M+W GROUP

Filter Fan Unit Systems

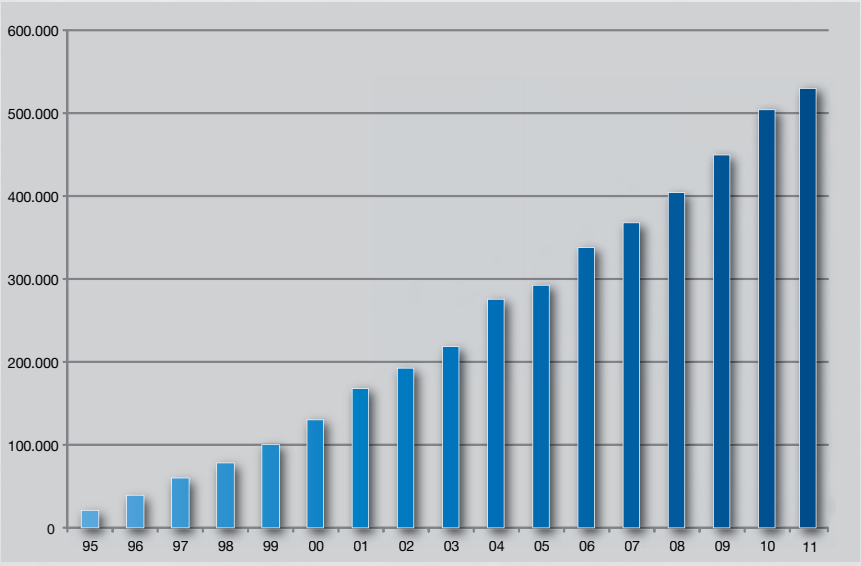
Cleanroom Products

Experience matters ...

… with Filter Fan Units from M+W Products

M+W Products has been a pioneer in filter fan unit systems since 1990. During that period more than half a million M+W Products filter fan units have been installed worldwide. M+W Products is developing, manufacturing and qualifying filter fan units. Our extensive experience in this field has given us in-depth understanding of our customers' processes and needs. Specialized products such as FFU-RA (return air) and PIFF (plenum integrated filter fan) units are the results of our expertise.

Outstanding patents and innovations testify to the performance of our Technology Center in Stuttgart. Several types of filter fan units enable our customers to choose the right system for their individual demands to improve productivity, process reliability and profitability.

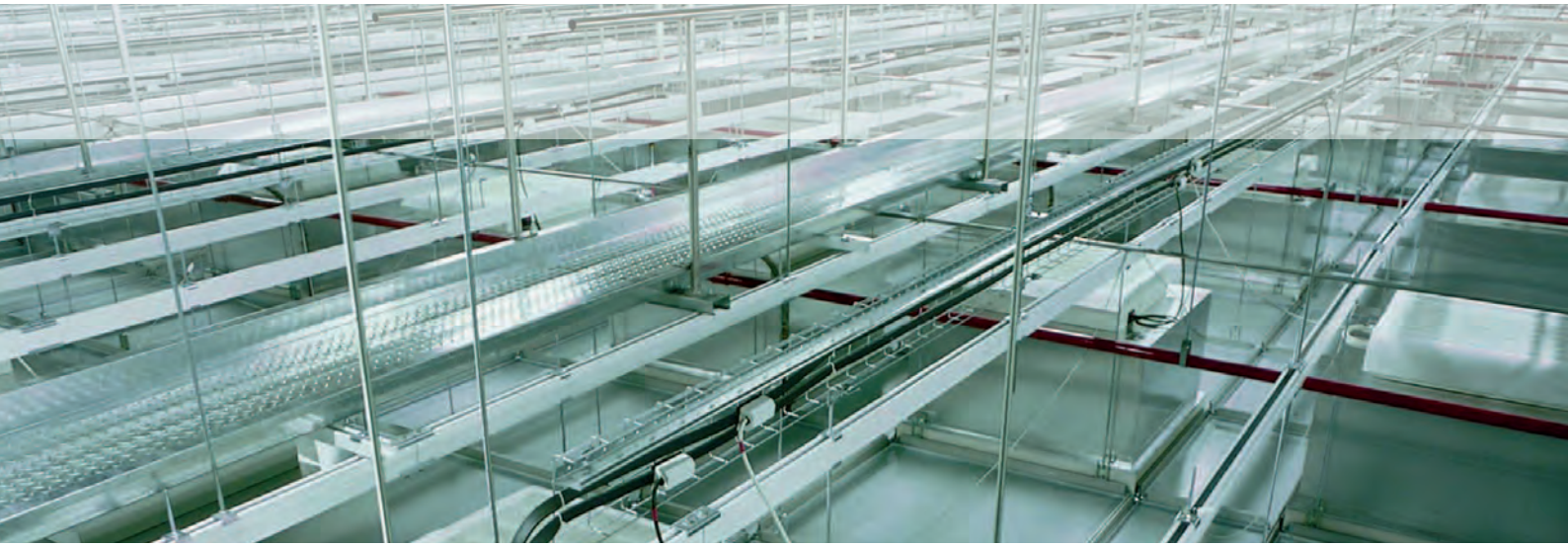


Number of installed Filter Fan Units by M+W Products, worldwide

All units are available with EC or AC motor versions.
Other motor systems are available upon request.

Units are available with ratings according

Filter Fan Units from M+W Products ...



More than half of the products of the world's leading wafer fabs are manufactured in environments created by M+W Products

Filter Fan Units are widely used in clean production environments to ensure particle free air circulation. The effectiveness of contamination control and the operating costs depend strongly on the design of these units.

Our extraordinary engineering expertise in ultra-clean air and ultra-pure atmospheres ensures that your current and future manufacturing processes are clean, safe, productive, cost-efficient – and environmentally friendly.

Our tailor-made OEM accessories include prefilter, AMC-filter, cooling / heating coils and testing equipment. Whether in stainless steel, aluminum or powder-coated, Filter Fan Units from M+W Products are the right choice for your application.

Products and Industries for Filter Fan Units

FFU Types	Semiconductor	Flat Panel Display	Photovoltaics	Battery Cells	Pharma & Biotech	Food & Nutrition	Science & Research	Automotive
SILENT	++	++	++	++	++	+	++	++
ECO	++	++	++	++	+	+	+	++
LIGHT	+	+	+	+	o	+	o	+
COMPACT	+	+	+	+	o	+	+	+
RETURN AIR *)	++	++	++	++	–	–	+	o
PIFF *)	o	o	o	o	++	++	+	o
CWIC	+	+	+	+	++	++	++	++

*) only turbulent airflow

++ well suited
+ suited
o restricted-use
– not applicable

... for precisely controlled Environments

Filter Fan Unit COMPACT with cooling coil and prefilter

Filter Fan Units with AMC-filter (V-shape)

Filter Fan Unit Types and Cleanroom Classes

		Uni-directional airflow					Turbulent airflow		
FFU Types	ISO 14644	ISO 1	ISO 2	ISO 3	ISO 4	ISO 5	ISO 6	ISO 7	ISO 8
	Fed. Std. 209E			1	10	100	1,000	10,000	100,000
SILENT		■	■	■	■	■	■	■	■
ECO				■	■	■	■	■	■
LIGHT							■	■	■
RETURN AIR							■	■	■
COMPACT		■	■	■	■	■	■	■	■
PIFF							■	■	■
CWIC		■	■	■	■	■	■	■	■

Standard Sizes

Individual dimensions are available upon request	
Metric	**Feet**
1200 mm x 1200 mm	4´ x 4´
1200 mm x 900 mm	4´ x 3´
1200 mm x 600 mm	4´ x 2´

Motor Types and Control Systems

Standard fan motors	
EC	**AC**
Control terminal CT3	Speed controller
Ultra display	Control panel AC
CRiS^{xt}	

Filter Fan Units SILENT / ECO / LIGHT

Filter Fan Unit SILENT*

FFU-S-EC (AC)-1212-T-AU

FFU optimized regarding sound power level and air flow.
Particularly suited for
- uni-directional airflow (laminar) cleanroom areas
- advanced requirements on the uniformity of the uni-directional air flow
- advanced sound pressure level requirements in the room
- cleanroom classes 1–8 according to ISO 14644-1

Applications
Electronics, Microelectronics
Life Sciences
High Tech Industries
New Technologies
Food Industry
Laboratories

Filter Fan Unit ECO*

FFU-E-EC (AC)-1212-T-AU

Effective construction – excellent compromise in terms of power consumption, uniformity of the unidirectional air flow, sound power and price. Particularly suited for
- non-unidirectional airflow (turbulent) cleanroom areas
- cleanroom classes 3–8 according to ISO 14644-1

Applications
Electronics, Microelectronics
Life Sciences
High Tech Industries
New Technologies
Food Industry

Filter Fan Unit LIGHT

FFU-L-EC (AC)-1212-T-AU

Practicable solution for a low budget.
Especially suited for cleanroom areas
- with high background sound level due to production noises
- in which sound levels are of secondary importance
- with a less dense filter coverage
- cleanroom classes 5–8 according to ISO 14644-1

Applications
Electronics, Microelectronics
High Tech Industries
New Technologies
Food Industry

Filter Fan Units RETURN AIR/ COMPACT

Filter Fan Unit RETURN AIR*

FFU-RA-EC (AC)-1212-T-AU

Exclusively suitable for the application in turbulent cleanrooms. Return-flow areas (raised floor, return-air ducts) in the building can be significantly reduced through the integrated return-air ducts. Local hot-spots can be avoided by closing of individual integrated return-air ducts. Particularly suited for

- turbulent cleanrooms with a maximum of 50% filter coverage
- cleanroom areas with large scale dimensions
- cleanroom classes 5–8 according to ISO 14644-1

Applications

Electronics, Microelectronics
High Tech Industries
New Technologies

Filter Fan Unit COMPACT

FFU-C-EC (AC)-1206-T-AU

Filter Fan Unit for the equipment of individual workstations or entire cleanroom ceilings. Especially suited for

- cleanroom areas with a low installation room clearance
- cleanroom areas with moderate sound pressure level requirements
- cleanroom classes 1–8 according to ISO 14644-1

Applications

Electronics, Microelectronics
Life Sciences
High Tech Industries
New Technologies
Food Industry
Laboratories

* These products are protected by patents

PIFF Plenum Integrated Filter Fan/ CWIC® Systems

Plenum Integrated Filter Fan*

PIFF 3 - EC (AC)-H14

Designed as self-sustaining return air unit with integrated filter fan, H14 filter, cooling coil and air grill. No raised floors and return air shafts are needed. Connectable to make-up air or exhaust air in order to pressurize the cleanroom. Especially suited for pharmacentical laboratories with turbulent airflow.

- cleanroom classes 5 – 8 according to ISO 14644-1 / class B, C and D according EC Guide (GMP)

Applications
Pharma & Biotech labs
Food & Nutrition

CWIC® Systems*

CWIC – 1010 / 1020 / 1030 / 1040

The CWIC® System is a versatile system: Individual Filter Fan Units (CWIC® modules) can be connected to form different size cleanroom ceilings, e. g. for machine enclosures, clean benches or clean work cabins. The modular design enables fast and low-cost cleanroom construction that can be suspended from the ceiling or supported from the floor by pedestals. Depending on the load of additional components, a range of 4,800 mm without support pedestals or suspensions is possible.

- cleanroom classes 1 – 8 according to ISO 14644-1 / class: A, B, C or D according to EC Guide (GMP)

Applications
Pharma & Biotech
Food & Nutrition
Science & Research

* These products are protected by patents

Control Systems

Our Filter Fan Units can be operated as a simple power on / off system at a pre-configured speed or air volume. Equipment lay-outs, process requirements and work shift models often result in the need for a more sophisticated control of the FFU system to ensure energy efficient and process aligned operation. M+W Products offers a wide range of control systems for AC and EC motor driven FFUs, starting with budget oriented solutions for small scale installations and ending with the high-end control software CRiS^{xt}.

Speed controller

Control terminal CT3

Control System AC (CSA)

The system includes the complete cabling, speed control for the fan unit systems, the visual alarm indicator as well as the illumination control. The fan units can be compiled in groups from 1 to 10 units (depending on the control unit).

The CSA is delivered with a plug-and-play cable-system, allowing a fast and low-cost installation. All components are designed for a 230 V power-supply and a frequency of 50 Hz. Depending on the project size, a Control System AC contains the following components:

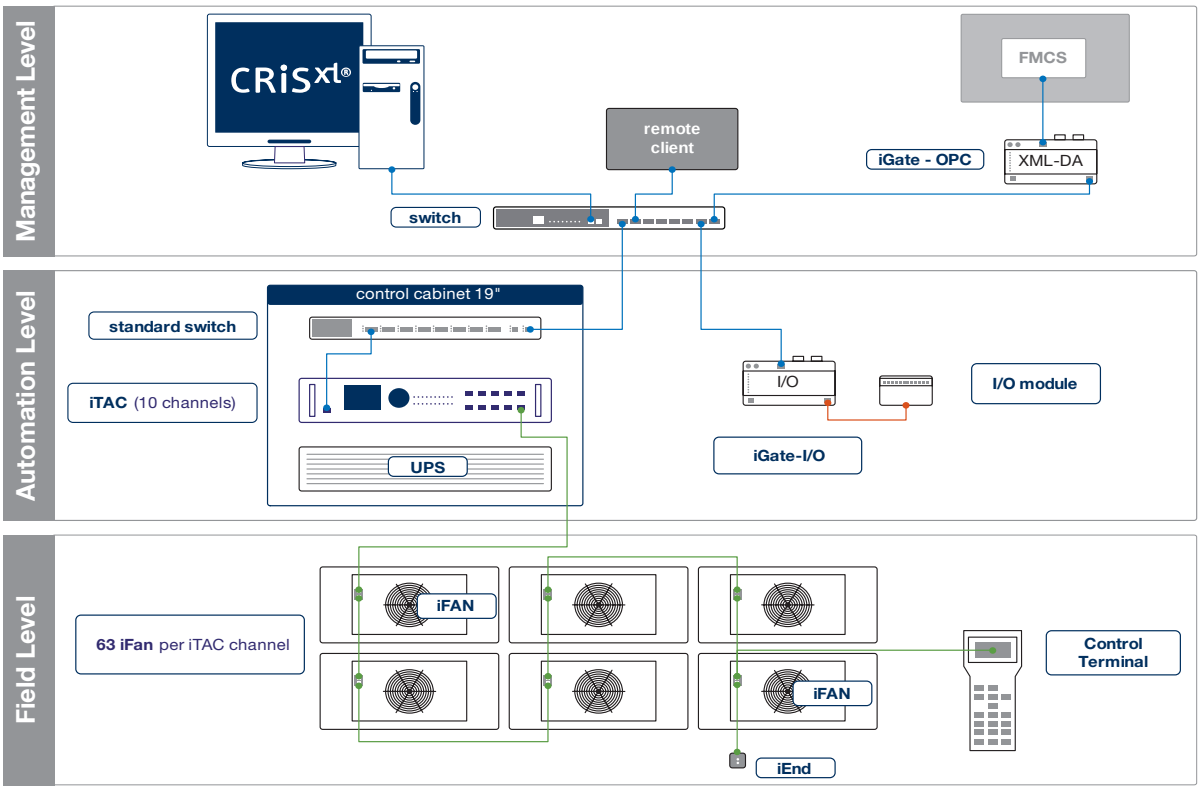
- Supply line with distribution box and dummy-plug (if used without speed controller)
- Speed-controller with connection cable (5A/8A/10A)
- Motor monitoring via a pressure cell and indicator light
- Illumination equipment with switch and connection cable

Control System DC (CSD)

The control electronics is plug-and-play integrated into the Fan Unit. The individual speed control of each Fan Unit allows the adjustment of the air-speed to the local requirements. Automatic monitoring and fast notification of any deviations guarantee a safe operation. The network is clearly structured and completely pre-assembled. Depending on project size, a Control System DC contains the following components:

- Control Terminal
- UltraDisplay
- CRiS^{xt} – Software with PC-workstation.

DC control systems can be operated with through a standard interface (LON, M+W Bus). Auto-installation, an interface to Auto-CAD for visualization in actual cleanroom layouts and the ability to handle up to 75,000 units make CRiS^{xt} an unique software solution for uncompromised FFU administration.



Customized Filter Fan Units
– the right Solution for every Challenge

The production of very small surface structures and consistent reproducibility of process results requires ultra-clean process environments

Photos: © SÜSS MicroTec AG

Areas of Application

Manufacturing processes in the semiconductor industry, in nanotechnology and in the production of optical storage media demand a highly purified environment across all areas of the production process. Particle-free air ensures quality and reduces the rejection rate during production. Due to the need for air purity, we develop **customized filter fan units** in close collaboration with the client.

Some outstanding features of these systems are the high level of flexibility in terms of geometric shapes, external dimensions, materials used, desired filter classes, required air flow rates, drive concepts that can be individually implemented and the multitude of options that can be integrated.

Special Features

- Devices that are ready to hook up and use, can be used independently of the power line frequency and supply voltage
- Sound atenuation and vibration isolation for the highest production demands
- Available in stainless steel, aluminum or powder-coated casing in a variety of sizes
- High reserve capacity in a compact design
- Wide range of control and regulation concepts, possibility of integration into client systems
- Pressure regulation, integrated temperature control, AMC filters, LED illumination, ionization are optionally available
- UL and SEMI certification and approval upon customer request
- HEPA/ULPA filter in various efficiencies and materials available

Customized Filter Fan Units
– Applications (Examples)

Customized FFU

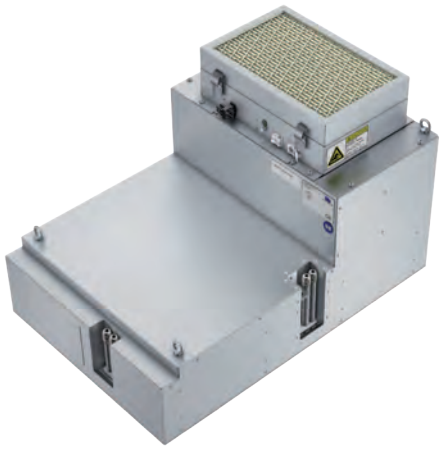
Application: Nanotechnology

- Stainless steel casing
- Integrated five-stage speed controller
- Modular system in a choice of three standard sizes
- Integrated lighting and process air ionization on the air purification side
- Slot for AMC filter
- CE verified
- In line with SEMI and UL standards

Customized FFU

Application: Optical Industry

- Natural aluminum casing
- Smooth, integrated speed controller
- Extremely high reserve capacity with the smallest possible footprint
- Air purification side laminating unit for optimum flow distribution
- Client interface to allow total monitoring of the filter fan unit
- Wide-range power supply motors of 110–230 V and 50–60 Hz
- CE verified
- In line with SEMI and UL standards



Customized FFU

Application: Semiconductor Industry

- Natural aluminum casing
- Smooth, integrated speed controller featuring LON bus operation
- Special design (L-shape)
- Integrated lighting and process air ionization on the air purification side
- Air purification side laminating unit for optimum flow distribution
- Slot for AMC filter
- Wide-range power supply motors of 100–230 V and 50–60 Hz
- CE verified
- In line with SEMI and UL standards

MAR12/FFU BE001

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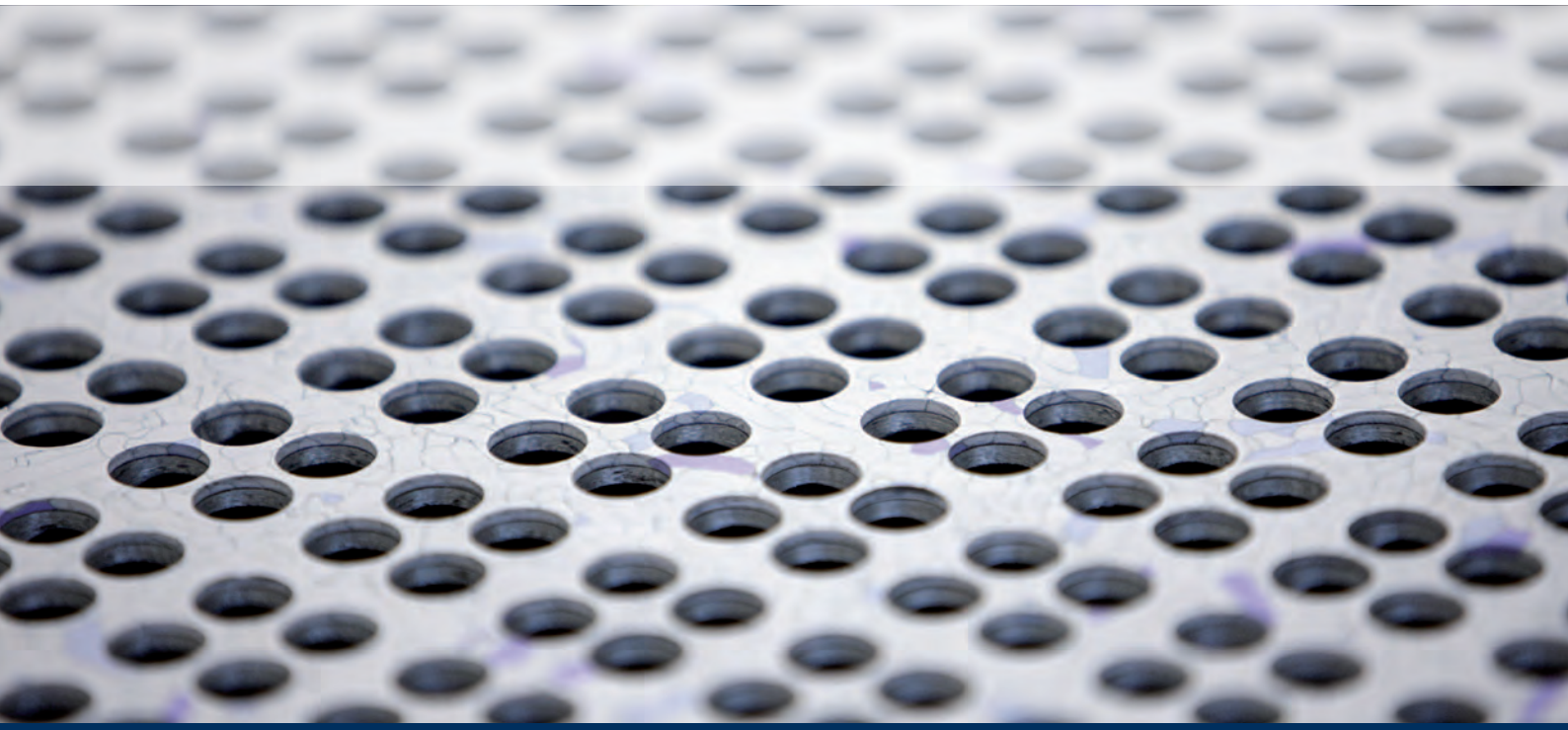


Raised Floor Systems

Cleanroom Products

Strength and durability ...

… to meet individual customer needs

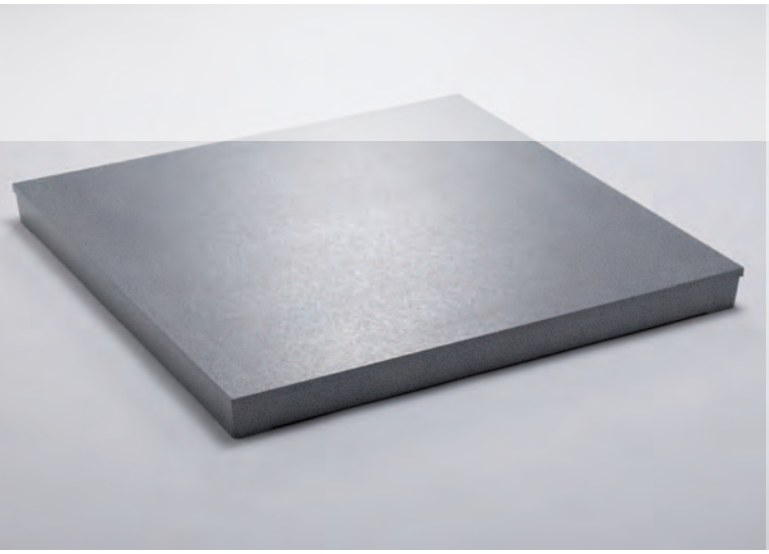
Raised Floor Systems

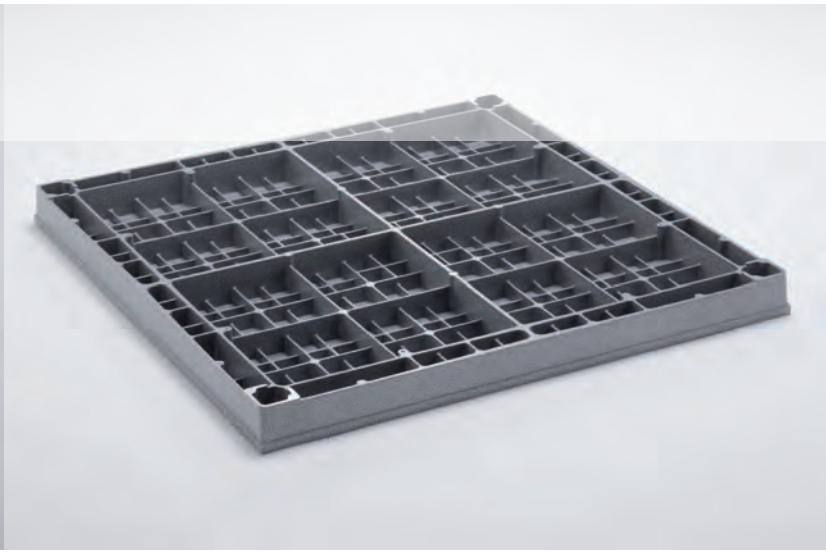
M+W Products offers Raised Floor Systems which fulfill the high requirements of state-of-the-art cleanrooms with regard to contamination control and tool loads.

The manufacturing of semiconductors and flat panels requires a floor system as an essential part of the airflow concept as well as a reliable base for high static and dynamic tool loads. The aluminum raised floor systems distributed by us combine the advantages of the material aluminum with outstanding manufacturing quality and high productline diversity that meets all the requirements of our customers.

For your cleanroom projects, we can provide not only the right products but also consulting and engineering assistance for installation, tool move-in, hook-up and earthquake requirements of the floor system. We can offer a solution for the whole raised floor package, delivered from one source to avoid typical interface problems.

Blind (Solid) Panel



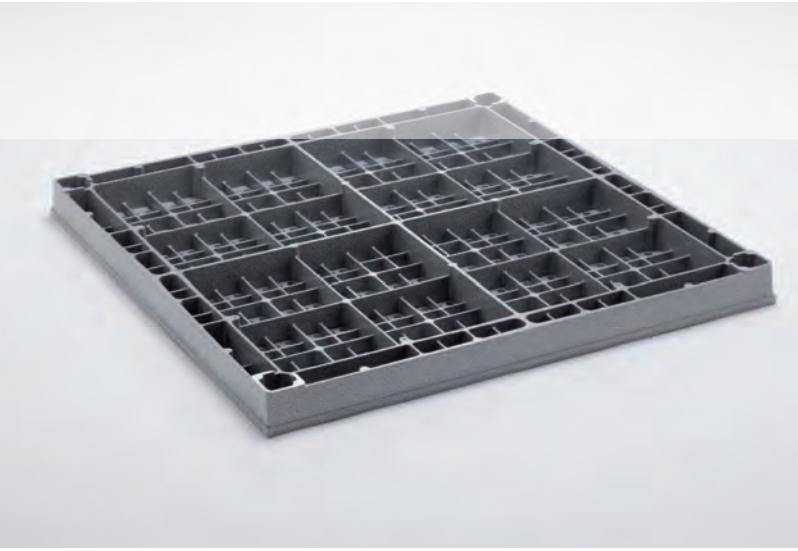


For use in areas where extremely heavy loads are to be placed. The unique lattice structure of these solid panels enables weight to be distributed in an optimum way so as to support manufacturing equipment. The precision afforded by each panel allows for excellent accessibility and interchangeability when needed – yet they are durable and strong enough to withstand the concentrated loads found in semiconductor cleanrooms and other manufacturing environments.

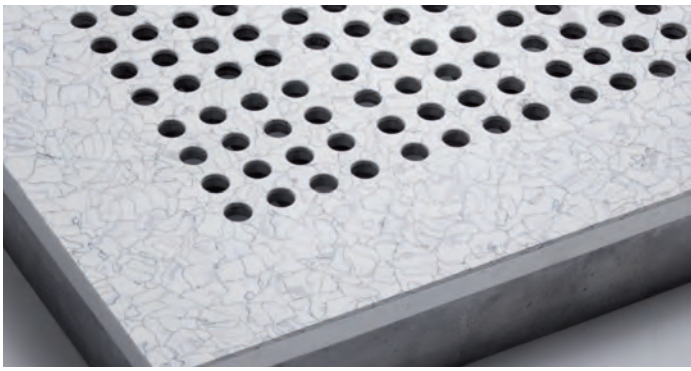
Advantages

- Precise manufacturing allows for excellent mobility and interchanging of panels
- Class A1 building material (non-combustible)
- Wide variety of finishing materials
- Unique manufacturing process provides high-quality yet low-cost components
- High load-bearing capacity with low deflection
- Easy-to-use material for subsequent cut-outs
- Long life cycle for economical usage
- Excellent electrical conductivity

Perforated Panel



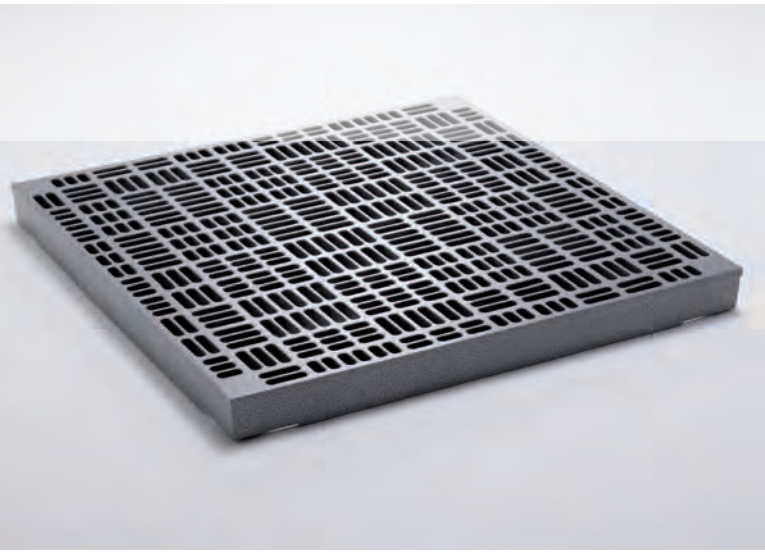
The perforated panel provides all the features and available options of our solid panel with the addition of either 1,296 or 1,024 chamfered holes to provide a nominal 18 ~ 38 % open area in a non-directional pattern for airflow requirements in both computer rooms and cleanrooms. Completely interchangeable with solid and grating panels.



Advantages

- Existing solid panels can be refitted to perforated panels by applying ventilation openings with standard drilling equipment
- Manufactured with the highest precision
- Class A1 building material (non-combustible)
- Precisely drilled holes with chamfered edges

Grating Panel

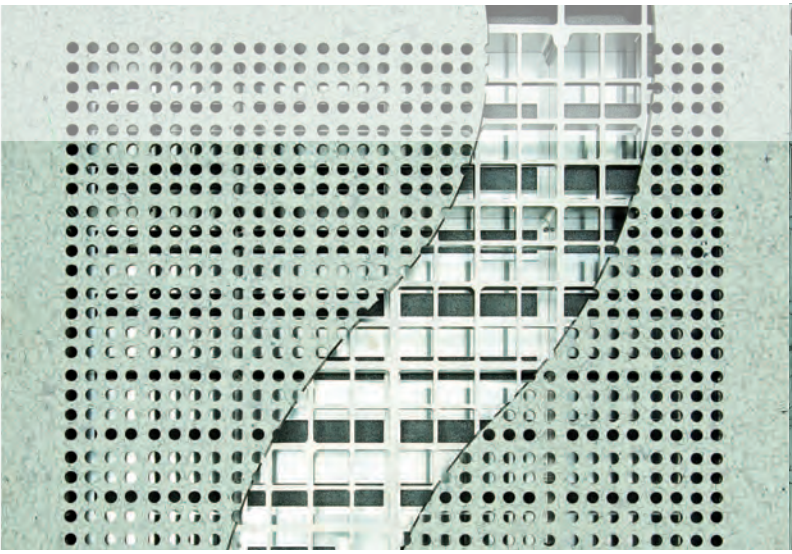


Patented die-cast aluminum gratings provide excellent concentrated and rolling load performance and are available with electrical conductive coatings and platings resistant to chemicals and abrasion. The non-directional grating pattern offers unrestricted airflow through a nominal 49 ~ 54 % open area required in return air chases and ballroom design sub-micron cleanroom facilities. The bare grating weight of 12.50 kg is available in a size of 600 mm and is nominally 49 – 51 mm thick. The grating is completely interchangeable with solid and perforated panels for maximum room configuration and air-balancing flexibility.

Advantages

- Free space in cross section: 49 – 54 % (grid size 600 x 600)
- Manufactured with the highest precision
- Class A1 building material (non-combustible)
- High load capacity with low deflection
- Easy-to-use material for cut-outs
- Long life cycle for economical usage
- Excellent electrostatic discharge
- Can be combined with the perforated panel system
- Can be powder-coated in a wide variety of electrical conductive colors

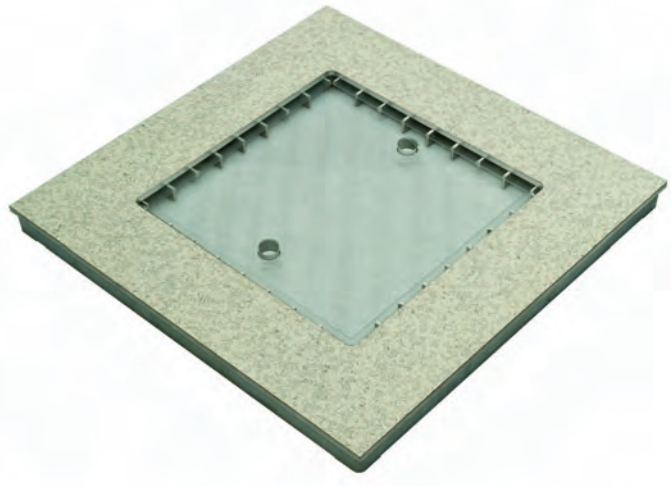
Damper

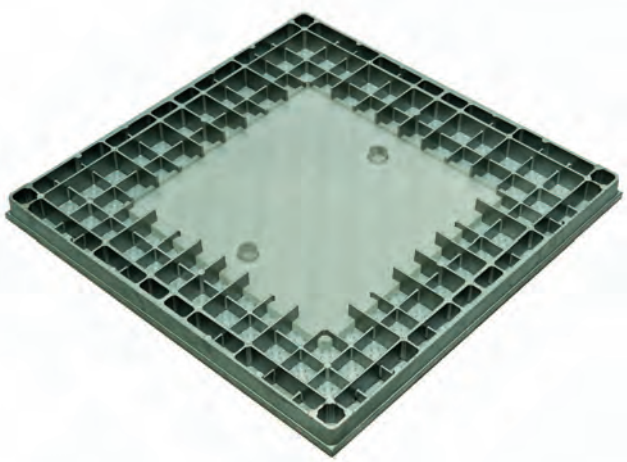


Perforated and grating panels can be fitted with dampers. This unique damper system allows uniform balancing of air throughout the room or around workstations and manufacturing tools. All adjustments are made from above using a flat head screwdriver.

Acrylic Cover

All panel types can be fitted with an acrylic cover to enable quick and handy access to equipment devices located under the raised floor.





Substructure

- Pedestal Systems

Heavy duty pedestal head

Aluminum pedestal

Steel pedestal

Pedestal Systems

- Compatible with solid, perforated and grating floors
- Pedestals available for all seismic environments
- Head assembly finishes: bare aluminum or e-coat
- Tube finishes: bare aluminum, e-coat or epoxy powder coat
- Base finishes: bare aluminum, e-coat or epoxy powder coat
- Axial load performance of pedestal assembly is 5,000 – 11,000 kg
- Available in a module size of 600 mm
- Finished floor heights from 160 – 1,800 mm

Aluminum Pedestal

The aluminum pedestal is used in applications where a non-ferrous material is required. The pedestal assemblies are compatible with all of our flooring products including solid, perforated and grating panels. The type of pedestal is chosen based on seismic zone, finished floor height and floor loading conditions.

The aluminum and aluminum/steel pedestals can be mixed in the same flooring without affecting the panels.

Advantages

- Non-ferrous material
- Can be easily cut onsite

Aluminum/Steel Pedestal

For other applications where an all aluminum pedestal is not needed, projects with a tight budget or sensitive cleanroom projects, a mixed aluminium/steel solution can be used. It consists of an aluminum head with steel stud and steel tube that works with a steel base plate assembly designed for highly seismic locations, high floor heights and heavy loading.

The aluminum and aluminum/steel pedestals can be mixed in the same flooring without affecting the panels.

Advantages

- For high area loads
- For extreme seismic requirements
- For high floor heights

Substructure

- Stringers and Bracings

Aluminum Stringer

Steel pedestal with bracing detail

Aluminum pedestal with bracing detail

Aluminum (Steel) Stringers

Our aluminum stringers are made with extruded aluminum (steel stringers are galvanized steel profile) and designed to fit 600 mm systems. The stringers are used to provide lateral support only and are not intended to improve the vertical load carrying capacity of the panels. The stringers do not establish the system spacing as the holes in the stringer tops are slightly slotted, allowing the stringers to conform to the size of the panels. When used in cleanrooms, the stringers can feature an e-coat, epoxy powder coat or bare finish (steel stringers excluded). Both conductive and non-conductive coatings are available.

- Available for 600 mm systems
- Designed for seismic environments

Bracing System

Additional strengthening of the substructure, particularly along the perimeter lines, in the form of additional bars or threaded rods which are clamped onto the base at an angle and mechanically fastened to the slab by anchor bolts to inhibit movement when the floor has to cope with high horizontal loads.

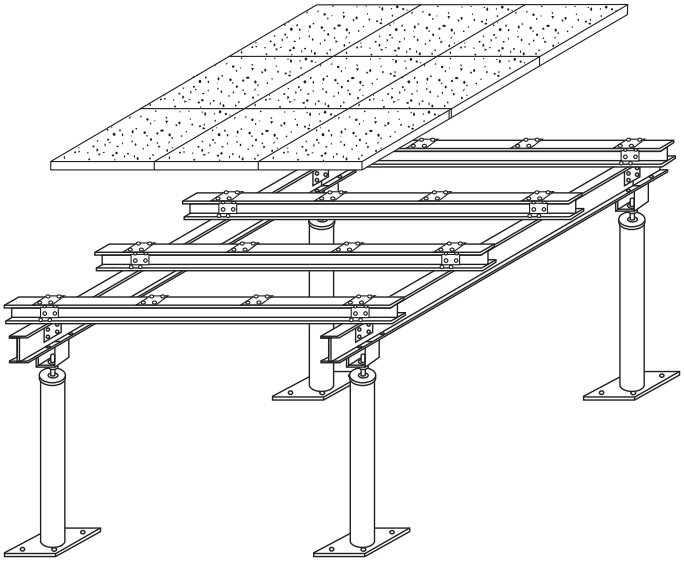
Reinforcement for Seismic Bracing

This bracing of the floor system is installed for heavily loaded areas such as tool move-in paths, heavy machine areas and seismic activity regions.

Advantages

- Designed to withstand heavy loads
- Applicable to existing raised floor systems
- Convenient installation
- Economical price and convenient replacement and maintenance
- Handy installation at points of the system

Additional Reinforcement



Post Type

We have our own particular type of sub-structure system with sizes of 1,200, 1,800 and 2,400 mm. The upper and lower side beam can be coated with e-coating or epoxy powder. The height is adjusted using a bolt on the post. The base of the post can be attached to the subfloor with anchor bolts. The upper and lower beams are fastened with bolts, aluminum plates and insulation plates are placed on the beam in order to install raised access floor panels.

- Variable distance between posts
- Height range: 600 – 1,800 mm
- Convenient installation

Spanning

When installations beneath the raised floor such as pipes, air ducts or other utility lines are in conflict with the standard pedestal layout, the spanning system gives the possibility to stay within the standard layout using C-Channels on the pedestal heads to bridge these obstructions.

- Keeping the installation module of the raised floor
- Convenient installation using the existing pedestal
- Economical price and convenient remodeling

Product Line

Standard Systems

Blind (Solid) Panels

Type	Dimensions [mm]	Max. Point Load [kN]
ABS-650	600 x 600 x 40-42	5 kN
ABH-602 LC	600 x 600 x 46-50	9 kN

Perforated Panels

Type	Dimensions [mm]	Free Cross Section [%]	Max. Point Load [kN]
APS-650	600 x 600 x 40-42	15 – 23	5 kN
APH-602 LC	600 x 600 x 46-50	18 – 22	8 kN

Grating Panels

Type	Dimensions [mm]	Free Cross Section [%]	Max. Point Load [kN]
AGS-609	600 x 600 x 46-50	25 – 45	7 kN
AGH-607	600 x 600 x 46-50	51	8 kN

Heavy Load Systems

Blind (Solid) Panels

Type	Dimensions [mm]	Max. Point Load [kN]
ABH-602 C	600 x 600 x 46-55	11 kN
ABH-602 F1	600 x 600 x 50	13 kN
ABH-602 EXR	600 x 600 x 46-55	15 kN
ABH-2000	600 x 600 x 50-55	20 kN
ABH-2500	600 x 600 x 70	25 kN

Perforated Panels

Type	Dimensions [mm]	Free Cross Section [%]	Max. Point Load [kN]
APH-602 C	600 x 600 x 46-55	18 – 22	10 kN
APH-602 F1	600 x 600 x 50	18 – 20	12 kN
APH-602 EXR	600 x 600 x 46-55	18 – 22	13 kN
APH-2000	600 x 600 x 50-55	18 – 22	15 kN
APH-2500	600 x 600 x 70	18 – 22	25 kN

Grating Panels

Type	Dimensions [mm]	Free Cross Section [%]	Max. Point Load [kN]
AGH-608	600 x 600 x 46-50	51	10 kN

MAR12/RFS BE001

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