# User Requirement Specifications
# Ceiling Suspended Laminar Air Flow

**URS Annexure List:**

| URS Annex No. | Detail |
|---|---|
| 1 | Excel sheet showing room location, quantity and dimension details |

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| | Equipment/System | Ceiling Suspended Laminar Air Flow Unit | | | |
| | Identification #: | - | Document No: | URS/CLF-01 | |
| | Effective Date: | | Revision No: | 01 | |

## 1 APPROVAL SIGNATURE

This document is prepared by the Process, Validation and GMP Compliance team of "NNE Pharmaplan India" for the project "Integrated Vaccine Complex, Chengalpattu, Chennai" (**project number:** 120310) of HLL BIOTECH LIMITED (Chennai) under the authority of their Project Manager. Hence, this document before being effective shall be reviewed by the QA team of HBL, approved by Team lead and authorized by the appropriate Project authority.

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## 2 EQUIPMENT DESCRIPTION

A Ceiling Suspended Laminar air flow unit is used to carry out aseptic operations.

**All points of the IRS except the below mentioned would be applicable for the equipment**

- 4.1.11
- FDA Guidance for industry- Documentation for sterilization Process Validation
- ASME, ANSI / NSF 49-2008, EN12469
- ISO 14364, ISO 8362
- 5.2.7, 5.2.8

**Note:**

| | |
|---|---|
| I. | This Technical Specification is the basis for an inquiry to a vendor and therefore the basis for the vendor's proposal. |
| II. | The vendor is asked to state in "REMARKS" column with "yes" if the described requirement will be completely fulfilled and with "no" in case the requirement will not or cannot be fulfilled with the proposed equipment. In case of any deviation a comment must be inserted or enclosed as a separate annexure by referring to the respective URS specification number. |
| III. | The vendor must clearly comment each item of the Technical Specification. The comments must be in English language. If extra cost for necessary options becomes necessary the item must be clearly stated. |
| IV. | In case that the requirement includes a question or request or an information from the vendor, the answer / information should be stated in the "REMARKS" column. |
| V. | The final version of this document including the vendor's comments will become basis of a potential purchase order or contract. |
| VI. | The Technical Specification serves to define a summary of all vendor's requirements concerning scope of delivery and services. |
| VII. | The vendor is responsible for technically unobjectionable function of the equipment. This TS is not intended to dictate a technical design to the vendor. If agreed upon with the vendor, the vendor can apply his practically proven design. |
| VIII. | Special Instruction<br>a. If no comments against any specification should be considered as "NO" and<br>b. If there is no reply / comments against the complete URS by the vendor then it should be treated as unresponsive / technically non-compliant and rejected. |
| IX. | All the instruments and controls mentioned in the URS(s) are expected to be standard supply and part of your standard equipment model. In case of any deviation or redundancy or additional scope of supply is noticed, vendor is required to obtain clarification from HBL |

| | |
|---|---|
| | before submitting the quotes. |
| X. | The makes requested are standard international makes. In case of any deviation, vendor to seek clarification from HBL before submitting the offers. |
| XI. | Refer document Installation Requirement Specification and Specific Instructions with URS; NPI-120310-IRS-S1-01 |
| XII. | Refer Tender document with URS; NPI-120310-EQP-S1-TD-14 |

| Specifications | Remarks |
|---|---|
| **3 PROCESS DESCRIPTION** | |
| **3.1 Input & Charging method** | |
| A LAF is used to Carry out aseptic operations. | |
| **3.2 Brief Process Steps** | |
| 3.2.1 Blower in the LAF should be switched on for prior to using the LAF. | |
| 3.2.2 LAF's use vertical laminar airflow to create a barrier to product & Environment. | |
| **3.3 Output & Discharging method** | |
| Not Applicable | |
| **4 PRODUCTIVITY REQUIREMENT** | |
| **4.1 Desired/ suggested capacity** | |
| Refer URS annexure - 1 | |
| **4.2 Standard batch size** | |
| Not Applicable | |
| **4.3 Change Over Time** | |
| Not Applicable | |
| **4.4 Other Productivity Requirement** | |
| Continuous 24x7 operation required | |
| **5 CONTAINMENT** | |
| Not applicable | |
| **6 GMP REQUIREMENTS** | |
| **6.1 Process control** | |
| Not Applicable | |
| **6.2 In –Process control** | |
| Not applicable | |

## 6.3 Level of instrumentation

Sufficient and suitable instrumentation for the process, safety and productivity control as indicated in the following table:

| Type of control | Purpose | Instrumentation |
|---|---|---|
| Differential Pressure | Monitor the pressure drop of the HEPA (H-14) filter w.r.t the ambient pressure | Microprocessor control to provide current filter condition |
| Air velocity | To measure the laminarity of air | Air velocity sensing device with continuous digital display on the LED |
| Speed controller | To maintain the stable motor voltage and airflow despite building voltage fluctuations | Microprocessor based speed controller |
| UV light with Hour meter | UV radiation | with digital hour meter On/Off automation (Timer) for exposure time with Manual Switch. |

## 6.4 Batch data display and record printing

Not Applicable

| 6.5 Technical Specification | | | |
|---|---|---|---|
| 6.5.1 | Model | cGMP | |
| 6.5.2 | Type | Grade A (ISO 5) | |
| 6.5.3 | Inner Area (mm) | Refer URS Annexure - 1 | |
| 6.5.4 | Air flow pattern | Vertical Laminar Air Flow type<br>a) Uni-directional Laminar Air Flow type<br>b) Double Stage filtration | |
| 6.5.5 | Pre- Filter | EU EN779Class G3Efficiency 95% down to 5 µ | |
| 6.5.6 | UV light | a) UV light emitting lamp with Hour meter The minimum operate able life of UV Lamp should be 8000 hr & light emitted shall be short-wave UV radiation with a peak at 253.7 nm (UV-C) for germicidal action. The hour meter should be able to be manually re-**set.**<br>b) UV light with digital Hour Meter | |
| 6.5.7 | HEPA Filter | EU EN 1822 Class H14 / ISO 29463 Class 45H<br>Efficiency >>99.995% down to 0.3 µ | |
| 6.5.8 | Air flow rate | 0.45 ±20 % m/s | |
| 6.5.9 | Quantity | Refer Annexure 1 | |
| 6.5.10 | Electrical Requirement | 220-230 V, 50 Hz , Single phase | |

| 6.6 Material of Construction | | |
|---|---|---|
| 6.6.1 | Body Construction | SS 304, min 240 grit |
| 6.6.2 | Grills | SS 304, min 240 grit |
| 6.6.3 | Coving | SS in built |
| 6.6.4 | Curtains | Anti-static PVC curtains (Except for filling and sealing line ceiling suspended LAFs) |
| 6.6.5 | MOC Fan | Aluminium or SS 304 |
| 6.6.6 | All welds shall be ground finish | |

| 6.7 Specific Equipment requirement | | |
|---|---|---|
| 6.7.1 | LAF shall comply ISO Class 5 (Grade A as per WHO) | |
| 6.7.2 | Pre-filters should be easily accessible for periodic cleaning. | |
| 6.7.3 | Sleeving for accommodating the pre filters. | |
| 6.7.4 | Side access panel for final filters and blowers. | |
| 6.7.5 | HEPA filter shall have an efficiency of 99.995 % when tested with POA. | |
| 6.7.6 | 1 No. magnehelic gauge to be provided to monitor the differential pressure across the HEPA filter. If the number of modules more than one than each module shall have separate magnehelic gauge. | |

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| 6.7.7 | Blower System shall be balanced for vibration free operation and noise level. | |
| 6.7.8 | Blower shall be permanently lubricated | |
| 6.7.9 | Individual blower motor shall be provided on each standard HEPA filter as per the LAF area | |
| 6.7.10 | Motor and electrical devices designed for working in normal operating conditions. | |
| 6.7.11 | Preferred make for Motor and Blower: Crompton Greaves/ ABB/ GE/ Siemens/EBM-PAPST/ebm-Nadi / Zeil-abegg/ Kruger/ Nicotra | |
| 6.7.12 | Light level shall be minimum 650 Lux. Lighting with fluorescent lamps installed in such a way as to generate no turbulence in air flow. | |
| 6.7.13 | Soft touch controls for blower, light shall be provided along color coded indicator (different for each application). It shall be unit mounted. | |
| 6.7.14 | Ergonomic design to access electrical connections and instrumentation behind the control panel | |
| 6.7.15 | PVC curtains shall be provided around the Ceiling suspended LAF to maintain the air flow pattern. Length of the curtains shall be till 300-400mm above the ground floor. (Except for filling and sealing line ceiling suspended LAFs) | |
| 6.7.16 | Vendor shall specify the sizes and quantity of HEPA filter and pre filter in each Ceiling suspended LAF as per the sizes | |
| 6.7.17 | Detailed Installation and fixing details shall be provided | |
| 6.7.18 | Approved makes for filter : Camfil Farr/ AAF/ Freudenberg | |
| 6.7.19 | Approved makes for Magnehelic Gauge : Dwyer | |

## 6.8 Other requirement

| | | |
|---|---|---|
| 6.8.1 | Cleaning shall be done manually. | |
| 6.8.2 | All bolts, nuts shall be of dome type of SS304 material | |
| 6.8.3 | Vendor to give code numbers for each component | |
| 6.8.4 | There shall be no crevices, edges, cracks, pits so as to avoid dust accumulation | |
| 6.8.5 | In general the equipment has to be designed in a way to get easy and quick access to all necessary maintenance points e. g. motors, filters, etc. | |
| 6.8.6 | The design shall be maintenance friendly for the ease of replacement of filters | |
| 6.8.7 | All parts of the machine exposed in classified area must be resistant to standard disinfectants or vendor shall provide the name of specific disinfectants | |
| 6.8.8 | The heat given off by the unit must be stated (inside the room). | |

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| 6.8.9 | Failure mode detection<br>A. Equipment shall be capable to detect the following failure, notify the operator with alarm ,Visual indication:<br>a) Blower motor overload.<br>b) Emergency stop activated.<br>B. Following condition need only notification to operator for procedural control:<br>a) Differential pressure across HEPA filter should provide constant indication of pressure drops and a visual alarm signal of high and low pressure in the filter | |
| 6.8.10 | The following tests to be conducted at the site during qualification:<br>1. Air velocity test<br>2. Filter integrity test<br>3. Flow visualization test (Videography)<br>4. Non-viable particle count<br>5. Recovery test<br>6.Lux level<br>7. Sound level | |
| **6.9** | **Regulatory guidelines / standards** | |
| 6.9.1 | ISO Class 5 14644 – 1 (For Cleanliness Class) | |
| 6.9.2 | ISO 14644 – 3 (For HEPA filter integrity testing & Velocity testing) | |
| 6.9.3 | DIN EN 1822 and ISO 29463 (Filter Class) | |
| 6.9.4 | DIN EN779 (2012) for Filter Efficiency | |
| 6.9.5 | IEST-RP-CC001.3, CC007.1, CC034.1 (Filtration) | |
| 6.9.6 | IEC 61010-1 (Electrical safety) | |
| 6.9.7 | EU-GMP-Guideline Part 1, Annexes 1, 11 & 15 | |
| 6.9.8 | Schedule M of Indian Drugs and Cosmetics Act | |
| 6.9.9 | Code of Federal Regulations (CFR) 21, Part 210: cGMP in Manufacturing, Processing, Packing and Holding of Drugs | |
| **6.10** | **Safety requirements** | |
| 6.10.1 | Noise level should not be more than 65 decibels. | |
| 6.10.2 | Appropriate closure of all the rotating parts. | |
| **6.11** | **Documents** | |
| 6.11.1 | Vendor to submit detailed fabrication drawing for approval before fabrication. | |
| 6.11.2 | **Phase 1: Post ordering and prefabrication stage of the equipment** | |
| 6.11.2.1 | Functional design specification | |
| 6.11.2.2 | Equipment descriptions | |
| 6.11.2.3 | Equipment operation steps | |
| 6.11.2.4 | List of failure indications and interlocks (as applicable) | |

| | | |
|---|---|---|
| 6.11.2.5 | Critical list of major component, devices and instruments with their specific functions, specs and data sheets. | |
| 6.11.2.6 | GA/ Schematic diagram of the equipment | |
| 6.11.2.7 | DQ specification as per the User approved format. | |
| 6.11.2.8 | IQ specification as per the User approved format. | |
| 6.11.2.9 | OQ specification as per the User approved format. | |
| 6.11.3 | **Phase - 2** | |
| 6.11.3.1 | Vendor shall provide the FAT protocol at least 1 month in advance of the date of FAT, for the approval by the user. | |
| 6.11.3.2 | System shall be inspected and tested (FAT) at the Vendor's site in the presence of user's representative before delivery. | |
| 6.11.4 | **Phase - 3** | |
| 6.11.4.1 | Vendor shall provide the following documents in the delivery package in minimum 2 sets. The delivery package shall reach the site of user at least 15 days before the delivery equipment's for the engineering check of the documents. | |
| 6.11.4.2 | Shipping checklist. | |
| 6.11.4.3 | Operation and maintenance manuals; preventive maintenance instruction & schedule for equipment major component as well as the operating system. Control system operation manual. Cleaning procedures to be provided. | |
| 6.11.4.4 | Operation and maintenance manuals for the bought out items (as applicable). | |
| 6.11.4.5 | Drawings: Electrical, instrumentation, final GA drawing etc. | |
| 6.11.4.6 | Spare and/ or change parts list with ordering information. | |
| 6.11.4.7 | MOC certificates | |
| 6.11.4.8 | Calibration certificates of critical instruments with respect to the traceable national reference standard instrument and their calibration procedure. | |
| 6.11.4.9 | Guaranty/ warranty certificate for each equipment and major bought-out items and comprehensive 1 years warranty from the date of installation. | |
| 6.11.4.10 | Types of Lubricant and Lubrication instructions. Food grade certificates. | |
| 6.11.4.11 | The Vendor shall provide start-up services through successful completion of the site acceptance test. The site acceptance test will be a repeat of the factory integration test performed at the Vendor's facility. | |

## 7 CONSTRAINTS

### 7.1 Equipment location and available space

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|---|---|
| Refer annexure 1 | |

## 7.2 Utility

a) Electricity: Single Phase (220 V) & 3 phase (420 - 440 V) (Report Requirement)

## 8 ABBREVIATION

| Abbreviation | Definition |
|---|---|
| CFC | Chlorofluorocarbon |
| CFR | Code of Federal Regulations |
| DQ | Design Qualification |
| FDA | Food and Drug Administration |
| GMP | Good Manufacturing Practice |
| HBL | HLL Biotech Ltd |
| HMI | Human Machine Interface |
| IQ | Installation Qualification |
| ISO | International Standards Organization |
| LAF | Laminar Air Flow |
| MOC | Material Of Construction |
| NA | Not Applicable |
| NPI | NNE Pharmaplan India Limited |
| OQ | Operational Qualification |
| PAO | Poly Alpha Olefin |
| PQ | Performance Qualification |
| QA | Quality Assurance |
| RH | Relative Humidity |
| SS | Stainless steel |
| TBD | To be discussed |
| UPS | Uninterrupted Power Supply |
| URS | User Requirement Specifications |

## 9 REVISION INDEX

| Revision | Date | Reason for revision |
|---|---|---|
| 00 | 16-06-2015 | First Draft for Client's Review |
| 01 | 14-07-2015 | Updated as per HBL comments dated 10-07 2015 |
| | | |

| HLL BIOTECH LIMITED, | | | | | | | |
|---|---|---|---|---|---|---|---|
| nne pharmaplan | INTEGRATED VACCINES COMPLEX, CHENGALPATTU | | | | | | IIBL |
| | Document Name: | URS Annexure-1: Ceiling Suspended LAF List | | | | | |
| | Document number: | NPI_120310_EQP_URS_CLF_01 | | | | | |
| | Date / Revision: | 15-07-2015 / 00 | | | | | |
| Sl. No | Room Number | Room Name | Equipment Code | Description | Quantity | Room Height, mm | Remark |
| **BACTERIAL VACCINES FORMULATION BLOCK** | | | | | | | |
| 1 | F2G009 | Prep. Room | F2-CLF-01 | HEPA Filter Area (3.0 m x 1.2 m) | 1 | 3000 | |
| 2 | F2G011 | Sterile Buffer | F2-CLF-02 | HEPA Filter Area (3.8 m x 1.8 m) | 1 | 3000 | |
| 3 | F2G024 | Disinfection preparation | F2-CLF-03 | HEPA Filter Area (1.5 mx 1.2 m) | 1 | 3000 | |
| 4 | F2G028 | Blending | F2-CLF-04 | HEPA Filter Area (1.6 m x 1.5 m) | 1 | 4000 | |
| 5 | F2G030 | Buffer & solution Preparation | F2-CLF-05 | HEPA Filter Area (2.0 m x 1.0 m) | 1 | 3500 | |
| 6 | F2G044 | Filling Room | F2-CLF-06, 07 | HEPA Filter Area (4.5 m x 2.7 m), (1.8 m x 2.5 m) | 2 | 3000 | |
| **VIRAL VACCINES FORMULATION BLOCK** | | | | | | | |
| 7 | F1G036 | Blending / Formulation Room | F1-CLF-01 | HEPA Filter Area (1.5 m x 2.0 m) | 1 | 4000 | |
| 8 | F1G037 | Sterile Material Receiving | F1-CLF-02, 03 | HEPA Filter Area (1.8 m x 2.9 m), (1.8 m x 2.3 m) | 2 | 3000 | |
| 9 | F1G043 | Vial Filling & Capping | F1-CLF-04, 05, 06 | HEPA Filter Area (3.3 m x 2.3 m), (1.6 m x 5.2 m) (2.0 m x 2.0 m) | 3 | 3000 | |
| 10 | F1G081 | Sterile Material Receiving | F1-CLF-07 | HEPA Filter Area (1.5 m x 1.8 m) | 1 | 3000 | |
| 11 | F1G081 | Sterile Material Receiving | F1-CLF-08 | HEPA Filter Area (1.0 m x 1.8 m) | 1 | 3000 | |
| 12 | F1G086 | Vial Filling | F1-CLF-09, 10, 11 | HEPA Filter Area (2.5 m x 3.4 m), (5.1 m x 1.6 m), (1.8 m x 1,8 m) | 3 | 3000 | |
| 13 | F1G028 | Media Preparation | F1-CLF-12 | HEPA Filter Area (1.8 x 1.0) m | 1 | 3500 | |
| 14 | F1G028 | Media Filtration | F1-CLF-13 | HEPA Filter Area (1.8 x 1.0) m | 1 | 3500 | |
| 15 | F1G080 | Blending and Formulation Room | F1-CLF-14 | HEPA Filter Area (1.5 m x 2.0 m) | 1 | 4000 | |
| **HIB(MBB) BLOCK** | | | | | | | |
| 16 | B1G120 | Media Preparation Room | B1-CLF-01 | HEPA Filter Area (1.5 mtr x 1.0 mtr ) | 1 | 3000 | |
| 17 | B1G137 | Sterile Material Unloading Room | B1-CLF-02, 03 | HEPA Filter Area (3.0 m x 2.5 m) (3.3 m X 2.5 m) | 2 | 3000 | |
| 18 | B1G145 | Dis-Infectant Preparation Room | B1-CLF-04 | HEPA Filter Area (1.5 mtr x 1.2 mtr ) | 1 | 3000 | |
| **HEPATITS-B(MBB) BLOCK** | | | | | | | |
| 19 | B1G043 | Purification & Chromatography Room | B1-CLF-05 | HEPA Filter Area (1.5 mtr x 1.2 mtr ) | 1 | 3000 | |
| 20 | B1G045 | Sterile Material Unloading Room | B1-CLF-06 | HEPA Filter Area (10.0 mtr x 2.5 mtr ) | 1 | 3000 | |
| 21 | B1G048 | Dis-Infectant Preparation Room | B1-CLF-07 | HEPA Filter Area (1.5 mtr x 1.2 mtr ) | 1 | 3000 | |
| 22 | B1G041 | Aerosol -Preparation Room | B1-CLF-08 | HEPA Filter Area (1.2 mtr x 1.2 mtr ) | 1 | 3000 | |
| **RABIES BULK BLOCK** | | | | | | | |
| 23 | B4G033 | Sterilized Material Unloading | B4-CLF 01, 02 | HEPA Filter Area (24 x 1.4) m (for DHS) ; (1.2 x 2.4) m (for autoclave) | 2 | 3000 | |
| 24 | B4G036 | Cell Culture | B4-CLF 03 | HEPA Filter Area (1.650 x 1.25) m | 1 | 2700 | |
| 25 | B4G057 | Purification | B4-CLF 04 | HEPA Filter Area (2.0 x 1.5) m | 1 | 3000 | |
| 26 | B4G046 | Virus Propogation | B4-CLF 05 | HEPA Filter Area (1.650 x 1.25) | 1 | 2700 | |
| **BCG BLOCK** | | | | | | | |
| 27 | F4G041 | Media Bottle Storage | F4-CLF 01 | HEPA Coverage Area (1.2 m X 1.2 m) | 1 | 3000 | |
| 28 | F4G035 | Sterile Unloading | F4-CLF 02, 03 | HEPA Coverage Area (1.2 m X 1.2 m) | 2 | 3000 | |
| 29 | F4G040 & F4G040A | Filling & Lyo Loading | F4-CLF 04, 05, 06, 07 | HEPA Filter Area (2.5 m x 3.4 m), (5.1 m x 1.6 m), (1.8 m x 1,8 m), (2.2 m x 5.0 m) | 4 | 3000 | |
| **QC BLOCK** | | | | | | | |
| 30 | Q1S041 | Sterile Filtration Area | Q1-CLF 01 | HEPA Coverage Area (1.2 x 0.6) m | 1 | 2400 | |
| **WAREHOUSE BLOCK** | | | | | | | |
| 31 | W1G036 | Autoclave Room | W1-CLF 01 | HEPA Coverage Area (1.2 x 0.6) m | 1 | 3000 | |