



Low turbulence ventilation system

with ceiling-mounted recirculation module (horizontal filter level) with laminar displacement flow

Fields of application

Due to the laminar displacement flow this system ensures a stable protected area, thus providing the highest degree of safety and air quality to both, patients and the operating team. Furthermore, it contributes to protect against contamination caused by airborne particles and germs, and reduces the risk of post-operative infections. The filter elements, which are distributed across the whole area protected through sterile air, contribute to reduce the initial filter pressure. Broad ceiling extraction units take care of a symmetrical and constant extraction of air from the operating theatre.

The recirculation modules behind the extraction units lead the pre-filtered air straight to the pressure chamber. Large-area ceiling systems provide for a protected zone that not only covers the patient and the operating team, but also the instruments used during surgery.

It is suitable for use in the most sensitive areas e.g. during surgery (hip and/or joint surgery, surgery with prosthetic implants, etc.) and in pharmaceutical areas (production of sterile drugs).

Fields of application according to EN ISO 14644, ÖNORM H 6020 (2015-03-15), DIN 1946-4 (2008-12) for medical purposes and according to VDI 2083.

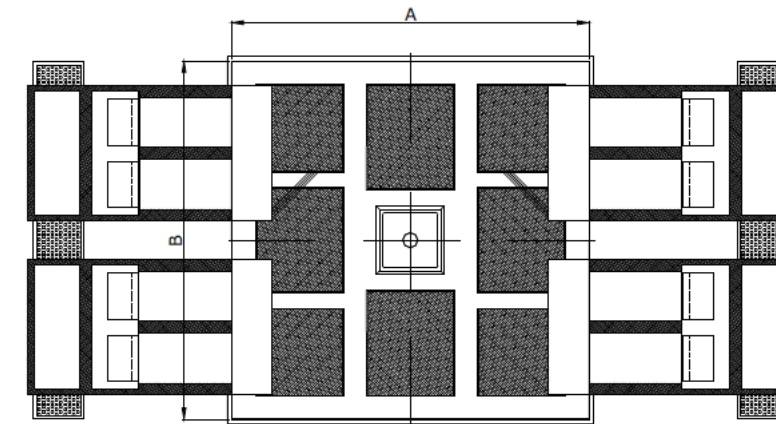
Product features

- Airtight, welded framework and module elements (without using silicone or similar sealing materials)
- sound insulated fan units with integrated motor electronics
- ceiling extraction units with variable angles of inclination
- rectangular shut-off facilities prevent air to be misrouted

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Outline view



Technical data

Type (Area protected)		Square protection area					
		2.5 x 2.5	2.8 x 2.8	3.0 x 3.0 ^{4,)}	3.2 x 3.2 ^{4,)}	3.5 x 3.5 ^{4,)}	3.8 x 3.8 ^{4,)}
Dimensions housing (mm)	A	2,606	2,906	3,106	3,306	3,606	3,906
	B	2,606	2,906	3,106	3,306	3,606	3,906
	H ^{5,)}	530	530	530	530	530	530
Protected area ^{1,)} (m ²)		5.3	6.8	8.1	9.2	10.9	13.0
Number recirculated air module (units)		3	4	6	6	8	10
Number of main filters (units)		8	8	8	8	10	14
Number pre-filters (units)		4	6	8	8	8	10
Main filter - initial pressure ^{2,)} (Pa)		95	85	85	85	90	95
Nominal volume flow rate (m ³ /h)		5,600	7,070	8,100	9,200	11,000	12,990
Recirculated air-volume flow ^{3,)} rate (m ³ /h)		2,950	4,900	5,800	6,400	7,850	9,550

^{1,)} The specified area (about 1.2m above floor level) corresponds to the available data based on the experience at optimum room and air conditioning parameters. Modifications of parameters (such as flow velocity, temperature data, position of extraction units, utilization of a stabilizing curtain) could have a considerable influence on the area.

^{2,)} Tolerance: +/-10% calculated with one main filter (filter frame made of aluminium) type Micro-SF-AL, class H 13, with a height of 90 mm and a pre-filter (plastic frame) type BETA-PAK, class F7 related to an air flow velocity of 0.25 m/s below the diffuser across the effective air outlet surface.

^{3,)} The basic value considered for outside air volume flow has been 25%-30%. For detailed calculation of the outside air volume, the thermal loads to be extracted have to be used based on the specific project.

^{4,)} Because of the size suitable for specifically sensitive surgery.

^{5,)} Reduced housing heights feasible (optional) under specific given stipulations.

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Design

Housing

- airtight and corrosion resistant design
- visible surface coated with a disinfectant-resistant coating in RAL 9010 (pure white)
- filter seat (main filter) with a horizontal, stable profile frame
- integration in the suspended ceiling on site via circumferential mounting flange
- the design includes a lamp stand and a service shaft adjusted to the stand with separate openings (to access the service and revision opening)
- air diffusers (for sterile air) are made of aluminium profiles and covered with special tissue on both sides

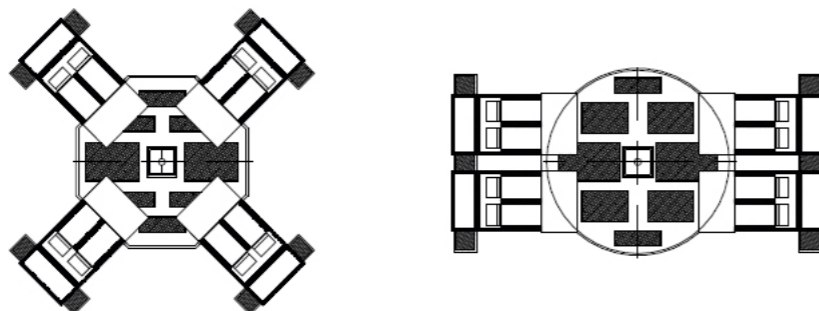
Ceiling-mounted recirculation module

- Made of aluminium
- airtight and corrosion resistant design
- completely coated with a disinfectant-resistant coating in RAL 7045 (grey)
- including revision openings (accessible from the operating theatre)
- to obtain sound insulation, the inner side is coated with abrasion-proof sound absorbing mats, which are suited to hygiene sensitive environment
- Sound insulation elements are placed in the air stream
- in case the fans stop, individual shut-off facilities with automatic control prevent air to be misrouted (optional).

Ceiling extraction unit

- Made of aluminium
- a wide extraction area ensures a constant air evacuation across the whole area
- disinfectant-resistant coating in RAL 9010 (pure white)
- integration in the suspended ceiling on site via circumferential mounting flange
- unit includes particulate filter, lint trap and pre-filter
- perforated sheet metal elements can easily be removed for maintenance works

More layouts of protected areas on demand (round, rectangular or octagonal).



Filter

With this specific housing design the following filters may be used:

Main filter

- Micro-SF-AL (h = 69 mm)
- Micro-SF-AL (h = 78 mm)
- Micro-SF-AL (h = 90 mm)
- Micro-SF-AL (h = 117 mm)

Particulate filter

- Beta PAK (h = 98 mm)

For technical specifications of filters, please, refer to the corresponding data sheets (catalogue index 7).

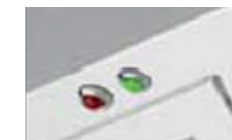
Note:

On site conditions may require a different layout of the ceiling-mounted air extraction units, which deviates from the standard version.

When placing them, special care should be taken to a symmetrical installation with regard to the air inlet of the low turbulence system.

Accessories (optional)

- Circumferential transparent stabilizing guard
- background illumination (IP 20) with included analogue ballasts
- perforated sheet metal plates in the air suction units made of stainless steel
- control panel placed in the operating theatre
- ceiling extraction units let-in flush into the suspended ceiling
- LED-system check by means of LED-pilot lamps at the front side to indicate the operational status - proper function (green), filter replacement (yellow) and failure (red)
- background illumination in form of LED-batten luminaires
- control panel



3D-diagram

