KAIZEN GROUP

KAIZEN AIRTECH SOLUTIONS

CLEANROOM AIR TENT BROCHURE

Introduction

Kaizen Airtech solution's Air tents provide an economical, versatile solution to clean manufacturing requirements in many industries. Portable, expandable, and easy to assemble/disassemble, this system features ceiling HEPA fan filter units that direct a continuous flow of particle-free air through the enclosure. It is completely free standing and requires no external bracing.

Description:

Air tent Modular Cleanrooms provide an economical, versatile solution to clean manufacturing requirements in many industries. Portable, expandable, and easy to assemble/disassemble, this system features ceiling HEPA fan filter units that direct a continuous flow of particle-free air through the enclosure. It is completely free standing and requires no external bracing.

Air tent l modular cleanrooms are designed for functionality and reduced cost while providing all the flexible benefits of modular construction. They are tent-like, lightweight, and easy to-assemble structures that can be installed free-standing or suspended from the ceiling of an existing building.

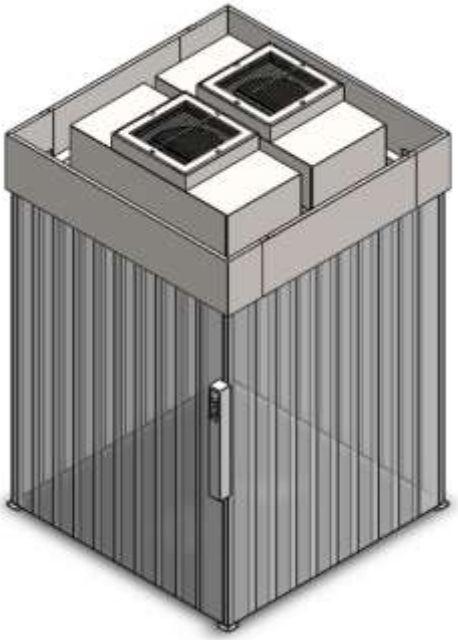
Cleanroom Air Tent:

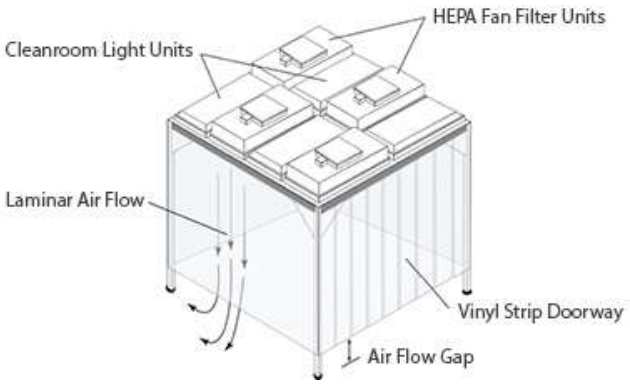
Air tent cleanrooms from Flow are the most cost-effective way to transform any environment into an efficient, high-performance, and contaminant-free space. The simplistic yet innovative design and minimal use of material makes softwall cleanrooms the quickest and easiest clean wall solution to assemble.

Air tent Modular Cleanrooms use free-standing steel frames or ceiling hanging steel frames with cleanroom-grade vinyl panels such as PVC curtains as a partition; versatile design meets any ISO 5 to ISO 8 requirement. This cleanroom contains Fan filter units to give cleanliness. To achieve cleanliness only FFU system is used.

Customized ceiling filters systems prevent contaminants, harmful aerosols, and fine particulate from impeding critical processes. Steel and aluminium support structures bear

customized curtain heights, lighting grids, ceilings, and custom hardware for lean temporary structures or permanent manufacturing areas.





Frame:

Air tent cleanroom support structure is of SS or MS powder coated material. Steel Frame units are made of tubular steel components. The components are cut, formed, welded and powder coated. The frames are bolted together to create the room. Castor wheels are provided as per requirement and need.

This Air tent cleanroom system consists of a Tubular Steel Frame Structure that supports the Ceiling Grid.

This system consists of a steel support frame, ceiling mounted filtration and illumination system, flexible side panels and a variety of other access options. The softwall cleanroom support frame is fabricated of interlocking 2.5” powder-coated square steel or stainless steel uprights, cross sections, and ceiling members.

Ceiling members are connected to steel T-bars, forming the 2’ X 4’ bays that support filters and lights. Corner reinforcement gussets ensure a rigid structure. Optional heavy-duty casters allow easy repositioning after installation. Standard height is seven feet measured from filter face to floor allowing installation below a standard nine foot ceiling. Custom ceiling heights up to ten feet are available. System includes a control panel for operation of fan filter units, lights, and other selected options.

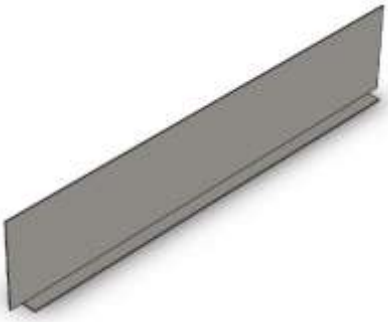
Air tent frame components:

1) Corner Post

2) Middle Post

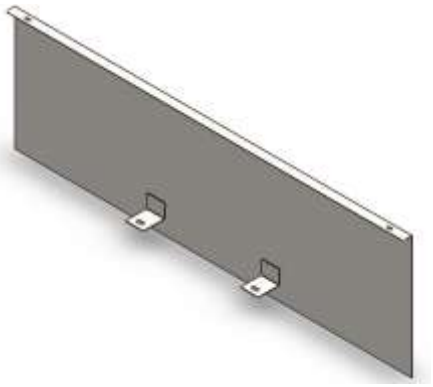
3) T Patti

4) T joist divider

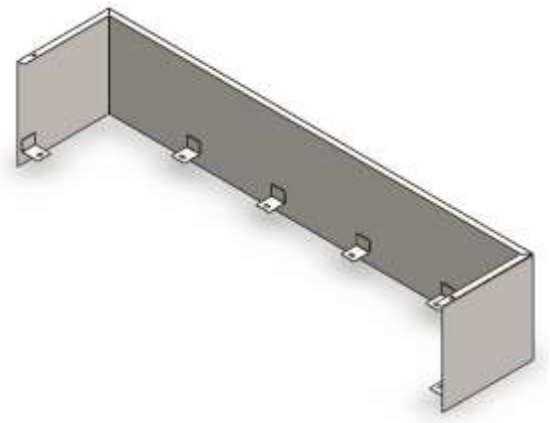


5) PVC Curtains

6) Middle Top Cover



7) Side Top Cover



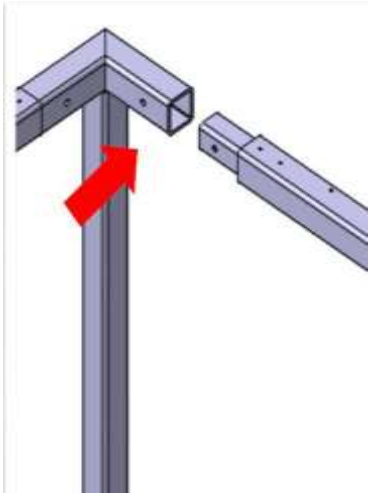
8) Castor wheels

Air Tent Frame assembly:

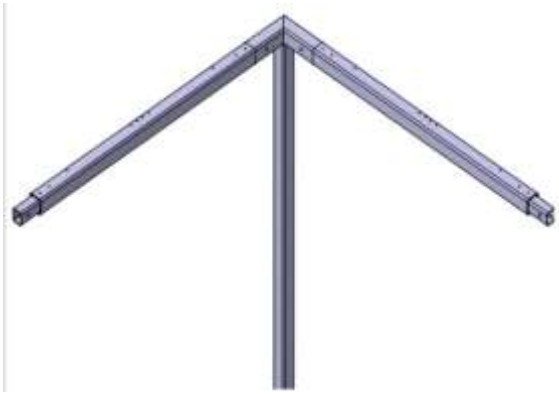
1) We used at corners four corner posts for small sized air tent. As size of air tent increases, number and location of corner post along with additional middle post will increase accordingly. At the bottom of corner post base plate or castor wheels are used as per required.

2) Four corner posts are connected by middle post. Connection between corner post and middle post is shown.
3) After connecting corner post with the help of middle post basic frame structure will be ready. Then bays of 2 x 4 are created to hold Fan filter unit according to FFUs size.
4) Bays are created by mounting T Patti and T joist divider forming rectangular shape. Mounting of T Patti and T joist divider is shown.
5) Next is to attach PVC curtains to Frame which is shown.
6) Then both Side top covers are mounted with the help of mounting arrangement given.
7) After side top covers middle top cover mounted over side top cover which is shown.
8) PP sheets are placed on their particular location after complete assembly.

Step 1



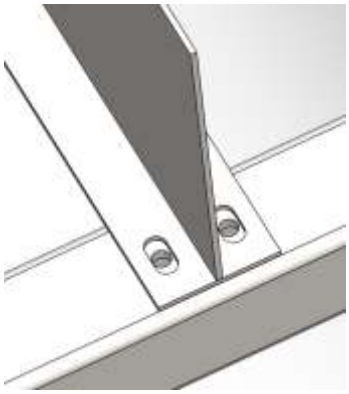
step 2



step 3

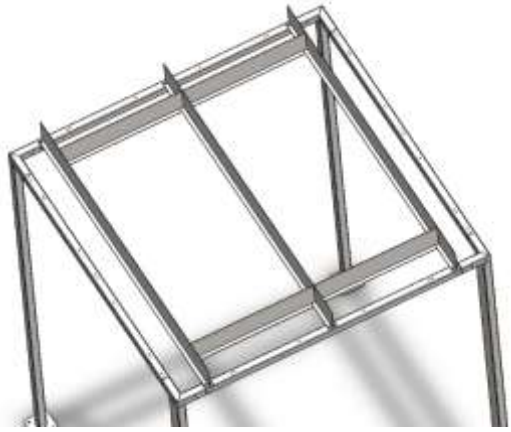
Step 4

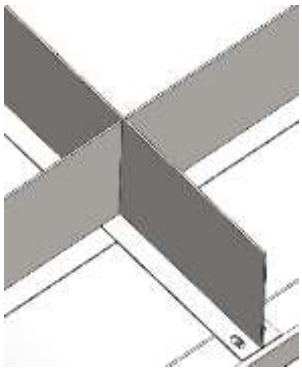
Step 5



T Patti mounting arrangement by using tapping.

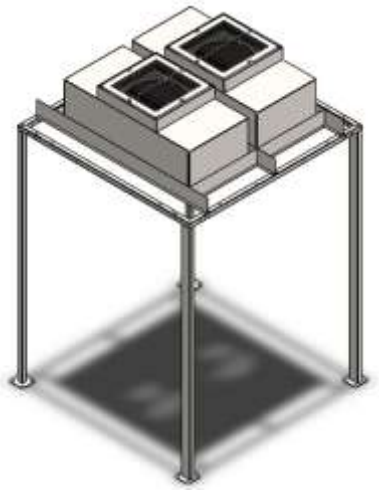
Step 6





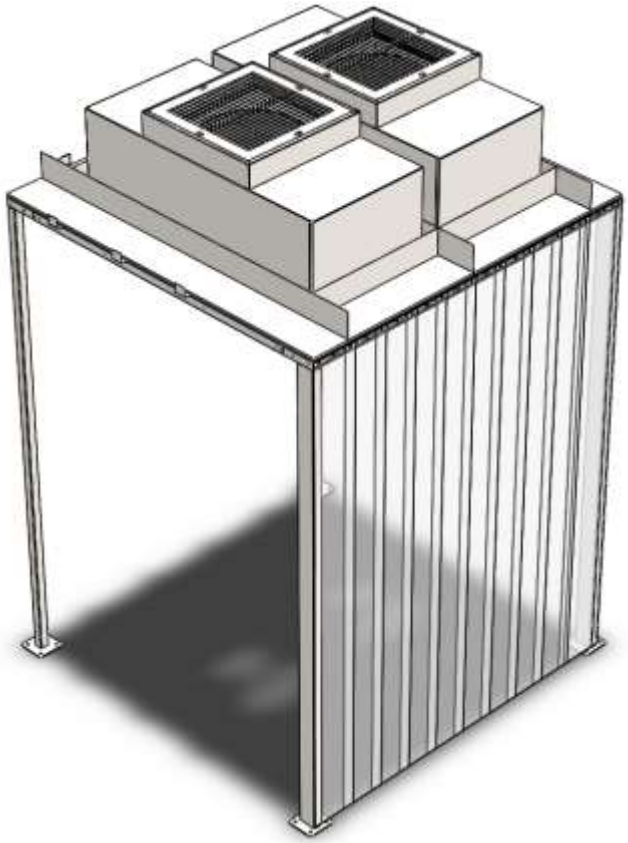
T Patti and T joist divider assembly

Step 7



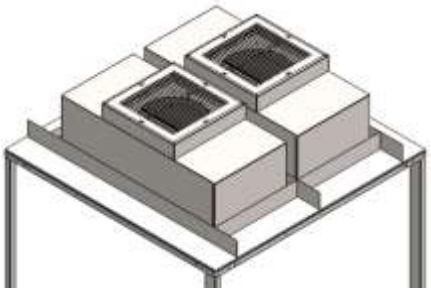
Fan Filter Unit Mounted in prepared ceiling grid by keeping 5 mm gap between t Patti and FFU.

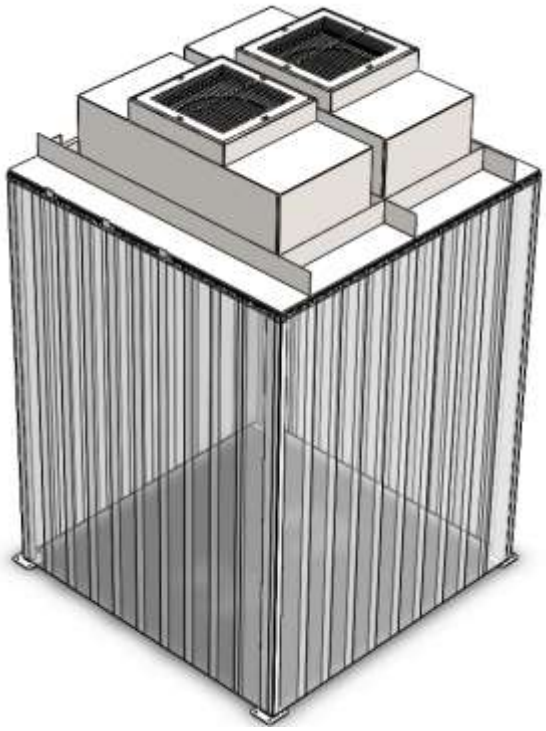
Step 8



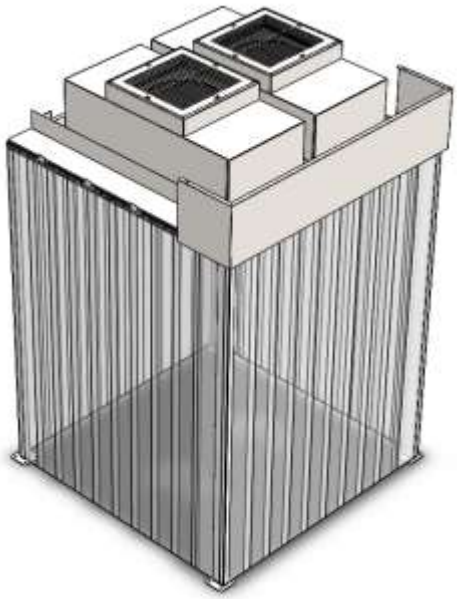
PVC curtains are fixed with den drill by overlapping of 50 mm. Then this den drill is mounted to the frame by bolting arrangement.

After PVC Curtain mounting PP sheets for ceiling are used to cover/close open area as shown.

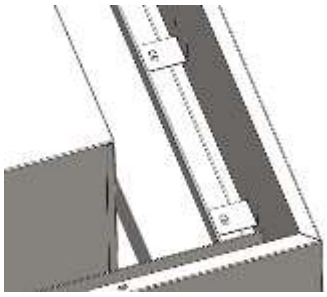


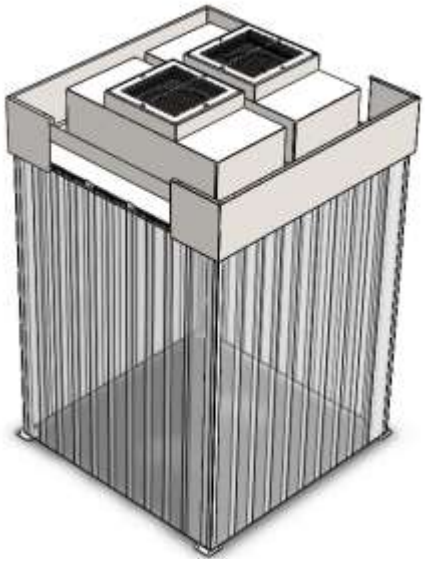


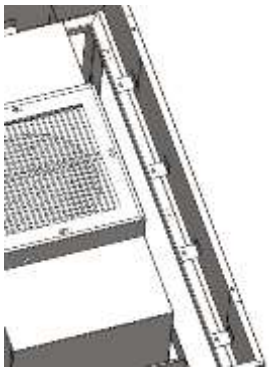
Step 9

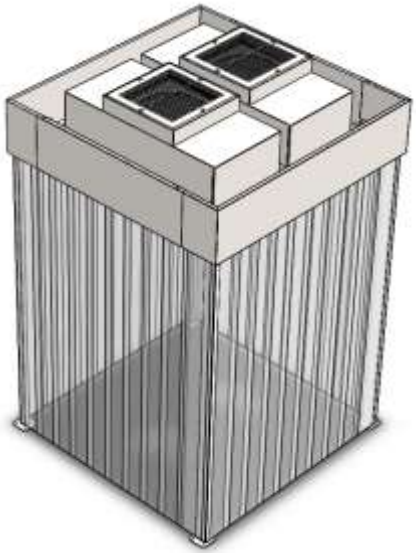


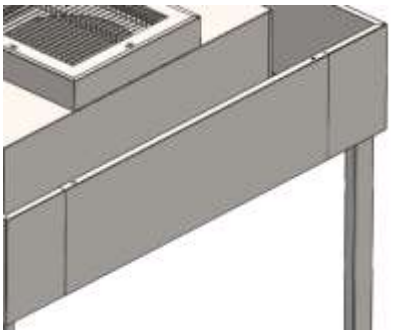
Both side top covers are then mounted first. Then Middle top covers are fixed over side top covers by bolting arrangement.

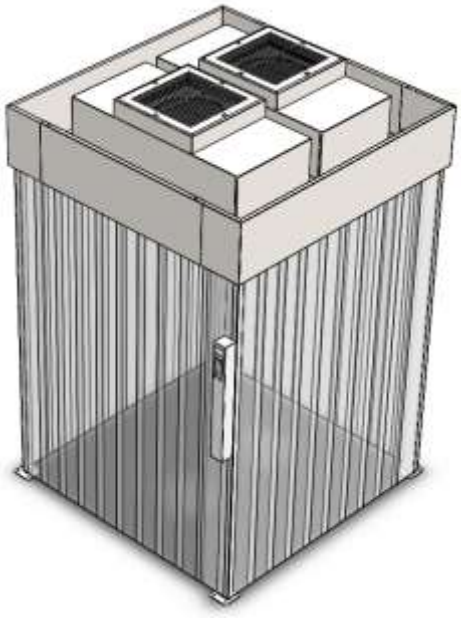






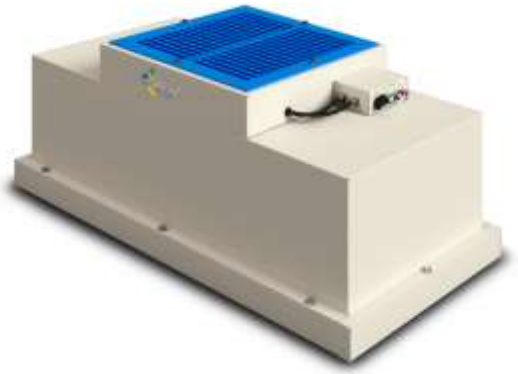






Control panel mounted on frame which is used for FFU.

Fan Filter Unit:



Fan Filter Units direct a vertical laminar flow of filtered air downward through the enclosed cleanroom area.

Each includes a 1200 CFM Air Filter, impeller blower (rated at 90 FPM with filter load) with a plenum design that ensures ample air velocity across the entire face of the filter. A HEPA (high efficiency particulate air) filter installed inside the housing is rated 99.99% efficient at 0.3um particles. The filtration medium consists of micro porous polyurethane mini-pleats held in place by strong, rigid plastic separators that keep the medium from nesting. This design channels airflow with optimal efficiency to reduce resistance. The filter is sealed into the sturdy powder-coated steel frame with a fire-retardant, non-outgassing adhesive. Power to the Fan Filter Units is controlled by a master ON/OFF switch located on the cleanroom control panel. Fan filter unit speed controlled by three speeds low, medium, high. Control box is attached to the FFU.

Specifications:

FFU Dimensions: 1220 x 610 x 70 mm

Filter specifications:

Efficiency: 99.997% down to 0.3 micron

IPD: 25+/-10% mm of WC

FPD: 60 mm WC

Material casing: Aluminium

Media: Imported submicronic glass fibre

Pak depth: 45 mm miniplate pack

Temperature: Ambient/<60ºC

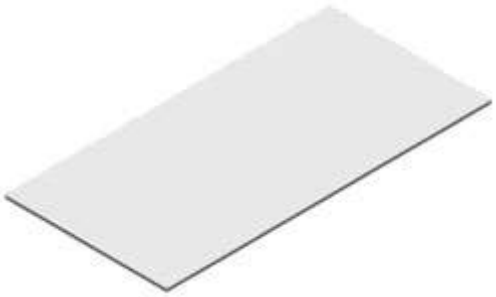
Gasket MOC: As per Freudenberg standard

Protection guard MOC: As per Freudenberg standard on both side

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

Ceiling Panels:



All remaining ceiling grids are covered with blank panels, which can be removed to allow installation of additional fan filter units or illuminator modules. Panels are made of white polypropylene, acrylic or steel depending on customer selection. All ceiling modules rest against the ceiling grid frame to form a tight seal along the perimeters.

PVC Curtains:

The PVC panels overlap to ensure the walls of the softwall cleanroom are effective barriers when in position. The positive airflow pushes air down through the cleanroom, allowing particles to be flushed out through the low level exhaust vent.

PVC curtains for cleanrooms is an economical solution to area containment in industry. We use either standard grade PVC or high-grade anti-static PVC (various widths and thicknesses) for cleanroom application to meet your containment requirements.

Technical Features of Our PVC

Food Grade

Anti – Static

Fire Retardant, M4

UV Stabilizers (from sun & Welding Arc)

Reduce Noise, >35 DB

Castor wheels:

Designed to provide vibration dampening in controlled environments. Nickel horn, resilient tread wheel, dust cover, and Celcon bearing. Offers superior roll ability and manoeuvrability and resists virtually all common cleaners, solvents, oils and acids.

Caution: Casters are intended to allow movement only on smooth floors and require that personnel support each cleanroom upright during motion.

Pressure gauge:

Pressure gauge is used to show positive pressure inside cleanroom.

1. **Filtration:**

Soft wall cleanroom system contains Fan Filter Unit system to achieve cleanroom environment. Fresh air taken by outside, it is filtered by Fan filtration unit and then distributed throughout inside cleanroom. Then return air goes out of cleanroom by lower side of PVC curtains.

Air tents employ air 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 air tents 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 air tents employing laminar air flow are typically referred to as Unidirectional Airflow Cleanrooms.

For all these process of air purification we use FFU which contains HEPA filters. Filtered air flows down towards floor and outs from small space below curtains and flooring forming positive pressure inside air tent. Due to PVC curtains outside air do not enters in air tent.

Benefits:

Mobile Contamination Control

Filtration from Class 10 – 100,000

Built to specific requirements

Easy to move, modify or upgrade (Can be manufactured with casters for mobility)

Easy installation

Affordable

Cleanroom Validation:

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: