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Cleanrooms

Your partner in Cleanrooms

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Content

Philosophy

As the specialist in clean air, Interflow creates functional solutions to complex air control issues. For almost fifty years, we deliver quality by paying close attention to safety, comfort, durability, flexibility and ease of use. These concepts are interwoven with our values and standards, determining our way of thinking and working.

Our cleanrooms are the result of this vision. They guarantee a clean working environment and provide product protection. We are of course proud of the advanced technology, but above all we value the safety that the products offer. A high-quality end result starts with a clean work area. Our high-tech cleanrooms achieve this for you.

We create functional solutions to complex issues.

- Safety
- Comfort
- Sustainability
- Flexibility
- Ease of use

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From necessity to 'must'

Today's cleanroom technology finds its ear-spring in the late 1950s and early 1960s. The components of nuclear weapons - especially the mechanical parts - became smaller and smaller. As a result, microscopic (dust) particles that previously could do no harm now had an adverse effect. A new kind of cleanroom was needed to provide the necessary quality.

More than 1,000 times cleaner

Back then, a clean room was nothing more than an enclosed space in which people wore protective clothing and vacuumed above-average frequency. However, that did not prevent contaminating particles from entering the room. The solution lay in filtering and circulating air. The system was then optimized such that the cleanroom was more than a thousand times cleaner in the new situation.

Monitoring for suspended contaminants

Sometimes suspended contaminants are visible, such as in a smoky room or in the smog over cities. But even in spaces that appear clean at first glance, contaminants are found at a microscopic level and often in concentrations too high for certain applications. Monitoring for airborne contaminants is required, for example, in a factory that manufactures sensitive equipment or in an operating room. This is to prevent damage to components and/or health risk. These clean rooms are called Cleanrooms.

Cleanroom applications:

- Nano industry
- Pharmaceutical industrie
- Medical industry
- Fine mechanical industry
- Semiconductor industry
- Biotechnology
- Food industry
- Aviation industry
- Optical industry

From design to validation

Interflow can guide you in deciding which dust-free classification you need. Too high a classification entails unnecessary costs. It is also important to know in which condition you assess the cleanroom: As built, At rest or Operational.

Heat release equipment

For cooling, it is important to know whether there is equipment in the room that gives off heat to the environment. Is the equipment suitable for use in a cleanroom and if not what modifications are needed. Are the requirements regarding temperature and relative humidity in the cleanroom realistic? It is also important to know whether you have sufficient space for the necessary air treatment systems. Our cleanroom consultants will help you answer these questions.

Cost-effective

We strive to provide you with the most cost-effective cleanroom possible that excels in simplicity and reliability and makes good business sense. We use energy-friendly installations, such as heat recovery systems and low-energy lighting and fans.

The Design

Based on the data, an air technology plant is designed to meet your requirements, the guidelines and regulations of the various authorities. Together with your specific knowledge of the production process and based on the layout, we can advise you for the design. A design will be created that meets the required classification of your cleanroom. Interflow can offer you a seamlessly coordinated total concept.

From construction to validation

During the construction of your cleanroom, you only have to deal with one project team, which is interdependent and has short lines of communication. Project management can thus be taken out of your hands. Your ideas will be concretized into a cleanroom in which all components are coordinated. The validation and measurement service ensures that your cleanroom is validated periodically, ensuring that your cleanroom continues to meet the specified requirements. If desired, we can assist you in the proper use and maintenance of your cleanroom by providing instructions and clothing suggestions.

Interflow can offer you a seamlessly coordinated overall concept

Classification of cleanrooms

Several standards are normative in the classification of cleanrooms, including NEN-EN-ISO 14644-1:2015 and the GMP standard (in full: Guide to good manu-facturing practice for medicinal products).

ISO standards

NEN-EN-ISO 14644-1:2015 'Dust and germ-free rooms and environments - Part 1: Classification of air cleanliness' from January 2015 is a worldwide ISO standard and has 9 classifications: ISO classes 1 to 9. The maximum number of particles of a given size per m^3 of air is determined using the formula CN = 10N (0.1/D)2.08 where N is the classification and D is the particle size in µm. The class can be specified for As built, At rest and Operational cleanrooms.

Responsible way of producing

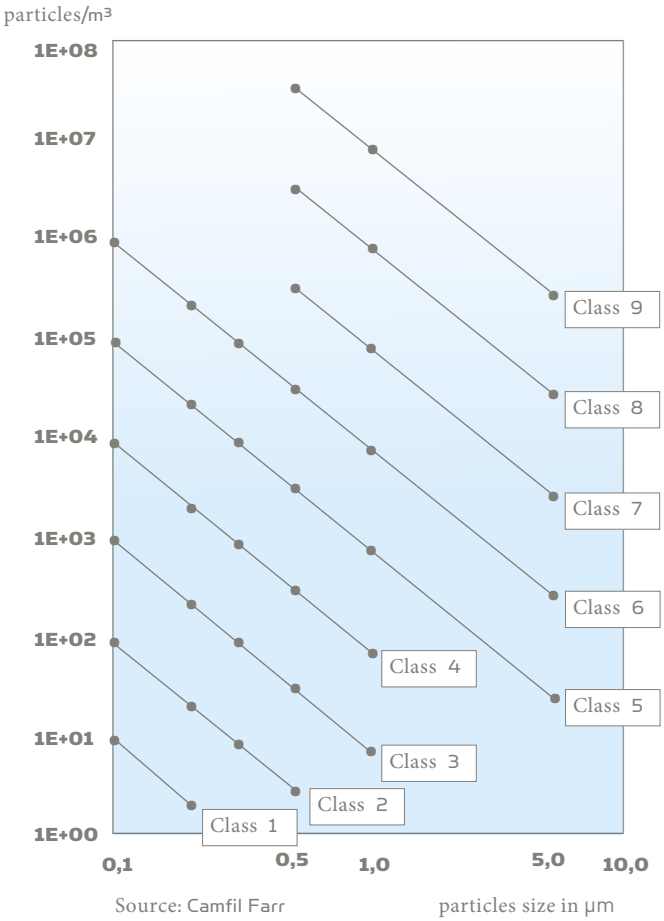
GMP stands for Good Manufacturing Practices. The Netherlands uses the GMP 'Guide to good manufacturing practice for medicinal products', published by the Pharmaceutical Inspection Convention. The rules apply to the production of medicines in the European Union. GMP has classes A to D and is used in the preparation of medicines. The class can be speci-ficated for As built, At rest and Operational clean-rooms. Finally, the "old" classifications of US Federal Standard 209D are still regularly used within cleanroom technology. The classification is indicated as the maximum number of particles of 0.5 µm per cubic feet. The most well-known classi-fications are 10, 100, 1,000, 10,000 and 100,000. With the advent of NEN-EN-ISO 14644-1:2015, these classifications are no longer in use.

As built cleanroom: a cleanroom just prior to completion, but without equipment, fixtures, etc., as long as they do not need to be installed during new construction, and without personnel.

At rest cleanroom: a cleanroom ready for use, with all facilities connected and functioning and equipped with production equipment but with no personnel in it.

Operational cleanroom: a normally operating cleanroom, with all facilities functioning and containing production equipment and personnel performing normal operations.

The number of particles per m^3 of a given particle size according to ISO 14644-1



Source: Camfil Farr

Classification of cleanrooms

Cleanroom classifications

Cleanroomklasse NEN-EN-ISO 14644-1:2015	9	8	7	6	5	4	3	2 en 1
Good manufacturing practice		D	C		B/A			
Patroon luchtstroom	Turbulente luchtstroom	Turbulente luchtstroom	Turbulente luchtstroom	Wel/niet laminaire luchtstroom	Laminaire luchtstroom	Laminaire luchtstroom	Laminaire luchtstroom	Laminaire luchtstroom
Overdruk in ruimte (Pa)	10 - 15	10 - 15	10 - 15	10 - 15	15	15	15	15
Minimale kledingvoorschrift	Labjas	Labjas	Cleanroom-kleding	Cleanroom-kleding	Cleanroom-kleding	Cleanroom-kleding	Cleanroom-kleding	Cleanroom-kleding
Luchttoevoer inlaten	Plafondwer-velroosters of geperforeerd plafond	Plafondwer-velroosters of geperforeerd plafond	Plafondwervel-roosters	Plafondwer-velroosters of filterplafond	Filterplafond	Filterplafond	Filterplafond	Filterplafond
Retourroosters	Zijwanden	Zijwanden	Zijwand laag niveau	Laag niveau zijwand of verhoogde vloer	Verhoogde vloer of wand	Verhoogde vloer	Verhoogde vloer	Verhoogde vloer
Voorfilter 1e stap (EN 779)	G3	G4	G4	F7	F7	F7	F7	F7
Voorfilter 2e stap (EN 779)	F9	F9	F9	H10	H10	H12	H12	H12
Eindfilter (EN 1822)	-	H13	H13	H14	H14	U16	U16	U16
Filteronderhoud	Jaarlijks	Jaarlijks	Halfjaarlijks	Per kwartaal	Per kwartaal	Maandelijks	Maandelijks	Maandelijks
Werkoppervlak per persoon m^2	5	5	10	20	30	60	100	100
Activiteit in ruimte	Continue	Continue	Continue	Regelmatig	Regelmatig	Minimaal	Minimaal	Minimaal

Classificaties bij het produceren volgens GMP-richtlijnen

Cleanroomklasse	D	C	B	A
Patroon luchtstroom	Turbulente luchtstroom	Turbulente luchtstroom	Turbulente luchtstroom	
Overdruk in ruimte (Pa)	- -	- -	- -	- 0,36 - 0,54
Maximaal aantal toegestane levende micro-organismen (per m^3)	200	200	200	200
Max. aantal toegestane deeltjes in rust (per m^3) > 0,5 um > 5 um	35.200.000 29.000	352.000 2.900	3.520 29	3.520 20

1 Values are only an indication and depend on the situation regarding pollution, heat loads and comfort. Interflow can also recommend the optimum number of changes for you using a 'Partical Breakdown' analysis.
2 This value can only be determined by taking a large number of air measurements.

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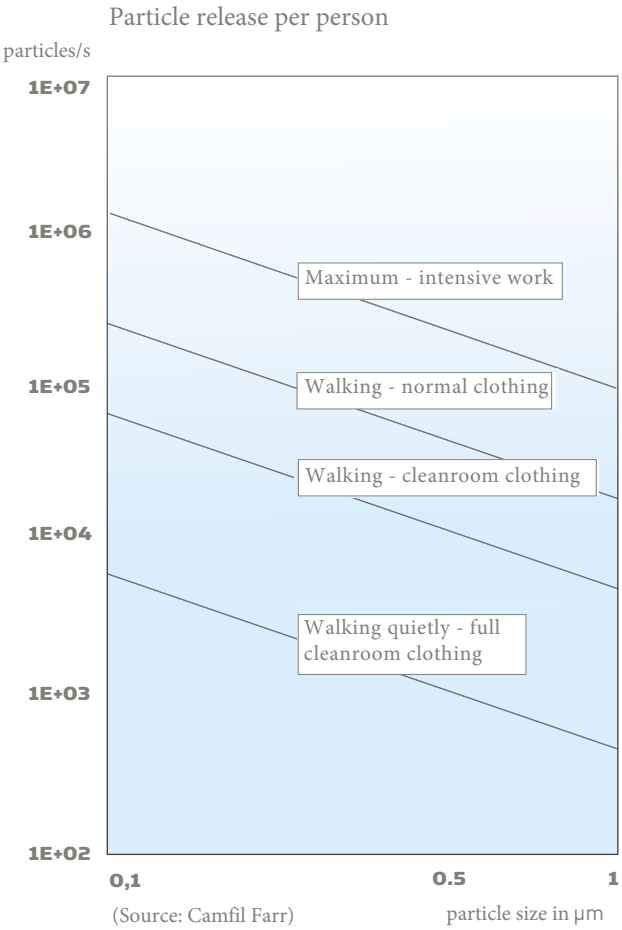
Man as biggest polluter

An ideal mixing of air in a turbulently ventilated cleanroom creates an equilibrium condition that depends on the dust emission in the room and the dust content of the supply air. Interflow filters the supply air with absolute filters.

This makes the dust content of the supply air manageable and controllable. The dust emission in the room is a measure of the quantity of supply air and the degree of dust freedom that can be achieved with it. The largest dust producer in a cleanroom is the user himself. The graph shows the particle emission of the human at various activities, dressed in various ways.



(Source: Camfil Farr)

The biggest dust producer is the user himself.

Filtration

Airborne contaminants can be subdivided into various sizes (expressed in µm). Each range of this subdivision requires a specific filtration method. Thus, a subdivision into coarse filters, fine filters and absolute filters takes place. To avoid rapid saturation of the "main filter" - which is relatively expensive - the up-building of filters in a plant is stepwise.

The relatively inexpensive prefilters remove the larger contaminants from the air and prevent rapid saturation of the absolute filters. The main two types of absolute filters are HEPA filters and ULPA filters.

HEPA stands for 'High Efficiency Particulate Air', freely translated: high efficiency particulate filter.

ULPA stands for 'Ultra Low Penetration Air', freely translated: extremely low penetration filter.

Depending on the room classification, an absolute filter ranging from H10 to U17 will be applied. Interflow has the knowledge to suggest the most ideal solution for you in terms of the area of application and filter life.

Absolutefilters		
Ē% @ 0.3 µm		Ē% @ MPPS
≥ 95	E10	≥ 85
≥ 98	E11	≥ 95
≥ 99.99	H12	≥ 99.5
≥ 99.997	H13	≥ 99.95
≥ 99.999	H14	≥ 99.995
Ē% @ 0.12 µm		
≥ 99.9995	U15	≥ 99.9995
≥ 99.99995	U16	≥ 99.99995
≥ 99.999995	U17	≥ 99.999995
EN 1822 1:2009		

Coarse dust filters	
G1	50 ≤ Am < 65
G2	65 ≤ Am < 80
G3	80 ≤ Am < 90
G4	90 ≤ Am
EN 779	

Particulate filters	
F5	40 ≤ Em < 60
F6	60 ≤ Em < 80
F7	80 ≤ Em < 90
F8	90 ≤ Em < 95
F9	95 ≤ Em
EN 779	

Am% Average gravimetric efficiency for coarse filters in the classification range G1 - G4

Em% Average atmospheric efficiency for fine filters in the classification range F5 - F9

Ē% Average fractional efficiency for absolute filters in the classification range H10 - U17

MPPS Most penetrating particle size

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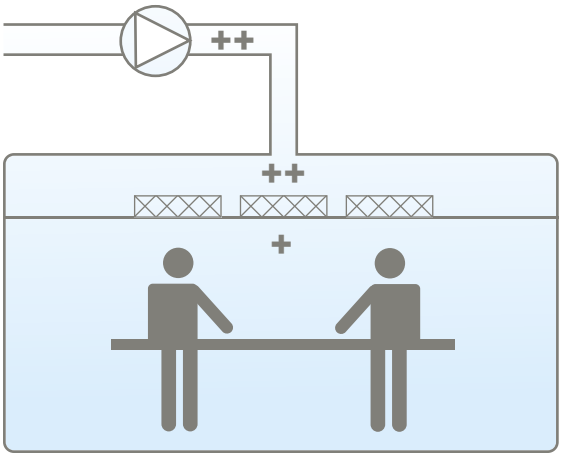
Filtration systems

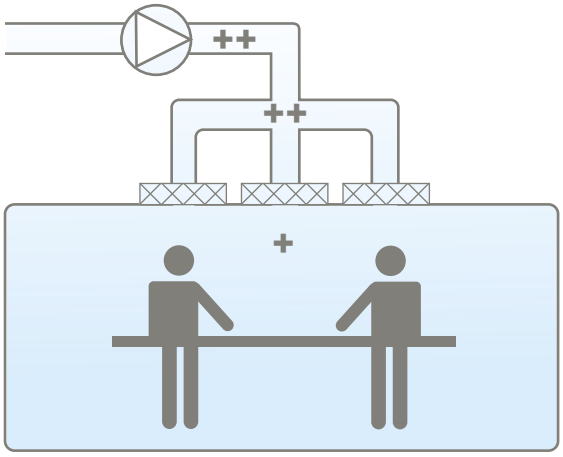
There are several air supply systems, each with its own specific advantages. The main air supply systems are:

- Open plenum systems
- Systems with separated ducts
- Systems with 'in-line' housing
- Fan Module System
- Satellite system



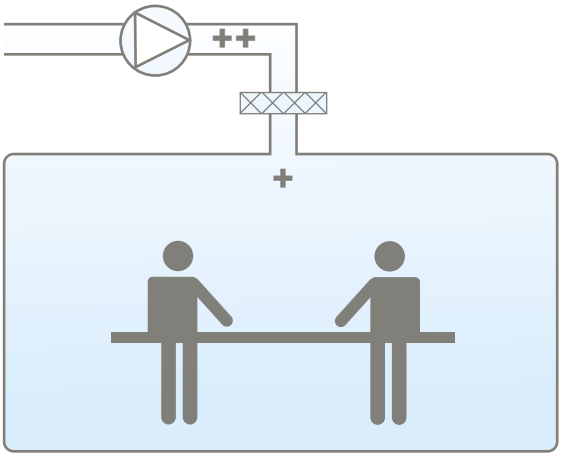
Open plenum systems

An open plenum system consists of a space above the cleanroom ceiling: the "plenum," or pressure space. The air is fed through one or more channels at a pressure higher than atmospheric pressure to overcome the air resistance across the filters. An impenetrable roof is necessary in this system to form the plenum. Since the pressure in the plenum is higher than in the room, proper sealing of the filters in the ceiling and ceiling is very important. Open plenum systems are used, for example, in clean rooms that must meet a room classification 4 to 6 (according to NEN-EN-ISO 14644-1:2015).



Systems with separated ducts

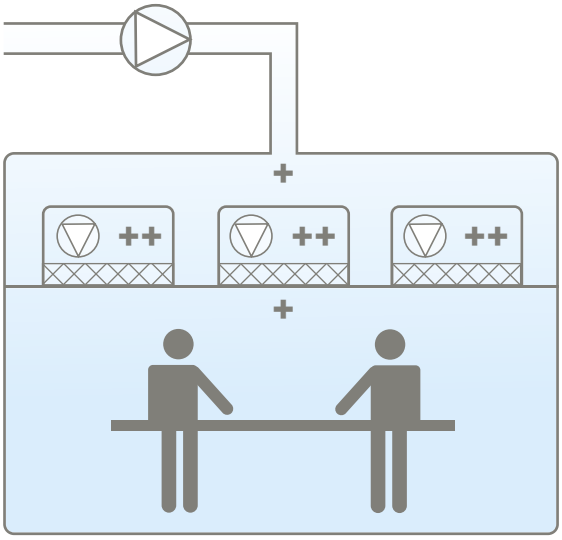
In systems with separate ducts, air is supplied from the main duct through separate ducts to separate modules, equipped with a filter, through which the air flows into the room. The modules are equipped with easy-to-change filter cartridges and are easily accessible for service and validation work. Systems with separate ducts find their application, for example, in clean rooms that must comply with a room classification 6 to 8 (according to NEN-EN-ISO 14644- 1:2015).



Systems with 'In-line' housing

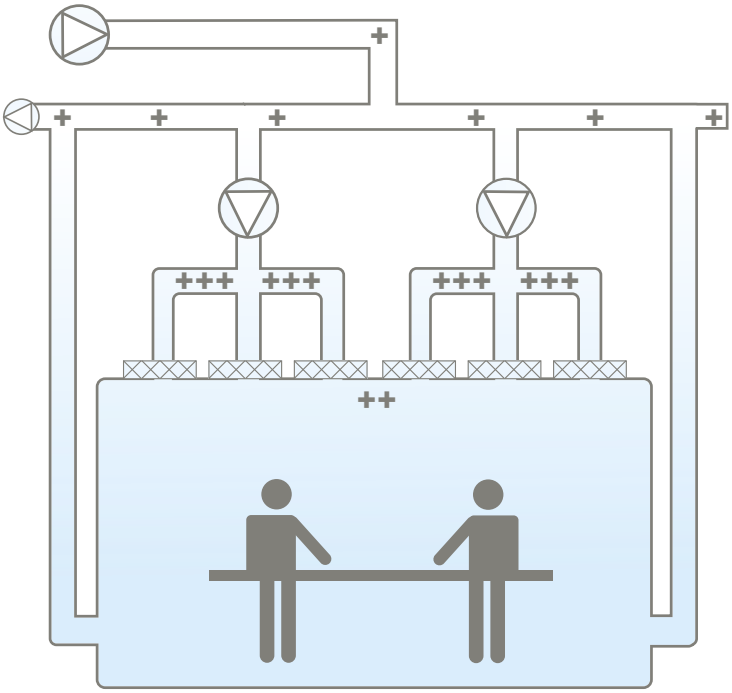
Systems with "In-line" housing are used, for example, in cleanrooms that must comply with room classification 8 (according to NEN-EN-ISO 14644-1:2015). An advantage of this system is that the costs are relatively low compared to other systems. However, it is recommended to place filters as close as possible to the cleanroom. When filters are placed at a relatively large distance from the cleanroom, minute particles may adhere to the channel walls. These particles will then collect until they are heavy enough to detach themselves from the wall and enter the cleanroom.

Filtration systems



Fan Filter Module System

Fan Filtermodule system consists of a closed space above the cleanroom: "the plenum. Conditioned air is fed to the plenum through the air handling system. Each module has its own ventilator and HEPA filter. The fan draws conditioned air from the plenum and overcomes the resistance of the HEPA filter. The air propelled by the HEPA filter flows into the room as a laminar air stream. This air is returned by the return system to the plenum where it mixes with air from the air handling system. Fan Filtermodule systems are used in clean rooms that must comply with classification 4 to 7 (according to NEN-EN-ISO 14644-1:2015).



Satellite systems

The satellite system is a derivative of the fan filter module system however a plenum and the fan filter modules are not necessary. Filter hoods are used instead. The conditioned air in the air handling system is connected to recirculation fans via the supply air duct. These fans mix the conditioned make-up air from the air handling system with return air from the clean room and supply the mixed air to the HEPA filters installed in the ceiling. Each fan, to which cleanroom ceiling-mounted HE-PA filters are connected, is positioned as a satellite. Satellite systems are used in cleanrooms that must comply with room classification 4 to 8 (according to NEN-EN-ISO 14644-1:2015). One cluster of filters is similar to the filter arrangement shown in the system with separated filters.

Each air supply system has specific advantages

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Cleanroom flow systems

The way air flows through a cleanroom is an important factor in cleanroom design. In addition to the clean air flowing into the room through the absolute filters, the way the air flows through the room greatly affects cleanliness.

The contaminants produced by the process and the user of the cleanroom and the way in which these contaminants are removed from the room largely determine the classification of the room (see also Clean-room classifications table on page 7).

ISO standards

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Cleanroom flow systems

Down flow cleanrooms

In a down flow cleanroom, the emphasis is on filtration of the air and capture of any contaminants. This makes it possible to achieve a lower dust classification in the room. In a down flow cleanroom, the healed-le ceiling has filters through which the air is blown into the room. The floor may be perforated to exhaust the air blown into the room. The air flow moves at a uniform velocity along parallel flow lines vertically through the room. The air passes through the room in one direction and transports any contaminants from the top to the bottom of the room. The air velocity in a down flow cleanroom ranges from 0.20 to 0.45 m/s. With this flow type, velocity differences in the air are minimal, minimizing turbulence in the room. This minimizes the possibility of small contaminants in the air collecting into measurable particles. Particles released at a particular workstation in the room are removed from the room without affecting other workstations. A down flow cleanroom is currently the cleanest possible working environment.

Cross flow cleanrooms

A cross flow cleanroom uses the same filtration technique as a down flow cleanroom. However, in a cross flow cleanroom, two opposite walls are completely equipped with filters. Air is blown into the room through the blow-in filters in one wall. The air leaving the room through the filters in the other wall is filtered, allowing the air to be recirculated. The airflow moves horizontally through the room at a uniform velocity along parallel flow lines. Workstations located in the immediate vicinity of the blow-in filters can have a dust classification of 5 and above (according to NEN-EN-ISO 14644-1:2015).

A disadvantage of this type of cleanroom is that activities in the laminar airflow can affect activities further away. In other words, the dust classification achieved in certain parts of the room depends on the type of work or process performed in another part of the room.

HEPA stands for 'High Efficiency Particulate Air', freely translated: high efficiency particulate filter.

ULPA stands for 'Ultra Low Penetration Air', freely translated: extremely low penetration filter.

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Meet our CleanWall

Because of the need to capture dust and microorganisms, it is a requirement to take great care in the architectural finish of a cleanroom. This also reduces operating costs.

Both architectural and mechanical engineering aspects are very important when designing a cleanroom. Through years of experience in building cleanrooms, Interflow has developed its own modular wall system, made of hpl (high presure laminate), which meets the latest technology: CleanWall.

The unique concept of the CleanWall system is reflected in the way it is put together. The construction is chosen so that the elements below contribute to a wall system that can be optimally used in Interflow's CleanWall walls.

- integrated return channels
- completely smooth finish of the walls
- door and window frames are fully integrated
- window cassette(s) flush with the wall

The CleanWall system

The clean CleanWall system is characterized by the use of hollow wall panels; so-called "monoblock panels. Monoblock panels are primarily constructed of hpl material. Both the frame and the wall covering are made of this.

Monoblock panel structure

The prefabricated wall panels of the CleanWall system consist of a base frame made of an aluminum U-profile. Vertical HTPL uprights are positioned on this profile. Solid hpl cover panels are attached to the base frame and uprights on both sides. Where desired, the prefabricated wall panels are fitted with glazing, doors, and so on.

The use of prefabricated wall panels allows for short construction times and clean work on site. An aluminum ground rule - applied to a finished subfloor - indirectly serves as a base for fixing the monoblock panels of the Clean-Wall wall system. In consultation with Interflow, media ducts and switchboards can be integrated into the wall system. This allows ready-made wall panels to be delivered to site. Dismountable service panels can be installed in locations of media facilities.

Corner finishing

The wall system can be fitted with round interior and exterior corners for optimum cleaning. This eliminates sharp transitions and reduces the risk of microbiological fouling.

Besides standard wall panels in different heights and fitting panels to achieve any desired wall length, Interflow also provides corner finishes with rounded and angled inner and outer corners. As standard, the sys-teem is executed with an angled inner and a rounded outer corner. For covering columns in the room, Interflow has special column coverings, which are applied as shells around the column.

Interflow CleanWall is a unique concept

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Glazing in the CleanWall system

The cassettes consist of a frame of high pressure laminate (hpl), on which an all-round poly-cut pane with a thickness of 6 mm is pressed on both sides. The glass cassettes have a standard dimension of 908 x 965 mm.

The glass cassettes are glued completely flush into the wall. After mounting the cover panels, a seam is created between the pane and the panel. This seam is sealed with an airtight, white sealant (FDA approved), creating a seamless connection between the panels and pane.

Benefits of the CleanWall System:

- Open HPL wall system, free of wood components or other absorbent materials
- Antistatic
- Due to prefabricated wall panels a short lead time on site
- Modular construction of panels with a width of 1,300 mm.
- Seamless transition in ceiling and floor
- Glass panels and door frames are fully integrated flush into the wall
- Double-shell design and prepared for media pipes (hollow wall design)
- Due to construction, piping can also be retrofitted
- Moveable
- Return ducts are integrated into the wall
- Possibility of integration of switchboards and removable lock panels
- Stainless
- Clean construction, no construction waste on site
- Excellent chemical resistance thanks to hpl material
- Moisture resistant
- Impact and scratch resistant

Floor systems

In addition to a smooth wall and ceiling finish, the floor in a cleanroom is very important for the finish of the room and the degree of dust freedom. In addition, the floor in the cleanroom area must be easy to clean.

Depending on the application, there are various options for a neat finish for the floor, based on your requirements. Floor systems can be applied antistatically, electrically conductive and limited electrically conductive. Interflow has two skirting constructions within its own CleanWall concept.

Shock skirting
The mounted baseboard backfill, consists of a backfill profile mounted against the baseboard of the wall system. This baseboard is implemented in a height of 100 mm. Against the backfill profile made of an aluminum plate, a so-called Shock skirting board (PVC finishing skirting board) is installed in a color of your choice.

Sanitary baseboard
The mounted baseboard backfill, consists of a backfill profile mounted against the baseboard of the wall system. This baseboard is implemented in a height of 100 mm. Against the backfill profile made of an aluminum plate, a so-called Shock skirting board (PVC finishing skirting board) is installed in a color of your choice.

Flooring often used in Cleanrooms:

- PVC floor finishing
- Rubber floor finishing
- Epoxy casting floor (synthetic resin)
- Trowel floor
- Polyurethane screed

Ceiling systems

Depending on the classification needed and the intended application(s), Interflow has a ceiling system to meet your requirements:

CleanCeiling systems

Interflow's CleanCeiling system is composed of fully prefabricated ceiling cassettes. The cassettes have a size of 1,200 x 1,200 mm and feature hpl finishing. The cassettes are mounted against the overhead aluminum beams (center-to-center 1,200 mm). The ceiling system is constructed to be passable for service purposes.

For an airtight finish of the ceiling, the panels are sealed and flattened with white silicone sealant (FDA approved) on the clean room side during assembly. In this way, a completely airtight result is achieved. For the installation of supply air elements and lighting, the necessary cutouts are made in the ceiling cassettes.

Benefits of the CleanCeiling system:

- Modular ceiling system with grid size up to 1,200 x 1,200 mm and fully demountable
- Walkable as standard (for service purposes)
- Standard suitable for installation of Fan Filter modules of 590 x 1,190 mm.
- Easy to integrate supply air elements and lighting fixtures
- The ceiling system is prefabricated, eliminating machining and dust-producing operations at the construction site
- Fast construction time at the construction site.

A big advantage is the fast construction time thanks to our prefabricated system

Ceiling systems

CleanCeiling lighting fixtures

Interflow provides recessed lighting fixtures specifically designed for integration into the Interflow CleanCeiling ceiling system. These luminaires are ideally suited for application in clean, dust- and germ-free areas common in healthcare: hospitals (operating rooms and ancillary rooms, sterile preparation rooms, CSA department, laboratories) and in industry: semiconductor, food, pharmaceutical, bio, techno-engineering, precision mechanical, nano and optical industries.

Aluminum T-grid ceiling system

The melamine panel ceiling system is constructed with a white-coated aluminum T-grid in a width of 50 mm. The connection of the wall to the ceiling, takes place by means of a corner profile against the CleanWall wall panel. The ceiling grid has a powder-coated paint coating (color white). The standard ceiling tiles, equipped with a melamine coating, are sealed on the cleanroom side with a white silicone sealant (FDA approved).

T-grid ceiling system

The supporting framework of the ceiling system with melamine panels consists of wide metal T-profiles, powder-coated (white color). These are suspended from the building structure. The T-profiles are mounted in grid size 1,200 x 600 mm.

Standard white melaminated pa panels are clamped into the grid. Sound-absorbing ceiling tiles are also possible. The ceiling tiles are sealed with white silicone sealant (FDA approved) and levelled off. This creates a completely airtight ceiling.

There are three systems:

- CleanCeiling system
- Aluminum T-grid ceiling system
- T-grid ceiling system

Door systems

Interflow supplies a wide variety of doors for your cleanroom. For example, Interflow has standard and hermetically sealed versions of single, one-and-a-half and double hinged doors with wicket locks. If desired, these hinged doors can be equipped with a through-lock system. Furthermore, Interflow supplies hermetically lockable and non-hermetically lockable sliding doors.

Revolving doors

All door panels for hinged doors have a standard blue Duropal coating on both sides. The door is provided with 3 mm PVC tape all around. The total door thickness is 42 mm. The doors are hung with stainless steel hinges and equipped with a stainless steel door handle with running lock. The door frames are executed in hpl, so that the wall panel and the door frame are integrated as one unit.

Sliding doors

For non-critical rooms or rooms without pressure differentials, non-hermetically sealed Clean-Wall sliding doors can be used. To open the door, it has an integrated bowl handle in the door leaf on both sides. This allows you to use the entire reveal area as a door opening.

The door guide consists of a balanced suspension construction with two sets of rollers at the top and a plastic guide at the bottom.

The drive is equipped with:

- precision bearings
- plastic sheathing
- an adjustable door locking system
- double-sided running rail in anodized aluminum
- automatic return mechanism with closing damping*

The cover slopes and is easily removable.

Door systems

Hermetically closing sliding door

For pressure differences between rooms and as a separation between critical areas, a hermetically closing sliding door is available. This creates better logistics, contributing to higher productivity and quality. The door opens automatically after activating a foot or elbow switch.

The interlock system

In the CleanWall concept, the interlock consists of a fully integrated electronic system. The stop-and-go displays are mounted next to the door, completely flush in the wall, and serve as (visual) support to grant or deny persons access to the room.

Pass-through locker

The pass-through locker is used to allow goods to be moved within the clean room zone without people passing through, while maintaining the room pressure hierarchy. A pass-through locker can be equipped with a mechanical or an electronic locking system.

Interflow supplies a wide variety of doors for your cleanroom

Air handling

To maintain a classified space, it is very important to control dust emissions in that space. Interflow builds air treatment systems that include absolute filters.

The dust emission in the room is decisive for the quantity of air supplied and the degree of dust freedom that can be achieved with it. However, the largest dust producer in a cleanroom is the user himself. Interflow develops customer-specific air treatment systems. After all, each cleanroom requires its own customer-specific approach. Consider, for example, the required classification of dust freedom and/or the number of germ-forming units, the heat emission of the equipment in the room, any requirements regarding temperature and relative humidity in the cleanroom, the number of people working in the cleanroom, etc.

The air handling systems can be divided into the following main components:

- Air handling installation
- Cooling installation
- Heating installation
- Filters
- Ductwork
- Dehumidification installation

Interflow uses open plenum systems, systems with separated ducts or systems with "in-line" housing for filtration. By applying various techniques, Interflow is able to create the right flow pattern in the cleanroom for each application; whether the demand is for cleanrooms with turbulent flow, down flow cleanrooms or cross flow cleanrooms.

Interflow designs an air technology installation based on the now known data, which meets your requirements and the guidelines and regulations of the various authorities. Hereby Interflow strives for an air treatment installation that works reliably and economically. Consider the recovery of energy from the air extracted from the room (s).

Air handling

Cooling and heating

Interflow uses an air-cooled liquid cooler or an air-cooled cooling plant according to the direct ex-pansion principle for cooling and dehumidifying your cleanroom.The air-cooled liquid cooler is connected to the cooling registers of the air handling plant by an insulated, steel, chilled water piping system. They are designed for the ozone-friendly refrigerant R-407C and are distinguished by their reliable operation and simple handling.

There are many ways to heat your cleanroom to the desired temperature. Interflow matches the method of heating the cleanroom to your requirements for the conditions in the various rooms. Interflow develops the most economical system for you.

In the design of the air technology installation, a number of aspects are of great importance:

- The classification of the room
- The desired temperature and humidity
- The heat load to be cooled with air
- Any prescribed minimum ventilation rates
- Extraction.

Dust removal and vacuum

Dedusting system

During a production process, for example, when weighing, mixing, tableting, granulating, filling, preparing and packaging certain powders, dust may be released. The released dust is a nuisance and can be harmful to people. In addition, these released substances can cause contamination, which can adversely affect the process. For cleanroom locations where dust is released, Interflow designs and installs central dedusting equipment.

The dust collector has filtration such that the exiting air does not contain a concentration higher than 1 mg/Nm. Depending on the process, the air will be additionally filtered after the dust collector with the help of an absolute filter (HEPA) with an efficiency of 99.995%.

Central vacuum cleaning system

For the cleaning of floors and production equipment, one can use a vacuum system integrated into the defined CleanWall system. This vacuum system works automatically. By inserting the hose into the vacuum socket, or by operating the switch on the handle (telecom hose), central vacuum is started.

The vacuum cleaner has a turbine that has about 50% more suction power than an ordinary vacuum cleaner. It is installed in a central location, for example in the technical room. In combination with the CleanWall system (hollow wall structure), it is easy to expand your vacuum system.

Furnishing

With its extensive delivery program, Interflow offers a total concept for clean and safe production environments. Interflow can therefore make a significant contribution to the design of your cleanroom.

- Customer-specific furniture
- Various interchange benches, such as movable with round seats and interchange benches with shoe storage
- Customer-specific lock fittings, such as built-in cabinets
- Incorporating firefighting equipment, etc.
- Sanitary fixtures, including sinks, soap dispensers and mirrors
- Waste bins, tissue holders, etc.

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Measuring and control technology

Measuring and control technology

Interflow has the knowledge and expertise to keep your desired room conditions nearly constant. Where necessary, Interflow equips your cleanroom with temperature, pressure and relative humidity sensors.

These transducers are connected to a fully automatic process control system. To optimize process monitoring, system flexibility, ease of operation, traceability of process parameters and minimize service costs, Interflow uses a high-performance cleanroom control system.

A control system should be user-friendly. In addition, the rules and / or guidelines established by inspection or industry should be included in the choice of the control system. Interflow has years of experience in building clean rooms and the control systems for this.

Interflow is one of the few cleanroom builders who has the in house expertise to control installation:

- design
- assemble
- commissioning and adjusting
- programming according to customer-specific software and/or parameters

The additional benefits of a good operating system are:

- Building control capabilities
- Monitoring of the production process
- An overtime timer and/or scheduler
- The modem functions for remote management and maintenance, for example with Interflow
- An installation overview via screen
- Signaling of malfunctions.

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Integral cleanroom construction:

- Consulting
- Design
- Realization
- Commissioning
- Validation
- Management and maintenance

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