

Filter Fan Unit ECO 2 Type ECO 2 EC

Technical Concept



Product Description

Filter Fan Units (FFUs) from Exyte Technology are designed to provide clean air to individual workstations or entire cleanrooms. Due to the simple construction the FFU offers a good compromise in matters of power consumption, sound power level and price. The FFU ECO 2 is in particular suitable for applications in non-unidirectional (turbulent) airflow cleanrooms.

Depending on the configuration of the filter coverage and of filter classes, cleanroom classes ISO 3.0 to ISO 8.0 according to DIN EN ISO 14644-1 can be reached. This brochure provides information about the device design.

FFU ECO 2 EC – FFU with EC-motor and advanced control and monitoring possibility

The product is protected by patent.

Technical Data

Grid size ¹⁾	mm	1200 × 600	1200 × 900	1200 × 1200			
Housing length	mm	1132	1132	1132			
bearing rails	mm	1100	1100	1100			
filter installation frame	mm	1100	1100	1100			
Housing width	mm	532	832	1132			
bearing rails	mm	500	800	1100			
filter installation frame	mm	500	800	1100			
Housing height	mm	350					
Housing material standard		Aluminium untreated					
Weight standard without filter	kg	21	26	32			
EC-Motor (IP20)							
Voltage/Phase	V/ph	200–277/1					
Frequency	Hz	50/60					
Nominal current	A	1,8–1,3					
Nominal power	W	370					
Rotation speed max.	1/min	300–1304					
Operation temp. min./max.	°C	0/+40					
Air velocity	m/s	0,30	0,45	0,30	0,45	0,30	0,45
Air volume flow	m ³ /h	778	1166	1166	1750	1555	2330
Differential pressure	Pa	80	120	80	120	80	120
Power consumption ²⁾	W	47	94	64	140	83	200
Sound power level pressure side ²⁾	dB(A)	44	52	47	54	50	59
Sound pressure level in the cleanroom ²⁾							
– 25 % coverage	dB(A)	47	55	47	55	50	59
– 50 % coverage	dB(A)	50	58	50	58	53	62
– 100 % coverage	dB(A)	53	61	53	61	56	65
External differential press. max. ³⁾	Pa	400	365	385	315	320	215

Design and Function

The unit consists essentially of the housing **1**, the HEPA filter cell **2** and the compact fan unit **3** with impeller and motor **4** with inlet nozzle **5**. The integrated baffle plate **1a** optimizes the uniformity of airflow towards the filter. The sound absorber **9** reduces the fan noise level.

The following additional accessories are available:

- Prefilter **11** for coarse particle filtration
- AMC-filter **12** for filtration of gaseous contaminants
- Cooling coil/heating coil **13**
- Aerosol inlet connector, Aerosol measurement connector
- air diffuser (perforated plate diffuser, swirl outlet) **10**

The FFUs generate an uni-directional airflow. With implementation of the air diffuser **10** a turbulent airflow inside the cleanroom is created. If necessary filter cell classes H13 to U17 can be used.

The FFU fans have sufficient reserve capacity to overcome any additional pressure loss due to e.g. raised floor, return air ducts, prefilter or cooling/heating coils.

The FFU ECO 2 EC is driven by an electronically commutated external rotor motor.

- 1) Special size upon request
- 2) with H14 filter cell without external differential pressure
- 3) without installed HEPA/ULPA filter
- 4) Measurement with transformer

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

Dimensions

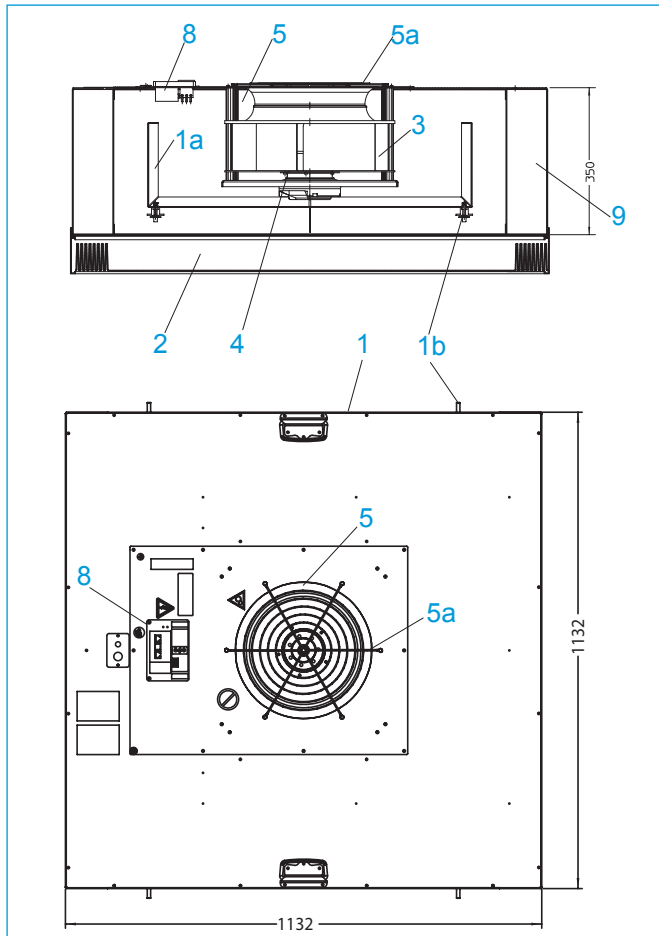


Fig. 1 FFU-ECO 2-1212, with locking bolts 1b for the cleanroom side installation into Exyte Technology ceiling grid UFR 55/70-T with bearing rails.

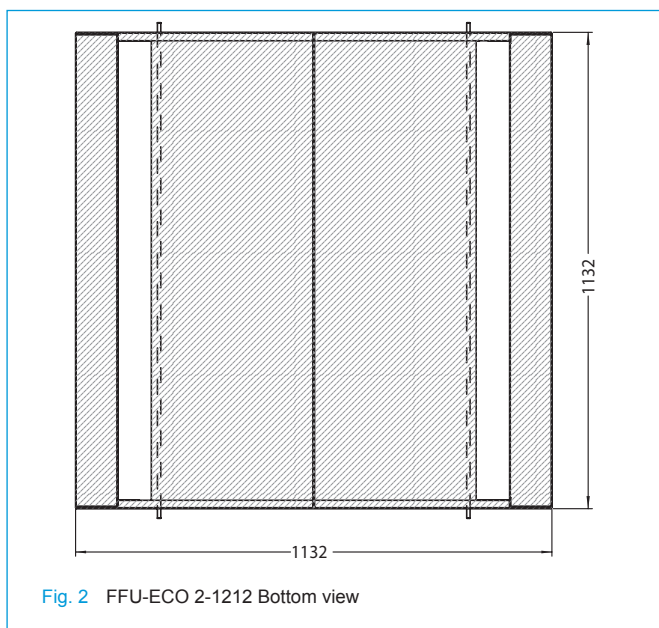


Fig. 2 FFU-ECO 2-1212 Bottom view

Device Installation

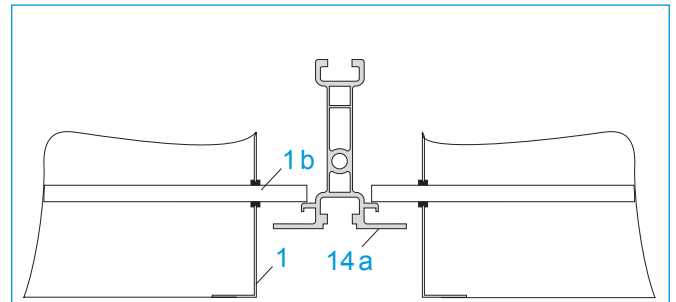


Fig. 1.1 Installation step 1: FFU-housing with locking bolts 1b into the ceiling grid

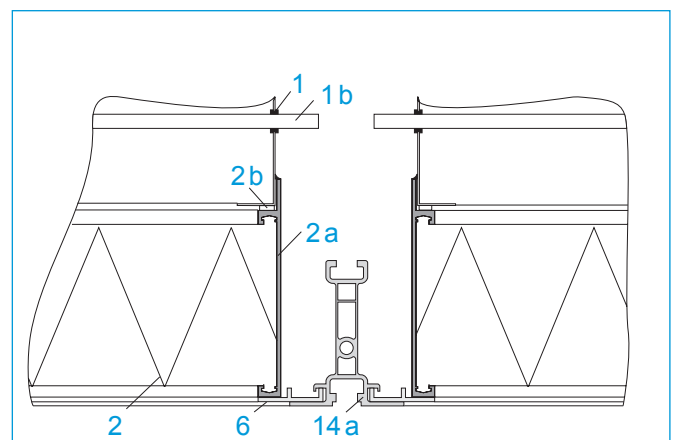


Fig. 1.2 Installation step 2: lift up HEPA filter fan cell 2 and FFU-housing together, insert bearing rails 6 into dry ceiling UFR-55/70-T 14a and then lower the filter cell and the FFU-housing onto the bearing rails

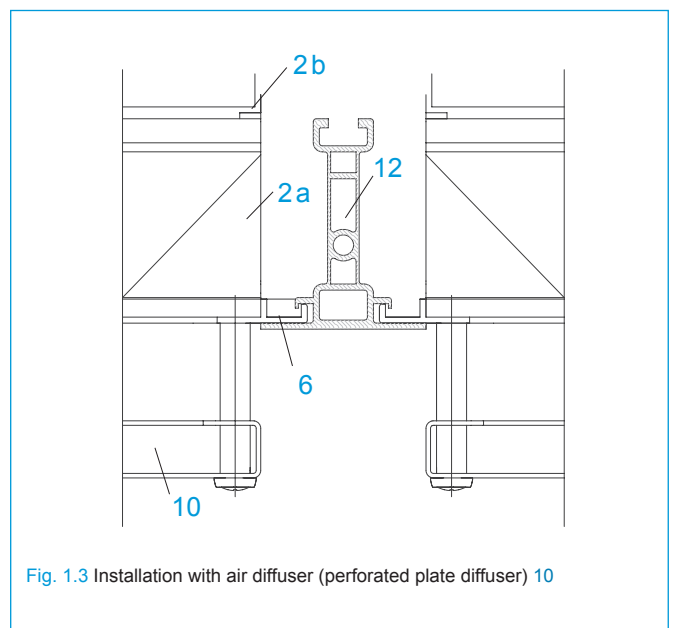


Fig. 1.3 Installation with air diffuser (perforated plate diffuser) 10

Device Installation

The Installation into the Exyte Technology ceiling grid system → Ultraflex Grid Ceiling is very simple. The installation can take place from the cleanroom, using the ceiling grid system UFR-55/70-T 14a with bearing rails 6 (Fig. 1.2). FFU and filter cell are installable independently from each other from the cleanroom side. Depending on the requirements on air tightness of the ceiling grid system, grid profiles without a gasket 14a (Fig. 2.1) or grid profiles with fluid seal 14c are available (Fig. 2.2). The sealing between the housing and the filter cell frame is done with a dry sealant 2b (Fig. 1.2, 2.1 and 2.2).

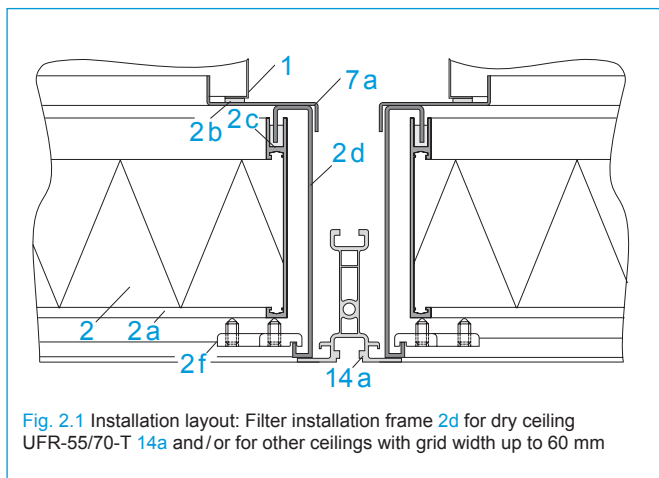


Fig. 2.1 Installation layout: Filter installation frame 2d for dry ceiling UFR-55/70-T 14a and/or for other ceilings with grid width up to 60 mm

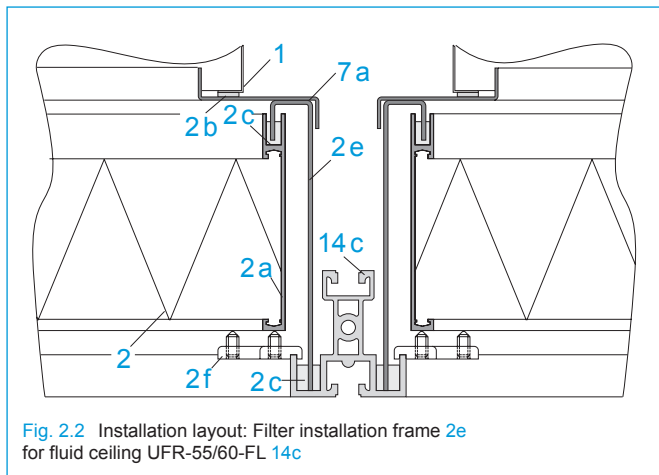


Fig. 2.2 Installation layout: Filter installation frame 2e for fluid ceiling UFR-55/60-FL 14c

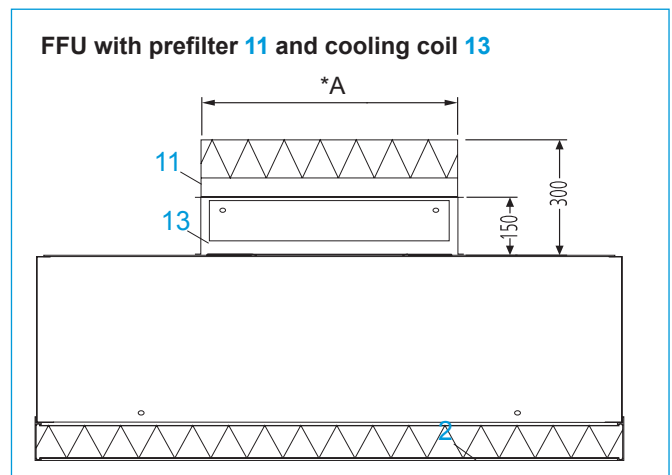
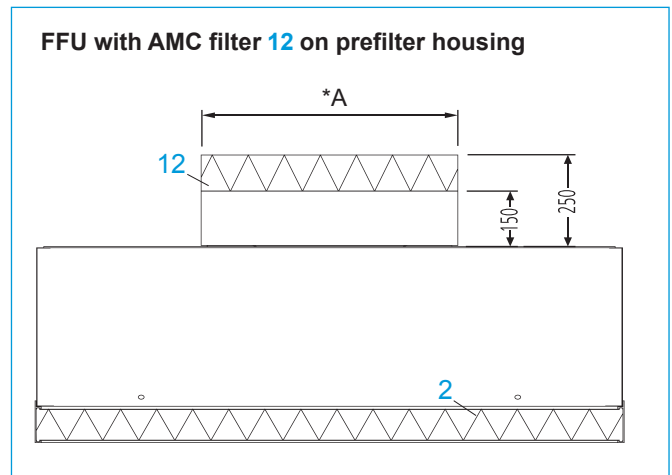
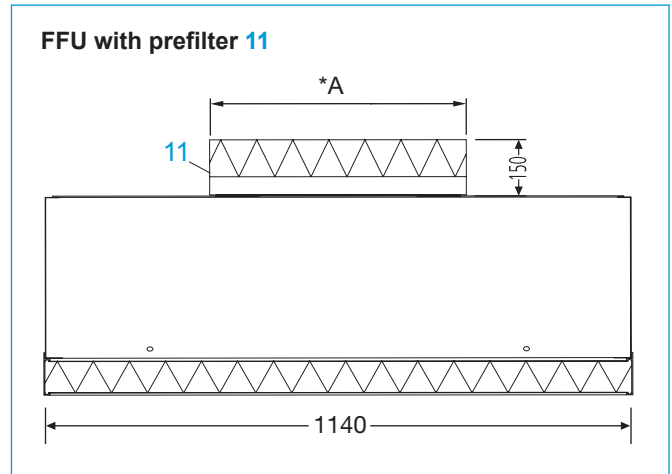


Fig. 3 FFU-ECO 2 with accessories

*A) FFU 1206 Prefilter 500 x 500 mm
FFU 1209 Prefilter and Cooling coil 750 x 750 mm

Control

FFU ECO 2 EC

Based on LON (Local Operating Network) the FFUs are merged to a network system through a special bus-system → Control System DC. This enables a simple and individual speed adjustment and monitoring of each unit, even in complex systems with several thousand units.

Power Supply

A plug & play cable system is provided for the power supply. Each unit is connected through the existing terminal box 8, minimizing installation efforts.



Fig. 4 FFU ECO 2

Key Features

- FFU suitable for all cleanrooms, in particular suited for applications in non-uni-directional (turbulent) airflow areas.
- FFU sizes fit in ceiling grid size
 - 1200 mm × 1200 mm
 - 1200 mm × 900 mm
 - 1200 mm × 600 mm
- Low power consumption, low sound pressure level
- Easy operation, low maintenance effort
- Applicable for individual workstations or entire cleanroom facilities
- Aluminum housing (standard), optionally steel powder coated (disinfectant proof, color similar RAL 9010), different designs on request
- Filter cell classes H13 to U17 (standard H14)
- Installed radial fan:
Motor with internally wired thermal contacts
- FFU ECO 2 EC with electronically commutating external rotor motor, volume flow adjustable through → Control System DC
- Minimized power supply installation effort due to plug & play cable system
- Easy device installation from below (cleanroom side) with bearing rails or segmented adapter frame from Exyte Technology; optionally installation from top (plenum side)
- Optional components: Prefilter, AMC filter, air cooling coil/
heating coil and air diffuser on the cleanroom side, test aerosol device
- Flexible installation, if when production conditions will change

Legend

1	FFU housing	FL	9	Sound absorber	
1a	Baffle plate	2f	Filter tension part	10	Air diffuser
1b	Locking bolt	3	Impeller	11	Prefilter
2	HEPA filter	4	Motor	12	AMC filter
2a	Filter frame	5	Inlet nozzle	13	Cooling Coil
2b	Dry seal	5a	Air grill	14a	Ceiling grid UFR-55/70-T
2c	Fluid seal	6	Bearing rail	14c	Ceiling grid UFR-55/60-FL
2d	Filter installation frame UFR-55/70-T	7a	Intermediate profile		
2e	Filter installation frame UFR-55/60-	8	Terminal box		

Type Designation

FFU	-	E2	-	-	-	-	-	-	-	-	-	-	-	-	-
Filter Fan Unit	Type	Motor	Size	Housing Design	Material/Surface	HEPA-/ULPA- Filter	Prefilter	AMC Filter	Cooling/-heating coil	Air Diffuser					

Type	E2	ECO 2
Motor	EC/LR	EC-Motor with LON RS485-interface
	EC/LF	EC-Motor with LON FTT10A-interface
	EC/MW	EC-Motor with MW-BUS-interface
Size (ceiling grid)		
1212		1200 mm × 1200 mm
1209		1200 mm × 900 mm
1206		1200 mm × 600 mm
Housing Design		
T		Installation into dry ceiling with bearing rails
FL		Installation into fluidceiling with filter installation frame
So		Installation into other ceiling systems (special design)
Material/Surface		
AU		Aluminium untreated (standard)
AE		Aluminium anodized
PB		Steel powder coated (disinfectant proof, color similar to RAL 9010)
ES		Stainless steel (1.4301)
RAL ___		Special color for powder-coating
HEPA-/ULPA- Filter		
O		Without
H14		Standard filter class
Optional ___		Filter classes H13, U15, U16, U17
Prefilter		
O		Without
Optional		
G4		Filter class G4
___		Special filter class
AMC Filter		
O		Without
A		With AMC filter
Cooling/heating coil		
O		Without
Optional		
LK		With cooling coil
LE		With heating coil
Air diffuser		
O		Without
Optional		
LV		With air diffuser

Submittal Text

FFU ECO 2 EC

___ pcs. of FFU ECO 2 EC for all cleanliness classes, consisting of:

- Housing with sound absorber, non-flammable according to class A2 according to DIN 4102
- High performance radial fan with backwards curved blades. The impeller is directly connected with the driveshaft of the external EC motor. The motor is maintenance free. Fan impeller and motor are statically and dynamically balanced.

Technische Daten

Component size 1200 mm × 1200 mm

Air-flow	_____ m ³ /h
Length × width	1132 mm × 1132 mm 1100 mm × 1100 mm ¹⁾
Height without filter	350 mm
Weight per FFU	32 kg*
Operating voltage	200–277 V/1 ph, 50/60 Hz
Speed min./max.	300–1304 1/min
Nominal power	370 W
Nominal current	1,8–1,3 A

Component size 1200 mm × 900 mm

Air-flow	_____ m ³ /h
Length × width	1132 mm × 832 mm 1100 mm × 800 mm ¹⁾
Height without filter	350 mm
Weight per FFU	26 kg*
Operating voltage	200–277 V/1 ph, 50/60 Hz
Speed min./max.	300–1304 1/min
Nominal power	370 W
Nominal current	1,8–1,3 A

Component size 1200 mm × 600 mm

Air-flow	_____ m ³ /h
Length × width	1132 mm × 532 mm 1100 mm × 500 mm ¹⁾
Height without filter	350 mm
Weight per FFU	21 kg*
Operating voltage	200–277 V/1 ph, 50/60 Hz
Speed min./max.	300–1304 1/min
Nominal power	370 W
Nominal current	1,8–1,3 A

* Gehäuse in Aluminiumausführung, ohne Filter
1) Abmessungen für Fluiddecke

Operational Data

Air velocity _____ m/s
 Power consumption _____ W
 Allowed sound pressure level. _____ dB(A)

HEPA Filter

- Class H14
- Class _____
- Filter height _____ mm

Housing Material

- Aluminium untreated (standard)
- Aluminium anodized
- Steel with disinfectant proof powder coating similar to RAL 9010
- Stainless steel (1.4301)
- Special color (RAL_____) for powder-coating

Ceiling profile grid-ceiling

- UFR-55/70-T
- UFR-55/60-FL
- Other ceiling profile

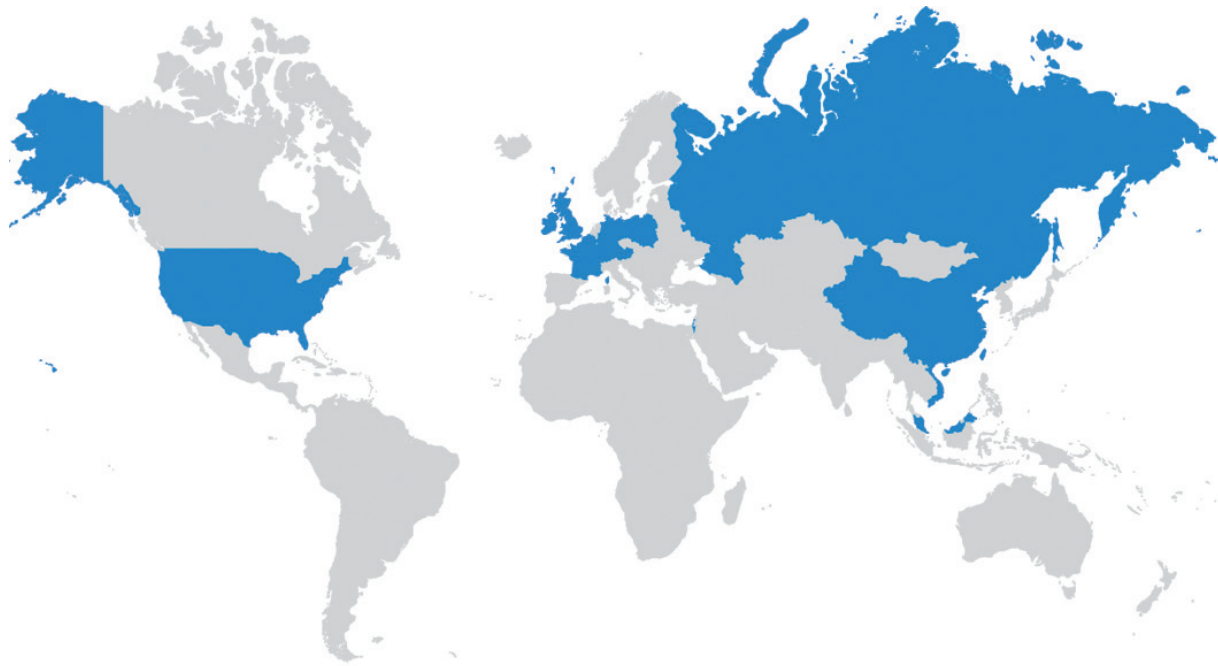
Optional

- Prefilter according to DIN EN 779 for coarse particle separation, incl. frame made of aluminium, untreated
 Filter class
 G4

- AMC filter for the separation of gaseous and air pollutant substances, Adapter frame standard made of aluminium (the AMC filter must be specified).
- Heating coil
- Cooling coil
 made of copper tubes, aluminium fins and an aluminium frame
 Cooling coil for FFU 1212 1209 1206
 Air-flow 2300 1750 1165 m³/h
 Air inlet temperature 23,0 23,0 23,0 °C
 Air outlet temperature 19,5 19,2 20,0 °C
 Pressure loss airside 15 9 16 Pa
 Water inlet temperature 14,0 14,0 14,0 °C
 Water outlet temperature 18,0 18,0 18,0 °C
 Pressure loss waterside. 5,9 4,1 2,1 kPa
 Sensible capacity 2,7 2,2 1,1 kW
 Water quantity 600 500 300 l/h
- Filter installation frame for installation and removal of filter and FFU from the cleanroom side (fluid ceiling system only), made of
 - Steel frame 1,5 mm, powder coated
 - 4 bearing elbows
 - Filter tension part, size:
 - 1200 × 1200
 - 1200 × 900
 - 1200 × 600
- Air diffuser, cleanroom side, includes mounting hardware design:
 - Aluminium perforated plate, anodized
 - Steel perforated plate, powder-coated RAL _____
 - Swirl outlet
- Test aerosol device
 - Test aerosol dispenser
 - Aerosol measuring point

Manufacturer Exyte Technology GmbH
Type FFU-E2-EC-_____-_____-_____-_____-_____-_____-

Local Support Wherever You Need Us



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