. (In respect of the justifies period extended under the provisions of clause 5 of the contract without any action under clause 2, the index prevailing at the time of stipulated date of completion or the prevailing index of the period under consideration, whichever is less, shall be considered.)

MI0 = All India Wholesale Price Index for civil component/electrical component* of construction material as worked out on the basis of all India Wholesale Price Index for Individual Commodities/group Items valid on the last stipulated date of receipt of tender including extension, if any, as published by the Economic Advisor to Govt. of India, Ministry of Industry & Commerce and applying weight ages to the Individual Commodities/Group Items.

*Note: relevant component only will be applicable.

(d) Adjustment for component of 'POL'

$$VF = W \times \frac{Z}{100} \times \frac{FI-FI0}{FI0}$$

VF= Variation in cost of Fuel, Oil & Lubricant i.e. increase or decrease in the amount in rupees to be paid or recovered.

W = Cost of work done worked out as indicated in sub-para (ii) of Clause 10CC.

Z = Component of Fuel, Oil & Lubricant expressed as per-cent of the total value of work.

FI = All India Wholesale Price Index for Fuel, Oil & Lubricant for the period under consideration as published by Economic Advisor to Govt. of India, Ministry of Industry & commerce, New Delhi. (In respect of the justified period extended under the provisions of clause 5 of the contract without any action under clause 2, the index prevailing at the time of stipulated date of completion or the prevailing index of the period under consideration, whichever is less, shall be considered.)

FI0 = All India Wholesale Price Index for Fuel, Oil & Lubricant valid on the last stipulated date of receipt of tender including extension, if any.

(v) The following principles shall be followed while working out the indices mentioned in para (iv) above.

(a) The compensation for escalation shall be worked out at quarterly intervals and shall be with respect the cost of work done as per bills paid during the three calendar months of the said quarter. The first such payment shall be made at the end of three months after the month (excluding) in which the tender was accepted and thereafter at three months interval. At the time of completion of the work, the last period for payment might become less than 3 months, depending on the actual date of completion.

(b) The index (MI/FI etc.) relevant to any quarter/period for which such compensation is paid shall be the arithmetical average of the indices relevant to the three calendar months. If the period up to date of completion after the quarter covered by the last such instalment of payment, is less than three months, the index MI and FI shall be the average of the indices for the months falling within that period.

(vi) The compensation for escalation for **labour** shall be worked out as per the formula given below:-

$$VL = W \times \frac{Y}{100} \times \frac{LI-LI0}{LI0}$$

VL = Variation in labour cost i.e. amount of increase or decrease in rupees to be paid or recovered.

W = Value of work done, worked out as indicated in sub-para (ii) above.

Y = Component of labour expressed as a percentage of the total value of the work.

LI = Minimum wage in rupees of an unskilled adult male mazdoor, fixed under any law, statutory rule or order as applicable on the last date of the quarter previous to the one under consideration. (In respect of the justified period extended under the provisions of clause 5 of the contract without any action under clause 2, the minimum wage prevailing on the last date of quarter previous to the quarter pertaining to stipulated date of completion or the minimum wage prevailing on the last date of the quarter previous to the one under consideration, whichever is less, shall be considered.)

Llo = Minimum daily wage in rupees of an unskilled adult male mazdoor, fixed under any law, statutory rule or order as on the last stipulated date of receipt of tender including extension, if any.

- (vii) The following principles will be followed while working out the compensation as per sub-Para (vi) above.
 - (a) The minimum wage of an unskilled male mazdoor mentioned in sub-para (vi) above shall be the higher of the wage notified by Government of India, Ministry of Labour and that notified by the local administration both relevant to the place of work and the period of reckoning.
 - (b) The escalation for labour also shall be paid at the same quarterly intervals when escalation due to increase in cost of materials and/or P.O.L. is paid under this clause. If such revision of minimum wages takes place during any such quarterly intervals, the escalation compensation shall be payable at revised rates only for work done in subsequent quarters;
 - (c) Irrespective of variations in minimum wages of any category of labour, for the purpose of this clause, the variation in the rate for an unskilled adult male mazdoor alone shall form the basis for working out the escalation compensation payable on the labour component.
- (viii) In the event the price of materials and/or wages of labour required for execution of the work decrease/s, there shall be a downward adjustment of the cost of work so that such price of materials and/or wages of labour shall be deductible from the cost of work under this contract and in this regard the formula herein before stated under this Clause 10CC shall mutatis mutandis apply, provided that:
 - (a) No such adjustment for the decrease in the price of materials and/or wages of labour aforementioned would be made in case of contracts in which the stipulated period of completion of the work is equal to or less than the time as specified in Schedule 'F'.
 - (b) The Engineer-in-Charge shall otherwise be entitled to lay down the procedure by which the provision of this sub-clause shall be implemented from time to time and the decision of the Engineer-in-Charge in this behalf shall be final and binding on the contractor.
- (ix) Provided always that :-
 - (a) Where provisions of clause 10CC are applicable, provisions of Clause 10C will not be applicable but provisions of clause 10CA will be applicable.
 - (b) Where provisions of clause 10CC are not applicable, provisions of clause 10C and 10CA will become applicable.

CLAUSE 10 D Dismantled Material Govt. Properties

The Contractor shall treat all materials obtained during dismantling of a structure, excavation of the site for a work, etc. as Government's property and such materials shall be disposed off to the best advantage of Government according to the instructions in writing issued by the Engineer-in-Charge.

CLAUSE 11 Work to be Executed in Accordance with specifications, Drawings, Orders etc.

The Contractor shall execute the whole and every part of the work in the most substantial and workmanlike manner both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also conform exactly, fully and faithfully to the design, drawings and instructions in writing in respect of the work signed by the Engineer-in-Charge and/or his authorized representative and the contractor shall be furnished free of charge one copy of the contract documents together with specifications, designs, drawings and instructions as are not included in the standard specifications of Central Public works Department specified in Schedule 'F' or in any Bureau of Indian Standard or any other, published standard or code or, Schedule of Rates or any other printed publication referred to elsewhere in the contract.

The contractor shall comply with the provisions of the contract and with the care and diligence execute and maintain the works and provide all labour and materials, tools and plants including for measurements and supervision of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these, is specified or is reasonably inferred from the contract. The Contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.

CLAUSE 12 Deviations/Variations Extent and Pricing

The Engineer-in-Charge shall have power (i) to make alteration in, omissions from, additions to, or substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work, and (ii) to omit a part of the works in case of non-availability of a portion of the site or for any other reasons and the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the Engineer-in-Charge and such alterations, omissions, additions or substitutions shall form part of the contract as if originally provided therein and any altered, additional or substituted work which the contractor may be directed to do in the manner specified above as part of the works, shall be carried out by the contractor on the same conditions in all respects including price on which he agreed to do the main work excepts as hereafter provided.

12.1 The time for completion of the works shall, in the event of any deviations resulting in additional cost over the tendered value sum being ordered be extended, if requested by the contractor, as follows:

- (i) In the proportion which the additional cost of the altered, additional or substituted work, bears to the original tendered value plus
- (ii) 25% of the time calculated in (i) above or such further additional time as may be considered reasonable by the Engineer-in-Charge.

12.2 Deviation, Extra Items and Pricing

In the case of extra item (s) (items that are completely new, and are in addition to the items contained in the Contract), the contractor may within fifteen days of receipt of order or occurrence of the item(s) claim rates, supported by proper analysis, for the work and the Engineer-in-Charge shall within one month of the receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates and the contractor shall be paid in accordance with the rates so determined.

In the case of substituted items (items that are taken up with partial substitution or in lieu of items of work in the contract), the rate for the agreement item (to be substituted) and substituted item shall also be determined in the manner as mentioned in the following para.

Deviation, Substituted Items, Pricing

- (a) If the market rate for the substituted item so determined is more than the market rate of the agreement item (to be substituted), the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).

- (b) If the market rate for the substituted item so determined is less than the market rate of the agreement item (to be substituted), the rate payable to the contractor for the substituted item shall be rate for the agreement item (to be substituted) so decreased to the extent of the difference between the market rate of substituted item and the agreement item (to be substituted)

Deviation, Deviated Quantities, Pricing

In the case of contract items, substituted items, contract cum substituted items, which exceed the limits laid down in schedule F, the contractor may within fifteen days of receipt of order or occurrence of the excess, claim revision of the rates, supported by the proper analysis for the work in excess of the above mentioned limits, provided that if the rates so claimed are in excess of the rates specified in the schedule of quantities, the Engineer –in –Charge shall within one month of receipt of the claim supported by the analysis, after giving consideration to the analysis of the rate submitted by the contractor, determine the rates on the basis of the market rates and the contractor shall be paid in accordance with the rates so determined.

- 12.3** The provisions of the preceding paragraph shall also apply to the decrease in the rates of items for the work in excess of the limits laid down in schedule F, and the Engineer–in–Charge shall after giving notice to the contractor within one month of occurrence of the excess and after taking in top consideration any reply received from him within fifteen days of the receipt of the notice, revise the rates of the work in question within one month of the expiry of the said period of fifteen days having regard to the market rates.
- 12.4** The contractor shall send to the Engineer – in – Charge once every three months, an up to date account giving complete details of all claims for additional payments to which the contractor may consider himself entitled and of all additional work ordered by the Engineer – in – Charge which he has executed during the preceding quarter failing which the contractor shall be deemed to have waived his right. However, the Engineer-in-charge may authorize consideration of such claims on merits.
- 12.5** For the purpose of the operation of schedule F, the following work shall be treated as works relating to foundation:
- (i) For buildings: All works upto 1.2 metres above ground level or upto floor 1 level, whichever is lower.
 - (ii) For abutments, piers, and well steining: All works upto 1.2 m above bed level
 - (iii) For retaining walls, wing walls, compound walls, overhead reservoirs/tanks and other elevated structures: All works upto 1.2 metres above the ground level.
 - (iv) For reservoirs/tanks (other than overhead reservoirs/tanks): All works upto 1.2 metres above the ground level
 - (v) For basement : All works upto 1.2 m above ground level or upto floor 1 level, whichever is lower.
 - (vi) For Roads all items of excavation and filling including treatment of sub- base.
- 12.6** Any operation incidental to or necessarily has to be in contemplation of bidder while filling tender, or necessary to proper execution of the item included in the schedule of quantities or in the schedule of rates mentioned above, whether or not, specifically indicated in the description of the item and the relevant specifications, shall be deemed to be included in the rates quoted by the bidder or the rate given in the said schedule of rates, as the case may be. Nothing extra shall be admissible for such operations.

CLAUSE 13 Foreclosure of contract due to Abandonment or Reduction in scope of Work

If at any time after acceptance of the tender, the Engineer-in-charge shall decide to abandon or reduce the scope of works for any reason whatsoever and hence not require the whole or any part of the works to be carried out, the Engineer – in – Charge shall give notice in writing to that effect to the contractor and the contractor shall act accordingly in the matter. The contractor shall have no claim to any payment of compensation or otherwise whatsoever, on account of any profit or

advantage which he might have derived from the execution of the works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.

The contractor shall be paid at contract rates, full amount for work executed at site and, in addition, a reasonable amount as certified by the Engineer – in – Charge for the items hereunder mentioned which could not be utilised on the work to the full extent in the view of foreclosure;

- (i) Any expenditure incurred on preliminary site work, e.g. temporary access roads, temporary labour huts, staff quarters and site office; storage accommodation and water storage tanks.
- (ii) Department/Government shall have the option to take over contractor's materials or any part of thereof either brought to site or of which the contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental to the work) provided, however Department/Government shall be bound take over the materials or such portions thereof as the contractor does not desire to retain. For materials taken over to be taken over by Department/Government, cost of such materials as detailed by Engineer –in – Charge shall be paid. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the contractor.
- (iii) If any materials supplied by the Department/Government are rendered surplus, the same except normal wastage shall be returned by the contractor to the Department/Government at rates not exceeding those at which these were originally issued, less allowance for any deterioration or damage which may have been caused whilst the materials were in the custody of the contractor. In addition, cost of transporting such materials from site to Government stores, if so required by Department/Government, shall be paid.
- (iv) Reasonable compensation of transfer of T&P from site to contractor's permanent stores or to his other works, whichever is less. If T&P are not transported to either of the said places, no cost of transportation shall be payable.
- (v) Reasonable compensation for repatriation of contractor's site staff and imported labour to the extent necessary.

The contractor shall, if required by the Engineer – in – Charge, furnish to him, books of account, wage books, time sheet and other relevant documents and evidence as may be necessary to enable him to certify the reasonable amount payable under this condition.

The reasonable amount of items on (i), (iv) and (v) above shall not be in excess of 2% of the cost of the work remaining incomplete on the date of closure, i.e. total stipulated cost of the work as per accepted tender less the cost of work actually executed under the contract and less the cost of contractor's materials at site taken over by the Department/Government as per item (ii) above. Provided always that against any payments due to the contractor on this account or otherwise, the Engineer – in – Charge shall be entitled to recover or be credited with any outstanding balances due from the contractor for advance paid in respect of any tool, plants and materials and any other sums which at the date of termination were recoverable by the Government from the contractor under the terms of the contract

CLAUSE 14 – Carrying out part work at risk & cost of Contractor

If contractor:

- i) At any time makes default during currency of work or does not execute any part of the work with due diligence and continues to do so even after a notice in writing of 7 days in this respect from the Engineer-in-charge; or
- ii) Commits default in complying with any of the terms and conditions of the Contract and does not remedy it or takes effective steps to remedy it within 7 days even after a notice in writing is given in that behalf by the Engineer-in-Charge; or
- iii) Fails to complete the work(s) or items of work with individual dates of completion, on or before the date(s) so determined, and does not complete them within the period specified in the notice given in writing in that behalf by the Engineer-in-charge.

The Engineer-in-Charge without invoking action under clause 3 may, without prejudice to any other

right or remedy against the contractor which have either accrued or accrue thereafter to Client, by a notice in writing to take the part work/part incomplete work of any item(s) out of his hands and shall have powers to:

- (a) Take possession of the site and any materials, constructional plant, implements, stores, etc., thereon; and/or
- (b) Carry out the part work/part incomplete work of any item(s) by any means at the risk and cost of the Contractor.

The Engineer-in-Charge shall determine the amount, if any, is recoverable from the Contractor for completion of the part work/part incomplete work of any item(s) taken out of his hands and execute at the risk and cost of the Contractor, the liability of contractor on account of loss or damage suffered by the Client because of action under this clause shall not exceed 10% of the tendered value of the work.

In determining the amount, credit shall be given to the contractor with the value of work done in all respect in the same manner and at the same rate as if it had been carried out by the original contractor under the terms of his contract, the value of Contractor's materials taken over and incorporated in the work and use of plant and machinery belonging to the contractor. The certificate of the Engineer-in-Charge as to the value of work done shall be final and conclusive against the contractor provided always that action under this clause shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the department are less than the amount payable to the contractor at his agreement rates, the difference shall not be payable to the contractor.

Any excess expenditure incurred or to be incurred by the Client in completing the part work/part incomplete work of any item(s) or the excess loss of damages suffered or may be suffered by Government as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to the Client in law or per as agreement be recovered from any money due to the contractor or any account, and if such money is insufficient, the contractor shall be called upon in writing and shall be liable to pay the same within 30 days.

If the contractor fails to pay the required sum within the aforesaid period of 30 days, the Engineer-in-Charge shall have the right to sell any or all of the contractor's unused materials, constructional plant, implements, temporary building at site etc. and adjust the proceed of sale thereof towards the dues recoverable from the contractor under the contract and if thereafter there remains any balance outstanding, it shall be recovered in accordance with the provisions of the contract.

In the event of above course being adopted by the Engineer-in-Charge, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advance on any account or with a view to the execution of the work or the performance of the contract.

CLAUSE 15 Suspension of Work

- (i) The contractor shall, on receipt of the order in writing of the Engineer – in – Charge, (whose decision shall be final and binding on the contractor) suspend the progress of the works or any part thereof for such time and in such manner as the Engineer – in – Charge may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of the following reasons:
 - (a) On account of any default on the part of the contractor or;
 - (b) For proper execution of the works or part thereof for reasons other than the default of the contractor; or
 - (c) For safety of the works or part thereof.

The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer – in – Charge.

- (ii) If the suspension is ordered for reasons (b) and (c) in sub-para (i) above:
 - (a) The contractor shall be entitled to an extension of time equal to the period of every such suspension PLUS 25%, for completion of the item or group of items of work for which a separate period of completion is specified in the contract and of which the suspended work forms a part, and;

- (b) If the total period of all such suspension in respect of an item or group of items or work for which a separate period of completion is specified in the contract exceeds thirty days, the contractor shall, in addition, be entitled to such compensation as the Engineer –in – Charge may consider reasonable in respect of salaries and /or wages paid by the contractor to his employees and labour at site, remaining idle during the period of suspension, adding thereto 2% to cover indirect expenses of the contractor provided the contractor submit the claim supported by details to the Engineer – in – Charge within fifteen days of the expiry of the period of 30days.
- (iii) If the works or part thereof is suspended on the orders of the Engineer – in – Charge for more than three months at a time, except when suspension is ordered for reason (a) in sub-para (i) above, the contractor may after receipt of such order serve a written notice on the Engineer – in – Charge requiring permission within fifteen days from receipt by the Engineer – in – Charge of the said notice, to proceed with the work or part thereof in regard to which progress has been suspended and if such permission is not granted within that time, the contractor, if he intends to treat the suspension, where it affects only a part of the works as an omission of such part by Government or where it affects whole of the works as an abandonment of the works by Government, shall within ten days of expiry of such period of 15 days give notice in writing of his intention to the Engineer –in – Charge. In the event of the contractor treating the suspension as an abandonment of the contract by the Government, he shall have no claim to payment of any compensation on account of any profit or advantage which he might have derived from the execution of the work in full but which he could not derive in consequence of the abandonment. He shall, however, be entitled to such compensation, as the Engineer – in – Charge may consider reasonable, in respect of salaries and /or wages paid by him to his employees and labour at site, remaining idle in consequence adding to the total thereof 2% to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer – in – Charge within 30 days of the expiry of the period of 3 months.

Provided, further that the contractor shall not be entitled to claim any compensation from Government for the loss suffered by him on account of delay by Government in the supply of materials in schedule 'B' where such delay is covered by difficulties relating to the supply of wagons, force majeure including non- allotment of such materials by controlling authorities, acts of God, acts of enemies of the state/country or any reasonable cause beyond the control of the Government.

CLAUSE 16

Action in case Work not done as per Specifications

All works under or in course of execution or executed in pursuance of the contract, shall at all times be open and accessible to the inspection and supervision of the Engineer – in – Charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Quality Assurance Unit of the Department or any organization engaged by the Department for Quality Assurance and of the Chief Technical Examiner's Office, and the contractor shall, at all times, during the usual working hours and at all other times at which reasonable notice of the visit of such officers has been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing, present for that purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

If it shall appear to the Engineer – in – Charge or his authorized subordinates in charge of the work or to the Officer in charge of Quality Assurance or his subordinate officers or the officers of the organization engaged by the Department for Quality Assurance or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, imperfect, or unskilful workmanship, or with materials or articles provided by him for the execution of the work which are unsound or of a quality inferior to that contracted or otherwise not in accordance with the contract, the contractor shall, on demand in writing which shall be made within twelve months (six months in the case of work costing Rs.10 Lac and below except road work) of the completion of the work from the Engineer –in – Charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer – in –

Charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as under clause 2 of the contract (for non- completion of the work in time) for this default.

In such case the Engineer – in – Charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the authority specified in schedule ‘F’ may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and /or get it and other connected and incidental items rectified, or removed and re – executed at the risk and the cost of the contractor. Decision of the Engineer – in – Charge to be conveyed in writing in respect of the same will be final and binding on the contractor.

CLAUSE 17 Contractor Liable for Damages, defects during maintenance period

If the contractor or his working people or servants shall break, deface, injure or destroy any part of building in which they may be working, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, grass or grassland, or cultivated ground contiguous to the premises on which the work or any part is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage or other faults appear in the work within twelve months (six months in the case of work costing Rs. Ten lacs and below except road work) after a certificate final or otherwise of its completion shall have been given by the Engineer – in – Charge as aforesaid arising out of defect or improper materials or workmanship the contractor shall upon receipt of a notice in writing on that behalf make the same good at his own expense or in default the Engineer – in – Charge cause the same to be made good by other workmen and deduct the expense from any sums that may be due or at any time thereafter may become due to the contractor, or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof. The security deposit of the contractor shall not be refunded before the expiry of twelve months (six months in the case of work costing Rs. Ten lacs and below except road work) after the issue of the certificate final or otherwise, of completion of work, or till the final bill has been prepared and passed whichever is later. Provided that in the case of road work, if the opinion of the Engineer – in – Charge, half of the security deposit is sufficient, to meet all liabilities of the contractor under this contract, half of the security deposit will be refundable after six months and the remaining half after twelve month of the issue of the said certificate of completion or till the final bill has been prepared and passed whichever is later.

In case of Operation & Maintenance works, the security deposit deducted from contractors shall be refunded within one month from the date of final payment or within one month from the date of completion of the maintenance contract whichever is earlier.

CLAUSE 18 Contractors to Supply Tools & Plants etc.

The contractor shall provide at his own cost all materials (except such special materials, if any, as may in accordance with the contract be supplied from the Engineer – in – Charge’s stores), machinery, tools & plants as specified in schedule “F”. In addition to this, appliances, implements, other plants, ladders, cordage, tackle, scaffolding and temporary works required for the proper execution of the work, whether original, altered or substituted and whether included in the specifications or other documents forming part of the contract or referred to in these conditions or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer – in – Charge as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage therefore to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials, necessary for the purpose of setting out works, and counting, weighing and assisting the measurement for examination at any time and from time to time of the work or materials. Failing his so doing, the same may be provided by the Engineer-in-Charge at the expense of the contractor and the expenses may be deducted, from any money due to the contractor under this contract or otherwise and /or from his security deposit or the proceeds of sale thereof, or a sufficient portions thereof.

CLAUSE 18A Recovery of Compensation paid to workmen

In every case in which by virtue of the provision sub-section (1) of Section 12, of the Workmen's Compensation Act, 1923, Government is obliged to pay compensation to a workman employed by the contractor, in execution of the works, Government will recover from the contractor, the amount of the compensation so paid; and, without prejudice to the rights of the Government under sub-section (2) of Section 12, of the said Act, Government shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Government to the contractor whether under this contract or otherwise. Government shall not be bound to contest any claim made against it under sub-section (1) of Section 12, of the said Act, except on the written request of the contractor and upon his giving to Government full security for all costs for which Government might become liable in consequence of contesting such claim.

CLAUSE 18B Ensuring Payment and Amenities to Workers if Contractor fails

In every case in which by virtue of the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and of the Contract Labour (Regulation and Abolition) Central Rules, 1971, Government is obliged to pay any amounts of wages to a workman employed by the contractor in execution of the work, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act or under the Rules framed by Government from time to time for the protection of the health and sanitary arrangements for workers employed by Contractors to be followed by the Contractor for this Project, Department/Government will recover from the contractor, the amount of wages so paid or the amount of expenditure so incurred; and without prejudice to the rights of the Government under sub-section (2) of Section 20, and sub-section (4) of Section 21, of the Contract Labour (Regulation and Abolition) Act, 1970, Government shall be at liberty to recover such amount or any part thereof by deducting it from the security deposit or from any sum due by Department/Government to the contractor whether under this contract or otherwise. Department/Government shall not be bound to contest any claim made against it under sub-section (1) of Section 20, sub-section (4) of Section 21, of the said Act, except on the written request of the contractor and upon his giving to the Department/Government full security for all costs for which the Department/Government might become liable in contesting such claim.

CLAUSE 19 Labour Laws to be complied by the Contractor

The contractor shall obtain a valid license under the Contract Labour (R & A) Act, 1970, and the Contract Labour (Regulation & Abolition) Central Rules, 1971, before the commencement of the work, and continue to have a valid license until the completion of the work. The contractor shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act, 1986.

The contractor shall also comply with the provisions of the Building and Other Construction Workers (Regulation of Employment & Condition of Service) Act, 1996 and the Building and Other Construction Workers Welfare Cess Act, 1996.

Any failure to fulfil these requirements shall attract the penal provisions of this contract arising out of the resultant non-execution of the work.

CLAUSE 19A

No labour below the age of fourteen years shall be employed on the work.

CLAUSE 19B Payment of wages:

Payment of wages:

- (i) The Contractor shall pay to labour employed by him either directly or through sub-contractors, wages not less than fair wages as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970 and the contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.
- (ii) The contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any labour

engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him.

- (iii) In respect of labour directly or indirectly employed in the works for performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with the Central Public Works Department contractor's Labour Regulations made by Government from time to time in regard to payment of wages, wage period, deduction from wages recovery of wages not paid and deductions unauthorisedly made, maintenance of wage books or wage slips, publication of scale of wages and other terms of employment, inspection and submission of periodical returns and all other matters of the like nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act, 1970, and the Contract Labour (Regulation and Abolition) Central Rules, 1971, wherever applicable.
- (iv) (a) The Engineer-in-Charge concerned shall have the right to deduct from the moneys due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfilment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deductions made from his or their wages which are not justified by their terms of the contract or non-observance of the Regulations.
 (b) Under the provision of Minimum Wages (Central) Rules, 1950, the contractor is bound to allow to the labours directly or indirectly employed in the works one day rest for 6 days continuous work and pay wages at the same rate as for duty. In the event of default, the Engineer-in-Charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labours and pay the same to the persons entitled thereto from any money due to the contractor by the Engineer-in-Charge Concerned.
 In the case of Union Territory of Delhi, however, as the all-inclusive minimum daily wages fixed under Notification of the Delhi Administration No. F. 12 (162) MWO/DAB/43884-91, dated 31.12.1979 as amended from time to time are inclusive of wages for the weekly day of rest, the question of extra payment for weekly holiday would not arise.
- (v) The contractor shall comply with the provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947, maternity Benefits Act, 1961, and the Contractors Labour (Regulation and Abolition) Act 1970, or the modifications thereof or any other laws relating thereto and the rules made thereunder from time to time.
- (vi) The contractor shall indemnify and keep indemnified Government against payments to be made under and for the observance of the laws aforesaid and the C.P.W.D Contractor's Labour Regulations without prejudice to his right to claim indemnity from his sub-contractors.
- (vii) The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.
- (viii) Whatever is the minimum wage for the time being, or if the wage payable is higher than such wage, such wage shall be paid by the contractor to the workman directly without the intervention of Jamadar and that Jamadar shall not be entitled to be deduct or recover any amount from the minimum wage payable to the workmen as and by way of commission or otherwise.
- (ix) The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered by the Jamadar from the wage of workmen

CLAUSE 19C

In respect of all labour directly or indirectly employed in the work for the performance of the contractors part of this contract, the contractor shall at his own expense arrange for the safety provisions as per Safety Code framed from time to time and shall at his own expense provide for all facilities in connection therewith. In case the contractor fails to make arrangement and provide necessary facilities as aforesaid, he shall be liable to pay a penalty of Rs. 200/- for each default and in addition, the Engineer-in- Charge shall be at liberty to make arrangement and provide facilities as

aforesaid and recover the costs incurred in that behalf from the contractor.

CLAUSE 19D

The contractor shall submit by the 4th and 19th of every month, to the Engineer-in- Charge, a true statement showing in respect of the second half of the preceding month and the first half of the current month respectively:-

- (1) The number of labours employed by him on the work,
- (2) Their working hours,
- (3) The wages paid to them,
- (4) The accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and
- (5) The number of female workers who have been allowed maternity benefit according to Clause 19F and amount paid to them.

Failing which the contractor shall liable to pay Government, a sum not exceeding Rs.200/- for each default or materially incorrect statement. The decision of the Departmental Officer(EIC) shall be final in deducting from any bill due to the contractor, the amount levied as fine and be binding on the contractor.

CLAUSE 19E

In respect of all labour directly or indirectly employed in the works for the performance of the contractor part of this contract, the contractor shall comply with or cause to be complied with all the rules framed by Government from time to time for the protection of the health and sanitary arrangements for workers employed by the HLL/ Client and its contractors.

CLAUSE 19F

Leave and pay during leave shall be regulated as follows:-

1. Leave
 - (i) In the case of delivery – maternity leave not exceeding 8 weeks, 4 weeks up to and including the day of delivery and 4 weeks following that day,
 - (ii) In the case of miscarriage – upto 3 weeks from the date of miscarriage.
2. Pay:
 - (i) In the case of delivery – leave pay during maternity leave will be at the rate of the women's average daily earnings, calculated on total wages earned on the days when fulltime work was done during a period of three months immediately preceding the date on which she gives notice that she expects to be confined or at the rate of Rupee one only a day whichever is greater.
 - (ii) In the case of miscarriage – leave pay at the rate of average daily earning calculated on the total wages earned on the day when full time work was done during a period of three months immediately preceding the date of such miscarriage.
3. Conditions for grant of Maternity Leave:

No maternity leave benefit shall be admissible to a woman unless she has been employed for a total period of not less than six months immediately preceding the date on which she proceeds on leave.
4. The contractor shall maintain a register of Maternity (Benefit) in the Prescribed form as shown in appendix –I and II, and the same shall be kept at the place of work.

CLAUSE 19G

In the event of the contractor(s) committing a default or breach of any of the provisions of the CPWD Contractor's Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filling any statement under the provisions of the above Regulations and Rules which is materially incorrect, he/they shall without prejudice to any other liability, pay to the Government a sum not exceeding Rs.5000/- for every default breach or furnishing, making, submitting filling such materially incorrect statements and in the event of the contractor(s) defaulting continuously in this respect, the penalty may be enhanced to Rs.5000/-per day for each day of default subject to a maximum of 5 per cent of the estimated cost of the work put to tender. The decision of the Engineer-in-Charge shall be final and binding on the parties.

Should it appear to the Engineer-in-Charge that the contractor(s) is/are not properly observing and complying with the provisions of the C.P.W.D Contractor's Labour Regulations and Model Rules and the provisions of the Contract Labour (Regulation and Abolition) Act 1970, and the Contract Labour (R&A) Central Rules 1971, for the protection of health and sanitary arrangements for work people employed by the contractor(s) (hereinafter referred as "the said Rules") the Engineer-in-Charge shall have power to give notice in writing to the contractor(s) requiring that the said Rules be complied with and the amenities prescribed therein be provided to the work-people within a reasonable time to be specified in the notice. If the contractor(s) shall fail within the period specified in the notice to comply with and/ observe the said Rules and to provide the amenities to the work-people as aforesaid, the Engineer-in-Charge shall have the power to provide the amenities hereinbefore mentioned at the cost of the contractor(s). The contractor(s) shall erect, make and maintain at his/their own expense and to approved standards all necessary huts and sanitary arrangements required for his/their work people on the site in connection with the execution of the works, and if the same shall not have been erected or constructed, according to approved standards, the Engineer-in-Charge shall have power to give notice in writing to the contractor(s) requiring that the said huts and sanitary arrangements be remodelled and/or reconstructed according to approved standards, and if the contractor(s) shall fail to remodel or reconstruct such huts and sanitary arrangements according to approved standards within the period specified in the notice, the Engineer-in-Charge shall have the power to remodel or reconstruct such huts and sanitary arrangements according to approved standards at the cost of the contractor(s).

CLAUSE 19H

The contractor(s) shall at his/their own cost provide his/their labour with a sufficient number of huts (hereinafter referred to as the camp) of the following specifications on a suitable plot of land to be approved by the Engineer-in-Charge.

- (i) (a) The minimum height of each hut at the eaves level shall be 2.1m (7ft.) and the floor area to be provided will be at the rate of 2.7 sqm (30 sqft) for each member of the worker's family staying with the labourer.
- (b) The Contractor(s) shall in addition construct suitable cooking places having a minimum area of 1.80m x 1.50m (6'x5') adjacent to the hut for each family.
- (c) The contractor(s) shall also construct temporary latrines and urinals for the use of the labourers each on the scale of not less than four per each one hundred of the total strength, separate latrines and urinals being provided for women.
- (d) The contractor(s) shall construct sufficient number of bathing and washing places, one unit for every 25 persons residing in the camp. These bathing and washing places shall be suitably screened.
- (ii) (a) All the huts shall have walls of sun-dried or burnt- bricks laid in mud mortar or other suitable local materials as may be approved by the Engineer- in-Charge. In case of sun-dried bricks, the walls should be plastered with mud gobri on both sides. The floor may be kutchra but plastered with mud gobri and shall be at least 15 cm (6") above the surrounding ground. The roofs shall be laid with thatch or any other materials as may be approved by the Engineer-in-Charge and the contractor shall ensure that throughout the period of their occupation, the roofs remain water-tight.

- (b) The contractor(s) shall provide each hut with proper ventilation.
- (c) All doors, windows and ventilators shall be provided with suitable leaves for security purposes.
- (d) There shall be kept an open space of at least 7.2m (8 yards) between the rows of hut which may be reduced to 6m (20 ft.) according to the availability of site with the approval of the Engineer-in-Charge. Back to back construction will be allowed.
- (iii) **Water Supply** – The contractor(s) shall provide adequate supply of water for the use of labourers. The provision shall not be less than two gallons of pure and wholesome water per head per day for drinking purposes and three gallons of clean water per head per day for bathing and washing purposes. Where piped water supply is available, supply shall be at stand posts and where the supply is from wells or river, tanks which may be of metal or masonry, shall be provided. The contractor(s) shall also at his/their own cost make arrangements for laying pipelines for water supply to his/ their labour camp from the existing mains wherever available, and shall pay all fees and charges therefore.
- (iv) The site selected for the camp shall be high ground, removed from jungle.
- (v) **Disposal of Excreta** – The contractor(s) shall make necessary arrangements for the disposal of excreta from the latrines by trenching or incineration which shall be according to the requirements laid down by the Local Health Authorities. If trenching or incineration is not allowed, the contractor(s) shall make arrangements for the removal of the excreta through the Municipal Committee/authority and inform it about the number of labourers employed so that arrangements may be made by such Committee /authority for the removal of the excreta. All charges on this account shall be borne by the contractor and paid direct by him to the Municipality/authority. The contractor shall provide one sweeper for every eight seats in case of dry system.
- (vi) **Drainage** – The contractor(s) shall provide efficient arrangements for draining away sullage water so as to keep the camp neat and tidy.
- (vii) The contractor(s) shall make necessary arrangements for keeping the camp area sufficiently lighted to avoid accidents to the workers.
- (viii) **Sanitation** – The contractor(s) shall make arrangements for conservancy and sanitation in the labour camps according to the rules of the Local Public Health and Medical Authorities.

CLAUSE 19I

The Engineer-in-Charge may require the contractor to dismiss or remove from the site of the work any person or persons in the contractor(s) employ upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such requirements.

CLAUSE 19J

It shall be the responsibility of the contractor to see that the building under construction is not occupied by any body unauthorisedly during construction, and is handed over to the Engineer-in-Charge with vacant possession of complete building. If such building though completed is occupied illegally, then the Engineer-in-Charge shall have the option to refuse to accept the said building / buildings in that position. Any delay in acceptance on this account will be treated as the delay in completion and for such delay, a levy upto 5% of tendered value of work may be imposed by the Superintending Engineer whose decision shall be final both with regard to the justification and quantum and be binding on the contractor.

However, EIC, through a notice, may require the contractor to remove the illegal occupation any time on or before construction and delivery.

CLAUSE 19K Employment of skilled /semi skilled workers

The contractor shall, at all stages of work, deploy skilled/semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute/ Industrial Training Institute /National institute of Construction Management and Research (NICMAR) /National Academy of Construction, CIDC or any similar reputed and recognized Institute managed /certified by State /Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled /semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesman along with requisite certificate from recognized Institute to Engineer in charge for approval. Notwithstanding such approval if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs.100 per such tradesmen per day. Decision of Engineer in Charge as to whether particular tradesmen possess (es) requisite skill and amount of compensation in case of default shall be final and binding.

Provided always, that the provisions of this clause shall not be applicable for works with estimated cost put to tender being less than Rs.5 crores.

CLAUSE 20 Minimum Wages Act to be complied with

The contractor shall comply with all the provisions of the Minimum Wages Act, 1948, and Contract Labour (Regulation and Abolition) Act, 1970, amended from time to time and rules framed thereunder and other labour laws affecting contract labour that may be brought into force from time to time.

CLAUSE 21 Work not to be sublet. Action in case of insolvency

The contract shall not be assigned or sublet without the written approval of the Engineer-in-Charge. And if the contractor shall assign or sublet his contract, or attempt to do so, or become insolvent or commence any insolvency proceedings or make any composition with his creditors or attempt to do so, or if any bribe, gratuity, gift, loan, perquisite, reward or advantage pecuniary or otherwise, shall either directly or indirectly, be given promised or offered by the contractor, or any of his servants or agent to any public officer or person in the employ of Government in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Engineer-in-Charge on behalf of the President of India shall have power to adopt the course specified in Clause 3 hereof in the interest of Government and in the event of such course being adopted, the consequences specified in the said Clause 3 shall ensue.

CLAUSE 22

All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the actual loss or damage sustained and whether or not any damage shall have been sustained.

CLAUSE 23 Changes in firm's Constitution to be intimated

Where the contractor is a partnership firm, the previous approval in writing of the Engineer-in-Charge shall be obtained before any change is made in the constitution of the firm. Where the contractor is an individual or a Hindu undivided family business concern, such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the works hereby undertaken by the contractor. If previous approval as aforesaid is not obtained, the contract shall be deemed to have been assigned in contravention of Clause 21 hereof and the same action may be taken, and the same consequences shall ensue as provided in the said Clause 21.

CLAUSE 24

All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of the Engineer-in-Charge who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.

CLAUSE 25**Settlement of Disputes & Arbitration**

Except where otherwise provided in the contract, all questions and disputes relating to the meaning of the specifications, design, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used on the work or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions or otherwise concerning the works or the execution or failure to execute the same whether arising during the progress of the work or after the cancellation, termination, completion, or abandonment thereof shall be dealt with as mentioned hereinafter:

- (i) If the contractor considers any work demanded of him to be outside the requirements of the contract, or disputes any drawings, record or decision given in writing by the Engineer-in-Charge on any matter in connection with or arising out of the contract or carrying out of the work, to be unacceptable, he shall promptly within 15 days request the authority as indicated in Schedule 'F' (Reviewing Authority) in writing for written instruction or decision. Thereupon, the Reviewing Authority shall give his written instructions or decision within a period of one month from the receipt of the contractor's letter.

If the Reviewing Authority fails to give his instructions or decision in writing within the aforesaid period or if the contractor is dissatisfied with the instructions or decision of the Reviewing Authority, the contractor may, within 15 days of the receipt of Reviewing Authorities' decision, appeal to the authority as indicated in Schedule 'F' (Appealing Authority) who shall afford an opportunity to the contractor to be heard, if the latter so desires, and to offer evidence in support of his appeal. The Appealing Authority shall give his decision within 30 days of receipt of contractor's appeal. If the contractor is dissatisfied with this decision, the contractor shall within a period of 30 days from receipt of the decision, give notice to the Client for appointment of arbitrator failing which the said decision shall be final binding and conclusive and not referable to adjudication by the arbitrator.

- (ii) Except where the decision has become final, binding and conclusive in terms of sub-para (i) above, disputes or difference shall be referred for adjudication through arbitration by a sole arbitrator appointed by the Client. If the arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever, another sole arbitrator shall be appointed in the manner aforesaid. Such person shall be entitled to proceed with the reference from the stage at which it was left by his predecessor.

It is a term of this contract that the party invoking arbitration shall give a list of disputes with amounts claimed in respect of each such dispute along with the notice for appointment of arbitrator and giving reference to the rejection by the Appealing Authority of the appeal.

It is also a term of this contract that no person, other than a person appointed by IMPCL or the Client, as aforesaid, should act as arbitrator.

It is also a term of this contract that if the contractor does not make any demand for appointment of arbitrator in respect of any claims in writing as aforesaid within 120 days of receiving the intimation from the Engineer-in-Charge that the final bill is ready for payment, the claim of the contractor shall be deemed to have been waived and absolutely barred and the Department/Government shall be discharged and released of all liabilities under the contract in respect of these claims.

The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act, 1996 (26 of 1996) or any statutory modifications or re-enactment thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceeding under this clause.

It is also a term of this contract that the arbitrator shall adjudicate on only such disputes as are referred

to him by the appointing authority and give separate award against each dispute and claim referred to him and in all cases the arbitrator shall give reasons for the award. However the Arbitrator shall also have the power to make Interim Award.

It is also a term of the contract that if any fees are payable to the arbitrator, these shall be paid equally by both the parties.

It is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their statement of claims and counter statement of claims. The venue of the arbitration shall be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any, of the arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award (including the fees, if any, of the arbitrator) shall be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part thereof shall be paid and fix or settle the amount of costs to be so paid.

CLAUSE 26 Contractor to indemnify Govt. against Patent Rights

The contractor shall fully indemnify and keep indemnified the President of India against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claims made under or action brought against Department/Government in respect of any such matters as aforesaid, the contractor shall be immediately notified thereof and the contractor shall be at liberty, at his own expense, to settle any dispute or to conduct any litigation that may arise there from, provided that the contractor shall not be liable to indemnify the President of India if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge in this behalf.

CLAUSE 27 Lump sum Provisions in Tender

When the estimate on which a tender is made includes lump sum in respect of parts of the work, the contractor shall be entitled to payment in respect of the items of work involved or the part of the work in question at the same rates as are payable under this contract for such items, or if the part of the work in question is not, in the opinion of the Engineer-in-Charge payable of measurement, the Engineer-in-Charge may at his discretion pay the lump-sum amount entered in the estimate, and the certificate in writing of the Engineer-in-Charge shall be final and conclusive against the contractor with regard to any sum or sums payable to him under the provisions of the clause.

CLAUSE 28 Action where no specifications are specified

In the case of any class of work for which there is no such specifications as referred to in Clause 11, such work shall be carried out in accordance with the Bureau of Indian Standards Specifications. In case there are no such specifications in bureau of Indian Standards, the work shall be carried out as per manufacturers' specifications, if not available then as per District Specifications. In case there are no such specifications as required above, the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in-Charge.

CLAUSE 29 With-holding and lien in respect of sums due from contractor

- (i) Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the contractor, the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any deposited by the contractor and for the purpose aforesaid, the Engineer-in-Charge or the Government shall be entitled to withhold the security deposit, if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the Engineer-in-Charge or the Government shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, from any sum or sums found payable or which may at any time thereafter become payable to the contractor under the same contract or any other contract with the Engineer-in-Charge of the Government or any contracting person

through the Engineer-in-Charge pending finalization of adjudication of any such claim.

It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above by the Engineer-in-Charge or Government will be kept withheld or retained as such by the Engineer-in-Charge or Government till the claim arising out of or under the contract is determined by the arbitrator (if the contract is governed by the arbitration clause) by the competent court, as the case may be and that the contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to above and duly notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company, the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/limited company as the case may be, whether in his individual capacity or otherwise.

- (ii) Government shall have the right to cause an audit and technical examination of the works and the final bills of the contractor including all supporting vouchers, abstract, etc., to be made after payment of the final bill and if as a result of such audit and technical examination any sum is found to have been overpaid in respect of any work done by the contractor under the contract or any work claimed to have been done by him under the contract and found not to have been executed, the contractor shall be liable to refund the amount of over-payment and it shall be lawful for Government to recover the same from him in the manner prescribed in sub-clause (i) of this clause or in any other manner legally permissible; and if it is found that the contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by Government to the contractor, without any interest thereon whatsoever.

Provided that the Government shall not be entitled to recover any sum overpaid, nor the contractor shall be entitled to payment of any sum paid short where such payment has been agreed upon between the Engineer-in-Charge on the one hand and the contractor on the other under any term of the contract permitting payment for work after assessment by the Engineer-in-Charge.

CLAUSE 29A Lien in respect of claims in other Contracts

Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the Engineer-in-Charge or the Government or any other contracting person or persons through Engineer-in-Charge against any claim of the Engineer-in-Charge or Government or such other person or persons in respect of payment of a sum of money arising out of or under, any other contract made by the contractor with the Engineer-in-Charge or the Government or with such other person or persons.

It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Engineer-in-Charge or the Government will be kept withheld or retained as such by the Engineer-in-Charge or the Government or till his claim arising out of the same contract or any other contract is either mutually settled or determined by the arbitration clause or by the competent court, as the case may be and that the contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

CLAUSE 30 Employment of coal mining or controlled area labour not permissible

The contractor shall not employ coal mining or controlled area labour falling under any category whatsoever on or in connection with the work or recruit labour from area within a radius of 32 km (20 miles) of the controlled area. Subject as above the contractor shall employ imported labour only i.e., deposit imported labour or labour imported by contractors from area, from which import is permitted.

Where ceiling price for imported labour has been fixed by State or Regional Labour Committees not

more than that ceiling price shall be paid to the labour by the contractor.

The contractor shall immediately remove any labourer who may be pointed out by the Engineer-in-Charge as being a coal mining or controlled area labourer,. Failure to do so shall render the contractor liable to pay to Government a sum calculated at the rate of Rs. 10/- per day per labourer. The certificate of the Engineer-in-Charge about the number of coal mining or controlled area labourer and the number of days for which they worked shall be final and binding upon all parties to this contract.

It is declared and agreed between the parties that the aforesaid stipulation in this clause is one in which the public are interested within the meaning of the exception in Section 74 of Indian contract Act, 1872.

Explanation: -Controlled Area means the following areas:

Districts of Dhanbad, Hazaribagh, Jamtara – a Sub-Division under Santhal Pargana Commissionery, Districts of Bankura, Birbhum, Burdwan, District of Bilaspur.

Any other area which may be declared a Controlled Area by or with the approval of the Central Government.

CLAUSE 31 Unfiltered water supply

The contractor(s) shall make his/their own arrangements for water required for the work and nothing extra will be paid for the same. This will be subject to the following conditions.

- (i) That the water used by the contractor(s) shall be fit for construction purposes to the satisfaction of the Engineer-in-Charge.
- (ii) The Engineer-in-Charge shall make alternative arrangements for supply of water at the risk and cost of contractor(s) if the arrangements made by the contractor(s) for procurement of water are in the opinion of the Engineer-in-Charge, unsatisfactory.

CLAUSE 31A Departmental water supply, if available

Water if available may be supplied to the contractor by the Department subject to the following conditions:-

- (i) The water charges @ 1% shall be recovered on gross amount of the work done.
- (ii) The contractor(s) shall make his/their own arrangement of water connection and laying of pipelines from existing main of source of supply.
- (iii) The Department do not guarantee to maintain uninterrupted supply of water and it will be incumbent on the contractor(s) to make alternative arrangements for water at his/their own cost in the event of any temporary break down in the Government water main so that the progress of his/their work is not held up for want of water. No claim of damage or refund of water charges will be entertained on account of such break down.

CLAUSE 32 Alternate water arrangements

- (i) Where there is no piped water supply arrangement and the water is taken by the contractor from the wells or hand pump constructed by the government, no charge shall be recovered from the contractor on that account. The contractor shall, however, draw water at such hours of the day that it does not interfere with the normal use for which the hand pumps and wells are intended. He will also be responsible for all damage and abnormal repairs arising out of his use, the cost of which shall be recoverable from him. The Engineer-in-Charge shall be the final authority to determine the cost recoverable from the contractor on this account and his decision shall be binding on the contractor.
- (ii) The contractor shall be allowed to construct temporary wells in Government land for taking water for construction purposes only after he has got permission of the Engineer-in-Charge in writing. No charges shall be recovered from the contractor on this account, but the contractor shall be required to provide necessary safety arrangements to avoid any accidents or damage to

adjacent buildings, roads and service lines. He shall be responsible for any accidents or damage caused due to construction and subsequent maintenance of the wells and shall restore that ground to its original condition after the wells are dismantled on completion of the work.

CLAUSE 33 Return of Surplus materials

Notwithstanding anything contained to the contrary in this contract, where any materials for the execution of the contract are procured with the assistance of Government either by issue from government stocks or purchase made under orders or permits or licences issued by Government, the contractor shall hold the said materials economically and solely for the purpose of the contract and not dispose of them without the written permission of the Government and return, if required by the Engineer-in-Charge, all surplus or unserviceable materials that may be left with him after the completion of the contract or at its termination for any reason whatsoever on being paid or credited such price as the Engineer-in-Charge shall determine having due regard to the condition of the materials. The price allowed to the contractor however shall not exceed the amount charged to him excluding the element of storage charges. The decision of the Engineer- in-Charge shall be final and conclusive. In the event of breach of the aforesaid condition, the contractor shall in addition to throwing himself open to action for contravention of the terms of the licence or permit and/or for criminal breach of trust, be liable to Government for all moneys, advantages or profits resulting or which in the usual course would have resulted to him by reason of such breach.

CLAUSE 34 Hire of Plant & Machinery

- (i) The contractor shall arrange at his own expense all tools, plant, machinery and equipment (hereinafter referred to as T & P) required for execution of the work except for the Plant & Machinery listed in Schedule 'C' and stipulated for issue to the contractor. If the contractor requires any item of T&P on hire from the T & P available with the Government over and above the T&P stipulated for issue, the Government will, if such item is available, hire it to the contractor at rates to be agreed upon between him and the Engineer-in-Charge. In such a case, all the conditions hereunder for issue of T&P shall also be applicable to such T&P as is agreed to be issued.
- (ii) Plant and Machinery when supplied on hire charges shown in Schedule 'C' shall be made over and taken back at the departmental equipment yard/shed shown in Schedule 'C' and the contractor shall bear the cost of carriage from the place of issue to the site of work and back. The contractor shall be responsible to return the plant and machinery with condition in which it was handed over to him, and he shall be responsible for all damage caused to the said plant and machinery at the site of work or elsewhere in operation and otherwise during transit including damage to or loss of plant and for all losses due to his failure to return the same soon after the completion of the work for which it was issued. The Divisional Engineer shall be the sole judge to determine the liability of the contractor and its extent in this regard and his decision shall be final and binding on the contractor.
- (iii) The plant and machinery as stipulated above will be issued as and when available and if required by the contractor. The contractor shall arrange his programme of work according to the availability of the plant and machinery and no claim, whatsoever, will be entertained from him for any delay in supply by the Department.
- (iv) The hire charges shall be recovered at the prescribed rates from and inclusive of the date the plant and machinery made over upto and inclusive of the date of the return in good order even though the same may not have been working for any cause except major breakdown due to no fault of the contractor or faulty use requiring more than three working days continuously (excluding intervening holidays and Sundays) for bringing the plant in order. The contractor shall immediately intimate in writing to the Engineer-in-Charge when any plant or machinery gets out of order requiring major repairs as aforesaid. The Engineer- in-Charge shall record the date and time of receipt of such intimation in the log sheet of the plant or machinery. Based on this if the breakdown before lunch period or major breakdown will be computed considering half a day's breakdown on the day of complaint. If the breakdown occurs in the post lunch period of major breakdown will be computed starting from the next

working day. In case of any dispute under this clause, the decision of the Engineer-in-charge shall be final and binding on the contractor.

- (v) The hire charges shown above are for each day of 8 hours (inclusive of the one hour lunch break) or part thereof.
- (vi) Hire charges will include service of operating staff as required and also supply of lubricating oil and stores for cleaning purposes. Power fuel of approved type, firewood, kerosene oil etc. for running the plant and machinery and also the full time chowkidar for guarding the plant and machinery against any loss or damage shall be arranged by the contractor who shall be fully responsible for the safeguard and security of plant and machinery. The contractor shall on or before the supply of plant and machinery sign an agreement indemnifying the Department against any loss or damage caused to the plant and machinery either during transit or at site of work.
- (vii) Ordinarily, no plant and machinery shall work for more than 8 hours a day inclusive of one hour lunch break. In case of an urgent work however, the Engineer-in-Charge may, at his discretion, allow the plant and machinery to be worked for more than normal period of 8 hours a day. In that case, the hourly hire charges for overtime to be borne by the contractor shall be 50% more than the normal proportionate hourly charges (1/8th of the daily charges) subject to a minimum of half day's normal charges on any particular day. For working out hire charges for over time, a period of half an hour and above will be charged as one hour and a period of less than half an hour will be ignored.
- (viii) The contractor shall release the plant and machinery every seventh day for periodical servicing and/or wash out which may take about three to four hours or more. Hire charges for full day shall be recovered from the contractor for the day of servicing/wash out irrespective of the period employed in servicing.
- (ix) The plant and machinery once issued to the contractor shall not be returned by him on account of lack of arrangements of labour and materials, etc. on his part, the same will be returned only when they are required for major repairs or when in the opinion of the Engineer-in-Charge, the work or a portion of work for which the same was issued is completed.
- (x) Log Book for recording the hours of daily work for each of the plant and machinery supplied to the contractor will be maintained by the Department and will be countersigned by the contractor or his authorized agent daily. In case the contractor contests the correctness of the entries and/or fails to sign the Log Book, the decision of the Engineer-in-Charge shall be final and binding on him. Hire charges will be calculated according to the entries in the Log book and will be binding on the contractor. Recovery on account of hire charges for road rollers shall be made for the minimum number of days worked out on the assumption that a roller can consolidate per day and maximum quantity of materials or area surfacing as noted against each in the annexed statement (see attached annexure).
- (xi) In the case of concrete mixers, the contractors shall arrange to get the hopper cleaned and the drum washed at the close of the work each day or each occasion.
 - (a) In case rollers for consolidation are employed by the contractor himself, log book for such rollers shall be maintained in the same manner as is done in case of departmental rollers, maximum quantity of any items to be consolidated for each roller-day shall also be same as in annexure to Clause 34(x). For less use of rollers, recovery for the less roller days shall be made at the stipulated issue rate.
- (xii) The contractor shall be responsible to return the plant and machinery in the condition in which it was handed over to him and he shall be responsible for all damage caused to the said plant and machinery at the site of work or elsewhere in operation or otherwise or during transit including damage to or loss of parts, and for all losses due to his failure to return the same soon after the completion of the work for which it was issued. The Divisional Engineer shall be the sole judge to determine the liability of the contractor and its extent in this regard and his decision shall be final and binding on the contractor.
- (xiii) The contractor will be exempted from levy of any hire charges for the number of days he is called upon in writing by the Engineer-in-Charge to suspend execution of the work, provided Government plant and machinery in question have, in fact, remained idle with the contractor

because of the suspension.

- (xiv) In the event of the contractor not requiring any item of plant and machinery issued by Government though not stipulated for issue in Schedule 'C' any time after taking delivery at the place of issue, he may return it after two days written notice or at any time without notice if he agrees to pay hire charges for two additional days without, in any way, affecting the right of the Engineer-in-Charge to use the said plant and machinery during the said period of two days as he likes including hiring out to a third party.

CLAUSE 35

Condition relating to use of asphaltic materials

- (i) The contractor undertakes to make arrangement for the supervision of the work by the firm supplying the tar or bitumen used.
- (ii) The contractor shall collect the total quantity of tar or bitumen required for the work as per standard formula, before the process of painting is started and shall hypothecate it to the Engineer-in-Charge. If any bitumen or tar remains unused on completion of the work on account of lesser use of materials in actual execution for reasons other than authorized changes of specifications and abandonment of portion of work, a corresponding deduction equivalent to the cost of unused materials as determined by the Engineer-in-Charge shall be made and the material return to the contractors. Although the materials are hypothecated to Government, the contractor undertakes the responsibility for their proper watch, safe custody and protection against all risks. The materials shall not be removed from site of work without the consent of the Engineer-in-Charge in writing.
- (iii) The contractor shall be responsible for rectifying defects noticed within a year from the date of completion of the work and the portion of the security deposit relating to asphaltic work shall be refunded after the expiry of this period.

CLAUSE 36

Employment of Technical Staff and Employees

Contractors Superintendence, Supervision, Technical Staff & Employees

- (i) The contractor shall provide all necessary superintendence during execution of the work and all along thereafter as may be necessary for proper fulfilling of the obligations under the contract.

The contractor shall immediately after receiving letter of acceptance of the tender and before commencement of the work, intimate in writing to the Engineer-in-Charge, the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. Minimum requirement of such technical representative(s) and their qualifications and experience shall not be lower than specified in Schedule 'F'. The Engineer-in-Charge shall within 3 days of receipt of such communication intimate in writing his approval or otherwise of such a representative(s) to the contractor. Any such approval may at any time be withdrawn and in case of such withdrawal, the contractor shall appoint another such representative(s) according to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from Engineer-in-Charge and shall be available at site before start of work.

All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s). The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any construction activity is in progress and also present himself/themselves, as required, to the Engineer-in-Charge and/or his designated representative to take instructions. Instructions given to the principal technical representative or other technical representative(s) shall be deemed to have the same force as if these have been given to the contractor. The principal technical representative and other technical representative(s) shall be actually available at site fully during all stages of execution of work, during recording/checking/test checking of measurements of works and whenever so required by the

Engineer-in-Charge and shall also note down instructions conveyed by the Engineer-in-Charge or his designated representative(s) in the site order book and shall affix his/their signature in token

of noting down the instructions and in token of acceptance of measurements/checked measurements/test checked measurements. The representative(s) shall not look after any other work.

Substitutes, duly approved by Engineer-in-Charge of the work in similar manner as aforesaid shall be provided in event of absence of any of the representative(s) by more than two days.

If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representative(s) is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non-refundable) shall be effected from the contractor as specified in Schedule 'F' and the decision of the Engineer-in-Charge as recorded in the site order book and measurement recorded checked/test checked in Measurement Books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable technical Principal technical representative and/or other technical representative(s) and if such appointed persons are not effectively present or are absent by more than two days without duly approved substitute or do not discharge their responsibilities satisfactorily, the Engineer-in-Charge shall have full powers to suspend the execution of the work until such date as suitable other technical representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor shall submit a certificate of employment of technical representative(s) along with every on account bill/final bill and shall produce evidence if at any time so required by the Engineer-in-Charge.

- (ii) The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work.

The contractor shall provide and employ skilled, semiskilled and unskilled labour as is necessary for proper and timely execution of the work.

The Engineer-in-Charge shall be at liberty to object to and require the contractor to remove from the works any person who in his opinion misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is other wise considered by the Engineer-in-Charge to be undesirable. Such person shall not be employed again at works site without the written permission of the Engineer-in-Charge and the persons so removed shall be replaced as soon as possible by competent substitutes.

CLAUSE 37 Levy/Taxes payable by Contractor

- (i) Sales Tax/VAT (including service tax), Building and other Construction Workers Welfare Cess or any other tax or cess in respect of this contract shall be payable by the contractor and Government shall not entertain any claim whatsoever in this respect.
- (ii) The contractor shall deposit royalty and obtain necessary permit for supply of the bajri, stone, kankar, etc. from local authorities.
- (iii) If pursuant to or under any law, notification or order any royalty, cess or the like becomes payable by the Government of India and does not any time become payable by the contractor to the State Government/Local authorities in respect of any material used by the contractor in the works then in such a case, it shall be lawful to the Government of India and it will have the right and be entitled to recover the amount paid in the circumstances as aforesaid from dues of the contractor.
- (iv) ESI and EPF contributions in respect of this contract shall be payable by the contractor and any payment in respect of this shall be made by the contractor only and Government shall not entertain any claim whatsoever in this respect. In case of any demand from the ESI & EPF authorities against the contractor, the same shall be deducted from their bills/ dues.

CLAUSE 38 Conditions for reimbursement of levy/taxes if levied after receipt of tenders

- (v) All tendered rates shall be inclusive of all taxes and levies (including service tax) payable under respective statutes. However, if any further tax or levy or cess is imposed by Statute, after the last stipulated date for the receipt of tender including extensions if any and the contractor thereupon necessarily and properly pays such taxes/levies, the contractor shall be reimbursed the amount so paid, provided such payments, if any, is not, in the opinion of the Engineer-in-charge (whose decision shall be final and binding on the contractor) attributable to delay in execution of work within the control of the contractor.
- (vi) The contractor shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Government and/or the Engineer-in-Charge and further shall furnish such other information/document as the Engineer-in-Charge may require from time to time.
- (vii) The contractor shall, within a period of 30 days of the imposition of any such further tax or levy or cess, give a written notice thereof to the Engineer-in-Charge that the same is given pursuant to this condition, together with all necessary information relating thereto.

CLAUSE 39 Termination of Contract on death of contractor

Without prejudice to any of the rights or remedies under this contract, if the contractor dies, the authority indicated in Schedule 'F', on behalf of the President of India shall have the option of terminating the contract without compensation to the contractor.

CLAUSE 40 If relative working in IMPCL/MoHFW then the contractor not allowed to tender

The contractor shall not be permitted to tender for works in IMPCL/MoHFW (responsible for award and execution of contracts) in which his near relative is posted as Accountant or as an officer in any capacity between the grades of the Secretary and Group B Gazetted officer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Gazetted Officer in the Ministry of Health and Family Welfare. Any breach of this condition by the contractor would render him liable to be debarred from tendering in the Department in future.

NOTE: By the term "near relatives" is meant wife, husband, parents and grandparents, children and grandchildren, brothers and sisters, uncles, aunts and cousins and their corresponding in-laws.

CLAUSE 41 No Gazetted Engineer to work as Contractor within one year of retirement

No Engineer of Gazetted rank or other Gazetted officer employed in Engineering or administrative duties in an engineering department of the Government of India shall work as a contractor or employee of a contractor for a period of one year after his retirement from government service without the previous permission of Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of Government of India as aforesaid, before submission of the tender or engagement in the contractor's service, as the case may be.

CLAUSE 42 Return of material & recovery for excess material issued.

- (i) After completion of the work and also at any intermediate stage in the event of no reconciliation of materials issued, consumed and in balance – (see Clause 10), theoretical quantity of materials issued by the Government for use in the work shall be calculated on the basis and method given hereunder:-
 - (a) Quantity of cement & bitumen shall be calculated on the basis of quantity of cement & bitumen required for different items of work as shown in the Schedule of Rates mentioned in Schedule 'F'. In case any item is executed for which standard

constants for the consumption of cement or bitumen are not available in the above mentioned schedule/statement or cannot be derived from the same shall be calculated on the basis of standard formula to be laid down by the Engineer-in-Charge.

- (b) Theoretical quantity of steel reinforcement or structural steel sections shall be taken as the quantity required as per design or as authorized by Engineer-in-Charge, including authorized lappings, chairs etc. plus 3% wastage due to cutting into pieces, such theoretical quantity being determined and compared with the actual issues each diameter wise, section wise and category wise separately.
 - (c) Theoretical quantity of G.I. & C.I. or other pipes, conduits, wires and cables, pig lead and G.I./M.S. sheets shall be taken as quantity actually required and measured plus 5% for wastage due to cutting into pieces (except in the case of G.I./M.S. sheets it shall be 10%), such determination & comparison being made diameter wise & category wise.
 - (d) For any other material as per actual requirements.
- (ii) Over the theoretical quantities of materials so computed a variation shall be allowed as specified in Schedule 'F'. The difference in the net quantities of material actually issued to the contractor and the theoretical quantities including such authorized variation, if not returned by the contractor or if not fully reconciled to the satisfaction of the Engineer-in-Charge within fifteen days of the issue of written notice by the Engineer-in-Charge to this effect shall be recovered at the rates specified in Schedule 'F', without prejudice to the provision of the relevant conditions regarding return of materials governing the contract. Decision of Engineer-in-Charge in regard to theoretical quantities of materials, which should have been actually used as per the Annexure of the standard schedule of rates and recovery at rates specified in Schedule 'F', shall be final & binding on the contractor.
- For non-scheduled items, the decision of the Superintending Engineer regarding theoretical quantities of materials which should have been actually used shall be final and binding on the contractor.
- (iii) The said action under this clause is without prejudice to the right of the Government to take action against the contractor under any other conditions of contract for not doing the work according to the prescribed specifications.

CLAUSE 43

Compensation during warlike situations

The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall be at the risk of the contractor until the work has been delivered to the Engineer-in-Charge and a certificate from him to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or warlike operation, the contractor shall when ordered (in writing) by the Engineer-in-Charge to remove any debris from the site, collect and properly stack or remove in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable material and for reconstruction of all works ordered by the Engineer-in-Charge, such payments being in addition to compensation upto the value of the work originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for, the compensation shall be assessed by the Engineer-in-charge or his authorized representative. The contractor shall be paid for the damages/destruction suffered and for restoring the material at the rate based on analysis of rates tendered for in accordance with the provision of the contract. The certificate of the Engineer-in-Charge regarding the quality and quantity of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.

Provided always that no compensation shall be payable for any loss in consequence of hostilities or warlike operations (a) unless the contractor had taken all such precautions against air raid as are deemed necessary by the A.R.P. Officers or the Engineer-in-Charge (b) for any material etc. not on the site of the work or for any tools, plant, machinery, scaffolding, temporary building and other things not

intended for the work.

In the event of the contractor having to carry out reconstruction as aforesaid, he shall be allowed such extension of time for its completion as is considered reasonable by the Divisional Officer.

CLAUSE 44 Apprentices Act provisions to be complied with

The contractor shall comply with the provisions of the Apprentices Act, 1961 and the rules and orders issued thereunder from time to time. If he fails to do so, his failure will be a breach of the contract and the Client may, in his discretion, cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the said Act.

CLAUSE 45 Release of Security deposit after labour clearance

Security Deposit of the work shall not be refunded till the contractor produces a clearance certificate from the Labour Officer. As soon as the work is virtually complete the contractor shall apply for the clearance certificate to the Labour Officer under intimation to the Engineer-in-Charge. The Engineer-in-Charge, on receipt of the said communication, shall write to the Labour Officer to intimate if any complaint is pending against the contractor in respect of the work. If no complaint is pending, on record till after 3 months after completion of the work and/or no communication is received from the Labour Officer to this effect till six months after the date of completion, it will be deemed to have received the clearance certificate and the Security Deposit will be released if otherwise due.

CLAUSE 46 Insurance

46.1 Without limiting the Contractor's obligations and responsibilities stated elsewhere in the Contract, the Contractor shall at his own cost arrange, secure and maintain insurance in the joint names of the HLL/ Client and the contractor with an insurance company selected by the contractor and acceptable to the HLL/ Client/Consultant, in such a manner that the HLL/ Client and the contractor are covered for all time during the period of contract i.e. the time period allowed for completion of work, extended period and the defect liability period. The insurance shall be effected in accordance with terms approved by the HLL/ Client and the contractor shall submit the insurance policies to the Engineer-In-Charge within one week of signing of the agreement along with the receipt of premium. The contractor shall timely pay and submit the receipts of payment of premiums for extensions of policies, if any. The insurance shall cover the following: -

a) Contractor's All Risks Insurance

The contractor shall insure the work for a sum equivalent to the Contract value together with materials and Plant for incorporation therein, to the full replacement cost and it being understood that such insurance shall provide for compensation to be payable to rectify the loss or damage incurred, and, an additional sum of 15 (%) per-cent of such replacement cost to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature, and it being understood that such insurance shall provide for compensation to be payable to rectify the loss or damage incurred or such additional sums as specified and the interests of the HLL/ Client against ALL RISKS claims, proceedings, loss or damages, costs, charges and expenses from whatsoever cause arising out of or in consequence of the execution and maintenance of the work for which the contractor is responsible under the contract.

b) Workman Compensation & Employers Liability Insurance.

This insurance shall be effected for all the contractor's employees engaged in the performance of the contract. The HLL/ Client shall not be liable in respect of any damages or compensation payable at law in respect of or in consequence of any accident or injury to any workman or any other person in the employment of the contractor and the contractor shall indemnify and keep indemnified the HLL/Client against all such damages and compensation and against all claims, demands, proceedings, costs, charges and expenses, whatsoever in respect or in relation thereof.

c) Third Party Insurance.

The contractor shall be responsible for making good to the satisfaction of the Engineer-in-Charge any loss or any damage to all structures and properties belonging to the HLL/ Client or being executed or procured or being procured by the HLL/ Client or of the other agencies within the premises of all work of the HLL/ Client if such loss or damage is due to fault and or the negligence or willful acts or omissions of the contractor, his employees, agents, representatives.

The contractor shall take sufficient care in moving his plants, equipment and materials from one place to another so that they do not cause any damage to any person or to the property of the HLL/ Client or any third party including overhead and underground cables and in the event of any damage resulting to the property of the HLL/ Client or to a third party during the movement of the aforesaid plant, equipment or materials, the cost of such damages including eventual loss of production, operation or services in any plant or establishment as estimated by the HLL/ Client or ascertained or demanded by the third party, shall be borne by the contractor.

Before commencing the execution of the work, the contractor, shall insure and indemnify and keep the HLL/ Client harmless of all claims, against the contractor's liability for any materials or physical damage, loss or injury which may occur to any property, including that of the HLL/ Client or to any person including any employee of HLL/ Client, or arising out of the execution of the work or in the carrying out of the contract, otherwise than due to the matters referred to in the provision to (a) above. Such insurance shall be effected for an amount sufficient to cover such risks. The terms shall include a provision whereby, in the event of any claim in respect of which the contractor, would be entitled to receive indemnify under the policy being brought or made against the HLL/ Client, the insurer willfully indemnify HLL/ Client against such claims and any costs, charges and expenses in respect thereof.

- d) The contractor shall also at times indemnify the HLL/ Client against all claims, damages or compensation under the provisions of Payment or Wages Act, 1936, Minimum Wages Act, 1948, Employer's Liability Act, 1938, the Workman's Compensation Act, 1947, Industrial Disputes Act, 1947 and Maternity Benefit Act, 1961, or any modification thereof or any other law relating thereof and rules made there under from time to time.
- e) The Contractor shall also at his own cost carry and maintain any and all other insurance(s) which he may be required for the Contractor's Equipment and other things brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site
- f) The Contractor shall also at his own cost carry and maintain any and all other insurance(s) which he may be required to take out under any law or regulation from time to time. He shall also carry and maintain any other insurance, which may be required by the Engineer-in-Charge.
- g) **Cross liabilities:** -The insurance policy shall include a cross liability clause such that the insurance shall apply to the contractor and to the client/HLL as separate insured.

46.2.1 The Contractor shall prove to the Engineer-in-charge from time to time he has taken out all the insurance policies referred to above and has paid the necessary premiums for keeping the policies alive till expiry of the Defects Liability Period.

46.2.2 Evidence and Terms of Insurance

The Contractor shall provide evidence to the Consultant as soon as practicable after the respective insurance have been taken out but in any case prior to the start of work at the Site that insurance required under the Contract have been effected and shall, within 84 days of the Commencement Date, provide the insurance policies to the Client/HLL. When providing such evidence and such policies to the Client/HLL, the Contractor shall notify to the Engineer in Charge also. Such insurance policies shall be consistent with the general terms agreed prior to the issue of the Letter of Acceptance. The Contractor shall effect all insurance for which he is responsible with insurers and in terms approved by the Consultant.

46.2.3 Adequacy and cancellation of Insurance

- a) The Contractor shall notify the insurers of changes in the nature, extent or programme for the execution of the Works and ensure the continuity and adequacy of the insurance at all times in accordance with the terms of the Contract and shall, when required, produce to the

Consultant the insurance policies in force and the receipts for payment of the current premiums.

- b) The aforesaid insurance policies shall provide that they shall not be cancelled till the Engineer-in-charge has agreed for cancellation.

46.3 Remedy on the contractor's failure to insure

If the contractor shall fail to effect and keep in force the insurance referred to above or any other insurance which he/they may be required to effect under the terms of the contract then and in any such case Engineer-in-charge may without being bound to, effect and keep in force any such insurance and pay such premium or premiums, as may be necessary for that purpose and from time to time deduct the amount so paid by the Engineer-in-charge from any moneys due or which may become due to the contractor or recover the same as a debt due from the contractor.

46.4 Compliance with Policy Conditions

In the event that the Contractor fails to comply with conditions imposed by the insurance policies effected pursuant to the Contract, the Contractor indemnify the Client/HLL against all losses and claims arising from such failure.

SECTION-3**SAFETY CODE**

1. Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction except such short period work as can be done safely from ladders. When a ladder is used an extra Mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable footholds and hand-hold shall be provided on the ladder and the ladder shall be given an inclination not steeper than $\frac{1}{4}$ to 1 (1/4 horizontal and 1 vertical).
2. Scaffolding of staging more than 3.6 m (12 ft.) above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached or bolted, braced and otherwise secured atleast 90 cm (3 ft.) high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
3. Working Platforms, gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 3.6 m (12 ft.) above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in (2) above.
4. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of person or materials by providing suitable fencing or railing whose minimum height shall be 90 cm (3 ft.).
5. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 m (30 ft) in length while the width between side rails in rung ladder shall in no case be less than 29 cm. (11 $\frac{1}{2}$ ") for ladder upto and including 3 metre (10 ft.) in length. For longer ladders this width should be increased atleast $\frac{1}{4}$ " for each additional 30 cm.(1 foot) of length. Uniform step spacing of not more than 30 cm shall be kept. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which maybe awarded in any such suit, action or proceedings to any such person or which may, with the consent of the contractor, be paid to compensate any claim by any such person.
6. Excavation and trenching- All trenches 1.2 m (4 ft.) or more in depth, shall at all times be supplied with atleast one ladder for each 30 metre (100 ft) in length or fraction thereof. Ladder shall extend from bottom of the trench to atleast 90 cm. (3 ft) above the surface of the ground. The sides of the trenches, which are 1.5 m (5 ft) or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides collapsing. The excavated material shall not be placed within 1.5 m (5 ft) of the edges of the trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.
7. Demolition. - Before any demolition work is commenced and also during the progress of the work,
 - i) All roads and open areas adjacent to the work site shall either be closed or suitably protected.
 - ii) No electric cable or apparatus which is liable to be a source of danger or a cable or apparatus used by the operator shall remain electrically charged.
 - iii) All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.
8. All necessary personal safety equipment as considered adequate by the Engineer- in-Charge should

be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the contractor should take adequate steps to ensure proper use of equipment by those concerned. The following safety equipment shall invariably be provided.

- i) Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective goggles.
- ii) Those engaged in whitewashing and mixing or stacking of cement bags or any material, which is injurious to the eyes, shall be provided with protective goggles.
- iii) Those engaged in welding works shall be provided with welder's protective eye shields.
- iv) Stonebreakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- v) When workers are employed in sewers and manholes, which are in active use, the contractors shall ensure that the manhole covers are opened and ventilated atleast for an hour before the workers are allowed to get into manholes and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public. In addition, the contractor shall ensure that the following safety measures are adhered to:-
 - a) Entry for workers into the line shall not be allowed except under supervision of the Engineer in Charge or any other higher officer.
 - b) Atleast 5 to 6 manholes upstream and downstream should be kept open for atleast 2 to 3 hours before any man is allowed to enter into the manhole for working inside.
 - c) Before entry presence of toxic gases should be tested by inserting wet lead acetate paper, which changes colour in the presence of such gases and gives indication of their presence.
 - d) Presence of oxygen should be verified by lowering a detector lamp into the manhole. In case, no oxygen is found inside the sewer line, worker should be send only with oxygen kit.
 - e) Safety belt with rope should be provided to the workers. While working inside the manhole such rope should be handled by two men standing outside to enable him to be pulled out during emergency.
 - f) The area should be barricaded or cordoned off by suitable means to avoid mishaps of any kind. Proper warning signs should be displayed for the safety of the public whenever for the cleaning works are undertaken during night or day.
 - g) No smoking or open flames shall be allowed near the blocked manhole being cleaned.
 - h) The malba obtained on account of cleaning of blocked manholes and sewer lines should be immediately removed to avoid accidents on account of slippery nature of the malba.
 - i) Workers should not be allowed to work inside the manhole continuously. He should be given rest intermittently. The Engineer-in-Charge may decide the time upto which worker may be allowed to work continuously inside the manhole.
 - j) Gas masks with Oxygen cylinder should be kept at site for use in emergency.
 - k) Air blowers should be used for flow of fresh air through the manholes.
Whenever called for, portable air blowers are recommended for ventilating the manholes. The motors for these, shall be vapour proof and of totally enclosed type. Non-sparking gas engines also could be used but they should be placed at least 2 metres away from the opening and on the leeward side, protected from wind so that they will not be the source of friction on any inflammable gas that might be present.
 - l) The workers engaged for cleaning the manholes/sewers should be properly trained before allowing working in the manhole.
 - m) The worker shall be provided with Gumboots or non-sparking shoes bump helmets and gloves non-sparking tools and safety lights and gas masks and portable air-blowers (when necessary). They must be supplied with barrier cream for anointing the limits before working inside the sewer lines.
 - n) Workmen descending a manhole shall try each ladder stop or rung carefully before putting his full weight on it to guard against insecure fastening due to corrosion of the

- rung fixed to manhole well.
- o) If a man has received a physical injury, he should be brought out of the sewer immediately and adequate medical aid should be provided to him.
 - p) The extent to which these precautions are to be taken depend on individual situation but the decision of the Engineer-in-Charge regarding the steps to be taken in this regard in an individual case will be final.
 - vi) The contractor shall not employ men and women below the age of 18 years on the work of painting with products containing lead in any form. Whenever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken: -
 - a) No paint containing lead or lead products shall be used except in the form of paste or readymade paint.
Suitable face masks should be supplied for use by the workers when paint is applied in the form of spray or a surface having lead paint is dry rubbed and scrapped.
 - b) Overalls shall be supplied by the contractors to the workmen and adequate facilities shall be provided to enable the working painters to wash during and on the cessation of work.
9. As per additional clause (viii)(i) of Government Safety Code(iv), the Contractor shall not employ women and men below the age of 18 years on the work of painting with product containing lead in any form. Whenever men above the age of 18 are employed on the work of lead painting, the following principles must be observed for such use:
- i) White lead, sulphate of lead or product containing these pigments, shall not be used in painting operation except in the form of pastes or paint ready for use.
 - ii) Measures shall be taken, wherever required in order to prevent danger arising from the application of paint in the form of spray.
 - iii) Measures shall be taken, wherever practicable to prevent danger arising out of from dust caused by dry rubbing down and scrapping.
 - iv) Adequate facilities shall be provided to enable working painters to wash during and on cessation of work
 - v) Overall shall be worn by working painters during the whole of working period.
 - vi) Suitable arrangement shall be made to prevent clothing put off during working hours being spoiled by painting materials.
 - vii) Cases of lead poisoning and suspected lead poisoning shall be notified and shall be subsequently verified by medical man appointed by the competent authority of Department.
 - viii) Department may require, when necessary, medical examination of workers.
 - ix) Instructions with regard to special hygienic precautions, to be taken in the painting trade, shall be distributed to working painters.
10. When the work is done near any place where there is risk of drowning, all necessary equipment should be provided & kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision, should be made for prompt first aid treatment of all injuries likely to be obtained during the course of the work.
11. Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions: -
- (i) (a) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defects and shall be kept repaired and in good working order.
 - (b) Every rope used in hoisting or lowering materials or as means of suspension shall be of durable quality and adequate strength, and free from patent defects.
 - (ii) Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine

including any scaffolding winch or give signals to operator.

- (iii) In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley blocks used in hoisting or as means of suspension the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of hoisting machine having a variable safe working load each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear, referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
 - (iv) In case of departmental machines, the safe working load shall be notified by the Electrical Engineer-in-Charge. As regard contractor's machines the contractors shall notify the safe working load of the machines to the Engineer-in-Charge whenever he brings any machinery to the site of work and get it verified by the Electrical Engineer concerned.
12. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations, which are already energised, insulating mats, wearing apparel, such as gloves, sleeves and boots, as may be necessary, should be provided. The worker should not wear any rings, watches and carry keys or other materials, which are good conductors of electricity.
 13. All scaffolds ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.
 14. These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at work spot. The person responsible for compliance of the safety code shall be named therein by the contractor.
 15. To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangements made by the contractor shall be open to inspection by Labour Officer or the Engineer-in-Charge or their representatives.
 16. Notwithstanding the above clauses from (1) to (15) there is nothing in these to exempt the contractor from the operations of any other Act or Rule in force in the Republic of India.

SECTION -4**RULES FOR THE PROTECTION OF HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS EMPLOYED BY CONTRACTORS****1. APPLICATION**

These rules shall apply to all buildings and construction works in charge of the IMPCL/MoHFW in which twenty or more workers are ordinarily employed or are proposed to be employed in any day during the period during which the contract work is in progress.

2. DEFINITION

Work place means a place where twenty or more workers are ordinarily employed in connection with construction work, on any day during the period, during which the contract work is in progress.

3. FIRST-AID FACILITIES

- i) At every work place there shall be provided and maintained, so as to be easily accessible during working hours, first aid boxes at the rate of not less than one box for 150-contract labour or part thereof ordinarily employed.
- ii) The first-aid box shall be distinctly marked with a red cross on white back ground and shall contain the following equipment: -
 - a) For work places in which the number of contract labour employed does not exceed 50- Each first-aid box shall contain the following equipment: -
 1. 6 small sterilised dressings.
 2. 3 medium size sterilised dressings.
 3. 3 large size sterilised dressings.
 4. 3 large sterilised burn dressings.
 5. 1 (30 ml.) bottle containing a two per-cent alcoholic solution of iodine
 6. 1 (30ml) bottle containing salvolatile having the dose and mode of administration indicated on the label.
 7. 1 snakebite lancet.
 8. 1 (30gms.) bottle of potassium permanganate crystals.
 9. 1 pair scissors.
 10. 1 copy of the first-aid leaflet issued by the Director General, Factory Advice Service and Labour Institute, Government of India or his Client.
 11. 1 Bottle containing 100 tablets (each of 5 gms.) of aspirin.
 12. Ointment for burns.
 13. A bottle of suitable surgical antiseptic solution
 - b) For workplaces in which the number of contract labour exceeds 50- Each first-aid- box shall contain the following equipment.
 1. 12 small sterilized dressing.
 2. 6 medium size sterilised dressings.
 3. 6 large size sterilised dressings.
 4. 6 large size sterilised burn dressings.
 5. 6 (15-gms.) packets sterilised cotton wool.
 6. 1 (60 ml.) bottle containing two per-cent alcoholic solution iodine.
 7. 1 (60-ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.

8. 1 roll of adhesive plaster.
 9. 1 snake bite lancet.
 10. 1 (30gms.)Bottle of potassium permanganate crystals.
 11. 1 pair of scissors.
 12. 1copy of the first-aid leaflet issued by the Director General Factory Advice Service and Labour Institute/ Government of India or Client of India.
 13. A bottle containing100 tablets (each of 5 gms.) of aspirin.
 14. Ointment for burns.
 15. A bottle of suitable surgical antiseptic solution.
- iii) Adequate arrangements shall be made for immediate procurement of the equipment when necessary.
 - iv) Nothing except the prescribed contents shall be kept in the First-aid box.
 - v) The first-aid box shall be kept in charge of a responsible person who shall always be readily available during the working hours at the work place.
 - vi) A person in charge of the first-aid box shall be a person trained in First-Aid treatment, at the work places where the number of contract labour employed is 150 or more.
 - vii) In work places where the number of contract labour employed is500 or more and hospital facilities are not available within easy distance from the works, First-aid posts shall be established and run by a trained compounder. The compounder shall be on duty and shall be available at all hours when the workers are at work.
 - viii) Where work places are situated in places, which are not towns or cities, a suitable motor transport shall be kept readily available to carry injured person or person suddenly taken ill to the nearest hospital.

4. DRINKING WATER

- i) In every work place, there shall be provided and maintained, at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.
- ii) Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.
- iii) Every water supply or storage shall be at a distance of not less than50 feet from any latrine drain or other source of pollution. Where water has to be drawn from an existing well, which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it or for drinking. All such wells shall be entirely closed in and be provided with a trap door, which shall be dust and waterproof.
- iv) A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5. WASHING FACILITIES

- i) In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contract labour employed therein.
- ii) Separate and adequate cleaning facilities shall be provided for the use of male and female workers.
- iii) Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

6. LATRINES AND URINALS

- i) Latrines shall be provided in every work place on the following scale namely:-
 - a) Where female are employed there shall be at least one latrine for every 25 females.
 - b) Where males are employed, there shall be at least one latrine for every 25 males.

Provided that where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females as the case may be upto the first 100, and one for every 50 thereafter.

- ii) Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings.
- iii) Construction of latrines: The inside walls shall be constructed of masonry or some suitable heat-resisting non-absorbent materials and shall be cement washed inside and outside at least once a year. Latrines shall not be of a standard lower than bore-hole system.
- iv)
 - a) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men only" or "For Women only" as the case may be.
 - b) The notice shall also bear the figure of a man or a woman, as the case may be.
- v) There shall be at least one urinal for upto 50 number of male workers and one for upto 50 number of female workers employed at a time, provided that where the number of male or female workers, as the case may be, exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females, upto the first 500 and one for every 100 or part thereafter.
- vi)
 - a) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.
 - b) Latrines and urinals other than those connected with a flushes wage system shall comply with the requirements of the Public Health Authorities.
- vii) Water shall be provided by means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.
- viii) Disposal of excreta: - Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternately excreta may be disposed off by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with a 15 cm. layer of waste or refuse and then covering it with a layer of earth for a fortnight (When it will turn to manure).
- ix) The contractor shall at his own expense, carry out all instructions issued to him by the Engineer-in-Charge to effect proper disposal of night soil and other conservancy work in respect of the contractor's workmen or employees on the site. The contractor shall be responsible for payment of any charges, which may be levied by Municipal or Cantonment Authority for execution of such on his behalf.

7. PROVISION OF SHELTER DURING REST

At every place there shall be provided, free of cost, four suitable sheds, two for meals and the other two for rest separately for the use of men and women labour. The height of each shelter shall not be less than 3 metres (10 ft.) from the floor level to the lowest part of the roof. These shall be kept clean and the space provided shall be on the basis of 0.6 sq. m. (6 sq. ft.) per head.

Provided that the Engineer-in-Charge may permit, subject to his satisfaction, a portion of the building under construction or other alternative accommodation to be used for the purpose.

8. CRECHES

- i) At every work place, at which 20 or more women worker are ordinarily employed, there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years. One room shall be used as a playroom for the children and the other as their bedroom. The rooms shall be constructed with specifications as per clause 19 H (ii) a, b & c.
- ii) The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.
- iii) The contractor shall supply adequate number of toys and games in the playroom and

sufficient number of cots and beddings in the bedroom.

- iv) The contractor shall provide one ayah to look after the children in the crèche when the number of women workers does not exceed 50 and two when the number of women workers exceeds 50.
- v) The use of the rooms earmarked as crèches shall be restricted to children, their attendants and mothers of the children.

9. CANTEENS

- i) In every work place where the work regarding the employment of contract labour is likely to continue for six months and where in contract labour numbering one hundred or more are ordinarily employed, an adequate canteen shall be provided by the contractor for the use of such contract labour.
- ii) The contractor shall maintain the canteen in an efficient manner.
- iii) The canteen shall consist of atleast a dining hall, kitchen, storeroom, pantry and washing places, separately for workers and utensils.
- iv) The canteen shall be sufficiently lighted at all times when any person has access to it.
- v) The floor shall be made of smooth and impervious materials and inside walls shall be lime-washed or colour washed atleast once in each year. Provided that the inside walls of the kitchen shall be lime-washed every 4 months.
- vi) The premises of the canteen shall be maintained in a clean and sanitary condition.
- vii) Wastewater shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance.
- viii) Suitable arrangements shall be made for the collection and disposal of garbage.
- ix) The dining hall shall accommodate at a time 30 percent of the contract labour working at a time.
- x) The floor area of the dining hall, excluding the area occupied by the service counter and any furniture, except tables and chairs, shall not be less than one square metre (10 sq. ft.) per diner to be accommodated as prescribed in sub-Rule 9.
 - a) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion to their number.
 - b) Washing places for women shall be separate and screened to secure privacy.
- xii) Sufficient tables, stools, chair or benches shall be available for the number of diners to be accommodated as prescribed in sub-Rule 9
- xiii) a)
 - 1. There shall be provided and maintained, sufficient utensils, crockery, furniture and any other equipment's, necessary for the efficient running of the canteen.
 - 2. The furniture utensils and other equipment shall be maintained in a clean and hygienic condition.
 b)
 - 1. Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.
 - 2. A service counter, if provided, shall have top of smooth and impervious material.
 - 3. Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipment's.
- xiv) The foodstuffs and other items to be served in the canteen shall be in conformity with the normal habits of the contract labour.
- xv) The charges for foodstuffs, beverages and any other items served in the canteen shall

be based on 'No profit, No loss' and shall be conspicuously displayed in the canteen.

- xvi) In arriving at the price of food stuffs, and other articles served in the canteen, the following items shall not be taken into consideration as expenditure namely: -
- a) The rent of land and building.
 - b) The depreciation and maintenance charge for the building and equipment's provided for the canteen.
 - c) The cost of purchase, repairs and replacement of equipment's including furniture, crockery, cutlery and utensils.
 - d) The water charges and other charges incurred for lighting and ventilation.
 - e) The interest and amounts spent on the provision and maintenance of equipment's provided for the canteen.
- xvii) The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

10. ANTI-MALARIAL PRECAUTIONS

The contractor shall at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge including the filling-up of any borrow pits which may have been dug by him.

11. The above rules shall be incorporated in the contracts and in notices inviting tenders and shall form an integral part of the contracts.

12. AMENDMENTS

Department may, from time to time, add to or amend these rules and issue directions it may consider necessary for the purpose of removing any difficulty, which may arise in the administration thereof.

SECTION-5**CONTRACTOR'S LABOUR REGULATIONS TO BE FOLLOWED IN THIS PROJECT****1. SHORT TITLE**

These may be called Contractors Labour Regulations and shall be followed by the Contractor for this Project.

2. DEFINITIONS

i) **Workman** means, any person employed by Department or its contractor directly or indirectly, through a subcontractor, with or without the knowledge of the Department, to do any skilled, semiskilled or unskilled, manual, supervisory, technical or clerical work, for hire or reward, whether the terms of employment are expressed or implied, but does not include any person: -

- a) Who is employed mainly in a managerial or administrative capacity; or,
- b) Who, being employed in a supervisory capacity draws wages exceeding five hundred rupees per mensem or exercises either by the nature of the duties attached to the office or by reason of powers vested in him, functions mainly of managerial nature; or,
- c) Who is an out worker, that is to say, person to whom any article or materials are given out by or on behalf of the principal employers to be made up cleaned, washed, altered, ornamental finished, repaired adopted or otherwise processed for sale for the purpose of the trade or business of the principal employers and the process is to be carried out either in the home of the out worker or in some other premises, not being premises under the control and management of the principal employer.

No person below the of 14 years shall be employed to act as a workman

- ii) **Fair Wages** means wages whether for time or piecework fixed and notified under the provision of the Minimum Wages Act from time to time.
- iii) **Contractors** shall include every person who undertakes to produce a given result other than a mere supply of goods or articles of manufacture through contract labour or who supplies contract labour for any work and includes a subcontractor.
- iv) **Wages** shall have the same meaning as defined in the Payment of Wages Act.

3.

- i) Normally working hours of an adult employee should not exceed 9 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, it shall not spread over more than 12 hours on any day.
- ii) When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week he shall be paid over time for the extra hours put in by him at double the ordinary rate of wages.
- iii) a) Every worker shall be given a weekly holiday normally on a Sunday, in accordance with the provisions of Minimum Wages (Central) Rules 1960, as amended from time to time, irrespective of whether such worker is governed by the Minimum Wages Act or not.
- b) Where the minimum wages prescribed by the Government, under the Minimum Wages Act, are not inclusive of the wages for the weekly day of rest, the worker shall be entitled to rest day wages, at the rate applicable to the next preceding day, provided he has worked under the same contractor for a continuous period of not less than 6 days.
- c) Where a contractor is permitted by the Engineer-in-Charge to allow a worker to work on a normal weekly holiday, he shall grant a substituted holiday to him for the whole day, on one of the five days, immediately before or after the normal weekly holiday, and pay wages to such worker for the work performed on the normal weekly holiday at the overtime rate.

4. **DISPLAY OF NOTICE REGARDING WAGES ETC.**

The contractor shall, before he commences his work on contract, display and correctly maintain and continue to display and correctly maintain, in a clear and legible condition in conspicuous places on the work, notices in English and in local Indian languages spoken by the majority of the workers, giving the minimum rates of the wages fixed under Minimum Wages Act, the actual wages being paid, the hours of work for which such wage are earned, wages periods, dates of payments of wages and other relevant information as per Appendix 'III'.

5. **PAYMENT OF WAGES.**

- i) The contractor shall fix wage periods in respect of which wages shall be payable.
- ii) No wage period shall exceed one month.
- iii) The wages of every person employed as contract labour in an establishment or by a contractor, where less than one thousand such persons are employed, shall be paid before the expiry of seventh day and in other cases before the expiry of tenth day after the last day of the wage period in respect of which the wages are payable.
- iv) Where the employment of any worker is terminated by or on behalf of the contractor the wages earned by him shall be paid before the expiry of the second working day from the date on which his employment is terminated.
- v) All payment of wages shall be made on a working day at the work premises and during the working time and on a date notified in advance and in case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day.
- vi) Wages due to every worker shall be paid to him direct or to other person authorised by him in this behalf.
- vii) All wages shall be paid in current coin or currency or in both.
- viii) Wages shall be paid without any deductions of any kind except those specified by the Central Government by general or special order in this behalf or permissible under the Payment of Wages Act 1956.
- ix) A notice showing the wages period and the place and time of disbursement of wages shall be displayed at the place of work and a copy sent by the contractor to the Engineer-in-Charge under acknowledgement.
- x) It shall be the duty of the contractor to ensure the disbursement of wages in presence of authorised representative of the Engineer-in-Charge who will be required to be present at the place and time of the disbursement of wages by the contractor to workmen.
- xi) The contractor shall obtain from the junior engineer or any other authorised representative of the Engineer-in-Charge, as the case may be, a certificate under his signature at the end of the entries in the "Register of Wages" or the "Wage-cum-Muster Roll", as the case may be, in the following form: -

"Certified that the amount shown in the column No.....has been paid to the workman concerned in my presence on.....at....."

6. **FINES AND DEDUCTIONS WHICH MAY BE MADE FROM WAGES**

- (i) The wages of a worker shall be paid to him without any deduction of any kind except the following: -
 - (a) Fines
 - (b) Deductions for absence from duty i.e. from the place or the places where by the terms of his employment he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.

- (c) Deductions for damage to or loss of goods expressly entrusted to the employed person for custody, or for loss of money or any other deductions which he is required to account, where such damage or loss is directly attributable to his neglect or default.
 - (d) Deduction for recovery of advances or for adjustment of overpayment of wages, advances granted shall be entered in a register.
 - (e) Any other deduction, which the Central Government may from time to time, allows.
 - (ii) No fines should be imposed on any worker save in respect of such acts and omissions on his part as have been approved of by the Chief Labour Commissioner.
- Note:-** An approved list of Acts and Omission for which fines can be imposed is enclosed at Appendix-1.
- (iii) No fine shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deductions.
 - (iv) The total amount of fine, which may be imposed, in any one-wage period, on a worker, shall not exceed an amount equal to three paise in a rupee of the total wages, payable to him in respect of that wage period.
 - (v) No fine imposed on any worker shall be recovered from him by instalment, or after the expiry of sixty days from the date on which it was imposed.
 - (vi) Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

7. LABOUR RECORDS

- (i) The contractor shall maintain a **Register of Persons employed** on work on contract in Form XIII of the CL (R&A) Central Rules 1971 (Appendix IV)
- (ii) The contractor shall maintain a **Muster Roll** register in respect of all workmen employed by him on the work under Contract in Form XVI of the CL (R&A) Rules 1971 (Appendix V)
- (iii) The contractor shall maintain a **Wage Register** in respect of all workmen employed by him on the work under contract in Form XVII of the CL (R&A) Rules 1971 (Appendix VI)
- (iv) **Register of accident** – The contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars:
 - a) Full Particulars of the labourers who met with accident.
 - b) Rate of wages.
 - c) Sex
 - d) Age
 - e) Nature of accident and cause of accident
 - f) Time and date of accident
 - g) Date and time when admitted in hospital
 - h) Date of discharge from the hospital
 - i) Period of treatment and result of treatment
 - j) Percentage of loss of earning capacity and disability as assessed by Medical Officer.
 - k) Claim required to be paid under Workmen's Compensation Act.
 - l) Date of payment of compensation
 - m) Amount paid with details of the person to whom the same was paid
 - n) Authority by whom the compensation was assessed
 - o) Remarks.
- v) The contractor shall maintain a **Register of Fines** in the Form XII of the CL (R&A) Rules 1971 (Appendix XI). The contractor shall display in a good condition and in a conspicuous place of work the approved list of acts and omission for which fines can be imposed (Appendix X)

- vi) The contractor shall maintain a Register of deductions for damage or loss in Form XX of the CL (R&A) Rules 1971 (Appendix XII).
- vii) The contractor shall maintain a **Register of Advances** in Form XXIII of the CL (R&A) Rules 1971 (Appendix-XIII).
- viii) The contractor shall maintain a **Register of Overtime** in Form XXIII of the CL (R&A) Rules 1971 (Appendix-XIV).

8. **ATTENDANCE CARD-CUM WAGE SLIP**

- i) The contractor shall issue an **Attendance card cum wage slip** to each workman employed by him in the specimen form at (Appendix-VII).
- ii) The card shall be valid for each wage period.
- iii) The contractor shall mark the attendance of each workman on the card twice each day, once at the commencement of the day and again after the rest interval, before he actually starts work.
- iv) The card shall remain in possession of the worker during the wage period under reference.
- v) The contractor shall complete the wage slip portion on the reverse of the card at least a day prior to the disbursement of wages in respect of the wage period under reference.
- vi) The contractor shall obtain the signature or thumb impression of the worker on the wage slip at the time of disbursement of wages and retain the card with him.

9. **EMPLOYMENT CARD**

The contractor shall issue an **Employment Card** in the Form XIV of CL (R&A) Central Rules 1971 to each worker within three days of the employment of the worker (Appendix-VIII).

10. **SERVICE CERTIFICATE**

On termination of employment for any reason whatsoever the contractor shall issue to the workman whose services have been terminated, a Service Certificate in the Form XV of the CL (R&A) Central Rules 1971 (Appendix-IX).

11. **PRESERVATION OF LABOUR RECORDS**

All records required to be maintained under Regulations Nos. 6 & 7 shall be preserved in original for a period of three years from the date of last entries made in them and shall be made available for inspection by the Engineer-in-Charge or Labour Officer or any other officers authorised by the Ministry of Health and Family Welfare in this behalf.

12. **POWER OF LABOUR OFFICER TO MAKE INVESTIGATIONS ORENQUIRY**

The labour officer or any person authorised by the Central Government on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of Fair Wage Clauses and provisions of these Regulations. He shall investigate into any complaint regarding the default made by the contractor or subcontractor in regard to such provision.

13. **REPORT OF LABOUR OFFICER**

The Labour Officer or other persons authorised as aforesaid shall submit a report of result of his investigation or enquiry to the Engineer in charge concerned indicating the extent, if any, to which the default has been committed with a note that necessary deductions from the contractor's bill be made and the wages and other dues be paid to the labourers concerned. In case an appeal is made by the contractor under Clause 13 of these regulations, actual payment to labourers will be made by the Engineer in charge after superintending engineer has given his decision on such appeal.

- i) Engineer in charge shall arrange payments to the labour concerned within 45 days from the receipt of the report form or the superintending engineer as the case may be the

Labour Officer

14. APPEAL AGAINST THE DECISION OF LABOUR OFFICER

Any person aggrieved by the decision and recommendations of the Labour Officer or other person so authorised may appeal against such decision to the Superintending Engineer concerned within 30 days from the date of decision, forwarding simultaneously a copy of his appeal to the Executive Engineer concerned but subject to such appeal, the decision of the officer shall be final and binding upon the contractor.

15. PROHIBITION REGARDING REPRESENTATION THROUGH LAWYER

- i) A workman shall be entitled to be represented in any investigation or enquiry under these regulations by: -
 - a) An officer of a registered trade union of which he is a member.
 - b) An officer of a federation of trade unions to which the trade union referred to in Clause (a) is affiliated.
 - c) Where the employer is not a member of any registered trade union, by an officer of a registered trade union, connected with the industry in which the worker is employed or by any other workman employed in the industry in which the worker is employed.
- ii) An employer shall be entitled to be represented in any investigation or enquiry under these regulations by:-
 - a) An officer of an association of employers of which he is a member.
 - b) An officer of a federation of associations of employers to which association referred to in Clause (a) is affiliated.
 - c) Where the employer is not a member of any association of employers, by an officer of association of employer connected with the industry, in which the employer is engaged or by any other employer, engaged in the industry in which the employer is engaged.
- iii) No party shall be entitled to be represented by a legal practitioner in any investigation inquiry under these regulations.

16. INSPECTION OF BOOKS AND SLIPS

The contractor shall allow inspection of all the prescribed labour records to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Officer or any other person, authorised by the Central Government on his behalf.

17. SUBMISSION OF RETURNS

The contractor shall submit periodical returns as may be specified from time to time.

18. AMENDMENTS

The Central Government may from time to time add to or amend the regulations and on any question as to the application/interpretation or effect of those regulations the decision of the EIC concerned shall be final.

Appendix 'I'**REGISTER OF MATERNITY BENEFITS (Clause 19F)**

Name and address of the contractor_____

Name and Location of the work_____

Name of the Employee	Father's/ husband's name	Nature of Employment	Period of actual confinement	Date on which notice of confinement given
1	2	3	4	5

Date on which maternity leave commenced and ended				
Date of Delivery/ Miscarriage	In case of delivery		In case of miscarriage	
	Commenced	Ended	Commenced	Ended
6	7	8	9	10

Leave pay paid to the employee				Remarks
In case of delivery		In case of miscarriage		
Rate of leave pay	Amount paid	Rate of leave pay	Amount paid	
11	12	13	14	15

Appendix 'II'**SPECIMEN FORM OF THE REGISTER, REGARDING MATERNITY BENEFIT
ADMISSIBLE TO THE CONTRACTOR'S LABOUR IN****MINISTRY OF HEALTH AND FAMILY WELFARE.**

Name and address of the contractor _____

Name and location of the work _____

1. Name of the woman and her husband's name.
2. Designation
3. Date of appointment.
4. Date with months and years in which she is employed.
5. Date of discharge / dismissal, if any.
6. Date of production of certificates in respect of pregnancy.
7. Date on which the woman informs about the expected delivery.
8. Date of delivery / miscarriage / death.
9. Date of production of certificates in respect of delivery / miscarriage.
10. Date with the amount of maternity/ death benefit paid in advance of expected delivery.
11. Date with amount of subsequent payment of maternity benefit.
12. Name of the person nominated by the woman to receive the payment of the maternity benefit after her death.
13. If the woman dies, the date of death, the name of the person to whom maternity benefit amount was paid, the month thereof and the date of payment.
14. Signature of the contractor authenticating entries in the register.
15. Remarks column for the use of inspecting officer.

Appendix 'III'**LABOUR BOARD**

Name of work: _____

Name of Contractor: _____

Address of Contractor: _____

Name and address of Government divn. _____

Name of CLIENT Labour Officer: _____

Address of CLIENT Labour Officer: _____

Name of Labour Enforcement Officer: _____

Address of Labour Enforcement Officer: _____

Sl. No	Category	Minimum wage Fixed	Actual wage paid	Number Present	Remarks

Weekly holiday _____

Wage period _____

Date of payment of Wages _____

Working hours _____

Rest interval _____

Appendix 'IV'

Form-XIII (See Rule 75)

Register of Workmen Employed by Contractor

Name and address of contractor_____

Name and address of establishment under which contract is carried on _____

Nature and location of Work_____

Name and address of Principal Employer_____

Sl. No.	Name and surname of Workman	Age and Sex	Father's/husband Name	Nature of employment / designation.	Permanent home address of the workman(Village and Tehsil, Taluka and District)	Local Address	Date of commencement of employment	Signature or thumb impression of the workman	Date of Termination of employment.	Reasons For terminations.	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

Appendix 'V'

Form-XVI (See Rule 78(2)(a))

Muster Roll

Name and address of the contractor_____

Name and address of establishment under which contract is carried on _____

Nature and location of work_____

Name and address of Principal Employer_____

For the month of fortnight_____

Sl. No.	Name of workman	Sex	Father's/ Husband's Name	Dates					Remarks
1	2	3	4	5					6
				1	2	3	4	5	

Appendix 'VI'**Form –XVII (See Rule****78(2)(a)) Register of Wages**

Name and address of the contractor_____

Name and address of establishment under which contract is carried on_____

Nature and location of work_____

Name and address of Principal Employer_____

Wages period_____Monthly/fortnightly

Sl.No.	Name of workman	Serial No.in the register of workman	Designation Nature of work done	No. of days worked	Units of work done	Daily rate of wages/piece rate	Basic Wages
1	2	3	4	5	6	7	8

Dearness allowances	Overtime	Other cash payments (Indicate nature)	Total	Deductions (indicate nature)	Net amount paid	Signature or thumb impression	Initial of his representati
9	10	11	12	13	14	15	16

Wage Card No. _____

Wage Card**Appendix'VII' (Observe)**

Name and address of the contractor Date of issue _____

Name and location of work Designation _____

Name of Workman _____

Month/fortnight-----

Rate of Wages _____

DATE																																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Morning																																
Evening																																
Initial																																

Rate_____Amount_

Received from_ the sum of Rs. _____on account of my wages.

Signature

The wage card is valid for one month from the date of issue

Appendix 'VII' (Reverse)

Form-XIX(See rule 78(2)(b))

Wages Slip

Name and address of the contractor_____

Name and Father's/Husband's name of workman_____

Nature and location of work_____

For the Week/Fortnight/Month ending_____

1. No. of days worked _____

2. No. of units worked in case of piece rate workers_____

3. Rate of daily wages/piece rate_____

4. Amount of overtime wages_____

5. Gross wages payable_____

6. Deduction, if any_____

7. Net amount of wages paid_____

Initials of the Contractors or his representative

Appendix 'VIII'

Form-XIV (See rule 76)

Employment Card

Name and address of the contractor_____

Name and address of establishment under which contract is carried on_____

Nature of work and location of work_____

Name and address of Principal Employer_____

1. Name of Workman_____
2. SI No. in the register of workman employed_____
3. Nature of employment/designation_____
4. Wage rate (with particulars of unit in case of piece work)_____
5. Wages period_____
6. Tenure of employment_____
7. Remarks_____

Signature of contractor

Appendix 'IX'

Form-XV (See Rule 77)

Service Certificate

Name and address of the contractor_____

Nature and location of work_____

Name and Address of workman_____

Age or date of birth_____

Identification marks_____

Father's/Husband's name_____

Name and address of establishment in under which contract is carried on_____

Name and address of Principal Employer_____

Sl. No.	Total period for which employed		Nature of work done	Rate of Wages (with particulars of unit in case of piece work)	Remarks
	From	To			
1	2	3	4	5	6

Signature

Appendix 'X'**LIST OF ACTS AND OMISSIONS FOR WHICH FINES CAN BE IMPOSED**

In accordance with rule 7 (v) of the CPWD Contractor's Labour Regulations to be displayed prominently at the site of work both in English and local Language.

1. Wilful insubordination or disobedience, whether along or in combination with other.
2. Theft fraud or dishonestly in connection with the contractors beside a business or property of Department.
3. Taking or giving bribes or any illegal gratifications.
4. Habitual late attendance.
5. Drunkenness fighting, riotous or disorderly or indifferent behaviour.
6. Habitual negligence.
7. Smoking near or around the area where combustible or other materials are locked.
8. Habitual indiscipline.
9. Causing damage to work in the progress or to property of the Department or of the contractor.
10. Sleeping on duty.
11. Malingering or slowing down work.
12. Giving of false information regarding name, age, father's name etc.
13. Habitual loss of wage cards supplied by the employers.
14. Unauthorized use of employer's property of manufacturing or making of unauthorized particles at the work place.
15. Bad workmanship in construction and maintenance by skilled workers which is not approved by the Department and for which the contractors are compelled to undertake rectification.
16. Making false complaints and/or misleading statements.
17. Engaging on trade within the premises of the establishments.
18. Any unauthorized divulgence of business affairs of the employees.
19. Collection or canvassing for the collection of any money within the premises of an establishment unless authorized by the employer.
20. Holding meeting inside the premises without previous sanction of the employers.
21. Threatening or intimidating any workman or employer during the working hours within the premises.

Appendix 'XI'

Form-XII (See Rule 78(2)(d))

Register of Fines

Name and address of the contractor_____

Name and address of establishment in under which contract is carried on_____

Nature and location of work_____

Name and address of Principal Employer_____

Sl. No.	Name of workman	Father's/Husband's name	Designation/nature of employment	Act/Omission For which fine imposed	Date of Offence
1	2	3	4	5	6

Whether workman Showed cause against fine	Name of person in whose presence employees explanation was heard	Wage period and wages payable	Amount of fine imposed	Date on which fine realized	Remarks.
7	8	9	10	11	12

Appendix 'XII'

Form-XX(See Rule 78(2)(d))

Register of Deduction for Damage or Loss

Name and address of the contractor_____

Name and address of establishment in under which contract is carried on_____

Nature and location of work_____

Name and address of Principal Employer_____

Sl. No.	Name of workman	Father's/Husband's name	Designation/nature of employment	Particulars of damage or loss	Date of damage or loss
1	2	3	4	5	6

Whether workman showed cause against fine	Name of person whose presence employees explanation was heard	Amount of deduction imposed	No. of instalments	Date of recovery		Remarks
				First instalment	Last instalment	
7	8	9	10	11	12	13

Appendix 'XIII'**Register of Advances**

Name and address of the contractor_____

Name and address of establishment in under which contract is carried on

Nature and location of work_____

Name and address of Principal Employer_____

Sl. No.	Name of workman	Father's/Husband's name	Designation nature of employment	Wage period and wages payable	Date and Amount of Advance given	Purpose(s) for which Advance made	Number of Instalments by which advance to be repaid	Date and amount of each instalments repaid	Date on which last Instalments was repaid	Remarks
1	2	3	4	5	6	7	8	9	10	11

Appendix 'XIV'

Form-XXIII (See Rule 78(2)(e))

Register of Overtime

Name and address of the contractor_____

Name and address of establishment in under which contract is carried on

Nature and location of work_____

Name and address of Principal Employer _____

Sl.No.	Name of workman	Father's/husband's name	Sex	Designation /nature of employment	Date on which Overtime worked	Total overtime worked or production in case of piece rated	Normal rate of wages	Overtime rate of wages	Overtime earnings	Rate on which overtime wages paid	Remarks
1	2	3	4	5	6	7	8	9	10	11	12

Section -6**Formats****GUARANTEE TO BE EXECUTED BY THE CONTRACTOR FOR REMOVAL OF DEFECTS AFTER COMPLETION IN RESPECT OF WATER SUPPLY AND SANITARY INSTALLATIONS**

The agreement made this..... Day of Two thousand and between S/O..... (Herein after called the GUARANTOR of the one part) and the ----- (herein after called the Client of the other part). WHEREAS THIS agreement is supplementary to the contract. (Herein after called the Contract) dated..... and made between the GUARANTOR OF THE ONE PART AND the Client of the other part, whereby the contractor inter alia, undertook to render the work in the said contract recited structurally stable workmanship and use of sound materials.

AND WHEREAS THE GUARANTOR agreed to give a guarantee to the effect that the said work will remain structurally stable and guarantee against faulty workmanship, finishing, manufacturing defects of materials and leakages etc.

NOW THE GUARANTOR hereby guarantee that work executed by him will remain structurally stable, after the expiry of maintenance period prescribed in the contract for the minimum life of ten years, to be reckoned from the date after the expiry of maintenance period prescribed in the contract.

The decision of the Engineer- in- charge with regard to nature and cause of defects shall be final.

During the period of guarantee the guarantor shall make good all defects to the satisfaction of the Engineer- in- charge calling upon him to rectify the defects, failing which the work shall be got done by the Client by some other contractor at the guarantor's cost and risk. The decision of the Engineer -in- charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to make good all the defects, commits breach there-under then the guarantor will indemnify the Principal and his successor against all loss, damage cost expense or otherwise which may be incurred by him by reason of any default on the part of THE GUARANTOR in performance and observance of this supplementary agreement. As to the amount of loss and/or damage and/or cost incurred by the Client the decision of the Engineer in charge will be final and binding on the parties.

IN WITNESS WHEREOF those presents have been executed by the obligator. And by for and on behalf of the Client on the day, month and year first above written. Signed sealed and delivery by OBLIGATOR in the presence of:

1

2

SIGNED FOR AND ON BEHALF OF ----- BY in the present of:

1

2

**GUARANTEE BOND TO BE EXECUTED BY THE CONTRACTOR FOR
WATERPROOFING TREATMENT FOR BASEMENT/TERRACE/TOILETS.**

The agreement made this _____ day of two thousand and _____ between _____ S/o _____ (hereinafter called the GUARANTOR of the one part) and the - _____ (hereinafter called the Client of the other part).

WHEREAS this agreement is supplementary to a contract. (Herein after called the Contract) dated and made between the GUARANTOR OF THE ONE PART AND the Client of the other part, whereby the contractor inter alia, undertook to render the structures in the said contract of the work in the said contract recited completely water and leak proof.

THE GUARANTOR hereby guarantee that the water proofing treatment given by him will render the structures completely leak proof and the minimum life of such water proofing treatment shall be ten years to be reckoned from the date after the expiry of maintenance period prescribed in the contract. Provided that the guarantor will not be responsible for leakage caused by earthquake or structural defects.

The decision of the Engineer in charge with regard to cause of leakage shall be final. During the period of guarantee the guarantor shall make good all defects and in case of any defects being found render the structure water proof to the satisfaction of the Engineer in charge at his cost and shall commence the work for such rectification within seven days from the date of issue of notice from the Engineer in charge calling upon him to rectify the defects, failing which the work shall be got done by the Client through some other contractor at the guarantor's cost and risk. The decision of the Engineer in charge as to the cost payable by the Guarantor shall be final and binding.

That if the guarantor fails to execute the water proofing, or commits breach there-under then the guarantor will indemnify the Principal and his successor against all loss, damage, cost of expenses or otherwise which may be incurred by him by reason of any of any default on the part of the GUARANTOR in performance and observance of this supplementary agreement.

As to the amount of loss and/or cost incurred by the Client on the decision of the Engineer in charge will be final and binding on the parties.

IN WITNESS WHEREOF those presents have been executed by the obligator by _____ and _____ by for and on behalf of _____ on the day, month and year first above written.

Signed sealed and delivered by OBLIGATOR in presence of:

1. _____ 2. _____

SIGNED FOR AND ON BEHALFOF _____ BY _____

in presence of:

1. _____ 2. _____

SECTION 7**PROFORMA OF
SCHEDULES****(Operative Schedules)**

SCHEDULE 'A'		
	Schedule of quantities (BOQ)	Attached as Volume –IV, Bill ofQuantities.
SCHEDULE 'B'		
	Schedule of materials to be issued to the contractor	NIL – No material to be issued to the Contractor
SCHEDULE 'C'		
	Tools and plants to be hired to the contractor	NIL – No tools and plants to be hired to the Contractor
SCHEDULE 'D'		
	Extra schedule for specific requirements/document for the work, if any.	NIL
SCHEDULE 'E'		
	Reference to General Conditions of Contract	
	Name of work :	Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works.
	Estimated cost of work:	As per NIT
	Earnest money:	As per NIT
	Performance Guarantee:	5% of Accepted Tendered Value.
	Security Deposit:	5% of Accepted Tendered Value.
SCHEDULE 'F'		
	GENERAL RULES & DIRECTIONS	
	Officer inviting bid	Managing Director, Indian Medicines Pharmaceutical Corporation Ltd.

	DEFINITIONS	
1	Authority executing the agreement on behalf of the President of India	Managing Director, Indian Medicines Pharmaceutical Corporation Ltd.
2(i)	Accepting Authority	Managing Director, Indian Medicines Pharmaceutical Corporation Ltd.
2(vi)	Engineer-in-Charge	Authorized representative nominated by IMPCL/ HLL
2(ix)	Percentage on cost of materials and labour to cover all Overheads and profits.	15%
2(xi)	Standard Schedule of Rates	Latest CPWD Schedule of Rates, with up to date correction slips
2(xii)	Department	Indian Medicines Pharmaceutical Corporation Ltd.
	CLAUSES OF CONTRACT	
Clause 1	(i) Time allowed for submission of Performance Guarantee from the date of issue of letter of acceptance	30 days
	(ii) Maximum allowable extension beyond the period provided in (i) above	15 days
Clause 2	Authority for fixing compensation under Clause 2.	VP (ID), HLL Lifecare Ltd.
	Authority for deciding incentive under Clause 2A.	VP (ID), HLL Lifecare Ltd.
	Whether Clause 2A shall be applicable	YES
Clause 5	Time Allowed for execution of Works	05 Months
	Number of days from the date of issue of letter of acceptance for reckoning date of Start	30 Days
	Authority to decide shifting of date of start in case of delay in handing over of site.	VP (ID), HLL Lifecare Ltd.
Clause 5.4	Authority for deciding Extension of Time	VP (ID), HLL Lifecare Ltd.
Clause 6, 6A	Clause applicable – (6 or 6A)	6A
Clause 7	Gross work to be done together with net payment /adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment.	Rs. Fifty Lakh Only

Clause 8B	Completion Plans to be Submitted by the Contractor as per specifications	Latest General CPWD Specifications for HVAC (2004) & Electrical works (Part – I internal) and (Part – II External)
Clause 10A	List of testing equipment to be provided by the contractor at site laboratory.	As per Annexure-I and II
Clause 10B	Whether Clause 10 B (ii) shall be applicable	Yes
	Whether Clause 10 B (iii) shall be applicable	No
Clause 10C	Component of labour expressed as per-cent of value of work	25%
Clause 10CA	Material covered under this clause	Not Applicable
	Base price of all the materials covered under Clause 10CA	Not Applicable
Clause 10CC	Clause 10 CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column	Not Applicable
Clause 11	Specifications to be followed for execution of work	Latest CPWD Specifications for HVAC, Electrical and all other works with up to date correction slips for all sub heads of work as applicable, and, Technical Specifications included in the tender documents, wherever applicable
Clause 12		
12.2 & 12.3	Deviation Limit beyond which clauses 12.2 & 12.3 shall apply for building work.	30 % of Items
12.5	Deviation Limit beyond which clauses 12.5 shall apply for foundation work.	100 % of Items
Clause 16	Competent Authority for deciding reduced rates	VP (ID), HLL Lifecare Ltd.
Clause 18	List of mandatory machinery, tools & plants to be deployed at site.	Not Applicable. Necessary as per requirement or as decided by the Engineer in Charge.
Clause-25	(i) Reviewing Authority	VP (ID), HLL Lifecare Ltd.
	(ii) Appealing Authority	MD IMPCL

Clause 36 (i)		Minimum Requirement of Technical Representative(s) and monthly recovery Rate				
Sl. No.	Designation (Principal Technical/ Technical representative)	Discipline	Minimum Qualification of Technical Representative	Minimum Experience	Number	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 36 (i)
1.	Project Manger	Mech./ Elect.	Degree	20	1	Rs 150,000/-
2	Site Engineer/ Billing Engineer	Mech./ Elect.	Degree/Diploma	5/10	3	Rs 50,000/-
Note: The above staff is required to be in position within 15 days of commencement of work, in case of difficulty, wherever more than one engineers are required atleast one of them should be in position within 15 days, rest of the engineers should be posted within 15 days on commencement of work.						
Clause 37		Levy/Taxes payable by Contractor		Form C will be made available by the Client (IMPCL) as applicable.		
Clause 39		Authority having option of terminating the Contract in event of death of Contractor		Managing Director, Indian Medicines Pharmaceutical Corporation Ltd.		

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

Tender No. HLL/IDN/IMPCL/HVAC/2013-14/03/R

Request for Proposal (RFP)
for

**Modernization, Up-Gradation & Expansion of existing Plant Facilities at Indian
Medicines Pharmaceutical Corporation Limited (IMPCL) - Mohan, District: Almora
(Uttarakhand)
Package III- HVAC works**

Volume-II (GCC & SCC)

- **Vol. –II- Special Conditions of Contract**



B-14A, Sector – 62,
NOIDA (UP) -201307

Phone no: 0120-4071500, Fax no: 0120-4071513

(January, 2014)

**Modernization, Up-Gradation & Expansion of existing Plant Facilities at Indian
Medicines Pharmaceutical Corporation Limited (IMPCL) – Mohan, District: Almora
(Uttarakhand)
Package III- HVAC works**

INDEX

SPECIAL CONDITIONS OF CONTRACT (S C C)

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Modernization, Up-Gradation & Expansion of existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Limited (IMPCL) – Mohan, District: Almora (Uttarakhand)
Package III- HVAC works

SECTION 1

SPECIAL CONDITIONS OF CONTRACT (S C C)

1. Scope of Contract

The scope of work involves HVAC works in following buildings:

- a) Utility Block , Staff Facility , Workers facility
- b) Capsule & Churan Block
- c) Chawyanprash Block
- d) Tablet & Pills block
- e) Services Block

The scope of work also includes preparation of all detailed shop drawings, obtaining approvals at different stages from local authorities, completion certificates and all other required statutory approvals /clearances from relevant statutory authorities if required for the subject work.

2. Drawings

(a) Tender Drawings

The tender drawings are for Tender Purpose only and are intended as a guide to the Bidder / Contractor and give general layout of buildings and general information of the structures and general positions of utilities, services and equipments only. Contractor's quoted rate for any item should not be based on any measurement, quantity, and specification from these drawings. Any claim raised by the contractor in this regard shall not be valid in this contract and shall not be accepted by the Client.

(b) Issue and custody of drawings & specifications

The contractor on the signing of contract shall be furnished free of cost three copies of all drawings and all further drawings issued during the progress of the works. The contractor shall keep one copy of all drawings at the works site and the Client/Engineer-in-charge/Consultant shall have, at all reasonable times, access to the same.

The drawings shall be provided to the Contractor as per the schedule (prepared at the starting of the works and necessarily updated or revised time to time) mutually agreed by the Engineer-in-charge and the Contractor. Last major drawings may be provided as per the schedule prior to the stipulated date of completion and the Contractor, if found necessary shall increase his resources and effort so as to complete the works within stipulated time

From time to time during the course of contract revised drawings may be issued to the Contractor and the Contractor shall ensure that all superseded drawings are removed from site and stored in a lockable cabinet as directed by the Engineer-in-charge and replaced by revised drawings.

The Contractor shall maintain complete up to date Register of drawings at site. All drawings shall be properly numbered and indexed for ready reference. Superseded drawings should be properly identified.

The contractor shall ensure that only the valid up to date drawings are used for setting out, construction and preparation of as built drawings etc.

(c) Bar Bending Schedule

Contractor shall prepare bar bending schedules and shall get them approved from the Engineer-in-charge or his authorized representative.

(d) Working drawings/ Shop drawings/ Design:

The drawings supplied by the Engineer-in-charge have been listed in the tender documents. These drawings are indicative for the purpose of detailing and requirement of the contracts. The contractor shall take into consideration space allocated for equipments before ordering them to ensure that the equipment would fit in the space provided with necessary clearances required as per the relevant standard / manufacture's recommendations. In case of any difficulty it should be brought to the notice of the Engineer - in- Charge.

Structural and architectural drawings will be provided by the Engineer-in-charge / Consultant. However, to ensure the uninterrupted progress of work and timely completion, the contractor will do further detailing as per site requirement at his own.

Detailing for shop drawings of all services will have to be done by the contractor based on the schematics and other details provided by the Engineer-in-charge /Consultant or local authorities. The work will be executed by the contractor based on the approved drawings from the concerned authority and accordingly contractor will be responsible for obtaining all required final NOC / clearance from concerned authorities. These drawings and details shall also contain details of construction, size, arrangement, operating clearances, performance characteristics and capacity of all items of equipments and also details of all related items of work by other discipline.

The contractor shall submit to the Engineer-in-charge for approval details of all proposed equipments, accessories, equipment characteristics and capacity details of all equipment, accessories and devices etc. as per the specifications and obtain approval of the Engineer-in-charge.

In case there is delay in any drawings and design viz shop drawings, or specialised works drawings etc. to be supplied by the contractor, Engineer - in- Charge may ask the Contractor to make necessary changes as required. In case of failure on the part of the contractor to carryout the directions of the Engineer - in- Charge action may be taken to get the needful done at the risk and cost of the Contractor. All drawings shall be signed by Contractor or their authorised representative with name, seal and date before submission to Engineer-in-charge.

3. Disruption of Progress

- (a). The Contractor shall give 4 weeks written notice to the Engineer-in-charge whenever planning or progress of the Works is likely to be delayed or disrupted due to non-issue of any drawing or order by the Engineer-in-charge. The notice shall give details of the drawing or order required explaining why and by when it is required and if any delay or disruption is likely to be suffered on that account.
- (b). If by reason of any failure or inability of the Engineer-in-charge /Consultant to issue drawings/ order/ clarifications within 4 weeks of such notice the Contractor and the contractor suffers delay, then the Engineer-in-charge, shall record the facts for any extension of time under respective clause of the agreement. Notwithstanding anything stated above, the Contractor shall not be eligible for any financial compensation arising out of the above.
- (c). No compensation whatsoever shall be payable to the contractor for any damage by rains, lightening, wind, storm, floods, tornadoes, earthquakes, or any other natural calamities

during execution of work and no claim on this account will be entertained such damages.

4. Further Drawings and Instructions

The Contractor shall carry out and complete the said work in every respect in accordance with this Contract and with the directions of and to the satisfaction of the Engineer-in-charge/Consultant. The Engineer-in-charge /Consultant may in his absolute discretion and from time to time further issue drawings and/or written instructions, details, directions and explanations, which are hereafter collectively referred to as “Engineer-in-charge /Consultant’s Instructions” in regard to:

- a. The variation or modification of the design, quality or quantity of items of works or the addition or omissions or substitution of any item.
- b. Any discrepancy in the drawings or between the bill of quantities and/or drawings and/or specification.
- c. The removal from the site of any material brought thereon by the contractor and the substitution of any other material thereof.
- d. The removal and/or re-execution of any works executed by the contractor.
- e. The removal of any persons employed by the contractor on the site.
- f. The opening up for inspection of any work covered up.
- g. The amending and making good of any defects noticed during or after execution of the work.

The contractor shall forthwith comply with and duly execute any work in compliance to above instructions provided always that verbal instructions, directions and explanations given to the contractor or his representative by the Engineer - in- Charge / Consultant, shall, if involving a variation, be confirmed in writing by the Contractor within seven days, and if not dissented in writing within a further seven days by the Engineer - in- Charge / Consultant, these shall be deemed to be Engineer - in- Charge / Consultant’s instructions within the scope of the contract

5. Contractor’s General Responsibilities

(a). Execution of works:

The Contractor shall, subject to the provisions of the Contract, and with due care and diligence, execute and complete the Works & remedy any defects therein in accordance with the Contract. The Contractor shall provide all labour, including the supervision thereof, materials, Constructional Plant and Machineries and all other things, whether of a temporary or permanent nature, required in and for such execution, completion, maintenance and remedying of any defects, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.

If the contractor finds any discrepancy in the drawings or between the drawings, bill of quantities and specifications, he shall immediately and in writing refer the same to the Engineer - in- Charge /Consultant for clarifications who shall decide the matter.

The successful contractor is bound to carry out any items of work necessary for the completion of the job even though such items are not included in the bill of quantities and rates instructions in respect of such additional items and their quantities will be decided as per the provision of the contract and issued in writing by the Engineer-in-charge / Consultant .

The Contractor must bear in mind that all the work shall be carried out strictly in accordance with the specifications as given in these documents and also in compliance of the requirements of the local public authorities and to the requirements/ satisfaction/ direction of the Consultant / Engineer-in-charge and no deviation of any account will be permitted.

The contractor shall have to use materials from the makes / manufacturers specified in the list of materials of approved brand and/or manufacture contained in the contract documents and as approved by the Engineer - in- Charge / Consultant. Wherever different pattern/ Design/ Quality of materials with same specification/ make as specified in the contract, is available in the market, Consultant/ Engineer-in-Charge will approve the pattern/ Design/ Quality of the material/ item which shall be final and binding on the contractor. The contractor shall supply samples of all the materials / fittings / fixtures proposed to be used in the work and obtain approval of the Engineer - in- Charge / Consultant. These samples shall be retained at site till completion of the work. If subsequently it is found that approved material upon testing does not meet the requirement as specified in the contract the contractor shall get approval of alternate material.

(b). Safety in construction

The contractor shall employ only such methods of construction, tools and plant as are appropriate for the type of work or as approved by Engineer-in-Charge in writing.

The contractor shall take all precautions and measures to ensure safety of works and workman and shall be fully responsible for the same. Safety pertaining to installation/construction works such as excavation, centering and shuttering, trenching, blasting, demolition, electric connections, scaffolds, ladders, working platforms, gangway, mixing of bituminous materials, electric and gas welding, use of hoisting and installation/construction machinery shall be governed by the Safety code, relevant safety codes and the direction of Engineer-in-Charge.

(c). Adequacy, stability and safety:

The Contractor shall be fully responsible for the adequacy, stability and safety of all site operations and methods of construction, the contractor shall ensure that all safety norms are followed as per contractual and other statutory requirements.

(d). Temporary works and arrangements:

The Contractor shall furnish to the Engineer-in-charge /Consultant full particulars i.e. site location and area required including drawings, etc. of all temporary works necessary for the execution of the works and shall give adequate time to the Engineer - in- Charge for his approval. The Contractor shall be solely responsible for the stability and structural safety of all temporary works including obtaining statutory approvals and payment of statutory fees, if any. Should it be necessary to shift the temporary works to some other place during the execution of the works, the Contractor shall do so, at his own cost.

(e). Initial and Final Clearance of site for temporary works:

The Contractor shall be responsible for the clearance of the site of all scrub, debris, rubbish, etc. to be removed off site to a location to be provided by the contractor and approved by the Engineer- in-charge. However, no trees shall be removed without the prior permission of the Engineer-in-charge. The structures, services and works required to be demolished and removed shall also be removed off site to a location as mentioned above. The Contractor shall obtain necessary permissions and approvals from the local authorities for such disposals. The demolition shall include digging, excavating and removal of substructures, foundations and buried works. The cost of all this shall be borne by the Contractor.

The above is applicable for all site offices, labour camps, and godowns etc., which are not required after the works is completed.

(f). Storage, Cleaning and Dewatering

The Contractor shall at all the times during construction keep the Site clean and free from all debris and unwanted materials on a daily basis as per instructions of the Engineer-in-charge.

Storage of materials shall be in an organized manner and in proper compartments as

directed by the Engineer - in- Charge. Storage on suspended floors shall not be permitted unless specifically approved in writing by the Engineer-in-charge /Consultant for specific materials in specific locations and in approved manner. The Engineer-in-charge / Consultant shall be furnished with load details, if requested, before seeking approval for storage.

Regular cleaning operations shall be undertaken to remove all dust, debris, waste materials etc. A cleaning schedule shall be maintained.

Contractor shall make his own arrangement for storage of those materials, which can be accommodated at site. Contractor shall be fully responsible for safe custody of the same. Materials shall be considered as "Delivered at Site" only after the physical presence of materials at site are verified by the Engineer-in-charge /Consultant. Storage of materials / equipment else where shall not be considered as "Delivered at Site."

Contractor shall be responsible to keep entire site free from water due to water coming from any source at any level and shall protect all materials and works from being damaged by the water from any source. Contractor shall make proper arrangements for drainage prior to use of water for curing, testing, cleaning etc.

Any expenditure incurred by the Contractor in fulfilment of his obligations under this sub-clause shall be deemed to have been included in the financial bid and subsequent contract.

- (g). All the equipment, components and the entire system as a whole shall be guaranteed for its performance and against any manufacturing defect.

6. Watching & Lighting

The Contractor shall throughout the execution and completion of the Works and the remedying of the site and the Works and the remedying of any defects therein have full regard for the safety of all persons entitled to be on the site and keep the site and the Works in an orderly state to avoid any accident or danger and provide safety measures, lights, guards, fencing and barricades where ever necessary or required by the Engineer-in-charge /Consultant, or by any duly constituted authority, for the execution and for the protection of the Work, and/or for the safety and convenience of the public or others and take all reasonable steps to protect the environment on and off the site and to avoid damage or nuisance to person or property of the public or others resulting from pollution, noise and other causes etc. at his own cost.

7. Care of Works

From the commencement to the certified completion of the whole of works, the contractor shall be responsible for the care, safety and maintenance of the works executed under the contract thereof and of all temporary works. In case of any damage/ loss or injury shall happen to the works or to any part thereof or to any temporary works from any cause whatsoever save and except the expected risks as defined in sub-clauses of Clause 12, the contractor shall at his own cost repair and make good the same, so that on completion the works shall be in good order and condition in conformity to every respect with the requirements of the contract. The contractor shall also be liable for any damage to the works occasioned by him including his subcontractors in the course of any operations carried out by him for the purpose of completing any outstanding work and complying with his obligations under clause 33 hereof. In case of failure on the part of the contractor the damage/ loss/ injury shall be made good by the client at the risk and cost of the contractor.

8. Force Majeure:

Any failure or delay in the performance by either party hereto of its obligations under his Contract shall not constitute a breach thereof or give rise to any claims for damages if, and to the extent that it is caused by occurrences beyond the control of the party affected, namely, acts of

God, floods, explosions, wars, riots, storms, earthquakes, insurrection, epidemic or other natural disasters. The party so affected shall continue to take all actions reasonably within its power to comply as far as possible with its obligations under this Contract. The affected party shall promptly notify the other party after the occurrence of the relevant event and shall use every reasonable effort to minimize the effects of such event and act in all good faith with due care and diligence.

9. Contractor's Superintendence

- (a). The contractor shall be solely responsible for the means, methods, techniques sequence and procedure of construction. The Contractor shall be responsible to see the completed work complies accurately with the Contract requirements. The Contractor shall provide all necessary superintendence during the execution of the Works as per contractual provisions.

(b). Contractor's Senior Representative for Execution & Coordination of Works

The Contractor shall ensure his presence at site all times during working hours throughout the course of the Contract or depute a Competent representative who shall be empowered to receive instructions from the Engineer - in- Charge in respect of all matters likely to arise in connection with the execution & coordination of the works at the site Contractor's Representative shall have the power to take joint measurement and sign the measurement books / bills. Any direction, explanations, instructions or notices given by the Consultant/ Engineer-in-charge to such representative shall be held to be given to the Contractor. In case of absence of said Representative other alternative representative should also be mentioned having same powers.

The contractor should submit curriculum vitae (CV) of the following key personnel proposed to be deployed at site for supervision and execution of work.

- Director/Project Coordinator
- Project Managers
- Installation/construction Engineers
- Project Engineers
- Billing Engineers
- Quality Control Engineers
- Planning Engineers

The contractor under normal circumstances would not be allowed to replace the key personnel during the execution of the contract. However, for any reasons, due to unavoidable circumstances if it becomes necessary in the interest of the project to replace any one / all the above key personnel the contractor must submit the CV of the new personnel (having qualification and experience as per requirement of the contract) to Engineer-in-Charge/ Consultant for their approval.

A list of all technical and key personal staffs must be submitted to the Engineer-in-Charge / Consultant with their area of work / responsibility with verified signature and the link persons to receive the instruction at site (in case the main person was not found at site) during the inspection by representative of Client and/or Consultant and/or Engineer-in-charge. Any staff of contractor found incapable/unsuitable to execute the assigned work shall be replaced by the Contractor if desired by the Engineer-in-Charge /Consultant.

(c). Contractor's Employees

The Contractor shall employ competent Engineering staff / technical assistants/ technicians who are qualified, skilled and experienced in their respective trades, to ensure proper supervision, quality & output of the work they are required to supervise. No child labour

shall be employed on the work. All the skilled semi-skilled and unskilled labour shall work under the sole guidance of the contractor/his representative.

(d). Removal of Contractor's Employees

The Contractor shall on the direction of the Consultant/Engineer-in-Charge immediately remove from the work any person employed thereon by him who may, in the opinion of the Consultant/ Engineer-in-Charge has misconduct himself and such person shall not be again employed on the works without the permission of the Engineer-in-charge/ Consultant.

(e). Unauthorized Persons

No unauthorized persons shall be allowed on the site. The contractor shall provide complete security arrangement for the campus during construction to avoid trespassing. The Contractor shall ensure all such persons are kept out and shall take steps to prevent trespassing. However the contractor will make sure to provide free access at any time for Engineer-in-charge/Client/Consultant to the site and other working places.

10. Compliance with Statutes, Regulations, Etc.

The contractor shall conform to the provisions of all statutes, ordinance, laws, acts of the legislature relating to the works, and to the regulations and by-laws of any local or other duly constituted authority and of any water, electric supply and other companies and/or authorities with whose systems the structure is proposed to be connected. The Contractor shall keep the Client / Engineer-in-charge/ Consultant indemnified against all fines or penalties or liability of every kind for breach of any such statutory ordinance, law act of the legislation, regulations, and byelaws as aforesaid.

The contractor shall before making any variations from the drawings or specifications that may be necessitated by such regulations, give to the Engineer- in-charge/Consultant written notice, specifying the variation proposed to be made and the reasons for making it and apply for instructions thereon. The contractor will not execute any work without written permission from the Engineer-in-charge/ Consultant

The contractor shall bring to the attention of the Engineer-in-charge/Consultant any specific requirement of the local authorities or any notice required for execution by virtue of such acts, regulations or bye-laws of such authority, or public office. All fees that may be chargeable in respect of these works shall be reimbursed by the client/consultant on production of authorised receipts.

11. Setting out

The contractor shall be responsible for the true and proper setting-out of the Works in relation to original points, lines and levels or reference issued by Engineer-in-charge/Consultant in drawing or in writing and for the correctness, subject as above mentioned, of the position, levels, dimensions and alignment of all parts of works and for the provision of all necessary instruments, appliances and labour in connection therewith. If, at any time during the progress of the works, and during defects liability period, any error shall appear or arise in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required to do by the Engineer-in-charge/ Consultant and / or Client or his authorised representative shall at his own cost, rectify such error to the satisfaction of the Engineer-in-charge. The checking of any setting out or of any line or level by the Consultant shall not in any way relieve the Contractor of his responsibility for the correctness thereof. The Contractor shall carefully protect and preserve the benchmarks; sight-rails, pegs and other things used in setting-out the Works. Any rectification works required should be done by the Contractor at his own cost.

12. Quality of Materials, Workmanship and Test

(a). All the materials used in the work shall be subjected to the mandatory tests as prescribed in

the specifications detailed in Schedule F of the General Condition of Contract and other specifications referred to in the contract and workmanship shall be the best of the respective kinds described in the Contract and in accordance with the Engineer-in-charge / Consultant's instructions and shall be subjected from time to time to such tests as the Engineer-in-charge / Consultant may direct at the place of manufacture or fabrication or on the Site or at an approved testing laboratory. The source of supply and / or manufacturing within/ out side India may be inspected by the Engineer-in-charge/ Consultant/ any representative as nominated by the client. The expenditure on this account is deemed to be included in the rate quoted.

The contractor shall upon the instruction of the Engineer-in-charge /Consultant's representative furnish him with documentation to prove that the materials & goods comply with the requirements of contract and for requirement stated above. The Engineer-in-charge /Consultant may issue instruction in regard to removal of material from site or any work, if these are not in accordance with the contract. The contractor shall provide such assistance, instruments, machinery, labour and materials as are required for examining, measuring, sampling, testing of material or part of work.

The Engineer-in-charge/ Consultant may carry out Third Party Quality Assurance /Audit by an independent agency/ individual/firm/institute at any time. The agency will be permitted and offered all support related to site inspection by the Contractor. Observations / discrepancies noticed by third party quality assurance/audit shall be attended by the contractor at his own cost.

(b). Samples

- i) All samples of materials and /or items of works in adequate numbers, sizes, shades & pattern as per specifications shall be supplied free of charge by the contractor without any extra charge. All other expenditure required to be incurred like conveyance for taking the samples for testing at the laboratory, packing, etc, shall be borne by the contractor. If the test results do not confirm to the specifications and standards laid down, the materials shall be rejected, the contractor shall remove such materials from site. The laboratory for testing of samples shall be decided by the Engineer – in charge, whose decision shall be final and binding.
- ii) Contractor shall submit Samples to the Engineer-in-charge/Consultant for approval. If certain items proposed to be used are of such nature that samples cannot be presented or prepared at the site, detailed literature / test certificate of the same shall be provided instead to the satisfaction of the Engineer-in-charge /Consultant. Each Sample will be identified clearly as to material, Supplier, pertinent data such as catalogue numbers and the use for which intended and otherwise as the Engineer-in-charge /Consultant may require to review the submittals for the limited purposes required by paragraph (d) below. The numbers of each sample to be submitted will be as specified in the Specifications, or as shall be specified by the Engineer-in-charge/Consultant.
- iii) Submittal Procedures
 - (a). Before submitting each Sample, Contractor shall have determined and verified all materials with respect to intended use, fabrication, shipping, handling, storage, assembling and installation pertaining to the performance of the Work and All information relative to Contractor's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programmes incident thereto.
 - (b). Each submittal will bear a specific written indication that Contractor has satisfied Contractor's obligation under the Contract Documents with respect to Contractor's review and approval of that submittal.
 - (c). At the time of each submission, contractor shall give the Engineer-in-charge/

Consultant specific written notice of such variations, if any; that the sample submitted may have from the requirements of the contract document. Such notice shall be separate from the submittal and in addition shall cause a specific notation to be made on each sample submitted for review and approval of each such variation

iv) Review and Approval:

- a. Sample shall be reviewed and approved only to determine if the items covered by the submittals will, after installation or incorporation in the work, conform to the information given in the contract documents and be compatible with the design concept of the completed project functioning as a whole as indicated by the contract documents, drawings.
 - b. Review and approval will not extend to means, methods, techniques, sequences or procedures of construction. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. Contractor shall make corrections required by Engineer-in-charge/Consultant and shall submit as required new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for and by the Engineer-in-charge/ Consultant on previous submittals.
 - c. Above referred review and approval Samples shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Document unless Contractor has in writing called the Engineer-in-charge/Consultant's attention to each such variation at the time of submission as specified above and received written approval of each such variation by specific written notation thereof incorporated in or accompanying the Sample approval; nor will any approval by Engineer-in-charge / Consultant relieve Contractor from responsibility for complying with the requirements of contract.
 - d. Only when the samples are approved in writing by the Consultant, the contractor shall proceed with the procurement and installation of the particular material / equipment. The approved samples shall be signed by the Consultant for identification and shall be kept on record at site office until the completion and acceptance of the work and shall be available at the site for inspection / comparison at any time. The contractor shall keep with him a duplicate of such samples to enable him to process the matter.
 - e. For items of works where the samples are to be made at the site, the same procedure shall be followed. All such samples shall be prepared at a place where it can be left undisturbed until the completion of the project.
 - f. The Engineer-in-charge shall communicate his comments / approval to the Contractor to the samples at his earliest convenience. Any delay that might occur in approving of the samples for reasons of its not meeting with the specifications or other discrepancies, inadequacy in furnishing samples of best qualities from various manufacturers and such other aspects causing delay on the approval of the materials / equipment's etc., shall be to the account of the contractor. In this respect the decision of the Engineer-in-charge shall be the final.
- v) On delivery of the supplies of materials / equipments for permanent works at the site, the contractor shall specifically arrange to get the supply inspected by the Engineer-in-charge /Consultant and compared with the approved sample and his specific obtained before using the same in the work.

(a). Cost of Tests

The cost of making any test shall be borne by the Contractor as intended by or provided for the Contract or as found necessary by the Engineer-in-charge/Consultant for ascertaining whether the quality of materials intended to be used by the Contractor in the Works is acceptable, whether any finished or partially finished work is appropriate for the purposes which it was intended to fulfil.

(b). Testing facilities

The Contractor shall, at his own cost, provide testing facilities as per CPWD specifications and IS Codes at site as stipulated in the General conditions of the contract (GCC) or as directed by the Engineer-in-charge/Consultant including staff required for testing. The test shall be carried out jointly in the presence of Engineer-in-charge/Consultant or his representative and the contractor or his representative.

The contractor shall also provide suitable weighing and measuring arrangement and testing instruments and machines for testing of materials and cubes at site as per details given in GCC.

The contractor shall carryout all the mandatory tests and shall maintain records of testing & checks of material, in formats, checklists etc. to be given by Engineer-in-charge /Consultant. All such records shall be maintained jointly by the contractor and Engineer-in-charge/Consultant these shall remain under the custody of the Engineer-in-charge /Consultant.

The laboratory shall be connected to the main potable water, electricity and other Services.

Some of the mandatory tests for each item of work and /or materials shall be carried out in approved outside laboratory as directed by the Engineer-in-charge/Consultant. The Contractor shall bear the entire cost of testing charges for samples of items of work and /or materials and also the other expenditure towards making samples, packaging, and transport etc.

The materials brought at site of work shall not be used in the work before getting satisfactory test result as per relevant mandatory tests, detailed in the relevant CPWD specifications.

13. Absence of Specifications

If the nomenclature of any item do not contain particulars of materials and works which are necessary for its proper execution, all such materials shall be supplied and item shall be executed by the Contractor without extra charge over the quoted rates and If the Contractor requires any information, he shall request in writing well in advance to commencement of the particular work to the Engineer-in-charge /Consultant who will clarify the issue within a reasonable time.

14. Obtaining Information's related to Execution of work

No claim by the Contractor for additional payment will be entertained which in consequent upon failure on his part to obtain correct information as to any matter affecting the execution of the works, nor will any misunderstandings or the obtaining of incorrect information or the failure to obtain information relieve him from any risks or from the entire responsibility for the fulfilment of the contract.

15. Access for Inspection

Persons nominated by Engineer-in-charge /Consultant shall at all reasonable times have free access to work and/ or to the workshops, factories or other places where materials are lying or from which they are being obtained and the Contractor shall extend necessary service to Engineer-in-charge /Consultant and their representatives every facility necessary for

checking measurements, inspection and examination and test of the materials and workmanship.

16.Examination of Work before covering up

- (a) No part of the works shall be covered up or put out of view without the written approval of the Engineer-in-charge/Consultant and the contractor shall give due notice to the Engineer-in-charge/ Consultant whenever any such work or foundation is or ready or about to be ready for examination and the Engineer-in-charge/Consultant shall, examine and measure any work before it is covered up or put out of view and to examine foundations before further work is placed thereon.

(b) **Uncovering and making openings**

The contractor shall uncover any part or parts of the works or make openings in or through the same as the Engineer-in-charge /Consultant may direct from time to time and shall reinstate and make good such part or parts to the satisfaction of the Engineer-in-charge /Consultant at his own cost.

17.Assignment

The contractor shall not, without the prior consent of the Engineer-in-charge / Consultant assign the Contract or any part thereof, or any benefit or interest therein or there under, otherwise than by:

- A change in favour of the Contractor's bankers of any money due or to become due under the Contract, or
- Assignment to the Contractor's insurers (in case where the insurers have discharged the Contractor's loss or liability) of the Contractor's right to obtain relief against any other party liable.

The Contractor shall not sub-contract the whole of the Works. Also, the Contractor shall not subcontract any part of the works without the prior consent of the Engineer-in-charge/ Consultant, except where otherwise provided under the Contract. Any such consent shall not relieve the Contractor from any liability or obligation under the Contract and he shall be fully responsible for the for the quality of the work executed and acts omission and commission, defaults and neglects of any Subcontractor, his agents, servants or workmen as if these were the acts, defaults or neglects of the Contractor, his agents, servants or workmen. Such Permission may be granted only for the specialized work etc and the decision of Engineer-in-charge/ Consultant shall be final.

18.Claims

The contractor shall submit to the Engineer-in-charge monthly statement giving full details of claims for any additional payments for extra or additional / substituted work ordered by the Engineer-in-charge /Consultant which he has executed during the preceding month, to which the contractor may consider himself entitled supported with analysis of rates being claimed.

19.Secured Advance

- I. Secured advance on materials, which are admissible as per Clause 10 (B) (i) of the General Conditions of Contract and brought to site for use in the work, shall be paid only after:
 - a. Receipt of satisfactory test result from the laboratory.
 - b. Engineer in charge has personally verified that the material brought at site of work for use in the work conforms to the sample approved by him.
- II. Secured advance shall be shall be recovered according to consumption of material in the work. Contractor shall have to sign an Indenture Bond before release of the advance.

- III. The materials shall virtually stand Hypothecated to Client/HLL but contractor shall be fully responsible for watch & ward/ security of materials for which Secured Advance has been paid by client/HLL.
- IV. Any infringement and / or breach of the above specifications and conditions etc, shall render the contractor liable to action under various clause of the contract and such action as stipulated in the conditions therein.

20. (a) Inspection & Testing during manufacture

The Client / Engineer-in-charge / Consultant shall be entitled to inspect, examine and test during manufacture the materials and workmanship and check the progress of manufacture of all fabrication materials to be supplied under the contract on the contractor's premises during working hours, and if part of the said materials is being manufactured on other premises, the contractor shall obtain for the Client / Engineer-in-charge / Consultant permission to inspect the same at such premises. This inspection, examination or testing shall not relieve the contractor from any obligation under the contract.

(b) Dates for Inspection & Testing

The dates of Inspection & Testing shall be mutually agreed by the Engineer-in-charge / Consultant and the contractor.

(c) Facilities for Testing at Manufacturer's Works

Where the contract provides for tests on the premises of the contractor or of any sub-contractor the contractor shall provide such assistance, labour, materials, electricity, fuel, stores, apparatus and instruments as may be required and as may be reasonably demanded to carry out such tests.

(d) Certificate of Testing

As and when fabrication materials shall pass the tests referred in this clause, the Engineer-in-charge /Consultant shall furnish to the contractor a certificate in writing to that effect.

(e) Rejection

If as a result of such inspection, examination or test of the works (other than a Test on Completion the Engineer-in-charge /Consultant shall decide that such material is defective or not in accordance with the contract he shall notify the contractor accordingly stating in writing his observations and reasons thereof. The contractor shall with due diligence make good the defect and ensures that the material complies with the Contract. Thereafter, if required by the Engineer-in-charge/Consultant, the tests shall be repeated under the same terms and conditions till satisfactory results are made available.

(f) Delivery of Materials and Equipment

The contractor shall be responsible for all materials and equipment brought at site for the purposes of the contract. Unless the Engineer-in-charge/Consultant directs, no material shall be brought to the site which is not required for execution of the work.

(g) Inspection & Testing and Re-inspection

All deficiencies revealed by testing and inspection shall be rectified by the contractor at his own expense and to the satisfaction and approval of the Engineer-in-charge/Consultant. Rectified components shall be subject to re-testing till desired results are obtained.

(h) Inspection Reports

The contractor shall provide the Engineer - in- Charge /Consultant with five copies of reports of all inspection and tests.

21. Physical and Virtual Completion of Work

When the whole of the Work is physically and virtually complete and has satisfactorily passed required tests that may be prescribed under the Contract:-

- (a). The contractor shall give a written notice to this effect alongwith an under taking to rectify any defects that may be found during inspection. The Engineer - in- Charge / consultant shall jointly inspect the work with the contractor within 30 days of receipt of such notice.
- (b). The Engineer-in-charge / Consultant shall inspect the works are completed to see if they are in such a condition so as to be put to its proper or other intended final use and / or occupied without any short comings and no major or minor items of works are remaining which in the opinion of the Engineer-in-charge/ Consultant will cause undue difficulties in satisfactory use/ occupation of the works.

22. Provisional Acceptance and Certificate of completion

(a) Provisional Acceptance and Issue of Certificate of Physical Completion of work

The work shall be deemed to have been physically completed and provisionally accepted after fulfilment of all the following by the Contractor.

- i) Physical completion of all works and obtaining all required approvals from the statutory authorities as required for occupation and use of the works and handing over such certificates to the Engineer-in-Charge
- ii) Submitting As-Built Drawings, Catalogues, Brochures, and Data Sheets, manuals in the form as directed by Engineer in Charge
- iii) Issue of Certificate of Physical Completion by the Engineer-in- Incharge /Consultant.

(b) Certificate of Final Completion

The contract shall not be considered as completed until a Certificate of Final Completion has been issued by the Engineer-in-charge/ Consultant stating that the Works have been completed to his satisfaction and remedying / rectifying of defects have been satisfactorily completed.

The composite work shall be treated as complete when all the components of the work are complete. The Certificate for Final Completion of the Composite work shall be recorded by the Engineer-in-charge / Consultant after obtaining / recording of completion certificate of all the components.

The Engineer-in-charge/ Consultant shall give the Certificate for Final Completion as per the following, whichever is later:

- Twenty-eight days after the expiration of the Defects Liability Period

OR

- If different Defect Liability Periods shall become applicable to different sections or parts of the Works, the expiration of the last such period

OR

- As soon thereafter as any works ordered during such period have been completed to the satisfaction of the Client.

Provided always that the issue of the Certificate of Final Completion shall be a condition precedent to payment or return to the Contractor the security deposit and / or Performance security in accordance with the conditions set out in the contract.

23. The contractor shall give performance test of the entire work as per standards specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the tests.

24. The contractor shall maintain in perfect condition all works executed till the completion of the entire work allotted to him. Where phased handing over of completed portion of the work is required by the Engineer – in – charge, the provisions mentioned for completion of entire work will apply to each phase.

25. Defect after completion

(a). General

Any defect, shrinkage, settlement or other faults that may appear within the “Defects Liability Period” which in the opinion of the Client / Engineer-in- charge/ Consultant are due to materials or workmanship not in accordance with the contract, shall be rectified as per the directions in writing of the Client / Engineer-in- charge/ Consultant to the Authorized representative of the contractor within such reasonable time as shall be specified therein by the contractor, at his own cost. In case of default, the Client / Engineer-in-charge /Consultant/ may employ any person’s to amend and make good such defects, shrinkage, settlements or other faults and all expenses consequent thereon or incidental thereto shall be borne by the contractor. Such damages, losses and expenses shall be recoverable from the bills due or may be deducted from any money due to or that may become due to the contractor. If no amount is available to the credit of contractor, the Client / Engineer-in-charge/Consultant/ may recover the amount from the dues of the contractor with any other government/department.

(b). Execution of work of repair etc.

Any defects, shrinkage, settlement or other faults which may appear or be noticed within the defect liability period, and arising in the opinion of the Engineer-in-charge/Consultant from materials or workmanship not having in accordance with the contract, shall upon the direction in writing of the Engineer-in-charge’s / Consultant’s representative and within such reasonable time as shall be specified therein and without any delay, be amended and made good or replaced by the contractor at his own cost.

(c). Cost of Execution of Work of Repair, Etc.

All such works shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer-in- charge/Consultant, be due to the use of materials or workmanship not in accordance with the Contract, or due to neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor’s part under the Contract.

(d). Contractor’s personnel to be at site

During the defects liability period the contractor shall depute at least one of his authorized representative at site along with required tradesmen to attend the defects to the satisfaction of Client/ Engineer-in-charge/ Consultant.

26. Works by Other Agencies

The Client/ Engineer-in-charge/Consultant reserves the right to use premises and any portion of the site for the execution of any work not included in this contract which it may desire to have carried out by other persons simultaneously, and the contractor shall allow the reasonable facilities for the execution of such work, but shall not be required to provide any plant or material for the execution of such work except by special arrangement with the other agency. Such work shall be carried out in a manner so as not to impede the progress of the works included in the contract, the contractor shall not be responsible for any damage or delay which may happen to or occasioned by such work.

The contractor shall co-operate with other agencies working in the same project, and coordinate his plans and time schedules so that there will be no interference. The Contractor shall forward to the Engineer-in-charge /Consultant all correspondences and drawings exchanged. Failure to

check plans for conditions will render the Contractor responsible for bearing the cost of any subsequent changes found necessary or damages done.

The Client/ Engineer-in-charge /Consultant shall not entertain any claim on account of the Contractor affording necessary facilities to execute the work simultaneously with other agencies executing the works for the same project.

27.Dues not paid by the Contractor

The contractor shall pay all dues or fees to Statutory authorities and Electric and Water supply authorities & Lift licensing authority etc. within due period and indemnify the Client and the Engineer-in-charge /Consultant from any claims or compensations or penalties or damages arising out of non-payment of any such dues or fees. However, in case some dues or fees are not paid by contractor / and or claims for compensations or penalties etc. are raised by the Statutory authorities, the Client may deposit the required amount or any or all of the above and recover or deduct the same from any money payable to the contractor by the Client or any other means available to the Client such as bank guarantee.

28.Urgent Repairs

If, by reason of any accident, or failure, or other event occurring to or in connection with the works, or any part thereof, either during the execution of the works, or during period of Defects Liability any remedial or other work or repair, shall, in the opinion of the Engineer-in-charge/ Consultant/Client be urgently necessary for the safety of the Works and the Contractor is unable or unwilling to do such work or repair despite notice, the Engineer-in-charge/ Consultant/ may employ and pay other persons to carry out such work or repair as the case may be and may consider necessary. If the work or repair so done by the other agency is the work which, in the opinion of the Engineer-in-charge/Consultant the Contractor was liable to do at his own expense under the Contract, all expenses incurred by Other agency in so doing shall be recoverable from the Contractor by the Engineer-in-charge/Consultant, or may shall be deducted by the Engineer-in-charge/ Consultant from any monies due or which may become due to Contractor.

29.Boreholes & Exploratory Excavation

If, at any time during the execution of the Works, the Engineer-in-charge /Consultant shall require the Contractor to make boreholes or to carry out exploratory excavation, such requirement shall be ordered in writing and shall be deemed to be an additional ordered under the provisions unless a provisional sum in respect of such anticipated work shall have been included in the schedule of items.

30.Fossils, Etc.

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site of the works shall be the property of the Government.

31.Plant Temporary Works & Materials

(a.) Plant, etc. Exclusive use for the Works

All Constructional Plant, Temporary Works and materials provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the Works and the Contractor shall not remove the same or any part thereof except for the purpose of moving it from one part of the Site to another, without the consent, in writing of the Engineer-in-charge /Consultant, which shall not be unreasonably withheld.

(b.) Removal of Plant etc.

Upon completion of the Works, the Contractor shall remove from the Site all the said Constructional Plant and Temporary Works remaining thereon and any unused materials

provided by the Contractor, within 10 days of obtaining the completion certificate/ Virtual completion of the work.

32. Operations and Maintenance Manual

The Contractor shall provide and submit to the Engineer-in-charge /Consultant with two copies of the Operation and Maintenance Instruction Manuals as may be applicable for the works in a durable plastic case. The arrangement of these manuals shall be as follows:

SECTION A:	Index
SECTION B:	Full set of Indexed Photographs showing all salient features of the Project.
SECTION C:	Description and details of materials, items and fittings and fixtures used for the project along with Catalogues & Addresses of the Suppliers.
SECTION D:	Planned maintenance instruction and dates for order replacements.
SECTION E:	List of recommended Spare parts of consumables.
SECTION F:	List of “As-Built” Drawings (related to Working/ Shop drawings)

Until the Record Drawings, prints, transparencies and manuals referred to above have been received and approved by the Engineer-in-charge /Consultant, Contract shall not be considered as complete and payment of monies will be withheld until such drawings, etc. have been submitted to and approved by the Engineer-in-charge /Consultant. The cost of providing such records including proper submission thereof is deemed to be included in the Contract Sum quoted by the Contractor.

33. Reports by Contractor

- (a.) The Contractor shall submit CPM – Pert Chart and activity wise bar charts, indicating the duration of various subheads of the work, for the complete work within 30 days of award of work for approval by the Engineer - in- Charge /Consultant. On the basis of approved bar charts contractor shall submit Progress Charts by the 4th day of every month.
- (b.) The Contractor shall submit Monthly Progress Report in triplicate in format approved by Engineer-in-charge /Consultant. Failure to submit reports may result in holding up or delay in Payment of bills.
- (c.) **Monthly Progress Photographs:-** The Contractor shall arrange at his own cost to maintain a progress record of the works by taking postcard size colour photographs (preferably digitized photographs) 6 Nos. or more per month per block as directed by the Engineer-in-charge / Consultant during the constructions stages and after completion and shall supply three sets at no extra cost. The Contractor will be required to submit monthly reports on the progress of his work as per the format approved by the Engineer-in-charge /Consultant.
- (d.) The Contractor shall prepare Weekly Reports of planned and actual progress of work and subsequent week's scheduled work. These will also include material procurement status. These reports shall be submitted to the Engineer-in-charge /Consultant & shall be reviewed in Weekly Co-ordination Meetings.
- (e.) The Contractor shall file daily category-wise labour report to the Engineer-in- charge / Consultant. The report shall indicate scheduled requirement against actual strength.
- (f.) The contractor shall maintain daily weather record. Daily maximum and minimum temperature and corresponding humidity shall be recorded and charted. Rainy days shall be recorded when the rain lasting more than one hour hampers the work. Any other inclemency in weather shall be recorded. The records shall be regularly shown to the Engineer-in-charge /Consultant and his signature obtained.

- 34.** Every care has been made to include all the aspects/ terms and condition in these documents. However, during execution, if any issue arises, which has not been included in these documents then standard norms / rules & regulations/ terms & conditions as prevalent in CPWD shall be followed which shall be binding on both the parties.

35. Technical Examination

The Client/ Engineer-In-Charge/ Consultant shall have the right to cause Audit and Technical Examination of the works and the final bills of the contractor including all supporting vouchers, abstracts, etc. to be made as per payments of the final bill and if as a result of such Audit and Technical Examination the sum is found to have been overpaid in respect of any work done by the contractor under the contract and found not to have been executed, the contractor shall be liable to refund the amount of over payment and it shall be lawful for the Client/ Engineer-in-charge/ Consultant to recover the same from the security deposit or Performance Security of the contractor or from any dues payable to the contractor. If it is found that the contractor was paid less than what was due to him under the contractor in respect of any work executed by him under it, the amount of such under payment shall be duly paid. The work comes under the purview of CVC and as such all orders and instructions are applicable to this work.

In the case of any audit examination and recovery consequent on the same the contractor shall be given an opportunity to explain his case and the decision of the Client shall be final. Payment on this account will be recovered from the contractor.

In the case of Technical Audit, consequent upon which there is a recovery from the contractor, recovery shall be made with orders of the Client whose decision shall be final. All action under this clause shall be initiated and intimated to the contractor within the period of twelve months from the date of completion.

36. Miscellaneous

(a.) Safety Regulations

Contractor shall be fully responsible for the safety of his Employees / Visitors / Contract Labour / Sub-Contractors Labour. The Contractor shall provide first-aid box readily available at site. The Contractor shall provide all safety measures as per labour safety rules applicable

(b.) Labour Laws

The Contractor shall strictly adhere to all labour laws prevailing in the region. The contractor shall make timely payment of wages of his labour and the wages paid to the labour shall be equal to or more than the minimum wage prevailing at the time of payment. The Contractor shall comply with all applicable labour legislation, maintain labour records including payment made to the workers and obtain licence for engaging workers for the work as required under the labour laws.

(c.) By-Laws of Statutory Authorities

The Contractor and his labour shall not violate municipal /sanitation /health or any other byelaws.

(d.) Tax Deduction at Source

All Taxes and surcharge as applicable on date shall be deducted from the amount due to the Contractor towards the value of the work done. TDS certificate thereof shall be issued to the Contractor.

(e.) General Lighting and Securities

The Contractor shall, throughout the execution, completion and remedying of the

defects, provide and maintain at his own cost all lights, guards, fencing, warning signs and watch post, when and where necessary or directed by the Engineer-in-charge / Consultant or by any duly constituted authority for the protect for the safety and convenience of the workers / public / or others.

(f.) **Delay in starting the work**

No compensation shall be allowed for any delay caused in the starting of the work on account of acquisition of land, encroachment or in the case of clearance of works, on account of any delay in according sanction to estimates in issue of drawings, decisions etc. However, the extension of time shall be granted as per relevant conditions of Contract.

(g.) **Site instruction book**

For the purpose of quick communication between Engineer-in- charge / Consultant and the Contractor or his representative, site instruction book shall be maintained at site as described below:

Any communication, relating the works may be conveyed through instructions in the site instruction book. Such a communication from Engineer-in-charge / Consultant to the Contractor shall be deemed to have been adequately served in terms of the contract once the entries are made and signed by the authorised representative of the contractor. For this purpose the contractor should authorise one of his employees on the site instruction book itself. Site instruction book shall have machine numbered pages and shall be carefully maintained and remain under custody of Engineer-in-charge / Consultant/Client the contractor can also avail of the site instructions book for urgent communication with Engineer-in-charge/ Consultant. Any instruction which Engineer-in- charge / Consultant may like to issue to the Contractor may be recorded by the Engineer-in-charge / Consultant in site instruction book.

(h.) **Signage**

The Contractor shall provide at his own cost, a sign board at directed location having overall size 2 meters by 4 meters indicating name of the project, and a three-D view of the project, as approved by Engineer-In-Charge/Consultant. The signboard will be illuminated during night.

- (i.) **Cutting of Trees** Permission for cutting of trees if required will be obtained by Client from the concerned authority
- (j.) The contractor shall have adequate generators of required capacity as per site requirement as stand by arrangement.
- (k.) The temporary connection for electric line and water line from local authorities shall be taken by the contractor who will bear the expenditures
- (l.) No idling charges or compensation shall be paid for idling of the contractor's labour, staff or P&M etc. on any ground or due to any reason whatsoever.
- (m.) The Contractor shall mobilize and employ sufficient resources for completion of all the works within the stipulated time period as per agreement and as indicated in the approved Bar Chart/ Network. No additional payment will be made to the contractor for any multiple shift work or other incentive methods contemplated by him in his work schedule even though the time schedule is approved by Engineer-in-charge /Consultant.

37. Co-ordination Meetings

The Contractor shall be required to attend co-ordination meetings with the Engineer-in-charge / Consultant / Client and the other Contractors during the period of Contract as intimated by the Engineer-in-charge / Consultant / Client. All costs incidental to such interaction shall be to

the Contractor's account and no claim will be entertained by the Engineer-in-charge / Consultant / Client on this account.

38. Site Management:

(a) Contractor's Working Area

Suitable working space will be provided by the Engineer-in-charge/Consultant /Client to the Contractor as per site conditions and availability. The Contractor may have to carry out some cutting / filling work for making this area workable. The cost of all such Works shall be deemed to have been included in the contract price quoted for the Works and no payment shall be made on this account.

Before commencement of the work, the contractor shall obtain approval of the Engineer-in-charge the location of cement godown, steel stacking and fabrication yard, site office and shall from time to time take instructions from the Engineer – in- charge regarding collection and stacking of materials at the site.

No excavated earth or building material shall be stacked on areas where other buildings, roads, services or compound wall or any other structure are to be constructed.

(b) Contractor's Temporary Structures

The Contractor may, at his own expense and subject to the approval of the Engineer-in-charge / Consultant /Client and statutory authorities, construct temporary structures for its site office, stores; Workshop etc. in the working area allocated to him as above and remove the same on completion of Works. The Contractor shall furnish such details of his Temporary Works as may be called for by the Engineer-in-charge/Consultant /Client and the Contractor shall satisfy the Engineer-in-charge/Consultant as to their structural safety. Temporary structures, found unsafe or inefficient shall be removed and replaced in a satisfactory manner.

(c) Contractor's Labour Camp

The Contractor shall make arrangements at his own expense for labour camp / accommodation for labour and staff to be employed for execution of the work and their conveyance to Site. No workers/ staff shall be allowed to stay within the Site except with the specific approval of the Engineer-in-charge/Consultant /Client. Proper ID Cards shall be got approved /authorized by the contractor from the Engineer-in-charge/ Consultant / Client to authorise the Contractor's staff and workers to enter the Site.

(d) Procurement of Various Materials

The Engineer-in-charge/Consultant / Client will not supply any materials required for execution of the Works under this Contract. The Contractor must, therefore, make his own arrangements for timely procurement of various materials including steel and cement. Prior approval of each and every material including steel cement, aggregate, bricks etc or any other fittings & fixtures shall be taken by the contractor from the Engineer-in-charge / Consultant. Samples for all the materials to be used in the work shall be got approved from Engineer-in-charge /Consultant before their bulk procurement. Samples approved shall be kept in the sample room till the completion of the work. However in case of delay in procurement of various materials by the contractor resulting into likely delay in completion of work, the Engineer-in-charge /Consultant /Client may procure the required materials directly and the cost of the same will be recovered from the contractor.

(e) Water Supply & Power Supply

The Contractor shall make his own arrangement for water supply at Site for drinking as well as construction purposes & Power Supply at his own cost. Non-availability of power supply and /or water from whatever source shall not entail any additional claims or extension of Contract period in this account.

(f) Temporary Fencing

The Contractor shall at his own expense, erect and maintain in good condition temporary fence all around the working area as per directions of the Engineer-in-charge / Consultant

(g) The contractor shall make, till completion of the project arrangements for/of:

- i. Proper pumping for removing water from the basement or elsewhere at site.
- ii. Proper security, safety, transportation, manpower, lighting arrangement for execution of works at night.
- iii. Tower crane, batching plant and others machinery, tools and tackles required for timely execution of work.
- iv. Proper barricading around site so that surrounding area is made free from disturbances. The specifications of barricading shall be got approved by Engineer-in-charge / Consultant. External face of barricading to display name of Client, Consultant & Engineer-in-charge. No sign board of contractor is allowed unless permitted by the Engineer-in-charge in writing.
- v. Diversion of underground services with the approval of Engineer-in-charge.

(h) Restriction in work areas.

- (a). The contractor must see the site of the work, its approaches carefully before tendering, No claim of any sort shall be entertained on account of any site conditions. If any approach from main road is required or existing approach is to be improved and maintained, for cartage and materials by the contractor, the same shall be done by the contractor his own cost.
- (b). Some restrictions may be imposed by the Hospital authorities or its security staff etc. On the working and/or movement of labour, materials etc. The contractor shall follow all such restrictions / instructions and nothing shall be payable on this account.
- (c). In case the contractor is not permitted to erect the huts for labour at the site of work, the contractor will have to make his own arrangement to provide such accommodation elsewhere and nothing extra shall be paid for this.
- (d). The contractor shall obtain approval of the Hospital authorities to erect the hutments for labour etc. at the site of work; denial of approval shall not affect the construction activities.
- (e). The contractor shall take all precautions to avoid accidents by exhibiting necessary caution boards such as day and night boards, speed limit boards, red lights and providing barriers. He shall be responsible for all damages and accidents caused due to negligence on his part. No hindrance shall be caused to traffic during the execution of the work.

39. Payment of water charges in connection with water used for construction purpose and for drinking purpose by the contractor's labour.

Both the water charges (if any) incidents to water used by the Contractor for construction purpose and for the drinking purpose for his labours residing in the site of work shall be borne by the Contractor / agency under the following cases:

- i. In case of temporary water connections from municipal mains: - Water charges (including the water used for construction purpose and drinking purpose of the contractor's labours) have to be borne by the contractor / agency.
- ii. Water used from other source: - Prior permission for using the water for construction purpose and drinking purpose of the contractor's labours has to be obtained from Municipal Corporation / local body by the contractor / agency. Water charges if any and other charges

for use of water from other sources for construction purposes/for drinking purposes of the contractor's labours have to be borne by the contractor / agency.

- iii. Any infringement and / or breach of the above shall render the contractor liable to action under various clauses of the contract and such actions stipulated in the conditions therein.

40. Statutory Requirements/ Approvals

The Contractor shall be responsible for obtaining approval from local electrical inspector, Lifts authority & water & Sewer line connection, tree cuttings, permission for bore well and for temporary structures etc. from local Authorities. All the statutory expenditure incurred towards payment to the local bodies for getting local Electric inspector, sewer line and water supply connection for Client/ Engineer-in-charge /Consultant will be reimbursed on the production of proof of payment. Contractor will be extended all assistance in this connection by the Engineer-in-charge /Consultant/ client.

The Contractor shall obtain all necessary approvals from Municipal and other local bodies including Municipal bodies, Water supply agencies concerned, Electric Supply and inspectorate. Agencies concerned, Police and Security Agencies, Chief Controller of Explosives, Fire Department, Civil Aviation Department, concerned in accordance to prevailing rules, Building Bye-Laws etc., as the case may be with related to Construction/ Completion. All expenditure on this account will be borne by the contractor. However the fees paid by the contractor to these statutory authorities only for obtaining the required statutory approvals shall be reimbursed by the Client on submission of valid payment receipts from these statutory authorities.

The approvals shall include the **following in addition to any other approval which may be required for the project.**

- Construction Permit if required
- NOC from Chief Fire Officer
- NOC from Lift Inspector where lifts are provided
- Occupancy certificate

The Engineer-in-charge/Consultant /Client may, at the written request of the Contractor, assist him in obtaining the approvals from relevant authorities. However any such request by the Contractor shall not bind the Engineer-in-charge/Consultant /Client in any manner.

41.Compliance of Statutory Obligations for obtaining completion Certificates:

The Contractor shall comply all the statutory obligations and obtain all required clearances to implement the project without any financial repercussions to Engineer-in-charge /Consultant /client and ensure all follow up actions with the local authorities in this respect for smooth completion of the project. All statutory charges to get any NOC, clearances from local authorities shall be reimbursed by the Engineer-in-charge /Consultant / client after submission of the bills/documentary evidences by the contractor. The contractor shall assist the client/Engineer-in-charge /Consultant to obtain all NOC, completion & Occupancy certificates from respective local bodies and other statutory authorities as under:

- i) Pollution control Board if required for the subject work,
- ii) Local Municipal authority if required for the subject work etc.
- iii) And any other statutory requirement if required for the subject work for execution of work and to occupy the buildings and run the services in all respects.

Contractor shall organise all inspections of concerned authorities & obtain the NOC's within the time for completion if required for the subject work.

The contractor is required to submit the relevant drawings like completion Drawings and

any other statutory documentary requirements of local bodies in copies as per requirement to obtain the above etc. at their own cost if required for the subject work.

42. Maintenance

The Contractor shall provide maintenance services for the works for a period of one year after the taking over under Defects Liability Period.

The maintenance services during this period shall be inclusive of all spares, accessories, consumables, manpower, tools and tackle, replacement of parts, routine servicing and maintenance of equipment/systems etc. complete in all respects.

The Contractor shall carry out all routine and special maintenance of the equipment/ plant/ system and attend to any defects that may arise in operation of the equipments/system and plant.

SECTION – 2

ADDITIONAL CONDITIONS OF CONTRACT AND SPECIFICATIONS

General

- 1.1 The following Additional Conditions and specification shall be read in conjunction with General Conditions of Contract and Specific Conditions of Contract. If there are any provisions in these Additional Conditions of Contract & specifications which are at variance with the provisions in the above mentioned documents, the provisions in these Additional Conditions of Contract & specifications shall take precedence.
- 1.2 Rates: -
 - 1.2.1 The quoted rates shall be for complete items of work i.e. inclusive of material, labour, plant and machinery, tools and tackles etc. including water & electricity, overheads charges, all taxes, statutory charges / levies applicable from time to time and others as specified etc, incidental works and all other charges for items contingent to the work, such as, packing, forwarding, insurance, freight and delivery at Site, watch and ward of all materials & successful installation, testing & commissioning at site etc.
 - 1.2.2 The rate of all items of work, shall, unless clearly specified otherwise include cost of all labour, materials and all other inputs required in the execution of the item, including octroi, sales tax and any other taxes.
 - 1.2.3 Unless otherwise specified in the schedule of quantities, the rate tendered by the contractor shall be all inclusive and shall apply to all heights, lifts, leads and depth of the building and nothing extra shall be payable to him on any account.
 - 1.2.4 The rates for items of work wherein cement is used are inclusive of cost for curing
 - 1.2.5 Royalty at the prevalent rates whenever payable shall have to be borne by the contractor on the boulders, metal, shingle, sand and bajri etc. Or any other materials collected by him for the work direct to the revenue authority of the District / state Government concerned and nothing extra shall be payable on this account

1.0 Scope of Contract

- 2.1 The scope of work covers the supply, erection, testing and commissioning of HVAC works which also includes design & preparation of detailed shop drawings, testing and commissioning of components and accessories.
- 2.2 The work shall be carried out in conformity with the relevant drawings and the requirement of architectural, electrical, structural, and other specialised service drawings approved by Engineer-in-charge/Consultant.
- 2.3 The Contractor shall make provision of hangers, sleeves, structural openings and other requirements during construction to avoid holding up progress of the construction schedule. The Contractor should ensure that the structure is designed for additional loads or cut outs. Subsequent Cutting holes in the RCC structural members /slab shall not be allowed.
- 2.4 The contract items comprises of furnishing of all materials, equipment, labour & transportation etc. necessary to render the installation / item fully operational as per the intent of specification and drawings, including any necessary adjustment or

corrections. Further the installation / item shall be in conformity with local laws and manufacturer instructions applicable.

3 Contract Drawings

- 3.1 The drawings issued with the Bid are diagrammatic only and indicate the extent and general arrangement of the installation. Drawings shall not be scaled.
- 3.2 The Contractor shall follow the Bid drawings for preparation of his detailed sanitary, plumbing & fire fighting & Shop drawings and for subsequent installation work and also cross check the drawings of other services to avoid subsequent complications in inter services. Any discrepancies observed should be immediately brought into the notice of Engineer-in-charge/Consultant and clarifications obtained. No changes from approved plans shall be made without prior approval of the Engineer-in-charge.

4 Shop Drawings

- 4.1 The Contractor shall furnish for approval of the Engineer-in-charge/Consultant three sets of detailed HVAC plant room, schematic, supply & return ducting, piping (chilled & condensate –supply & return) & Shop drawings of all equipment and materials required to complete the work as per specifications well in advance. These drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics, and capacity of all items of equipment, as also the details of all related items of work of other trades. All shop drawings to be made in accordance with latest fire safety norms and building codes.
- 4.2 All drawings necessary for assembly, erection, maintenance, repair and operation of the equipment shall be furnished and different parts shall be suitably numbered for identification and ordering of spare parts.
- 4.3 For any amendments proposed by Engineer-in-charge / Consultant in the above drawings, the Contractor shall supply fresh sets of drawings with the amendments duly incorporated, along with the drawings on which corrections were indicated.
- 4.4 No material or equipment may be brought at Site until the Contractor has the approved Shop drawings for that particular material or equipment.
- 4.5 After approval of the drawings by the Engineer-in-charge / Consultant, the Contractor shall further furnish six sets of Shop drawings for the exclusive use of and retention by the Engineer-in-charge/Consultant /Client.
- 4.6 Approval of drawings by the Engineer-in-charge/Consultant shall not relieve the Contractor of any obligation to meet all the requirements of the Contract or of the correctness of his drawings. The Engineer's approval of specific item shall not mean the approval of the assembly of which it is a component. The Contractor shall be responsible for and is to bear the cost for all alternations of the works due to discrepancies or omission in the drawings or other particulars supplied by him, whether such drawings have been approved by the Engineer-in-charge/ Consultant or not.
- 4.7 Where the work of the Contractor has to be installed in close proximity to, or will interfere with the work of other trades, the Contractor shall assist in working out the space conditions to make a satisfactory adjustment. If so directed by the Engineer, the Contractor shall prepare composite working drawings and sections to a suitable scale not less than 1:50, clearly showing how his work is to be installed in relation to the work of other trades. If the Contractor installs his work before coordinating with other trades, and it is cause for any interference with the work of other trades, he shall make all the necessary changes without extra cost.
- 4.8 All shop drawings and detail drawings will be made as per requirements of local authorities and tender drawings incorporating all latest regulations and requirements. No separate drawings will be, issued for making shop drawings.

5 Samples and Catalogues

5.1 Prior to ordering any equipment/ material/ system, the Contractor shall submit to the Engineer-in-charge/ Consultant the catalogues, along with samples from approved list of manufacturers. No material shall be procured without written approval of the Engineer-in-charge / Consultant.

5.2 Approval of Materials

All materials used on the Works shall be new and of the best quality and make available, conforming to the relevant specifications of the contract. Prior approval shall be obtained in writing from the Engineer-in-charge/Consultant for all materials proposed and when necessary, approved samples duly identified and labelled shall be deposited with the Engineer-in-charge/ Consultant and shall be kept in the sample room at Site. List of approved make indicates make / manufacturer generally acceptability. Final choice of make / manufacturer of material & models shall be with the Engineer-in-charge /Consultant.

6 Material and Equipment

6.1 All material and equipment shall conform to the relevant Indian Standards and bear IS marking where ever applicable.

6.2 Where interfacing is involved, both equipments shall be mutually compatible in all respects.

6.3 Where an item of equipment, other than as specified or detailed on the drawings, is approved by Engineer-in-charge/ Consultant, requires any re-design of the structure, partitions, foundation, piping, writing or any other part of the mechanical, electrical or architectural layout, all such re-design, and all new drawings and detailing required therefore, shall be prepared by the Contractor at his own expense and approval obtained by the Engineer.

6.4 All similar equipment, materials, removable parts of similar equipment etc. shall be inter-changeable with one another.

6.5 Approved makes for materials and vendor list

The contractor shall procure materials from vendors as mentioned in the vendor lists enclosed. In case a material is not available from any of the vendors in the enclosed vendor lists, the contractor may intimate and submit details of source from where, the contractor wishes to procure the material, along with complete details and the particular material shall be got approved from the Engineer - in- Charge before procurement.

7 Conformity with Statutory Acts, Rules and Standards

7.1 The installation shall be in conformity with the Bye-laws Regulations and Standards of the local authorities applicable to the installations. But if the specifications and drawings call for a higher standard of materials and/or workmanship than those required by any of the above regulations and those required by any of the above regulations and standards, then the specifications and drawings shall take precedence over the said Regulations and Standards.

7.2 However, if the drawings or specifications required something, which violates the Byelaws and Regulations, then the Bye-laws and Regulations shall govern the requirement of such installation/drawings.

7.3 Indian Standards: The System / Components shall conform to relevant Indian standards wherever they exist and to the National Building Code Amended up to date.

7.4 Nothing in these Specifications shall be construed to relieve the contractor of his

responsibility for the design, Manufacture and installation of equipment with all its accessories in accordance with applicable statutory regulations and safety codes in force.

8 Manufacturer's Instructions

Where manufacturers have furnished specific instructions relating to the materials and equipment used, covering points not specifically mentioned in these documents, manufacture's instructions shall be followed with the approval of Engineer-in-charge.

9 Training and Operating Instructions

9.1 If required by the Engineer-in-charge / Consultant, the Contractor shall at his cost, train members of the maintenance staff either at his or the subcontractor's workshop or at such other place or places as may be considered suitable by the Engineer-in-charge / Consultant.

9.2 Upon completion of all work and all tests, the Contractor shall furnish the necessary skilled labour and helpers for operating the entire installation for a period of fifteen (15) working days. During this period, the Contractor shall instruct and train the Engineer-in-charge /Consultant/ client representative in operation, adjustments and maintenance of the equipment installed.

9.3 The Contractor shall submit to the Engineer-in-charge /Consultant draft comprehensive operating instructions and maintenance schedule for all systems and equipment included in this Contract. This shall be supplemented, not substituted, by manufacturer's operating and maintenance manuals. Upon approval of the draft, the Contractor shall submit to the Engineer-in-charge/Consultant four (4) complete bound sets of operating and maintenance schedules along with manufacturers printed literature.

10 Inspection and Testing

10.1 The Engineer-in-charge / Consultant reserve the right to request inspection and testing at manufacturer's Works at all reasonable times during manufacture of items for this Contract.

10.2 The Engineer-in-charge / Consultant or his authorised representative shall have full power to inspect the materials and workmanship at the Contractor's Works or at any place from which the materials or equipment is obtained. Approval by the Engineer-in-charge /Consultant of any material or equipment shall in no way relieve the Contractor of his responsibility for meeting the requirements of the specifications. All incident expenditure like travelling, boarding and lodging etc shall be born by the contractor.

10.3 Routine and typical tests for the various items of equipment shall be performed at the Contractor's Workshop in the presence of Engineer-in-charge/Consultant or his authorised representative, results recorded and test certificates issued.

10.4 After installation has been virtually completed, the Contractor shall carry out under the direction and in the presence of the representative of the Engineer-in-charge such tests and inspections as have been specified, or as considered necessary to determine whether or not the requirements of the item, drawings and specifications have been fulfilled. In case the work does not meet the full intent of the drawings and specifications and further tests after making require changes and as considered necessary shall be done again, the Contractor shall carry them out and bear the expenses thereof. If test fail to demonstrate the satisfactory nature of the installation or any part thereof, then no claims for the extra cost of modifications, replacement or retesting will be considered. The decision of the Engineer shall be regarded as final as to what constitutes a satisfactory test.

10.5 The above general requirements as to testing shall be read in conjunction with any particular requirements specified elsewhere

10.6 The Contractor shall provide all necessary instruments such as Theodolite, Dumpy level, steel tapes, weighing machine, plumb bobs, spirit levels, hammers, micro-meters, thermometers, hydraulic cube testing machine, smoke test machine and labour for conducting tests. All such equipments shall be tested for calibration by an approved laboratory. The Contractor shall make adequate records of the test procedures, readings and results to be maintained by the Engineer-in-charge/Consultant who shall issue test certificates signed by the person authorised by him.

11 Test Certificates

The contractor shall submit test certificates for all the materials / systems issued by government recognized inspection / office / manufacturer certifying the Equipment / Materials / installation and its function are in agreement with the requirements of relevant specification and accepted standards.

12 Performance Guarantee

It is clearly understood that the specifications, drawings, schedule of quantities for HVAC system are for bidder's guidance only. The bidder shall carry out necessary calculation and provide alternative equipment if required to achieve the specified limit of indoor air conditioning CFM/Tonnage for various blocks. Complete sets of Architectural Drawings shall be available at site in the Engineer-in-charge / Consultant office and reference may be made to these drawings as required for calculations or for other details. The contractor shall also guarantee that performance of various equipments, individually, shall not be less than, the specified ratings.

13 Quiet Operation and Vibration

All equipments shall operate under all conditions of designed load without any sound or vibration, which is considered objectionable by the Engineer-in-charge. Such conditions shall be corrected by the Contractor at his own expense. Decision of the Engineer-in-charge / Consultant shall be final in this regard.

14 Accessibility

The Contractor shall locate all equipment, which require servicing, operation or regular maintenance in a fully accessible positions. The exact location and size of access panels, required for each valve or other devices requiring attendance, shall be finalised and communicated to Engineer - in- Charge well in time, to facilitate working by other agencies, failing this, the Contractor shall make all the necessary repairs and changes at his own expense.

15 Handing over & Taking over process

For handing over & taking over process, in addition to clauses specified elsewhere, following services / works have to be complied with by the main contractor:

- a. Rectification of all defects shall be carried out by the main contractor before Handing over/ Taking over process.
- b. As built drawings : - **4** (four) sets for HVAC system drawings as approved by Engineer-in-charge / Consultant shall be submitted by the main contractor before handing over & taking over process.
- c. All services/equipments to be run and check before handing over & taking over process as per requirements of Engineer-in-charge/Consultant.
- d. Contractor has to arrange water, electricity, fuel , consumables and manpower at their own cost for the purpose of testing of services and equipments. No amount shall be payable on this account. Only Power & Water required during seasonal test shall be provided by the Client free of cost.

- e. Main contractor shall submit catalogues, brochures, operation manual, manufacturer test certificate, Guaranty/ Warranty papers, licence etc for all equipments /materials before handing over & taking over process.

SECTION – 3

SPECIFIC CONDITIONS OF CONTRACT RELATING TO HVAC SYSTEM

1. Scope of Contract

The scope and general character of works to be carried out under this section comprises of Supply, Installation, Testing and Commissioning of Heating, Ventilation and Air-conditioning installations as illustrated in drawings, specifications, technical data and Bill of Quantities.

2. Stores and Materials

The contractor shall provide everything necessary for the proper execution of the work according to the intent and meaning of the drawings, Bill of quantities and specifications taken together whether the same may or may not be particularly shown or described therein provided that the same can be reasonably inferred there from. In case of any discrepancy in the drawings or between the drawings, Bill of quantities and specification, decision of the Engineer-in-charge/Consultant will be final and binding.

3. Supply of Equipment

Equipment shall be strictly as per the list of approved makes/ manufacturers given in the Bid documents. However, final choice of make shall lie with the Engineer-in-charge / Consultant.

- i. The Contractor shall submit manufacturer's test certificates of equipment supplied.
- ii. The Contractor shall submit the original "Excise Paid Certificates", and exit Gate passes form manufacturer's factory/works clearly bearing the batch numbers and date of despatch.

4. Shop / Working Drawings etc.

- 4.1. The Contractor shall prepare and submit to the Engineer-in-charge/Consultant for approval, 2 sets of detailed shop drawings of equipment, equipment characteristics and capacity details of all equipment, accessories and devices etc. as per specifications well in advance or as required by the Engineer-in-charge/Consultant. The structure works should not be affected due to delay on this account. The shop drawings shall be submitted within 15 days of issue of instructions by Engineer - in- Charge. No claims for extension of time shall be entertained because of any delay in the work due to failure on part of the contractor to produce shop drawings in time.
- 4.2. These drawings shall contain details of construction, size, arrangement, operating clearances, performance characteristics, and capacity of all items of equipment, as also details of all related items of work by other disciplines.
- 4.3. If the Engineer-in-charge/Consultant makes any amendment in the above drawings, the Contractor shall supply two fresh sets of drawings with the amendments duly incorporated, along with the drawings on which corrections were made. After final approval has been obtained from the Engineer - in- Charge, the Contractor shall submit a further six sets of shop drawings for the exclusive use of and retention by the Engineer-in-charge/ Consultant.
- 4.4. Approval of shop drawings shall not be considered as a guarantee of measurement or of building condition. It will in no way relieve the contractor from his responsibility of furnishing materials or performing work as required by the contract.

5. Completion Drawings:-

Following "AS BUILT" drawings shall be submitted by the Contractor on completion of the work:

- a. Plant installation drawings giving complete details of the entire equipment including AHU's and their foundations.
- b. Ducting drawings showing all sizes, damper locations and sizes of all air outlets and

intakes, for all floors

- c. Electrical drawings showing cable sizes, equipment capacities, control components and control wiring.
- d. Schematic control drawings giving detailed sequence of operation and notes to explain the operation of the control circuit.
- e. Piping drawings showing all pipe sizes, valves and fittings
- f. Any other drawings to be supplied as per instructions of the Engineer-in-charge / Consultant.

6. Operation and Service Manuals

6.1. The Contractor shall submit 3 (three) sets of operation and service manuals in respect of the air-conditioning plant including salient details of plant including internal circuit diagrams. Following minimum details shall be furnished:

- i. Detailed equipment data as approved by the Engineer-in-charge/Consultant
- ii. Manufacturer's maintenance and operating instruction
- iii. Approved test readings

6.2. The Contractor shall also submit 4 (four) sets of technical literature on all automatic controls and complete technical literature on all equipment and materials. The Contractor shall frame under glass, in the Air conditioning plant room all consolidated control diagrams and all piping diagrams.

6.3. Coloured Layouts of all electrical lines in A-1 size properly laminated to be fixed at various locations at the time of handing over of building.

7. Inspection at Work / Contractor's Premises

7.1. The Client/Engineer-in-charge/Consultant or their representatives shall at all reasonable time have free access to the Contractor's premises/works. The Contractor shall give every facility to them and necessary help for inspection and examinations and test of the materials and workmanship.

7.2. These representatives shall have full powers to inspect drawings of any portion of the work or examine the materials and workmanship of the plant at the Contractor's works or at any other place from where the material or equipment is to be obtained. Acceptance of any material or equipment shall in no way, relieve the Contractor of his responsibility for meeting the requirement of the specifications.

7.3. For Imported screw type water chilling machine manufacturer's factory test certificate would be acceptable in lieu of inspection at manufacturer works.

8. Subcontracting

The Contractor may subcontract part of the works with the written approval of the Engineer-in-charge /Consultant. A single sub-contractor as approved by the Engineer - in- Charge / Consultant shall be appointed for carrying out the entire work of supplying, installation, testing and commissioning of all the equipment covered under this package. However, the overall responsibility for compliance of the Contract lies with the Contractor.

9. Material Submittals

The Contractor shall submit materials for all equipment and machinery for the written approval of the Engineer-in-charge/Consultant before placing orders. The material submittals shall comprise of at least the following:

- i. Manufacturer's technical catalogues and brochures giving technical data about

performance and other parameters

- ii. Manufacturers drawings / sketches showing construction, dimensional and installation details
- iii. Rating charts and performance curves clarifying rating of equipment proposed.

10. Samples and Prototypes

The Contractor shall submit samples of items such as grilles/ diffusers, valves, controls and/ or any other parts or equipment as required by the Engineer-in-charge/Consultant for prior approval in writing before placing the order. The Contractor shall also construct prototype or samples of work as laid down in the Contract or as instructed by the Engineer-in-charge /Consultant. Such samples and prototypes after approval shall be retained by the Engineer-in-charge/Consultant and shall serve as the standards to be achieved in final construction.

11. Testing and Commissioning

11.1. Tests on equipment as called for in the specifications shall be carried out by the Contractor in accordance with the specifications, the relevant Indian Standard Specifications (BIS) and International Standards.

11.2. The initial tests shall include but not be limited to the following:

- i. To operate and check the proper functioning of all electrically operated components viz., compressor motor, pumps, blowers, air handling units, rotating machine, fans, boilers, etc.
- ii. To operate and check the proper functioning of all electrical panels, switch gears, safety and other controls
- iii. To adjust and balance air, water, steam and gas quantities to provide the designed flow rates by adjusting valves, dampers, diverters etc.
- iv. To check the systems against leaks in different circuits, alignment of motor, 'V' Belt adjustments etc.
- v. To check the vibration and noise levels of the equipment
- vi. Setting of all control and all such other tests which are essential for smooth functioning of the plant.

11.3. The Contractor shall pay for and arrange without any cost, all necessary balancing and testing equipment, instruments, materials, accessories, power, water, fuel and the requisite labour for testing. Any defects in materials and/or in workmanship detected in the course of testing shall be rectified by the Contractor entirely at his own cost, to the satisfaction of the Engineer-in-charge/Consultant. The installation shall be tested again after removal of defects if any and shall be commissioned only after approval by the Engineer-in-charge/Consultant. All tests shall be carried out in the presence of the Engineer-in-charge/Consultant or his representative.

12. VALIDATION:-

12.1. The Validation of the HVAC system shall be in the scope of HVAC Contractor.

12.2. The Contractor shall carry out & prepare complete documents for validation of HVAC Systems (Validation Test shall include water & air pressure balancing , DOP test of HEPA Filter , particle count test, Temperature & RH recording, Air flow pattern test, filter air velocity test, ACPH calculation & other tests as required). The required measuring instruments & tools for validation process shall be arranged by the HVAC contractor. All inputs required to get the validation including rectification/correction etc. is covered in

HVAC Contractor's scope of work. No extra charges shall be paid for above work.

12.3. The Contractor shall prepare complete documents for validation of HVAC Systems.

Validation Test shall include

- a) Water & air pressure balancing
- b) DOP test of HEPA Filter
- c) Particle count test
- d) Temperature & RH recording
- e) Air flow pattern test
- f) Filter air velocity test
- g) ACPH calculation & other tests as required.

12.4. In case the Client intends to get the Validation done from another agency in addition to the above, the Fee payable to such agency will be paid by Client. The HVAC Contractor shall provide all support/documents etc. as required and nothing extra shall be payable on this account.

13. Provisional Taking Over

- 13.1. After completion of the HVAC system, the same shall be put to a continuous running test for a period of 72 (Seventy Two) hours. All adjustments should be made prior to this test so that proper conditions / working are achieved during this testing. The Contractor shall pay for and arrange at his own cost for materials, accessories, power, water, fuel and the requisite labour for this testing the test readings shall be noted in the Testing format approved by the Engineer-in-charge /Consultant. Only Power & water required during seasonal test shall be provided by the Client free of cost.

The plant will be provisionally taken over after successful completion of the above test and the defects liability period shall commence after provisional taking over of the system.

14. Final Performance and Capacity Test

In addition to the above testing, final performance and capacity tests shall be carried out on the equipment as per the "Testing Schedules" during the defects liability period as follows:

- i. Peak summer / monsoon test during the period from 15th May to 31st July on the dates decided by Engineer - in- Charge /HLL. The installations should be able to maintain the specified inside temperature/conditions within the tolerance limits prescribed in the Contract the duration of the test shall be 72 hours.
- ii. Peak winter test during the period from 1st December to 15th February on the dates decided by Engineer - in- Charge / HLL. The installations should be able to maintain the specified inside temperature within the tolerance limits permitted in the Contract. The duration of the test shall be 72 hours.

- 14.1. All the arrangements required making the entire system operational /running, for the performance test as above, including cost of manpower, and fuel (Gas etc) etc will be borne by the Contractor. Only Power & water required during seasonal test shall be provided by the Client free of cost.

15. General

- 15.1. After provisional taking over of the plant, user / owner shall provide staff for operation.

- 15.2. The user shall have the right to operate all equipments, if it is in the operating condition if

such equipments, have been accepted as complete and satisfactory. Repairs and alterations if required shall be carried out as and when directed by the Client /Engineer-in-charge/Consultant. In special circumstances Client/Engineer-in-charge /Consultant may request Air conditioning of some areas even before the completion of whole of HVAC work. The Contractor shall co-operate fully under such circumstances.

16. Guarantee and Defects Liability Period

The guarantee of HVAC works shall be valid for a period of 12 (Twelve) months from the date of completion of the project as accepted by Client / Engineer-in-charge/ Consultant. In case the contractor is not able to carry out the seasonal tests (summer/ monsoon & winter) within the stipulated period as mentioned above, the same can be carried out even after defects liability period. The Defect Liability period for HVAC shall be deemed to be extended till satisfactory completion of seasonal tests.

17. Performance Guarantee from Sub contractor

The Contractor shall submit a performance guarantee certificate from the agency which executed the HVAC work, counter signed by the Contractor that the system shall maintain the desired parameters within + /- 5 % of the specified parameters who shall also guarantee that the capacity of various components as well as the whole system covered under the scope of work, technical schedules and Bill of Quantities etc., shall not be less than the specified capacities. The guarantee of the specific equipment supplied alone with regard to the performance of the system shall not be acceptable and overall responsibility of the Contractor for performance of HVAC work & its compliance with the Contract terms and conditions remains unchanged.

18. Measurement of Works

All works shall be measured in accordance with the mode of measurement given in the specific sections of the specifications. In case the method of measurement for any item is not clarified in the specifications, the same shall be measured in accordance with the relevant IS standards and CPWD norms.

19. Maintenance

The Contractor shall provide free maintenance for a period of **twelve months** after testing and commissioning of the installation of HVAC works or from the date of completion accepted by Client / Engineer-in-charge / Consultant whichever is later. The Contractor shall carry out all routine and special maintenance of the plant and attend to any defects that may arise in operation of the plant.

20. Painting

All equipment and ancillary items such as pipes, supports etc., will be painted in approved manner, using standard paints as approved by Client/Engineer-in-charge /Consultant

21. Safe Custody and Storage

The contractor shall be responsible for safe custody of all machinery and equipment supplied and installed by the till the final taking over by the Client/Engineer-in-charge /Consultant.

22. Terms of Payment

The following norms shall be followed for the payment of HVAC equipment & installation:

- A. 75% of BOQ rate shall be paid on receipt of equipment at Site and after inspection and passing on pro-rata basis
- B. 10% of BOQ rate shall be paid on satisfactory erection and installation of equipment

on pro-rata basis

- C. 10% after successful completion of running tests, validation of HVAC system and provisional taking over.
- D. 5% after final performance and satisfactory seasonal test to be conducted in summer or monsoon and removal of all defects pointed out during previous tests.

23. Training of Personnel

The Contractor shall arrange to train the Client / HLL's personnel on the following aspects prior to provisional takeover of the plant:

- a. Operation of plant
- b. Gas charging and pumping down of the system
- c. Adjustments of settings for controls and protective devices
- d. Preventive maintenance
- e. Disassembling and assembling of compressor including identification and replacement.

24. Operation and Running of entire system

The contractor shall pay for and arrange for operation & running of entire HVAC system for a minimum period of one month after satisfactory completion of work as desired by Engineer-in-charge / Consultant. Cost of operation & running of entire system including required material e.g. consumables, tools & tackles, requisite manpower etc. shall be deemed to be included in the contract price and nothing extra shall be paid on this account. Only water and electricity shall be provided by the client/HLL.

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

Tender No. HLL/IDN/IMPCL/2013-14/03/R

Request for Proposal (RFP)
for

**Modernization, Up-Gradation & Expansion of existing Plant Facilities at Indian
Medicines Pharmaceutical Corporation Limited (IMPCL) - Mohan, District: Almora
(Uttarakhand)
Package III- HVAC works**

Volume-III - Technical Specifications



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SECTION-01
DOCUMENTATION & DESIGN PARAMETERS

A. DOCUMENTATION

1	<u>Planning documents</u> <ul style="list-style-type: none"> • Plan drawings, sections • Flow charts and skeleton diagrams. • Control charts and functional descriptions. • Equipment lists and descriptions. • Man and material flow chart • Project schedule 	
2	<u>Final documentation drawings</u> <ul style="list-style-type: none"> • Plan drawings, sections • Detailed installation drawings (As built). • Flow charts and skeleton diagrams. • Control charts and functional descriptions. • Equipment lists and descriptions. 	IQ IQ IQ IQ IQ
3	<u>Certificates</u> <ul style="list-style-type: none"> • Test certificates for HEPA-filters. • Test certificates for the filters G4, F5, and F9. • Test certificates for electrical motors. • Test certificates for cooling and heating coil. • Blower test certificates. • Blower performance curve. • Fire damper test certificates. • Test certificates for damper actuators. • GI duct raw material test certificates. • Insulation test certificates. • Calibration certificates (protocols) for sensors. • Calibration certificates for all used measuring instruments. • Material certificates. • Curves for fan/blower characteristics 	IQ IQ IQ IQ IQ IQ IQ IQ IQ IQ IQ IQ IQ IQ

	<ul style="list-style-type: none"> Curves of all filters – Pressure drop Vs CFM 	
4	<u>Protocol</u> <u>To be prepared by vendor and after format approval the protocol to be fill up by Vendor</u> <ul style="list-style-type: none"> Protocol on functional testing. Protocol on performed internal cleanliness check after installation is completed up to the extend of possibility Protocol on air tightness checks of the ducts. Protocol on measured airflow Temp and RH mapping Protocol on measured air flow directions and differential pressures. Protocol on measured sound values in the ventilator room and the adjacent office rooms. Protocol on ventilation rate check. Protocol on air tightness check of HEPA-filters 	IQ IQ IQ IQ IQ IQ IQ IQ IQ
5	<u>Instructions</u> <ul style="list-style-type: none"> Operation and maintenance instructions written in English. 	IQ
6	<u>Spare parts list</u> <ul style="list-style-type: none"> Spare parts list. 	
7	<u>Qualification protocols/ reports</u> <ul style="list-style-type: none"> IQ protocol and report. OQ protocol and report. PQ protocol and report. 	IQ OQ PQ

Mechanical guarantees on supply

The supply will be covered by a mechanical guarantee of 24 months starting from performance acceptance protocol signed by parties at site, provided that all pending issues of mechanical completion, start-up as well as qualification activities have been successfully closed out.

Technical requirements:

Design, construction and materials will be in accordance with Pharmaceutical Standard foreseen by CGMP and FDA.

The equipment will be designed, realized and installed according to current safety rules and standards, and particularly:

- Local national codes for safety and work
- UNI standard EN 292: Machinery security. Fundamental concepts and general guides for design. Terminology and basic methodology.
- UNI standard EN 294: Machinery security. Distance to prevent reaching of dangerous zones with upper limbs.

- UNI standard EN 418: Machinery security. Emergency interlocks. Functional aspect and basic design.
- CEI standard EN 60204-1. Machinery electric components.
- MACHINERY DIRECTIVE 89/392/EEC - 91/368/EEC - 93/44/EEC - 93/68/EEC, (whenever applicable)
- EMC DIRECTIVE 89/336/EEC - 92/31/EEC - 93/68/EEC
- LOW VOLTAGE DIRECTIVE 73/23/EEC - 93/68/EEC
- Pressure Equipment – EU directive 97/23/EC
- CE stamp
- ATEX norms

1. SAFETY DEVICES

Machines will be supplied with all needed safety devices to guarantee control and interlocked-actions in any normal and abnormal condition.

Main components:

- Equipment will have adequate interlocks to guarantee operator protection from the moving parts.
- Warning alarms (local visual and acoustical) will signal abnormal conditions.
- Emergency push buttons will be within operator arm's reach.

Vendor shall calculate the safety devices considering the case of external fire.

B. DESIGN PARAMETERS

1.00 The given below are some design parameters that **should be given by supplier of water cooled screw chillers with guarantee** followed in addition to those given in various sections of technical specifications enclosed.

- 2.0**
- a) Temperature of chilled water entering the chiller °C / °F : 12.22 / 54
 - b) Temperature of chilled water leaving the chiller °C / °F : 6.66 / 44
 - c) Fouling factor of chiller (FPS) : 0.0005
 - d) Temperature of water to inlet of condenser °C / °F : 32.22 / 90
 - e) Temperature of water leaving the condenser °C/ °F : 36.39 / 97.5
 - f) Maximum water velocity through the condenser MPS / FPS : 2.5 / 8
 - g) Fouling factor of Condenser (FPS) : 0.001

3.0 AIR HANDLERS

- a) Maximum Face velocity across cooling coil MPM : 152.0
- b) Maximum face velocity across pre-filters MPM : 152.0
- c) Maximum water pressure drop across the coil in Mt. : 4.6
- d) Maximum water velocity through coil in MPS : 2.5
- e) Fan outlet velocity (maxim.) MPS : 10.0

4.0 DUCTING WORK

- a) Method of Duct Design : Equal friction method
- b) Maximum air velocity in supply duct MPM : 550.0
- c) Maximum air velocity in return duct MPM : 305.0
- d) Friction loss in duct (maxim.) mm WG in 100 Mt runs. : 8.33
- e) Maximum Velocity at supply air grill outlet MPM : 150.00

5.0 PIPING WORK

- a) Friction loss (maxim.) Mt / 30 Mt lengths : 1.60
- b) Flow velocity (maxim.) Mt / Sec. : 2.50

6.0 INSULATION

Maximum temperature rise in the supply air duct from Air-handlers outlet to farthest outlet in °C 1.10

7.0 REFRIGERANT

The Rotary Screw Water Cooled Chiller shall be selected for R-134a refrigerant.

SECTION-02

STANDARD SPECIFICATION

1.0 SCOPE OF WORK

The complete scope of work shall cover supply, erection, testing and commissioning of the entire HVAC system as detailed under specification.

BASIS OF DESIGN

The entire system has been based and designed on climatological data available as given under Basis of Design and Scheme.

2.0 TERMS AND DEFINATIONS

The followings terms have been used in the tender specifications, drawings etc.

ISI.	Bureau of Indian Standards.
ASHRAE	American Society of Heating Refrigeration & Air-conditioning Engineers, USA.
ASME.	American Society of Mechanical Engineers.
ASA.	American Standard Association.
B.S.	British Standards.
CMH.	Cubic Meter per Hour.
USGPM.	US Gallons per minute.
IGPM.	Imperial Gallons per Minute.
RPM.	Revolutions per Minute.
BTU/Hr.	British Thermal Unit per Hour.
Kcal/Hr..	Kilo Calories per Hour.
HZ.	Hertz.
H.P.	Horse Power
Kg/Cm2..	Kilo Gram per Square Centimeter.
SAG	Supply Air Grills.
SAD.	Supply Air Diffuser.

SAF.	Supply Air Filters.
FD.	Fire Damper.
VCD..	Volume Control Damper.
RAD.	Return Air Damper.
FAD.	Fresh Air Damper.
RH.	Relative Humidity.
DB.	Dry Bulb Temperature.
WB.	Wet Bulb Temperature.
MV.	Mechanical Ventilation.
DP.	Drain Point.

3.0 The codes, regulation as detailed below shall be followed in this contract :-

1.	Safety code for air-conditioning (revised) amendment 1	IS 659 : 1964 (reaffirmed 1991)
2.	Safety code foe mechanical Refrigeration	IS 660 : 1963 (reaffirmed 1991)
3.	Testing of refrigeration compressors	IS 5111 : 1993
4.	Air cooled heat exchangers (amendment 1)	IS 10470 : 1983 (reaffirmed 1991)
5.	Packaged Air-conditioner (amendment 1991)	IS 8148 : 1976 (reaffirmed 1991)
6.	Hermetic compressors	IS 10617 : Part I, II & III 1983 (reaffirmed 1991)
7.	Suppliers data sheet for clean air equipment (laminar flow)	IS 12357 : 1998
8.	Thermostats for use in refrigeration etc.	IS 11338 : 1965 (reaffirmed 1991)
9.	Code of practice for design and construction of flue chimneys.	IS 11338 : 1965 (reaffirmed 1991)

10.	Metal Duct Work	IS 655 : 1963 (reaffirmed 1991)
11.	Steel for general structural purpose	IS 2062 : 1992
12.	Piping Work	IS 1239 Part I & II 1990 / 1992 IS & BS : 3601
13.	Welding	IS : 3589
14.	Refrigeration	As per ASHRAE / ISI Air conditioning & Refrigeration Air-conditioning institute Standards.
15.	Hot Dip Zinc Coated Steel Tubes	IS 4736 : 1968
16.	Gate Valves for Water lines	IS 778 : 1980
17.	Copper Alloy Gate Globe Check Valve for water lines	IS 778 : 1980
18.	Butterfly Valve	IS 13095 : 1991
19.	Steel Pipe flanges	IS : 6392
20.	Gaskets	IS 638 : 1979 (reaffirmed 1993)
21.	Mild steel tubes & fittings	IS 1239 Part I & II
22.	Dual plate Check Valve for Water Lines	AP : 194
23.	Colour code for the identification of pipe lines	IS 2379 : 1963
24.	Specific requirements for the direct switching of the individual motors.	IS 4064 (Part II) 1978
25.	PVC insulated (HD) Electric Cables for working voltage up Including 1100 Volts.	IS : 1554 (Part I)
26.	HRC Cartridge fuse links upto 650 Volts.	IS 2208 : 1976
27.	Starter	IS 8554 (Part I) 1979
28.	Inspection and testing of installation	IS 732 (Part III) 1979

29.	Galvanized steel wire for fencing	IS 277 : 1977
30.	Three phase induction motors	IS : 325
31.	PVC insulated (heavy duty) cables for working voltage up to 1.1. KV and up to 11 KV Grade respectively.	IS 1554 : 1981 Part I & II
32.	Code for practice for electrical wiring installations.	IS 732 : 1989
33.	Code for practice for earthing	IS 3043 : 1966
34.	Horizontal centrifugal pumps	IS : 1620
35.	Centrifugal fans (1 st . Division)	IS 894 : 1987 (reaffirmed 1991)
36.	Wrought aluminium & aluminium alloy sheet and strip for general engineering purposes.	IS : 737
37.	Mild steel tubes, tublar and other wrought steel fittings.	IS : 1239
38.	Bourdon tube pressure and vacuum gauges.	IS : 3624
39.	Glossary of terms used in refrigeration and air-conditioning.	IS : 3615
40.	Code for practice for standard for selection of standard worm and helical gears.	IS : 7403
41.	Three phase induction motors.	IS : 325
42.	Specification for single phase small A/C & universal motors	IS : 996
43.	Specifications for flame proof motors	IS : 2148
44.	Circuit breaker A.C	IS 2516 : 1980 Part I & II
45.	Contactors for A.C for voltage upto 1100 V.	IS 2959 : 1975
46.	Low voltage switch gear and control gear assemblies.	IS 8623 : 1993 Part I & II
47.	Code of practice for selection of starters for AC induction motors	IS 3914

48.	Specification for cables glands	IS 4821
49.	Code for selection, installation & maintenance of switch gear and control gear.	IS 10118 : 1982 Part I to IV
50.	Conduits for electrical installations	IS 9537 : 1981 Part I to IV
51.	Permissible limits of noise level for rotating electrical machines.	IS 12065 : 1987
52.	Code of practice for installation and maintenance of motors	IS 3106 : 1966
53.	Bourdon tube pressure and vacuum gauges	IS : 3624
54.	Code of practice for selection of standard worm and helical gear boxes.	IS : 7403
55.	Mild tubes, tubular and other wrought steel fittings.	IS : 1239
56.	Electrically welded steel pipes for water, gas and sewage.	IS : 3589
57.	Gum metal gate, globe and check valves for general purposes.	IS : 778
58.	Wrought aluminum and aluminum alloy steel and strips for general engineering purposes.	IS : 737
59.	HRC cartridge fuse links upto 650 volts	IS : 2208
60.	PVC insulated (heavy duty) electric cables for working voltage upto & including 1100 watts.	IS : 1554 (Part I)
61.	Method for testing Panel type air filters for AC purposes.	IS 7613 : 1975 (reaffirmed 1991)
62.	Unbounded glass wool for thermal insulation (1st. Revision)	IS 3690 : 1974
63.	Expanded polystyrene for thermal insulation purposes. (1 st . revision)	IS 4671 : 1984 (reaffirmed)
64.	Propeller type AC Ventilation fans	1IS 2312 : 1967 (reaffirmed 1991)

65. Electrical axial flow fans IS 3588 : 1987 (reaffirmed 1991)

4.0 SAFETY CODES

The following IS codes shall be followed:

Safety code for mechanical refrigeration	IS 660
Safety code for air conditioning	IS 659
Safety code for scaffolds & ladders	IS 3696
Code of practice for fire precaution in Welding & cutting operations	IS 3016
Code for safety procedures and practices In electrical works	IS 5216
Code of practice for safety and health Requirements in electrical & gas welding And cutting operations.	IS 3696

5.0 INSPECTION

All shop drawings shall be prepared by the A.C Contractor after examining the Architectural & AC drawings.

6.0 TENTATIVE LAYOUT PLANS

The tentative layout plans enclosed with the tender documents are only for guidance purposes only.

SECTION-03
NOISE AND VIBRATION CONTROLS

1.0 The air conditioning contractor must take all necessary precautions to have minimum noise generation and its transmission. Minimum vibration as permitted by IS relevant code shall be ensured. A few points for guidance only are given below:

- a) Double fire retardant flexible connections shall be provided from air discharge to outlet of air-handler to the duct.
- b) Vibration isolation pads of suitable thickness commensurate to loading for isolation of vibration shall be provided under all pumps, air handlers fans etc. in consultation with manufacturer for proper selection of vibration isolators
- c) Vibration isolation springs of suitable size to suit the weight of water chilling machine if recommended by the manufacturer for elimination of vibrations shall be provided as suitable for type & model of water chilling unit.
- d) Flexible conduit connections of minimum diameter of 50mm to motors shall be provided. All loops should be large enough to allow connections to remain flexible.
- e) All conduit connection where conduits are 60mm or larger shall be made of 1.2 meters minimum length conduit installed in the shape of U and grossly slack to provide maximum vibration isolation.
- f) Operating clearance of 40mm shall be kept between the base and the inertia base.
- g) All end suction pumps shall be bolted and grouted to the inertia base which in turn shall be supported on suitable vibration isolation rubber pads duly sandwiched with 20G GI sheets. Concrete inertia blocks shall be formed of suitable thickness and of adequate mass.
- h) The floor supported piping shall be mounted on pipe supports with 7.5mm ribbed neoprene pads between the base plate of the pipes and the floors.
- i) All items suspended from false ceiling shall be isolated on separate hangers.
- j) In case of ducts, conduits, pipes & tubes the annular space between construction and penetrating element shall be sealed with sand cement plaster.
- k) The air-conditioning contractor shall take all other precautions or shall make his own arrangements even if not specified in the tender documents for eliminating high noise levels & shall minimize vibrations in all mechanical equipments without any additional cost.

SECTION 04

INSTALLATION OF ROTARY SCREW CHILLER

CPWD HVAC Specifications (2004) shall be followed and instructions of Engineer in Charge shall be followed.

In respect of Factory Performance Test, the provisions as per clause 7 under section-3 SCC shall be applicable.

In case of Indigenous chillers, the factory performance test shall be carried out as per standard practices of manufacturers.

SECTION-05

STANDARD SPECIFICATIONS OF ROTARY MULTIPLE SCREW WATER COOLED CHILLERS

- 1.00** The specifications under this section covers the supply, installation, testing and commissioning of the **ROTARY MONO/ TWIN SCREW MULTIPLE COMPRESSORS WATER COOLED CHILLERS** ARI CERTIFIED conforming to following parameters and in accordance with the requirements of the schedule of equipment.

TEST CERTIFICATES AT MANUFACTURERS TEST BED.

It is necessary for the AC contractor to furnish detailed certificates of tests carried out on test bed in the factory before dispatch of water chilling units. The AC contractor not conforming & complying with this condition shall render his offer liable for rejection.

2.0 ROTARY SCREW CHILLERS

The Rotary Screw Water AHRI Certified chilling machine shall consist of Twin compressor , Semi -hermetic / Direct driven low speed helical rotary compressors, closed transition starter (Factory Fitted) delta starter refrigerant / motor, oil separator, evaporator, condenser, factory mounted microprocessor based panel compatible to IBMS , interconnecting refrigerant piping, electronic expansion valve, controls and accessories to make it compact & efficient unit. The capacity control shall be achieved by use of slide valve to provide fully modulating control from 100 % to 25 % of the full load. The cost of closed transition starter is to be included in the cost of unit.

3.0 COMPRESSOR

SEMIHERMETIC COMPRESSOR

The horizontal helical rotary compressor shall be direct drive at low speed for higher reliability & efficiency. The compressor should have minimum rotating parts.

Compressor Motor

The compressor should be driven by refrigerant cooled, hermetically sealed, two pole squirrel cage induction motor & should be suitable for 415 Volts $\pm 10\%$, 50Hz $\pm 5\%$, AC supply.

4.0 SHELL & TUBE CONDENSOR – FLOODED TYPE EVAPORATOR

The shells shall be fabricated from carbon steel plate. Evaporator and condenser are to be designed, tested and stamped in accordance with ASME code for refrigerant side working pressure of 300 Psig.

All tube sheets should be made of carbon steel. Evaporator and condenser tubes are to be individually replaceable. Standard tubes are externally finned, internally enhanced

seamless copper with lands at all tube sheets. Tubes are to be mechanically expanded into tube sheets. Condenser tubes are to be mechanically fastened to tube supports. In condenser baffle plates are to be provided to prevent direct impingement of compressor discharge gas upon tubes.

All water pass arrangements will be either flat-faced flanged (150 or 300 psig water side) or marine configuration with grooved connections (300 psig waterside). All connections may be either right or left handed. Water side will be hydrostatically tested at one & half times design working pressure or at 225 psig whichever is more & also water passes arrangement should 2 passes only.

The insulation of evaporators shall be as per manufacturers standards & shall be factory insulated only.

5.0 REFRIGERANT

The Rotary Screw Chiller shall be selected on R-134A refrigerant only. The water chilling unit should be fully factory charged with refrigerant & oil & spare refrigerant & oil must be sent along with the machine for topping up of gas & oil as may be required.

6.0 REFRIGERANT CIRCUIT

A multiple orifice control system consisting of an electronically controlled expansion valve and a fixed orifice would maintain and control refrigerant flow into evaporator.

7.0 MICROPROCESSOR BASED CONTROL PANEL

Factory mounted microprocessor-based control panel must be provided with at least the following features:

1. Automatic shutdown protection with manual reset for
 - a) Low evaporator refrigerant temperature and pressure,
 - b) High condenser refrigerant pressure,
 - c) Loss of condenser water flow and chilled water flow by DP switch.
 - d) High motor temperature,
 - e) Low oil flow,
 - f) Electrical distribution faults such as Phase reversal, phase loss, Phase imbalance, motor current overload,
 - g) High compressor discharge temperature.
2. Critical sensor or detection of circuit fault in
 - a) Starter transition failure.
 - b) External or local emergency stop.
3. Automatic shutdown protection with automatic reset when condition is corrected for loss of chilled water and condenser water flow, high compressor discharge temperature, under / over voltage and momentary power loss.

Display Panel should display chilled water Temp In & Out, Condenser Water Temp In & Out & also Current display and Volts & fault annunciation.

The monitoring system should be provided for early detection and warning of refrigerant loss. Microprocessor based chilled water reset based on return water is necessary & must be provided.

The unit control panel should be capable of avoiding unit shutdown due to transient abnormal operating conditions associated with low evaporator refrigerant temperature, high condensing temperature and motor current overload. If the abnormal operating condition persists and the protective limit is reached, the machine will be shut down. The microprocessor based panel should be compatible to building management system. **Interface card & other hardware / software required shall be supplied with the panel of Chilling Machine.**

8.0 SELECTION OF WATER CHILLING UNIT (AHRI CERTIFIED ONLY)

The Water chilling unit should be selected for the duty as specified in **Schedule of Equipment SECTION-22**. The water chilling unit should be selected for power consumption of not more than 0.68 IKW / TR at 100 % load at operating conditions .The Rotary Screw Water Chilling Machine at works Part load such as 25%, 50%, 75% & 100%.

9.0 INSTALLATION

The Rotary Screw chiller shall be installed over a reinforced cement concrete platform on flooring and shall be adequately isolated as per manufacturer's recommendations against transmission of vibration to the building structure.

10 PAINTING

The Rotary Screw Chilling machine shall be finished with durable enamel paint. The shop coats of paint that may become marred during shipment or erection, shall be cleared with mineral spirit, wire brushed and spot primed over the affected areas & then be coated with enamel paint.

SECTION-06

STANDARD SPECIFICATIONS OF PUMP SETS

1.0 PUMP SETS

This section deals with supply, installation, testing and commissioning of water pump sets conforming to general specification and suitable for the duty selected as indicated in **Schedule of Equipment, SECTION-22**. The type, capacity and size of pumps shall suit the parameters given under SECTION-22. The Pumps selected should have high efficiency which should be supported by selection charts and curves.

2.0 END-SUCTION PUMP SETS

End Suction Centrifugal Pump of the back pull out design as per ISO 2858 or DIN 24255 shall be selected for condenser water / chilled water re-circulation duty. Pump shall be furnished complete with flexible coupling (spacer type). The pump casing shall have heavily ribbed construction, suction and discharge branches with raised face, drilled to BS 4504 PN-16 or equivalent. The impeller made of bronze shall be double shrouded, single entry, radial flow type. It shall be hydraulically balanced to minimize axial thrust. The stuffing box shall be factory fitted with mechanical seal.

A minimum of the following accessories shall be provided with each pump:-

- a) Air vents Cocks.
- b) Lubrication fittings and seals.

3.0 The construction of End Suction pumps shall be as follows and as per IS 1520.

Duty	Condenser water / Chilled water
Casing	Cast Iron
Impeller	Bronze
Shaft	Stainless Steel
Bearings	Ball Bearing
Base Plate	MS
Speed (Synchronous)	1500 RPM
Motor	TEFC
Mechanical seal	Factory fitted

The impellers of pumps shall be statically and dynamically balanced.

- 4.0** The capacity of motor shall be at least 15% in excess of BHP requirement of pump & shall be as per **Standard Specifications, SECTION-02**. Detailed calculation for selection of pumps shall be provided by the Tenderer.

The installation of pumps shall be carried out by the contractor as per manufacturer recommendations. The pumps shall be mounted on concrete foundations with vibration isolator's sandwiched between foundation and floor. As far as possible, the pump sets shall be factory aligned and if necessary site alignments shall be done by experienced and trained person. The pumps shall be installed in a manner that would allow maintenance without causing damage to the insulation.

SECTION-07
STANDARD SPECIFICATIONS OF VARIABLE SPEED PUMPING SYSTEM

1.00 VARIABLE PUMPING SYSTEM

This section deals with supply Erection, testing and commissioning of variable pumping system confirming to general specification and suitable for the duty selected as indicated in **Schedule of Equipment / Materials**. The type, capacity and size of pumps shall be as selections given under this section only. The Pumps selected should have a very high efficiency and supported by selection charts and curves. The pumps shall be used for air-conditioning applications.

2.0 VARIABLE SPEED PUMPING SYSTEM

This section includes the following :

- A. Variable Speed Pumping Package
 - 1. Individual Components
 - 2. Pump Control Panel
 - 3. Adjustable Frequency Drive
 - 4. Sensor Transmitters
 - 5. Sequence of Operation

3.0 The following references has been broadly considered while designing variable pumping system.

- A. Hydraulic Institute
- B. ANSI - American National Standards Institute
- C. NEMA - National Electrical Manufacturers Association
- D. UL - Underwriters Laboratories Inc.
- E. ETL - Electrical Testing Laboratories
- F. CSA - Canadian Standards Association
- G. NEC - National Electrical Code
- H. ISO - International Standard Organization
- I. IEC - International Electro technical Commission

4.0 The following submittals shall be submitted, but not limited to the list given below by the HVAC CONTRACTOR for approval.

1. System summary sheet.
2. Sequence of operation.
3. Shop drawing indicating dimensions, required clearances. and location and size of each field connection.
4. Power and control wiring diagrams.
5. System profile analysis including variable speed pump curves and system curve. The analysis shall also include staging points.
6. Pump data sheets.

The submittals must be specific to this project only & general submittals will not be acceptable.

5.0 QUALITY ASSURANCE

- A. The pumping package supplier shall assume “Unit Responsibility” for the complete pumping package. Unit responsibility shall be defined as responsibility for interface and successful operation of all system components supplied by the pumping system supplier.
- B. All function of the variable speed pump controller shall be tested at the factory prior to shipment and it shall test all inputs, outputs and program execution specific to this application.
- C. AC contractor shall comply with all sections of this specifications relating to packaged pumping system. Any deviations from this specification shall be bid as alternate clearly defined in writing. If exceptions are not defined clearly the contractor shall be bound by these specifications only.

6.0 The following manufacturers shall be acceptable only subject to compliance with the specifications:

1. ITT Bell & Gossett
2. Grundfoss

7.0 MANUFACTURED UNITS

- A. Furnish and install as shown on the plans Variable Speed Pump controller.
- B. The control system shall include as, a minimum, pumps, the programmable logic pump controller, adjustable frequency drive(s) and remote sensor / transmitters.

- C. The pumps, variable speed pump logic controller, adjustable frequency drives and remote sensor / transmitter (s) shall be shipped as individual components to the job site.
- D. Pumps, logic controller, adjustable frequency drives, sensor / transmitters and related equipment shall be installed.
- E. Line voltage power wiring shall be installed by the HVAC contractor as shown on the field connection drawings and wiring diagrams supplied with the pumping package.
- F. Low voltage (24 VDC and 115 VAC) wiring shall be installed by the controls HVAC Contractor as shown on the field connection drawings and wiring diagrams supplied with the pumping package.

8.0 COMPONENTS

PUMP LOGIC CONTROLLER

- a) The Technologic pump logic controller assembly shall be listed by and bear the label of Under writer's Laboratory, Inc. (Canadian Standards Association (CSA) listing available upon request). The controller shall meet Part 15 of FCC regulations pertaining to class A computing devices. The controller shall be specifically designed for variable speed pumping applications.
- b) The controller shall function to a proven program that safeguards against damaging hydraulic conditions including :
 - i) Motor overload Pump flow surges
 - ii) Hunting
 - iii) End of Curve.
- c) The pump logic controller shall be capable of accepting 4 discrete analog inputs from zone sensor / transmitters indicated on the plans. The analog input resolution shall be 12 bit minimum, and the controller shall scan each analog input a minimum of once every 500 milliseconds. The use of a multiplexer for multiple sensor inputs is not acceptable. All sensor / transmitter inputs shall be individually wired to the pump logic controller for continues scan and comparison feature.
- d) The pump logic controller shall select the analog input signal which has deviated the greatest amount from the set point. The selected signal will be used as the command feedback input for a closed loop hydraulic stabilization function to minimize hunting.
- e) The hydraulic stabilization program shall utilize a proportional-integral-derivative control function. The proportional, integral and derivative values shall be user adjustable over an infinite range. The scan can compare rate then selects the command set point and process variable signal shall be continuous and

automatically set for optimum performance. Each sensor shall be scanned at least once every 500 milliseconds.

- f) The pump controller shall be capable of controlling pumps in parallel as described in point 7B.64 of this section Sequence of Operation
- g) The pump logic controller shall be self prompting & all messages shall be displayed in plain English. The following features shall also be provided.
 - a) Multi-fault memory & recall.
 - b) On – Screen help functions
 - c) LED pilot lights and switches
 - d) Soft-touch membrane keypad switches.
- h) The variable speed pumping system shall be provided with a user friendly operator interface complete with membrane switches and numeric keypad. Display shall be no less than four lines with each line capable of displaying up to twenty characters. The human interface panel shall display the following values :
 - a) Flow in GPM (requires optional flow meter)
 - b) Pump On/Off Status
 - c) Pump % Speed
 - d) Temperature in degree F or C
 - e) Individual Alarm Conditions
 - f) Trouble shooting diagnostics
 - g) User adjustable parameters such as alternation, PID, set points, etc.
- i) The pump controller shall communicate to the Building Automation System (BAS) by both hard-wired and serial communications.
 - a.) The following communication features shall be provided to the BAS in “hardwired” form via 4-20 mA analog signals and digital outputs :
 1. Remote system start / stop (dry contact supplied by BAS)
 2. Failure of any system component (qty. 1, relay output from pump controller)
 3. Process variable (qty. 1, 4-20ma analog output supplied by pump controller)
 4. AFD speed (qty. 1, 0-10 VDC analog output supplied by pump controller)
 5. Optional : Pump on / off status (qty. 3 relay output supplied by pump controller)
 - b) The following communication features shall be provided to the Building Automation System via an RS-485 port.
 1. All sensor process variable.
 2. Individual zone set points.
 3. Individual pump failure.
 4. Individual pump on / off status.

5. Individual AFD on/off status.
 6. AFD speed.
 7. Individual AFD Failure.
 8. AFD bypass status (if automatic)
 9. Individual sensor failure.
- j) The pump logic controller shall be supplied by the pump supplier and the enclosure shall be conforming to NEMA 1.

9.0 ADJUSTABLE FREQUENCY DRIVE.

- i) The adjustable frequency drive (s) shall be pulse width modulation (PWM) type, microprocessor controlled design.
- ii) The AFD, including all factory installed options, shall have CSA approval.
- iii) AFD shall utilize a diode bridge rectifier to convert three phase AC to a fixed DC voltage. Power factor shall remain above 0.95 regardless of speed or load. AFDs employing power factor correction capacitors shall not be acceptable.
- iv) Insulated gate bipolar transistors shall be used in the inverter section to convert the fixed DC voltage phase adjustable frequency AC output. A DC line reactor shall be provided to minimize harmonic and current distortion of the input power line.
- v) The following customer modifiable adjustments shall be provided :
 - a. Accel time : 0.1 to 1800 seconds
 - b. Decel time : 0.1 to 1800 seconds
 - c. Minimum frequency : 0HZ
 - d. Maximum frequency : 120 HZ
 - e. Analog input filter : 0.1 to 10 seconds
 - f. Analog outputs filter : 10 to 1 gain.
 - g. Overload protection : 70 % - 100% to full load current.
- vi) Speed reference signal shall be customer selectable for 1-10 VDC or 4-20 MA.
- vii) The AFD shall be capable of displaying the following information in plain English via a 40 character alphanumeric display :
 - a. Frequency
 - b. Voltage
 - c. Current
 - d. Kilowatts per hour
 - e. Fault identification
 - f. Percent torque
 - g. Percent power
 - h. RPM
 - i. Setting of O/L protection

- viii) The AFD controller shall be suitable for elevation upto 1000 meters above sea level.

10 SENSOR / TRANSMITTER

To Provide 2 nos. field mounted differential pressure sensor transmitter(s) as indicated on the plans. Unit shall transmit as isolated 42Ma designed indicative of process variable to the pump logic controller via standard two wire 24 DC system. Unit shall have stainless steel wetted parts with 0.25" male NPT process connections. It shall be protected against radio frequency interference and shall have a water tight, NEMA 4 electrical enclosure capable of withstanding 200 PSI static pressure with a 0.5" NPT conduit connection. Accuracy shall be within 0.25% of full span.

11 SEQUENCE OF OPERATION

- i) The system shall consist of a Technologic pump logic controller, multiple pump / AFD sets with manual and automatic alternation and pump staging.
- ii) The pumping system shall start upon the closure of customer's contact when the pump logic controller Mode of Operation selector switch is in the REMOTE position.
- iii) When the pump logic controller selector switch is in the LOCAL position, the pumping system shall operate automatically.
- iv) Sensor / transmitters shall be provided as indicated on the plans.
- v) Each sensor / transmitters shall send a 4-20Ma signal to the pump logic controller, indicative of process variable condition.
- vi) The pump logic controller shall compare each signal to the independent, engineer / user determined set points.
- vii) When all set points are satisfied by the process variable, the pump speed shall remain constant at the optimum energy consumption level.
- viii) The pump logic controller shall continuously scan compare each process variable to its individual set point and control to the least satisfied zone.
- ix) If the set point cannot be satisfied by the designed lead pump, the pump logic controller shall initiate a timed sequence of operation to stage a lag pump.
- x) The lag pump shall accelerate resulting in the lead pump(s), decelerating until they equalize in speed.
- xi) Further change in process variable shall cause the pumps to change speed together.

- xii) When the set point criteria can be safely satisfied with fewer pumps, the Technologic pump logic controller shall initiate a timed de-stage sequence and continue variable speed operation.
- xiii) As the worst case zone deviates from set point, the pump logic controller shall send the appropriate analog signal to the AFD to speed up or slow down the pump motor.
- xiv) In the event of a system differential pressure failure due to a pump or AFD fault, the Technologic pump logic controller shall automatically start the next variable speed pump / AFD set in sequence and continue variable speed operation.
- xv) In the event of the failure of a zone sensor / transmitter, its process variable signal shall be removed from the scan / compare program. Alternative zone sensor / transmitters, if available, shall remain in the scan / compare program for control.
- xvi) The zone number corresponding to the failed sensor / transmitter shall be displayed on the operator interface of the pump logic controller.
- xvii) In the event of failure to receive all zone process variable signals, all AFDs shall maintain 100% speed, reset shall be automatic upon correction of the zone failure.
- xviii) PUMP or AFD fault shall be continuously scrolled through the display on the operator interface of pump logic controller until the fault has been corrected and the controller has been manually reset.

SECTION-08

STANDARD SPECIFICATION OF DOUBLE SKINNED AIR HANDLERS

8.0 SCOPE

This section deals with supply, installation, testing and commissioning of FLOOR MOUNTED type air handlers of various capacities and sizes as enumerated under the head **Detailed Bill of Quantities and Schedule of equipment and conforming to the following specifications.**

ALL THE AIR HANDLING UNITS WOULD BE CE CERTIFIED

- The area shall be served by several AHUs. Air handling units provides air to the areas and maintains the required pressure differences between corresponding rooms. Air handling units also maintains the required temperature and humidity conditions in the controlled and un controlled areas as per attached **Basis of Design**
- The AHU shall be in Double skin construction fabricated from Al extruded section frame structure. Outer skin will be 0.63 mm pre plasticized GI. Inner skin 0.63 mm plain GI construction
- Particular attention shall be paid to ensure reasonably low and acceptable noise level maximum 75 DB when measured 2 meter away from AHU.
- The cooling coil shall be sized so that the coil face velocity shall not exceed 500 FPM. The cooling coil size shall be adequate to offset the total heat load for that AHU.
- The coil should be suitably brazed during manufacture to withstand all handling stresses. The bracing should be of hot dip galvanized material. The coil support frames should also be of galvanized iron.
- All the Air handling units will be placed in the AHU service floor above the concrete block.
- The height of the foundation concrete blocks will be as per consultants drawing. (Same will be issued by Consultant at the time of Execution)
- **The filtration of AHU shall be as detailed in the bill of quantity**

1.1 Air handling unit specification

Sr.No.	Description	Specification
1	AHU Type	Recycle/, Double skin, NON -Thermal break type, Single Decker
2	Installation	Indoor (service floor)
3	AHU Construction	Standard
4	AHU panel thickness	Not less than 43 mm thick (vender to select the thickness and to submit the calculation)

5	Outer and inner skin material thickness	Outer skin will be 0.63 mm pre plasticized GI. Inner skin 0.63 mm plain GI with Pre plasticized from cooling coil onward and up to cooling coil is GI.
6	Outer skin finish shade color	PRE PAINTAINED
7	Core insulation material	CFC free Polyurethane Foam
8	Density of insulation material	40±2 kg/m ³
9	AHU section [frame] material	Extruded aluminum
10	AHU section [frame] material thickness	1.25 mm
11	AHU corners	Rounded corners / No sharp edges
12	Panel fixing method and screw projection.	Conceal screw in panel with plastic cap on screw head
13	AHU lifting arrangement	Shall provide by vendor as per center of gravity.
14	AHU base frame	Vendors standards and as per AHU weight
15	AHU internal coving	Inside coving required, Pen radius
16	Door Requirement	Access doors for fan section, coil sections & filter sections.
17	Door Type	Positive Pressure side-inside openable Negative Pressure- Out side openable
18	Door sizes	To enable easy Filters removal.
19	Door hinges and locking system	Min 2 Hinges per door with self locking system
20	Door gasket material	Neoprene or equivalent gasket of suitable thickness.
21	Door tightness against water and air	Air tight door
22	Any Holes in AHU panels	To be seal for air tightness
23	Cooling and hot coil connection side	Opposite side of the access door

24	Differential pressure gauges across the each filter section	The magnehelic gauge with SS 304 housing to be provide with SS needles between the upstream and downstream of the filter section with necessary accessories and mountings. Gauge Box drawing to be submitted by vendor and get approval from Consultants/Client.
25	Limit switch	Manufacturer shall provide dust and oil free heavy duty limit switch for blower access door.
26	Light	Shall provide the industrial Marine light inside the blower section with suitable heavy protection.
27	Electrical connections	Electrical connection inside the AHU including motor connection will be in the scope of AHU manufacturer with limit switch and weather proof light along with earthling. Vendor will provide the terminal box outside the AHU. Cable will be in the scope of AHU vendor
28	Type of blower	DIDW backward curved centrifugal fan
29	Blower construction	Standard
30	Blower construction material	Shall made out of galvanised sheet steel finished with polyester powder coating.
31	Fan performance and balance quality	Performance - As per AMCA210 standard “Laboratory Methods of testing fans for rating” Balancing quality – As per AMCA204 standard.
32	Anti vibration mounting system	The vibration of the AHU fans (as measured on the motor and fan housing block after assembly) shall not exceed a peak-to-peak displacement of 100 microns
33	Blower efficiency	Fan will be selected for the maximum efficiency at lower RPM
34	Suitable for VFD	As per Requirement
35	Blower drive	Direct /V Belt Drive
36	Electrical supply	The motor shall be suitable for 3 phase 415 Volt +/- 10% 50 Hz frequency (Suitable for india electric standard)
37	Motor RPM / Pole	Up to 900 RPM – 6 pole 900 – 1440 RPM – 4 Pole 1440 – 2800 RPM – 2 Pole
38	Motor terminal box	Easy for electrical connection and maintenance.
39	Blower outlet	Max.10 m/sec

	velocity	
40	Filter fixing arrangement	Flange type filter fix with wing nuts
41	Gap between the Filter frame and AHU	Avoid the gap by using the rubber gasket, filled with Silicon sealant
42	Filter access door size	Able to remove the filters easily
43	Cooling coil design parameter	Coil air face velocity – should not more than 500 FPM Temperature difference 5°C (Chilled water coil inlet temperature : 7°C ,outlet temperature : 12°C) Pressure drop across the coil : Not More Than 0.5 kg/cm ²
44		
45	Cooling coil tube material	Copper
46	Tube gauge	26 SWG
47	Tube size	OD-12.5mm to 15 mm
48	Fin material	Aluminium
49	Fin material thickness	37 SWG
50	Fin per 50 mm	22-26 Nos
51	Coil header material	Copper
52	End connection of header to connect the water piping	With threaded MS socket and flange.
53	Coil testing pressure	21 kg/cm ²
54	Cooling coil tray material	SS 304
55	Cooling coil tray construction	Sandwiched type and 3 side slope towards drainage hole
56	Drainage Pipe Material	G.I
57	Drainage pipe	U trap drawing to be provided by vendor.
58	Drainage pipe end	Threaded connection

59	Drainage pipe size	Not Less Than 40mm
60	AHU noise level @ 2 meter away from AHU	Not more than 75 DB
61	AHU accessories and mountings	All the air filters and dampers shown in the typical AHU GA drawing will be in the scope of AHU manufacturer. All the magnehelic gauges with housing across the air filter will be in the AHU manufacturer's scope.

1.2 **FORCED DRAFT SUPPLY AIR & EXHAUST AIR UNITS**

Forced draft ventilation supply and exhaust unit shall be in single skin construction fabricated from Aluminium extruded section frame structure. The skin should be 1.6 MM thick Galvanised Iron Sheet and complete with following sections.

Particular attention shall be paid to ensure reasonably low and acceptable noise level maximum 75 DB when measured 2 meter away from FDV. If it is found more after installation, the Vendor has to arrange for replacement/repair the same.

The fan in the FDV unit shall be mounted on anti vibration mountings, which will be designed to achieve desired DB level.

1.3 **FDV Specification**

S.no	Description	Specification
1	Type	100% Fresh air supply unit 100% Exhaust unit
2	AHU panel thickness	20 - 30 mm thick (vender to select the thickness)
3	skin material & thickness	1.6 MM thick Galvanised Iron Sheet
4	Filter access door size	Able to remove the filters easily
5	Core insulation material	CFC free Polyurethane Foam
6	Density of insulation material	40±2 kg/m ³
7	Installation	Indoor (AHU floor)
8	Construction	Standard
9	AHU lifting arrangement	Shall provide by vendor as per center of gravity.
10	AHU base frame	Vendors standards as per AHU weight
11	Door Requirement	Access doors required for filter section and blower section.
12	Door Type	Positive Pressure side-inside openable

		Negative Pressure- Out side openable
13	Door sizes	To enable easy Filters removal.
14	Door hinges and locking system	2 Hinges per door with self locking system
15	Door gasket material	Neoprene or equivalent gasket
16	Door tightness against water and air	Air tight door
17	Any Holes	Shall be air tight
18	Access door side	As per GA drawing and AHU layout
19	Limit switch	Manufacturer shall provide dust and oil free industrial heavy duty limit switch for blower access door.
20	Light	Shall provide the industrial heavy duty weather proof marine light inside the blower section with suitable heavy protection.
21	Electrical connections	Electrical connection inside the AHU including motor connection will be in the scope of AHU manufacturer with limit switch and weather proof light along with earthing. He will provide the terminal box outside the AHU.
22	Differential pressure gauges across the filter	The magnehelic gauge to be provide with ss needles between the upstream and down stream of the each filter section
23	Type of blower	DIDW backward curved centrifugal fan
24	Blower construction	Standard
25	Blower construction material	Shall made out of galvanised sheet steel finished with polyester powder coating or epoxy paint.
26	Fan performance and balance quality	Performance - As per AMCA210 standard “Laboratory Methods of testing fans for rating” Balancing quality – As per AMCA204 standard.
27	Anti vibration mounting system	The vibration of the AHU fans (as measured on the motor and fan housing block after assembly) shall not exceed a peak-to-peak displacement of 100 microns
28	Blower efficiency	Fan will be selected for the maximum efficiency at lower RPM.
29	Suitable for VFD	no
30	Blower drive	Direct/Belt Driven
31	Electrical supply	The motor shall be suitable for 3 phase 415 Volt +/- 10% 50Hz frequency

32	Motor RPM/Pole	Blower RPM Up to 900 RPM – 6 pole 900 – 1440 RPM – 4 Pole 1440 – 2800 RPM – 2 Pole
33	Motor terminal box	Suitable and easy for motor connection
34	Filter fixing arrangement	Flange type filter shall fix with wing nuts
35	Gap between the Filter frame and AHU	Should not more than 2 mm and should filled with Silicon sealant

COOLING COILS (for AHU only)

The cooling shall be made of aluminum fins and copper tubes of dia.12.5mm or 16mm OD. The minimum no. of fins / cm for cooling coils shall be 4.72. The bonding of aluminum fins with copper should be done hydraulically. **The tube thickness shall be 0.51 mm & fin thickness shall be 0.15 mm the cooling coil** should be tested for leaks at a hydraulic pressure of at least 10 Kg / sq.cm. for a minimum period of 3 hours at works. The velocity across face should be limited to 152 meter / minute. In case of chilled water coils the design should be such to limit water velocity to maximum of 2.5 m / sec.

ACCESSORIES

The following accessories must be provided with each air handlers

- Belt guard at the access window. (Part of AHU & not to be priced separately)
- Limit Switch with AHU access window. (Part of AHU & not to be priced separately.(In ceiling suspended AHU, not required).
- Borden type pressure gauge conforming to IS 3624 with gun metal globe valves shall be provided at the inlet and outlet of coils.
- V form Thermometers with metal guards shall be provided at inlet and outlet of water of cooling coil.
- Balancing valves at coil outlet and butterfly valve at coil inlet.

The quantities of item (c) to (e) have been separately quantified under **Bill of Quantities** and should not be estimated along with the AHU.

SECTION -09

STANDARD SPECIFICATIONS OF COOLING TOWERS

1.00 COOLING TOWER

This section deals with supply, erection, testing and commissioning of cooling towers, conforming to general specifications and suitable for the load parameters indicated in **Schedule of Equipment**.

The function of efficient cooling tower is to cool adequate quantity of water through a range of 4.2 °C efficiently with reference to ambient Wet Bulb Temperature approach of 3.9°C.

TYPES: The cooling tower selected shall be induced draft, counter flow type conforming to their respective specification as under. The cooling tower should be installed in open space where free flow of air is available. The cooling towers shall be constructed conforming to relevant ASME standards. CTI Certified Cooling Tower shall be acceptable.

2.0 FRP INDUCED DRAFT COUNTER FLOW COOLING TOWER

The Fiberglass reinforced plastic Cooling Tower shall be suitable for outdoor installation. The Cooling Tower shall be vertical, induced draft, counter flow in fiberglass reinforcement plastic construction, complete with FRP fan blades, motor, surface and spray section, eliminators, steel supports etc.

a) CAPACITY :

The cooling tower capacities shall be as per SECTION-22, Schedule of Equipments.

b) SIDE CASING :

Side casing shall be made out of FRP with smooth surface for minimum resistance to air flow. It shall have sufficient structural strength to withstand high wind velocities and vibration. The casing shall be installed in the fiberglass reinforced basin. The tower supporting structure shall be made out of hot dipped galvanized frame. The tower shall have FRP panels reinforced with embedded steel frame.

c) COLD WATER BASIN :

The Cold Water Basin shall be a deep fiberglass reinforced sump on which cooling tower structure shall be supported.

Basin fittings shall include the following:

- i) Bottom Outlet.
- ii) Screened suction assembly fixed to the basin.

- iii) Drain at under side of suction, suction side sheet.
- iv) Overflow fixed to inside of casing side sheet.
- v) Ball type automatic make-up water valve.
- vi) Equalizing connection where required.
- vii) Quick Fill arrangements

d) DISTRIBUTION SYSTEM

Hot water distribution system shall comprise of header and branch arms system.

e) FILLINGS:

The Fillings shall be made of corrosion proof and rigid film in cross fluted design and arranged in square / rectangular form and shall be elevated from the floor of the cold water basin to facilitate cleaning and easy replacement. They shall be arranged in such a manner to ensure negligible resistance to air flow and to eliminate back water spots and prevent fouling trough scales that may form. In order to reduce carry-over losses through entrapment of water droplets in air stream, PVC drift eliminators shall be installed.

Thickness of PVC fill shall not be less than 0.02 mm.

f) MECHANICAL EQUIPMENT :

The Fan shall be aerofoil type, light-weight rotor fitted with multiple FRP made Aerofoil blades. The entire fan assembly shall be statically balanced. The fan shall be direct / gear driven by TEFC motor suitable for 415 volts $\pm 10\%$, 3 phase, 50 Hz $\pm 5\%$, AC supply conforming to IP 55. The fan shall be protected by fan guard and shall be easily accessible for inspection and maintenance. The mechanical equipment assembly shall be adequately supported on a rugged steel base welded to tubular support assuring vibration-free support. Fan guard shall be provided to prevent birds from nesting during idling periods. All fans shall be direct driven with low RPM suitable for low noise application.

9.20 INDUCED DRAFT COUNTER FLOW:

The induced draft counter flow FRP cooling tower should be complete with corrosion proof construction and all steel components including assembly hardware are hot dip galvanized construction with FRP cold & hot basin .The induced draft propeller fan of the cooling tower shall be direct / gear driven by TEFC squirrel cage motor located outside the moist air stream. The corrosion proof PVC fill should be vacuum formed to provide maximum heat transfer surface. The design should also include cellular drift eliminators and honeycomb air inlet louvers right on the fill sheet. The maintenance on the mechanical equipment should be provided from outside the tower & access to the tower interior should be available through the opening in the centre of cold basin.

WATER DISTRIBUTION SYSTEM

The warm water flows through external piping into a chamber at the top of the tower. The splash box prevents the incoming water from spilling out of the basin and helps in providing uniform water distribution & the water should flow by gravity from the fiberglass basin through nozzles to the fill.

FILL /LOUVERS/DRIFT ELIMINATORS

The fill sheet includes both louvers and drift eliminators & the louvers should prevent water from escaping the fill sheets to assure proper & efficient heat transfer throughout wide variations in the airflow. The HDG steel structural tubes shall support & stabilize the fill in position & shall also hold the fill sheets in position above the cold water basin to facilitate the cleaning of the basin. Suitable screens between the side of the cold water basin & the base of the fill should be provided to prevent foreign materials in the circulating water flow & should be easily removable.

COLD WATER BASIN:

The specification for cold water basin shall be same as given for counter flow cooling tower.

9.30 PAINTING:

The cooling tower shall be procured of the colour, strictly in accordance with written approval of the Engineer in Charge and should have a striking finish.

9.40 PERFORMANCE DATA:

The complete performance ratings and power consumption at varying outdoor wet bulb temperatures, shall be submitted and verified at the time of testing and commissioning of the installation. The Capacity of the cooling tower shall be computed as indicated in the testing procedures for air - conditioning equipments.

9.50 ACCESSORIES:

Each cold water basin shall be provided with a deep leak proof sump complete with a suitable suction strainer having duplicate screen. The strainer shall have handles for its removal.

The cooling tower basin shall be provided with automatic float valve with a stop valve for continuous make up water flow, quick fill arrangement with stop valve, over-flow and drain connections with stop valves.

A hot water bleed connection to the drain line through a stop valve shall be provided. It shall be connected to the drain line below the drain stop valve.

Steel ladders shall be provided in such a manner and location as necessary to give safe and complete access to all parts of tower requiring inspection. Each ladder shall be made of iron sides and 16 mm straps and shall be bolted to the tower on the top and grouted in masonry at the bottom end.

All pipe connections shall be hot dip galvanized and double flanged.

9.60 TESTING:

The testing of cooling towers shall be conducted as per ASME codes and results should be within $\pm 5\%$ of the specified capacity.

SECTION-10

STANDARD SPECIFICATIONS OF CONTROL SYSTEM

- 1.0** This section deals with supply, installation and testing, commissioning of necessary controls (automatic) and instruments conforming to these specifications and shall be in accordance with **Bill of Quantities**. The various controls listed below shall be electrically operated and in case of low voltage controls the necessary step down transformer shall be provided with each control. All automatic controls shall be as detailed in specifications below, however, if the automatic control is not already installed on the machines, it may be installed by the contractor as per **Bill of Quantities**.

2.0 CONTROLS FOR AIR HANDLER

Two way modulating valves:

The two way modulating valves shall be provided in chilled water line to the cooling coil of Air-handlers which is actuated by a proportionating thermostat. The two-way valve shall be selected for valve authority value in the range of 30 % to 60 %. These valves shall consist of bronze metal valve body with stainless steel trim with linear flow characteristics. Modulating motor shall be suitable for operation with a signal of 0-10 volt DC from the IBMS System. The pressure drop across valve for air-handler unit shall not exceed 5.0 PSI. The valve linkages shall be of the same make as of valves & modulating motor.

3.0 THERMOSTATS

a) Snap Acting Humidistat for AHU:-

These shall be electrically operated fixed differential type with the sensing elements located in the return air passage. The exact mounting arrangement, profile etc. shall be derived as per location requirements.

b) Proportion ting Thermostat for AHU:-

For Air-handlers, two way modulating valves shall be proportionately operated based on return air temperature & is suitable to operate in the range of 14 to 30 °C.

4.0 INSTRUMENTS

i) Thermometer: The alcohol filled V-form thermometer shall have range of 50 °C. for air-conditioning application. These shall be provided at inlet / outlet of chillers & air-handlers.

ii) Pressure gauges: The pressure gauges shall be dial type of 100 mm dia to be installed at inlet / outlet of chillers, condensers, suction and discharge ends of pump-sets. The air-handlers shall have common pressure gauge for inlet & outlet. The pressure gauges shall be connected to the pipes by common dia copper pipe with shut off cocks required for gauges protection during testing.

SECTION-11

STANDARD SPECIFICATION OF THERMAL / ACCOUSTIC INSULATION

1.00 This section deals with supply and fixing of **thermal / acoustic** insulation of ducts, pipes etc. as per the specification given in this section.

2.0 MATERIAL OF INSULATION

a) CLOSED CELL CROSS LINKED POLYTHYLENE (XLPE) FOAM

The insulation material of the following kind shall be used for cold insulation.

The Thermal conductivity values in W/m.K shall confirm to following:

Mean Temperature °C	Density In Kg / Cmt.	Thermal Conductivity W/m.k
<u>For Duct Insulation</u>		
40°C	30	0.035

b) Expanded Polystyrene

The density of expanded polystyrene shall not be less than 20 kg per cubic meter and the thermal conductivity shall not exceed 0.031 Kcal./ hr.m °C at 10 °C mean temperature.

The sample of insulation material shall be submitted for approval to the Engineer in Charge and the sample shall be tested for thermal conductivity values by the contractor at his own expense. Adhesive used for setting the insulation shall be non-flammable, vapour proof, CPRX compound.

3.0 TECHNICAL SPECIFICATIONS OF CLOSED CELL, CHEMICALLY CROSS-LINKED POLYETHYLENE (XLPE) INSULATION

The insulation material for the ducts, pipe and under-deck insulation shall be Closed Cell Cross-Linked Fire Retardant Polyethylene Foam. The thermal conductivity of the material shall not exceed 0.035 w/mk at an average temperature of 40°C.

Thermal conductivity of the material shall not be affected by **ageing**, as per **DIN 52616**. The material must be tested for ageing effect in an accredited laboratory for a minimum period of **five years** to satisfy the **ageing** criteria.

The material must be in a **single layer up to 16mm thickness** and not formed by laminating several layers.

The product will have bending trial and the dimensional stability as per DIN 51949 and DIN 53431 for an operating range of – 40⁰c to + 110⁰c. The density of the material shall be **not less than 30 kg/m³ or 0.030 gm/cc**.

The material shall be rated as **Class 1**, as per **BS 476 PART 7**. The rating as per **DIN 4102** shall be **B1**. The **smoke density** of the material as per **AS-1530.3** shall not exceed **1**.

There shall be no toxicity in the emitted smoke, both under flaming and non-flaming conditions as per **AIM 3.000** (1993).

The water vapour permeability, as per **DIN 52615**, shall not exceed **0.15ng/m.sec.pa**

The material shall have a fire approval from CBRI / FIRE advisor (Govt. of India)/Chief fire officer.

For providing UV protection the insulation shall be cladded with minimum 30 micron aluminum PE foil. The cladding shall be factory finished to avoid site work. The minimum thickness will be as per specs.

4.0 INSULATION ON SHEET METAL DUCTING

The thickness of insulation used on ducting shall be as detailed below:

Conditioned space

- | | |
|--------------------|--|
| a) Supply Air Duct | 13 mm thick Closed Cell Cross Linked Polyethylene (XLPE) Foam Insulated with factory Laminated Al PE Foil. |
| a) Return Air Duct | 09 mm thick Closed Cell Cross Linked Polyethylene (XLPE) Foam Insulated with factory Laminated Al PE Foil. |
| b) Fresh Air Duct | 13 mm thick Closed Cell Cross Linked Polyethylene (XLPE) Foam Insulated with factory Laminated Al PE Foil. |
| c) Duct Collars | 13 mm thick Closed Cell Cross Linked Polyethylene (XLPE) Foam Insulated with factory Laminated Al PE Foil |

5.0 ACOUSTIC LINING OF DUCT.

The material to be used for duct lining shall be 12 mm thick resin bonded fiberglass rigid board having a density of 48 Kg/m³ & covered with 0.5 mm thick perforated aluminum sheet. The lining of initial length of the duct shall be done as shown in the tender layout drawings & shall be carried out as follows.

- a) Clean the duct piece thoroughly,
- b) Fix the board of suitable thickness inside the duct & cover with fiberglass tissue paper.
- c) Cover the insulation board with 0.5mm thick perforated aluminium sheet with at least 20% perforation.
- d) Secure the insulation board & aluminium sheet with cadmium coated bolts nuts & cup washers / steel screws.

- e) Finally seal the ends completely, so that no lining material is exposed.

6.0 INSULATION OF PIPES

The chilled water pipes & condensate drain water pipes shall be insulated with 50 mm & 25 mm thick expanded polystyrene pipe section respectively. Expanded polystyrene of P quality shall be used. The buried chilled water pipe insulated with 75 mm thick expanded polystyrene pipe sections. The application of insulation on pipes should be carried out in workman like manner as mentioned below:

7.0 INSULATION OF PIPES WITH ALUMINIUM CLADDING (INSIDE THE BUILDING)

- a) The pipe to be insulated should be cleaned thoroughly with steel brush for removing dirt, rust and grease.
- b) Apply a coat of Zinc chromate primer and two coats of cold setting adhesive CPRX compound on pipes.
- c) Fix insulation of specified thickness tightly and seal all joints with adhesive compound.
- d) Insulated surface should be wrapped in two layers with 400G polythene sheet with over lapping longitudinal & transverse joints.
- e) To apply self adhesive tape for firm holding of polythene sheet in position at interval of 500 mm.
- f) Finish the surface with 0.5 mm thick aluminium sheet fixed with the hand operated roller machine (Grooving Machine) & finally to be fixed with self tapping screws.

8..0 INSULATION OF PIPES WITHOUT ALUMINIUM CLADDING (OUTSIDE THE BUILDING – BURIED IN GROUND)

- a) The pipe to be insulated should be cleaned thoroughly with steel brush for removing Dirt, rust and grease.
- b) Apply a coat of Zinc chromate primer and two coats of cold setting adhesive CPRX Compound on pipes.
- c) Fix insulation of 75mm thickness tightly and seal all joints with adhesive compound.
- d) Insulated surface should be wrapped in two layers with 400G polythene sheet with over lapping longitudinal & transverse joints.
- e) To apply self adhesive tape for firm holding of polythene sheet in position at interval of 500 mm.

- f) Polythene sheet shall be covered with 24 gauge x 19mm wire mesh.
- g) Two layers of sand cement plaster each layer not less than 10 mm thick shall be applied.
- h) Hot bitumen & then tarfelt shall be applied & then finally coated with bitumen. Cost of excavation & refilling shall be included wherever needed.

9.0 INSULATION OF VALVES AND FITTINGS IN CHILLED WATER LINE

All valves, fittings, flanges, strainers etc. in the chilled water line shall be insulated in the same manner as described above for chilled water pipes with 50 mm thick uniformly cut pieces from slabs of expanded polystyrene duly aluminum cladded or with sand cement plaster as finalized. Care should be taken to ensure that no damage would be caused to the insulation when valves or strainers are operated.

10.0 PUMP AND ACCESSORIES

All chilled water pumps and accessories shall be insulated with 50mm thick expanded polystyrene.

11.0 EXPANSION TANK OPEN TYPE

Expansion tank shall be insulated with 80mm thick expanded polystyrene in two layers of equal thickness. The tank shall be internally two coats of epoxy paint. The method of application of insulation shall be same as described for insulation of piping. The final finish shall be done with 0.5mm thick aluminum sheet cladding.

SECTION-12**STANDARD SPECIFICATION FOR AIR CIRCULATION SYSTEM & FILTER
CLASSIFICATION**

This section deals with supply, erection, testing & balancing of GI sheet metal duct work either site fabricated or Factory fabricated as **specified in the Section GSP-19 Detailed Bill of Quantities** and air registers conforming to specifications as given below:

2.0 MATERIAL FOR RECTANGULAR DUCTING: - SITE FABRICATED

The duct shall be fabricated out of galvanized sheet, class VIII (Zinc coating 120 gm/m² as per the parameters given below which are conforming to IS 655-1963.

MAXIMUM SIDE	THICKNESS OF GI SHEET	TYPE OF TRANSVERSE JOINT CONNECTIONS	BRACING
(1) mm	(2) mm	(3)	(4)
Up to 300	0.63	S-drive, pocket or bar Slips, on 2.5m centers	None
301 to 600 601 to 750	0.63	S-drive, pocket or bar slips, on 2.5m centres S-drive, 25mm pocket or 25 mm bar slips on 2.5m centers.	None 25 x 25 x 3 mm angles, 1.2m from joint
751 to 1000	0.80	Drive, 25-mm pocket or 25mm bar slips, on 2.5 m centres 40 x 40 mm angle connections,	25 x 25 x 3 mm angles, 1.2 m from joint
1001 to 1500		or 40-mm bar slips, with 35 x 3 mm bar reinforcing on 2.5 m centres.	40 x 40 x 3 mm angles, 1.2 m from joints
1501 to 2250	1.00	40 x 40 mm angle conn- ections, or 40-mm bar slips, 1 m maximum centres with 35 x 3 mm bar reinforcing .	40 x 40 x 3 mm diagnol angles, or 40 x 40 x 3 mm angle 60 cm from joint.
2250 to above*	1.25	50 x 50 mm angle connec- tions, or 40 mm pocket or 40 mm bar slips, 1 m max. centres with 35 x 3 mm bar reinforcing.	40 x 40 x 4 mm diagnol angles, or 40 x 40 x 3 mm angles, 60 cm From joint.

* Ducts 2250 mm and larger require special field study for hanging and supporting Methods.

In addition to above the following points should be also taken into account while fabrication of ducts.

- a) All ducts of size larger than 450mm shall be cross broken.

- b) All ducts shall be supported from the ceiling / slab by means of MS rods of dia. 9mm with MS angle of size 40 x 40 x 5 mm at the bottom with neoprene pad in between the duct & MS angle. The ducts shall be suspended from the ceiling with the help of dash fasteners. Provision for necessary ancillary materials required for hanging the ducts shall be arranged by the contractor.
- c) The vanes shall be provided wherever required and shall be securely fastened to prevent noise & vibration.
- d) The rubber gasket shall be installed between duct flanges in all connections and joints.
- e) All flanges and supports should be primer coated.
- f) The flexible joints shall be fitted to the delivery side of AHU fans with Fire Retardant Double canvass. The length of flexible joints should not be less than 150 mm and not more than 300 mm between faces.
- g) The ducting work can be modified if deemed necessary in consultation with the Engineer in Charge to suit actual site conditions in the building.
- h) **Box Type Dampers & Splitters**

These dampers shall be provided in the ducting work for proper control and balancing of air distribution. All dampers shall be louver type robust construction. These dampers shall be fitted with easily accessible operating mechanism, complete with links, levers, quadrant for proper control and setting in a desired position. The position of the handle of the damper operating mechanism shall be clearly visible and shall indicate the position of the damper in the duct. All dampers, splitters shall be fabricated out of G.S. sheet of two gauges higher than the duct piece having these fittings. Dampers shall be installed in duct at all required locations. **No extra payment shall be made separately since these form part of Air Circulation System.**

NOTE: In case angle iron supports are not feasible to be installed for supporting the ducts due to height constraint then the contractor shall support the ducts with M.S flats of at least double the thickness of the angle iron supports.

3.0 **MATERIAL FOR RECTANGULAR DUCTING: - FACTORY FABRICATED**

DUCT MATERIAL

All ducts shall be fabricated from galvanized steel sheets of the following thickness:

	Gauge	Thickness (mm)
Rectangular ducts upto 750mm	24	0.63
Rectangular ducts greater than 750 mm and upto 1500mm	22	0.80
Rectangular ducts greater than 1500mm and upto 2250mm	20	1.00
Rectangular ducts greater than 2250mm	18	1.25

FACTORY FABRICATED DUCTS SHALL HAVE THE THICKNESS OF THE SHEET AS ABOVE AND SHOULD HAVE BEADING AT EVERY 300mm.

Recommended SMACNA Standard at 4 Feet Transverse Joint Reinforcement

Duct static pressure Sin Inches	2"
Duct Size (mm)	
150-300	B-26
301-550	C-26
551-700	D-26
701-900	E-24
901-1000	F-22
1001-1200	G-22
1201-1300	H-20
1301-1500	H-20 R
1501-1800	I-18
1801-2100	J-18 R
2101-2400	J-18 R

Ducts shall be straight and smooth on the inside. Longitudinal seams shall be airtight and at corners, which shall be either Pittsburgh or snap Button Punch as per SMACNA practice, to ensure air tightness.

Note:

- SMACNA – Sheet Metal & Air Conditioning Contractor National Association Inc. “HVAC Duct construction standard Metal & Flexible” – 1995 USA.
 - In 1” static pressure i.e. comfort cooling application optional “ C&S and C&SS cleats joints can be used
- Up to 450mm duct size use C&S Cleats
 451 mm to 750mm duct size use “ C&SS cleats.
 Over 750mm duct size use TDC Flanges with respective gauges as mentioned above.
- Alphabets B, C, D, E, F, G, H, I and J per SMACNA 1995, transverse joint reinforcement table 1-12m (T-25b flanged) and TDC addendum.
 - R means reinforcement with Zeebar Stiffener.

DUCT FABRICATION

All Galvanized ducts shall be **factory fabricated** from lock form grade galvanized sheet steel zinc coated conforming with IS: 277, coating grade 120 or aluminium sheets conforming to ISS:737-1955 (wherever aluminium ducts are specified).and installed in a workman like manner.

To suite pieces shall be fabricated at site as per ISS: 655 latest editions.

Ducts shall be straight and smooth on the inside with neatly finished joints. All joints shall be made airtight by applying sealant during the assembly of the ductwork; Sealing of the seams shall be accomplished by using approved sealant. Transverse joints shall be made using sponge rubber sulphur-free foam rubber gasketing (3mm thick and 20mm wide) All exposed ducts within conditioned spaces shall have only slip joints and no flanged joints. The internal ends of slip joints shall be made in the direction of Air flow.

Changes in dimensions and shape of ducts shall be gradual. Curved elbows, unless otherwise approved, shall have a center line radius equal to one and half times the width of the duct. Air

turns shall be installed in all abrupt elbows and shall consist of curved metal blades or vanes, arranged to permit the air to make the turns without appreciable turbulence.

All ducts shall be rigid and shall be adequately supported and braced where required with standing seams to keep the ducts true to shape and to prevent buckling, vibration or breathing.

All sheet metal connections, partitions and plenums required to confine the flow of air to and through the filters and fans, shall be constructed out of 18 gauge galvanized steel sheet, thoroughly stiffened with 25mm x 25mm x 3mm angle iron braces and fitted with all necessary doors, to give access to all parts of the apparatus. Doors shall not be less than 45cm x 45cm in size.

Volume control dampers wherever indicated on the drawings shall be installed as a minimum. The final duct design may call for additional volume control dampers based on final duct configuration.

3.0 MATERIAL FOR ROUND DUCTING: - FACTORY FABRICATED

SCOPE

The Specification covers the general design material , construction features , manufactures ,shop inspection & testing at manufacture's work ,delivery at site , installation testing commissioning & carrying out performance test at site of air distribution system. All ducts shall be factory fabricated. The accepted factories are listed in the approved list of makes.

CODES & STANDARDS

The design material ,construction features ,manufactures ,inspection ,testing & performance of air distribution system shall comply with all currently applicable statues regulation , codes & standards in the locality where the system is to be installed nothing in the specification shall be constructed to relieve the contractor of this responsibility . In particular, the air distribution system shall conform to the latest edition of following standards:

IS 277 Galvanized Steel Sheets (Plain & Corrugated)

SMACNA HVAC system –Testing adjusting & balancing

UL181 Factory made air ducts & connectors

UL555 Fire dampers

ASHRAE 70 method of testing for rating the performance of air outlets & inlets

MATERIAL REQUIREMENT:

Ducting shall be fabricated of galvanized steel sheet & stainless steel as specified in BOQ

- a) GSS duct shall be lock forming grade , zinc coated conforming to IS 277 coated grade 120 GSM
- b) SS duct shall be of SS304 as per ASTM A167

CONSTRUCTION FEATURES:

Fabricated detail shall be generally in accordance with the detail given here under:

ROUND DUCT:

- A. Dead End caps / Blank off shall be dish type.
- B. Round duct thickness in mm/G for GSS/SS shall be given below:
- C. Slip type coupling shall be used for transverse joints & shall be joined with each other with Al 3mm to 5mm POP RIVERTS.

Up to 600mm	3mm POP RIVERTS
Above 600mm	5mm POP RIVERTS

D. Duct shall be forming using lock forming machine.

S.NO	Gauge	ROUND DUCT DIAMETER(mm)	Up to 65mm WC static pressure positive Spiral Seam (mm thick/Gauge)
1	24G	Up to 200mm dia	0.63 /24
2	24G	201 to 350mm dia	0.63 /24
3	24G	350 to 600mm dia	0.63 /24
4	22G	601 to 900mm	0.80/22
5	20G	901 to 1250mm	1.00/20
6	18G	1251 to 1600	1.25/18

Round duct shall have longitudinal or spiral seam as specifies above

DUCT SUPPORTS & HANGERS:

Round duct shall be supported using one/two hanger straps & rods. Straps or Rods shall be of GSS. Supporting of round duct shall be as given below:

S.No	Duct Dia.mm	G.I Strap 2.5mm Thick			G.I Threaded Rod	
		Nos.	Width(mm)	Thickness(G)	Nos.	Dia. MM
1	Up to 600mm dia	1	30	22	1	10
2	601 to 900mm dia	1	30	20	1	10
3	901 to 1250mm dia	2	30	20	2	10
4	1251 to 1600mm dia	2	40	18	2	10

Zinc coated anchor fasteners or embedded plates shall be provided for upper attachment in the buildings. Anchor fasteners, embedded plates & necessary supports to hang the duct shall be provided by the contractors. Anchor fasteners shall be loaded to maximum 30% of the maximum rated capacity specify by the manufactures. Site engineers shall approve all anchors fasteners for supporting ducts. In case of insulated duct anchor fasteners shall be selected based on the actual load.

The spacing between supports should not be greater than 2.5meter

NOTE: In case angle iron supports are not feasible to be installed for supporting the ducts due to height constraint then the contractor shall support the ducts with M.S flats of at least double the thickness of the angle iron supports.

A) VOLUME CONTROL DEVICE

The opposed blade volume control device shall be made of 50micron Powder Coated extruded aluminum construction in black anodised finish. Opposed blades shall be pivoted to extruded aluminum frame with Nylon bushes. Specially designed blade shall have an overlapping lip which shall ensure a tight closure.

B) FRESH AND EXHAUST AIR INTAKE LOUVERS WITH BIRD SCREEN

The fresh air intake louvers at least 50mm deep will be made of G.I. construction. Bird / insect screen will be provided with the intake louvers. The blades shall be inclined at 45 degree on a 40mm blade pitch to minimize water ingress. The lowest blade of the assembly shall be extended out slightly to facilitate disposal of rain water without falling on door / wall on which it is mounted.

The intake louvers shall be provided with factory fitted aluminum construction volume control dampers in black anodized finish with pre filter and wire mesh.

C) AIR FILTERS**Specification – Air filter (Grade – G-4)**

Sr.No.	Description	Specification
1	Filter grade	G-4 as per EN779: 2002
2	Applicable	Primary filter for Uncontrolled area
3	Type	Flange
4	Filter frame and box construction MOC	Aluminum Anodized – 3mm Thick.
5	Filter Efficiency	90% down to 10μ
6	Filter Media	HDPE washable type
7	Filtration	Shall protect the secondary filter from small size dust particle equal to & larger than 10μ

Specification – Air filter (Grade – F-7)

Sr.No.	Description	Specification
1	Filter Grade	F-7 as per EN779: 2002
2	Applicable	Final filter for uncontrolled & Primary filter for Controlled
3	Type	Flange
4	Filter frame and box construction MOC	Aluminum Anodized – 3mm Thick.
5	Filter Efficiency	95% down to 5μ particle size
6	Filter Media	HDPE + Non woven washable type

Specification – Air filter (Grade – F-9)

Sr.No.	Description	Specification
1	Filter Grade	F-9 as per EN779: 2002
2	Applicable	Final filter for AHU & Secondary filter for Controlled area
3	Type	Flange

4	Filter frame and box construction MOC	Aluminum Anodized – 3mm Thick.
5	Filter Efficiency	50% down to 0.3μ particle size
6	Filter Media	Micro Glass Fiber

Specification – Air filter (Grade – H-13)

Sr.No.	Description	Specification
1	Filter grade	H-13
2	Applicable	Final filter for Unclassified Controlled area.
3	Type	Box type
4	Filter frame and box construction MOC	Aluminum Anodized – 3mm Thick.
5	Filter Efficiency	99.97 % down to 0.3μ
6	Filter Media	Fiber glass filter media
1	Filtration	Shall protect the product from small size dust particle equal to & larger than 0.3 μ

1.4 HEPA filter housing specification

Sr.No	Description	Specification
1	Type of HEPA filter housing	Ceiling mounted, suitable for bottom filter loading
2	Provision for duct connection	Top connection
3	MOC	G I powder coated
4	Thickness	1.6 mm
5	Housing surface finishing from inside	G I powder coated
6	Filter fixing arrangement	Loading from bottom side Pressure plates - One (top) shall fixed and other (bottom) will lose and tightens with clites and bolts
7	Pressure plate size	25 mm x 5 mm
8	Pressure plate MOC	SS 304
9	Grill MOC	SS 304 Capsule perforated with 75% perforation
10	DOP test and on line pressure measurement	Vendor shall provide the port with nipple for DOP test and online pressure measurement
11	External volume control damper and MOC	External damper at housing inlet For MOC and specification of volume control damper pl ref specification of “Volume control damper”

Return air riser

Sr.No	Description	Specification
1	Riser details	In built in the panel. OR In built in between the two wall panel pocket when the air capacity will very high.
2	Return air riser grill	Push fit type Capsule Shape perforated sheet 16Gauge thick within built G-4 filter
4	MOC of return air grill	SS 304
5	Return air grill location	300 mm above the Finished floor
6	Damper	External damper at return air riser outlet
7	Damper specification	External damper at riser outlet. For MOC and specification of volume control damper refer specification of “Volume control damper”

12.30 PAINTING

All ducts collar / shoot behind the grills / diffuser shall be given at least two coats oil black enamel paints.

12.40 TESTING

The complete duct system shall be tested for air leakage & complete air distribution system shall be balanced in accordance with air quantities indicated on the approved drawing.

SECTION-13

STANDARD SPECIFICATION ON ELECTRICAL MOTORS AND STARTERS

13.00 This section deals with supply, installation, testing and commissioning of all types of motors used for pumps, air-handlers, compressors, cooling towers etc. The motor installation, wiring & its control shall be carried out in accordance with the specifications as detailed below.

13.10 MOTORS

MAKE OF MOTORS

The make of motors shall be as specified in List of Approved Make.

- a) The motor shall be of the following design and should run at all loads without any appreciable noise or hum.
 - i) Totally enclosed fan cooled Sq. Cage.
 - ii) Screen protected drip proof wound Sq. Cage motor.

Enclosure and type of motor shall depend upon duty and usage unless otherwise specified.

- b) The winding of motors shall be class 'F' insulation and suitable for local conditions. The insulation of motors shall confirm to IS:325/1978.

Note: The winding of motors used for smoke exhaust fans shall be class "H" insulation.

- c) All motors shall comply with IS:325, IEC-34.1 or BS – 2313, IEC-72.1 for foot mounted motors.
- d) The rating of the motor shall be as indicated in the **Schedule of Equipment & Bill of Quantities**. The motors shall be selected on the basis of ambient temperatures and allowable maximum temperature rise.
- e) Motor above 1HP shall be three phase unless otherwise specified.
- f) All motors shall be rated for continuous duty as per IS:325. Motor shall be suitable for operation on 415 volts \pm 10% volts, 50 \pm 5% Hz AC supply (or 230 \pm 10% volts, 50 \pm 5% Hz for single phase AC supply).
- g) Motors shall be provided with cable box to receive Aluminum conductors, PVC insulated, PVC sheathed and armoured cables suitable raised cable eatery berries with in if required shall be provided for easy-ness of cable termination and adequate space.
- h) All motors shall be provided with combination of 'Ball and Roller Bearing'. Suitable grease nipples for regreasing the bearing shall be provided.

- i) Motors above 0.25 HP shall be provided with overload protection. Motors above 100 HP shall be provided with thermal protection and thermistor detector in the starter winding.
- j) The starter current and the type of starter to be used shall be as follows (unless otherwise specified)

<u>Type of motor</u>	<u>Starting Current</u>	<u>Starting method</u>
a) Sq. Cage motor up to 7.5 H.P	600% of full load current	D.O.L
b) Above 7.5 H.P & less than 20 H.P	250% of full load current	Star / Delta
c) 20 H.P & above	200% of full load	Soft Starter heavy duty/Closed transition Star / Delta Current

13.20 MOTOR STARTERS

- a) All starters shall confirm to IS: 13947. The starter shall be enclosed in sheet metal enclosure, which would be dust vermin proof.
- b) All starters should have suitable range of voltage and frequency.
- c) All starters shall have integral stop/start push button of international colour code.
- d) Contactor shall have number of poles as required for appropriate duty. Contacts should be made of solid silver face & shall be suitable for at least 40 contacts per hours.
- e) In event of power failure, the starter should automatically disconnect.
- f) All starters shall be provided with thermal over load relay.
- g) All star delta starters shall have adjustable timers.
- h) Terminal blocks with integral insulating barrier shall be provided for each starter.
- i) All starters shall be provided as specified in **Bill of Quantities**. All starters shall be compatible to the drive and driven equipment.
- j) Extra contact for interlocking purpose shall be provided in the starter.

13.30 INSTALLATION OF MOTORS

- a) The motor and drive machine shall be fixed on slide rails to facilitate belt and other adjustments.
- b) Vibration isolation arrangement shall be provided.
- c) The installation of motor shall be carried out as per IS:900.
- d) The motor with driving equipment shall be mounted on foundation and connected to each other with flexible coupling with guard in condenser & chilled water pumps.
- e) All motor shall be wired as per specifications. Earthing of motor frame shall be done with GI strips as specified in '**Bill of Quantities**'.
- f) All motors shall be tested at manufacturer's works as per I.S. standard and test certificates shall be furnished.
- g) All motors after installation shall be tested at site for vibrations, heating and electrical insulation resistance by AC contractor.

SECTION-14

STANDARD SPECIFICATION OF MOTOR CONTROL CENTRE (MV PANEL), SUB-PANEL, POWER & CONTROL CABLING

14.00 This section deals with supply, installation, testing & commissioning of Motor Control Centre (MV panel), AHU Sub-Panels etc. & shall be manufactured by CPRI approved vendors. The power / control cabling & earthing work shall be carried out as per the specification given below:

14.10 SCOPE

All work shall confirm to Indian Electricity Act (amended up to date), I.S. code of practices local rules and regulations etc. Power cabling shall be carried out with approved make of cables as indicated in the **List of approved make of equipment / materials** and shall be of grade 1100 volts, PVC insulated & sheathed, armoured aluminum conductors cables. Control cabling shall be of approved make and shall be of grade 1100 volts, PVC insulated & sheathed, copper conductor armoured multi core cables as specified in B.O.Q.

14.20 MOTOR CONTROL CENTRE (MV PANEL) / AHU SUB-PANEL

Motor control centre (MV Panel) floor mounted extendable type & wall mounted AHU sub-panel shall be fabricated out of 14G C.R.C.A. Sheet. These panels shall be cubical sectionalised type, totally enclosed dust & vermin proof. Gaskets shall be provided in all joints to prevent dust to reach the internals of the panels to make it completely dust proof. The degree of protections for panels shall be IP 52 for indoor applications and IP 55 for outdoor applications as per IS:2147.

These panel (MV) shall be suitable for voltages up to 500 volts, three phase 50 Hz, 4 wire supply capable of functioning satisfactorily in temperature ranging up to 45 to 50 degree centigrade and rupturing capacity suitable for connected load & design should be type tested for 42 KA fault level. All joints of panels shall be welded and braced as necessary to provide a rigid support for all components. The base channel provided in the floor mounted MV panel shall be 75mm high & a clear space of 200mm between the floor and the bottom most part of the unit shall be provided. The panel shall be correctly positioned. Self- threading screws shall not be used in the construction of control panels. Appropriate knock-out holes of proper sizes shall be provided for incoming and outgoing cables. The facility for bottom or top entry of cables in the panels shall be provided. Necessary cables clamps shall provided for holding the cables in position.

All power/control wiring inside the panel shall be colour coded and control wiring ferruled for identification purpose. All labeling shall be provided in engraved anodized aluminum strips on the front faced of the panel.

Each circuit breaker shall be housed in separate compartments. It shall have steel sheets on top and bottom of compartment. The steel sheet hinged door shall be interlocked with the circuit breaker on the "ON" position. When the breaker is on the "ON" position, suitable preventive measures shall be provided, such as interlocks, to prevent the breaker from being drawn out. When the breaker is in "ON" position steel sheet shall be provided

between the tiers in the vertical section. The door of this compartment shall not form part of the draw out arrangements.

14.30 BUS-BARS

The bus-bar and its connections shall be aluminum Electrolytic grade E-91 as per IS: 5082 and shall be of rectangular section. The amperage capacity of aluminium bus bar shall $1A / \text{Sq. mm}$. These should be suitable for full load current for phase bus-bar and neutral bus-bar shall be of half rated current capacity. The bus-bar should have provision on either side for extension. The bus-bar should be sleeved with colour coded heat shrinkable PVC sleeve. Bus-bar supports shall be of fiber glass reinforced thermosetting polyester having in built and tracking barriers to break the path of conducting dust through moulded ribs.

In panels bus-bar connections shall be done by drilling holes with cadmium coated bolts and nuts. Extra cross section shall be provided to compensate drilling of the holes. Insulated aluminum strips of suitable size of full rated current capacity shall be used for interconnecting bus-bar and breaker.

A horizontal / vertical wire way shall be provided for interconnecting control wiring between different vertical sections.

The terminal blocks shall be used for outgoing terminals and neutral link at a suitable located place in the control panel. Separate compartments for outgoing and incoming cable shall be provided. The current transformers of all instruments shall be mounted with terminal blocks.

All live parts including incoming and outgoing link / terminals should be totally shrouded by means of non hygroscopic and fire retardant material.

14.40 ROTARY SWITCH / SELECTOR SWITCH / SWITCHES / HRC FUSES / STARTERS / SINGLE PHASE PREVENTERS / TOGGLE SWITCH.

These shall be of approved make and conforming to relevant ISI standard. The rupturing capacity of HRC fuses should not less than 80 KA and in case of switches it should be 60 Amps maximum.

14.50 CURRENT TRANSFORMER

The current transformers shall have accuracy of class I and 5P10 / 10P10 and suitable VA burden for operation of the connected meters and relays.

14.51 OVERLOAD RELAYS

All the motors shall have overload relay protections conforming to relevant IS.

14.52 TIME DELAY RELAYS

These shall be adjustable type with time delay adjustments of 0-180 or as per manufacturer's standards.

14.53 INDICATING LAMPS AND METERING

These shall confirm to BS37 & BS39. All meters shall be flush mounted and draw-out type. The indicating lamp shall be filament type and with very low burden & economy resistor.

14.54 VOLTMETER AND AMMETERS

Motor Control Centre (MV Panel) shall have flush type voltmeter & ammeter of size 96 x 96 mm as detailed in B.O.Q.

14.55 PUSH BUTTON STATIONS

These shall be suitable for panel mounting and accessible from front without opening. These shall be provided for manual starting and stopping of motors/equipments as per normal practices. The contacts shall be suitable for 6AMP current capacity.

14.56 CONDUITS

These shall be preferable made of mild steel, stove enameled from inside and outside with minimum wall thickness of 1.6 mm for conduits up to dia of 25mm and 2 mm for conduits above 25 mm diameter.

14.57 CABLES

These shall be PVC insulated, pre-sheathed, aluminum conductor armoured cables as per IS:694 and as per **list of approved make of equipment / materials**. Control Cables shall be multi-core PVC-insulated PVC sheathed copper conductor and armoured cables of approved make only.

14.58 LAYING OF CABLES

These shall be laid as Indian Standard code of practice. All cables shall be laid on **16G Cadmium Plated U shaped Channel** minimum 40mm x 20mm cable trays and above size as per required. In case more than one cable is running, then proper space in between the two cables shall be provided to avoid loss of current carrying capacity. While cables are running on walls, proper saddles must be provided.

14.59 WIRE SIZES

Single stand PVC-copper conductor wires shall be used inside the control panel for interconnecting different components. All wires shall be neatly dressed and coloured beads shall be provided for easy identification in control wiring. The minimum size of control wiring shall be 1.5sq.mm. Testing of panels as per code of practice shall be done at works by AC contractor before inspection & dispatch to site.

14.60 DRAWINGS

Necessary drawings of all control panels and wiring of equipment etc., shall be submitted by the A.C contractor for approval of the Engineer in Charge. On final completion of job and before handing over of AC System As Built Drawings shall be submitted to the Department.

14.61 TESTING

The complete electrical installation shall be tested in accordance with relevant ISI codes in presence of Electrical Supervisor of the Department before commissioning of plant.

14.62 PAINTING OF PANELS

All sheet metal enclosures shall be powder coated only after de-rusting & hot-dip phosphating degreasing etc. at works only.

NOTE: Rubber mats of 1100 volts shall be laid in front of all switch boards as specified in BOQ.

14.72 EARTHING

The earthing of all equipments shall be carried out by G.I. strips / wires as mentioned in **Bill of Quantities**. All panels / three phase motors shall be earthed with two number distinct and independent G.I. strips / wires of the following sizes:

- | | |
|------------------------|-------------------|
| 1. Motor upto 7.5 KW | 8 SWG GI Wire |
| 2. Motor 8.5 to 15 KW | 10 SWG GI Wire |
| 3. Motor 18.5 to 30 KW | 25x3 mm GI Strips |
| 4. Motor 37 to 65 KW | 25x6 mm GI Strips |
| For above 70 KW | 50x6mm GI Strips |

The earthing connections shall be connected to main earth station or main earth grid. The earth connections shall be connected to equipments after removal of paint, grease etc.

14.90 POTENTIAL FREE CONTACTS

The AC contractor shall provide fire shunt relay contact in his panel wherever necessary either it is specified in the Schedule of Quantities or not free of cost along with auto / manual mode selector switch in the outgoing feeder for AHU Fan, Ventilation & Pressurization fan etc. to take fire input signal (Potential Free Contact).

SECTION-15**STANDARD SPECIFICATION ON PIPING WORK**

This section deals with supply, installation, testing & commissioning of chilled water / condenser water / drain water pipes, pipe fittings and valves etc. as detailed below in specifications. All pipes, fittings and valves etc. shall conform to relevant Indian standards.

WATER PIPING

- 1.00** The pipes, fittings and valves shall be of approved make given in the NIT.
- 2.0** Chilled water / Condenser water pipes shall be "C" Class M.S. E.R.W Black pipes & shall conform to IS:1239 (Part 1) - 1991 & IS:3589 - 1991 with latest amendments. The wall thickness of "C" Class M.S. E.R.W. Black pipes as per IS:1239 (Part 1) shall be as follows:-

	Nominal Pipe Dia in mm	Wall Thickness of Pipe in mm
a)	25	4.00
b)	32	4.00
c)	40	4.00
d)	50	4.50
e)	65	4.50
f)	80	4.80
g)	100	5.40
h)	125	5.40
i)	150	5.40
j)	200	6.00
k)	250	6.00
l)	300	6.00

- 3.0** Drain water / make up water pipes shall be "B" Class GI Pipe & shall Conform to IS: 4736.
- 4.0** The pipes shall be sized for individual liquid flow & shall ensure smooth noiseless balanced circulation of fluid.
- 5.0** All piping and their steel supports shall be thoroughly cleaned and primer coated before installation.

6.0 PIPE FITTINGS

The pipe fittings for screwed piping shall be malleable iron and for piping with welded joints shall of weld able quality. Also the fittings shall be suitable for same pressure ratings as for the piping system.

- 7.0** All bends up to sizes 150 mm dia shall be ready made of heavy duty wrought steel of appropriate class.

8.0 All bends in sizes 200 mm and above shall be fabricated from the same dia and thickness of pipe in at least four sections and having a center in radius of at least 1.5 times diameter of pipes. Fittings such as tees, reducers etc. shall be fabricated from the same pipe and its length shall be at least twice the diameter of the pipe.

9.0 The dead ends shall be formed with flanged joints & shall have 6 mm thick blank between flange pair for 150 mm and over.

10 FLANGES

All flanges shall be of mild steel as per IS: 6392 / 71 (with latest amendments) & shall be slip on type welded to the pipes. Flanged thickness shall be to suit Class II pressure. 3 mm thick gasket shall be used in between the flanges.

Flanged pair shall be used on all such equipments which are required to be isolated or removed for service for example condenser / chilled water pumps, chilling m/c, AHU etc.

11 VALVES (BUTTERFLY VALVES)

Butterfly valves shall be of PN 16 rating as per IS 13095 preferably with fixed linear design to suit duty and flanges as per IS 6392 Table "E". Valves of sizes 32 mm and above diameter shall be made of cast iron close end body, cast iron epoxy coated disc, Nitrile Seat and SS 410 Stem with Teflon bush. Valves up to 150mm NB shall be with detachable hand lever operation whereas valves above 150 mm NB shall have worm gear operation.

These valves shall be installed in condenser / chilled water lines, make up / drain water piping lines. All valves shall be supplied with factory test reports and the manufacturer must have test facilities at their works.

12 NON-RETURN VALVE (DUAL PLATE CHECK VALVES)

The dual plate check valves shall be used for horizontal / vertical run of pipes & shall conform to PN 16 rating .The valve design shall confirm to API 594 and tested as per ANSI SERIES.

The valves shall have cast iron body, and SS 410 plates, SS 410 Shaft & Nitrile Seat. All valves shall be supplied with factory test reports and the manufacturer must have test facilities at their works.

13 Y-STRAINER & POT STRAINER(PN-16)

The Y-strainer shall be fabricated out of MS 'C' class pipe two size higher than that of strainer pipe size. Flanges as per BS 10 shall be provided at inlet & outlet of connections. The body shall be pressure tested at 16 Kg/Sq. cm and shall be hot dip galvanized. Permanent magnet shall be provided in the body of the strainer to arrest MS particles. Filter element shall be of nonmagnetic 20 gauge SS sheet with 3 mm perforation. Strainer shall be provided at inlet of each AHU & chilled water pumps,

Pot Strainer body shall be fabricated out of MS plate IS 226. Thickness of sheet shall be as per size of the strainer chamfered pipes with flanges shall be provided at inlet / outlet connections of the strainer. The tangential entry of water shall create a centrifugal action and due to velocity shall separate sediments and deposit on the inner surface of filter element and at bottom of the Strainer. Butterfly valves shall be provided at inlet/ outlet connections as shown in drawing and included in BOQ. The strainer body shall have two separate chambers properly sealed to avoid mixing of filtered and unfiltered water. A powerful magnet shall be provided in the body to arrest MS particles. Filter element of Pot Strainer shall be of non magnetic 18 gauge SS sheet properly reinforced to avoid damage of the element. A cone with sufficiently large drain pipe with butterfly valve shall be provided at the bottom chamber to flush-out foreign particles. This arrangement shall avoid frequent opening of Pot Strainer for cleaning of filter element. Gauge connection shall be provided at inlet and out let connection.

A set of MS flanges with tongue and groove arrangement and neoprene rubber gasket shall be provided on the top cover and Pot Strainer flange with sufficient bolts and nuts to make the joint water tight. Bearing loaded lope cover lifting and swinging arrangement shall be provided. The pot strainer body shall be properly de-rusted and epoxy coated from inside and outside. Manufacturers Test Certificate shall be provided with each Pot Strainer.

Size of various Pot Strainer, Filter Element and Thickness of MS sheet shall be as under.

Pipe Size (mm)	Pot Dia (mm)	Pot HT (mm)	Element Dia. (mm)	Element HT (mm)	MS Plate Thickness (mm)
50	300	400	200	240	6
80	350	450	250	250	6
100	450	500	300	280	6
125	500	600	330	340	8
150	540	700	360	390	8
200	610	815	400	470	8
250	800	955	550	510	8

The Y-Strainer & Pot Strainer confirming to SSPL 107 & SSPL 106 shall have cast iron body and factory tested at works at 16 Kg/sq. cm pressure. The screen shall be made out of 3 mm perforated stainless steel sheet. It should be easily removable when required to be cleaned. Isolating butterfly valves at either end of the pot strainer shall be provided.

14 BALANCING VALVES

The balancing control and shut off valves with built in pressure drop measuring facility shall be provided in return water lines for air-handling units, chillers, condensers as given in the tender drawings.

The valves of sizes 32 mm to 65mm dia. shall be of gun metal / cast iron construction with screwed ends angular design digital hand wheel with locking facility. Whereas valves of sizes 75mm and above shall be of cast iron construction with internal parts of SS 410 and EPDM / nitrile seat with flanged ends. The test cocks should be long enough to protrude out of valve insulation.

The valves shall be designed for PN 16 and tested for the seat at 1.1 times the design pressure and 1.5 times the design pressure for the shell. All valves shall be supplied with test certificates and the manufacturer must have test facilities at their works.

15 SUPPORTS FOR PIPES

In plant room pipe shall not be supported from ceiling and shall have steel supports of adequate strength firmly fixed to the floor only.

16 LAYOUT AND SIZING OF PIPE LINES

The sizes and layout given in the drawings / bill of quantities are for guidance purpose only. The A/C Contractor shall prepare and submit detailed drawings after the award of contract to the Engineer in Charge for his approval. No work at site shall be started before final approval of drawings if given. The drawings shall indicate sizes of pipes, quantity of water flow in each length of pipe. All details of fittings, location of all valves, air vents, pipe supports etc. shall be clearly indicated in the drawings.

17 INSTALLATION OF CHILLED / CONDENSER / DRAIN / MAKE UP WATER PIPING

- a) All pipes shall be securely supported or suspended on stands, hangers, clamps etc. as required. The Air-conditioning contractor shall design all brackets, saddles, anchors, clamps etc. & shall be responsible for structural adequacy.
- b) All pipe supports shall be of steel, coated with two coats of anti-corrosive paint and finally finished with paint.
- c) The pipe spacing shall be as follows :

Dia of Pipe	Spacing between supports
Up to 25mm	1.5 mt
30 mm to 50 mm	2.0 mt
65 mm to 75 mm	2.5 mt
100 mm to 125 mm	3.0 mt
150 mm	3.5 mt
200 mm & above	4.0 mt

- d) The vertical rises shall run parallel to walls and should be straight to wall duly checked with plumb line.
- e) In case pipes with/ without insulation while passing through the wall / slab, shall be provided with sleeve 50mm higher in size than the pipe with / without insulation.

- f) Wherever insulated pipes are running, it should be supported in such a way that no undue pressure is exerted on the insulated pipe.
- g) The expansion-joints or expansion-loops shall be provided to take care of the expansion and contraction in pipes due to temperature rises.

EXPANSION TANK (OPEN TYPE)

Expansion tank of the size 1Mtr. x 1Mtr. x 1Mtr. shall be provided as shown in hvac drawings encled. The bottom of the tank shall be at least 500mm above the highest point of the system MS tanks may be provided unless otherwise stated. Tanks shall be insulated as per mentioned in **SEC- 11** and shall be complete with float valves, siphon scaled gauge, and drain, over-flow insulated cover and provision for make up connections without any isolating valves. Thickness of MS sheet shall be 5mm.

18 TESTING OF PIPE SYSTEM

- a) All tools, tackles, labours etc. shall be arranged by A/C Contractor.
- b) All pipes shall be tested hydraulically at 3 times the maximum operating pressure for a period of 48 hours. The test pressure should not be less than 10 Kg/sq.cm at any times. All leaks occurring during testing shall be rectified to the satisfaction of the Engineer in Charge. After repairs of leak it shall be tested again at the same pressure.
- c) In case piping is tested in parts, these sections shall be securely sealed and capped during testing.
- d) The A/C Contractor should ensure that there should be minimum vibration / noise in the chilled water / condenser water circuit due to water turbulence.

19 AIR-VENTS

Air vents for purging of air trapped in piping system shall be provided at the highest point. Globe valves of the size as indicated below shall be provided & **no additional price shall be paid.**

Pipe Size	Valve Size
Upto 100mm	25mm dia
Above 100mm to 300mm	40mm dia

20 COMMON PRESSURE GAUGES / THERMOMETERS

PRESSURE GAUGES

Common Pressure gauges of 150mm dia & of suitable range shall be provided at the following locations:

- a) Chiller / Condenser / Cooling coils of AHU - Inlets and outlets.
- b) All pumps - Suction & discharge

The water pressure gauge shall be made of stainless steel grade SS-304. All parts shall be made of copper alloy & stainless steel to prevent from corrosion. The dial plate shall be of white colour & numbers in black & in red colour for better visibility. Pressure gauge shall have a stainless steel “U” Tube of 15 mm dia & 400 mm in length both side threaded with stainless steel nut & a ball valve shall also be provided at one end of tube for protecting gauge during testing of system.

21 INDUSTRIAL TYPE THERMOMETER

Direct reading V form type thermometer mercury filled of suitable range / length shall be provided at the following locations:

- a) Condenser / Chiller / Cooling coil – Inlets and outlets in separate wells.

The V form thermometer shall be made of aluminium die casting with golden colour anodizing. The thermometer shall have a V groove in the body to protect the refill from the damages during the installation. The refill shall be filled with blue colour mercury. The thermometer shall be complete with brass well & the calibration of temperature shall be in Celsius & Fahrenheit

SECTION-16

STANDARD SPECIFICATION OF FIRE DAMPERS

100 This section deals with supply, erection and commissioning of fire dampers and box type dampers, conforming to general specification and suitable for duty selected, indicated in **Schedule of Equipment & Bill of Quantities.**

2.0 MOTORISED COMBINED SMOKE & FIRE DAMPERS - SPRING RETURN TYPE

- a) All supply air Ducts in Ceiling Suspended AHU's and Smoke exhaust Fans/ Pressurization Fans crossing shall be provided with approved make fire and smoke dampers of at least 90 minutes fire rating certified by CBRI, Roorkee as per UL555:1973.
- b) The fire damper blades & outer frame shall be formed of 1.6 mm galvanized steel sheet. The damper blade shall be pivoted on both ends using chrome plated spindles in self lubricating bushes. Stop seals shall be provided on top & bottom of the damper housing made of 16G Galvanized steel sheet. For preventing smoke leakage side seals will be provided.
In normal operating conditions damper blade shall be held in open position with the help of a 24 V operated electric actuators thereby providing maximum air passage without creating any noise or chatter.
- c) The damper shall be actuated through electric actuator. The actuator shall be energised with the help of a signal from smoke detector installed in Ceiling Suspended AHU's Connections with supply Duct and Smoke exhaust Fans/ Pressurization Fans . The fire damper shall close due to temp. rise in S. A. Ducts through the electric temp.sensor which is factory set at 165 °F
- d) Each motorized smoke cum fire damper shall have its own panel which will incorporate necessary circuit required to step down voltage available from UPS or emergency power supply to show status of the damper (open or close), to allow remote testing of damper, indication in event of damper closure due to signal from smoke sensor / temp. sensor & reset button. Additional terminal will be provided to have audio cum video signal in Central Control Room.
- e) Damper actuator shall be such that it should close the damper in the event of power failure automatically and open in the same in case of Power being restored.
- f) The fire Damper shall be mounted in fire rated wall with a duct sleeve 600 MM long. The sleeve shall be factory fitted on fire damper. The joints at sleeve end shall be slip on type. Minimum thickness of GI Sheet shall be 18G.
- g) The damper shall be installed in accordance with the installation method recommended by the manufacturer.
- h) Hinged access doors of suitable size complete with air tight gaskets shall be provided in all fire dampers & plenums.

SECTION-17**STANDARD SPECIFICATION OF AIR COOLED SPLIT AIR CONDITIONING UNITS****1 Scope:**

The scope of this section comprises of supply, erection, testing and commissioning of air-cooled split units conforming to these specifications and in accordance with the requirements of drawings and Schedule of Quantities.

2 Type:

The split units shall consist of hermetic/semi-hermetic sealed, reciprocating/scroll compressor, motor, air-cooled condenser, integral refrigerant piping and wiring, all mounted on a steel frame.

Indoor unit to be installed within building shall be housed insulated cabinet consisting of cooling coil, blower with motor, filter & insulated drain pan. The indoor units shall be hi-wall / furred-in / vertical slim line / cassette / ductable as specified in the BOQ.

3 Capacity:

The refrigeration capacity of split units shall be as shown on drawings and in Schedule of Quantities.

4 Compressor and Motor:

Compressor shall be hermetic/semi-hermetic, reciprocating/scroll, and serviceable type and shall have dual pressure stat, and an operating oil charge. The motor shall be suction gas cooled and shall be sealed against dirt and moisture. The motor shall be suitable for $415 \pm 10\%$ volts or $230 \pm 10\%$ volts, 50 Hz, ac supply.

5 Refrigerant piping and controls:

Refrigerant piping and fittings interconnecting compressor, condenser shall be all copper and valves shall be brass/gunmetal construction.

6 Casing:

The indoor & outdoor units shall be sectionalized / cabinet construction. Indoor units shall be consisting of fan section, coil section, filter section, and drain pan. Outdoor unit shall consist of condenser coil, fan & compressor. The compressor shall be placed outside in the outdoor units. Base panel shall be constructed / fabricated steel structure provided with an under frame suitably braced. Each unit shall include one place drain pan constructed of galvanized sheet steel plate. Drain pan shall extend under coil and fan sections with drain connections. Removable panels in fan and coils sections shall provide access to all internal parts.

7 Fan Motor and Drive:

Fan motor shall be suitable for $415 \pm 10\%$ volts or $230 \pm 10\%$ volts, 50 Hz, AC supply, single phase, motors shall be provided with permanent capacitor. Motors shall be specially designed for quiet operation and motor speed shall not exceed 1440 rpm.

- 11 **Painting:**
Split units shall be factory finished with durable alkyd spray enamel. Shop coats of paint that have become marred during shipment or erection shall be cleaned off with mineral spirits, then coated with enamel paint to match the finish over the adjoining shop-painted surface.
- 12 **Performance Rating:**
The unit shall be selected for the lowest operating noise level. Capacity ratings and power consumption with operating points clearly indicated shall be submitted with the tenders and verified at the time of testing and commissioning of the installation.

SECTION-18**STANDARD SPECIFICATION OF DEHUMIDIFIER****1. Type of Dehumidifier:**

The dehumidifier shall be of liquid desiccant type (lithium chloride), with refrigeration heat pump based regeneration for the dehumidification process. The dehumidifier should be capable of simultaneous sensible & latent heat removal from the air stream using the refrigeration unit energy during the dehumidification process. The unit should be capable of heating/cooling the outlet process air if required to some extent.

2. Construction:

The dehumidifier should be built in complete plastic construction outer body but rigid with distinctly separated regeneration & heat pump sections, complete with magnetic driven/sump pumps in polypropylene construction, refrigeration unit, distribution piping, strainers, blowers for process & regeneration air with motors, titanium tube-in-tube heat exchangers, media, electrical & electronic control system. The process & regeneration section should have honey comb construction cellulose/equivalent media for simultaneous sensible/latent heat transfer between the liquid desiccant & air. The liquid desiccant flow should be by gravity i.e without forced distribution.

3. Control Philosophy:

The electrical/electronic control system shall be PLC based with complete control on the components for continuous safe operation of the dehumidifier. It should be capable of collecting & transferring the data such as control parameters, alarms etc. through modern/Ethernet protocol (optional) & also capable of displaying the minimum required system parameters such as air temp & RH, On/Off status of the components & alarms.

Technical Specifications for DEHUMIDIFIERS

Technical Specifications for DEHUMIDIFIERS	
TYPE	REFRIGERATION BASED
TECHNOLOGY	LIQUID DESICANT
TYPE OF DESICANT	LITHIUM CHLORIDE
TYPE OF COMPRESSOR	SCROLL TYPE
TYPE OF HOT & COLD HEAT EXCHANGER	TITANIUM TUBE IN TUBE TYPE
SUPPLY OF AIR FLOW RANGE	500 CFM TO 3400 CFM
TYPE OF SUPPLY AIR FAN	PLUG TYPE/BELT DRIVEN CENTRIFUGAL
TYPE OF REGERATION AIR FAN	PLUG TYPE/BELT DRIVEN CENTRIFUGAL WITH 2 SPEED MOTOR
NO. OF PUMPS	2
TYPE OF PUMPS	SUMP PUMP/MAGNETIC PUMP
MOC OF CASING	ABS PLASTIC, POLYPROPELENE/POLYETHYLENE,POLYEURETHENE
TYPE OF CONSTRUCTION SOR SUMP	DOUBLE SKIN CONSTRUCTION WITH THERMAL INSULATION

SECTION-19

STANDARD SPECIFICATION OF DUST COLLECTOR

The dust collector is of pulse jet type. The particulate matter shall be sucked through the pendant and conveyed to the dust collector. The dust shall be trapped on the filter media and clean air shall be discharged to the atmosphere. The dust shall be collected in the bottom container. The dust from the filter is removed by injecting compressed from top.

Dust collector designed for:

1) 200CFM 2Nos. 2) 300CFM 5Nos 3) 400 CFM 10nos 4) 500CFM 3Nos 5) 700CFM 1nos

The dust collector is of pulse jet type. The dust collected on the outside surface of the filter is removed by injecting compressed air from top of the filter. This is regulated by means of a timer and solenoid operated diaphragm valve. The dust is collected in the bottom hopper.

DATA SHEET OF DUST COLLECTOR FOR 400-500CFM

Type	: Pulse Jet Dust collector
Model /Qty	: PET-10
Capacity	: 500cfm
No. of filters	: 01no.
Filter material	: Spun bond polyester with anti-adhesive finish.
Filter efficiency	: 99% down to 5micron.
Total filtration area	: 10m ²
Type of cleaning	: On-line.

Compressed air required for cleaning: 4-6 cfm.
free of oil & moisture at 4-5kg/cm².

Flange to flange pressure drop : 100 - 125 mmwc.

Appx overall size mm: 750 x 750mm x 2100 mm ht.

10 Construction: MS epoxy painted.

11

BLOWER DETAILS:

Capacity	: 500cfm at 300mmwc
Motor rating	: 2hp (standard induction motor).
MOC	: Casing and impeller in M.S epoxy.

Mounting : Vertically on dust collector top

DATA SHEET OF DUST COLLECTOR FOR 200-300CFM

Type : Pulse Jet Dust collector
 Model /Qty : PET-05
 Capacity : 300cfm
 No.of.filters : 01no.
 Filter material : Spun bond polyester with anti-adhesive finish.
 Filter efficiency : 99% down to 5micron.
 Total filtration area : 05m2
 Type of cleaning : On-line.

Compressed air required for cleaning: 4-6 cfm.

free of oil & moisture at 4-5kg/cm2.

Flange to flange pressure drop: 100 - 125 mmwc.

Appx overall size mm: 650 x 650mm x 2100 mm ht.

12 Construction: MS epoxy painted.

13

BLOWER DETAILS:

Capacity : 300cfm at 300mmwc
 Motor rating : 1hp (standard induction motor).
 MOC : Casing and impeller in M.S epoxy.
Mounting : Vertically on dust collector top

DATA SHEET OF DUST COLLECTOR FOR 700CFM

Type : Pulse Jet Dust collector
 Model /Qty : PET-20
 Capacity : 700cfm
 No.of.filters : 01no.
 Filter material : Spun bond polyester with anti-adhesive finish.
 Filter efficiency : 99% down to 5micron.
 Total filtration area : 16m2
 Type of cleaning : On-line.

Compressed air required for cleaning: 4-6 cfm.
Free of oil & moisture at 4-5kg/cm².

Flange to flange pressure drop : 100 - 125 mm wc.

Appx overall size mm: 850 x 850mm x 2400 mm ht.

14 Construction: MS epoxy painted.

15

BLOWER DETAILS:

Capacity : 700cfm at 300mmwc

Motor rating : 3hp (standard induction motor).

MOC : Casing and impeller in M.S epoxy.

Mounting : Vertically on dust collector top

SECTION-20**MODE OF MEASUREMENT**

The following measurement code shall apply to the Contract:

1.00 SHEET METAL WORK**1. DUCTING**

- a) The final finished sheet area in sq. mtr. shall be measured only.
- b) Vanes, splitters (VCD for main duct), flanges, access doors etc. shall not be separately measured. These shall be treated as part of duct work.
- c) Bends, Elbows, Transformation, pieces etc. shall be measured along the centre line and measured as per duct work.
- d) Canvas connections, Duct Supports, Stiffening members, frames etc. shall not be measured separately and shall form part of duct work.

2. GRILLS / DIFFUSERS / FIRE DAMPERS

All Grills / Diffusers / Fire Damper areas will be measured in terms of effective area (Neck Area). Any Extruded aluminum grill / diffusers having an area less than 0.1 sq.mt shall be accounted as 0.1 sq.mt.

3. BOX DAMPERS

- a) No separate measurement of box dampers shall be done since they form part of duct.
- b) Fresh air dampers shall be measured as effective areas only. No separate measurements for bird screen inlet / outlet louvers shall be done.

4.0 PIPING WORK

- a) The length of piping accessories & fittings shall be measured along its centre line in meters and no measurements for bends, elbows, tees etc. shall be made. All such fittings / accessories shall be treated as part of the piping work.
- b) Flanges shall not be measured, as they form part of piping work.
- c) For thermometer wells & pressure gauge sockets no measurement shall be done separately.
- d) All kinds of supports, hangers etc shall be part of piping work & no extra measurements shall be done.

- e) No additional price for installation of purge & de-scaling valves as required at site shall be paid.

5.0 INSULATION

A) Insulation of Duct

- 1. This shall be measured on the basis of bare duct surface area i.e. the area of duct insulation & area of duct shall be same.

B) Insulation of Chilled Water / Drain Water.

- i) Insulation of pipes shall be measured in terms of linear length of pipe for each size.
- ii) For insulation of bends, elbows, tees etc. it shall be measured along with the center line of insulation and shall be measured in meters.
- iii) Insulation of valves shall be separately accounted as per bill of quantities.

C) Insulation of Chiller / Expansion Tank / Suction Line

The insulation of the above equipments shall be deemed to form part of equipment and no separate measurements for insulation of such items will be accounted for.

D) Acoustic Lining of Duct & Plenum

This shall be measured on the basis of bare duct surface area i.e. the area of duct lining & area of duct shall be same.

6.0 ELECTRICAL CABLING WORK

- a) All power cables / controls cables shall be measured on linear basis in meters.
- b) No extra price shall be paid on account of end termination of cables which includes thimble, Failure, gland (Heavy Duty Double compression brass type) etc.

7.0 STRUCTURAL SUPPORTS

No extra price shall be paid on account of structural supports required for piping, ducting & cabling work.

SECTION-21**PAINTING WORK**

This section deals with painting of various equipment / material supplied under this contract. It gives basic guidance for painting as specified below:-

- a) **Application:** The original colour of all equipments like water chilling machines, air-handling units etc. which if get damaged during transportation or during installation shall be painted in original shade with the two coat of paint to give a final finish.
- b) All chilled water pipes shall be painted as per standard code of practice and arrows shall be marked to indicate direction of flow of water.

COLOUR SCHEME FOR THE EQUIPMENTS / MATERIALS

i)	Chilling M/C	---	As Per Manufacturer's Standard.
ii)	Pump-sets	---	Battle ship gray
iii)	Chilled water pipes	---	Light blue
iv)	Condenser water pipes	---	Light green
v)	Direction of flow of water	---	Black arrows
vi)	Electrical panels/sub-panel/	---	Light gray powder coated
vii)	Cable trays	---	Cadmium Plated
viii)	Supports for ducts	---	Silver

SECTION-22 **BASIS OF DESIGN**

1.0 Location

Site Location : UTTARAKHAND

2.0 Outside design conditions

DBT °C

WBT °C

Summer / Monsoon / Winter 35/30.5/5.6 28.8/27.7/3.3

3.0 Inside design conditions

DBT °C

RH

For Clean Class Areas

Summer / Monsoon 23 ±2 50% ± 5

For Unclassified Areas

Summer / Monsoon 23 ±2 Uncontrolled

4.0 Make up water requirement: 2160 LPH Soft and filtered water for makeup purposes shall be made available near the make up tank for Cooling Tower & near the expansion tank by the Client through their on agencies.

5.0 POWER SUPPLY: Stabilised three phase four wire AC supply i.e. 415 Volts ± 10 % & 50 Hz ± 5 % with double earthing shall be made available in the plant room & in each FCU ,Ceiling suspended /Floor mounted AHU, inline fans, supply and exhaust fans i.e. Tube Axial Fans by the client through their own agencies.

6.0 EXPOSED ROOF / CEILING: All exposed roof / Ceiling shall be insulated with 80 mm thick in two layers each of 40mm thick expanded polystyrene or equivalent material by client through their own agencies to get an overall heat transmission factor of 0.12 BTU/HR/SFT/°F.

7.0 The Indoor Air Quality (IAQ) will be maintained as per ASHRAE STANDARDS - 62.1 & given below in the parameters of air-conditioning areas.

8.0 PROPOSED MINIMUM AIR CHANGES:

The following minimum Air Changes (However the Air changes can be more Depending on heat loads) shall be planned in various hygiene zones:

ISO Class 7 - >50

ISO Class 8 - >30

Unclassified Controlled area - >15

Comfort & General area as per heat load

9. Special Features of Proposed HVAC System

- Perforated grille for classified & non classified areas to provide the good mixing of air .

In clean rooms

- Secondary variable pumping system along with 2 way valves for chilled water coil is proposed. This will provide power savings during part load.
- Balancing valves are proposed in each chilled water coil to ensure better water balancing in the plant.

Water cooled mono/twin screw multiple compressor chillers to get better power saving on full & part load conditions

10. Safety Features

Motorized Fire damper & smoke sensors are provided at return air & supply air duct & sensors are interlocked with fan motor.

- Since solvent is envisaged, components in flameproof construction are proposed in solvent handling area

11. Differential Pressure Concept

- Differential pressure is proposed to maintain the core process area at relatively higher pressure than surrounding area to maintain required classification and cleanliness.
- A pressure difference of min. 12.5 Pa is proposed between two clean processing rooms of different hygiene zones.

S.no	Description	Floor Area(sq.m)	Summer TR	Monsoon TR
	Based on Chilled Water System			
1	Capsule & Churan	257	42	37
2	ASVA	781	67.6	67.5
3	Chyawanprash	485	60	54
4	Raw Material	371	18	15
5	Tablet & Pills	374	85	79
	Total	2268	272	254
	Based on Air Cooled Ductable System			
1	Worker Facility	36	2	1
2	KIT	176	10	8
3	Staff Faculty	93	9	9
	Total	305	21	18
	Grand Total of Above	2677	299	278

HIGH SIDE SELECTION OF EQUIPMENT & DESIGN SCHEME:

Based on the above parameters the calculated refrigeration load is approx 272TR. It is proposed to install the 2 x 220TR (working) water cooled screw chillers with multiple compressors.

S.No	Description	Qty.
1	2x220TR Water Cooled Screw Chiller(2Working)	2
2	2# Primary. Chilled water pumps (1W+1S)	2
3	2# Sec. Chilled water pumps with VFD (1W+1S)	2
4	2# Condenser Water Pumps (1W+1S)	2
5	2# 250TR Twin Cell Cooling Tower (1Working +1 standby Only)	2

The above equipment is being installed in the plant room as shown in the drawing. The chilled water MS Class piping from chillers shall feed the chilled water to the above mentioned area except Bhasm Block KIT & staff faculty which is placed on the air cooled ductable system since these areas are far from the chilled water routing & required buried piping which shall increase the capital cost.

LOW SIDE:

It is proposed to maintain the ISO class 8 (at Rest) as per ISO 14644-1.

To maintain desired conditions of filtration, temperature, and a slight positive pressure it is suggested using following Air Handling Units. The AHU shall comprise of a fresh air section, mixing section, cooling coil section, blower section and a filter section complete with pre-filters and fine filter.

All clean class areas return air shall be picked up from Low Level Return Air Extracts in-built into the wall and fed from the ceiling perforated SS grille with terminal HEPA.

PARAMETERS & EQUIPMENT SELECTION FOR AIRCONDITIONING SYSTEM**CAPSULE & CHURAN**

S.no	Sheet No.	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Temp. deg C +2 -2	Temp. deg F	RH% ± 5	Light (W/sqft)	Occupancy	Eqpt. Load(kw)	Process Exhaust (cfm)	Min. Fresh Air	Air Change	Filtration Level	Room Pressure Pa	Adjacent Prssure	Cleanliness Grade(at rest)	Equipment Selection
		Ground Floor																		
1	1	Blending	3.8	3.3	3	12.5	23	73	50	1.5	1	2.5	0.0	1.0	30	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-01 1x 800CFM /6RD /125mm Static
2	2	Capsule Filling	2.9	5.5	3	16.0	24	73	35	1.5	5	12.7	0.0	1.0	30	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-02 1x 3000CFM /6RD /125mm Static
3	3	Quarantine	2.6	2.2	3	5.7	25	73	50	1.5	1	0.0	0.0	1.0	30	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-02 1x 3000CFM /6RD /125mm Static
4	4	Empty Capsule ,PVC Foil Store	5.6	3	3	16.8	25	73	50	1.5	2	0.0	0.0	1.0	30	0.3 Micron	35 Pa	20 Pa	100000	FM AHU-03 1x 900CFM /6RD /125mm Static
5	5	Tool Room	3.6	3.2	3	11.5	25	73	50	1.5	2	0.0	0.0	1.0	30	0.3 Micron	35 Pa	20 Pa	100000	FM AHU-04 1x 2500CFM /6RD /125mm Static
6	6	Day Store	3.3	3.3	3	10.9	25	73	50	1.5	2	2.5	0.0	1.0	30	0.3 Micron	35 Pa	20 Pa	100000	
7	7	Corridor(Capsule)	15	1.5	3	22.5	25	73	50	1.5	2	0.0	0.0	1.0	30	0.3 Micron	35 Pa	20 Pa	100000	
8	8	Blending Churan	4.1	3.7	3	15.2	26	73	50	1.5	1	2.2	0.0	1.0	30	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-05 1x 800CFM /6RD /125mm Static
9	9	Churan Filling	3.5	5.3	3	18.6	27	73	35	1.5	2	4.5	0.0	1.0	30	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-06 1x 1100CFM /6RD /125mm Static
10	10	Powder Filling	3	5.3	3	15.9	28	73	35	1.5	2	4.5	0.0	1.0	30	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-07 1x 1100CFM /6RD /125mm Static
11	11	Blister	3	4.5	3	13.5	23	73	35	1.5	2	6.0	0.0	1.0	30	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-08 1x 1300CFM /6RD

																				/125mm Static
12	12	Drying	3	1.8	3	5.4	23	73	50	1.5	1	5.0	0.0	1.0	30	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-09 1x 2700CFM /6RD
13	13	Corridor(Blending Churan)	20	1.5	3	30.0	23	73	50	1.5	2	0.0	0.0	1.0	30	0.3 Micron	35 Pa	20 Pa	100000	/125mm Static
14	14	Day Store near Blending Churan	20	1.5	3	30.0	23	73	50	1.5	2	2.5	0.0	1.0	30	0.3 Micron	35 Pa	20 Pa	100000	FM AHU-10 1x 1800CFM /6RD /125mm Static
15	15	Corridor near Powder Filling	4.5	2.1	3	9.5	23	73	50	1.5	2	0.0	0.0	1.0	30	0.3 Micron	35 Pa	20 Pa	100000	
16	16	IPQC	3	3	3	9.0	23	73	50	1.5	2	2.5	0.0	1.0	30	0.3 Micron	35 Pa	20 Pa	100000	
17	17	Packing Hall	9.8	8.4	3	82.3	23	73	50	1.5	18	16.0	0.0	1.0	30	5.0 Micron	0 Pa	0 Pa	Comfort	FM AHU-11 1x 5000CFM /6RD /65mm Static
18	18	Capsule Powder Quarantine	3.6	3.1	3	11.2	23	73	50	1.5	2	0.0	0.0	1.0	30	5.0 Micron	0 Pa	0 Pa	Comfort	
		Total				336					51	61								

CHYWANPRASH

Sheet No.	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Temp. deg C \pm 2	Floor Area(sqft)	RH% \pm 5	Light (W/sqft)	Occupancy	Eqpt. Load(kw)	Process Exhaust (cfm)	Min. Fresh Air Change	Filtration Level	Room Pressure Pa	Adjacent Pressure	Cleanliness Grade(at rest)	Equipment Selection
	Ground Floor																	
1	Production Office	5.6	4.6	3	25.8	23	277	50	1.5	2	0.6	0.0	1	5.0 Micron	0 Pa	0 Pa	Comfort	FM AHU-01 1x 3000CFM /6RD with Mixing Box/50 mm static
2	Production Office	5.6	4.6	3	25.8	23	277	50	1.5	2	0.6	0.0	1	5.0 Micron	0 Pa	0 Pa	Comfort	
3	Quarantine Finish Good Store	5	9.4	3	47.0	23	506	50	1.5	4	2.2	0.0	1	5.0 Micron	0 Pa	0 Pa	Comfort	
4	PVC Foil Store	3.3	3	3	9.9	23	107	50	1.5	2	2.2	0.0	1	5.0 Micron	0 Pa	0 Pa	Comfort	

5	Chyawanprash Quarantine	5	9.4	3	47.0	23	506	50	1.5	1	2.2	0.0	1	5.0 Micron	0 Pa	0 Pa	Comfort	FM AHU-02 1x 5000CFM /6RD with Mixing Box/50 mm static
6	Chyawanprash Packing	12	9.4	3	109	23	1173	50	1.5	20	11.9	0.0	1	5.0 Micron	0 Pa	0 Pa	Comfort	
7	CHY. Filling	5.1	4.6	3	23.5	23	252	50	1.5	2	4.5	0.0	1	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-03 1x 1300CFM /6RD with Mixing Box /125mm static
8	CHY. Filling	5.1	4.6	3	23.5	23	252	50	1.5	2	4.5	0.0	1	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-04 1x 1300CFM /6RD with Mixing Box /125mm static
8	Corridor /IPQC /Airlock	9.4	1.8	3	16.9	23	182	50	1.5	2	1.0	0.0	1	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-05 1x 900CFM /6RD with Mixing Box /125mm static
9	Chyawanprash Storage	6.1	4.6	3	28.1	23	302	50	1.5	1	4.5	0.0	1	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-06 1x8400CFM /6RD with Mixing Box /125mm static
10	CHY Process & Manufacture	9.5	9.4	3	89.3	23	1208	50	1.5	5	16.4	0.0	1	0.3 Micron	20 Pa	35 Pa	100000	
11	Day Store	6.1	3	3	18.3	23	194	50	1.5	1	0.4	0	1	0.3 Micron	20 Pa	35 Pa	100000	
12	Avlah Washing	6.1	6.3	3	38.4	23	407	50	1.5	4	4.5	1700	1	0.3 Micron	20 Pa	35 Pa	100000	FM AHU-07 1x 3700CFM /6RD with Mixing Box /125mm static
	Total				502		5643			48	55							

RAW MATERIAL

S.no	Sheet No.	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Occupancy	Eqpt. Load(kw)	Process Exhaust (cfm)	Min. Fresh Air Change	Fresh air cfm	Floor Below considered	Floor Above considered	Air Change	Filtration Level	Room Pressure Pa	Adjacent Prssure	Cleanliness Grade(at rest)	Equipment Selection
		Ground Floor																	
1	1	Dispensing	6.2	8.6	3	53.3	1	1.1	0.0	1	94	Earth	Non A/C	60	0.3 Micron	15 Pa	25 Pa	10000	FM AHU-01 1x 6400CFM /6RD with Mixing Box/125mm static
2	2	Air Lock-01	2.2	1.5	3	3.3	1	0.1	0.0	1	6	Earth	Non A/C	60	0.3 Micron	25 Pa	15 Pa	10000	
3	3	Air Lock-02	2.2	1.5	3	3.3	1	0.1	0.0	1	200	Earth	Non A/C	25	0.3 Micron	10 Pa	25 Pa	100000	
4	4	Air Lock-03	2.2	1.5	3	3.3	1	0.1	0.0	1	6	Earth	Non A/C	20	0.3 Micron	15 Pa	10 Pa	100000	
5	5	Air Lock-04	2.2	1.5	3	3.3	1	0.1	0.0	1	6	Earth	Non A/C	20	0.3 Micron	15 Pa	10 Pa	100000	
6	6	Sampling	3	3.7	3	11.1	2	0.2	0.0	1	20	Earth	Non A/C	30	0.3 Micron	15 Pa	25 Pa	100000	FM AHU-02 1x 1000CFM /6RD with Mixing Box /125mm static
7	7	Air Lock-01	2.3	1.8	3	4.1	1	0.1	0.0	1	7	Earth	Non A/C	25	0.3 Micron	25 Pa	15 Pa	100000	
8	8	Air Lock-02	2.3	1.7	3	3.9	1	0.1	0.0	1	7	Earth	Non A/C	25	0.3 Micron	10 Pa	5 Pa	100000	
8	9	Unani Block	15	19	3	285	20	6.1	0.0	1	503	Earth	Non A/C	0	5.0 Micron	0 Pa	0 Pa	Comfort	FM AHU-03 1x 4500CFM /6RD with Mixing Box/50 mm static
		Total				371		8											

KIT																Equipment Selection
S.no	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Light (W/sqft)	Occupancy	Eqpt. Load(kw)	Process Exhaust (cfm)	Min. Fresh Air Change	Fresh air cfm	Floor Below considered	Floor Above considered	Air Change	Cleanliness Grade(at rest)	
	Ground Floor															
1	KIT	16	11	14	176	1.5	20	3.8	0.0	1	435	A/C	Non A/C	0	Comfort	8x2TR /800 CFM Split Units
Total					176			4								

Worker facility																Equipment Selection
S.no	Sheet No.	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Occupancy	Eqpt. Load(kw)	Min. Fresh Air Change	Floor Below considered	Floor Above considered	Air Change	Filtration Level	Cleanliness Grade(at rest)		
		Ground Floor														
1	1	Sick Room	6	6	3	36	3	0.8	1	Earth	Non A/C	0	0 Micron	Comfort		2TR Split
Total						36		1								

Staff Faculty																			
S.no	Sheet No.	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Floor Area(sqft)	Temp. deg C \pm 2	RH% \pm 5	Light (W/sqft)	Occupancy	Eqpt. Load(kw)	Process Exhaust (cfm)	Min. Fresh Air Change	Fresh air cfm	Floor Below considered	Floor Above considered	Cleanliness Grade(at rest)	Equipment Selection
		Ground Floor																	
1	1	Conference Hall	10.9	5.4	3	58.9	592	23	50	1.5	36	5.0	0.0	1	216	Earth	Non A/C	COMFORT	1x5.5TR /2200CFM Ductable units
2	1	Staff Dining	6.3	5.4	3	34.0	414	23	50	1.5	28	2.0	0.0	1	165	Earth	Non A/C	COMFORT	2x2TR /800CFM Split units
		Total				93	1006												

TABLET & PILLS																			
Sheet No.	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Temp. deg C \pm 2	RH% \pm 5	Light (W/sqft)	Occupancy	Eqpt. Load(kw)	Process Exhaust (cfm)	Min. Fresh Air Change	Air Change	Filtration Level	Room Pressure Pa	Adjacent Prssure	Cleanliness Grade(at rest)	S.A CFM ISO CLASS 8 ACPH Based	Equipment Selection
	Ground Floor																		
1	Blending -01	3.6	3	3	10.8	23	50	1.5	1	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	FM AHU-01 1x 1800CFM /6RD with Mixing Box/125mm static
2	Blending Quarantine	3	3	3	9.0	23	50	1.5	1	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	
3	Compression-1	3	3	3	9.0	23	50	1.5	1	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	FM AHU-02 1x 800CFM /6RD with Mixing Box /125mm static
4	Compression-2	3	3	3	9.0	23	50	1.5	1	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	FM AHU-03 1x 900CFM /6RD with Mixing Box /125mm static
5	Compression-3	3	3	3	9.0	23	50	1.5	1	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	FM AHU-04 1x 900CFM /6RD with Mixing Box /125mm static
6	Compression-4	3	3	3	9.0	23	50	1.5	1	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	FM AHU-05 1x 900CFM /6RD with Mixing Box /125mm static
7	Compression-5	3	3	3	9.0	23	50	1.5	1	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	FM AHU-06 1x 1500CFM /6RD with Mixing Box /125mm static
8	Visual Inspection	3.6	3	3	10.8	23	50	1.5	1	1.5	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	
9	Solution Preparation	3.6	3	3	10.8	23	50	1.5	1	4.5	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	FM AHU-07 1x 3800CFM /6RD with

10	Solvent Storage	3.6	3	3	10.8	23	50	1.5	3	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	Mixing Box /125mm static
11	Coating Quarantine	3.6	3	3	10.8	23	50	1.5	3	6.0	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	
	Coating -01	3.6	3	3	10.8	23	50	1.5	3	2.2	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	
12	Blending-2	6.2	4	3	24.8	23	50	1.5	1	3.7	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	1313	FM AHU-08 1x 1900CFM /6RD with Mixing Box /125mm static
13	Blending Quarantine-02	3.6	3	3	10.8	23	50	1.5	1	0.2	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	
14	Pill Fill 2	3	3	3	9.0	23	50	1.5	2	2.2	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	FM AHU-09 1x 1100CFM /6RD with Mixing Box /125mm static
15	Pill Fill 1	3	3	3	9.0	23	50	1.5	2	2.2	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	
16	Blister	3	3	3	9.0	23	50	1.5	2	7.5	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	476	FM AHU-10 1x 1600CFM /6RD with Mixing Box /125mm static
17	Blister	3.6	3	3	10.8	23	50	1.5	2	7.5	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	FM AHU-11 1x 1600CFM /6RD with Mixing Box
18	Blister	3.6	3	3	10.8	23	50	1.5	2	7.5	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	FM AHU-12 1x 1600CFM /6RD with Mixing Box /125mm static
19	Blister	3.6	3	3	10.8	23	50	1.5	2	7.5	0.0	1	30	0.3 Micron	20 Pa	35 Pa	100000	572	FM AHU-13 1x 1600CFM /6RD with Mixing Box /125mm static

20	Secondary Packing Hall-01	14.2	8.4	3	119.3	23	50	1.5	32	29.8	0.0	1	30	5.0 Micron	20 Pa	35 Pa	Comfort	6315	FM AHU-14 1x 7500CFM /6RD with Mixing Box /65mm static
21	Secondary Packing Hall-02	6.2	8.4	3	52.1	23	50	1.5	16	11.9	0.0	1	30	5.0 Micron	20 Pa	35 Pa	Comfort	2757	FM AHU-15 1x 3000CFM /6RD with Mixing Box /65mm static
	Total				385				82	124									

PARAMETERS & EQUIPMENT SELECTION FOR FORCED DRAFT VENTILATION SYSTEM:-

Capsule & Churan Area																	
Sno	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Area SFT	Effective HT FT	Volume CFT	Air Change Per Hour	Calculated CFM	Installed Fresh Air CFM	Exhaust Air CFM	Application	Type	Filtration level	Fan Capacity	
3	Washing	3	1.7	3	5.1	55	9.84	540	35	315		300	Exhaust Air	FDV	---	1x700CFM Exhaust Air Unit with 50 mm static	
4	Washing	2	3.1	3	6.2	67	9.84	656	35	383		400	Exhaust Air	FDV	---		
	Total of Above				32	342				1965	1400	2000					

Chyawanprash																
MECHANICAL VENTILATION SUMMARY																
Sno	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Area SFT	Effective HT FT	Volume CFT	Air Change Per Hour	Calculated CFM	Installed Fresh Air CFM	Installed Exhaust Air CFM	Application	Type	Filtration level	Fan Capacity
1	Day Store Packing Material	6	6	3	36	387	9.84	3812	34	2160	2200	1900	Fresh /Exhaust Air	FDV	5 Micron	1x2200CFM Fresh Air /65mm static & 1x1900CFM Exhaust Air Units /50mm static
3	Corridor	9.4	2	3	18.8	202	9.84	1991	35	1161	1200	1100	Fresh /Exhaust Air	FDV	5 Micron	Connected to Secondary Corridor
4	Container Washing	4.6	6.1	3	28.1	302	9.84	2971	35	1733	1800	1600	Fresh /Exhaust Air	FDV	0.3 Micron	1x3200CFM Fresh Air /125mm static & 1x4600CFM Exhaust Air Units/50mm static
5	Decarton	4.9	4.6	3	22.5	243	9.84	2386	35	1392	1400	1200	Fresh /Exhaust Air	FDV	0.3 Micron	
6	Avalah Washing	6.1	6.3	3	38.4	414	9.84	4069	35	2374	0	1800	Exhaust Air	FDV	0.3 Micron	
	Total of Above					1160				6660	4400	5700				

Worker facility																
MECHANICAL VENTILATION SUMMARY																
Sno	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Area SFT	Effective HT FT	Volume CFT	ACPH	Calculated CFM	Installed Fresh Air CFM	Installed Exhaust Air CFM	Application	Type	Filtration level	Fan Capacity
1	Training Room	6	6	3	36.0	387	9.84	3812	15	953	1000	900	Fresh /Exhaust Air	FDV	5 Micron	1x1000CFM Fresh Air &1x900CFM Exhaust Air Units
2	Staff Dining	11	7.5	3	84.8	912	9.84	8973	15	2243	2300	2000	Fresh /Exhaust Air	FDV	5 Micron	1x2300CFM Fresh Air &1x2000CFM Exhaust Air Units
3	Male & Female Wash Room	12	3.6	3	41.4	445	9.84	4383	15	1096	1100	1000	Exhaust Air		---	2x1200CFM Exhaust air Units(1W+1s)
4	Gents	4.5	9.7	3	43.7	470	9.84	4622	20	1541	1600	1400	Fresh /Exhaust Air	FDV	5 Micron	1x5800CFM Fresh Air &1x5100CFM Exhaust Air Units
5	Ladies	3.2	9.7	3	31	334	9.84	3286	20	1095	1100	1000	Fresh /Exhaust Air	FDV	5 Micron	

6	Staff	2.7	9.7	3	26.2	282	9.84	2773	20	924	1000	900	Fresh /Exhaust Air	FDV	5 Micron	
7	Secondary Change rooms	12	5	3	58.5	629	9.84	6194	20	2065	2100	1800	Fresh /Exhaust Air	FDV	5Micron	
	Total of Above					3460				9917	10200	9000				

Raw Material															
MECHANICAL VENTILATION SUMMARY															
Sno	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Effective HT FT	Volume CFT	Air Change Per Hour	Calculated CFM	Installed Fresh Air CFM	Installed Exhaust Air CFM	Application	Type	Filtration level	Fan Capacity
1	Raw Material Receiving Way	14	10	6	140	20	29646	30	14823	14900	12700	Fresh /Exhaust Air	FDV	5Micron	1x14900CFM Fresh Air /65mm static &1x12700CFM Exhaust Air Units /50 mm static
2	Quarantine Store	8.4	8.5	6	71	20	23598	30	11799	11800	10100	Fresh /Exhaust Air	FDV	5Micron	1x11800CFM Fresh Air /65mm static &1x10100CFM Exhaust Air Units /50 mm static

3	Herbs Washing & Drying	10	19	6	185	20	39175	30	19588	19600	16700	Fresh /Exhaust Air	FDV	5Micron	1x19600CFM Fresh Air /65mm static &1x16700CFM Exhaust Air Units /50 mm static
4	Herbal Store -01	15	8.3	6	126	20	25411	30	12705	12800	10900	Fresh /Exhaust Air	FDV	5Micron	1x12800CFM Fresh Air /65mm static &1x10900CFM Exhaust Air Units /50 mm static
5	Herbal Store -02	15	7	6	107	20	22234	30	11117	11200	9600	Fresh /Exhaust Air	FDV	5Micron	1x11200CFM Fresh Air /65mm static &1x9600CFM Exhaust Air Units /50 mm static
6	Pulverization	13	13	6	158	20	33352	30	16676	16700	14200	Fresh /Exhaust Air	FDV	5Micron	1x16700CFM Fresh Air /65mm static& 1x14200CFM Exhaust Air Units /50 mm static
7	Pulverization	13	13	6	159	20	33352	30	16676	16700	14200	Fresh /Exhaust Air	FDV	5Micron	1x16700CFM Fresh Air /65mm static &1x14200CFM Exhaust Air Units /50 mm static
8	Dispensing Quarantine	6	12	6	70	20	13976	30	6988	7000	6000	Fresh /Exhaust Air	FDV	5Micron	1x7000CFM Fresh Air /65mm static &1x6000CFM Exhaust Air Units /50 mm static
9	Storage	29	15	6	435	20	105878	30	52939	53000	45100	Fresh /Exhaust Air	FDV	5Micron	3x18000CFM Fresh Air /65mm static &3x15000CFM Exhaust Air Units /50 mm static

10	Corridors	221	3	6	663	20	140818	30	70409	70500	60000	Fresh /Exhaust Air	FDV	5Micron	4x18000CFM Fresh Air /65mm static &4x15000CFM Exhaust Air Units /50 mm static
	Total of Above								233720	234200					

Staff Faculty																
Sno	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Area SFT	Effective HT FT	Volume CFT	Air Change Per Hour	Calculated CFM	Installed Fresh Air CFM	Installed Exhaust Air CFM	Application	Type	Filtration level	Fan Capacity
1	Gents Change Room	1.9	2.7	3	5.1	55	10	543	30	272	300	300	Fresh /Exhaust Air	FDV	5Micro n	1x1200CFM Fresh Air &1x1000CFM Exhaust Air Units
2	Ladies Change Room	2	2.7	3	5.4	58	10	572	30	286	300	300	Fresh /Exhaust Air	FDV	5Micro n	
3	Primary Change Room	4.1	2.5	3	10.3	110	10	1085	30	543	600	600	Fresh /Exhaust Air	FDV	5Micro n	
	Total of Above				21	223.6				1100						

Tablet & Pills															
Sno	Description	Length Mt	Width Mt	Height mt	Floor Area(sm)	Effective HT F T	Volume CFT	Air Change Per Hour	Calculated CFM	Installed Fresh Air CFM	Installed Exhaust Air CFM	Application	Type	Filtration level	Fan Capacity
1	Corridor near Compression	28	2.2	3	61.6	9.84	6522	35	3805	3900	3400	Fresh / Exhaust Air	FDV	0.3 Micron	1x4000CFM Fresh Air/125mm static &1x3500CFM Exhaust Air Units /50 mm static
2	Corridor near Pill Fill	44	2.2	3	96.8	9.84	10249	35	5979	6000	5100	Fresh / Exhaust Air	FDV	0.3 Micron	1x6000CFM Fresh Air /125mm static &1x5000CFM Exhaust Air Units /50 mm static
3	Corridor near Packing	12	3	3	36.0	9.84	3812	35	2223	2300	2000	Fresh / Exhaust Air	FDV	0.3 Micron	1x2300CFM Fresh Air /125mm static &1x2000CFM Exhaust Air Units /50 mm static
4	Granulation-01	10	8.5	3	85.0	9.84	9000	35	5250	5300	4600	Fresh / Exhaust Air	FDV	0.3 Micron	1x7000CFM Fresh Air/125mm static &1x6300CFM Exhaust Air Units/50 mm static
5	Equipment Washing	2.9	3	3	8.7	9.84	921	35	537	600	600	Fresh / Exhaust Air	FDV	0.3 Micron	
6	Paste prepration	2.9	2.4	3	7.0	9.84	737	35	430	500	500	Fresh / Exhaust Air	FDV	0.3 Micron	
7	Day Store	2.9	2.8	3	8.1	9.84	860	35	502	600	600	Fresh / Exhaust Air	FDV	0.3 Micron	
8	Granulation-02	10	12	3	117	9.84	12388	35	7226	7300	6300	Fresh / Exhaust Air	FDV	0.3 Micron	1x12000CFM Fresh Air /125mm static &1x10500CFM Exhaust Air Units /50 mm static
9	Tablet Process	6	7.4	3	44.4	9.84	4701	35	2742	2800	2400	Fresh / Exhaust Air	FDV	0.3 Micron	

10	Equipment Washing	2.9	3	3	8.7	9.84	921	35	537	600	600	Fresh / Exhaust Air	FDV	0.3 Micron	
11	Paste preparation	2.9	2.4	3	7.0	9.84	737	35	430	500	500	Fresh / Exhaust Air	FDV	0.3 Micron	
12	Day Store	2.9	2.8	3	8.1	9.84	860	35	502	600	600	Fresh / Exhaust Air	FDV	0.3 Micron	
13	Tablet Quarantine	4.8	3	3	14.4	9.84	1525	35	889	900	800	Fresh / Exhaust Air	FDV	0.3 Micron	1x2700CFM Fresh Air /125mm static & 1x3500CFM Exhaust Air Units /50 mm static
13	IPQC	3	3	3	9.0	9.84	953	35	556	600	600	Fresh / Exhaust Air	FDV	0.3 Micron	
13	Tool Room	3	3	3	9.0	9.84	953	35	556	600	600	Exhaust Air	FDV	0.3 Micron	
13	Tablet Quarantine	3	3	3	9.0	9.84	953	35	556	600	600	Fresh / Exhaust Air	FDV	0.3 Micron	
13	Solvent Storage	3.6	3	3	10.8	9.84	1143	35	667		600	Exhaust Air	FDV	0.3 Micron	
	Wash	2.2	2.2	3	4.8	9.84	512	35	299		300	Exhaust Air	FDV	0.3 Micron	
	Total of Above				503				31052	31900	28000				

SECONDARY CORRIDOR AREA													
Sl. no	Description	Floor Area(sm)	Area SFT	Effective HT FT	Volume CFT	Air Change Per Hour	Calculated CFM	Installed Fresh Air CFM	Installed Exhaust Air CFM	Application	Type	Filtration level	Fan Capacity
1	Corridor-1	400	430 4	10	42351	30	21176	21200	18100	Fresh /Exhaust Air	FDV	5 Micro n	2x10500 CFM for Fresh Air 65mm static & 2x9000 CFM for Exhaust Air 50 mm static
2	Corridor-2	110	118 4	10	11647	30	5823	5900	5100	Fresh /Exhaust Air	FDV	5 Micro n	1x6000 CFM for Fresh Air 65mm static & 1x5000 CFM for Exhaust Air 50 mm static
3	Corridor-3	280	301 3	10	29646	30	14823	14900	12700	Fresh /Exhaust Air	FDV	5 Micro n	1x15000 CFM for Fresh Air 65mm static& 1x13000 CFM for Exhaust Air 50 mm static
	Total of Above	790	850 0				41822	42000	35900				

SECTION-23
SCHEDULE OF EQUIPMENT (PROPOSED)

1.00 The capacity/rating of various equipments in this contract are given for guidance only. The AC contractor shall check in detail the design parameters against selection of equipment. The AC contractor shall be responsible for maintaining the desired inside conditions with the equipments selected & offered by him and shall not deprive him of the responsibility if selection of equipment is not thoroughly checked. In case of shortfall the AC contractor shall replace / modify equipment for achieving desired parameter without any extra cost to owner / employer. The contractor would be bound to replace the equipment / equipments selected by him if design condition is not achieved by the AC System offered & installed by him.

2.0 ROTARY SCREW WATER COOLED WATER CHILLING MACHINE WITH TWIN COMPRESSORS

COMRESSOR

a) Capacity in TR at Operating Conditions	220TR (Actual)
b) Type of compressor	Rotary Screw (Semi-hermetic/ hermetic)
c) Refrigerant	R-134-A
d) Compressor Motor KW	to suit the above duty.
e) Type of Motor	Semi-hermetic/ hermetic
f) No. of machines	02 Nos.(1W+1S)
g) IKW / TR (Maximum)	0.67
h) Microprocessor Based control panel	YES
i) Test Bed facilities at works for computing the capacity of chilling m/c at full load & part load	YES

3.0 CONDENSER

a) Water flow LPM	3326
b) Entering water temperature °C.	32.22
c) Leaving water temperature °C.	36.39
d) Fouling Factor FPS	0.001
e) Water velocity max. mt/sec.	2.5
f) Pressure drop max. mt.	6.0

4.0 EVAPORATOR (FLOODED)

a) Type of chiller	Shell & Tube
b) Water flow LPM	1995
c) Entering water Temperature °C.	12.78
d) Leaving water Temperature °C.	6.66
e) Fouling factor FPS	0.0005
f) Pressure drop max. Mt.	5.5

5.0 CONDENSER WATER PUMP SETS

a) No. of Pump Sets	02
b) Stand by	01 inclusive in above qty
c) Capacity of each pump in LPM	3326
d) Net operating head Mts	20.0
e) RPM	1500
f) Motor HP	20
g) Type of Motor	T.E.F.C. Sq. Cage Induction Motor
h) Type of starter (To be included in electrical works)	Star Delta
i) Type of impeller	Bronze

j) Type of Pump	End Suction
k) Type of Seal	Mechanical Seal

PRIMARY CHILLED WATER PUMP SETS

a) No. of Pump Sets	02
b) Stand by	01 inclusive in above qty
c) Capacity of each pump in LPM	1995
d) Net operating head Mts	15
e) RPM	1500
f) Motor HP	10
g) Type of Motor	T.E.F.C. Sq. Cage Induction Motor
h) Type of starter (To be included in electrical works)	Star Delta
i) Type of impeller	Bronze
j) Type of Pump	End Suction
k) Type of Seal	Mechanical Seal

VARIABLE SPEED SECONDARY CHILLED WATER PUMP SETS

a) No. of Pump Sets	02
b) Stand by	01 inclusive in above qty
c) Capacity of each pump in LPM	1995
d) Net operating head Mts	40
e) RPM	1500
f) Motor HP	20
g) Type of Motor	T.E.F.C. Sq. Cage Induction Motor
h) Type of starter (To be included in Electrical works)	-----Star Delta-----

- | | |
|---------------------|--------------------------|
| i) Type of impeller | -----Bronze----- |
| j) Type of Pump | ----- End suction----- |
| k) Type of Seal | -----Mechanical Seal---- |

7.0 VARIABLE SPEED PUMPING SYSTEM

- | | | |
|----|--|-------------|
| a) | No. of Adjustable Frequency Drives
Suitably interfaced with other system
Components Hand / Auto macro
Designed for pumping system | 02 |
| b) | No. of Pump Logic Controller | 01 |
| c) | Pumping Software duly downloaded
DP Sensor / Transmitter | 1 Lot
02 |
| e) | Interfacing amongst all components
& compatibility of I/O signals | Yes |

8.0 COOLING TOWER

- | | | |
|----|---|---|
| a) | Capacity at operating WB
Temp Deg. C | 250 TR |
| b) | No. of Cooling Tower | 02 (1W+1S) |
| c) | Type of cooling Tower | FRP Induced Draft |
| d) | Entering water temp Deg. C | 36.39 |
| e) | Leaving water Temp Deg.C | 32.22 |
| f) | Water flow LPM | 3326 (Minimum) |
| g) | Type of fan | Aerofoil Propeller |
| h) | Material of fans blade | FRP |
| i) | Type of motor | Weather proof |
| j) | Type of starter (To be included in
electrical works) | Star Delta Starter |
| k) | Colour of CT | As per the approval of the Engineer in Charge |

9.0 MISCELLANEOUS

- | | |
|---------------------------------|----------------------|
| a) Water Pipes | MS |
| b) Class | C |
| c) Refrigerant Piping | As per manufacturer |
| d) Material for Pipe Insulation | Expanded polystyrene |
| e) Density | 20 Kg / CMT(minimum) |
| f) Drain Water Pipes | GI |
| g) Class (Drain Water Pipe) | B |

10 G.S.S. DUCTING

- | | |
|-------------------------|----------------------|
| a) Class of Galvanizing | VIII |
| b) Code of Fabrication | ISS-655 (revised) |
| c) Material of hangers | MS |
| d) Quantity of sheet | Lock forming quality |

11 EXTERNAL DUCT INSULATION

- | | |
|---|---------------------------|
| a) For external thermal
Insulation of duct | XLPE as per specification |
| b) Density | 30 Kg / M ³ |
| C) Thickness mm | 12 |

SECTION - 24**TECHNICAL DATA****(TO BE FURNISHED BY THE BIDDER IN METRIC SYSTEM ONLY)****1.00 ROTARY SCREW WATER COOLED CHILLERS**

Kindly Attach The Following.

1. Computer Selection of the Unit :
Along With Part Load Performance at
Constant Condenser Water Inlet
2. Details of safeties and protection. :
3. Detailed functions of Microprocessor:
Controller.

2.0 COMPRESSOR

- a) Manufacture Name :
- b) Model :
- c) Type of Compressor :
Hermetic/ Semi-hermetic
- d) No. of Compressor per :
Machine
- e) Nominal Capacity of :
Each Compressor in TR
- f) Nominal Capacity of :
Chilling Machine

Operating Conditions

- g) Saturated Suction :
Temperature Deg. C.
- h) Saturated Discharge :
Temperature Deg. C.
- i) Max. RPM :

- j) Mode of start :
- k) Refrigerant used :
- l) Qty. of Refrigerant used :
- m) Power consumption IKW/TR :
 - At Full Load 100 % :
 - 75 % :
 - 50 % :
 - 25 % :
- n) NPLV of the M/C :
- o) Type of capacity control :
- p) Range of capacity variation :
- q) Monitoring Devices :
- r) Type of bearings :

MOTOR (COMPRESSOR)

- a) Make of Motor :
- b) Type of Motor :
- c) Motor KW :
- d) Class of Insulation :
- e) R.P.M. :
- f) Type of starter (Star Delta or Part Winding) :
- g) Electrical characteristics
 - Voltage / Frequency :
 - Fluctuations permissible
- h) Full load current (Amp) :
- i) Starting current (Amp) :

- j) Type of Vibration :
Isolator for Rotary
Screw Water chilling
Machine recommended
by manufacturer

CONDENSER

- a) Manufacture Name :
b) Model :
c) Number of Condensers :
d) Fouling Factor MKS. :
e) Heat rejection capacity :
Kcal / hr.
f) Pressure drop Mts. :
g) Water flow rate (LPM) :
h) No. of passes :
i) Water temperature in °C :
j) Water temperature out °C :

CHILLER

- a) Manufacturer Name :
b) Model :
c) Type of chiller :
d) Water Flow LPM :
e) No. of passes :
f) Water Temperature Out °C :
g) Water Temperature In °C :

- h) Pressure Drop in Mt. of water:
- i) Cooling Capacity Kcal / Hr. :
- j) Fouling factor MKS :

3.0 OVERALL SIZE OF WATER CHILLING MACHINE

- a) Overall dimension MM :
- b) Operating Wt. Kg. :
- c) Service Clearance required :
in mm

4.0 ROTARY SCREW WATER CHILLING MACHINE

- a) Operating Conditions :
- b) Actual Capacity of water :
Chilling machine at above
Operating conditions.
- c) Compression Ratio :
- d) C. O. P. :

5.0 COOLING TOWER

- a) Make of cooling Tower :
- b) Type of cooling Tower :
- c) Model of cooling Tower :
- d) Capacity of Cooling Tower :
- e) Approach of cooling tower :
- f) Wet Bulb (Design) :
- g) Fan Motor (Type & Rating) :
- h) Fan Diameter (Each) :
- i) Fan Capacity (Each) :

- j) Material of casing & basin :
- k) Overall dimension in MM :
- l) Dry weight KG :
- m) Operating weight :
- n) Water flow rate USGPM :
- o) No. of fans :
- p) R.P.M. of Motor :
- q) Drift loss :
- r) Evaporation loss :
- s) Total Water Loss in LPH :
- t) Type of drive :

6.0 CONDENSOR WATER / CHILLED WATER PUMP SETS.

CONDENSOR PUMP SETS

- a) Make :
- b) Type :
- c) Model :
- d) Discharge (LPM) :
- e) Head (Mt) :
- f) Efficiency :
- g) Brake Horse Power :
- h) Horse power of motor :
- i) Make / Type of motor :
- j) Type of starter :

- k) Impeller Diameter (MM) :
& Material
- l) Material of Bearing & Seal :
- m) Type of Bearing / Seal :
- n) Speed (RPM) :
- o) Material of Shaft :

7.0 CHILLED WATER PUMP SETS PRIMARY SECONDARY PUMPS

- a) Make :
- b) Type :
- c) Model :
- d) Discharge (LPM) :
- e) Head (Mt) :
- f) Efficiency :
- g) Brake Horse Power :
- h) Horse power of motor :
- i) Make / Type of motor :
- j) Type of starter :
- k) Impeller Diameter (MM) :
& Material
- l) Material of Bearing/ Seal :
- m) Type of Bearing / Seal :
- n) Speed (RPM) :
- o) Material of Shaft :

8.0 VARIABLE SPEED PUMPING SYSTEM.

- a) Make :
- b) No. of Adjustable Frequency Drives :
Suitably interfaced with other system
Components. Hand / Auto macro
Designed for pumping system.
- c) Capacity of AFD :
- d) No. of Pump Logic Controller :
- e) Pumping Software duly downloaded :
- f) DP Sensor / Transmitter :
- g) Interfacing amongst all components :
& compatibility of I/O signals

9.0 CONTROLS**TWO WAY MODULATING VALVES FOR AIR HANDLERS**

- a) Make / Model of valve :
- b) Make / Model of :
Modulating motor
- c) Voltage of motor :
- d) Transformer Provided :
- e) Valve linkage, Make & :
Model
- f) Make of Pressure gauge :
- g) Make of Thermometers :

10 PIPES

- a) Make :

- b) Class :
- c) Wall Thickness mm :
- | Nominal Pipe Dia in mm | Wall Thickness of Pipe in mm |
|------------------------|------------------------------|
| 50 | : |
| 65 | : |
| 80 | : |
| 100 | : |
| 125 | : |
| 150 | : |
| 200 | : |
| 250 | : |

11 VALVES

- a) Check Valve make :
- b) Butterfly Valve make :
- c) Balancing Valve make :
- d) Y-Strainer Make :
- e) Material/Gauge/perforation of basket in Pot Strainer :

12 GRILLS / DIFFUSERS / DAMPERS

Please indicate make / material / gauge of the following:

- | | Make | Material |
|-----------------------|------|----------|
| a) Duct Dampers | : | |
| b) Grills / Diffusers | : | |

- c) Fire Dampers :
- d) Smoke & Temperature Sensor :
- e) Coating on Al in Micron :

13 DUCT INSULATION

- a) Manufactures Name :
- b) Material :
- c) Density Kg. Per Cmt :
- d) Thermal Conductivity :
Kcal / Hr. Deg. C.

14 DUCT LINING

- a) Manufactures Name :
- b) Material :
- c) Density Kg. Per Cmt :
- d) Thermal Conductivity :
Kcal / Hr. Deg. C.

15 PIPE INSULATION

- a) Manufactures Name :
- b) Material :
- c) Density Kg. Per Cmt :
- d) Thermal Conductivity :
Kcal / Hr. Deg. C.

16 ELECTRICAL ACCESSORIES

Please indicate the makes of the following.

- a) Panel Manufacturer's name :
- b) MCB
Manufacturer's name :
- c) MCCB :
- d) HRC Fuses :
- e) Rotary Switch :
- f) Starter's DOL / Star Delta :
- g) Contractor :
- h) Indicating Lights :
- i) Push Buttons :
- j) Control Cables :
- k) Power Cables :
- l) Ammeters :
- m) Voltmeters :
- n) Single Phase Preventers :
- o) Current Transformer :
- p) Bus-bar / Grade :

23.84 AIR HANDLING UNITS /FORCED DRAFT VENTILATION UNITS

AHU CAPACITY						
S.NO.						
a) Make of AHU						
b) Capacity CMH						

c) Material/Gauge (Casing Drain Pan.)						
d) Over all size LxBxH mt						
e) Type of AHU, vertical / horizontal / Ceiling Suspended						
f) Over all Weight in Kg.						
g) Type of AHU, SSAHU / DSAHU						
23.91 COOLING COIL						
a) Make						
b) Material of tube/fins						
c) No. of fins/cm						
d) No. of rows deep						
e) Dia of tubes (MM)						
f) FSECTION area(SMT)						
g) Cooling capacity (Kcal/hr)						
h) chilled water flow rate						
LPM						
i) Face velocity MPS						
j) Test pressure Kg/Sq.cm						
23.92 FILTER SECTION						
a) Make						
b) Type of filters						
c) No. of filters						
d) Size of filters						
e) Air velocity through filter FPM						
f) Efficiency of filter %						
23.93 FAN AND FAN MOTOR						
a) Make of Fan & Motor						

b) Type of fan						
c) No. of fans						
d) Width and dia of fans (MM)						
e) Type of blade						
f) Air quantity CMH.						
g) Static pressure in wg						
h) Type of balancing						
i) Brake horse power in HP						
j) Horse power of motor in HP						
k) Motor RPM						
l) Fan speed						
m) Type of Drive (Belt Driven / Direct Driven						

SECTION-24

PERFORMA OF WEEKLY PROGRESS REPORT OF SITE

1.0 CIVIL WORKS

- a) Plant room (by the Client) :
- b) Foundation of equipments (by the Client) :
- c) Pipe shafts (by the Client) :
- d) Drain traps in plant room (by the Client) :

2.0 WATER WORKS

- a) Soft and filtered water supply at expansion tank & Make up Water Tank (by the Client) :

3.0 ELECTRICAL WORK

Stablised three phase / single power supply with double earthing at the following locations (by the Client)

- a) Stablised power supply in plant room :
- b) Stablised power supply in AHU room :
- c) In all Ceiling Suspended AHU :
- d) In all Ceiling Suspended FCU :

4.0 DELIVERY OF EQUIPMENT BY AC CONTRACTOR

- a) Chilling m/c :
- b) Chilled / Condenser water pump sets :
- i) Pump sets :
- ii) Motor :

- c) Air Handling Unit :
- d) Electrical Panels
- i) Main Panel :
- ii) AHU Sub-Panels :
- e) Power & Control Cables
- f) G.S.S. Sheets
- g) Insulation Material
- h) Pipes & Valves

5.0 INSTALLATION OF EQUIPMENTS (By AC Contractor)

- a) Chilling m/c :
- b) Condenser / Chilled water pump sets :
- i) Pump sets :
- ii) Motor :
- c) Air Handling Unit :
- d) Electrical Panels
- i) Main Panel :
- ii) AHU Sub-Panels :

6.0 Fabrication & Installation of GSS Duct by AC Contractor :

7.0 Insulation & Lining of GSS Duct by AC Contractor :

8.0 Fabrication & Installation of CHW / CDW Pipes by AC Contractor :

9.0 Installation of CHW / CDW Valves by AC Contractor :

- 10.0** Insulation chilled water pipes & valves
Duct by AC Contractor :
- 11.0** Completion of erection, initial testing of plants,
Commissioning of plant, trial run of complete
AC System. (By AC Contractor)
- 12.0** Final commissioning of AC System.
- 13.0** Testing of plant
- 14.0** Handling over of plant.

SECTION -26
INSPECTION & TESTING PROCEDURE

1.0 INSPECTION PROCEDURE FOR CENTRAL AIR-CONDITIONING PLANT.

All major equipments such as Chilling machine, AHU's, Electrical Panel, etc. shall be got inspected & tested before dispatch of equipments by the Engineer in Charge at works if he so desires. All type of routine and type tests shall be carried out at the works. The Engineer shall be free to witness any or all tests if he so desires. In case the Engineer in charge or his representative is unable to witness the test at the manufacturer's works, the contractor shall furnish the manufacturers test certificate to the satisfaction of the Engineer in charge. The AC contractor shall intimate the Engineer in Charge in advance about the date of readiness of equipments for inspection & testing. The inspection procedures for testing of AC equipments are given below:-

2.0 INITIAL INSPECTION

a) CHILLING MACHINE

1. Salient features such as model no. of compressor, chiller & condenser, dimension of the machine; microprocessor panel etc shall be verified against the requirement.
2. Manufacturer's internal test certificate shall be scrutinized to check compliance with the requirement as per specification.
3. Salient features of condenser & chiller such as number of tubes, inside diameter of tubes, tube thickness & material, No. of passes, type of fins, length of condenser & chiller etc. shall be verified.

b) COOLING COILS:

1. Salient features of cooling coils such as material of tube, tube diameter, tube wall thickness, fin material & no. of fins per inch, gauge of fins & no. of rows shall be furnished and verified with reference to contract requirement.
2. Manufacturer's internal test certificate indicating results of pneumatic / hydraulic pressure test shall be scrutinized to check compliance with the requirement as per specification.

c) AIR HANDLING UNITS:

1. Salient features such as model, size, physical dimension & other details of various section, fan motor details, fan dimension etc. shall be verified against the contract requirement.

2. Manufacturer's internal test certificate for the motor and air handling units shall be furnished and scrutinized as per contract requirement.
3. Test certificate for static and dynamic balancing of the blower should be furnished.

d) PUMPS:

1. Salient features such as model and make shall be checked as per contract requirement.
2. The manufacturer's test certificate will be furnished and verified against contract requirement.

e) SWITCH ,GEAR, CONTROL GEAR , MEASURING INSTRUMENTS & POWER / CONTROL CABLES:

1. They should be of approved make. For air circuit breakers manufacturer's test certificate shall be furnished by the contractor and the same shall be verified as per contract requirement.

f) ELECTRIC MOTOR:

1. Electric motor should be of approved make. Test certificate for electric motor shall be furnished & verified as per contract.

g) PIPES & VALVES:

1. Make of pipe & valves shall be verified as per contract.
2. Wall thickness of pipes shall be verified as per contract.

h) DUCTING:

1. The GS sheet used for ducting shall be checked for physical test at site. The physical test should include the sheet thickness, bend test and galvanizing test as per relevant IS specifications.

i) THERMAL ACOUSTIC / INSULATION:

1. Physical verification for thickness and make should be as per contract before application of insulation.
2. Manufacturer's test certificate for density & thermal conductivity should be furnished.

3.0 FINAL INSPECTION

After completion of entire installation, as per specifications in all respects, the AC contractor shall demonstrate trouble free operation of the AC equipment for a period of minimum of 120 hours of running. Any defects found during this operation shall be rectified immediately before the initial test period of seven days is over. The test readings during initial test run shall be recorded in the Performa given in SECTION 26.

The initial test which has to be carried out by the contractor at his own expense & shall be as follows but not limited to:

- a) To check satisfactory functioning of all major equipments such as Rotary Screw Water Chilling m/c, electrical motors, pumps, cooling tower, switch gear, air handlers etc.
- b) To check alignments of motors.
- c) To operate chilling m/c, cooling towers, pump sets, air handlers etc. and adjust water flow in all line i.e. condenser water line, chilled water line and in the cooling coils.
- d) To check and balance air distribution system.

NOTE: All test instruments such as thermometer, psychrometer, pressure gauges, anemometer, flow meter, decibel meter or any other necessary instrument shall be arranged by the contractor at his own expense.

After initial test the plant shall be run continuously for a period of 30 days before the guarantee comes into force. In addition to the initial test as explained in this section the contractor shall also give the two continuous running test of the system during peak summer and monsoon for 3 days each of 10 hours duration when the ambient are closed to the designed conditions.

In case, the peak ambient conditions in the respective seasons are not found to be close to designed ambient conditions, the test shall be conducted on closest ambient conditions and capacity of equipments shall be computed and compared with capacities indicated in the contract. Water and power for testing and commissioning of the system shall be provided free of cost by the Department.

In case, seasonal tests are not possible to be performed by the contractor due to reasons not attributable to the contractor, then the guarantee of plant shall begin after 30 days of continuous run of plant.

4.0 CAPACITY OF PLANT

The test readings as per test reading Performa given in SECTION 26 shall be recorded & capacity of various of major equipments such as, compressor, condenser, chiller, cooling

coil, cooling tower, fan coil units, pump sets etc. shall be worked out as per computation formulas given in this section.

1. POWER CONSUMPTION / CAPACITY OF VARIOUS EQUIPMENT.

a) Compressor

$$\text{IKW. / Ton} = \frac{\text{Power input in KW}}{\text{Compressor Cap. in tons}}$$

b) Condenser / Chiller

Heat Rejection of Condenser =

$$\frac{\text{Water flow through condenser (USGPM)} \times \text{Temp. Difference Deg.F.}}{24}$$

c) Cooling Coils of Air Handlers and Fan Coil Units

$$\text{Capacity of cooling coil} = \frac{\text{CFM} \times 60 (\text{he} - \text{hl})}{\text{Avg. specific volume } V \times 12000}$$

Where as he = Enthalpy of entering air in btu / lb

hl = Enthalpy of leaving air in btu / lb

$$V = V_e + V_l$$

= Specific volume of air entering CFT /lb of air + specific volume of leaving air CFT / lb of air.

The interlocking connection of compressor motor with condenser and chilled water pumps cooling tower fan etc. shall be checked.

SECTION-27**PERFORMANCE TEST READINGS**

The Test Readings shall be recorded on hourly basis during the summer / monsoon seasons after satisfactory commissioning of AC System at site as per the Performa indicated below.

1.00 OUTSIDE DESIGN CONDITIONS

- a) Season :
- b) Dry bulb temp. °C :
- c) Wet bulb temp. °C :

2.0 INSIDE DESIGN CONDITIONS IN EACH AREA .

- a) Dry bulb temp. °C :
- b) Wet bulb temp. °C :
- c) Relative Humidity % :

3.0 COMPRESSOR

- a) Suction temp. Deg. C./ :
- b) Suction pressure Kg/Sq.cm :
- c) Discharge temp. Deg. C. :
- d) Discharge pressure Kg/Sq.cm :
- e) R.P.M. of compressor :
- f) Compression Ratio :

4.0 COMPRESSOR MOTOR RATING AT VARIOUS LOADS

- Motor current - AMPs :
- Voltage - AMPs :
- AC Load Status :

5.0 CONDENSER

- a) Water flow rate LPM :
- b) Entering water temp. °C :
- c) Leaving water temp. °C :
- d) Pressure drop through
condenser Kg/Sq.cm (PSI) :

6.0 EVAPORATOR

- a) Water flow rate LPM :
- b) Entering water temp. °C :
- c) Leaving water temp. °C :
- d) Pressure drop through
evaporator Kg/Sq.cm (PSI) :

7.0 CAPACITY TEST FOR CHILLING MACHINE ON

	TR of M/C	Current Drawn by Machine
100 % load	-----	-----

8.0 AIR HANDLERS UNIT

- a) Air quantity CFM :
- b) Air velocity ft/min. :
- c) Entering air temperature DB/WB °C :
- d) Leaving air temperature DB/WB °C :
- e) Entering water temp. °C :
- f) Leaving water temp. °C :
- g) Entering water pressure Kg/Sq.cm :
- h) Leaving water pressure Kg/Sq.cm :

9.0 MOTOR DRIVE FOR AIR HANDLERS

a) Actual voltage / current :

10 CHILLED WATER PUMP

a) Flow rate LPM :

b) Suction pressure Kg/smt :

c) Discharge pressure Kg/Sq.cm :

d) Actual voltage / current :

11 All electrical panels / cables / starters / single phase preventer etc. shall be tested as per standard code of practice.

SECTION-28**APPROVED LIST OF MAKES- HVAC**

Sl. No.	Details of Equipment/Material	Approved Makes /Manufacturers
1	Air Handling Units	
a.	Casing (Double Skin)	Zeco/Carrier-Flaktwood / CITIZEN/ Hemair/ Waves/Edgetech
b.	Casing (Single Skin)	Zeco/Air flow/Hitech/Blue star/Voltas/Citizen/ Waves/Edgetech
c.	Cooling Coil	Coil Co./ Carrier-Flaktwood /Zeco/Waves/Edgetech
d.	Fan	Nicotra/Comefri/Kruger
2	Fan Coil Units	
a.	Casing	Coil Co./Hitech/Zeco/ Carrier-Flaktwood
b.	Cooling Coil	Coil Co./Hitech/ Carrier-Flaktwood /Zeco
c.	Motor	GE /ABB/Kirloskar/Crompton & Greaves
3	Strip Heater	Daspass/ Escorts or Equivalent
4	Centrifugal Blowers	ALSTOM/ABB/Sarla/Ventilation system /Kruger
5	Propeller Fans	ALSTOM/ Kruger/FCG/Caryaire/CG
6	Controls	
a.	2 way / 3 way Motorized valve for F.C.U	Honey well/Johnson/ Danfoss/ Siemens
b.	2 way / 3 way Motorized valve for A.H.U	Honey well/Johnsons/Siemens/Danfoss/ABB
c.	Thermostat for FCU/AHU	Honey well/Johnsons/ Danfoss
d.	Humidistat	Honey well/ Danfoss/Johnsons Controls
e.	Pressure gauge (Dial)	Feibig/H. Guru/Warree/Wika
f.	Temperature gauge (Dial)	H. Guru/Feibig/Wika
g.	Thermometer (mercury in glass)	Emerals /Zeal/H. Guru/Feibig
h.	Solenoid valves	Rotex/ Parker / Festo/SMC Klenzaid/Thermodyne / Unitech
7	Starters/ change over switch/ push buttons/ Rotary switches/ 1-phase preventor/ Soft starter	Siemens / Larsen & Turbo / Merlinegerin/ ABB/ Schneider/C&S Electric
8	Control Cables	Universal/Finolex/Polycab/Havells
9	Power Cables	Universal/Finolex/Poly Cab//Havells
10	Electric Panels	Antelec Electricals/Anand Controls/Electro control Devices/ Ambit / Advance Panel Switchgears (P) Ltd/ Tricolite/ Sudhir/KEPL/EAP/Adlec
11	Push button starter	Siemens/ Controls and Switchgear / Cutter Hammer/ L&T/ABB/GE
12	Auxiliary Relays/ contactors	Siemens / L&T/ Schneider/ABB/GE

13	Line Type Fuse	L&T/Siemens/ ABB/GE
14	Timer	Siemens/ L&T/Cutler Hammer
15	Terminal Block	Elmex /Telemechnic/ Lapp/Siemens
16	Voltmeter / Ammeter(Digital Type)	Meco/ Conzerve/ L&T/ABB
17	Indicating lamps	Siemens/ L&T/ Control and Switchgear / Cutler Hammer/ Teknik/ABB
18	Selector Switches	Siemens /L&T/Kaycee/Telemechnic/ Siemens
19		
a.	Griller/ Fire Dampers/Diffuser	Caryaire /Waterloo/Dynacraft/M.K. Precision /Rola star/Ravistar/Airflow
b.	SS Grilles / Diffusers	SA Air Systems / Equivalent
20	G I Sheets	SAIL/Nippon/TATA/Jindal
21	Pipes	
a.	GI	Jindal / TATA/SAIL
b.	M.S. upto 150 mm	Jindal / TATA/ SAIL
c.	M.S. 200 to 300	Jindal / TATA/ SAIL
22	Valves	
a.	Butterfly Valves	Audco/ Intervolve / Keystone / SKS/Advance
b.	Non Return Valve	Advance / Inter Valve / Audco / SKS /Advance
c.	Balancing Valves*	Flowcon / TA Hydronics / Danfoss/Advance
	* Water balancing to be carried out with Computerized Balancing Instrument (CBI)	
d.	Automatic Balancing Valve	Flowcon / T.A Hydronics/Advance
e.	GM Gate Valve/ Ball Valve	Leader / Sant/ Rapidcool/ Emerald
23	Insulation	
a.	Glass Wool	U P Twiga/ Owens Corning or equivalent
b.	Polyurethane Foam	Malanpur / Superurethane / BestoPuf
c.	Aluminum Tape	Johnson / Birla 3 m/Milton
d.	Close cell Nitrile rubber	Armacell U. K./Armaflex/Vidofex/Trocellen /Superlon
24	Motors	GE (Maintenance free)/Crompton / ABB/ Kirloskar
25	Filters (Pre & Microvee)	Airtech / Thermadyne / Fabtech / Pyramid / TRIJAMA
26	Filters (HEPA)	Airtech / Thermadyne / Pyramid / Camfil / American Air Filter
27	Duct Dampers	Caryaire / Rolastar / Citizen / Ravistar
28	Double Skin HEPA Filter Box	M.K. Precision Metal Works or equivalent
29	Flexible Connection (N.U. Matic Cloth) (Fire & Fungal Proof and Lint free).	Archana Chemicals /Airflow/Pyroguard
30	Hooded HEPA Terminal	Camfil / TROX or equivalent

31	ACB	L&T (u-power) / Siemens(3WL) / ABB(E Max) / Schneider(master packed NW)/ GE(entelligaurd)
32	MCCB	Group Schneider (Mg) / Siemens / ABB/ L&T(Hager)/GE
33	Contactors	Siemens / ABB / BCH/GE/ Schneider/L&T(Hager)
34	Over Load Relays	Siemens / BCH/ABB/ L&T/GE
35	MPCB	Siemens / Group Schneider / ABB / L & T/GE
36	Push Buttons / Indicating Lamps	L & T/ Siemens / Telemechnic/ GE/ABB
37	Fuse	Siemens / L & T/ GE/ABB/ BCH
38	MCB	Group Schneider / Siemens / ABB/ L&T/GE
39	CTs	Control & Switchgear / G&M/ Kappa/AE/Pragati
40	Meters	Enercon / Conzerve/AE/ L&T/ABB/MECCO
41	Terminals	Elmex / Wago / Connect – Well/ Siemens/Schneider
42	Fabrication For Panel	Tricolite / Advance Electro Control / Anand Power / System Projects & Engineers / Advance Panel Switchgears (P) Ltd/Sudhir
43	Split Units (Air cooled) Indoor unit (wall mounted) Outdoor (Exposed to Atmosphere, Floor mounted)	DAIKIN / Voltas / Hitachi / Bluestar
44	Cooling Tower	Bell / Paharpur / Mihir / Himgiri/ Delta
45	Chilled water Pump (Primary & Secondary)	Kirloskar/ Grundfoss/Mather &Platt
46	Cooling water / hot water pump	Kirloskar / Grundfoss/Mather&Platt
47	Liquid Desiccant type dehumidifier	Munters / Dry Air Systems / Du COOL
48	Energy Recovery Unit	Dry Air, ABB, Munters
49	Anchor, Fasteners	Hilti / Fisher / Cannon/Bosch
50	Expansion Bellows	Dunlop / Resistoflex
51	Pre Insulated Flexible Ducts	Caryaire / Atco or equivalent
52	In line fans	System air / Kruger / Nicotra
53	Automatic Air vent	Anergy / Danfoss / ABB/Siemens/Rapid Control
54	Air flow measuring station	Air tech / SA Air systems
55	Filter cleaning station	Air tech / Pilani Envirotech / Whirlwind
56	Self Cleaning Pot strainer	Emerald/Rapid cool/Rapid Control/Sant/Leader
57	Variable pumping system	Danfoss / IIT Bell & Gossett or equivalent
58	Variable Frequency Drive	ABB/ Danfoss / Siemens /Honeywell/L&T
59	Low leak damper for AHU & duct	Caryaire/Airflow/Ravistar
60	Clean room false ceiling / coving	M. K Precision/Aerolite/Hilux/Gyproc
61	Water Cooled Screw Chiller Machine	Voltas / York / Mcquay/Daikin/Trane

62	Acoustic Lining for Ducts/AHU Rooms	UP Twiga/Owens Corning/Kimcco
63	Adhesive	Fevicol/ Superlonor Equivalent
64	Forced Draft Ventilator	Zeco/Systemaire/Carrier(flakwood)/Airflow
65	Air Separator	Spirotrech/Spirotherm/Comfort
66	Air Washer	Humiden/Zeco/Waves/Fedders Lloyd/ Kruger
67	Aluminum Sheet/Sections	Hindalco/Balco/Nalco
68	Axial Fan/ Centrifugal Fan /Fan Section (AMCA Certified for Sound &Performance)	SystemAir/Kruger/ Airflow/ABB/Humidin
69	Cable lugs/thimbles/glands	Dowell/Combat/Raychem/Jainsons
70	Cable tray	Pilco/Slotco/Ricco/KEPL
71	Switches/Change Over Switch	L&T/Siemens/GE
72	Closed Cell Fire Retardant XLPE(For Duct Insulation)	Supreme/Trocellene/Paramount/Armacell/ Aeroflux
73	Closed cell fire retardant XLPE(for pipe/valve insulation)	Paramout/Armacell/Supreme/Armaflex/ Eurobatex–Union Foam
74	Ductable Units	Hitachi/ Voltas / Daikin/Blue Star
75	Cooling/Heating Thermostat	Honeywell/Siemens/Danfoss/Johnson Control/
76	Copper Refrigerant piping for duct able split DX System	Diamond/ Star/Rajco/Totalline
77	PT	Kappa/AE/Pragati/Precise
78	Dash Fasteners	HILTI /Fischer/Cannon/Bosch/TKS
79	Dial thermometer(capillary Type)	Tadington/H Guru/Feibig/Emerald
80	Digital Thermostat	Siemens/Johnson/Honeywell/Danfoss/Belimo/ Schneider
81	Duct/Pipe Support	Easyflex/Resistoflex/ Diamond
82	Duct Heaters	Daspass or Equivalent.
83	Duct UVGI System (Ultra Violet Germicidal Irradiation System)	Ruks /Trimed/Magneto
84	Dust Collectors	Plani Envirotech or Eqvt.
85	Magnehelic Gauges & Digital hygroscope	Mitbraus Instruments / H.Guru or equivalent
86	Energy Recovery Wheel(ERW)	Tomkins/Novelair/Desicaant Rotors(DRI)/ Flakwood/Bryair/Heatex/APPIDI
87	Evaporative Cooling Unit, Exhaust Scrubber Unit	RootsCooling/Waves/Humidin
88	Expanded Polystyrene Insulation	Beardsell/Styrene Packing/Toshiba/Indian Packaging/Quality Thermopack/Mettur Beardsell
89	Expansion tank(pressurized)	ITT/ Wessels/Grundfoss/Emerald/Armstrong/
90	Extruded Aluminum Grills	Caryaire/Ravistar/Servex/Airflow/Titus/Trox/
91	Factory fabricated spiral duct	Atco/Ravistar/GPSpiro/Up twiga/Techno Duct/ Rolastar/Zeco
92	Fibre Glass Rigid Board	Lloydinsulation/U.P.Twiga/Owen

		corning/Kimco
93	Smoke Damper	Caryaire/ Ravistar/Titus/Trox/Airflow/Ruskin/ Systemair/Airflow/Flowel
94	Fire Damper Actuator	Siemens/Danfoss/Honeywell/Trox
95	Water Flow Switch	Honeywell/ Rapid control/ Danfoss
96	Flexible Pipe Connection	Resistoflex/Kanwal/Dunlope/EasyFlex
97	Flow switch	Siemens/Honeywell/Rapid Control/Danfoss
98	Fans for FDV	Nicotra / Kruger or equivalent
99	GI /Cu Wire or Strip(centrifugal For Earthing)	Bharti/Indiana/Slotco
100	Heat Exchanger	Alfa Lavel/ equivalent
101	Hot Water Generator &Pan Humidifier	Enmax/Rapid Control /KEPL/Emerald/
102	HRC Fuse and Fittings	L&T/Siemens/GE/C&S
103	Indicating Lamps	Siemens/L&T/Emco
104	Insulated Flexible Duct	Caryaire/Atco/GPSpiro
105	VCD/louvers	Flowel/AirFlow/ Trox or equivalent
106	Mineral wool/ Fibre glass insulation	Lloyd insulation/UP Twiga/Kimcco/Owens Cornings
107	Motorized butterfly valve	Honeywell/Siemens/Danfoss/Tour Andover/Johnson Control
108	MS Conduit	NIC/BEC/AKG/Steel craft
109	Y-strainer	Rapid control/Sandhu Engg/Emerald/Maharaja/ Sant/DS Engg/Leader/Rapid cool
110	Paints	Shalimar /Asian/Nerolac/Burger/ICI
111	Welding Rods	Advani /L&T or equivalent
112	PID balancing cum motorized valve For AHUs and FCUs	Danfoss or equivalent
113	Pre- insulated Chilled water pipe	Zeco or equivalent
114	Precision AC units	Emerson/GEA/Stulz/Bluestar
115	Pre Fabricated Ducts	Rolastar/Zeco/ equivalent
116	Pre-molded PUF section for insulation	Lloyd/Malanpur/Beardsel/Supreme
117	Pressure Gauges	Feibig/Emerald/HGuru
118	PUF pipe supports	Malanpur/Lloyd/Beardsel
119	Red Oxide, Zinc Chromate Primer	ICI/Bergeror Equivalent
120	Return Air Temp Sensors	Siemens/Honeywell/Jhonsons Sauter
121	Room thermostat/humidistat	Honeywell/Siemens/Danfoss/Johnson Control/ Schneider
122	Rotary Switches	L&T/Siemens/GE
123	RP Tissue	UPTwiga/StyrenePackingor Equivalent
124	Safety thermostat for heater	Honeywell/Siemens/Danfoss/Johnson Control

125	Scale Preventer System	Scale Guard(AquaTreat)/Crystallo/Scaloid
126	XLPE Insulation with Al Foil	Trocellin/Thermobreak/Supreme
127	Section(Single Skin) for fresh Air, Exhaust, Staircase, Lift Well pressurization	Voltas/Caryaire (Flakwoods)/ Fedders Lloyd
128	Toggle Switch	Kaycee/L&T/Siemens/Schnieder
129	Single Phase Preventer	L&T/ Minilec/Siemens
130	Suction guide	Anergy/ITT/Emerald/ABB/Sandhu
131	Tar felt/CPRX compound	Shalimar tar product/Asian or equivalent
132	Terminal Block	Siemens/Schneider/ equivalent
133	Thermal storage	CALMAC/Dunhumbush/Cristopia
134	HEPA FILTERMODULES	Allied concepts/Ravistar or equivalent
135	Time Delay Device	Siemens/L&T/equivalent
136	Tube Axial Fans	Kruger/Nicotra/Comefri/Systemair
137	Ultra violet germicidal Irradiation System (UL listed or UL recognized components)	Ruks /Trimed/Voltas
138	V Belt	Dunlop/Fenner or equivalent
139	Vacuum Degasser Separator/Air Separator	Spirotech/Spirotherm/Comfort
140	VAV Boxes/Constant air volume boxes	Trox/Belimo/Titus/Trane/York/ Barcolair
141	Vibration isolator	Resistoflex/Dunlop/Kanwal/EasyFlex

NOTE

1. The Contractor will use one of the approved makes as approved by the Engineer-In-Charge depending upon service center availability in the region.
2. In case of different quality, pattern of the same make, the pattern, quality shall be approved by the Engineer-in-charge.
3. All the items included in the list or otherwise to be used in the work should confirm to CPWD & relevant BIS specifications, relevant codes, as applicable.
4. If any major equipment is using a small component of make other than that given as a standard component with the equipment, the same shall be accepted.

5. It is the responsibility of the contractor to meet all technical requirements of this specifications whether the same are covered with standard product of above manufacturers or not. Any specific deviation shall be listed under “Deviation” with the offer.
6. If any item is missing in the above list its make will be decided by the Engineer-in-charge.

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

TenderNo.HLL/IDN/IMPCL/2013-14/03/R

Request for Proposal (RFP)
for

Modernization, Up-Gradation & Expansion of existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Limited (IMPCL) - Mohan, District: Almora (Uttarakhand)
Package III- HVAC works

Volume IV

- **Bill Of Quantities**



B-14A, Sector – 62,
NOIDA (UP) -201307

Phone no: 0120-4071500, Fax no: 0120-4071513

(January,2014)

INDIAN MEDICINES PHARMACEUTICAL CORPORATION LIMITED

(A GOVERNMENT OF INDIA ENTERPRISE)

Tender No. HLL/IDN/IMPCL/2013-14/03/R

Request for Proposal (RFP)

for
**Modernization, Up-Gradation & Expansion of existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Limited (IMPCL) - Mohan, District: Almora (Uttarakhand)
Package III- HVAC works.**

Issued To: _____ (Contractor)

Signature of officer issuing the Documents _____

Designation _____

Date of Issue _____.

PREAMBLE

Subject: Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttarakhand via Ram Nagar: Package III- HVAC works

(This preamble applies to all the sections of the Bill of Quantities. The Contract rates shall take into account all these provisions in addition to various provisions in other parts of the Contract document)

Sl No.	DESCRIPTION
1	The Contract basis is item rate. Rates shall include cost of materials, labour, plants & equipment, taxes, duties and all necessary apparent services required for complete execution, installation and commissioning in accordance with relevant drawings and specification. The HLL/IMPCL decision on interpretation of bill of quantities and its preamble shall be final and binding on the contractor.
2	The quantities given in this Bill of Quantities are liable to variations. Such variations in quantities shall not, however, vitiate the contract in any way whatsoever and all quoted rates shall remain valid as per deviation limits provided in the contract. Contractor shall be paid for the actual measured quantities of work executed by him/them .
3	Rates quoted shall be firm and shall not be subject to any price variations except as specifically provided in the contract.
4	The contractor's quoted rate shall include Site Visits, Site Supervision. surveying, making layout and demarcation of all services as required for completion of the works in all respects within the scope of this contract .
5	The words "as specified", "as described", "as shown", "as directed", or "as approved", shall mean as described in the specifications, Schedule of Quantities and other Contract documents as shown on the drawings or as directed by EIC.
6	The following notations as appearing in the Bill of Quantities and specifications shall mean :
	a) Cum = Cubic metre
	b) Sqm. = Square metre
	c) Rmt/Mtr./ Metre = Running metre
	d) No./Nos./Each/Set = Numbers
	e) Kg. = Kilogram
	f) MT. = Metric Ton
	g) TR = Tonns of Refrigeration
	h) IPLV = Integration Part Load value
	i) COP = Coefficient of Performance
	j) GPM = Gallon per Minute
	k) H.P = Horse Power
7	For the general guidance of the bidders, tender drawings are available with the HLL which should be seen /consulted by the intending bidders before bidding. The detailed working drawings shall be issued to the successful bidder after start of work at site and during the execution of the work at Site as per requirement and progress chart prepared initially and /or modified subsequently by the contractors.
8	The bidders shall take into account all leads and lifts involved in transport of materials to site, erection and hire of T & P, sheds for materials, etc. while quoting the rates for various sub heads of the work. Similarly all taxes including Octroi, Toll or Sales Tax, Works Contract Tax or any other Taxes etc. as payable by the contractor at the time of submission of bids shall be taken in to account by the bidders before quoting their Rates. Any claim in these matters whatsoever in this respect shall not be entertained.

Subject: Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works			
Summary_ HVAC Works			
SL.NO.	DESCRIPTION	QUOTED AMOUNT (Rs.) In Figures	QUOTED AMOUNT (Rs.) In Words
A	HIGH SIDE WORK		
1	PART A-EQUIPMENT		
2	PART B-PIPING WORKS		
3	PART C-ELECTRICAL WORKS		
	TOTAL HIGH SIDE WORKS (In Rs.)		
B	LOW SIDE WORK		
1	PART A-EQUIPMENT		
2	PART B-AIR DISTRIBUTION SYSTEM		
3	PART C-PIPING WORKS		
4	PART D-INSULATION WORKS		
5	PART E-ELECTRICAL WORKS		
	TOTAL LOW SIDE WORKS (In Rs.)		
	TOTAL HIGH & LOW SIDE WORKS (In Rs.)		

Subject: Modernization, Up-Gradation & Expansion of Existing Plant Facilities at Indian Medicines Pharmaceutical Corporation Ltd. (IMPCL), Mohan ,Distt Almora , Uttrakhand via Ram Nagar: Package III- HVAC works

		THE BELOW AIRCONDITIONING & VENTILATION WORK COMPRISES OF FOLLOWING AREAS:-						
A		Based on Chilled Water System						
i)		Capsule & Churan Block						
ii)		Raw Material Block						
iii)		Chvawanprash						
iv)		Tablet & Pills						
B		Based on Air Cooled Ductable/Split System						
i)		Worker Facility						
ii)		KIT						
iii)		Staff Faculty						
BILL OF QUANTITIES _HVAC WORKS								
SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		HIGH SIDE AIRCONDITIONING WORK FOR IMPCL ALMORA						
		PART A EQUIPMENTS.						
1	NDSR	ROTARY SCREW WATER COOLED CHILLING MACHINE WITH MICROPROCESSOR BASED CONTROL PANEL						
		Supply of ARI Certified Rotary mono/twin Screw multiple compressors Water Chilling Machine of 220 TR(Actual) capacity at below mentioned operating conditions with R-134A refrigerant, semihermetic / hermetically sealed compressor, driven by suitable KW Squirrel.Cage induction motor complete with water cooled shell & tube condenser, insulated shell & tube flooded chiller with Victaulic Coupling / Flange Type Coupling, DP switches in condenser & chiller, refrigerant piping ,Refrigerant and Oil (First Charge), Microprocessor based control panel, motor starter, vibration free foundation pads & accessories etc. all mounted on M.S. base frame. Motor shall be suitable for 415volts ± 10%, 50Hz, three phase A.C. supply.Control Panel of Chiller Should have load management moudule for lead and lag chiller arrangement, run-time equalization and sequencing of chiller at Part load.The chilling machine as described above shall be in line with specifications. All chillers shall have IBMS Integrator Card. It should be complete as per directions of Engineer-In-Charge.						
		Capacity : 220 TR Actual (1 Working + 1 Standby)						
		Chilled Water Leaving Temperature: 6.67 Deg Celcius						
		Chilled Water Entering Temperature: 12.22 Deg Celcius						
		Evaporator Fouling factor: 0.00050 (FPS UNITS)						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Chilled Water Circulation rate: 528 USGPM						
		Condenser Water Entering Temperature: 32.22 Deg Celcius						
		Condenser Water Leaving Temperature: 36.39 Deg Celcius						
		Condenser Fouling factor: 0.0010 (FPS UNITS)						
		Condenser Water Circulation rate: 880 USGPM						
		Suitable for Refrigerant: R-134a						
		COP: min. 5.40						
		IPLV: min. 6.17						
		The chilling machine as described above shall be in line with specifications and as per direction of Engineer-In-Charge.	Nos.	2				
		Note:						
		The price quoted above shall include pre shipping inspection / testing at the works of the manufacturer, Freight, Insurance, loading / unloading, Installation, testing and commissioning as per specifications complete with foundation as in approved shop drawing, leveling of machines, installation of manufacturers recommended and approved vibration isolators, testing of all safeties and interlocks, summer and monsoon season tests, etc.						
2	NDSR	Primary Chilled Water Pumps						
		Supply, installation, testing and commissioning of End Suction Chilled water centrifugal pump sets with bronze impeller for chilled water recirculation complete with TEFC Squirrel.Cage Eff -1 induction motor suitable for 415 +-10% V, 50 cycles, 3 phase power supply with class "F" insulation, base plate, coupling guard, vibration isolators, SS Shaft, factory fitted mechanical seal etc. conforming to technical specification & as per following parameters. The chilled water pumps shall also include the cost of thermal insulation and aluminium cladding. It should be complete as per directions of Engineer-In-Charge.						
		Capacity of each pump (USGPM) 528						
		Pump Head (Mt) 15						
		H.P of Motor 10						
		(1 Working +1 Stand By)	Nos.	2				
3	NDSR	SECONDARY PUMPING SYSTEM						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply, installation, testing and commissioning of End Suction Chilled water centrifugal pump sets with bronze impeller for chilled water recirculation complete with TEFC Squirrel Cage EFF 1 induction motor suitable for 415 Volts \pm 10% & 50 Hz with class "F" insulation with temperature rise to B class, base plate, vibration isolators, mechanical seal etc. conforming to specification & as per following parameters. The chilled water pumps shall include thermal insulation & cladding. Secondary chilled water pumps shall be suitable for operation on adjustable frequency drives & conforming to the specifications of variable speed pumping system.						
		This shall complete with 2 Nos. Pumps (1W+1S) with two numbers 20 H.P adjustable frequency drive (AFD) suitably interfaced with other system components, hand /auto macro designed for pumping application, 01 no. dedicated microprocessor based pump logic controller, parallel pumping software duly downloaded, 02 No. Differential Pressure Sensor / Transmitters, interfacing amongst all components and compatibility of I/O signals etc complete with other accessories as required. It should be complete as per directions of Engineer-In-Charge.						
		Capacity of Each Pump (USGPM) 528						
		Pump Head (Mt) 40						
		Pump Motor H.P. 20	Set	1				
4	NDSR	Condenser Water Pumps						
		Supply, installation, testing and commissioning of End Suction condenser water centrifugal pump sets with bronze impeller for condenser water recirculation complete with TEFC EFF 1 Squirrel Cage induction motor suitable for 415 \pm 10% V, 50 cycles, 3 phase power supply with class "F" insulation, base plate, coupling guard, vibration isolators, SS Shaft, factory fitted mechanical seal etc. conforming to technical specification & as per following parameters. It should be complete as per directions of Engineer-In-Charge.						
		(1 Working +1 Stand By)						
		Capacity of each pump (USGPM) 880						
		Pump Head (Mt) 20						
		H.P of Motor 20	Nos.	2				
5	NDSR	Cooling Towers						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply, installation, testing & commissioning of FRP induced draft cooling tower of capacity 250 TR (756000 Kcal/Hr) complete with sump & steel ladder, 2 Nos. of 1200 mm dia. fans, two. nos 7.5 HP EFF 1 type fan motors suitable for 415 V, 3 phase, 50 Hz. including MS Structure for mounting Cooling Tower, access arrangement for cooling tower interior, cement concrete foundation, steel / masonry support structure, anti vibration mountings etc. The starter is included in HVAC electrical panel. The cooling tower shall conform to technical specifications Section. It should be complete as per directions of Engineer-In-Charge.						
		250 TR (1 Working + 1 standby)						
		Inlet Water Temperature 36.39 °C						
		Outlet Water Temperature 32.22 °C						
		H.P of C/T Fan Motor 2 x 7.5HP	Nos.	2				
		Note: All required RCC/PCC foundations shall be in the scope of HVAC contractor. Nothing shall be paid extra for this .						
		Total of Part A carried to Summary of Prices.						
		PART B - PIPING WORK						
1	DSR 2013 Item No. 16.3	Supply, laying /fixing, testing and commissioning of following nominal sizes of piping with insulation (with necessary clamps, vibration isolators & fittings but excluding valves, strainers, Guages etc) with fire retardant quality expanded polystyrene moulded pipe section of 20kg/m ³ after a thick coat of cold adhesive (CRPX Compound) wrapping with 500 G polythene faced hessain & finally applying 0.63mm aluminum sheet cladding complete with type 3 grade 1 roofing feltstrip (as per IS : 1322 as amended up to date) at joints repairing of damage to building etc as per specification & as required complete in all respect .						
		Note : The pipe of Size 150mm & Below shall be MS C class as per IS : 1239 & pipe size above 150mm dia shall be welded black steel pipe heavy class as per IS : 3589, from minimum 6.35 thick MS sheet for the pipes upto 350mm & from minimum 7mm thick MS sheet for the pipes of 400mm Dia & Above.						
1.1	DSR 2013 Item No. 16.3.6	150mm dia (75mm thick Insulation)	RMT	260				
1.2	DSR 2013 Item No. 16.3.7	125 mm dia (50mm thick Insulation)	RMT	20				
1.3	DSR 2013 Item No. 16.3.8	100 mm dia (50mm thick Insulation)	RMT	290				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
1.4	DSR 2013 Item No. 16.3.9	80mm dia (50mm thick Insulation)	RMT	20				
1.5	DSR 2013 Item No. 16.3.11	50mm dia (50mm thick Insulation)	RMT	100				
1.6	DSR 2013 Item No. 16.3.14	25mm dia (50mm thick Insulation)	RMT	30				
2		CHILLED WATER INSULATED VALVES						
	DSR 2013 Item No. 16.7	Supplying, fixing, testing & commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the onnected piping and adequately supported as per specifications.						
2.1	DSR 2013 Item No.16.7.1	Butterfly Valve (Manual) with CI Body SS disc, Nitrile Rubber Seal & O-Ring PN-16 presure rating for chilled water water circulation as specified.						
2.1.1	DSR 2013 Item No.16.7.1.2	150 mm Dia	Nos.	12				
2.1.2	DSR 2013 Item No.16.7.1.4	100 mm Dia	Nos.	6				
2.1.3	DSR 2013 Item No.16.7.1.5	80 mm Dia	Nos.	2				
2.1.4	DSR 2013 Item No.16.7.1.7	50 mm Dia	Nos.	2				
2.2	DSR 2013 Item No. 16.7.2	Balancing Valve with built in measuring facility with CI Body flanged construction with EPDM coated disc with long pitch with protected out pipe insulation & PN 16 pressure rating for chilled water circulation as specified.						
2.2.1	DSR 2013 Item No. 16.7.2.2	150 mm Dia	Nos.	2				
2.2.2	DSR 2013 Item No. 16.7.2.4	100 mm Dia	Nos.	3				
2.2.3	DSR 2013 Item No. 16.7.2.5	80 mm Dia	Nos.	1				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
2.2.4	DSR 2013 Item No. 16.7.2.7	50 mm Dia	Nos.	1				
2.3	DSR 2013 Item No.16.7.4	"Y"strainer of ductile CI Body flanged ends with stainless steel strainer for chilled/hot water water circulation including insulation as specified.						
2.3.1	DSR 2013 Item No. 16.7.4.2	150 mm Dia	Nos.	4				
2.4	DSR 2013 Item No.16.7.3	Non- return Valve with dual plate of CI Body SS Plates vulcanised NBR seal flanged end & PN 16 pressure rating for chilled water circulation including insulation as specified.						
2.4.1	DSR 2013 Item No. 16.7.3.2	150 mm Dia	Nos.	4				
3	DSR 2013 Item No. 16.10	CONDENSOR WATER PIPING						
	DSR 2013 Item No. 16.10.1	Supplying, fixing, testing & commissioning of condenser water pipes of following sizes of MS "C" class along with necessary clamps, vibration isolators & fittings such as bends, tees etc. but excluding valves, strainers, gauges etc. adequately supported on rigid supports duly painted / buried in ground excavation and refilling etc. as per specification and as required complete in all respect.						
		Note : The pipe of Size 150mm & Below shall be MS C class as per IS :1239 & pipe size above 150mm dia shall be welded black steel pipe heavy class as per IS :3589, from minimum 6.35 thick MS sheet for the pipes upto 350mm & from minimum 7mm thick MS sheet for the pipes of 400mm Dia & Above.						
3.1	DSR 2013 Item No. 16.10.1.2	200mm dia.	RMT	150				
3.2	DSR 2013 Item No. 16.10.1.3	150 mm dia.	RMT	30				
3.3	NDSR	50 mm dia.	RMT	30				
3.4	NDSR	40 mm dia.	RMT	30				
4		CONDENSOR WATER VALVES (without insulation)						
	DSR 2013 Item	Supplying, fixing, testing & commissioning of following size valves, gauges and strainers for condenser water circulation as per specifications.						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
	No.16.11							
4.1	DSR 2013 Item No.16.11.1	Butterfly Valve (Manual) with CI body SS disc nitrile sheet & O ring & PN 16 pressure rating as specified.						
4.1.1	DSR 2013 Item No.16.11.1.1	200 mm Dia	Nos.	11				
4.1.2	DSR 2013 Item No.16.11.1.2	150 mm Dia	Nos.	8				
4.1.3	DSR 2013 Item No.16.11.1.7	50 mm Dia	Nos.	2				
4.1.4	DSR 2013 Item No.16.11.1.8	40mm dia	Nos.	2				
4.2	NDSR	Balancing Valve with built in measuring facility with CI body flanged construction with EPDM coated disc with long pitch & PN 16 pressure rating.						
4.2.1	NDSR	200 mm Dia	Nos.	2				
4.3	DSR 2013 Item No.16.11.2	Non Return Valve with dual plate of CI body SS plates vulcanised NBR seal flanged end & PN 16 pressure rating as specified.						
4.3.1	DSR 2013 Item No.16.11.2.1	200 mm Dia	Nos.	2				
4.4	NDSR	Pot Strainer cum Sediment Separator						
4.4.1	NDSR	For Pipe size 200mm dia.	No.	1				
5	DSR 2013 Item No.16.8	Providing & Fixing in position the mercury in glass industrial type thermometer complete as required.	Nos.	12				
6	DSR 2013 Item No.16.9	Providing & Fixing in position the industrial type pressure gauge complete as required.	Nos.	12				

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
7	NDSR	Supply, Installation, Testing, & Commissioning of Automatic air vent with ball valve in brass construction complete with nipples, union etc. as required at all high points in the pipe lines. The valve shall be such as to have non-return valve as integral part of the vent.						
7.1	NDSR	15 mm dia auto air vent valve	Nos.	8				
8	NDSR	Supply, Installation, Testing & Commissioning of 25mm diameter Drain Valves in dirt legs complete with nipples as per specifications.	Nos.	2				
9	NDSR	Supply, installation, testing and commissioning of duly insulated with 80mm thick(40mm in two layers) expanded Polystyrene P quality with aluminium clad open type expansion tank made out of 5 mm thick MS sheet of size 1mt x1mt x 1mt inner surface area epoxy paint two coats to avoid rust complete with all accessories valves & fittings for chilled water as per specs .	No.	1				
		Total of Part B carried to Summary of Prices.						
1		PART C ELECTRICAL WORK.						
1.1		For 2 x220 TR Rotary Screw Water Chilling M/C						
1.2		For 2 x 10 HP Primary Pumps (1W+1S)						
1.3		For 2 x 20 HP Secondary Pumps (1W+1S)						
1.4		For 2 x 20 HP CDW Pumps (1W+1S)						
1.5		For 4 x 7.5 HP fan motor - for Cooling Tower250 TR (1Working + 1stand by)						
		Supply, Installation,Testing & Commissioning of Cubical type sectionalised floor standing switch Board of 31 MVA fault capacity at 415 V complete made out 2.0 mm thick CRCA Sheet With 3.5 Core 800A capacity Aluminium Bus- Bar Electrolytic grade cable alley switchgears of following capacity & as per specifications.						
A		INCOMER						
		800 Amp manually operated draw out type TPN ACB (65KA) with overload short ckt earth fault protection Release (Microprocessor) with 96 mm (0 - 800A) ammeter with 3CT & selector switch 96 mm (0 - 800V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
	NDSR	Sections of 800Amps TPN bus bar (65KA) chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.80 Amps/sq.mm cross sectional area of Bus Bar.	Set	1				
B		OUTGOING						
i		For 2 x220 TR Rotary Screw Water Chilling M/C						
		2 Nos. 300 A Three Pole & netural MCCB with overload & short circuit protection with microprocessor with (0 - 300A) ammeter with three CT & selector switch, on / off / trip indication light with protection MCB. MCCB shall be of short circuit rating 50 KA.						
ii		For 2 x 10 HP Primary Pumps (1W+1S)						
		2 Nos. 32 A TP MCCB with 10HP Star Delta starter , overload relay start / stop push buttons, ammeter (0 -32A) with three CT and selector switch , on / off / trip indication lights with protection MCB ,single phase preventer with auto / manual mode selector switch .MCCB Shall be of short circuit rating 30 KA.						
iii		For 2 x 20 HP Secondary Pumps (1W+1S)						
		2 Nos. 63 A TP MCCB with 20HP soft starter , overload relay start / stop push buttons, ammeter (0 63A) with three CT, on / off / trip indication lights with protection MCB , single phase preventer with auto / manual mode selector switch. MCCB Shall be of short circuit rating 30 KA.						
iv		For 2 x 20 HP CDW Pumps (1W+1S)						
		2 Nos. 63 A TP MCCB with 20HP soft starter , overload relay start / stop push buttons, ammeter (0 63A) with three CT, on / off / trip indication lights with protection MCB , single phase preventer with auto / manual mode selector switch. MCCB Shall be of short circuit rating 30 KA.						
v		For 4 x 7.5 HP fan motor - for Cooling Tower250 TR (1Working + 1stand by)						
		2 Nos. 32 A TP MCCB with 2x 7.5HP DOL starter , overload relay start / stop push buttons, ammeter (0 -32A) with three CT, on / off / trip indication lights with protection MCB , single phase preventer with auto / manual mode selector switch. MCCB Shall be of short circuit rating 30 KA.						
vi		Spare						
		2 Nos. 32 A TP MCCB with 2x 10 HP DOL starter , overload relay start / stop push buttons, ammeter (0 -32A) with three CT, on / off / trip indication lights with protection MCB , single phase preventer with auto / manual mode selector switch. MCCB Shall be of short circuit rating 30 KA						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		3 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.						
2		POWER & CONTROL CABLING AND EARTHING						
2.1	NDSR	Supplying, laying, effecting proper connections, testing & commissioning of the following sizes of 1.1 KV -Cross Linked Poly Ethelene armoured aluminium conductor cables conforming to relevant latest amended Indian Standards laid over MS supports & Cable Trays including clamping the cables to supports in an approved manner as required complete with all accessories.						
2.1.1	NDSR	For Rotary Screw Water- Cooled Chilling M/C						
		2 x 3.5C x 150 Sq. mm	RMT	60				
2.1.2	NDSR	For Condenser Water & Chilled Water Pumps						
		2x 3C x 10 Sq. mm	RMT	150				
2.1.3	NDSR	For Cooling Tower 7.5 HP						
		3C x 6 Sq. mm	RMT	60				
2.2	NDSR	Control Cabling (PVC insulated & PVC sheathed, armoured, Copper Conductor of 1.1 KV grade on existing cable trays).						
2.2.1	NDSR	2C X 1.5 Sq.mm	RMT	180				
2.3	DSR Item No. DSR 2013-9.1	Supplying & Making End Terminations with Brass Compression Gland & Aluminium Lugs for following size of PVC insulated & PVC sheathed /XLPE aluminium conductor cable of 1.1 KV grade as required.						
2.3.1	DSR 2013 Item No.9.1.1 (derived)	3 x 6 sqmm	Each	160				
2.3.2	DSR 2013 Item No.9.1.7	3 x 10sqmm	Each	97				
2.3.3	DSR 2013 Item No.9.1.26	3.5 x 150 sqmm	Each	4				
2.4	DSR 2013	Earthing Strip / Wires.						
2.4.1	DSR 2013 Item No.5.15	Supply & laying 25mm x 5 mm GI strip on surface or in recess for connections etc as required. (For looping in the equipment)	RMT	120				

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
2.4.2	DSR 2013 Item No.5.16	Supply & laying of 6SWG. dia GI wire. or in recess for loop earthing as required.	RMT	210				
2.4.3	DSR 2013 Item No.5.4	Earthing with G.I. earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required.	Set	9				
2.4.4	DSR 2013item No.5.11	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	RMT	45				
		Note: 1 The Validation of the HVAC system shall be in the scope of HVAC Contractor. Note:2 The Contractor shall carry out & prepare complete documents for validation of HVAC Systems (Validation Test shall include water & air pressure balancing , DOP test of HEPA Filter , particle count test, Temperature & RH recording, Air flow pattern test, filter air velocity test, ACPH calculation & other tests as required). The required measuring instruments & tools for validation process shall be arranged by the HVAC contractor. All inputs required to get the validation including rectification/correction etc. is covered in HVAC Contractor's scope of work.No extra charges shall be paid for above work. Note:3 In case the Client intends to get the Validation done from another agency in addition to the above, the Fee payable to such agency will be paid by Client. The HVAC Contractor shall provide all support/documents etc. as required and nothing extra shall be payable on this account.						
		Note: The contractor shall provide fire shunt relay & potential free contacts in HVAC Electrical panel & all AHU DBs with auto / manual mode selector switch in the outgoing feeder for AHU Fan etc . to take fire input signal. The cost of these shall be included in respective panel / DBs.						
		Total of Part C carried to Summary of Prices.(in Rs.)						
		LOW SIDE AIRCONDITIONING WORK FOR IMPCL ALMORA						
		PART A EQUIPMENTS						
1	NDSR	AIR HANDLING UNITS (FOR ISO 8 & 7, RECIRCULATION AHU) HEPA FILTERS AT TERMINAL WITH FLOOR OPERATED BEWEL GEAR OPERATED MODULES						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply installation , testing & Commissioning of Sheet metal sectionalised cabinet type air handling unit with thermal break profile in Double skin construction fabricated from Al extruded section frame structure. Outer skin will be 0.63 mm pre plasticized GI. Inner skin 0.63 mm plain GI construction with 43 mm thick PUF insulation panel with 48kg ± 2 Density complete with following section. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
i		Mixing Chamber						
ii		Prefilter section with Pre filter(10 Micron & 90 % Efficiency)						
iii		coil section with coil 6RD						
iv		Blower(DIDW Backward Curve Fans for 125mm Static Pressure & DIDW Forward Curve Fan for 65mm Static Pressure) section with Blower and fm motor ,both Motor and Blower are mounted on common base frame.						
v		Microvee filter section with M.V. filter In Aluminium construction (5 Micron&95 % Efficiency)						
vi		Fresh air Module With S.S. bird screen ,volume control damper and 20 Micron Filter(90 % Efficiency)						
vii		Exhaust air Module With S.S. bird screen ,volume control damper and 20 Micron Filter(90 % Efficiency)						
viii		sandwich type insulated drain pan ,drain pan should be 18 G SS construction						
ix		Magnahelic Guages with Necessary Tubing across Pre Filter (0-25 mm WG), Microvee filter (0-25 WG) & HEPA filter (0-100 mm WG).						
x		Mixing chamber						
xi		Prefilter section should be of min. 50mm Thick.						
xii		Blower section length should be as per standared dimension of the blower required to install the blower in housing.						
xiii		There should be access door across every section of AHU						
xiv		Necessary openings for magnahelic gauges & electrical connections						
xv		The face velocity across cooling coil shall be limited to 152 MPM maxm. The capacity of Air-handlers shall be as follows:						
xvi		Maximum permissible fan outlet velocity shall be upto 10 m/sec.						
		Note 1: Length of mixing chamber, coil chamber, pre filter section section, gap between blower & pre filter section and gap after microvee filter & before main discharge shall be as per manufacture standard with adequate free space for maintenance across filters/ cooling coil/fans/mixing chamber with required access door to access AHU, accessories such as fans/filters/cooling coil /mixing chamber etc. Note 2: This item does not include the cost of Hepa Filters.						
1.1	NDSR	Floor Mounted AHU - 800CFM / 3TR / 6RD / 125mm static	Nos.	3				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
1.2	NDSR	Floor Mounted AHU - 900CFM / 3TR / 6RD / 125mm static	Nos.	5				
1.3	NDSR	Floor Mounted AHU - 1000CFM / 3TR / 6RD / 125mm static	No.	1				
1.4	NDSR	Floor Mounted AHU - 1100CFM / 3TR / 6RD / 125mm static	No.	1				
1.5	NDSR	Floor Mounted AHU - 1100CFM / 16TR / 6RD / 125mm static	Nos.	2				
1.6	NDSR	Floor Mounted AHU - 1300CFM / 4.1TR / 6RD / 125mm static	Nos.	2				
1.7	NDSR	Floor Mounted AHU - 1300CFM / 8TR / 6RD / 125mm static	No.	1				
1.8	NDSR	Floor Mounted AHU - 1500CFM / 5.5TR / 6RD / 125mm static	No.	1				
1.9	NDSR	Floor Mounted AHU - 1600CFM / 4.3TR / 6RD / 125mm static	Nos.	4				
1.10	NDSR	Floor Mounted AHU - 1800CFM / 6.3TR / 6RD / 125mm static	Nos.	2				
1.11	NDSR	Floor Mounted AHU - 1900CFM / 6TR / 6RD / 125mm static	No.	1				
1.12	NDSR	Floor Mounted AHU - 2000CFM / 6TR / 6RD / 125mm static for Micro Biology	Nos.	2				
1.13	NDSR	Floor Mounted AHU - 2500CFM / 7TR / 6RD / 125mm static	No.	1				
1.14	NDSR	Floor Mounted AHU - 2700CFM / 7TR / 6RD / 125mm static	No.	1				
1.15	NDSR	Floor Mounted AHU - 3000CFM / 7TR / 6RD / 125mm static	No.	1				
1.16	NDSR	Floor Mounted AHU - 3700CFM / 17.4TR / 6RD / 125mm static	No.	1				
1.17	NDSR	Floor Mounted AHU - 3800CFM / 13.5TR / 6RD / 125mm static with flame proof motor, fan, limit switch & other required accessories.	No.	1				
1.18	NDSR	Floor Mounted AHU - 6400CFM / 4.5TR / 6RD / 125mm static	No.	1				
1.19	NDSR	Floor Mounted AHU - 8400CFM / 19.6TR / 6RD / 125mm static	No.	1				
2	NDSR	AIR HANDLING UNITS (FOR COMFORT, RECIRCULATION AHU)						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply installation , testing & Commissioning of Sheet metal sectionalised cabinet type air handling unit with thermal break profile in Double skin construction fabricated from Al extruded section frame structure. Outer skin will be 0.63 mm pre plasticized GI. Inner skin 0.63 mm plain GI construction with 43 mm thick PUF insulation panel complete with following section. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
i		Mixing Chamber						
ii		Prfilter section with Pre filter(10 Micron & 90 % Efficiency)						
iii		coil section with coil 6RD						
iv		Blower(DIDW Backward Curve Fans for 125mm Static Pressure & DIDW Forward Curve Fan for 65mm Static Pressure) section with Blower and fm motor ,both Motor and Blower are mounted on common base frame						
v		Microvee filter section with M.V. filter In Aluminium construction(5 Micron&95 % Efficiency)						
vi		Fresh air Module With S.S. bird screen ,volume control damper and 20 Micron Filter(90 % Efficiency)						
vii		Exhaust air Module With S.S. bird screen ,volume control damper and 20 Micron Filter(90 % Efficiency)						
viii		sandwich type insulated drain pan ,drain pan should be 18 G SS construction						
ix		Magnahelic Guages with Necessary Tubing across Pre Filter (0-25 mm WG), Microvee filter (0-25 WG) & HEPA filter (0-100 mm WG).						
x		Mixing chamber						
xi		Prefilter section should be of min.50mm Thick.						
xii		Blower section length should be as per standared dimension of the blower required to install the blower in housing.						
xiii		There should be access door across every section of AHU						
xiv		Necessary openings for magnahelic gauges & electrical connections						
xv		The face velocity across cooling coil shall be limited to 152 MPM maxm. The capacity of Air-handlers shall be as follows:						
xvi		Maximum permissible fan outlet velocity shall be upto 10 m/sec.						
		Note: Length of mixing chamber, coil chamber, pre filter section section, gap between blower & pre filter section and gap after microvee filter & before main discharge shall be as per manufacture standard with adequate free space for maintenance across filters/ cooling coil/fans/mixing chamber with required access door to access AHU, accessories such as fans/filters/cooling coil /mixing chamber etc.						
2.1	NDSR	Floor Mounted AHU- 7500CFM / 14.8TR / 6RD / 65mm static	No.	1				
2.2	NDSR	Floor Mounted AHU- 5000CFM / 10TR / 6RD /65mm static	Nos.	2				

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
2.3	NDSR	Floor Mounted AHU- 4500CFM / 12.3TR / 6RD /65mm static	No.	1				
2.4	NDSR	Floor Mounted AHU- 3000CFM / 7.2TR / 6RD / 65mm static	Nos.	2				
3	NDSR	FORCE DRAFT VENTILATION FOR SUPPLY						
		Supply installation , testing & Commissioning of Single skin AHU for forced draft ventilation system. Sheet metal sectionalised cabinet type ventilation unit in single skin construction fabricated from Aluminium extruded section frame structure. The skin should be 1.6 MM thick Galvanised Iron Sheet and complete with following sections. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
i		Prefilter section with Pre filter(10 Micron & 90 % Efficiency)						
ii		Blower(DIDW (Double Inlet Double Width) forward /Backward curve fans , section with Blower and motor. Both Motor and Blower are mounted on common base frame.						
iii		Magnehelic Guages with necessary tubing across Prefilter(0-25 mm WG)/						
iv		Microvee filter section with M.V. filter In Aluminium construction(5 Micron&95 % Efficiency)						
v		Prefilter section should be min.50 MM thick.						
vi		Blower section length should be as per standard dimension of the blower required to installed the blower in housing.						
vii		There should be access door across every section of AHU. There should be opening for cable entries in AHU for blower section & ports for magnehelic gauges wherever required across prefilter section.						
viii		Maximum permissible fan outlet velocity shall be upto 10 m/sec.						
		Note 1: All space asked between section and length of section shall be as per manufacturer standard with adequate free space for maintenance across filters/ /fans with required access door to access FDV, accessories such as fans/ filters/ etc. Note 2: This item does not include the cost of Hepa Filters.						
3.1	NDSR	Fresh Air Unit with above technical requirement						
3.1.1	NDSR	Fresh Air Unit -2300CFM /125mm static (HEPA located at Terminal)	No.	1				
3.1.2	NDSR	Fresh Air Unit -2700CFM /125mm static (HEPA located at Terminal)	No.	1				
3.1.3	NDSR	Fresh Air Unit -3200CFM /125mm static (HEPA located at Terminal)	No.	1				
3.1.4	NDSR	Fresh Air Unit -4000CFM /125mm static (HEPA located at Terminal)	No.	1				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
3.1.5	NDSR	Fresh Air Unit -6000CFM /125mm static (HEPA located at Terminal)	No.	1				
3.1.6	NDSR	Fresh Air Unit -7000CFM /125mm static (HEPA located at Terminal)	No.	1				
3.1.7	NDSR	Fresh Air Unit -12000CFM /125mm static (HEPA located at Terminal)	No.	1				
3.2	NDSR	Fresh Air Unit with Pre & Fine Filter with above technical requirement & excluding HEPA						
3.2.1	NDSR	Fresh Air Unit -1000CFM /40mm static with Pre Filter without Fine Filter	No.	1				
3.2.2	NDSR	Fresh Air Unit -1200CFM /40mm static with Pre Filter without Fine Filter	No.	1				
3.2.3	NDSR	Fresh Air Unit -2200CFM /65mm static	No.	1				
3.2.4	NDSR	Fresh Air Unit -2300CFM /40mm static with Pre Filter without Fine Filter	No.	1				
3.2.5	NDSR	Fresh Air Unit -5800CFM /65mm static	No.	1				
3.2.6	NDSR	Fresh Air Unit -6000CFM /65mm static	No.	1				
3.2.7	NDSR	Fresh Air Unit -7000CFM /65mm static	No.	1				
3.2.8	NDSR	Fresh Air Unit -10500 CFM /65mm static	Nos.	2				
3.2.9	NDSR	Fresh Air Unit -11200CFM /65mm static	No.	1				
3.2.10	NDSR	Fresh Air Unit -11800CFM /65mm static	No.	1				
3.2.11	NDSR	Fresh Air Unit -12800CFM /65mm static	No.	1				
3.2.12	NDSR	Fresh Air Unit -14900CFM /65mm static	No.	1				
3.2.13	NDSR	Fresh Air Unit -15000 CFM /65mm static	No.	1				
3.2.14	NDSR	Fresh Air Unit -16700CFM /65mm static	Nos.	2				

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
3.2.15	NDSR	Fresh Air Unit -18000CFM /65mm static	Nos.	7				
3.2.16	NDSR	Fresh Air Unit -19600CFM /65mm static	No.	1				
4	NDSR	FORCE DRAFT VENTILATION FOR EXHAUST						
		Supply installation , testing & Commissioning of Single skins for forced draft ventilation system. Sheet metal sectionalised cabinet type Ventilation unit in single skin construction fabricated from Alluminium extruded section frame structure. The skin should be 1.6 MM thick Galvanised Iron Sheet and complete with following sections. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
i		Prefilter section with Pre filter(10 Micron & 90 % Efficiency)						
ii		Blower(DIDW (Double Inlet Double Width) forward /Backward curve fans , section with Blower and motor. Both Motor and Blower are mounted on common base frame.						
iii		Magnehelic Guages with necessary tubing across Prefilter (0-25 mm W.G).						
iv		Prefilter section should be of 50 MM thick.						
v		Blower section length should be as per standared dimension of the blower required to installed the blower in housing.						
vi		There should be access door across every section of AHU. There should be opening for cable entries in AHU for blower section & ports for magnehelic gauges wherever required across prefilter section.						
vii		Maximum permissible fan outlet velocity shall be upto 10 m/sec.						
		Note: All space asked between section and length of section shall be as per manufacturer standard with adequate free space for maintenance across filters/ /fans with required access door to access FDV, accessories such as fans/ filters/ etc.						
4.1	NDSR	Exhaust Air Units						
4.1.1	NDSR	700CFM Exhaust Air Unit with 50 mm static	No.	1				
4.1.2	NDSR	900CFM Exhaust Air Units with 50 mm static	Nos.	1				
4.1.3	NDSR	1000CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.4	NDSR	1200CFM Exhaust Air Units with 25 mm static	Nos.	2				

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
4.1.5	NDSR	1900CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.6	NDSR	2000CFM Exhaust Air Units with 50 mm static	Nos.	2				
4.1.7	NDSR	3500CFM Exhaust Air Units with 50 mm static	Nos.	2				
4.1.8	NDSR	4600CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.9	NDSR	5000CFM Exhaust Air Units with 50 mm static	Nos.	2				
4.1.10	NDSR	5100CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.11	NDSR	6000CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.12	NDSR	6300CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.13	NDSR	9000CFM Exhaust Air Units with 50 mm static	Nos.	2				
4.1.14	NDSR	9600CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.15	NDSR	10100CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.16	NDSR	10500CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.17	NDSR	10900CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.18	NDSR	12700CFM Exhaust Air Units with 50 mm static	No.	1				
4.1.19	NDSR	13000 CFM for Exhaust Air with 50 mm static	No.	1				
4.1.20	NDSR	14200CFM Exhaust Air Units with 50 mm static	Nos.	2				
4.1.21	NDSR	15000CFM Exhaust Air Units with 50 mm static	Nos.	7				

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
4.1.22	NDSR	16700CFM Exhaust Air Units with 50 mm static	No.	1				
5	NDSR	DUCT HEATERS Supply installation,testing & Commissioning of Heater plenum with Strip heaters (3 Banks) mounted with electrical starter panel , necessary mountings & accessories. Housing should be 1.25 MM thick CRCA (Cold Rolled Cold Annealed) with 2 coats of Red Oxide insulated of following capacities including Humidistat.It should be complete as per Manufacturer's Technical Specifications & as per directions of engineer-in-charge.						
5.1	NDSR	1.5 Kw	Nos.	2				
5.2	NDSR	2.0 Kw	Nos.	2				
5.3	NDSR	3.0 Kw	Nos.	2				
5.4	NDSR	4.0 Kw	Nos.	14				
5.5	NDSR	5.0 Kw	Nos.	25				
5.6	NDSR	7.0 Kw	Nos.	2				
5.7	NDSR	8.0 Kw	Nos.	2				
5.8	NDSR	9.0 Kw	Nos.	2				
5.9	NDSR	10 Kw	Nos.	5				
5.10	NDSR	12 Kw	No.	1				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
6	NDSR	Supply installation,testing & Commissioning of Dust collector of follwing capacity with approx 15mt length, 150mm dia MS pipe & necessary accessories to make the system functional . It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
6.1	NDSR	300CFM	Nos.	8				
6.2	NDSR	500CFM	Nos.	3				
6.3	NDSR	1400CFM	Nos.	2				
6.4	NDSR	2700CFM	Nos.	2				
6.5	NDSR	4200CFM	Nos.	2				
7	NDSR	Dehumidifier - Lithium Chloride type						
		Supply installation, testing & Commissioning of Lithium Chloride type dehumidifier complete with booster process blower (External static pressure of 10 mm WG, Suitable motor),refrigeration solution pumps with motor, honey comb structure cellulose Media ,Chilled water based precooling units, control panel with PLC /contrector /relay/switches etc. Communication facility for the PLC . fresh air intake with 10 micron synthetic washable filters, F6 filter and damper, G4 filter in reactivation path, H 13 HEPA filter, Suitable Motor and Coil, isolation valves, thermostat/ humidistat, display devices , condensate steam trap assembly . It should be complete as per Manufacturer's Technical Specifications & as per directions of engineer-in-charge.						
7.1	NDSR	Model No DT 2400/9 of DU Cool Make or equivalent	No.	1				
7.2	NDSR	Model No DT 1400/9 of DU Cool Make or equivalent	Nos.	3				
8	NDSR	AIR COOLED SPLIT UNITS						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supplying & installation, commissioning and testing of Air Cooled Split type Wall Mounted Air-conditioners with evaporating unit comprising of cooling coil, blower and motor and condensing unit comprising of hermetically sealed rotary compressor , Condenser coil, propeller fan. Unit shall be complete with controls , interconnecting copper refrigerant piping with insulation, electrical cabling, earthing etc. between evaporative and condensing unit complete with refrigerant gas and oil and MS Stand duly painted for outdoor units. The units shall be suitable for operating on $220 \pm 6\%$ volt 1 phase 50 cycle AC Supply. The units shall be suitable for cordless remote operation. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
8.1	NDSR	2 TR Split Unit	Nos.	11				
9	NDSR	AIR COOLED DUCTABLE UNITS						
		Supplying, installation, commissioning and testing of Air Cooled Split type Ductable Air-conditioners with evaporating unit comprising of cooling coil, blower and motor and condensing unit comprising of hermetically sealed scroll / reciprocating compressor , Condenser coil, propeller fan. Unit shall be complete with control , interconnecting copper refrigerant piping with insulation based on enclosed layout drawings, electrical control Panel, cabling, earthing etc.between evaporated and condensing unit complete with refrigerant gas and oil and MS Stand duly painted for outdoor units. The units shall be suitable for operating on 415 ± 10% volt 3 phase 50 cycle AC Supply. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
9.1	NDSR	5.5TR With Scroll Compressor	No.	1				
10	NDSR	Supply, installation, testing and commissioning of copper refrigerant piping duly insulated(Two Length included) with Nitrile between the above indoor & outdoor units as shown on drawing enclosed .with necessary supports etc. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.	RMT	140				
11	NDSR	Supply, installation, testing & commissioning PVC drain piping with fittings, &duly insulated with 6 mm thick Nitrile insulation. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
11.1	NDSR	32 mm O.D	RMT	140				
12	NDSR	Supply , Installation, testing and commissioning Room temperature / RH Digital display units with necessary measuring devices . It should be complete as per Technical Specifications & as per directions of engineer-in-charge.	Nos.	112				
		Total of Part A carried to Summary of Prices. (In Rs.)						
		PART B AIR DISTRIBUTION SYSTEM.						
1		DUCTING WORK						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
	DSR 2013 Item No.16.12.1	Supply, Installation, Balancing & Commissioning of factory fabricated GSS sheet metal rectangular / round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports etc. as per approved drawings and specifications of following sheet thickness complete as required.						
		All return air ducting to be provided with the chicken wire mesh, this shall be a part of below mentioned prices for ducting.						
1.1	DSR 2013 Item No.16.12.1.1	24 G (0.63 mm)	Sqm	7050				
1.2	DSR 2013 Item No.16.12.1.2	22 G (0.80 mm)	Sqm	2348				
1.3	DSR 2013 Item No.16.12.1.3	20 G (1.0 mm)	Sqm	442				
2	NDSR	Main Box Type Duct Damper						
	NDSR	Supply, fabrication, installation, testing & commissioning of aluminum construction low leakage airfoil blade Main duct damper for supply & return air complete with nuts bolts, screws, linkage, flanges etc. ducts lever and quadrants for proper balancing of the air distribution system . It should be complete as per Technical Specifications & as per directions of engineer-in-charge.	Sqm	63				
3		Fire Dampers Supplying, Fixing, Testing & Commissioning of Fire Dampers in supply air duct / main branch and return air path as and where required of required sizes i/c control wiring, the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and externally mounted. The damper shall also be closed in the event of fire signal complete as required and as per specifications.						
3.1	DSR 2013 Item No.16.20.1	Fire Damper	Sqm	31				
3.2	DSR 2013 Item No.16.20.2	Damper Actuator	Nos.	74				
4	NDSR	Terminal Hepa Modules to Accomodate HEPA Filter						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply, installation, testing and commissioning of HEPA Filter Modules made out of 1.2mm GI Powder coated construction complete with Floor operated Bewel Gear Damper, Filter fixing Raaangement along with DOP test port .Filter fixing frames as standard. Modules to include SS 304 1.2mm perforated grille with SS CSK Screw to fit fluah with Module . It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
4.1	NDSR	To accomadate -- 610 x 610 x 300 mm Hepa Filter	Nos.	110				
4.2	NDSR	To accomadate -- 610 x 610 x 150 mm Hepa Filter	Nos.	50				
5	NDSR	Supply, installation, testing and commissioning of SS-304 1.0 mm thick. Perforated Grille for supply and return air in Non & Classified Areas. Sizes will be as per the drawings. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.	Sqm	222				
6	NDSR	HEPA Filter						
		HEPA Filter (High efficiency particulate air) designed to remove particles down to 0.3 Microns from air streams with an efficiency of 99.97 %. The filter matrix comprises glass fiber media with machine pleated specially treated aluminium seperators with DOP test. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
6.1	NDSR	610 mm x610mm x300mm (1000CFM)	Nos.	110				
6.2	NDSR	610 mm x610mm x150mm (500CFM)	Nos.	50				
7	NDSR	Supply, installation, testing and commissioning of 50 micron powder coated "Aluminium" collar volume control dampers with key operated of black painted in supply & Return air registers / terminals. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.	Sqm	215				
8	NDSR	Supplying & fixing of 50 micron powder coated Fresh air intake louvers bird screen type (Aluminium extruded only) as per specification and sizes will be as per shop drawing mentioned. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.	Sqm	3				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
9	NDSR	Magnahelic Guages across room for differential pressure.This includes S.S. box to mount these units and necessary tubing and other accessories to get these unit functioning.(0 - 6 mm of W.G.). It should be complete as per Technical Specifications & as per directions of engineer-in-charge.	Nos.	112				
		Total of Part B carried to Summary of Prices. (In Rs.)						
		PART C PIPING WORK						
1	Derived from DSR 2013 Item No.16.3	Supply,laying /fixing, testing and commissioning of follwng nominal sizes of piping with insulation (with necessary wooden & MS supports ,pedestal , clamps,vibration isolators & fittings but excluding valves,strainers,Guages etc) with fire retrandant quality expanded ploystyrene moulded pipe section of 20kg/m3 after a thick coat of cold adhesive (CRPX Compound) wrapping with 500g polythene faced hessain or 500 G Polythene, as approved by the EIC & finally applying 0.63mm aluminum sheet cladding complete with type 3 grade 1 roofing feltstrip (as per IS :1322 as amended up to date) at joints repairing of damage to building etc as per specification & as required complete in all respect .						
		Note : The pipe of Size 150mm & Below shall be MS C class as per IS :1239 & pipe size above 150mm dia shall be welded black steel pipe heavy class as per IS :3589, from minimum 6.35 thick MS sheet for the pipes upto 350mm & from minimum 7mm thick MS sheet for the pipes of 400mm Dia & Above.						
1.10	DSR 2013 Item No.16.3.8	100mm dia pipe (50mm thick Insulation)	Rmt	110				
b)	DSR 2013 Item No.16.3.9	80mm dia pipe (50mm thick Insulation)	Rmt	60				
c)	DSR 2013 Item No.16.3.10	65mm dia pipe (50mm thick Insulation)	Rmt	100				
d)	DSR 2013 Item No.16.3.11	50mm dia pipe (50mm thick Insulation)	Rmt	70				
e)	DSR 2013 Item No.16.3.12	40mm dia pipe (50mm thick Insulation)	Rmt	130				
f)	DSR 2013 Item No.16.3.13	32mm dia pipe (50mm thick Insulation)	Rmt	260				
g)	DSR 2013 Item No.16.3.14	25mm dia pipe (50mm thick Insulation)	Rmt	50				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
2		Insulated Valves						
	DSR 2013 Item No.16.7	Supplying, fixing, testing & commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.						
2.1	DSR 2013 Item No.16.7.1	Butterfly Valve (manual) with CI body SS Disc, Nitrile Rubber Seal & O-Ring PN 16 pressure rating for chilled water/ hot water circulation as specified.						
2.1.1	DSR 2013 Item No.16.7.1.7	50mm Dia	Nos.	10				
2.2	NDSR	Globe Valve						
2.2.1	NDSR	25mm Dia	Nos.	6				
2.2.2	NDSR	32mm Dia	Nos.	42				
2.2.3	NDSR	40mm Dia	Nos.	18				
2.3	DSR 2013 Item No.16.7.2	Balancing Valve with built in measuring facility with CI body flanged construction with EPDM coated disc with long pitch with protected out pipe insulation & PN 16 pressure rating for chilled / hot water circulation as specified.						
2.3.1	DSR 2013 Item No.16.7.2.7	50mm Dia	Nos.	5				
2.3.2	DSR 2013 Item No.16.7.2.8	40mm Dia	Nos.	9				
2.3.3	NDSR	32mm Dia	Nos.	21				
2.3.4	NDSR	25mm Dia	Nos.	3				
2.4	DSR 2013 Item No.16.7.4	"Y" type strainer of ductile CI Body flanged ends with stainless steel strainer for chilled /hot water circulation including insulation as specified.						
2.4.1	DSR 2013 Item No.16.7.4.7	50mm Dia	Nos.	5				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
2.4.2	DSR 2013 Item No.16.7.4.8	40mm Dia	Nos.	9				
2.4.3	NDSR	32mm Dia	Nos.	21				
2.4.4	NDSR	25mm Dia	Nos.	3				
2.5	NDSR	Supply, installation, testing & commissioning of motorised 2way valve modulating type complete with electrical actuator,thermostat ,heavy duty PN10 cast iron body with nylon coated S.G. iron disk,water sealant lining, stainless steel shaft, control lever with thermostat control wiring,accessories if any like transformer etc.position confirming to standard specification for the following sizes.						
2.5.1	NDSR	20mm Dia	Nos.	3				
2.5.2	NDSR	25mm Dia	Nos.	21				
2.5.3	NDSR	32mm Dia	Nos.	9				
2.5.4	NDSR	40mm Dia	Nos.	5				
3	DSR 2013 Item No.16.9	Providing & Fixing in position the mercury in glass industrial type thermometer complete as required.	Nos.	80				
4	DSR 2013 Item No.16.8	Providing & Fixing in position the industrial type pressure gauge complete as required.	Nos.	40				
5	NDSR	Supply, Installation,Testing, & Commissioning of Automatic air vent with ball valve in brass construction complete with nipples, union etc. as required at all high points in the pipe lines. The valve shall be such as to have non-return valve as integral part of the vent. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
5.10	NDSR	12 mm dia auto air vent valve	Nos.	80				

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
6	NDSR	Supply, installation ,testing & commissioning of condensate drain water piping of GI 'Medium' class complete with Medium Class fittings like elbows, tees, reducers bends, MS flanges, supports, welding, painting etc. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
6.1	NDSR	32 mm dia pipe	Rmt	165				
7	NDSR	Supply, Installation, Testing & Commissioning of 25mm diameter Drain Valves in dirt legs complete with nipples. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.	Nos.	40				
		Total of Part C carried to Summary of Prices. (In Rs.)						
		PART D INSULATION WORK.						
1	NDSR	Supplying , installation, testing & commissioning of external thermal insulation on ducts with Closed Cell Cross Linked Polythylene (XLPE) Foam of density min. 30 Kg/m³ with 13/9 mm thick & thermal Conductivity not exceeding 0.035 W/mK at an average Temperature of 40°C. The Material Shall be rated as Class 1, As per BS476 Part 7 ,The Smoke Density as per AS - 1530.3 Shall not exceed 1. The Material shall have Fire Approval from CBRI - Roorkie & no toxicity under flaming and non-flaming condition as per AITM 3.000 (1993) .Adhesive used for setting the insulation shall be non - flammable,Vapour Proof. All Joints should be sealed with 3 mm thick 50 mm wide PE tape and Flange to be overlapped by 6" width of the same material thickness. Finally Duct insulated should be strapped by 12mm Plastic Packing strip at every random meter & conforming to technical specifications. It should be complete as per directions of Engineer-in-charge.						
1.1	NDSR	13 mm thick Closed Cell Cross Linked Polythylene(XLPE) Foam with <u>Factory Laminated Al PE Foil for Supply Air Duct</u>	Sqm	1500				
1.2	NDSR	9 mm thick Closed Cell Cross Linked Polythylene(XLPE) Foam with <u>Factory Laminated Al PE Foil for Return Air Duct</u>	Sqm	1500				
2	NDSR	Supply,installation, testing and commissioning of Insulation of condensate drain water piping with 25 mm thick pre - moulded expanded Polystyrene (P Quality) pipe section duly aluminium cladded and shall be conforming to technical specifications. It should be complete as per directions of Engineer-in-charge.						
2.1	NDSR	32 mm dia pipe	Rmt	165				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Total of Part D carried to Summary of Prices.						
		PART E ELECTRICAL WORK.						
1	NDSR	CUBICAL PANEL BOARD FOR ALL AHUS & FDVS						
		Supply, Installation, Testing and commissioning of wall mounted panels near the each AHU/Ventilation units constructed out of 2mm thick CRCA sheet duly powder coated as per specifications. The panel shall have hinged door with on-off interlocks. The panel shall be complete with incoming MPCB/MCCB, suitable bus bars of aluminum construction, bus links complete with Star delta /DOL starter with 'hands', "off", automatic modeselection switch, ammeter for each motor, timer, Auto Manual switch, remote start/stop contacts, earthing connector etc.,as required. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incommer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Panel With following Capacities:						
1.1	NDSR	FOR FLOOR MOUNTED AHU & VENTILATION UNITS						
1.1.1	NDSR	2A TP MPCB with up to 1.5HP DOL starter , overload relay start/stop push buttons, ammeter (0-50A) with single CT & ON / OFF / TRIP indication lights etc.MPCB Shall be 25 KA .	Set	9				
1.1.2	NDSR	4A TP MPCB with 2HP DOL Starter , overload relay start/stop push buttons, ammeter (0-50A) with single CT & ON / OFF / TRIP indication lights etc.MPCB Shall be 25KA .	Set	15				
1.1.3	NDSR	6A TP MPCB with 3HP DOL Starter , overload relay start/stop push buttons, ammeter (0-50A) with single CT & ON / OFF / TRIP indication lights etc.MPCB Shall be 25KA .	Set	18				
1.1.4	NDSR	10A TP MPCB with 5HP DOL Starter , overload relay start/stop push buttons, ammeter (0-50A) with single CT & ON / OFF / TRIP indication lights etc.MPCB Shall be 25KA .	Set	19				
1.1.5	NDSR	13A TP MPCB with 7.5HP DOL starter , overload relay start/stop push buttons, ammeter (0-50A) with single CT & ON / OFF / TRIP indication lights etc.MPCB Shall be 25KA .	Set	8				
1.1.6	NDSR	16A TP MPCB with 10HP Star Delta starter , overload relay start/stop push buttons, ammeter (0-50A) with single CT & ON / OFF / TRIP indication lights etc.MPCB Shall be 25KA .	Set	23				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
1.1.7	NDSR	21A TP MPCB with 15HP Star Delta starter , overload relay start/stop push buttons, ammeter (0-50A) with single CT & ON / OFF / TRIP indication lights etc.MPCB Shall be 25KA .	Set	12				
1.1.8	NDSR	28A TP MPCB with 20HP Soft starter , overload relay start/stop push buttons, ammeter (0-50A) with single CT & ON / OFF / TRIP indication lights etc.MPCB Shall be 25KA .	Set	1				
1.2	NDSR	Supply,Installation , Testing Commissioning of Isolator Box with MCB/MCCB as per manufacturer's specifications of Split AC & as per directions of engineer-in-charge.	Nos.	12				
		Controls & interlocking of accessories for above as required.						
2	NDSR	L.T PANEL FOR AHUS OF FOLLOWING BLOCKS						
2.1		FOR CAPSULE BLOCK						
2.2		FOR CHYAWANPRASH BLOCK						
2.3		FOR WORKER FACILITY						
2.4		FOR RAW MATERIAL						
2.5		FOR STAFF FACILITY						
2.6		FOR TABLET & PILLS						
2.7		FOR SECONDARY CORRIDOR						
2.8		FOR MICROBIOLOGY						
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter, energy meter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with heat shrink sleeve and mounted on non hydrosopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS chanel 75x50x5mm size or as required. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incommer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
	NDSR	1000 Amp manually operated draw out type TPN ACB with overload short ckt earth fault protection Release (Microprocessor) with 96 mm (0 - 1000A) ammeter with 3CT & selector switch 96 mm (0 - 1000V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01	Set	1				
		Sections of 1000 Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar						
B		OUTGOING						
i		FOR CAPSULE BLOCK						
		100 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 25 KA Short circuit rating. SET -1 No.						
ii		FOR CHYAWANPRASH BLOCK						
		125 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 25 KA Short circuit rating. SET -1 No.						
iii		FOR WORKER FACILITY						
		100 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 25 KA Short circuit rating. SET -1 No.						
iv		FOR RAW MATERIAL						
		630 A TPN ACB EDO type (microprocessor based) on / off indication lights with protection MCB. ACB Shall be of 50 KA Short circuit rating. SET -1 No.						
		100 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 25 KA Short circuit rating. SET -1 No. for RM duct heaters						
v		FOR STAFF FACILITY						
		32 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 25 KA Short circuit rating. SET -1 No.						
vi		FOR TABLET & PILLS						
		250 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 35 KA Short circuit rating. SET -1 No.						
vii		FOR SECONDARY CORRIDOR						
		160 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 25 KA Short circuit rating. SET -1 No.						
viii		FOR MICROBIOLOGY						
		32 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 25 KA Short circuit rating. SET -1 No.						
ix		Spare: 100 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be of 25 KA Short circuit rating. SET -1 No.						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
x		4 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands", "off", automatic mode selection switch of each type.						
3	NDSR	INDIVIDUAL CUBICAL PANEL BOARD TO BE INSTALLED ON SERVICE FLOOR OF EACH FOLLOWING BLOCKS FOR AHUS & FDVS						
3.1	NDSR	FOR CAPSULE BLOCK						
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS chanel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incommer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						
		100 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 100A) ammeter with 3CT & selector switch 96 mm (0 - 100V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 100Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO AHUS & FDVS						
i		FOR 12# AHU /FDV						
		32 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -12 No.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands", "off", automatic mode selection switch of each type.	Set	1				

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
3.2	NDSR	FOR CHYAWANPRASH						
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shriek sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS channel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incomer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frequency Meter etc.						
A		INCOMER						
		100 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 100A) ammeter with 3CT & selector switch 96 mm (0 - 100V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 100Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO AHUS & FDVS						
		FOR 11# AHU /FDV						
		32 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -10 Nos.						
		40 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -1 No.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
3.3	NDSR	FOR WORKER FACULTY						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS chanel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incomer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frequency Meter etc.						
A		INCOMER						
		100 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 100A) ammeter with 3CT & selector switch 96 mm (0 - 100V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 100Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO AHUS & FDVS						
		FOR 08# AHU /FDV						
		32 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -8 Nos.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands", "off", automatic mode selection switch of each type.	Set	1				
3.4	NDSR	FOR RAW MATERIAL						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS chanel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incommer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						
		630 Amp manually operated draw out type TPN ACB with overload short ckt earth fault protection Release (Microprossour) with 96 mm (0 - 800A) ammeter with 3CT & selector switch 96 mm (0 - 800V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 630Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO AHUS & FDVS						
		FOR 33 # AHU /FDV						
		32 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET - 21 Nos.						
		40 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET - 11 Nos.						
		63 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET - 01 Nos.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands", "off", automatic mode selection switch of each type.	Set	1				
3.5	NDSR	FOR TABLET & PILLS						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS channel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incommer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						
		250 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 250A) ammeter with 3CT & selector switch 96 mm (0 - 250V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 250Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO AHUS & FDVS						
		FOR 27 # AHU /FDV						
		32 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -24 Nos.						
		40 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -2 Nos.						
		63 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -01 No.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
3.6	NDSR	FOR SECONDARY CORRIDOR						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS channel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incommer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						
		160 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 160A) ammeter with 3CT & selector switch 96 mm (0 - 160V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 160Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO AHUS & FDVS						
		FOR 08 # AHU /FDV						
		32 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET - 04 Nos.						
		40 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET - 03 Nos.						
		63 A TPN MCCB on / off indication lights with protection MCB. MCCB Shall be 25 KA SET - 01 No.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
3.7	NDSR	FOR MICROBIOLOGY						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS channel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incomer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						
		40 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 40A) ammeter with 3CT & selector switch 96 mm (0 - 40V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 63Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO AHUS & FDVS						
		FOR 02 # AHU /FDV						
		16 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -02 Nos.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
4.00	NDSR	PANEL FOR DUCT HEATER OF REQUIRED BLOCKS						
4.1	NDSR	FOR CAPSULE & CHURAN						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS chanel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incommer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						
		250 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 250A) ammeter with 3CT & selector switch 96 mm (0 - 250V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 250Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO HEATERS						
		FOR 18 # DUCT HEATER						
		32 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -18 Nos.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
4.2	NDSR	FOR CHYAWANPRASH						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS channel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incomer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						
		250 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 250A) ammeter with 3CT & selector switch 96 mm (0 - 250V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 250Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO HEATERS						
		FOR 18 # DUCT HEATER						
		32 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -08 Nos.						
		50 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -08 Nos.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
4.3	NDSR	FOR RAW MATERIAL						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS channel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incomer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frequency Meter etc.						
A		INCOMER						
		100 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 100A) ammeter with 3CT & selector switch 96 mm (0 - 100V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01						
		Sections of 100Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar						
B		OUTGOING TO HEATERS						
		FOR 02 # DUCT HEATER						
		50 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -01 No.						
		32 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -01 No.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
4.4	NDSR	FOR TABLET & PILLS						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS chanel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incommer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frquency Meter etc.						
A		INCOMER						
		250 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 250A) ammeter with 3CT & selector switch 96 mm (0 - 250V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 250Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO HEATERS						
		FOR 02 # DUCT HEATER						
		50 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -02 Nos.						
		32 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -19 Nos.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
4.5	NDSR	FOR MICROBIOLOGY						

SL.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
		Supply,Installation,Testing and commissioning and designing of factory fabricated metal clad dust & vermin proof floor mounted 440V/ 50 HZ, with 50KA short circuit for 1 sec. 3 phase & neutral Electric panel duly powder coated spray painted with separate chamber for instruments and switching shall comprise of ampere meter, voltmeter & frequency meter, Incomer and outgoing switches, MCCBs/MCBs with extendable rotary handle etc. The panel shall have following size incomer and outgoing switchgears having suitable amp, capacity 415V, TPN Aluminium Bus bar Electrolyte as per IS 8623 insulated with hat shrik sleeve and mounted non hydroscopic support with detachable side with Hinged & Locking. The switches shall be completed with Lug and cable gland of suitable size of cable. The panels should be made of 2mm CRCA sheet. The panel should be rest on MS channel 75x50x5mm size or as required complete as per technical specifications & as per direction of Engineer-in-charge.						
		Panel should have following:						
		Indicating lights LED for incomer and outgoing						
		Ammeter with selector switch						
		Volt meter with selector switch with fuse						
		Frequency Meter etc.						
A		INCOMER						
		40 Amp TPN MCCB with overload short ckt earth fault protection Release with 96 mm (0 - 40A) ammeter with 3CT & selector switch 96 mm (0 - 40V) Voltmeter with selector switch phase indication light with protection MCB, on / off / trip indicating light. SET - 01.						
		Sections of 40Amps TPN bus bar chamber of suitable lengths with Aluminium bus bars. All bus bars and interconnections shall be of suitable size Al strips. Current density of Al shall not be more than 0.8 Amps/ sq.mm cross sectional area of Bus Bar.						
B		OUTGOING TO HEATERS						
		FOR 02 # DUCT HEATER						
		32 A TPN MCCB , on / off indication lights with protection MCB. MCCB Shall be 25 KA SET -02 Nos.						
	NDSR	2 nos.Vacant Space for outgoing feeders sufficient to accommodate MCCB and Starter with 'hands', 'off', automatic mode selection switch of each type.	Set	1				
5	NDSR	POWER & CONTROL CABLING WITH EARTHING						
5.1	NDSR	Supplying, laying, effecting proper connections, testing & commissioning of the following sizes of 1.1 KV -Cross Linked Poly Ethelene armoured aluminium conductor cables conforming to relevant latest amended Indian Standards laid over MS supports & Cable Trays including required lugs & clamping the cables to supports in an approved manner as required complete with all accessories & as per directions of Engineer-in-charge.						
		For Air Handling , FDV Units and duct heaters						

Sl.No.	DSR 2013 Item No./ NDSR	Description	Unit	Qty.	Rate (Rs.) In Figures	Rate (Rs.) In Words	Amount (Rs.) In Figures	Amount (Rs.) In Words
5.1.1	NDSR	3C x 6 Sq. mm	Rmt	1365				
5.1.2	NDSR	3C x 10 Sq. mm	Rmt	2940				
5.1.3	NDSR	3C x 16 Sq. mm	Rmt	60				
5.1.4	NDSR	3.5C x 25 Sq. mm	Rmt	60				
5.1.5	NDSR	3.5C x 35 Sq. mm	Rmt	60				
5.1.6	NDSR	3.5C x 70 Sq. mm	Rmt	60				
5.1.7	NDSR	3.5C x 150 Sq. mm	Rmt	60				
5.1.8	NDSR	3.5C x 400 Sq. mm (from main LT panel to Duct heater sub panels)	Rmt	450				
5.1.9	NDSR	3Rx 3.5C x 400 Sq. mm (from Main LT panel to sub AHU main panel)	Rmt	150				
5.2	NDSR	Supply and laying ,testing and commissioning of following sizes of Copper conductor control cables with PVC conduit & fixing clamps and effecting proper connections to equipment etc. It should be complete as per Technical Specifications & as per directions of engineer-in-charge.						
5.2.1	NDSR	2C X 1.5 Sq.mm	Rmt	1630				
5.3		Earthing Strip / Wires.						
5.3.1	DSR 2013 Item No.-5.16	Supply & laying of 6SWG. dia GI wire. or in recess for loop earthing as required.	Rmt	8610				
5.3.2	NDSR	Supply & laying of 50X5 MM GI Strip or in recess for loop earthing as required.	Rmt	540				
		Total of Part E carried to Summary of Prices. (In Rs.)						