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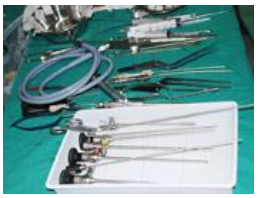
Clean Room



Instruction

Clean room is also called no-dust room or purification room. It is the basis for pollution control, mass-produced without clean room or pollution -sensitive parts.

In FED-STD-2, the clean room air filter is defined as devices-equipped room of distribution , optimization, structural materials, the specific operation rules to control the air concentration of suspended particles, so as to achieve an appropriate particle cleanliness level.

Clean room is the special room, which in a range of particles, excluding harmful air, pollutant and bacteria, and also control the temperature, cleanliness, room pressure , air velocity and air distribution, noise and vibration and lighting , static control within a certain demand, given specially designed room.

That is, no matter how changes in the external conditions of the air, the interior could still all have maintained original requirements set by the cleanliness, temperature, humidity and pressure and other performance characteristics.

The main goal of the clean room is that controlling products (such as silicon chips, etc.)which are in contact with the atmosphere and the temperature and humidity to survive clear , so that the products can be worked in a good environment, space, production, manufacture. According to international practice , dust purification level is mainly based on the particle per cubic meter of air into standard particle diameter greater than the number specified. That is so-called clean is not without any dust , but controlled in a very small amount of unit.

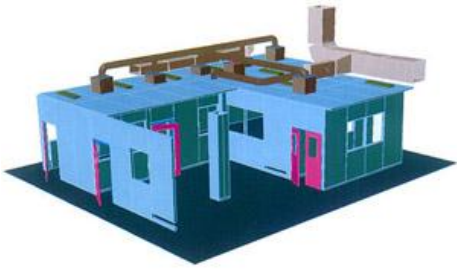
While, in accordance with this standard criteria of dust particles relative to our common small dust has been minimal, but in terms of the optical structure, even a little bit of dust will have a very large negative impact , so the optical configuration of the production , dust is an inevitable requirement.

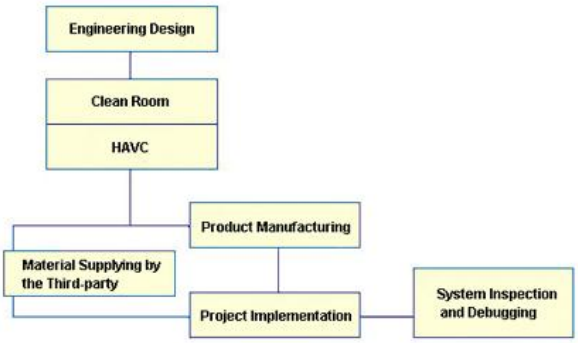
When the number of dust which is less than 0.3 microns per cubic meter is Controlled to 3,500 or less , then it is already reached to the international standard A dust level.

The production and processing of clean dust requirements of Chip-level standards is more strict than A-level, which is mainly used in some higher level chip production.

The quantity that is 0.5uM or less is strictly controlled in 1000 per cubic inch, which is the industry called 1K level.

Purification methods





1. Whole Purification

High- Efficiency filtration sterilization technology. It is mainly rely on efficient air cleaner or ultra-efficient filtration equipments, transportation to a specific environment and to keep the air clean air cleanliness. Filter Principles:
Net retention cut; ②Sieve retention; ③Electrostatic attraction retention;
④Brownian motion of inertial impaction and retention. Therefore, the filter clean technology is a combination result.

(2) Filter structure: The filters that are used for Biological clean room are of high- level or ultra-high efficiency filter, includes Glass wool filter system, Advanced filter paper pulp,
Asbestos fiber filter , perchlorethylene fiber filters etc. The resistivity of efficient filter
to 0.5 μ m can reach 90% to 99%, for ultra-efficient filter, it can retention 0.3 μ m particles than 99.9%.

2. Local Application

(1)Clean filter Unit: Clean filter Unit is the hospital local air purification device. Generally, it includes vertical laminar flow, surrounded by a transparent curtain. The entire unit can remain high cleanliness (10000-100) air. This can be used to treatment protection of immunocompromised patients, it is also known as sterile laminar flow unit.
(2)Purification operation board: Horizontal or vertical laminar flow cabinets purify the air inside the console can achieve a high level of purification
The air purification level in the operation cabinet can be achieved to a high level when applied by horizontal or vertical laminar flow.

Electrostatic adsorption sterilization purification technology.
It is based on the industrial electrostatic adsorption principle, innovation of miniaturization technology.
Equipped with Aluminum honeycomb discharge electrode and the collector -level line;
Used with mirror force charged adsorption. Currently there are three purification devices, includes pre- filter - HEPA filter - activated carbon adsorption , electrostatic adsorption of positive ions combined sterilization , air purification and the use of wind capacity in order to ensure that the purification times of indoor, solving the sterilization in hospitals operating room, ICU, maternal ward , hemodialysis room was continuous disinfection of air in case of problems , the hospital cleanliness of indoor air purification reach 100,000 ~ 10000.

Anion purification technology: Anion is a negatively charged chemical groups, it may occurs reversible changes, it exists in a very short time, which also has no ability to kill microorganisms, mainly combined by the charged particles in the air ions and in particular biological particles , forming a plurality of particle agglomerates which quickly becomes large settlement, to achieve the purpose of purifying the air.
Negative ions can kill against microbial protein only when they have certain chemical properties, such as reactive oxygen ions , etc., they only have the ability to kill against microbial protein, so negative ions has limited air purification capacity, the clearance rate for microorganisms can only reach 70% to 90%.

Air Velocity Control



The air in Clean room is the important factor for clean room performance,
Generally, the clean room air flow velocity is from 0.25 ~ 0.5m / s, This flow rate is a breeze region, which can be infected by people, machines to confusion. Although such a disturbance can be suppressed to improve speed while maintaining the cleanliness effect, but as the speed increase, it will increase the running cost increases.
so in order to achieve an appropriate speed within an economic results supply, it should be met to the standards of cleanliness requires. Meanwhile, to achieve the stabilization effect, maintaining a uniform gas flow is also an important factor, if not remain homogeneous flow , said speed is different, particularly in the wall along the wall surface airflow vortex action occurs at this time, so it is very difficult to achieve high cleanliness.

There should have the following precondition in order to maintain uniform air flow direction in Vertical laminar flow:
(a) There should not have air velocity difference.
(b) The velocity of the floor back to the suction side of the wind deflector should not have wind speed difference. The speed is too low or too high (0.2m / s, 0.7m / s) are the vortex phenomenon , and 0.5m / s of speed, air flow is more uniform, generally its wind speed were taken at 0.25 ~ 0.5m / s.

Application



Industry

The main control objects are inanimate particulate. Mainly controlling the airborne dust particles on the pollution of the work object, which the internal pressure is generally maintained state. It is used for precision machinery industry, electronic industry (semiconductors, integrated circuits, etc.) aerospace industry , high purity chemical industry, nuclear industry, magneto-optical products industry (CDs, film, magnetic tape production) LCD (liquid crystal glass),computer hard drives, computer heads manufacturing and other industries.

Biology

The main control life particulates (bacteria) and inanimate particles (dust) on the work object pollution. They can also be classified to as follows,

A. General biological clean room: Mainly controlling for the contamination of microorganisms (bacteria). While its internal materials must be able to withstand a variety of sterilizing agent erosion, usually the internal pressure is guaranteed. Its internal materials to be able to withstand a variety of industrial clean room sterilization process. Such as the pharmaceutical industry, hospitals (operating rooms, sterile ward) food, cosmetics, beverage production, animal laboratory , chemical laboratory, blood bank etc.

B. Biological Safety cleanroom: Major control objects are the outside of life and human pollution. To maintain the atmosphere inside the negative pressure. Example: bacteriology , biology , clean laboratories, barter engineering (recombinant DNA vaccine preparation)

International standard



ISO Series

(1) ISO14644-1 Classification of air cleanliness

(2)ISO14644-2 certified ISO14644-1 for the continuous monitoring of conformance testing and technical requirements.

(3)ISO14644-3 Test Methods

(4)ISO14644-4 Design and construction starts.

(5)ISO14644-5 Operation

(6)ISO14644-6 Terms and Definitions

(7)ISO14644-7 Separating devices(Clean air hoods , glove box , separator and micro- circulation device)

(8)ISO14644-8 molecular pollution

(9)ISO14644-9 Clean chemicals (liquid)

IEST Series

Clean air

RP-CC001 Efficient and ultra- high efficiency filter

RP-CC002 Unidirectional flow device

RP-CC006 Testing Cleanroom RP-CC007 test ultra- high efficiency filter

RP-CC008 Gas absorption device

RP-CC021 Efficient and ultra-high efficiency filter media filter test

RP-CC034 Efficient and ultra- high efficiency filter filter leak

Clean room and clean environment

RP-CC006 cleanroom testing

RP-CC012 cleanroom design elements

RP-CC016 Cleanroom non-volatile residue deposition rate

RP-CC018 cleanroom management operation and testing procedures

RP-CC022 cleanroom and controlled environment of static electricity

RP-CC023 microorganisms in the clean room

RP-CC024 vibration measurement and description of microelectronic devices

RP-CC026 Clean room Operation

RP-CC027 Clean room and controlled environment and behavior staff

Eight Advantages



1. It is used with the arc angle clean room.
2. System automatically controls the operation, two-door electronic interlocking, and a photoelectric sensor, single -channel air shower, clean area from the non- entry,After closing infrared sensors someone blew a shower, blow after leaching entry locked, only from go out Air shower.
3. Overall production of cold-rolled steel , the outer surface electrostatic spray.
4. Doors, floor nozzles are made of stainless steel, nice.
5. Soft touch relay, LED display and set the blowing leaching time, adjustable range is from 10-99s , blowing drenches two- door automatic locking.
6. Using the early, high level filtration system with HEPA filter, the filtration efficiency is 99.99 %, to ensure the level of purification.
7.Nozzle outlet winds of up to 25m / s or more, blowing wind on the human body 18m / s or more.
8.The outlet air velocity of nozzles is up to 25m / s or more, 18m / s or more on human body.
9. With EVA sealing material, high sealing.

Personnel standard



In order to avoid and reduce the pollution from employees of clean room. Any staff work outside of the clean room has contact or conversation with inside staff should be backwards, because the nose and mouth to the gaze FRANSHION distribute pollution.

If you have cough or sneeze, backwards clean room and covers with gloves, change gloves timely. If Serious cases, leave the clean room area immediately and report to the leaders.

Any non work-related items should not be placed in clean room, while the

work items to be discharged and orderly Cleanroom.

When the device can not operate normally, do not attempt to repair, report to leader,there should also professionals be responsible for the maintenance.

In addition, the clean room has a high degree of cleanliness. Therefore, the clean room staff physical aspects of health requirements are very strict.

Staffs Suffering from respiratory diseases, can not enter the clean room work which may result in air pollution.

Staff Suffering from conjunctivitis or other illnesses produce secretions,or persons suffering from skin diseases are not suitable for working in the clean room.

Lastly, clean room staff should keep attention to be on their own oral hygiene.
They should be conducted regular physical health checks.

Operation



1.Clean room air supply, exhausting, fresh air should be switched freely between each other. Such as production stops, cabinets exhausting must also be stopped or reduce air flow, fresh air should also adjusted to gentle.
2.Process is not absolutely required to run the fan on protection, there should be used early boot purification approach.
Cleanroom fan speed can be controlled so that the pressure head are not always at maximum pressure head or the maximum air amount.

Operation should maximize the use of outdoor air cooling, and increases fresh air ratio at this time.
Clean room should be based on outdoor weather conditions change ,by automation or manual adjustment device that is able to contribute.

Reduce clean space volume , such as clean tunnels or tunnel clean room, according to the production requirements of the clean room, cleanliness level is divided into different

process areas, operating area , maintenance area and the channel area.

Cleanliness standard



Air Purification Level	Greater or equal to the diameter of the particles of the standard maximum concentration limits (pcs / per cubic meter of air particles)					
	0.1 um	0.2 um	0.3 um	0.5um	1um	5 um
ISO Class 1	10	2				
ISO Class 2	100	24	10	4		
ISO Class 3	1 000	237	102	35	8	
ISO Class 4	10 000	2 370	1 020	352	83	
ISO Class 5	100 000	23 700	10 200	3 520	832	29
ISO Class 6	1 000 000	237 000	102 000	35 200	8 320	293
ISO Class 7				352 000	83 200	2 930
ISO Class 8				3 520 000	832 000	29 300
ISO Class 9				35 200 000	8 320 000	293 000
Marks: Due to the uncertainty of the measurement process involved, it requires no more than three figures to determine the effective concentration of scale levels.						

Maintenance Management



Purification technology has developed rapidly in the past 20 years, a variety of sizes, different levels of clean room in electronics, precision machinery , aerospace, medical, food, cosmetics , pharmaceutical and other industries are playing an increasingly important role, to improve product quality, develop high-tech products made important contributions.
If the design is correct and reasonable of non-dust room, the construction is of high quality, but in the operation and maintenance management, it is unscientific , not strict, resulting to the clean room air cleanliness gradually decrease, resulting in more than the actual production environment indicators deviate from the requirements, and thus decline in product quality , and even failure.

Cleanroom personnel management, to develop full-time management responsibilities , clean room personnel access system, personnel training and education required to enter into the clean room staff "person net program " Management. Logistics management, materials, equipments entry, and related equipment, pipeline maintenance and management , the particles should not be done with microbes into the interior.
Cleanliness management, including procurement and production of clean clothes , clean clothes use management, clean clothes cleaning provisions. Cleaning , sterilization management , for a variety of clean room equipment and facilities cleaning sterilization method , period and check for clear rules to prevent, eliminate dust clean room , microbial production, retention and reproduction. Monitoring normal in the course of the operation and maintenance of the health response to the indoor conduct regular inspections and related facilities.

Strict various types of equipment, facilities maintenance and management, developing appropriate procedures to ensure that all kinds of equipment, facilities functioning as required , including the air conditioning system, all kinds of water systems, production process equipment and appliances to ensure the production process requirements and air cleanliness level.
When the Cleanroom in operation and maintenance, there should be regular inspections conducted to related facilities. Such as within the time, place, controlled particle size was

measured with a particle counter of the number of particles ; within the specified time and place, number of determined settlement colonies or planktonic bacteria, temperature and humidity, etc. Place and continuous measurement record check wthin time and place.

Measuring air conditioning system 's efficiency filter differential pressure,check the air filter whether it is clogged, the installation gasket is intact or filter damage caused by leak , using local exhaust ventilation device to check anemometer wind.

Using a noise meter at a specified time and place to measure noise value ; check blower bearings, blower running, dust and dirt, as well as delivery, return air duct outlet inside and corrosion and dirt , etc.

Inspect Whether the hedge is clean, the ceiling and wall cracks or corrosion; applying state , machinery and equipment class has no abnormal phenomenon, the list must be individually checked, you can not miss any one ; using illumination table within the stipulated tim , location determination of illuminance values; Ssing measured pressure table clean indoor and outdoor static pressure difference.