

# CMM Enclosure



Modular CMM Enclosure

“We just going to control clean environment”



## KAIZEN AIRTECH SOLUTIONS

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## Kaizen's Modular CMM Enclosure

We are Manufacturer, Supplier, Exporter of Modular Clean Rooms, Soft wall, and hard wall, Bio Safe, Portable Cleanroom for Healthcare, Life Science, Medical Device Manufacturing, Pharmaceutical, Food Packing & Bottling Lines, Nano-Technologies, Nuclear Energy, Atomic Energy, Defence, Aerospace, Oil and Deep-Sea Exploration. We also provide Modular Clean Room Design, Build, Installation Services and Cleanroom Accessories, Components like Wall Panels, Doors, Windows, Switch Glass Privacy Windows, Flooring, Ceiling, and Cleanroom Pass through Chambers, Air Showers, Air-conditioning, Dehumidification Modules, Exhaust, and FFU. Our setup is situated in Pune, Maharashtra, India and majorly we serve customers from Maharashtra, Gujarat, Tamil Nadu, and South India.

A modular cleanroom is an environment-controlled room with a specific tolerable level of pollutants. At Kaizen, we design a complete cleanroom solution to satisfy customized requirements with ease. Kaizen's Modular Cleanroom delivers an ultra-clean working environment. We provide a clean and suitable environment with a controlled level of contamination as specified by particles per cubic feet. This type of environment promotes the execution of critical processes in the best possible way.

### **Cleanroom Technology mainly divided into three parts:**

- 1. Design**
- 2. Testing**
- 3. Operation Of Cleanroom**

## From Design to implementation

We will undertake total implementation of all areas of design and planning of project. Working with yourselves and with wide range of planning expertise of our specialists we will find an economical cleanroom solutions with design, installation, validation and maintenance.





## Area of applications:

### Features:

- ISO grade materials
- Compliance with UL and NABH guidelines
- Easy installation
- Highly efficient 99.99% particle reduction up to 0.3 micron
- Maintains positive pressure inside the room
- Customized configurations



## Modular Enclosure for CMM Machine:

Modular CMM enclosures are used to provide a controlled environment for your coordinate measuring machines.

Equipment/CMM machines inside enclosure will protect from environmental factors and allows your machine to provide X, Y, and Z coordinates with increased accuracy.

Modular CMM enclosures that protect your machinery, provide soundproofing, control the temperature of the room, and provide protection against fire and damage of your coordinate measuring machine.

### Why choose CMM Enclosure for a Coordinate measuring machine?

A coordinate measuring machine (CMM) is a device used in manufacturing and assembly processes to test a part or assembly against the design intent. By precisely recording the X, Y, and Z coordinates of the target.

These machines are typically quite large and heavy and often cannot fit through standard doorways. Modular CMM rooms from Kaizen Airtech Solutions for the enclosure to be 95% built before the CMM is put in place. Once the CMM is positioned, the final wall is then installed to complete the CMM enclosure.

### Modular CMM Enclosure Advantages:

We manufacture technologically advanced prefab CMM room facilities that are produced to your exact equipment needs. Our modular CMM enclosure design experts will work with you to create designated CMM Room Facilities that incorporate your company's unique specifications. Additional benefits include:

- Sound dampening
- Fire protection
- Modular flexibility and versatility
- Customizable
- Quality assurance



## CMM Enclosure:

### **CMM enclosure provides advanced protection**

The primary purpose of CMM rooms is to protect your coordinate measuring machines, controlling the environment inside the room to keep the machine operating correctly. Our cleanrooms are temperature controlled, providing insulation for cooling and heating. They also prevent contamination, moisture, and other environmental conditions from damaging products or machinery.

### **Quick and Efficient CMM room construction process:**

Our modular CMM enclosures are constructed without the mess of drywall dust and the facility disruptions caused by continuous cutting, sawing, and hammering. Most of our CMM rooms are constructed onsite in about 7-10 days, allowing you to keep up your current operations and maintain production with limited downtime.

### **CMM Room Facilities Provide Convenient Mobility:**

When the time comes to update your CMM or relocate it to another facility, our modular CMM rooms can be disassembled and reconstructed in the same layout or can be reconfigured or expanded to a larger size. The versatility and extended life of our CMM enclosures provides additional ROI.

### **Other Benefits of modular CMM Enclosure include:**

- Sound dampening to quiet the noise from the machine
- Fire protection to protect expensive equipment
- Versatile and flexible with a modular design
- Demonstrates quality assurance for customers
- Customizable to meet your needs



## High Quality Custom CMM Solutions:

Due to the stringent performance of CMMs and the sensitivity of the environments they require, CMM rooms from Cleanrooms By Kaizen Airtech Solutions are built with 4" insulated UL-classified composite panels which function not only as a thermal barrier, but also provide effective sound dampening, as many factories and production areas tend to be noisy.

### 1. Enclosure Section:

Insulated wall cleanrooms enclosure consist of insulated partition such as Puff panels, Rockwool panels of standard sizes. Also sizes can vary as per customer's requirements. Enclosure is fully packed with partition panels and positive pressure is created. Enclosure Maintains temperature, relative humidity and differential pressure conditions.

For partition purpose panel which are insulated by insulating material are used.

1. Puff Panel
2. Rockwool panel

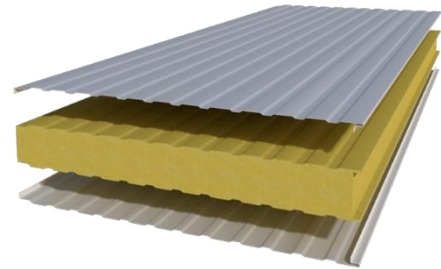
#### Puff Panels:



Puff panel Suitable for diverse applications, PUF panels consist of a rigid core or rigid slab of foam sandwiched between GI sheet metal structural boards.

- PUF insulated sandwich panels integrate joists and studs, insulation, vapour and air barriers.
- Improved thermal and acoustic insulation
- Offered in endless dimensional requirements
- Lifetime durability and high load bearing capacity
- Polyurethane foam insulation panels are 100% environment friendly

- Resistant to corrosion, termites, physical impact and fungus
- Lifetime weatherproof guarantee
- Supreme flame retardation with self-extinguishing property
- Standard width : 1200 mm
- Height : 4000 mm
- Thickness used : 80 mm
- Density : 40 ± 2
- Thermal conductivity at 10 ° C mean temp (W/m²k) : 0.023



Typical applications include laboratories, pharmaceutical cleanrooms, and environments subject to FDA regulations.

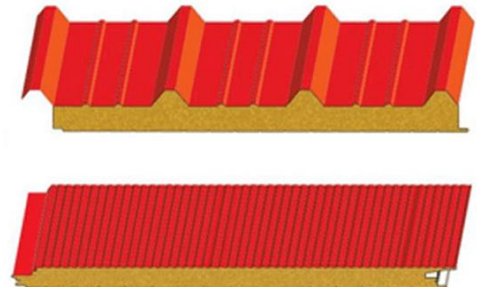
**Specifications:**

Variables	Specifications
Standard Size (W x H)	1000x3000 mm
Thickness	25 to 150 mm
MOC	Powder coated/Pre-coated galvanised steel/ Stainless steel
Infill	PUF (Polyurethane Foam) PIR (Poly Iso Rinate) Mineral Wool / Glass wool / Rockwool FRP CPVC
Barrier wall panels	Acrylic
	SDPVC
	Polycarbonate
Profile	Aluminium/GI
Fire resistance class	F130 under EN 13501-2

Compliance	ISO 5
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**Rockwool panels:**

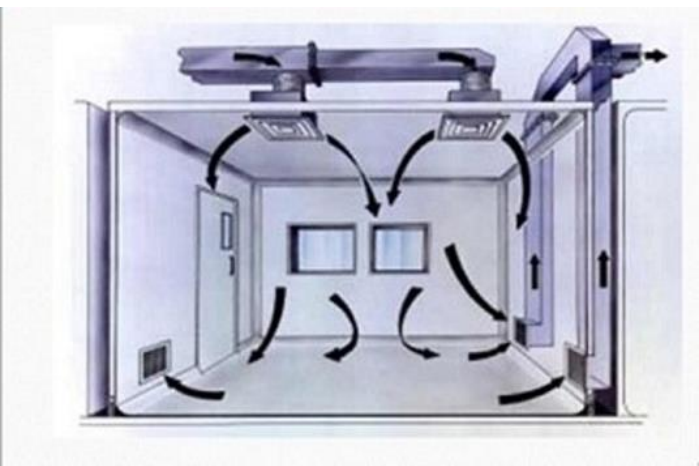
The top and bottom of Rockwool sandwich panel is galvanized pre-painted steel. Core material is rock wool with density at 100kg/m<sup>3</sup>, the rock wool is upright against the surfaces. There are high strength vesicant between rock wools and surfaces. This product is featured with full anti-firing, more heating and sound insulation. It is widely used as the wall or roof for cold storage, industrial workshop, public building etc. These panels are of standard size and also having customized range of sizes.



**2. Air Treatment System(Filtration)**

Insulated wall cleanroom system contains HVAC system to achieve cleanroom environment. Fresh air taken by outside, it is filtered by Air handling unit and then distributed through diffuser inside cleanroom. Then return air taken through return air riser to AHU and recirculated again.

Cleanrooms are facilities designed for conducting research or manufacturing products that require extremely clean environments. Typically, cleanrooms employ a broad range of techniques to prevent air particles, bacteria, and other contaminants from entering the workspace, often using an employee dress code and washing, pass-thru lockers and chambers, and intensive detail to cleaning. However, one of the major forces keeping a cleanroom particle free is the air filter system. Cleanrooms employ many different types of filters, including HEPA filters and ULPA filters, but there are two standard air flow patterns that are consistently used: laminar flow and turbulent flow.



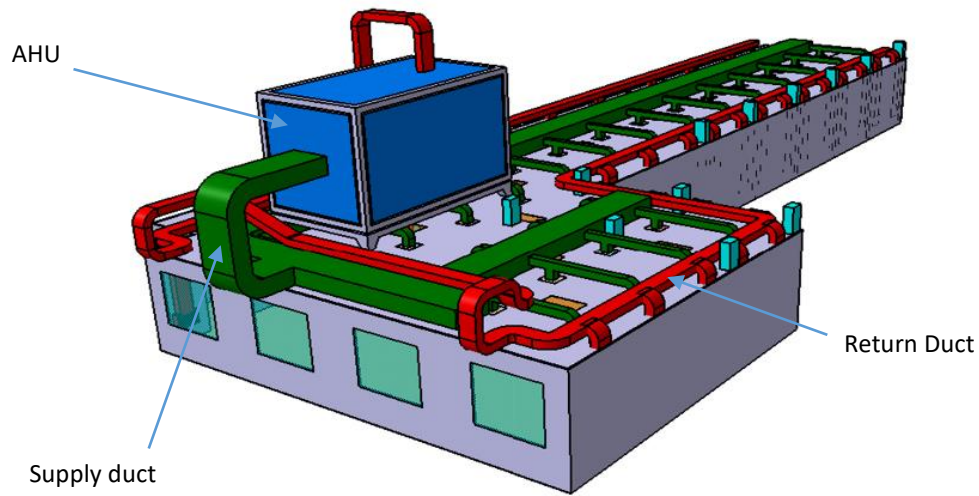


Cleanroom employee air filtration to limit the particles in the environment air. Typically, this is through the use of either a highly efficient particulate air (HEPA) or ultra-low particulate air (ULPA) filter. These filters can remove roughly 99.9 percent of all micro particles in room air by applying either laminar air flow or turbulent air flow techniques to the environment air. Laminar air flow refers to air that flows in a straight, unimpeded path. Unidirectional flow is maintained in cleanrooms through the use of laminar air flow hoods that direct air jets downward in a straight path, as well as cleanroom architecture that ensures turbulence is lessened. Laminar air flow utilizes HEPA filters to filter and clean all air entering the environment. Laminar filters are often composed of stainless steel or other non-shed materials to ensure the number of particles that enter the facility remains low. These filters usually compose roughly 80 percent of the ceiling space. Cleanrooms employing laminar air flow are typically referred to as Unidirectional Airflow Cleanrooms. Non-unidirectional airflow cleanrooms utilize turbulent airflow systems to clean particulate air and maintain a clean environment. While laminar air flow filters are often a component of turbulent airflow systems, they are not the only systems employed. The entire enclosure is designed to use laminar flow and random, non-specific velocity filters to keep the air particle-free. Turbulent airflow can cause particle movement that can be difficult to separate from the rest of the air, but non-unidirectional airflow systems count on this random movement to move particles from the air through the filter.

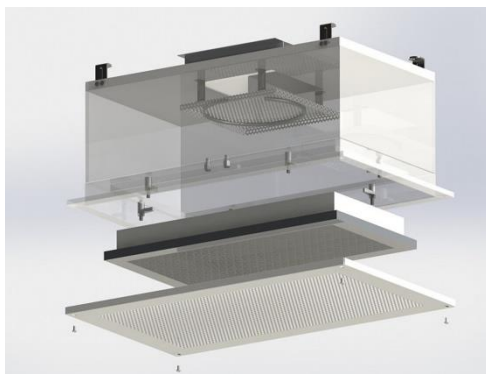


Return air risers

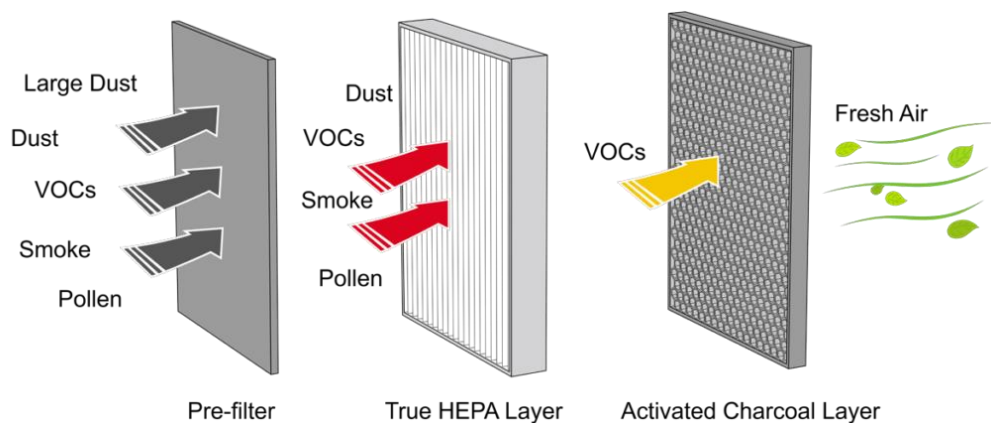
## HVAC System:



## HEPA filter with HEPA terminal box:

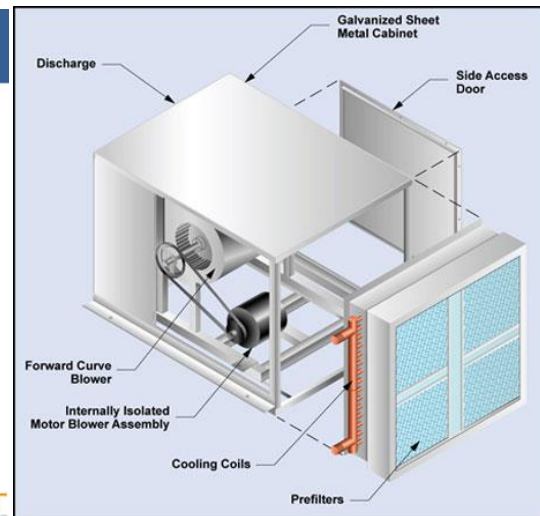
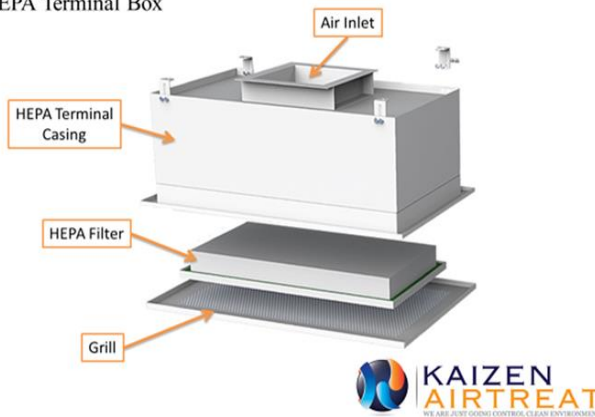


HEPA is a common term for High-efficiency particulate air. It is very important for any air purifier to work at its best. The HEPA filter is very powerful. It has the ability to kill 99.9% of harmful air particles. These particles are usually 0.3 microns or less. These microns are very small and are often can't be seen through naked eyes.



## HVAC

### 3. HEPA Terminal Box

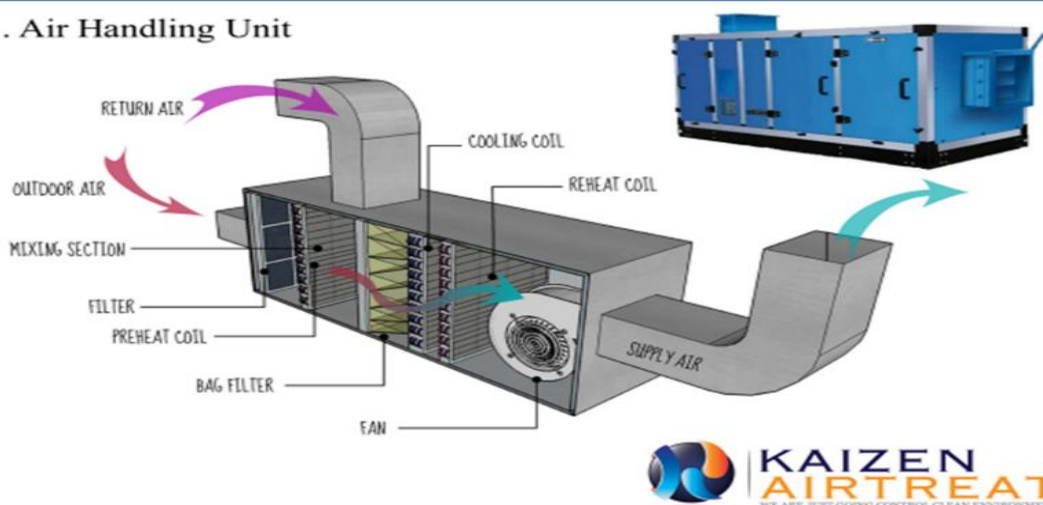


### AHU:

An air handler, or air handling unit (often abbreviated to AHU), is a device used to regulate and circulate air as part of a heating, ventilating, and air-conditioning (HVAC) system. An air handler is usually a large metal box containing a blower, heating or cooling elements, filter racks or chambers, sound attenuators, and dampers. Air handlers usually connect to a ductwork ventilation system that distributes the conditioned air through the building and

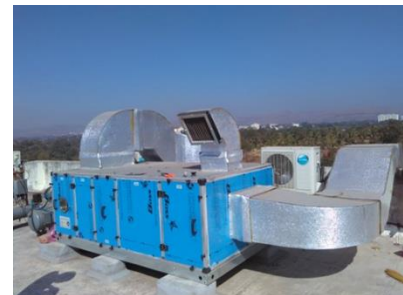
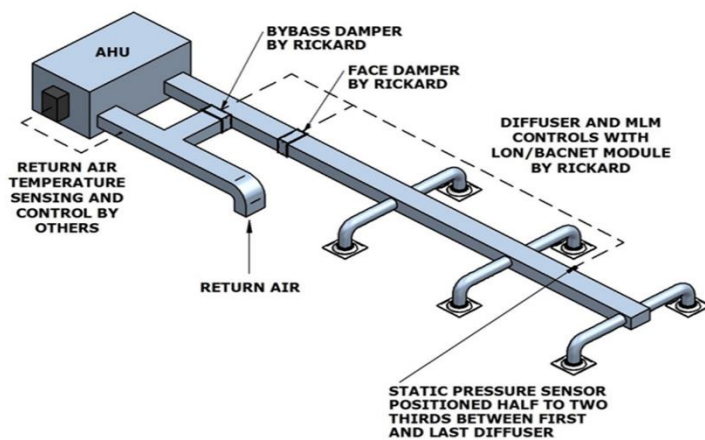
## HVAC

### 1. Air Handling Unit



returns it to the AHU. Sometimes AHUs discharge (supply) and admit (return) air directly to and from the space served without ductwork.

Air handling units' condition and distribute air within a building. They take fresh ambient air from outside, clean it, heat it or cool it, maybe humidify it and then force it through some ductwork around to the designed areas within a building. Most units will have an additional duct run to then pull the used dirty air out of the rooms, back to the AHU, where a fan will discharge it back to atmosphere. Some of this return air might be recirculated back into the fresh air supply to save energy.



**Light:**

LED cleanroom lighting fixtures are ideal for cleanrooms, pharmaceutical and biomedical labs, food processing centres, hospitals and high moisture areas. The totally sealed housing of the fixture maintains ceiling integrity and protects against infiltration of particles and airborne bacteria.



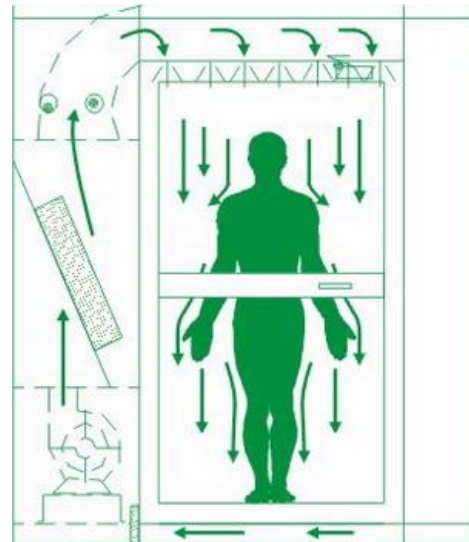


### Air shower:

Air showers are specialized enclosed antechambers which are incorporated as entryways of cleanrooms and other controlled environments to reduce particle contamination. Air showers utilize high-pressure, HEPA- or ULPA-filtered air to remove dust, fibrous lint and other contaminants from personnel or object surfaces. The forceful "cleansing" of surfaces prior to entering clean environments reduces the number of airborne particulates introduced.

When properly incorporated into cleanroom design, air showers provide an ISO-classified transition vestibule to ensure the cleanliness of the classified cleanroom. Air showers are typically placed between a gowning area and cleanroom; after workers don appropriate garb and personal protective equipment, they enter the shower so that the pressurized air nozzles remove any residual particles from coveralls. Once the program cycle is complete, users exit out through a second door, into the cleanroom. Air showers (or air tunnels) may also be placed between cleanrooms of different ISO ratings.





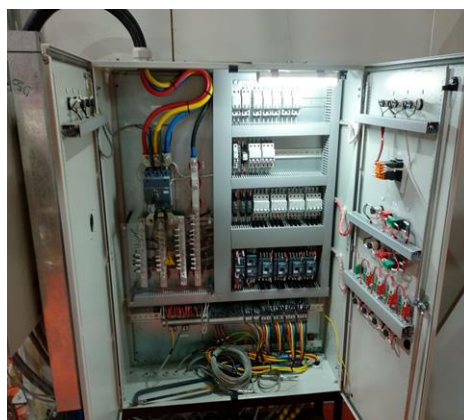
**Pressure gauge:**

Pressure gauge is used to show positive pressure inside cleanroom.



**Control panel:**

An on/off switch controls the lights and key-switches control the fan/filter units. Both controls are located on the control panel adjacent to the front access door.



## Cleanroom Door:

Insulated cleanroom doors are of swing doors, sliding doors and shutter doors. We used shutter doors for large sized opening. For Small opening we use single swing or double swing as required. Sliding doors are used in special cases or client requirement which is single slide or double slide.



Motorized Rolling Shutters are typical, are perfect for circumstances where side room is less and security is required. Rolling Shutters need very less headroom above the structural opening. They combine strength with elegance along with toughness and are designed for both external and internal applications. Automatic Rolling Shutters are made-up of interlocked Galvalume, Galvanized Insulated and Non Insulated, Stainless Steel, Patented Aluminium profiles and patented Bright Steel Bar Rolling Grills. Automatic Rolling Shutters are strongly built to endorse trouble-free process and long life. The Motorized Rolling Shutters can also be planned as per customer's conditions or conforming to IS6248. Clean Room Doors are best suited for pharms industries where you need to have controlled environment. The opening and closing of door is fast enough to separate two areas.





## Cleanroom Validation/Testing:

Validation is an important process for any cleanroom. It serves to ensure that the cleanroom is properly installed and designed for its intended ISO classification and that all of the components (facility, environment, equipment) meet regulatory requirements and other defined standards. Cleanroom is consistent with implementing, designing, and testing to specific requirements. Methods for evaluation and measurements for Certification are specified in ISO 14644-3. It calls for the following ten tests:

Airborne particle count test

Airflow test

Air pressure differential test

Filter leakage test

Flow visualization test

Airflow direction test

Temperature test

Humidity test

Recovery test

Containment leak test

Cleanrooms are validated to a required class of cleanliness that is driven by user requirements as defined in ISO 1464-1.

All these tests are done after installation of cleanroom.

Following are used for cleanroom validation:



Air Capture Hood



Digital humidity, temperature, and air flow meter



Humidity, temperature



Lux probe for measuring light



Thermal flow velocity probe



Vane measurement



Tachometer



InfraRed Thermometers



## Cleanroom Operations

