MACHINE SAFETY ENCLOSURE

Companies use various stand-alone equipment such as 3D printers, laser markers, chromatography and many other machines. However, the use of these machines poses health and environmental risks due to fine particles, gases and residues of molten material released into the air. It is therefore important to take steps to protect operators from potential exposure to these pollutants.

The HI10VP and HI10VPH machine enclosures can solve this problem. Above all, it is important to determine the potential pollutants emitted by the equipment and the types of filters to eliminate them.

Some examples of pollutants generated by machines in the workshop

Machines	Potential pollutants
3D printer	Plastic dust, fine particles, volatile organic compositions (VOC)
Laser marker	Smoke, fine particles, VOCs
Pad printing	Pad dust, fine particles, solvents
Electroplating	Emissions of acids, fine particles, heavy metals
Jewelry pickling	Pickling dust, fine particles, heavy metals
Rhodium plating	Emissions of acids, fine particles, heavy metals

Specific case of the 3D printer

Type of pollution	Description	Type of filter to implement
Fine particles	Fine particles are generally residues of melted material that are expelled by the printer during the manufacture of parts. These particles can be inhaled and cause health problems.	HEPA filter (High Efficiency Particulate Air)
Carbon monoxyde	Carbon monoxide is a gas that can be generated during incomplete combustion of healthcare materials such as ABS. It can cause health problems such as headaches and fatigue.	Activated carbon filter
Formaldehyde	Formaldehyde is a gas that can be generated by certain printing materials such as PLA. It can cause eye, nose and throat irritation, as well as respiratory problems.	Activated carbon filter with chemical adsorbent
Acrolein	Acrolein is a gas that can be generated by certain printing materials such as ABS. It can cause eye, nose and throat irritation, as well as respiratory problems.	Activated carbon filter

An air filtration system must be designed to filter dust particles and other contaminants present in the ambient air. The absence of a filtration system can :

1) Harm to the health of operators: risk of inhaling air polluted by fine particles or microparticles that can become lodged in internal organs. Risk of absorption of potentially dangerous VOCs (reminder : formaldehyde is classify carcinogenic and 1B mutagen)

2) Harm the quality of the prints by encrusting pollutants in the work.

OUR SOLUTIONS

To cupe with this problem, the concept of using an enclosure that completely isolates the machine from the workshop is essential. It guarantees that the pollution emitted by the machine will not be returned to the workshop without being treated.

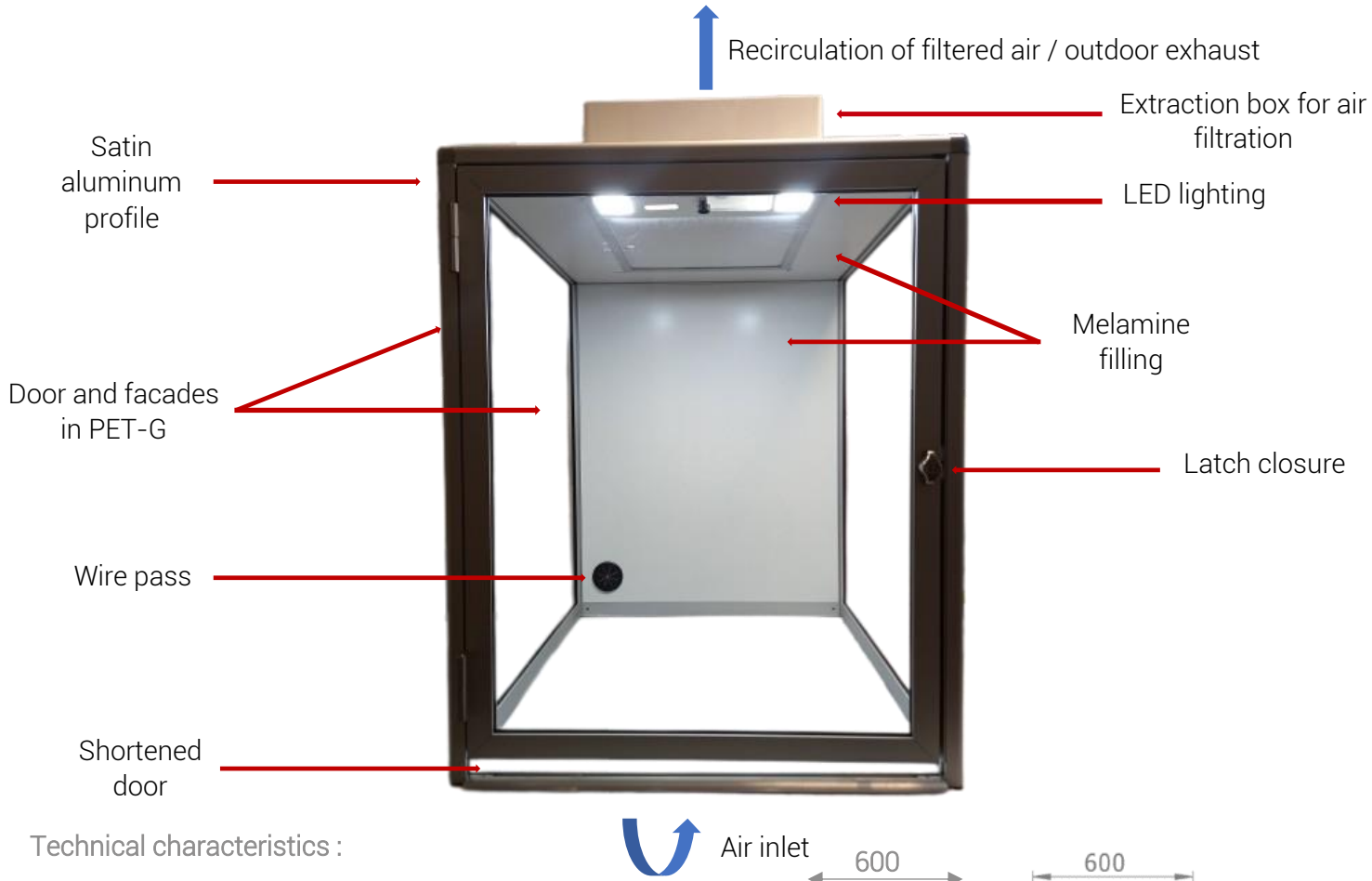
Our enclosures have a structure in satin aluminum profiles, a filling of melamine panels for the rear panel and the top panel (19 mm thick). They also have side facades and a door made of PET-G panels (6 mm thick). This robust and durable construction guarantees effective isolation of pollutants.

Our enclosures are available in two versions :

- √ **The standard version HI10VP** which is perfectly suitable for capturing VOCs and heavy dust (> 5 µm)
- √ **The HI10VPH version** specially designed for VOCs and microparticles (> 0.1 µm)

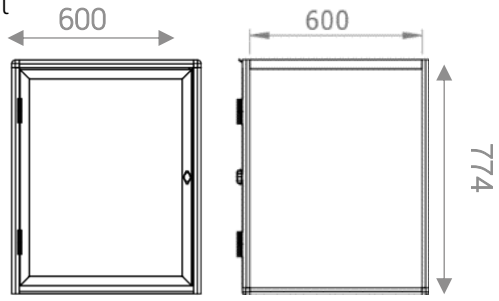
Enclosure HI10VP

Heavy particles and VOCs



Technical characteristics :

- √ Variable flow: 50 - 450 m3/h
- √ Power : 80 W
- √ Power supply : 110 – 230 V / 50 Hz – 60 Hz
- √ Noise : 50 m3/h = 40 dB - 150 m3/h < 60 dB
- √ Weight : 27kg
- √ Internal dimensions : L X H X P : 600 X 774 X 600mm
- √ External dimensions : L X H X l : 660 X 800 X 660 mm



The HI10VP filtration system

Control Panel :

- Motor power supply
- Speed variation
- Lighting

Extraction box for air filtration

Pre filter PFP1 (G3)

Activated carbon filter

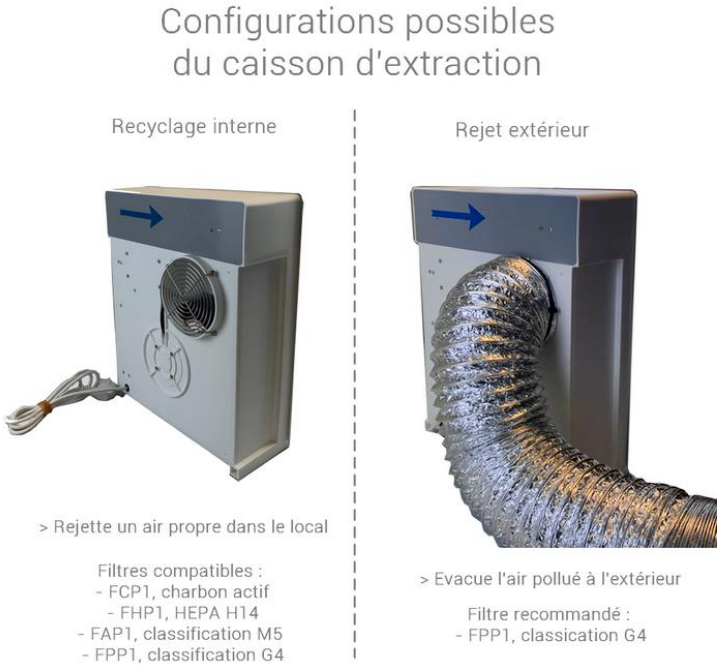
This structure allows operation in internal recirculation or external rejection.

Internal recirculation : Two types of filtration possible

- √ For cases of release of heavy particles and VOCs : protective pre-filter + activated carbon
- √ For cases of exclusive release of heavy particles (> 5µm) : particulate filters (class M5)

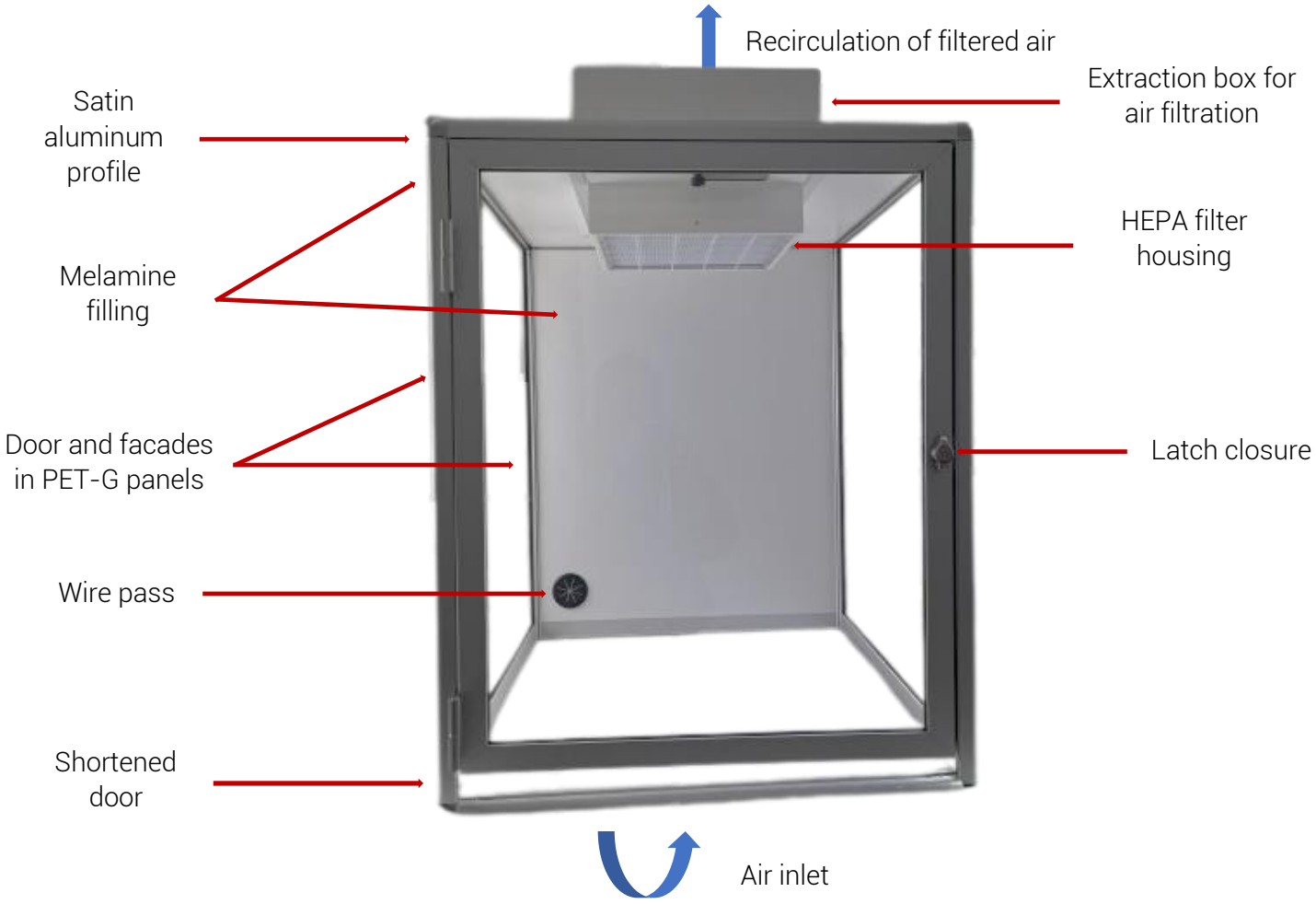
External rejection :

- √ Possible thanks to a connection to the rear output of the box, Ø 125mm. A simple particulate filter (class G4) is used to protect the engine.



Enclosure machine HI10VPH

Microparticles and VOCs



Technical characteristics :

- √ Variable flow: 50 - 450 m3/h
- √ Power : 80 W
- √ Power supply : 110 – 230 V / 50 Hz – 60 Hz
- √ Noise : à 50 m3/h = 40 dB - à 150 m3/h < 60 dB
- √ Weight : 28kg
- √ Internal dimensions : L X H X P : 600 X 704 X 600mm
- √ External dimensions : L X H X l : 660 X 800 X 660 mm

Filtration :

- √ Protection pre filter + HEPA H14 microparticle filter + activated carbon filter

Pre filter PFP1 (G3) | Filter HEPA H14 | Activated carbon filter