TECHNICAL DESCRIPTION OF THE VERTICAL LAMINAR FLOW TYPE:

VFL
6 – 9 – 12 – 18

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SUMMARY

I. PRESENTATION

Protection against tampering

Objective: Work in sterile environments and product protection - Compliant with ISO Class 5 (ISO 14644 standard)

II. STRUCTURE

1. FRAME

The frame is made of COPLAST AS (anti-static expanded PVC), ensuring high mechanical and chemical resistance throughout. Furthermore, the quality of the materials guarantees excellent resistance to variations in temperature and humidity.

This material optimises maintenance and cleaning with standard laboratory products. Compatible with clean rooms, COPLAST does not generate particles and does not affect the dust class of the enclosure.

2. WORKTOP

The worktop is made of Coplast, as is the hood structure.

Option: 304L stainless steel worktop with adhesive backing.

3. LIGHT

LED lighting

4. BASE (OPTIONAL)

The base structure is made of epoxy-coated mild steel (or 304L stainless steel, as required).

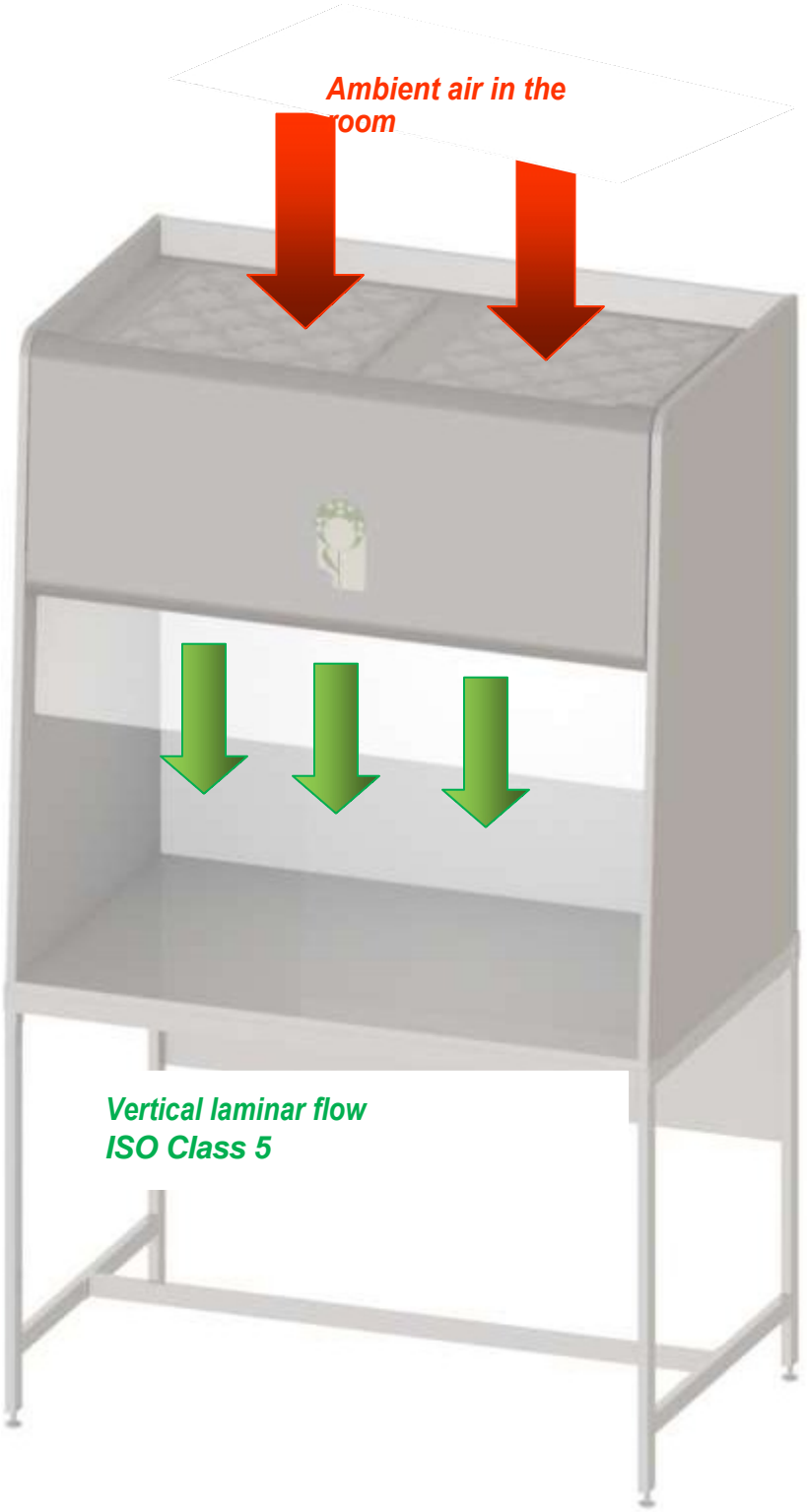
Possible additions to the base:

- Castors
- Power socket

The assembly is rigid and resistant to deformation and alteration

III. OPERATING PRINCIPLE - SAFETY

1. PRINCIPLE DIAGRAM



2. OPERATING PRINCIPLE

The VFL is a vertical laminar flow hood designed for applications requiring protection of the products being handled when they pose no danger to the operator.

Particularly suitable for sterility testing, cell culture, pharmaceutical preparations, microelectronics assembly, optics, etc.

The vertical laminar flow protects the work from environmental contamination by creating an ultra-filtered environment in the work area.

Air is drawn in through a pre-filter (G3/G4) at the top. The air flow is propelled by the fan through an HEPA filter (HEPA H14). At the outlet, the entire working volume is swept in a perfectly linear and homogeneous manner by ultra-filtered air. Thanks to its flow velocity, this laminar flow produces positive pressure compared to the ambient environment, thus creating a barrier that prevents external particles from entering the working volume. This ensures **protection during handling**.
(see diagram above)

Filtration and overpressure therefore make it possible to achieve a working volume that complies with ISO Class 5 according to ISO 14644-1 (ISO Class 4 achievable under specific validated conditions)..

3. AUTOMATIC FLOW RATE REGULATION

The air velocity at the outlet of the HEPA filter is maintained, regardless of the clogging state of the filters, thanks to flow management by a programmable microprocessor (ECM technology) integrated into the fan.

4. SAFETY / ALARMS

To ensure maximum safety during use, this vertical laminar flow hood is equipped with a fully automatic control system that maintains constant flow rates regardless of the clogging status of the filters.

The display on the control panel shows the remaining life of the HEPA filters (100% = new filter). An audible and visual signal indicates when the HEPA filter(s) need to be changed.

Finally, the various alarms are displayed in full text (see alarms section).

5. PERFORMANCE

a) Laminar flow:

The average speed of the vertical laminar flow (ISO class 5) is between 0.25 and 0.5 m/s. This flow is laminar at all points (the speed does not differ from the average speed by more than ± 20%). Thanks to the H14 class HEPA filter (EN1822), the air quality in the working volume is higher than that required in class ISO 5 of the European standard ISO 14644, which allows up to 3520 particles with a diameter equal to or greater than 0.5µ per m^3.

b) Automatic regulation / No sensor:

The VFL's air handling system is provided by a variable speed centrifugal motor fan incorporating ECM technology. This technology ensures fully automatic control and maintains constant flow rates regardless of filter clogging, without external airflow or pressure sensors requiring periodic calibration. **The absence of a sensor** eliminates the need for calibration and avoids measurement variations linked to climatic changes (temperature, pressure, humidity) to which sensors are sensitive. Regulation is therefore **more accurate and reliable** over time.
The display on the control panel shows the **progress of the HEPA filters' life**. An audible and visual alarm indicates when the HEPA filter needs to be changed when the filter is too clogged.

A standby position ensures continuous scanning of the working volume outside of periods of activity to keep the working area clean.

c) Noise level / Power supply:

The noise level is less than 60 dB (according to European standards).

The power supply is 220 V + T - 16A - 50 Hz (power consumption: 0.7 kW).

6. STORAGE AND TRANSPORT

When storing the enclosure, it is essential to wrap the hood in plastic film and store it in a location that is protected from climatic variations and complies with the conditions specified below.

If the hood needs to be transported, it must not be subjected to any impact. After each move, it is strongly recommended that you check the installation again.

7. CONDITIONS OF USE

The environmental following must be comped with

Ambient temperature: +5°C to +40°C. Humidity:
30% to 95%.

in order ensure proper operation of your VFL:

The VFL must not be installed near an open window, under a vent or in a draught.

Press the "ON/OFF" button to start the VFL.
If no password has been programmed, the device will start up immediately. If a password has been programmed (factory setting), you must enter it first. *(See user manual)*

IV. ABSOLUTE FILTRATION

The VFL is designed with a Fanjet filter box with two filtration stages: a pre-filter and an absolute filter.

1. PREFILTER

A synthetic fibre pre-filter filters out the largest particles. 90% efficiency, type G3/G4.

Lifespan: 3 to 6 months depending on usage.

2. HEPA FILTER

A panel-type H.E.P.A absolute filter with a minimum efficiency of 99.999% for particles of 0.3µ, DOP test (H14 classification) guarantees a perfectly sterile laminar flow, ISO class 5 (according to ISO 14644-1):

- aluminium filter frame
- fibreglass filter media
- epoxy-coated steel protective grille

Service life: 3 to 5 years depending on use. The efficiency certificate can be provided on request.

V. VENTILATION

This unit is equipped with high-efficiency variable centrifugal motor fans mounted on shock absorbers. The ECM version guarantees **constant flow** despite clogging of the absolute filters and low noise levels.

The on-board electronics simplify the management of information related to alarms and possible faults. **Automatic regulation of the constant flow rate** is achieved through simple programming, thanks to a **microprocessor** that analyses three parameters (intensity, torque, engine speed) to find the balance point corresponding to the required flow rate in relation to the pressure drop.

Automatic regulation compensates for clogging by increasing the air flow rate. This maintains ISO class 5 (according to ISO 14644 – speed between 0.25 m/s and 0.5 m/s) in the working volume.

All motors are protected in accordance with electrical safety standards. All electrical parts and electrical masses are earthed in accordance with regulations.

DF 280 ECM fan

Advantages

- Low power consumption: reduced by 30 to 40% compared to conventional fans
- Very high efficiency of 80% for a continuously powered fan (compared to 40% for a conventional asynchronous motor fan)
- Low temperature rise
- No sensor (speed or pressure) to regulate flow: no calibration issues related to measurement variations or climatic changes (temperature, pressure, humidity) to which sensors are sensitive.
- Very high accuracy
- Low noise level

VI. CONTROL PANEL

1. OVERVIEW

This control panel offers significant technical innovations:

- Built-in backlit graphic display
- Real-time display of flow rates, pressure and throughput
- Real-time display of consumable status (absolute filters, UV lamp depending on model)
- Icon-based controls
- Display of various alarm messages in scrolling text
- Updating future developments via computer
- Lock different modes with a secret code
- Multilingual menu and display
- Automation of procedures (standby, start-up, etc.)

2. CONTROL PANEL

3. CONTROLS

- *On/Off*: Turns the unit (i.e. ventilation) and all functions on or off. Allows you to exit a menu or cancel an action.
- *Standby:* Switch between normal mode and standby mode.
- ⇅ *:* Used to navigate through the menu, select an option or scroll through characters.
- ⇦ *:* Enter button. Used to enter a menu or submenu, or to confirm an action or selection.
- *Lighting:* Turns the main lighting on/off.
- *UV* (optional): Turns the UV lamp on/off (optional).
- *Free contact:* Opens and closes a free contact on the power board designed to connect an accessory (solenoid valve, electrical socket, etc.).

4. ALARMS

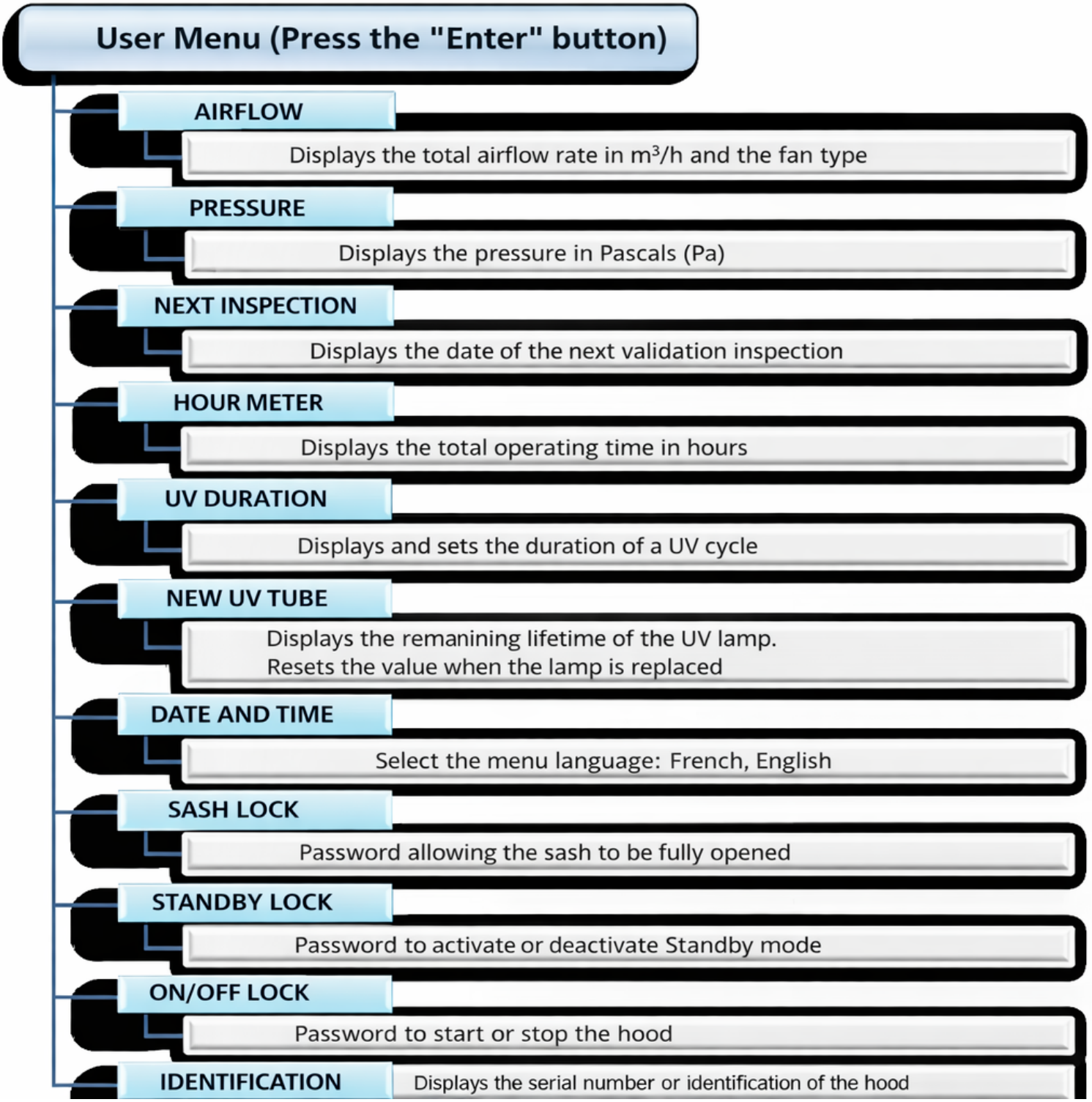
Alarm messages, coupled with an **audible alarm,** warn the user of an anomaly during operation and thus prevent prolonged use in the event of an incorrect flow.

The various alarm **messages** that can be displayed on the "flower" panel are:

- Start-up alarm: the alarm stops once normal operating parameters are reached (flow rate)
- Clogging alarm: When the filters are clogged, the following message appears: "**Filter Clogged**"
- Incorrect flow alarm: If the flow rate is outside the normal range, one of the following messages appears: "**Speed too** low" or "**Speed too high**"
- Ventilation alarm: If the fan is out of service, the following message appears: "**Ventilation fault**".
- ***Validation Alarm***: If the hood validation date has passed (based on a one-year cycle), the message "schedule inspection" appears. (There is no audible alarm.)

NOTE: A predefined 4-digit numerical code can prevent the hood from being put on standby the hood from being put on standby and/or switched off.

5. USER MENU: FLOWCHART



VII. TECHNICAL DATA

	VFL 6	VFL 9	VFL 12	VFL 18
Useful width (mm)	610	915	1220	1836
Height H T (mm)	648	953	1258	1874
Useful height (mm)	800			
Height H T (mm)	1250 (excluding base) 2080 (including base)			
Useful depth Worktop (mm)	750			
Depth H T (mm)	780			
Flow rate (m^3/h)	500	750	1000	1500
Fan type	DF 280 ECM			DF 280 ECM x2
Absolute filter (supply air)	MK14-66-80-A-P, Quantity: 1	M14-69-250-A-P, Quantity: 1	M14-612-250-A-P, Quantity: 1	M14-69-250-A-P, Quantity: 2
Pre-filter	W0412202C, Quantity: 1	W0412202C, Quantity: 1	W0412202C, Quantity: 1	W0412202C, Quantity: 2
Sound level	< 60 dB according to European standard			
Power supply	Mono 220 + T 16 A 50 Hz			
Maximum power	500 W			< 1 kW
Illuminance level	600 to 800 lux			
Weight	Approximately 85 kg	Approximately 90 kg	Approximately 100 kg	Approximately 150 kg

ADS Laminar reserves the right to change the references of certain VFL components.

VIII. EQUIPMENT

1. STANDARD EQUIPMENT

The standard equipment for VFL vertical laminar flow hoods is as follows:

- Control panel (with standby mode)
- LED lighting
- Filtration (2 stages: Pre-filters and HEPA filter)
- ECM control

2. AVAILABLE OPTIONS

Other equipment is available as an option:

- Painted steel base (on jacks or with castors)
- Shutter
- Fluid passage (air, gas) with tap
- Non-ionising lighting
- Power socket (on base)
- UV lamp
- Suspension bar for nutrition bags

IX. INSTALLATION REQUIREMENTS

1. LAMINAR ADS SERVICE

- Supply of VFL
- Packaging, shipping and on-site installation
- Electrical connection of the hood to a standby power outlet
- VFL checks
- Inspection report

2. NOT INCLUDED IN SUPPLY AND WORK

- Installation of ducts, cables and extractors
- Connection to our all-fluid outlets (nitrogen, water, drainage, etc.)
- Equipment to be integrated
-

3. TRAINING

Following installation of the equipment, a training period will be provided for user personnel and technicians. This training will include a phase on using the equipment, a phase on maintenance, and the delivery of the user manual.

4. DOCUMENTATION PROVIDED

The following documents will be provided upon delivery:

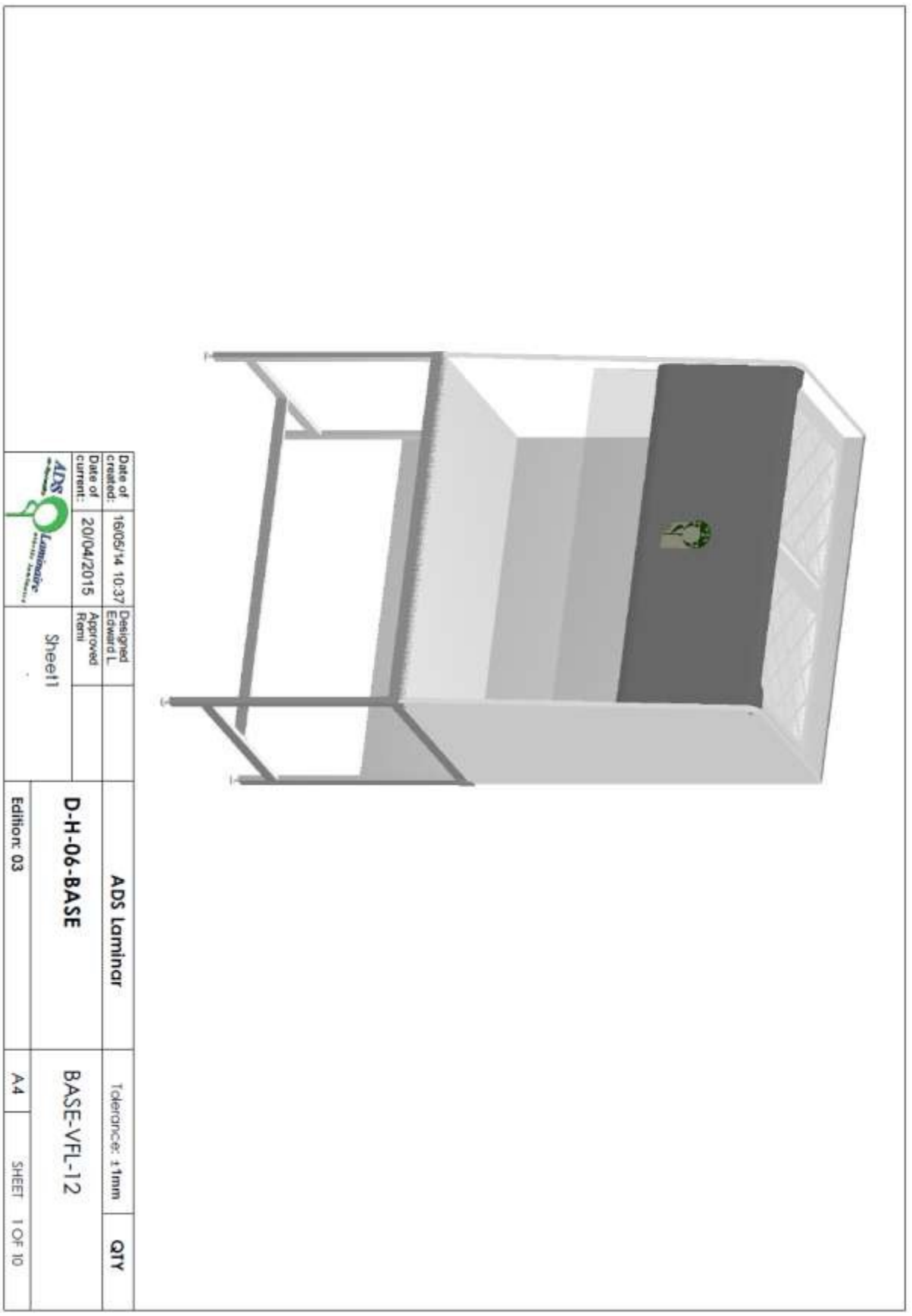
- **Certificate of Conformity**
- **CE Certificate**
- **Warranty Certificate**
- **User Manual**

5. PHONE SUPPORT

Helpline opening hours:

- Monday – Thursday: 8 a.m. – 12:30 p.m. and 1 p.m. – 6 p.m.
- Friday: 8 a.m. – 12:30 p.m. and 1 p.m. – 3 p.m.

X. MAP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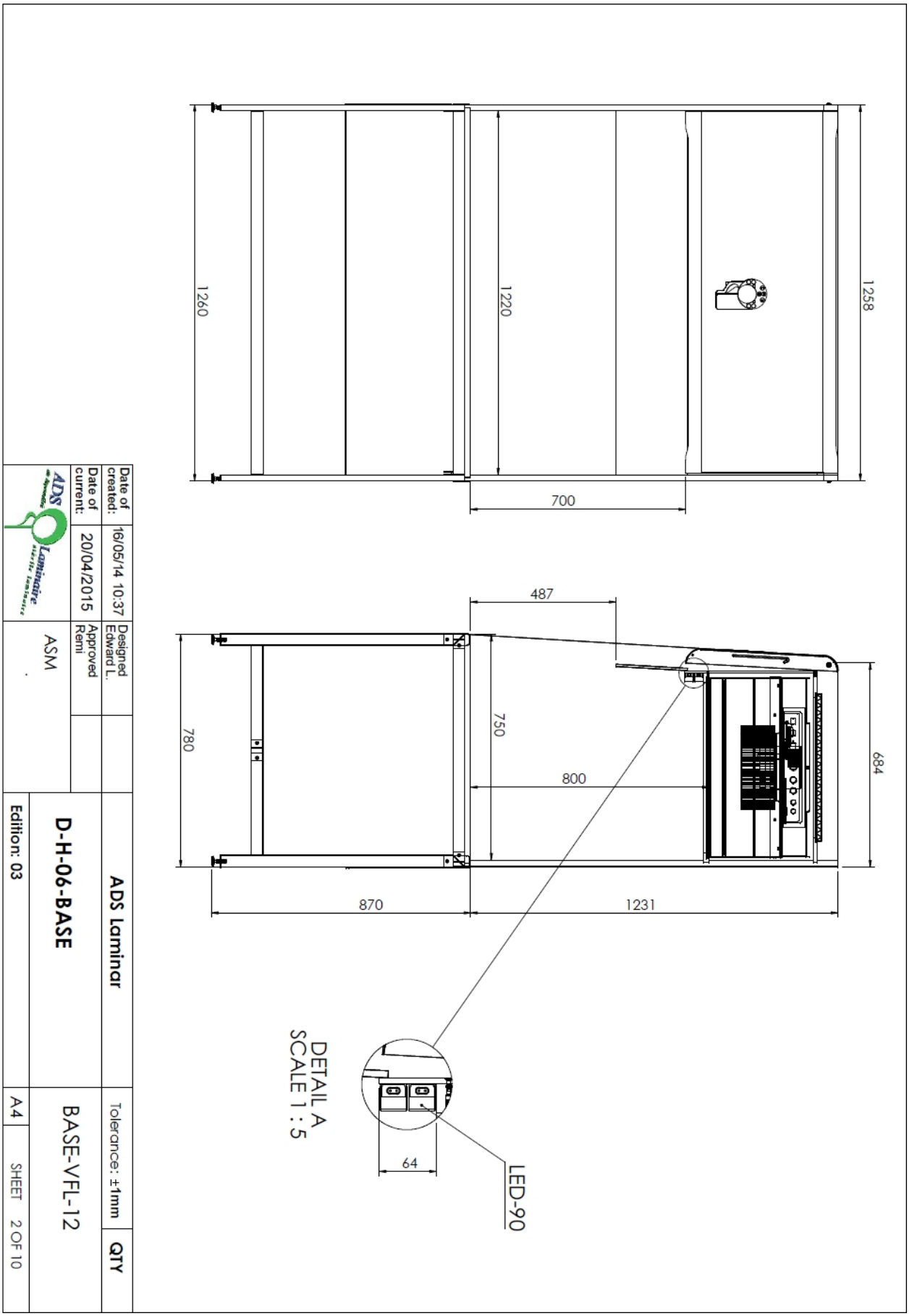
Designed Edward L
Date of current: 20/04/2015
Approved Remi
Sheet1
ADS Laminar
D-H-06-BASE
BASE-VFL-12
Tolerances: ±1mm
QTY
Edition: 03
A4
SHEET 1 OF 10



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Edition: 03				A4	SHEET 2 OF 10

XI. MAINTENANCE

1. CLEANING THE WORKING VOLUME

Laminar flow hoods must be cleaned **after each use and before being placed on standby**.

While cleaning the working volume (**excluding the exhaust filter**), leave the hood in normal operation.

Use large non-woven or disposable cloths that are preferably ISO 5 compatible (e.g. ADS ref: 7–C30L–99L–00). This type of cloth is large enough and lint-free (or non-shedding) to guarantee ISO 5 compliance. (**Our PPE/Utilities department is available to advise you and direct you to the best product**).

Impregnate the cloth with a bactericidal and fungicidal cleaning product. All alcohol-based products are compatible with the structure of the hood (e.g. impregnated wipes: ADS ref: 6LS7030). You can also spray the walls of the enclosure (do not spray the filter).
Clean all accessible parts using circular movements with the impregnated cloth.

Avoid:
- Using chlorine-based products such as bleach on any stainless steel parts unless they are highly diluted.
- The use of alcohol-based products or solvents is not recommended on Plexiglas parts.

2. FILTRATION

Refer to Chapter XII: Maintenance in this booklet.

XII. MAINTENANCE

ADS Laminaire has designed the **VFL** unit to be easy to maintain.

1. PREFILTER

The pre-filter is located above the enclosure.
Remove the used pre-filter and install the new pre-filter. Average

service life: 3 to 6 months. - Visual inspection for clogging.

2. HEPA FILTER

As soon as the filter life display falls below the 10% threshold, plan to replace the HEPA filters.

The HEPA filter is attached to the FANJET-type housing. Maintenance of the absolute filter is facilitated by detaching the housing from the working chamber.

Average service life of approximately 2 to 5 years, depending on conditions of use.

3. MOTORISED FANS

Maintenance-free.

4. LIGHTING

Direct access via the working area, behind the cover.

IMPORTANT

HEPA filter replacement operations must be carried out by a qualified technician and must be followed by a validation check of the enclosure.
In the event of replacement, relocation or prolonged shutdown of an enclosure, a validation check must be carried out by a qualified technician before it is restarted.

XIII. PERIODIC INSPECTION CONTRACT

To ensure that your VFL enclosure is used in optimal conditions, we have drawn up a periodic inspection contract for you, which can be carried out by our after-sales service.

This contract commits our company, ADS LAMINAIRE, to carry out inspection and monitoring visits to your hood at intervals defined with your establishment and agreed upon by mutual consent.

This maintenance contract includes:
- the deployment of our technical service (as part of a tour).
- checking connections and contactors.
- Particle counting in the working volume to verify compliance with ISO class 5 standard ISO 14644-1.
- scanning the filter and its joint surface with a particle counter to verify the integrity of the filter surface.
- Speed mapping and calibration of its display (flower chart).
- adjustment of the fan rotation speed according to the degree of clogging of the absolute filters.
- Restarting the hood.
- Sending of the inspection report

To ensure compliance with ISO 14644, we can offer you a contract that includes two annual visits.

ADS LAMINAIRE will repair and/or replace defective parts and filter elements if it deems necessary, and after agreement, to ensure the proper functioning of the equipment until the next scheduled service under the contract.

Three-month warranty on spare parts replaced by us during the service call.

Your maintenance contract is available for you to view. Please do not hesitate to
to contact your ADS LAMINAIRE representative.

XIV. WARRANTY CONTRACT

The VFL speaker is covered by a 1-year warranty on parts and labour (in mainland France, BENELUX and Switzerland) for any manufacturing defects (excluding consumables).

WARRANTY TERMS AND CONDITIONS:

- During the warranty period, the customer will benefit from free parts and labour in the event of a breakdown (in mainland France).

- The warranty does not apply to consumables that need to be replaced.

- The warranty does not cover:
  - In the event of damage resulting from misuse or lack of maintenance (failure to follow instructions) or damage resulting from external causes (theft, water damage, fire, falls, etc., see your establishment's insurance policy).
  - In the event of external intervention, other than by ADS LAMINAIRE, during the warranty period.

The VFL is certified compliant with ISO 14644; under no circumstances can ADS Laminaire be held liable for changes in standards taken into account at the time of construction of the hood.