# Plenum Integrated Filter Fan

## PIFF 3-EC

**Data sheet**

exyte-technology.net

# Product Description

The Plenum Integrated Filter Fan (PIFF) is a local fan filter unit with integrated return air, return air grill, HEPA filter 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 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 $m^3/h$ 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.

# Konstruktiver Aufbau und Funktion

The PIFF 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.

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 (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.

When installed professionally, the PIFF achieves the air tightness class 0 according to VDI 2083/19.

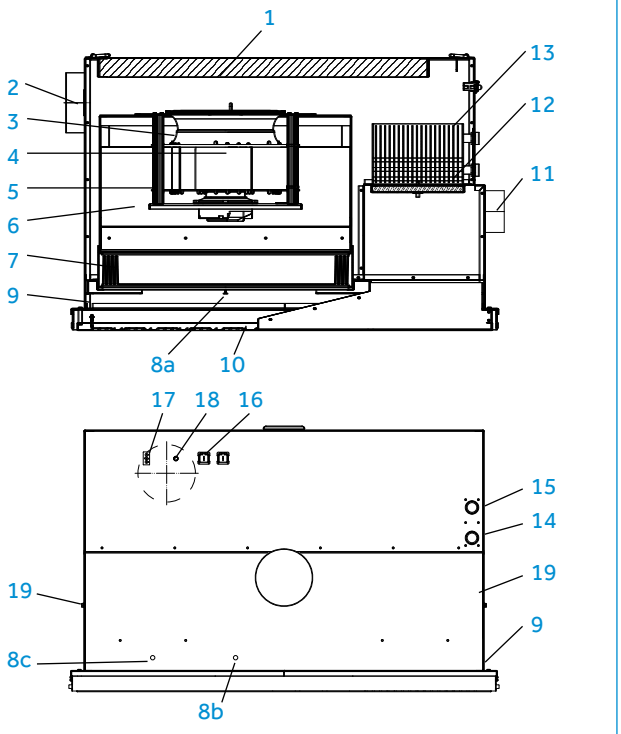



**Abb. 1** PIFF module with air grill 10, ceiling installation frame 9 and Prefilter 12 : construction

Legend

| | | | |
|---|---|---|---|
| 1 | Housing | 11 | Exhaust air connection DN 160 |
| 2 | Make-up air connection DN 160 | 12 | Prefilter (option) |
| 3 | Inlet nozzle | 13 | Cooling coil |
| 4 | Motor | 14 | Cooling return ¾" |
| 5 | Fan motor unit | 15 | Cooling water supply ¾" |
| 6 | Internal housing | 16 | RJ45 network connectors (EC version) |
| 7 | HEPA filter | 17 | Power supply |
| 8a/8b | Particle measuring point | 18 | Ground connection |
| 8b/8c | Differential pressure measuring point | 19 | Transport lock |
| 9 | Ceiling installation frame | 20 | UFR 55/70 T/P ceiling grid |
| 9a | Intermediate profile | 21 | Cassette ceiling system |
| 10 | Air grill | | |

# Technical Data

| Grid size | mm | 1200 × 1200 |
|---|---|---|
| Housing L × W × H | mm | 1100 × 1100 × 660 |
| Air grill cassette L × W × H | mm | 1145 × 1145 × 60 |
| Ceiling installation frame L × W × H | mm | 1166 × 1166 × 60 |
| Height Total | mm | 720 |
| Weight Total | kg | 80 |
| **Motor IP20** | | **EC-Motor** |
| Voltage / Phase | V | 200-277 / 1 |
| Frequency | Hz | 50 / 60 |
| Nominal current | A | 1.8-1.3 |
| Nominal power consumption | W | 370 |
| Airflow rate | m3/h | 1500 |
| Power [1)] | W | 280 |
| Sound power level [1)] | dB(A) | 62 |
| Sound pressure level [1)]<br>25% ceiling coverage<br>10% ceiling coverage | <br>dB(A)<br>dB(A) | <br>62<br>59 |
| **HEPA Filter** | | |
| Filter class DIN EN 1822-1 | | H14 |
| Dimensions L × W × H | mm | 1000 × 700 × 109 |
| Separation efficiency in MPPS | % | 99,995 |
| Pressure drop | Pa | 126 |
| **Cooling Coil** | | |
| Cooling capacity | kW | 2.6 |
| Media volume flow | m³/ h | 0.4 |
| Water temperature<br>In<br>Out | <br>°C<br>°C | <br>14<br>20 |
| Pressure loss water-side max. | kPa | 12.7 |
| Air temperature<br>In<br>Out | <br>°C<br>°C | <br>23<br>18 |
| Pressure loss air-side at 1500 m³/h | Pa | 42 |

1) with H14 HEPA Filter at airflow rate 1.500 m³/h

Sound power level measurement according to ISO 3741, tolerances according to DIN 24166

**Abb. 2** PIFF module without air grill and installation frame


**Abb. 2.1** Power supply 17, grounding 18, RJ45 network connectors 16, cooling water connection ( supply 14, return 15)

# System Installation

The installation of a PIFF into the Exyte Technology 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 a cassette ceiling system 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 is only necessary to connect the BUS-Systems, 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 cover panel.

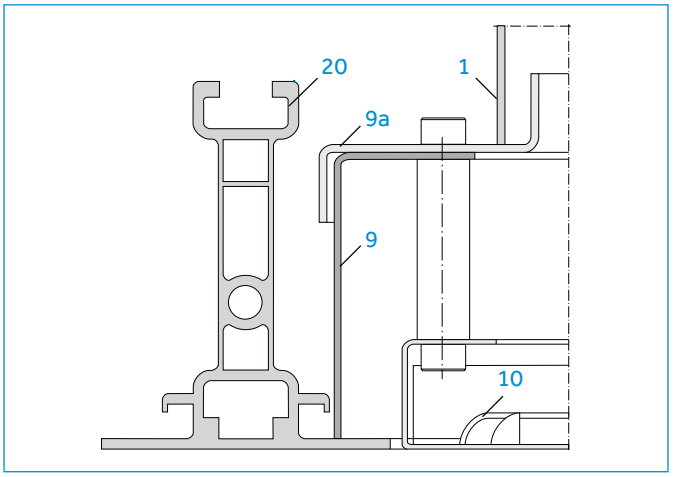



**Abb. 3** Installation situation with ceiling installation frame 9 and intermediate profile 9a in ceiling grid profile UFR 55/70 T/P

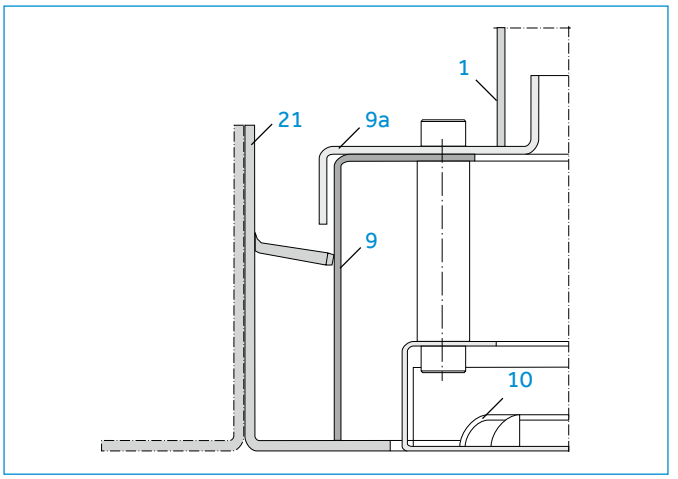



**Abb. 4** Installation Situation with ceiling installation frame 9 and intermediate profile 9a into a cassette ceiling type

# 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 ¾" female thread)
- No additional plenum necessary
- Connections for particle and/or differential pressure measurements at the HEPA filter
- Low sound power level
- 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

### 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 ..... special type

### Prefilter

O ..... without

Optional G4 ..... filter class G4

..... special type

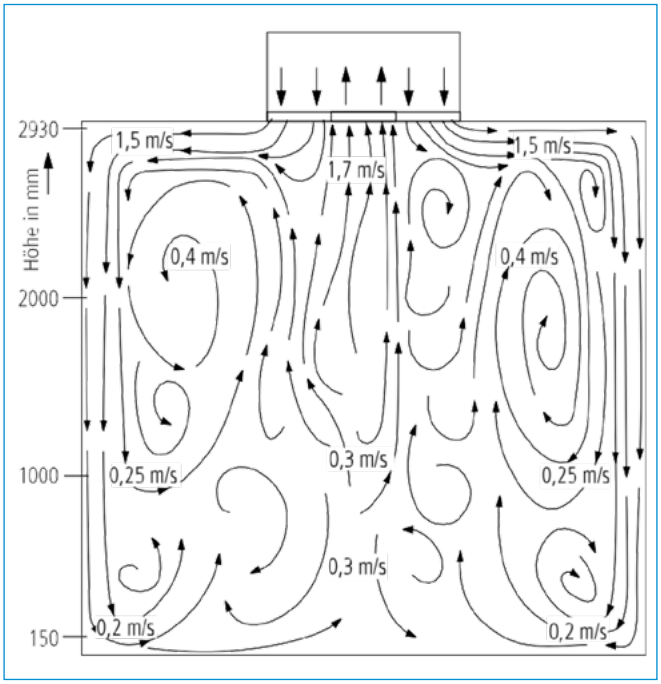



**Abb. 5** Typical room air velocity situation with turbulent mixed air generated by a Plenum Integrated Filter Fan (example)

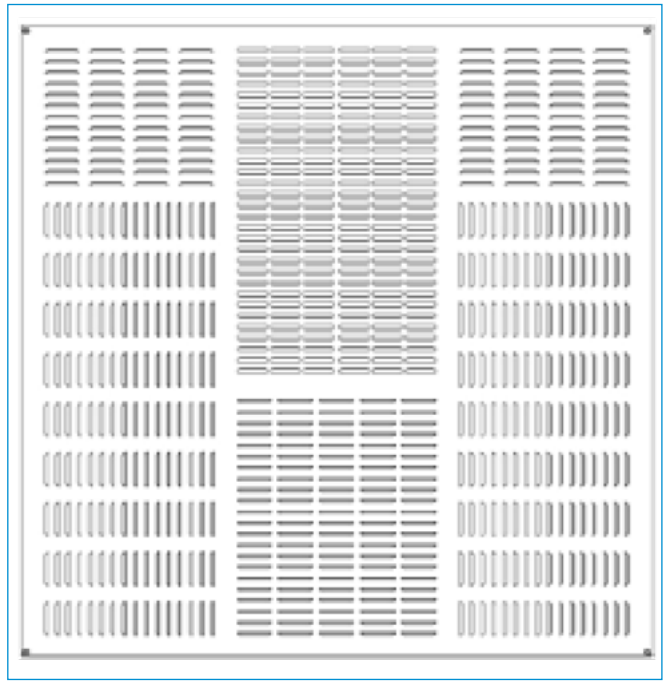


**Abb. 6** Supply air grill with return air inlet, view from below

# Submittal Text

_____ pcs. Plenum Integrated Filter Fan (PIFF)

The PIFF 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
- Developping 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 × 414 [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

## Technical Data

| | |
|---|---|
| Ceiling grid size | 1200 mm × 1200 mm |
| Outer dimensions | 1100 mm × 1100 mm |
| Height PIFF | 660 mm |
| Height installation frame | 60 mm |
| Total module height | 720 mm |
| Total Weight incl. filter | ca. 80 kg |
| Tightness class | 0 (acc. VOI 2083/19) |

## Fan Operating Parameters EC

| | |
|---|---|
| Air-flow volume | 500 $m^3/h$ |
| Filter pressure loss | 126 Pa |
| Power | 220 W |
| Voltage / Phase | 200 - 277/1 |
| Nominal current | 1.8 - 1.3 A |
| Sound power level | 62 dB(A) |

☐ HEPA filter H14

| | |
|---|---|
| Dimensions | 1000 × 700 × 109 [mm] |
| Pressure loss | 126 Pa (bei v = 1500 $m^3/h$) |
| Efficiency | 99.995 % im MPPS |

☐ Optional Filter class _____

## Cooling Coil

| | |
|---|---|
| Power | 2,6 kW |
| Air-flow volume | 1500 $m^3/h$ |
| 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 |

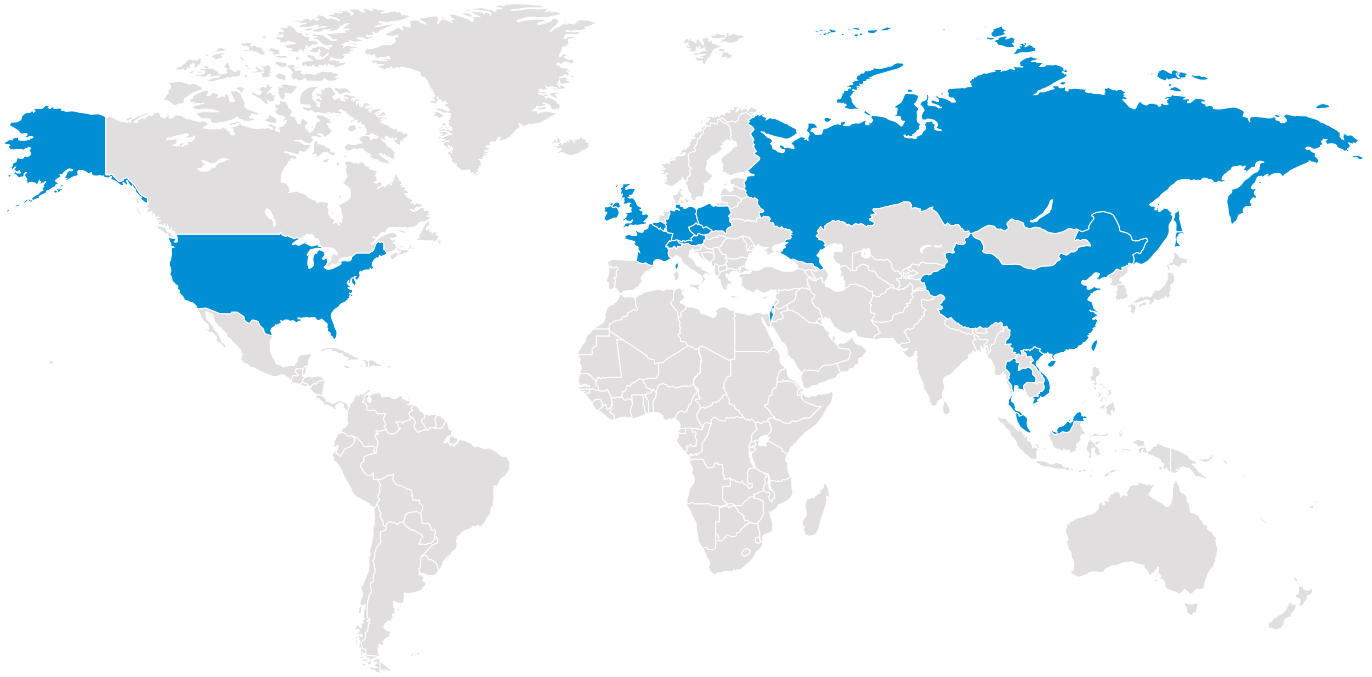
## Optional

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

## Manufacture Exyte Technology GmbH

Type ..... PIFF–___–_____–_____

# Local Support
# Wherever You Need Us



**Exyte Technology GmbH**
Rosine-Starz-Str. 2-4
71272 Renningen
Germany
Phone: +49 711 8804-8000
info@exyte-technology.net

**Exyte Technology Shanghai Co., Ltd.**
No. 139 Beimin Road,
Chedun, Songjiang
201611 Shanghai, China
Phone: + 86 21 37838360
info@exyte-technology.net