

# Spetec Clean room technology

- Laminar flow box
- Clean room workbench
- CleanBoy®
- Clean room cell
- Service, certification



# Product overview

**P**BS, FMS, and FBS series device families feature a modular design, meaning that the individual components are compatible with one another. Thus the laminar flow box FBS is made up of the protection box PBS plus the filter module FMS.

For the user of a protection box PBS, this means that he can retrofit it to be a full laminar flow box by purchasing a filter module FMS. The FMS series laminar flow modules can be found on both the clean room cell and the clean room workbench.

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# Portable clean room technology

Increasing requirements for product quality and process reliability require a clean environment during manufacturing, treating and processing, and for storage. Clean room technology plays an increasingly important role in nearly all high-tech sectors.

## Examples:

- Laser technology
- Optics and optoelectronics
- Microelectronics
- Manufacturing, processing and packaging of food
- Packaging of pharmaceutical products
- Chemical analysis
- Assembly technology

## Laminar flow

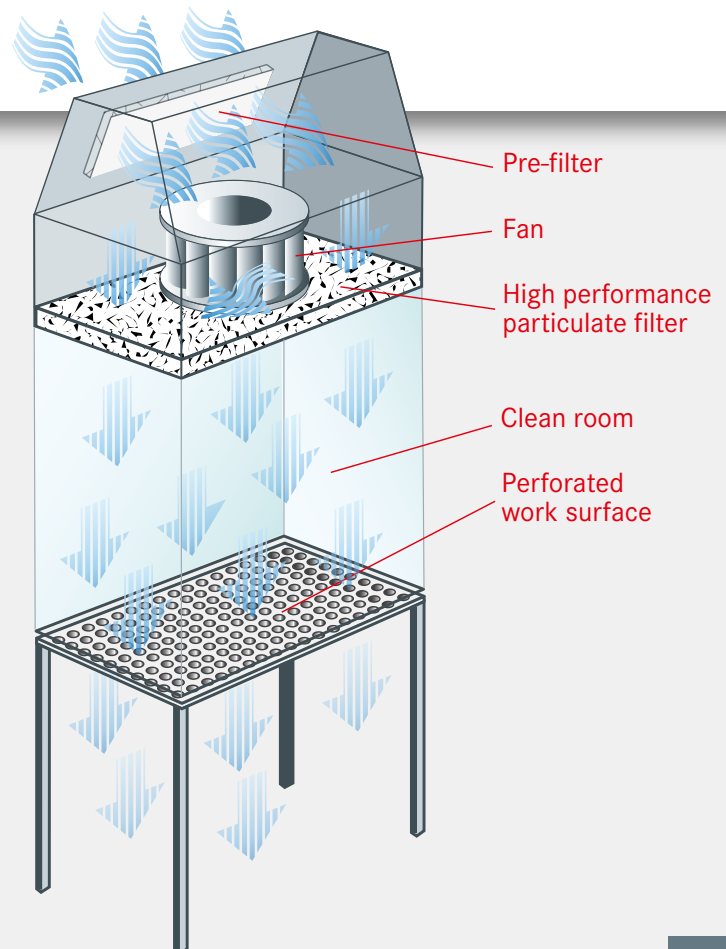
The basic principle for the development of clean room technology was established in the USA in the Sixties, when the principle of laminar flow was introduced.

The ambient air is drawn in using radial fans and pushed through the filter and flow straightener.

This generates a laminar flow, i.e. the air streams down in parallel flow lines. Particles are picked up by the parallel streams of air and transported out of the box. The air can escape through the perforated floor of the box.

## Application examples

Through the use of a SPETEC® laminar flow box, the particle concentrate is reduced e.g. from approx. 15 Mio/m<sup>3</sup> (size of 0.12 µm, MPPS) to approx. 1500 particles within the box. This corresponds to a clean room category of DIN ISO 5.



## High performance filter

The SPETEC® laminar flow box FBS uses a type H 14 filter. It features a retention rate of 99.995%. This means that at a particle size of 0.12 µm (according to MPPS), the filter removes at least 99.995% of all particles. At a particle size of 0.3 µm, the retention rate is approx. 99.9995%. By using the H 14 filter, the SPETEC® laminar flow box FBS has an isolation factor of 10. This means that the air quality inside the laminar flow box is improved by a factor of at least 10 000 relative to the ambient air.

## Design

The box is primarily made from anodized aluminium profiles and acrylic glass. The air inlet is located on the angled section of the filter module, so that the laminar flow box can be set directly against a wall.

A sophisticated mechanism allows for simple and functional opening and closing of the sliding door. This mechanism is found in all PBS and FBS series boxes. The useable door opening height is 480 mm.

FMS 75  
flow rate 6  
0.45 m/sec.  
SPETEC h:000000



## Control panel

The flow velocity can be controlled in 8 steps. The controls include the “night reduction” (eco) mode to save energy costs, and the “MAX” function to clean the workstation, parts, or equipment if applicable.

Through the use of latest generation EC fans with a very high efficiency, the power draw is reduced to a minimum. The noise generation in the workspace is approx. 40 to 52 dB (depending on the size), and the models are correspondingly quieter at lower flow velocities.

### Control panel functions:

- 8 level adjustment of the flow velocity with night reduction and flushing function
- LCD display with selected flow velocity in m/second
- Automatic flow adjustment with filter replacement indicator (optional)
- LED fault indicator
- Connection options for building control systems (remote monitoring) (optional)
- Interior light switch on the control panel (optional)
- Service and interval indicator, dependent on the usage period

# Laminar flow module

## FMS series “SuSi”

The laminar flow module which comes equipped with a ceiling suspension can for example be used as a clean air shower or be integrated directed in a machine enclosure. Through the master/slave function, one control unit is able to control up 100 slave-modules (optional).



Options: see page 13

Serie *SuSi*<sup>®</sup>  
Super Silent

### Filter change

The main filter is stored in a filter cartridge which is attached to the laminar flow module on its underside. This mechanism is especially advantageous when the modules are suspended from the ceiling or when these are mounted on clean room cells. As a result the filter can easily be changed from underneath.



Partial view: A filter change can also be made from the clean room side.

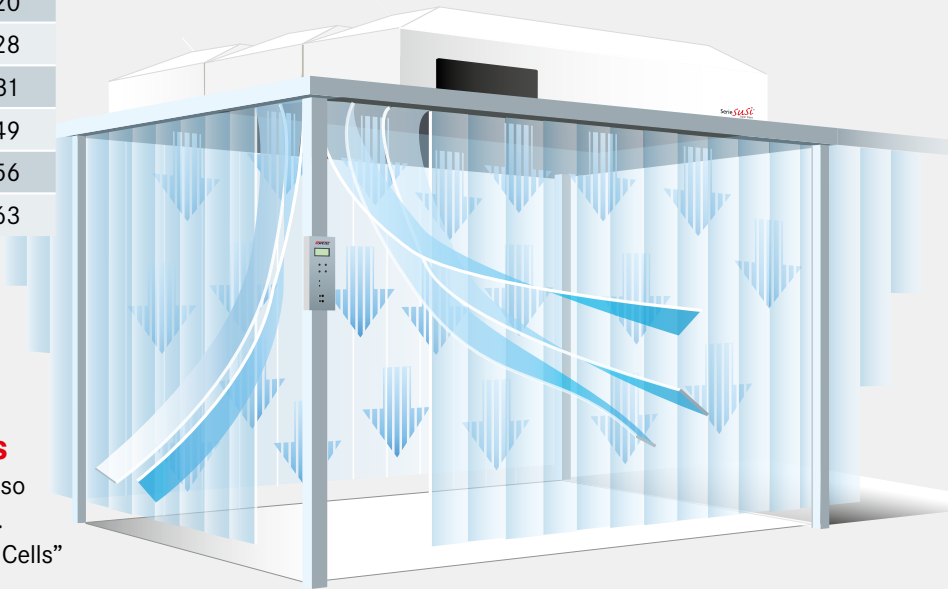
### Dimensions:

Name	Filter dim. in mm	Kg
*Laminar flow module FMS 24	610 x 400	20
Laminar flow module FMS 37	610 x 610	28
Laminar flow module FMS 56	915 x 610	31
Laminar flow module FMS 75	1220 x 610	49
Laminar flow module FMS 93	1525 x 610	56
Laminar flow module FMS 112	1830 x 610	63

\*Special version  
See page 26 for device dimensions.

### Application examples

The laminar flow modules are also used on top of clean room cells. Please refer to the “Clean Room Cells” section for further information.

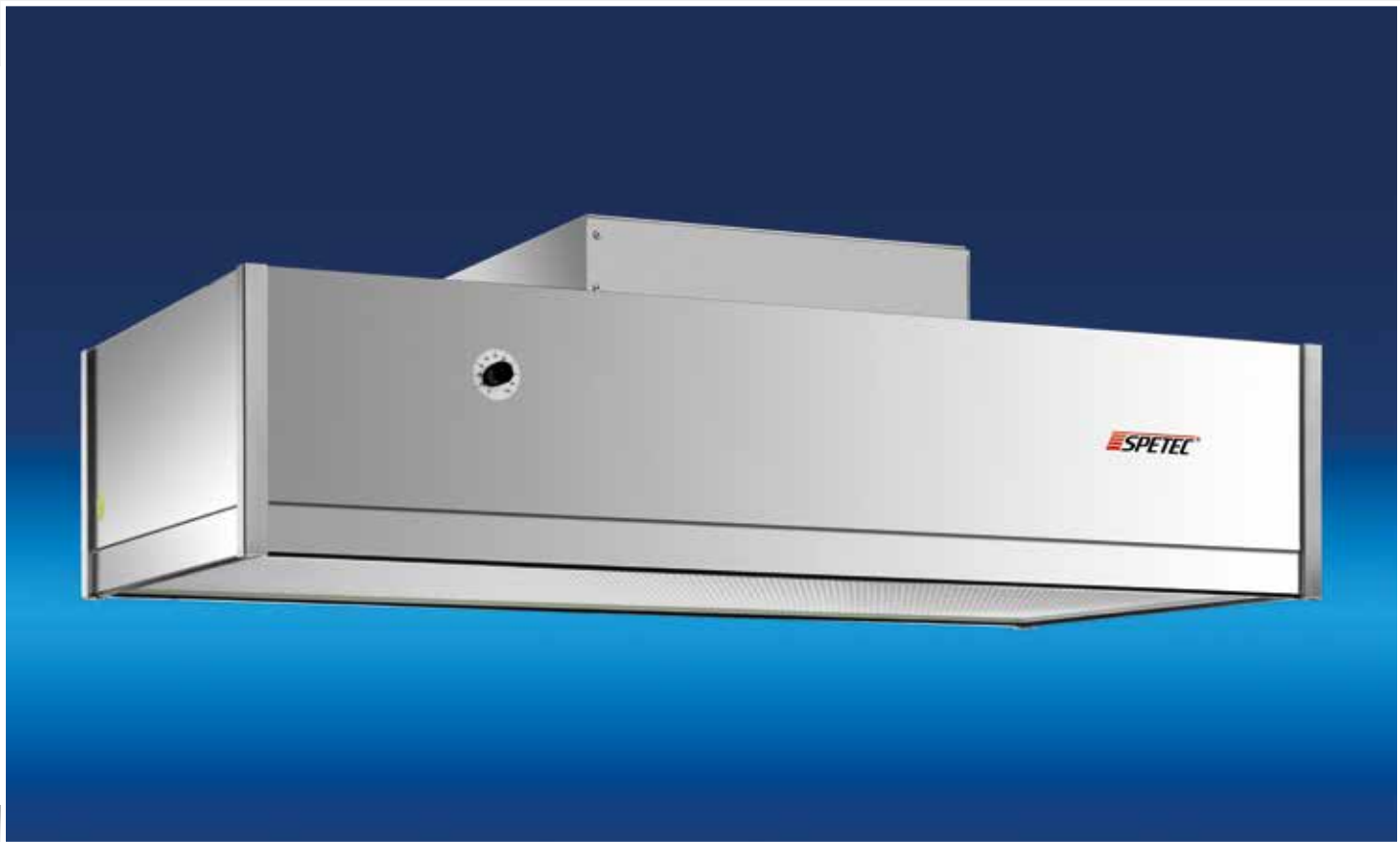


# Laminar flow module

## FMS Basic

The Basic-module is a simpler, more affordable alternative to the laminar flow module of the “SuSi” series. The laminar flow module is offered in a simple, robust version. With an EC-motor with step-less speed regulation the air flow speed

can be adjusted to the requirements. Through the Master/ Slave function one control unit is able to control up 100 Slave-modules (optional).



The laminar flow module can be used as a separate filter unit or in combination with a clean room cell. Retrofitting into a laminar flow box is not possible.

**Dimensions:**

Name	Filter dim. in mm	Kg
Laminar flow module FMS 75 Basic	1220 x 610	30

See page 26 for device dimensions.

# FMS Basic

# Laminar flow box

## FBS series

With the laminar flow box of the FBS series a portable clean room workspace is created which, depending on the model, can measure between 0.24 to 1.12 m<sup>2</sup>. It is used for the manufacture of products and for the storage of objects in clean room conditions.



Options: see page 13

# FBS



Sliding door

Serie *susi*<sup>®</sup>  
Super Silent

Ambient air is drawn in using EC fans and pushed through the filter. This generates an ISO class 5 laminar flow, i.e. the air streams down in parallel flow lines. Particles are picked up the flow of air and transported out of the box through the perforated floor.

### Technical Data

The technical data have been tested and certified by the Fraunhofer Institute for Manufacturing Engineering and Automation! The measurement systems used for the qualification are calibrated regularly and can be traced back to national and international standards. If no national standards exist, then the measurement process meets the current technical regulations and standards. The documentation prepared for this process can be reviewed upon request.

### Dimensions:

Name		Filter dim. in mm	Kg
*Laminar flow box FBS	24	610 x 400	46
Laminar flow box FBS	37	610 x 610	78
Laminar flow box FBS	56	915 x 610	89
Laminar flow box FBS	75	1220 x 610	93
Laminar flow box FBS	93	1525 x 610	130
Laminar flow box FBS	112	1830 x 610	145

\*Special version

See page 26 – 27 for special version device dimensions.

Max. door clearance 480 mm

# Laminar flow box

## FBS series standard

As an alternative to the laminar flow box of the FBS series “SuSi”, this version is offered without a sliding door and perforated metal floor. As a result, work can be performed directly on the existing table



FBS

Serie *SuSi*<sup>®</sup>  
Super Silent

A well thought out air circulation ensures that the air flow happens from the inside to the outside and no contamination through outside air occurs on the inside of the box.

### Dimensions:

Name	Filter dim. in mm	Kg
Laminar flow box FBS 37 standard	610 x 610	57
Laminar flow box FBS 56 standard	915 x 610	64
Laminar flow box FBS 75 standard	1220 x 610	86
Laminar flow box FBS 93 standard	1525 x 610	97
Laminar flow box FBS 112 standard	1830 x 610	108

See page 27 for device dimensions.

FBS standard

# Laminar flow box

## FBS-V series

### PVC clean room strip curtain

FBS-V series models consist of a laminar flow module FMS and a PVC clean room strip curtain.

The PVC strip curtain which hangs down from the laminar flow module is adjusted so that its ends are flush with the device housing. Thanks to the laminar flow of air, there is no mixing of dirty ambient air.



Options: see page 13

# FBS-V

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Super Silent

The laminar flow module is attached to the building's ceiling with ceiling hangers. The curtain prevents the entry of dirty air when people walk by or transport vehicles drive by. In general, this system is used to create localized clean room conditions at machines or instruments which are too big to place them inside a box. In addition, assembly workstations can also be enclosed.

### Dimensions:

Name	Filter dim. in mm	Kg
*Laminar flow box FBS-V 24	610 x 400	29
Laminar flow box FBS-V 37	610 x 610	42
Laminar flow box FBS-V 56	915 x 610	47
Laminar flow box FBS-V 75	1220 x 610	69
Laminar flow box FBS-V 93	1525 x 610	78
Laminar flow box FBS-V 112	1830 x 610	89

### \*Special version

The curtain has a length of 2000 mm, but can also be produced according to customer requirements. See page 26 for device dimensions.

# Laminar flow box

## EFBS series

The EFBS series laminar flow box also features an additional acid-resistant extraction system. The telescoping extraction arm, which can be positioned in three dimensions, can be adjusted precisely so that gases and vapours are extracted exactly where they are generated.

There is practically no mixing of the vapours being extracted with the clean air flowing down from above, since the flow velocity at the tip of the extraction tube is higher than that of the clean air flow. The exhaust system has a maximum capacity of 1 cubic meter per minute and is continuously adjustable.



Options: see page 13

# EFBS

Serie *susi*<sup>®</sup>  
Super Silent

### Dimensions:

Name		Filter dim. in mm	Kg
*Laminar flow box EFBS	24	610 x 400	53
Laminar flow box EFBS	37	610 x 610	85
Laminar flow box EFBS	56	915 x 610	96
Laminar flow box EFBS	75	1220 x 610	100
Laminar flow box EFBS	93	1525 x 610	137
Laminar flow box EFBS	112	1830 x 610	152

\*Special version

See page 26 – 27 for device dimensions.

The EFBS series devices are used where clean room conditions are required, but where these conditions are at the same time impaired by vapours, combustion gases, etc., e.g. AAS graphite tubes, ICP/MS, and laboratory benches used for chemical analysis.

### Option

#### Telescoping arm for the extraction system.

Arm with three-dimensional position adjustment for connection to the acid-resistant extraction system. Only available in combination with the EFBS, EFBS-V and EBS series.

# Laminar flow box

## EFBS-V series

The EFBS-V series devices are used where clean room conditions are required, but where these conditions are at the same time impaired by vapours, combustion gases, etc., e.g. AAS graphite tubes, ICP/MS, and laboratory benches used for chemical analysis.

The extraction system has a maximum capacity of 1 cubic meter per minute and is continuously adjustable.

The PVC strip curtain is adjusted so that its ends are flush with the device housing.



Options: see page 13

# EFBS-V

Serie *susi*<sup>®</sup>  
Super Silent

### Dimensions:

Name	Filter dim. in mm	Kg
Laminar flow box EFBS-V 24	610 x 400	42
Laminar flow box EFBS-V 37	610 x 610	49
Laminar flow box EFBS-V 56	915 x 610	54
Laminar flow box EFBS-V 75	1220 x 610	76
Laminar flow box EFBS-V 93	1525 x 610	85
Laminar flow box EFBS-V 112	1830 x 610	96

The curtain has a length of 2000 mm, but can also be produced according to customer requirements.  
See page 26 for device dimensions.

### Option

#### Telescoping arm for extraction.

Arm with three-dimensional position adjustment for connection to the acid-resistant extraction system. Only in combination with the EFBS, EFBS-V and EBS series.

# Protection box

## PBS series

The protection box PBS is used in the optics, analysis, and electronics industries to protect items against dust. However, it is not equipped with a filter module, but can be retrofit with one at any time to produce a laminar flow box.



PBS

# Portable tabletop exhaust hood

## EBS series

The portable tabletop exhaust hood EBS is universally usable. It is corrosion and acid resistant. The maximum extraction capacity is 1 cubic meter per minute.



EBS

**Dimensions:**

Name	Device dimensions
Protection box PBS 24	see page 27
Protection box PBS 37	
Protection box PBS 56	
Protection box PBS 75	
Protection box PBS 93	
Protection box PBS 112	

The interior height is 805 mm  
The total height is 940 mm  
Height with the door open is 1441 mm

**Dimensions:**

Name	Device dimensions
Exhaust hood EBS 24	see page 27
Exhaust hood EBS 37	
Exhaust hood EBS 56	
Exhaust hood EBS 75	
Exhaust hood EBS 93	
Exhaust hood EBS 112	

The interior height is 805 mm  
The total height is 940 mm  
Height with the door open is 1441 mm

# Laminar flow box

## Options



Option 1



Option 2



Option 3

Options			
1	<b>Base frame on casters.</b> As a table replacement for the FBS series, results in a mobile clean room workstation.		
2	<b>Laboratory cabinet with drawers.</b> Provides storage space to keep laboratory materials and other tools, only available in combination with option 1.		
3	<b>Extraction well below the perforated floor,</b> for connection of an extraction system or a central building extraction system. To divert the “contaminated” air flowing through the box.		
4	<b>Interior light,</b> FBS series <b>fluorescent lamp.</b>		
5	<b>230 V connection inside box.</b> Installation of a clean room compatible triple outlet inside the box.		
6	<b>Control via PLC interface.</b> ON/OFF and increase/decrease flow velocity functions, filter replacement indicator and error indicator. <table><tr><td><b>Control options</b> (control voltage 12V to 24V)<ul style="list-style-type: none"><li>• Power on/off</li><li>• Light on/off</li><li>• Increase/decrease flow rate by one step</li><li>• PLC interface</li></ul></td><td><b>Interface feedback</b><ul style="list-style-type: none"><li>• Power has been turned on/off</li><li>• Light has been turned on/off</li><li>• Filter replacement required</li><li>• An error occurred (Fan is not turning)</li></ul></td></tr></table>	<b>Control options</b> (control voltage 12V to 24V) <ul style="list-style-type: none"><li>• Power on/off</li><li>• Light on/off</li><li>• Increase/decrease flow rate by one step</li><li>• PLC interface</li></ul>	<b>Interface feedback</b> <ul style="list-style-type: none"><li>• Power has been turned on/off</li><li>• Light has been turned on/off</li><li>• Filter replacement required</li><li>• An error occurred (Fan is not turning)</li></ul>
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7	<b>Automatic flow adjustment</b> with filter replacement indicator		
8	<b>Ceiling mount</b>		

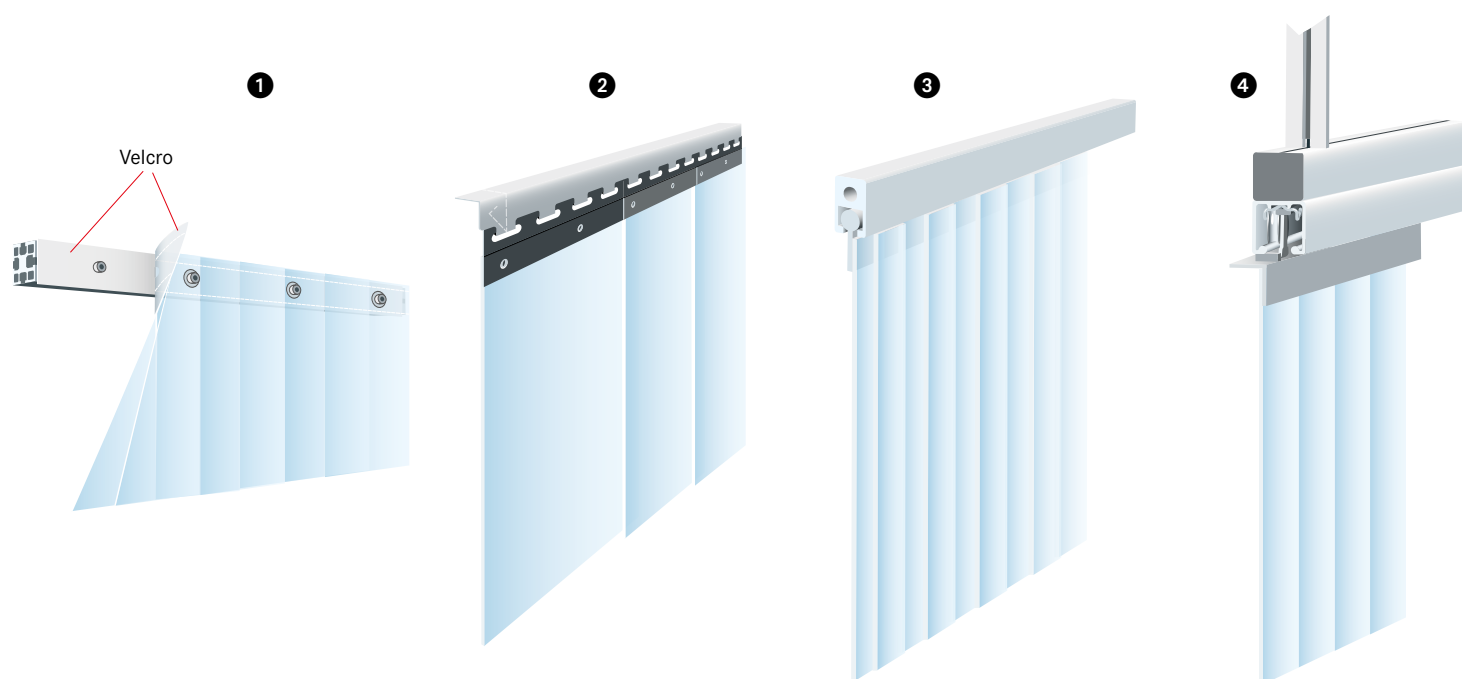
Options	
9	<b>Stainless steel pre-filter cartridge</b> (size 37–56 per 2 units, size 75–112 per 4 units)
10	<b>Replacement H 14 filter</b>
11	<b>H 14 PTFE main filter</b>
12	<b>Pre-filter</b> (size 24–56 per 2 units, size 75–112 per 4 units)
13	<b>Worktop</b> made of solid stainless steel, not perforated
14	<b>Worktop</b> made of sealed hard laminate, not perforated
15	<b>ESD-compatible version for FBS series</b>
16	<b>FMS in special colour</b> according to RAL table
17	<b>Plastic coating,</b> acid-resistant for FBS series
18	<b>Plastic coating,</b> acid-resistant for base frame on casters
19	<b>FMS series with master function</b> and wired remote control
20	<b>Telescoping arm</b> for exhaust hood
21	<b>UV interior light</b>
22	<b>Version made with UV-resistant polycarbonate box</b>

## Clean room curtains

The Spetec clean room curtains are made from strips of various thicknesses and a range of materials. They are always produced according to customer requirements. This allows us to offer you a customized product tailored precisely to your requirements. The strip curtain is fitted to the respective given conditions using special hardware.

### Examples:

- Clean rooms
- Locks
- Room separation
- Thermal barriers



### Hanger systems

#### 1 Velcro system

The individual strips are sewn in on the top side and attached to the aluminium profile via Velcro and screws.

##### Characteristics:

- Easy to dismantle
- Cost effective

#### 2 Hook system

(Stainless steel)

Each strip is attached to a separate retaining plate. As a result each strip can be replaced individually.

##### Characteristics:

- Stainless steel
- Overlap can be manually adjusted

#### 3 Bead system

This system allows a simple and quick installation and can be variably produced for all sizes. By integrating the curtain into the tent-rail a tight connection, is created which offers a high degree of process security.

##### Characteristics:

- Particle dense assembly

#### 4 Sliding system

In the sliding system the curtain is guided using a holding system in the running rail. Sliding is possible in both directions. The opening times can be limited via a stopper or be set only on one side.

Please request our  
special brochure

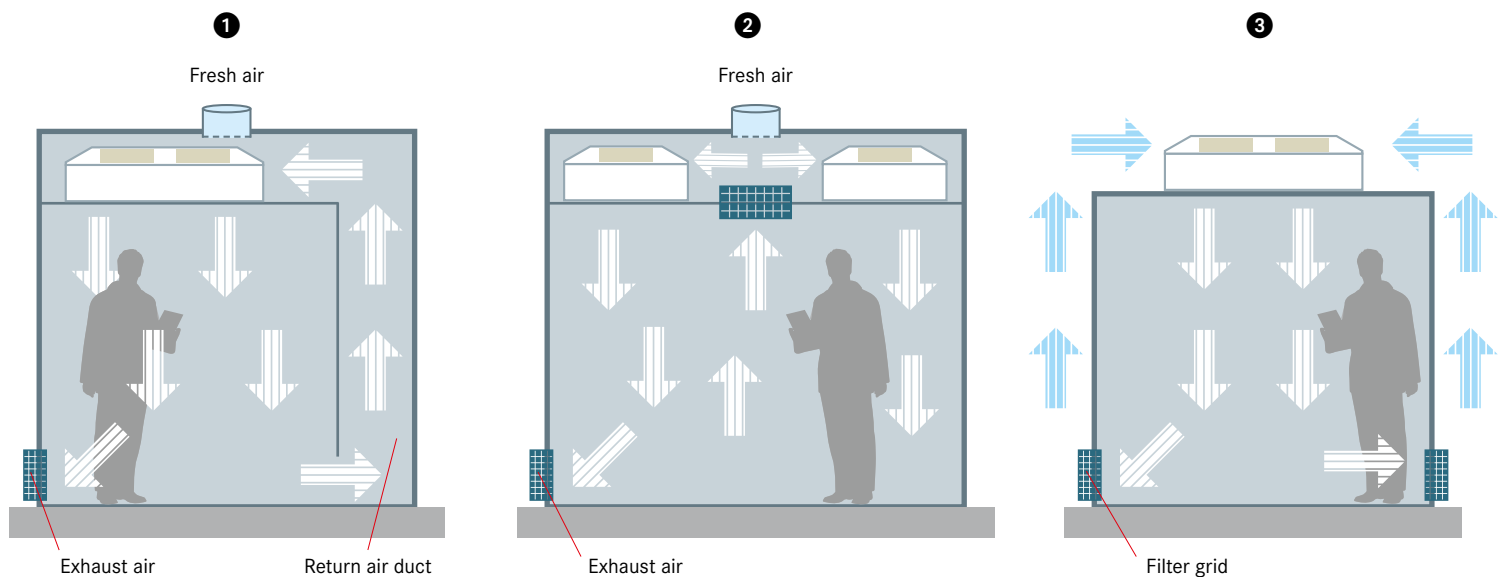
**“Laser safety”**

# Clean room concepts – overview

## Clean room cell

The Spetec clean room cell is a clean room system which can be designed in a flexible manner as a cost effective alternative to a complete clean room. One or more laminar flow modules are placed on a mounting stand. The laminar flow modules as a result serve as a clean air shower under which the workplace is located or where products, instruments and other items are stored.

The mounting stand can be assembled according to specific requirements and with freely selectable measurements up to about 300 m<sup>2</sup>. The material used for this is an anodized aluminium profile or stainless steel. Thus, the clean room cell is usable in any laboratory, production room/hall or in an office without any construction activities. Through the combination of different laminar flow modules the effective clean room area can variably determined.



### 1 Clean room cell with return air duct

#### Characteristics:

- Optimal air flow
- Climate control of the cell is possible
- Directional air flow even with a high ceiling height
- Clean room cell may be operated with low air flow speeds.

### 2 Clean room cell with return air duct via plenum

#### Characteristics:

- Small footprint
- Climate control of the cell is possible

### 3 Clean room cell with return air duct via filter grid or clean room curtain

#### Characteristics:

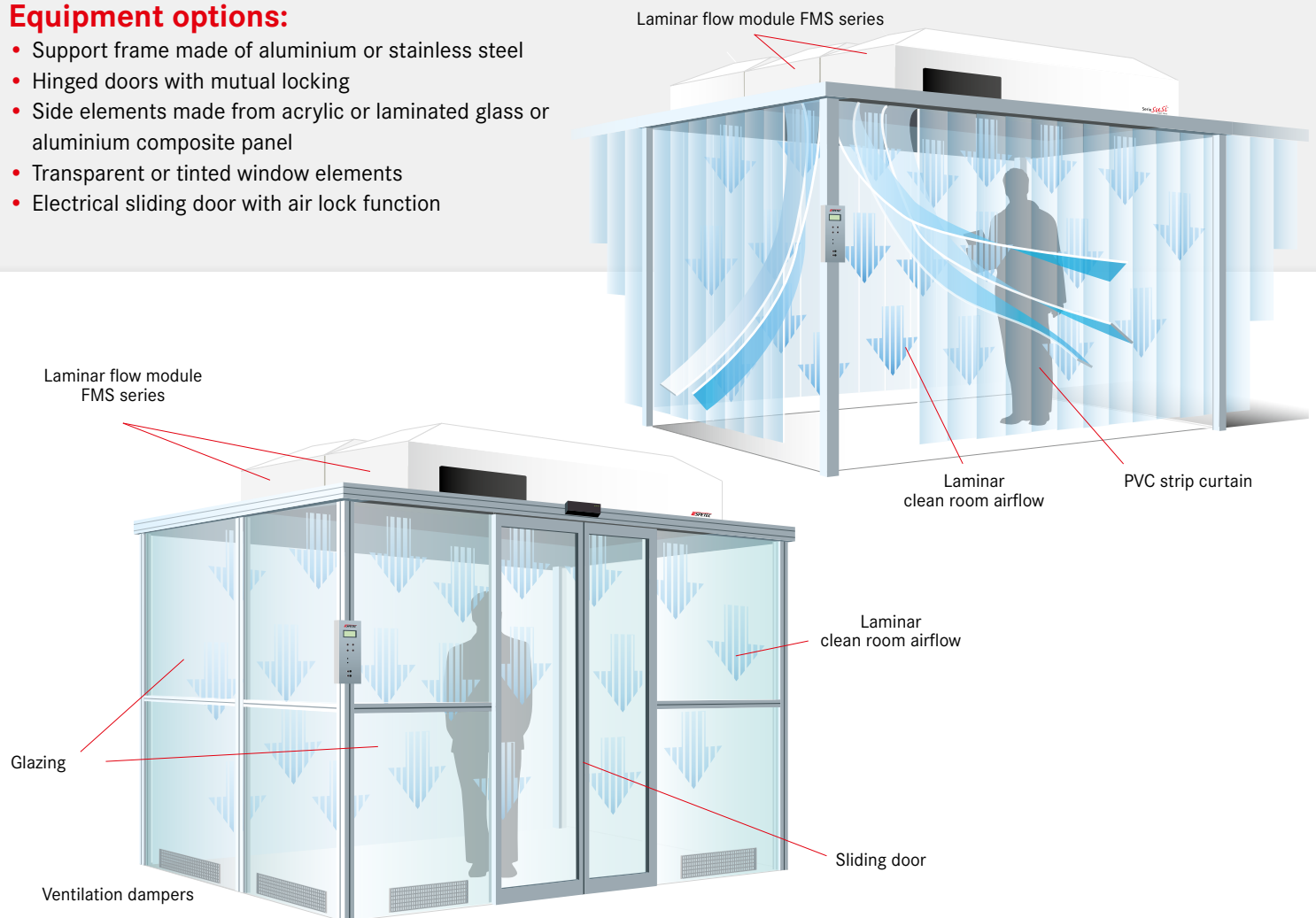
- Cleaning effect for the environment
- Cost effective solution
- Clean room cell can also be realized with strip curtain

# Clean room cell

## Clean room system

### Equipment options:

- Support frame made of aluminium or stainless steel
- Hinged doors with mutual locking
- Side elements made from acrylic or laminated glass or aluminium composite panel
- Transparent or tinted window elements
- Electrical sliding door with air lock function



### High performance filter

The Spetec laminar flow box FMS uses a type H 14 filter. It features a retention rate of 99.995%. This means that at a particle size of  $0.12\text{ }\mu\text{m}$  (according to MPPS), the filter removes at least 99.995% of all particles. At a particle size of  $0.3\text{ }\mu\text{m}$ , the retention rate is approx. 99.9995%.

By using the H 14 filter, the Spetec laminar flow module has an isolation factor of 10. This means that the air quality inside the laminar flow is improved by a factor of at least 10 000 relative to the ambient air.

### Control

Via a remote control the settings for the clean room cell as well as other environmental parameters (for example lighting) are entered. A SPS-interface is available as an option.

### Application example:

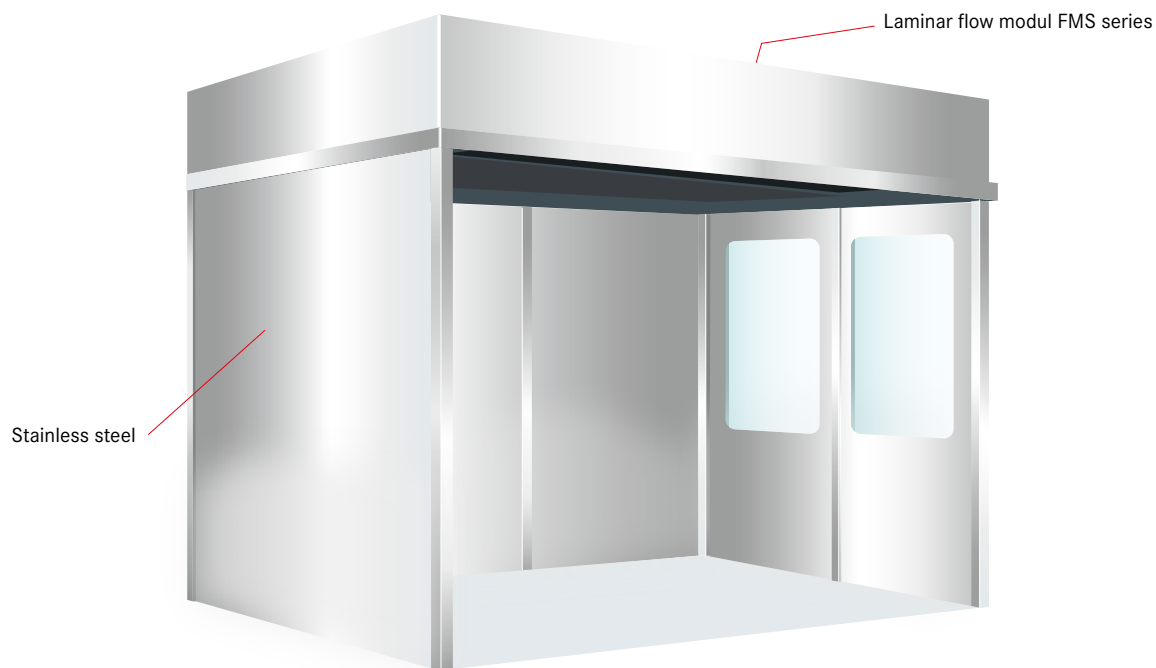
With the use of a SPETEC® clean room cell the particle concentration is reduced from approximately  $15\text{ Mio/m}^3$  (size  $0.12\text{ }\mu\text{m}$ , MPPS) to about 1,500 particles within the cell. This corresponds with a room class of DIN ISO 5.

# Clean room cell

## Stainless steel

Increasing requirements in the pharmaceuticals industry and in food engineering demand a clean environment during manufacturing, processing and storage.

Clean room cells are used in pharmacies, hospitals, in the foodstuffs and cosmetics industries and wherever a particle-free working environment is needed.



The stainless steel clean room cell is based on a similar concept to the aluminum profile clean room cell, but the supporting frame and any side walls are entirely manufactured from stainless steel. A flush-fitting ceiling and side walls ensure easy cleaning and disinfection of the cell.

The modular construction of the cell makes it a simple matter to extend the area of the clean room. So the cell can simply grow to meet future requirements.

Depending on the precise requirements, Spetec clean room cells are custom-built and adapted to the customer's exact needs. The cells can be built to meet the requirements of ISO classes 5 through 9 (DIN ISO 14644-1) and classes A through D of the GMP standard.

Generally, clean room conditions as laid down in the GMP (Good Manufacturing Practice) standard are required for such areas. The stainless steel clean room cell covers precisely these requirements.

### Optional features:

- Flush-surface internal and/or external wall system (modular)
- Access via double hinged door, sliding door or PVC strip-curtain with stainless steel mounting
- Windows glazed with acrylic or safety glass
- Integrated lighting (yellow or white light)
- Operating hours meter
- Filter change indicator and error LED
- Programmable controller interface
- IP 65 construction
- Airlock for materials and personnel

# Clean room concepts

## Options



Option 1



Option 2



Option 3



Option 4



Option 5

Options	
1	<b>Material lock</b>
2	<b>Access systems</b> - Curtain - Sliding door - Hinged door
3	<b>Sliding door electrical/mechanical</b>
4	<b>Flush ceiling</b>
5	<b>Interlocking personnel lock</b>
6	<b>Flush wall system</b>
7	<b>Side panels</b> - VSG – Laminated safety glass - Acrylic glass - Aludibond – Composite panel made of plastic - Stainless steel - MDF - Clean room curtain
8	<b>Fluorescent light</b>
9	<b>LED light</b>

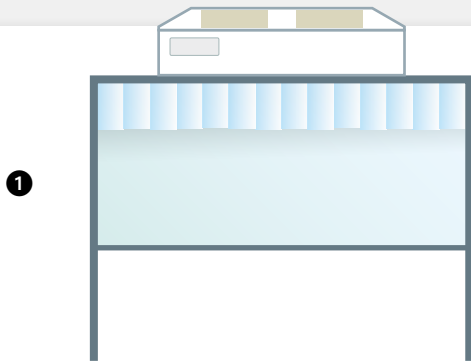


Option 2

## Clean room concepts – overview

# Clean room workbench

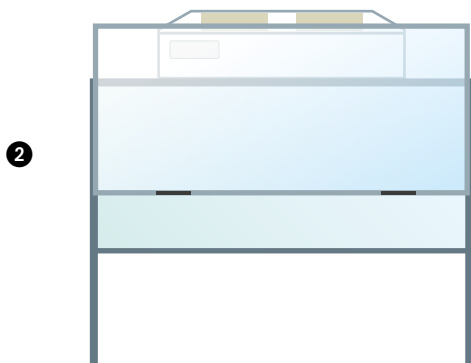
The clean room workbenches are always made to customer specifications. The measurements can be adjusted to the local requirements.



### 1 Clean room workbench with curtain-scoop

#### Characteristics

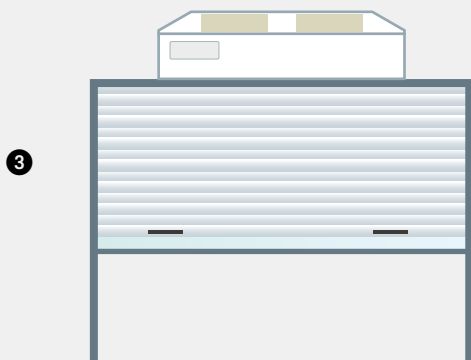
- Easy access to the workspace



### 2 Clean room workbench with sliding door

#### Characteristics

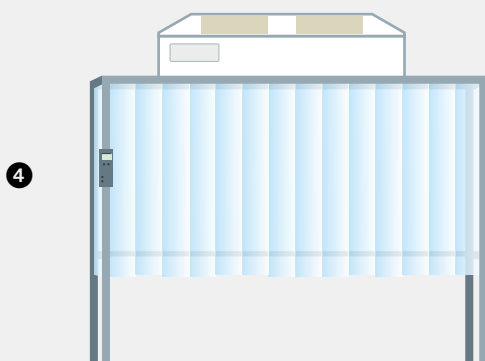
- Continuous sliding mechanism, the opening height can be adjusted individually
- Workbench can be locked during breaks or for storage of materials. The clean room class remain intact as part of this.
- Transparent front-side



### 3 Cleanroom workbench with roller blind

#### Characteristics

- Simple locking of the workbench
- Opaque



### 4 Clean room workbench with canopy

#### Characteristics

- No airflow from outside which disturbs the clean room environment
- User is in the clean room
- Very high degree of process security

# Clean room workbench

## Mini environment

The Spetec clean room workbench or mini environment is primarily used in the optics, electronics, and mechanical industries, e.g. for display manufacturing or finishing of touch panels and for cleaning optical components. The key difference in comparison to the laminar flow box (FBS series, tabletop unit) is the integrated work surface which can be

Class  
100



fabricated from perforated stainless steel, “solid” stainless steel, or hard laminate.

The clean room workbench (Mini Environment) can also be equipped with a “canopy” to reduce the influence of dust or drafts from the environment. This housing provides additional protection of the work area and the employee from the ambient atmosphere.

The clean room workbench can be fabricated according to the individual customer requirements and the required clean room category. This means that the size, equipment, and

design are adapted to the respective requirements. The clean room workbench is generally made with clean room compatible aluminium profiles. The side walls are made from glass, acrylic glass, or a PVC strip curtain. A laminar flow module is installed on top, so that an ISO 5 or category 100 (according to US FED. 209E) clean room is created inside of the mini environment. That equates to only approx. 100 particles with a size of 0.5µm. Compared to a particle count of approx. 1 million per cubic foot in a typical office or laboratory, this corresponds to improving the air quality by a factor of 10 000.

ISO 5



**Clean room workbench  
with sliding door**

**Clean room work bench  
with PVC strip curtain  
incl. "canopy"**

0,5 $\mu$ m

### **Clean room workbench with ionizer**

Clean room workbench with extraction system and ionizer to neutralize static charges.

This special version of the clean room workbench is equipped with an ionizer and extraction system. The partial vacuum created by the extraction system cleans the part in one step. Then the static charge on the part is neutralized by the ionizer so that dust does not adhere. This method ensures that the parts are clean for further processing.

The cleaning time is reduced by more than 50% in comparison to conventional cleaning methods. The canopy with PVC strip curtain prevents dirt from entering the workbench from the outside, making it easier to achieve the clean room category and allowing for even cleaner working.



# Clean room cell

## Special solutions

We are happy to advise you in the selection of a concept and the materials used.

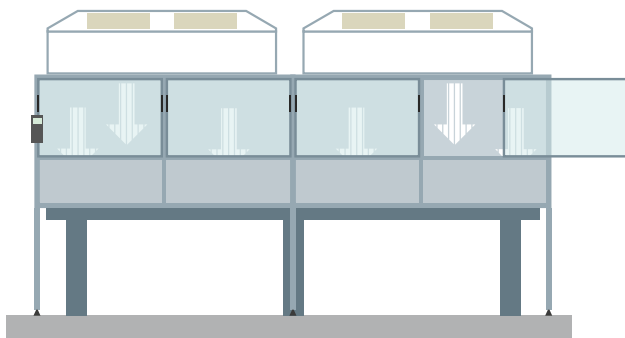
### Application examples:

#### Industry

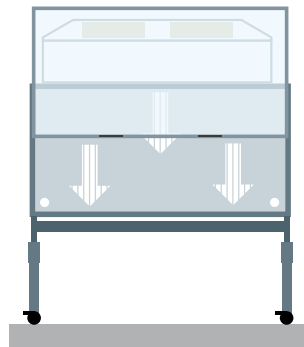
- Plastics processing fabrication machines
- Packaging systems for pharmaceutical products
- Packaging systems in the food industry
- Assembly in the automotive industry - instruments, displays

#### Research and development

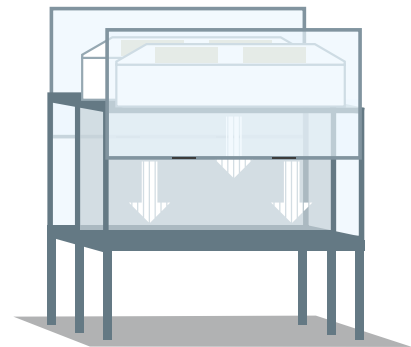
- Complete laser tables
- Laser systems
- Preparing samples in trace element analysis
- Optics and optoelectronics



Optical tables, straight and removable sliding door

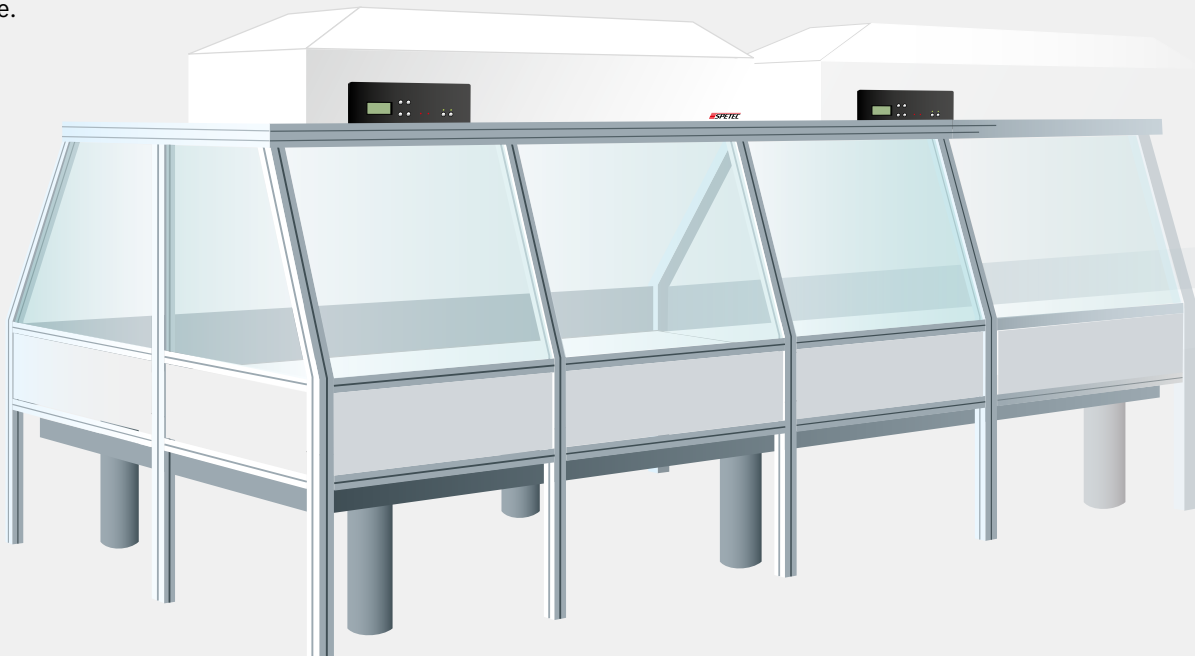


Height adjustable



Double sliding door

Housing of an optical table  
or a machine.



# Clean room station

## CleanBoy® Basic

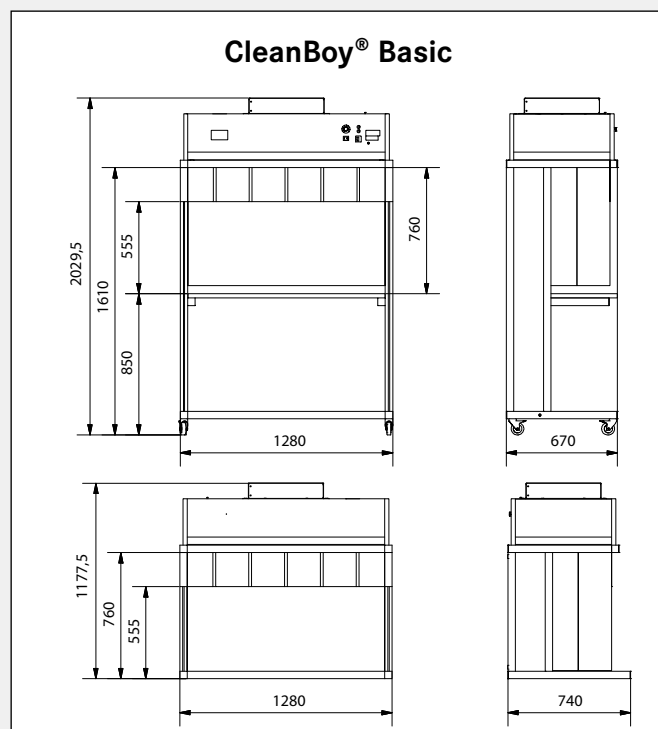


**CleanBoy® Basic,**  
Floor-standing device with work surface

*CleanBoy®*

The Spetec clean room station “CleanBoy®” brings cleanliness to the exact workstation where you need it. Cleanliness in technical terms means classified clean room conditions. The “CleanBoy®” clean room station is available as a floor-standing or table-top device. It is simple to set up and is operational immediately without any further installation.

The CleanBoy® Basic consists of a simpler, more affordable laminar flow module “Basic”. This laminar flow module is offered in a plastic coated, robust version. With an EC-motor with stepless speed regulation the air flow speed can be adjusted to the requirements.



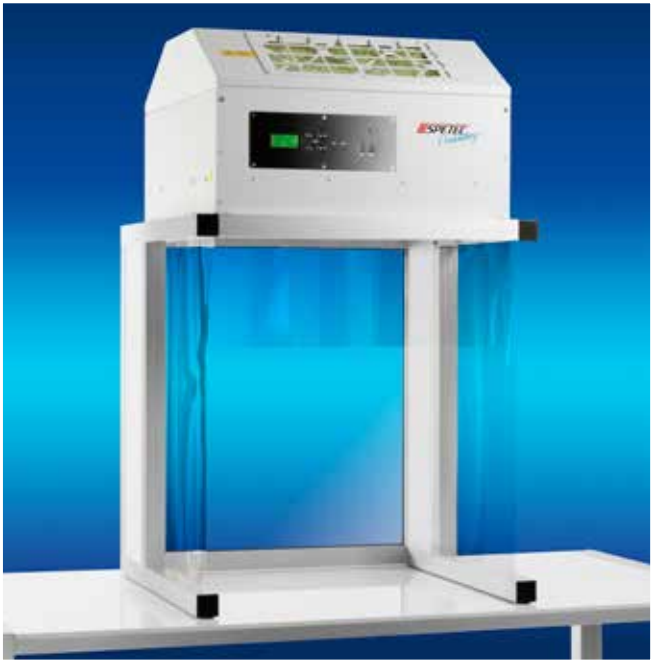
# Clean room station

## CleanBoy® Mini and Maxi

The CleanBoy® Mini or Maxi consists of a laminar flow module series SuSi and a supporting frame made from anodized aluminium. Work can be performed on the table top under category 5 clean room conditions. One of the most noteworthy features of the modules is the extremely low level of noise produced by the fans. The modules include an operating hours meter, a filter change and error indicator and a display for setting reproducible flow rates.

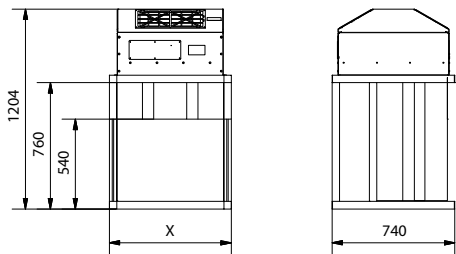


CleanBoy® Maxi, Floor-standing device with work surface



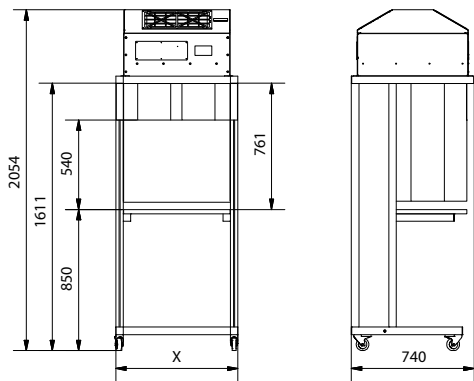
CleanBoy® Mini, Table-top device

### CleanBoy® Mini



Cleanboy® Mini	
Size	X
37	735
56	1040
75	1345
93	1650
112	1955

### CleanBoy® Maxi



Cleanboy® Maxi	
Size	X
37	735
56	1040
75	1345
93	1650
112	1955

# Clean room technology

## Service

**W**e – as a manufacturer and service provider for clean room technology – provide a range of device variants on the one hand, and fast and universal service assistance on the other hand. Now we have used our many years of experience as a manufacturer to develop a services offering, which allows us to test, service, and maintain your clean room system using state of the art measuring equipment.

Very clean air is not just vital in clinic operating rooms. Highly sensitive production environments, such as those in the semiconductor production, precision engineering, optics and optoelectronics, laser technology, or food processing industries, also demand a sufficient level of ambient air quality. In order to ensure this, flow velocity or filter tests are required at regular intervals.

### We offer the following services:

- Particle counts
- Replacing filters in various brands of laminar flow boxes (LF units)
- Finding and fixing leaks
- Determining volume flow rates or flow velocities
- Temperature and relative humidity measurements
- HEPA filter / filter system installation monitoring
- DEHS leak test
- Clean room validation and certification in accordance with EN ISO 14644 and GMP guidelines

We also perform certification within the framework of EN ISO 14644, that is, we record the measurement parameters defined in DIN EN ISO 14644 such as particle counts, flow velocities, etc. All of these parameters are confirmed with a corresponding certificate.

All of the particle measurement devices, air speed, temperature, and humidity sensors we use are tested and calibrated every 12 months.



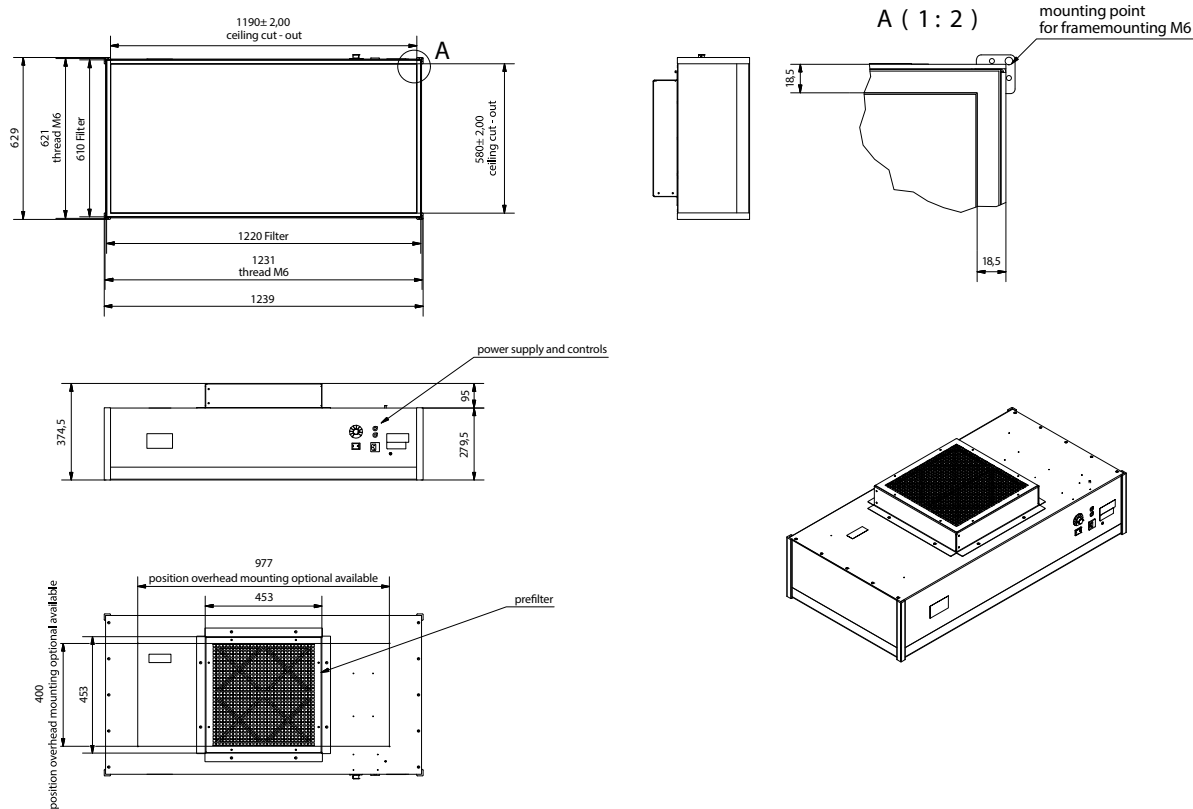
Our offering includes service and maintenance work as well as certification of clean rooms and laminar flow boxes according to the current national and international guidelines and standards. These include the VDI 2083 and DIN EN ISO 14644 guidelines as well as the US Fed Std. 209E. You receive comprehensive documentation about the measurements and a risk assessment.

# EN ISO 14644

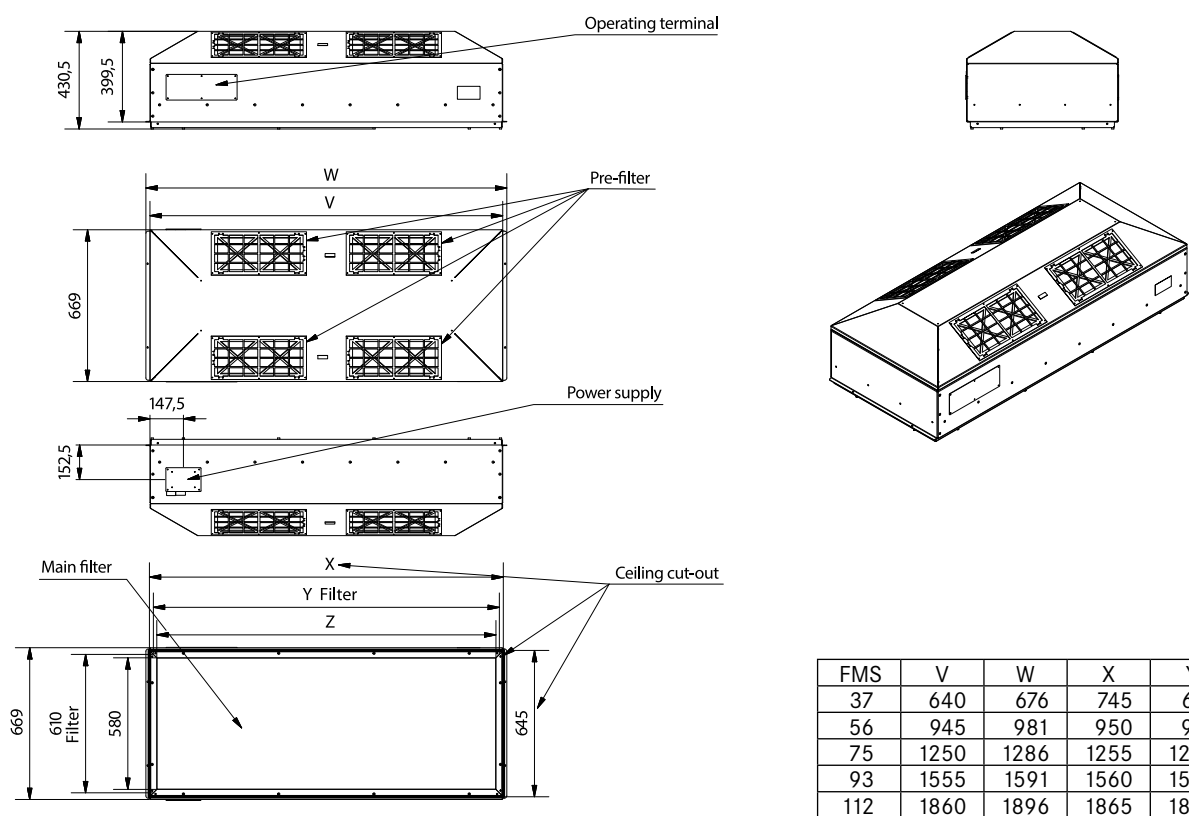
# Clean room technology

# Technical drawings

FMS series Basic

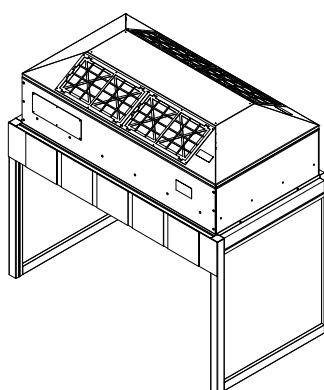
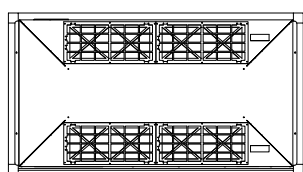
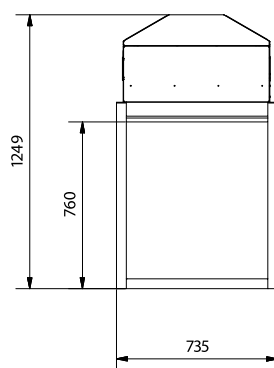
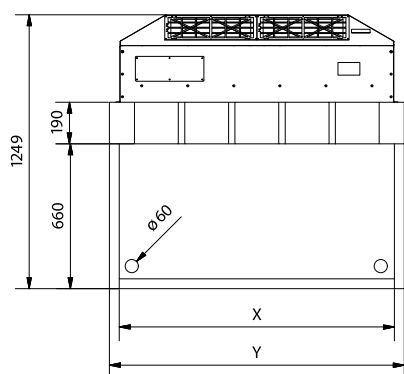


FMS series „SuSi“



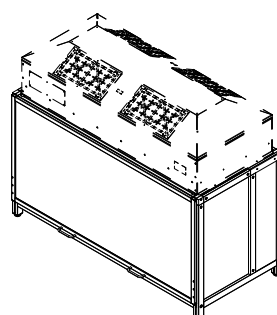
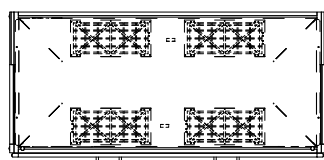
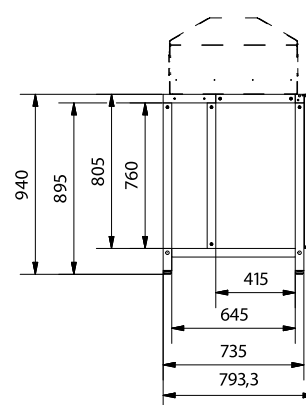
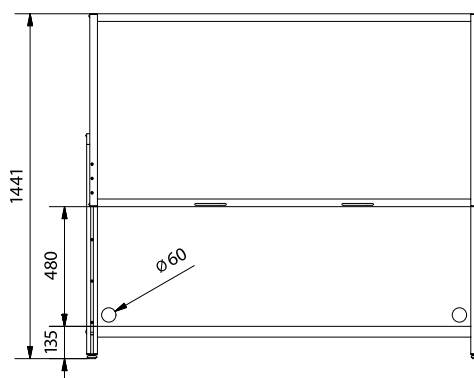
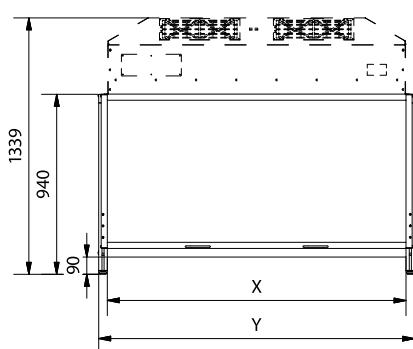
FMS	V	W	X	Y	Z
37	640	676	745	610	580
56	945	981	950	915	885
75	1250	1286	1255	1220	1190
93	1555	1591	1560	1525	1495
112	1860	1896	1865	1830	1800

## FBS series – standard



FBS	X	Y
37	645	735
56	950	1040
75	1255	1345
93	1560	1650
112	1865	1955

## FBS-, EFBS-, PBS-, EBS series



FBS	X	Y
37	645	735
56	950	1040
75	1255	1345
93	1560	1650
112	1865	1955

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