

# Operating theatre ceilings

## ■ Operating theatre ceiling – perforated version DPS

### Application

DPS with absolute filter is being used in clean rooms which require clean air but also frequent air-exchange within the working area. They are designed to be built-into the false ceilings of OP rooms and intensive care premises and to ensure the laminar flow of the absolute clean air into the target zone. The aim of the above device is to reduce the possibility of infection in OP rooms being caused by germs which are due to different causes constantly present in the premises and surroundings. DPS is suitable for OP rooms class Ib by DIN 1946-4.

### Description

The preparation of air for the OP theatre is accomplished with separate air conditioning system, capable of rough and fine air-filtering according to DIN 24185. The filtered supply air is distributed to the absolute filter on the DPS plenum box. The air is discharged from the pressure chamber into the OP theatre via the perforated ceiling plates. The temperature of the discharged air is to be 1° to 3 °C lower than the average room temperature. Two thirds of the air current should be led out of the room via the floor and one third via the ceiling. The air current which is being discharged from the DPS flows over the entire area under the ceiling thus preventing the surrounding air from penetrating within the operation area (fig. 1).

### Base material of pressure chambers and perforated plates

Steel sheet painted with epoxy dusty paint RAL 9010, resistant to disinfectants.

Some ceilings are composed of two parts, which are bolt together at the assembly point. In the assembly operations the connections are additionally packed with the acrylic putty, which is attached to the ceiling.

At the consumer's request the ceiling contains a transition for the operating light of the dimensions 300 x 300 mm. In that case a blind plate and a plate with a round opening of  $\Phi 150$  mm.

Perforated plates (from inside the ceiling) are covered with white G4 filter for a more uniform distribution of air. The delivered foam is packed in a foil in order to protect it from dirt and damage.

Fixation of the perforated plates is on the one hand carried out with the help of hinges and on the other hand with the help of locks.

The ceiling is fitted with the HEPA filters 610 x 305 x 292, which belong to the class H13 or H14 and have been tested according to the EN1822:2010 . They are fitted into the side connection on the longer side of the ceiling. The dimensions of the connection duct and the number of filters are given in the table. The inside of the ceiling is fitted with the filter pressure drop measurement connections (the difference between the pressure in front of and behind the filter, which serves to control the dirtiness of the filter) and with the SCAN test connection.

The initial pressure drop is given in Filter chapter. At a filter load with larger or smaller flow rates than the nominal the pressure drop increases and decreases respectively, which is shown in the diagram. Leak-tightness of HEPA filter at the sealing frame is in accordance with the DIN 1946 standard, Chapter 4. When changing filters one has to check the leak-tightness of the hinges.

The ceiling, filter body, filters, white G4 filter and the assembly material are delivered separately.

The assembly of ceilings to the concrete ceiling is carried out with the threaded bars and inners for the concrete.

### HEPA filter replacement

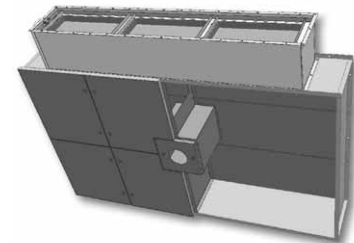
During the operation the permeability of the HEPA filter is decreased and the differential pressure increases. The permeability-loss rate is measured with differential manometer via the tubes fitted in front and after the filter. When the pressure drop has reached double its initial value, it is recommended to replace the HEPA filter. When replacing absolute filters, the first row of face plates has to be removed.

### Accessories

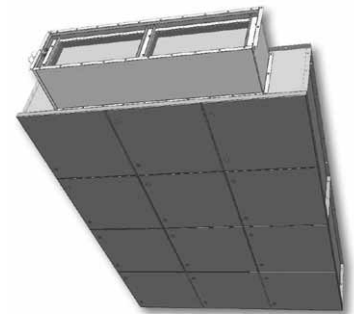
See chapter Accessories.



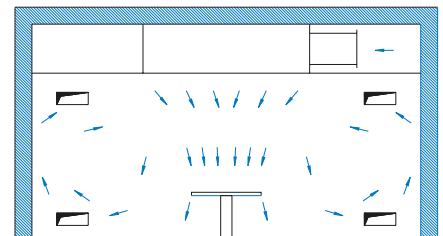
**With transition for the light and three filters**



**Without the transition for the light and two filters**



**Fig. 1**



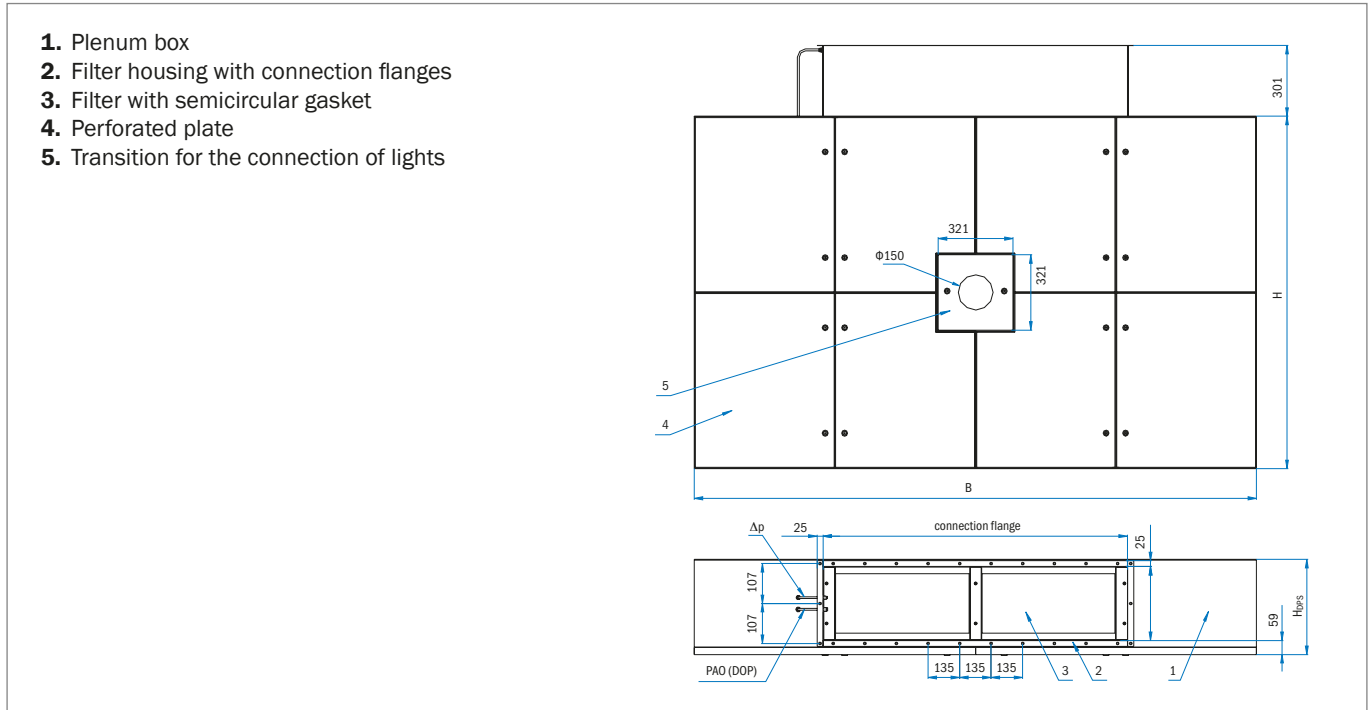


Table 1: Ceiling dimensions

B	H	H <sub>DPS</sub>	Q [m³/h]	Weight [kg]	No. of filters [ / ]	Connection lange
2000	1000	415	1700	90	2	1302 x 315
2400	1200	415	2300	122	2	1302 x 315
2400	1400	435	2700	135	3	1915 x 315
2400	1500	435	2800	149	3	1915 x 315
2400	1800	435	3300	174	4	two connections 1302 x 315
3000	1800	435	4200	210	4	two connections 1302 x 316
3000	2400	435	5800	251	6	two connections 1915 x 315
3000	3000	435	7200	320	8	four connections 1302 x 315

**Ordering key**

**DPS - B x H / L / S / H13 / RAL**

- RAL** Colored cold rolled steel (standard color RAL 9010)
- INOX** Stainless steel AISI 304
- H13** ≥ 99,95 % filter classification EN 1822:2010
- H14** ≥ 99,995 %
- S** Side spigot entry
- V** Vertical spigot entry (on customers request)
- L** Opening for lamp  
- without opening for lamp
- BxH** DPS dimension (see Table 1)

**Note:**

- Filters are included in DPS housing
- It is possible, in case of special demand, to produce DPS in special sizes and for optional air flow volume.