Product Description

The Plenum Integrated Filter Fan (PIFF-COMPACT) is a fan filter unit with integrated return air and cooling coil. It is used to supply turbulent mixed air-flow while reducing the concentration of particles and the temperature inside of clean environments e.g. pharmaceutical laboratories and clean rooms. Depending on the coverage of the clean room ceiling, the classes 5.0 to 8.0 according to DIN EN ISO 14644-1 as well as B, C and D according to EC Guide “GMP” can be achieved.

The PIFF-COMPACT is installed into the existing ceiling grid by an installation frame.

Compared to standard air supply systems with centralized air handing unit, the supply & return air ducts on top of the clean room ceiling can be eliminated, which results in considerable savings of installation space and in a reduction of design expenditures.

The unit is working in recirculation mode by default; if needed, supply with make up air can be engaged up to 500 m³/h to keep up the over-pressurization of the clean room as well as to maintain the supply with fresh air.

Through the exhaust air connection used air can be removed. For an operation with 100% return air supply both supply and exhaust connections can be closed with a cap.

The product is protected by patent.

Design and Function

The PIFF-COMPACT consists of an outer housing 1 with make-up air connection 2 and exhaust air connection 11 together with the internal components HEPA filter cell 7 with fan motor unit 5 in a common internal housing 6 and a cooling coil 13. As an option, a prefilter 12 can be installed.

The supply with fresh air and the collection of exhaust or return air is implemented by a specially designed air grill 10 which is located on top of the ceiling installation frame 9 of the PIFF-COMPACT.

The power 17 and network 16 connectors as well as the cooling water connections (supply 14/return 15) are located at the side of the unit. The control valve for the cooling coil is to be provided for a single or a group of PIFF-COMPACT (by others).

The fan 5 draws air from the room via the return air intake in the outlet grill and channels the air through an optional prefilter 12 to the cooling coil 13. The chilled air-flows through the HEPA filter 7 and is blown with high turbulence into the cleanroom via the outlet air grill. This design prevents a short-cut between supply air and return air. The distribution elements of the outlet air grill are arranged in a special design to ensure a homogenous air distribution to all sides.

Legend

1 Housing
2 Make-up air connection
   DN 160 (optional), Standard: closed with a cap
3 Inlet nozzle
4 Motor
5 Fan motor unit
6 Internal housing
7 HEPA filter
8ab Particle measuring point
8bc Differential pressure measuring point
9 Ceiling installation frame
9a Intermediate profile
10 Air grill
11 Exhaust air connection
   DN 160 (optional), Standard: closed with a cap
12 Prefilter (option)
13 Cooling coil
14 Cooling return ¾""cooling water supply ¾"
15 RJ45 network connectors
   (EC version)
16 Power supply
17 Ground connection
18 Transport lock
19 UFR 55/70 T/P ceiling grid
20 UKD cassette ceiling grid

Fig. 1 PIFF-COMPACT module with air grill 10, ceiling installation frame 9 and Prefilter 12: construction
Technical Data

<table>
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<tr>
<th>Grid size</th>
<th>mm</th>
<th>1200 × 1200</th>
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<tbody>
<tr>
<td>Housing L × W × H</td>
<td>mm</td>
<td>1100 × 1100 × 590</td>
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<td>Air grill cassette L × W × H</td>
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<td>1145 × 1145 × 60</td>
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<td>Ceiling installation frame L × W × H</td>
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</tr>
<tr>
<td>– In</td>
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<td>14</td>
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<tr>
<td>– Out</td>
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<td>Pressure loss air-side at 1500 m³/h</td>
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1) with H14 filter cell

System Installation

The installation of a PIFF-COMPACT into the M+W Products ceiling systems is very simple. Fig. 3 shows a sample installation situation into the → Ultraflex ceiling grid UFR 55/70 T/P 20 (an UFR 55/70 T/E can be used the same way). Fig. 4 shows the installation into the → Ultraflex cassette ceiling 21. Installation is executed from the clean room side using a ceiling installation frame 9 and an intermediate profile 9a. Installation in other ceiling systems available on the market is possible as well (for installation instructions please send an enquiry).

Access to the top side of the PIFF-COMPACT is only necessary to connect the BUS-Systems (EC only), the power supply and the chilled water connection.

Maintenance is executed from the clean room side. Therefore the air grill is removed by loosening the fixing screws. Next, the fan-motor-unit is lowered with an installation lift and there is free access to the HEPA filter. Alternatively the maintenance can be executed from the plenum side by unfastening the PIFF-COMPACT cover panel.

Fig. 3 Installation situation with ceiling installation frame 9 and intermediate profile 9a in ceiling grid profile UFR 55/70 T/P

Fig. 4 Installation Situation with ceiling installation frame 9 and intermediate profile 9a in ceiling grid profile UKD Cassette Ceiling Grid
Key Features

- Complete, plug & play unit
- Provided with supply air and return air as well as make-up air and exhaust air connections
- Integrated air cooling coil (without valve or thermostat, water connection 3/4" female thread)
- No additional plenum necessary
- Connections for particle and/or differential pressure measurements at the HEPA filter
- Easy installation with ceiling installation frames and intermediate profiles for an optimal unit integration into the cleanroom ceiling system
- Flexible in that way that the unit can be easily relocated
- Filter change from above or below
- Easily operated and maintained
- Housing made of 1.5 mm aluminum, untreated

Type Designation

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<tr>
<th>PIFF-COMPACT</th>
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<td>EC-Motor with LON RS485-interface</td>
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<td>standard filter class</td>
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<tr>
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Motor type:
EC/LR  EC-Motor with LON RS485-interface
EC/LF  EC-Motor with LON FTT10A-interface

HEPA Filter
H14  standard filter class
Optional

Prefilter
O  without
Optional
G4  filter class G4

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Fig. 5 Typical room air velocity situation with turbulent mixed air generated by a Plenum Integrated Filter Fan (example)

Fig. 6 Supply air grill with return air inlet, view from below
Submittal Text

_____ pcs. Plenum Integrated Filter Fan (PIFF-COMPACT)

The PIFF-COMPACT is a ceiling installed, compact recirculation air unit that accomplishes the following:

– Mixing make-up and recirculation air in the unit’s plenum
– HEPA filtration of the supply air
– Blowing the supply air into the room through the air grill
– Developing turbulent mixed air-flow
– Intake the return air through the air grill
– Discharging exhaust air rate
– Cooling the recirculated air

Housing
The housing is made of 1.5 mm aluminum sheet, fastened with rivets and sealed. The surface is untreated and cleaned.

The servicing level is recessed to protect it from damage. The fan power supply and bus cable connections (only EC) as well as grounding are on the left. The cooling water connections are on the right. All connections are labeled.

Function
Normally the unit runs in recirculation mode. Through the make-up air connection up to 500 m³/h of make-up air can be supplied and through an additional connector exhaust air can be discharged. In a 100 percent recirculation air mode the make-up and exhaust air connections will be closed by a cap.

Components
– Filter Fan Unit (FFU) with the dimensions 992 × 692 × 289 [mm]
– HEPA filter, class H14, efficiency 99.995 %
– Cooling coil, capacity approx. 2.6 kW (see technical data)
– Water connection ¾” female thread
– Connection for particle counter and/or differential pressure measurements at the HEPA filter
– Ceiling installation frame for M+W Products ceiling systems

Technical Data

Ceiling grid size ..............1200 mm × 1200 mm
Outer dimensions ..............1100 mm × 1100 mm
Height PIFF-COMPACT ......590 mm
Height installation frame ......60 mm
Total Weight incl. filter ......70 kg

Fan Operating Parameters .EC
Air-flow volume ..............1500 m³/h
Filter pressure loss ...........126 Pa
Power ....................220 W
Voltage/Phase ...............200-277/1
Nominal current ............1.8-1.3 A
Sound power level ...........68 dB(A)

☐ HEPA filter H14
  Dimensions ..............1000 × 700 × 109 [mm]
  Pressure loss ...........126 Pa (at v = 1500 m³/h)
  Efficiency .............99.995 % in MPPS

☐ Optional Filter class _____

Cooling Coil
Power ....................2.6 kW
Air-flow volume ..............1500 m³/h
Pressure loss air ...........42 Pa
Air inlet temperature ........23 °C
Air outlet temperature ......18 °C
Water amount ..............400 l/h
Pressure drop water .........12.7 kPa
Water supply temperature ....14 °C
Water return temperature ....20 °C

Optional
☐ Ceiling installation adaptor for other ceiling systems
☐ Prefilter G4 according to DIN EN 779

Manufacturer M+W Products GmbH
Type PIFF-COMPACT—____-____-____
Local Support
Wherever You Need Us