

Filter Fan Unit COMPACT Type COMPACT 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 its low overall height the FFU COMPACT is particularly suited for cleanrooms with low plenums.

Depending on the configuration of the filter coverage and the filter classes, cleanroom classes of 1.0 to 8.0 according to DIN EN ISO 14644-1 can be achieved.

The FFU COMPACT is available in following configurations: FFU COMPACT EC with EC-motor and advanced control and monitoring possibility

- LON RS485
- LON FTT10A
- Exyte BUS
- 0-10V
- MOD BUS-RTU

Design and Function

The FFU COMPACT fits into 1200 mm × 600 mm ceiling grid configurations.

The unit consists of the housing 1, the integrated HEPA filter 2; the compact fan unit 3 with impeller, motor 4 and inlet nozzle 5. The baffle plate 6 optimizes the uniformity of air flow towards the filter. The sound absorber 9 reduces the noise level.

The following additional components are available:

- HEPA/ULPA Filter (beidseitig Griffschutz bei H14) 2
- Prefilter 11 for coarse particle filtration
- Cooling/heating coil 13
- Air diffuser (perforated plate diffuser) 10
- Aerosol inlet connector, Aerosol measurement connector
- AMC-filter

The Filter Fan Units generate an unidirectional airflow. A turbulent airflow is created in the room when the air diffuser 10 is installed. If necessary, filter classes H14 to U17 can be used.

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

The FFU COMPACT EC is driven by an electronically commutated, direct current, external rotor motor.

Controls

FFU EC

– LON BUS (RS485 oder FTT10A)

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

– 0-10V

The speed control of the fans takes place through a 0...10V input signal.

The fan can be controlled individually or in groups (up to 8) via a speed controller. A combined fault signal and the connection of a light are optional. Ready-to-plug in cables are provided.

– MW-BUS

The FFU's are controlled and monitored with a proprietary Bus system (MW), allowing a simple and individual speed adjustment and monitoring for each unit.

– MOD-BUS

The fan control takes place through a Modbus-RTU interface. Alternatively, a 0-10V signal or the connection of a speed controller is possible.

Power Supply

A plug & play cable system is provided for the power supply. Each unit is connected through the existing terminal box 8. The power cables are connected in series to minimize installation costs.

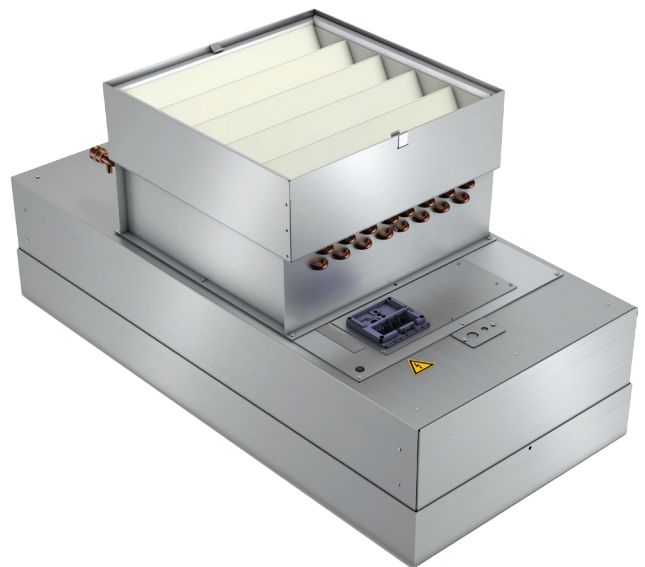


Fig. 1 FFU COMPACT with cooling coil 13 and Prefilter 11

Technical Data

Grid size	mm	1 200 × 600
Housing L × W	mm	1 132 × 532
Filter Cell H14 L × W × H	mm	1 140 × 540 × 109
Total height without Filter H14	mm	206
Housing Material Standard	Aluminum untreated	
Weight with H14-Filter	kg	21
Weight without H14-Filter	kg	12,5

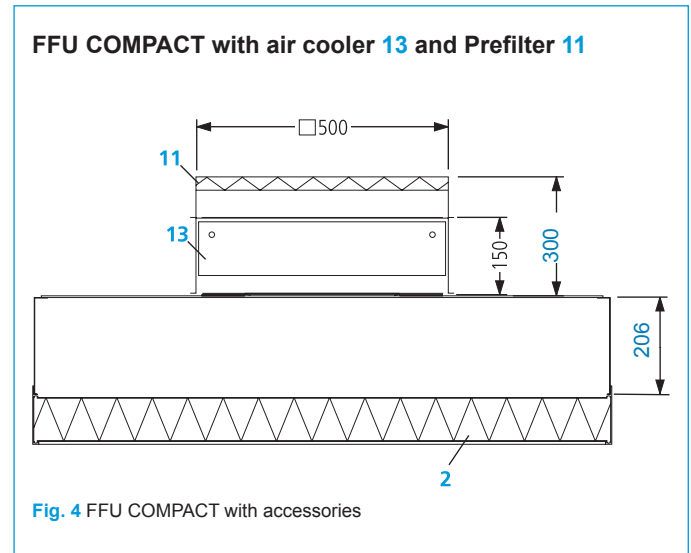
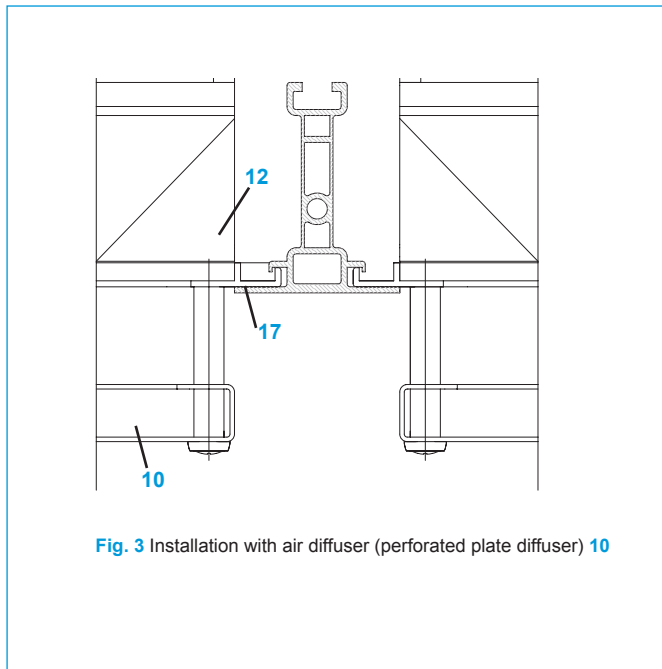
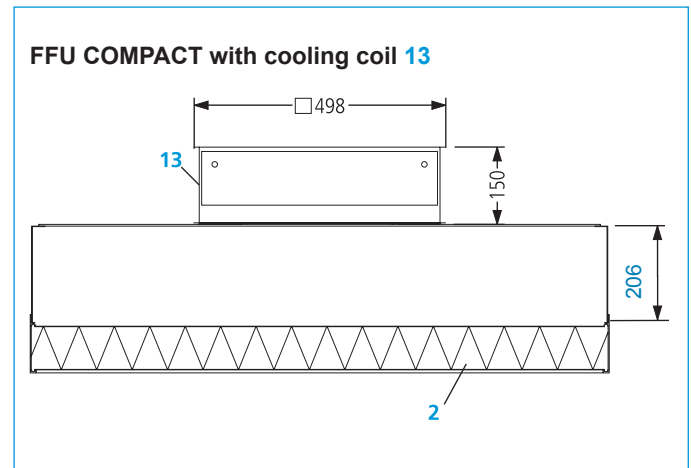
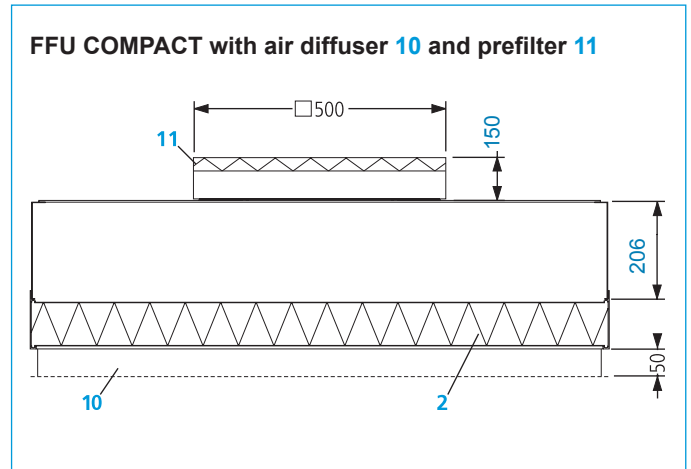
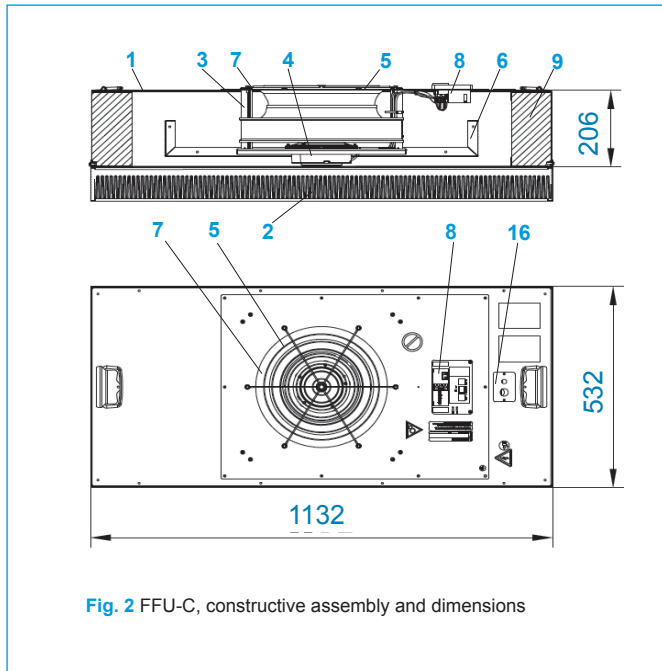
EC-Motor (IP10)		FFU COMPACT EC/LF	
Voltage/Phase	V/ph	208–277 / 1	
Frequency	Hz	50/60	
Nominal current	A	0,9	
Nominal power		250 W	
Rotation speed min. – max.	1/min	430–1 450	
Operation temperature	°C	0/+40	
Flow velocity	m/s	0,30	0,45
Air flow volume	m ³ /h	778	1 166
Pressure-rise	Pa	80	120
Power consumption ¹⁾	W	49	104
Sound power level pressure side ¹⁾	dB (A)	50	56
Sound pressure level ¹⁾			
– 25% coverage	dB (A)	52	59
– 50% coverage	dB (A)	56	62
– 100% coverage	dB (A)	59	65
External differential press max. ²⁾	Pa	390	300
EC-Motor (IP10)		FFU COMPACT EC/LR/MW	
Voltage/Phase	V/ph	200–277 / 1	
Frequency	Hz	50/60	
Nominal current	A	1,4 - 1,0	
Nominal power		275 W	
Rotation speed min. – max.	1/min	300–1 550	
Operation temperature	°C	0/+40	
Flow velocity	m/s	0,30	0,45
Air flow volume	m ³ /h	778	1 166
Pressure-rise	Pa	80	120
Power consumption ¹⁾	W	46	91
Sound power level pressure side ¹⁾	dB (A)	47	54
Sound pressure level ¹⁾			
– 25% coverage	dB (A)	50	57
– 50% coverage	dB (A)	53	60
– 100% coverage	dB (A)	56	63
External differential press max. ²⁾	Pa	460	390

EC-Motor (IP10)		FFU COMPACT EC/0-10V	
Voltage/Phase	V/ph	200–277 / 1	
Frequency	Hz	50/60	
Nominal current	A	1,6 @ 230 V	
Nominal power		360 W	
Rotation speed min. – max.	1/min	1 700	
Operation temperature	°C	0/+40	
Flow velocity	m/s	0,30	0,45
Air flow volume	m ³ /h	778	1 166
Pressure-rise	Pa	80	120
Power consumption ¹⁾	W	45	90
Sound power level pressure side ¹⁾	dB (A)	48	55
Sound pressure level ¹⁾			
– 25% coverage	dB (A)	51	57
– 50% coverage	dB (A)	54	60
– 100% coverage	dB (A)	57	64
External differential press max. ²⁾	Pa	560	480
EC-Motor (IP10)		FFU COMPACT EC/MOD	
Voltage/Phase	V/ph	200–277 / 1	
Frequency	Hz	50/60	
Nominal current	A	1,67 @ 230 V	
Nominal power		380 W	
Rotation speed min. – max.	1/min	1 750	
Operation temperature	°C	0/+60	
Flow velocity	m/s	0,30	0,45
Air flow volume	m ³ /h	778	1 166
Pressure-rise	Pa	80	120
Power consumption ¹⁾	W	45	90
Sound power level pressure side ¹⁾	dB (A)	48	55
Sound pressure level ¹⁾			
– 25% coverage	dB (A)	51	57
– 50% coverage	dB (A)	54	60
– 100% coverage	dB (A)	57	64
External differential press max. ²⁾	Pa	610	520

Sound measurement according to ISO 3741, Tolerance acc. to DIN 24166

1) with H14 filter cell without differential pressure
2) without installed HEPA/ULPA Filter

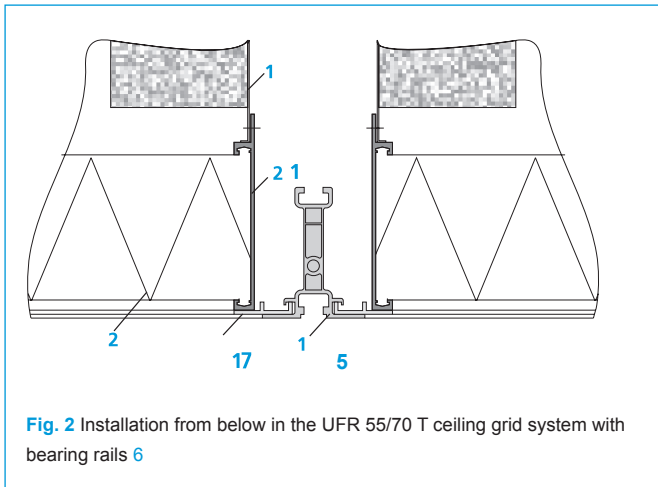
Constructive Assembly and Dimensions



Legend

- | | | |
|----------------|------------------|-----------------------------|
| 1 Housing | 7 Air grill | 13 Cooling coil |
| 2 HEPA Filter | 8 Terminal box | 14 Ceiling grid |
| 3 Fan assembly | 9 Sound absorber | 15 Ceiling grid UFR-55/70-T |
| 4 Motor | 10 Air diffuser | 16 Aerosol |
| 5 Inlet Nozzle | 11 Prefilter | 17 Bearing rail |
| 6 Baffle plate | 12 Filterframe | 18 Two-piece support frame |

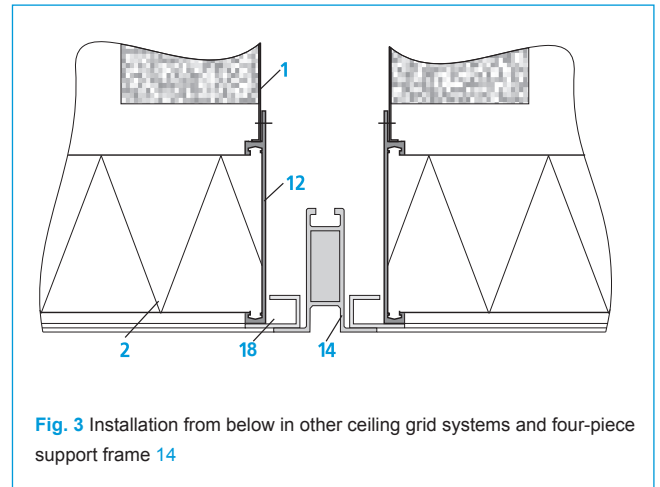
Device Installation in Exyte Ceiling



- Lift the FFU up through the ceiling grid profile UFR 55/70 T 15 from below
- Install four bearing rails 6 in a circular manner
- Lower and set the FFU with the filter frame 12 on the bearing rails

The installation of the Exyte Technology Ceiling Systems → Ultraflex Grid Ceiling is very easy. The installation can take place from the cleanroom side, by utilizing the grid ceiling UFR-55/70-T 15 with insertion strips 17 (pic. 2) Only 420 mm are required for the plenum height (clearance between cleanroom and building ceiling). This is especially beneficial for subsequent cleanroom installations in existing rooms with low ceilings.

Device Installation ext. Ceiling



- Lift the FFU up horizontally through the ceiling grid profile from below 14
- Insert the two-part intermediate frame 18 into the ceiling grid.
- Lower and place FFU with filter frame 12 onto the intermediate frame.

Key Features

- Filter Fan Units can be used for all cleanroom applications
- Unit size fits into 1200 mm × 600 mm ceiling grid
- Low height (206 mm without prefilter, air cooler etc.), especially suited for additional cleanroom system installations in existing rooms with low height or enclosures
- Low energy consumption, low sound pressure level
- Easy operation, low maintenance effort
- For individual workstations or complete cleanroom areas
- Housing made of aluminum untreated (standard), optionally made of steel with disinfectant-resistant powder-coating (color similar RAL 9010); other designs on request
- Filter classes H14 (standard), U15, U16, U17¹⁾
- Installed radial fan:
Motor with internally wired thermal contacts
- For FFU COMPACT EC with electronically commutated, external rotor motor, volume flow adjustable through
 - Control System DC
 - 0-10V speed controller
 - MOD BUS Display
- 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 (the plenum side)
- Optional accessories: prefilter, AMC filter, cooling coil/ heating coil and air diffuser on the cleanroom side, aerosol test device
- Flexible, when production conditions change

Type Designation

FFU	- C -	- 1206 -	-	-	-	-	-	-	-	-
Filter Fan Unit	Type	Motor	Size	Housing design	Material/ Surface	HEPA Filter	Prefilter	AMC filter	Cooling / heating coil	Luftverteiler
Type C		COMPACT								
Motor										
EC/LR		EC-Motor with LON RS485-Interface								
EC/LF		EC-Motor with LON FTT10A-Interface								
EC/MW		EC-Motor with MW-Bus								
EC/0-10V		EC-Motor with 0...10V Steuereingang								
EC/MOD		EC-Motor with RTU MOD Schnittstelle								
Size (ceiling grid size)										
1206		1200 mm × 600 mm								
Housing design										
T		installation into dry ceiling with bearing rails								
So		Installation into other ceiling systems (special design)								
Material/ Surface										
AU		Aluminum untreated (standard)								
AE		Aluminum anodized								
PB		Steel powder coated (similar RAL 9010)								
ES		Stainless steel (1.4301)								
RAL___		Special color steel powder coated								
HEPA Filter										
H14		Standard filter class								
Optional										
___		Filter classes U15, U16, U17 ¹⁾								
Prefilter										
O		without								
Optional										
G4		filter class G4								
___		special filter class								
AMC filter										
O		without								
A		with AMC filter								
Cooling/ Heating coil										
O		without								
LK		with cooling coil								
LE		with heating coil								
Air Diffusor										
O		without								
LV		with air diffuser								

Submittal Text FFU COMPACT EC

_____ pcs. of FFU-COMPACT-AC for all cleanroom applications:

- Self-supporting housing with integrated sound absorber, non-flammable according to class A2, DIN 4102.
- High performance radial fan with backwards-curved blades. The impeller is directly connected with the drive shaft of the external AC motor. The motor is maintenance free. Fan impeller and motor are statically and dynamically balanced.

Technical Data

Air-flow	_____ m ³ /h
Length x width	1 132 mm x 532 mm
Total height	206 mm
weight pro FFU	21 kg (inkl. H14-Filter) ¹⁾
Operating voltage	200–277 V/1 ph; 50/60 Hz
Speed min./max.	
EC/LF	430-1450 1/min
EC/LR	300-1500 1/min
EC/MW	300-1500 1/min
EC/0-10V	1700 1/min
EC/MOD	1750 1/min
Nominal power	
EC/LF	250 W
EC/LR	275 W
EC/MW	275 W
EC/0-10V	360 W
EC/MOD	380 W
Nominal current	
EC/LF	1,1-0,8A
EC/LR	1,4-1,0A
EC/MW	1,4-1,0A
EC/0-10V	1,60A@230V
EC/MOD	1,67A@230V

Operational Data

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

HEPA / ULPA

- Class H14
- Classe _____
- Filter height _____ mm

Housing Material

- Aluminum untreated (standard)
- Aluminum anodized
- Steel powder coated (disinfectant proof; color similar to RAL 9010)
- Stainless steel (1.4301)
- Special color (RAL _____) for powder-coating

Ceiling Grid Profile

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

Optional

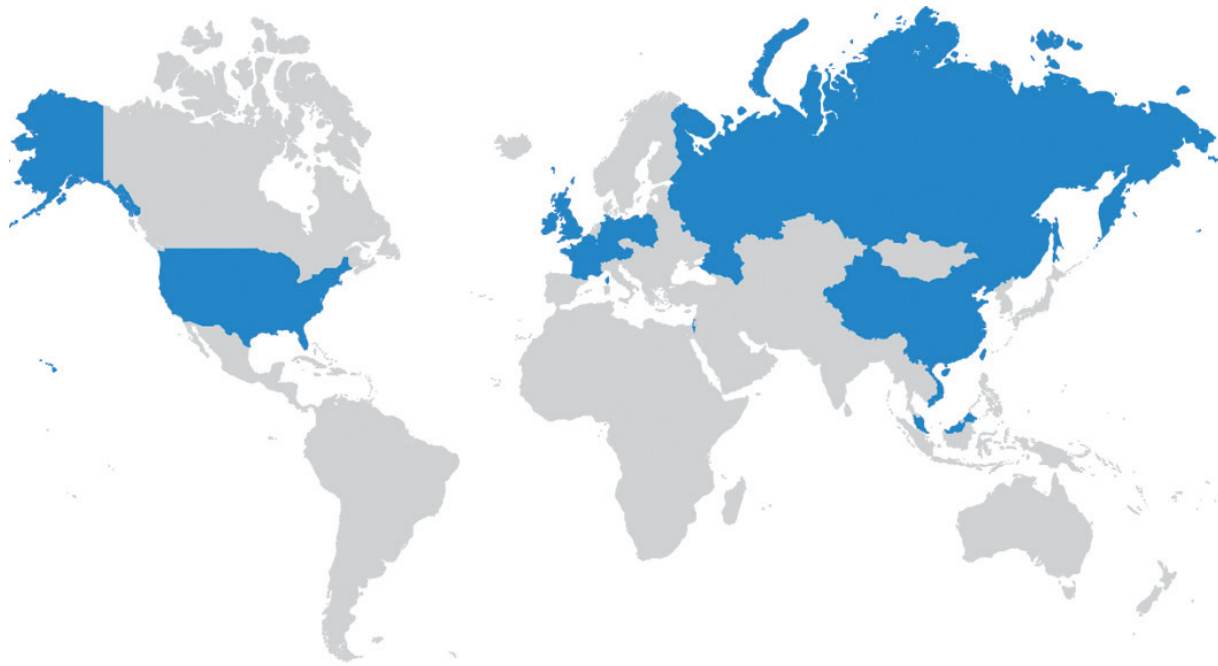
- Speed Controller for 0-10V
- Wiring
- Prefilter according to DIN EN 779 for coarse particle separation including aluminum frame (untreated), filter class:
 - G4
 - _____
- Heating Coil
- Cooling Coil
made of copper tubes, aluminum fins and an aluminum frame
Air-flow 1165 m³/h
Air inlet temperature 23 °C
Air outlet temperature 20 °C
Pressure loss airside 16 Pa
Water flow temperature 14 °C
Water return temperature 18 °C
Pressure loss waterside 2,3 kPa
Sensible capacity 1,2 kW
Water quantity 300 l/h
- Air diffuser, cleanroom side, includes mounting set
 - Aluminum perforated plate, anodized
 - Steel perforated plate, galvanized with powder-coated RAL _____
- AMC filter for the separation of gaseous and air pollutant substances, adapter frame standard made of aluminum (the AMC filter must be specified)
- Test Aerosol Device
 - Test Aerosol Dispenser
 - Aerosol measuring point

Manufacturer
Typ

Exyte Technology GmbH
FFU-C-EC ____-1206-____-____-____-____

1) Housing in Aluminum

Local Support Wherever You Need Us



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