

WEIBER

Air **Shower**



Models:

- Acm-4104-L

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Air Shower

A brief history of the emergence of contamination control technology

In today's modern world of manufacturing and research and development, contamination control technology has become a necessary part of the manufacturing process. In fact, without it, many of the advances made in the last twenty years or so would not have been possible.

Contamination control technology is not confined to any one industry. Its practice transcends specific industries and is used, to some degree, in just about all manufacturing and research and development processes.

Without contamination control technology, the developing broad field of life sciences encompassing biotech, biomedical, pharmaceutical, parenteral drug, microelectronics, aerospace and precision manufacturing would not have been able to achieve some of the discoveries that have been made to date nor the discoveries yet to be made. While nanotechnology, a new emerging field of study in which is research done at the atomic or molecular level, could not exist without the advancements made in contamination control technology over the years.

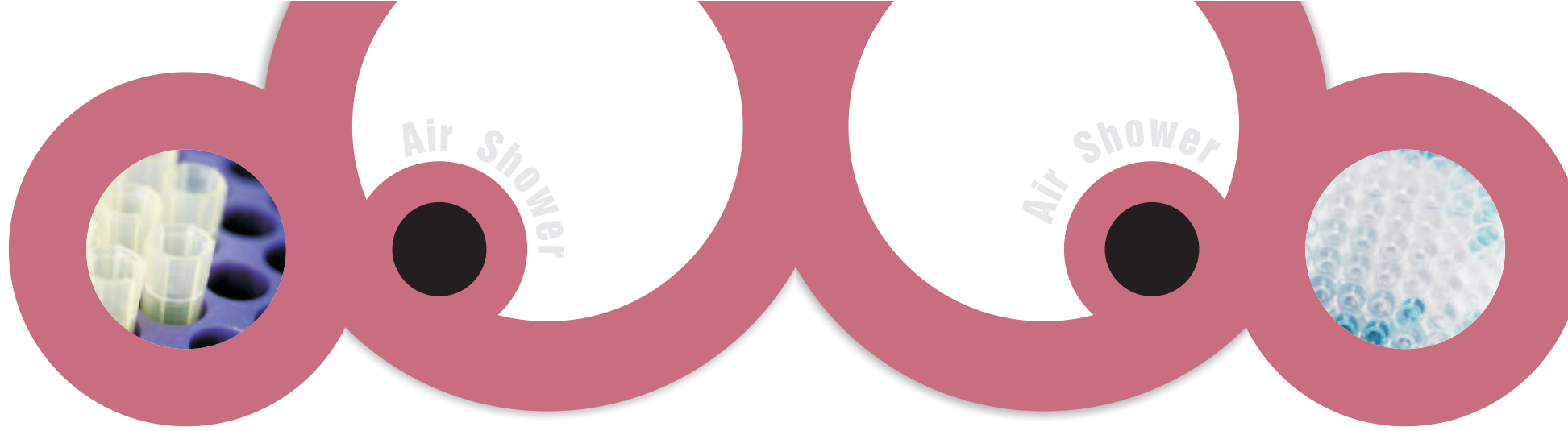
Dealing with the issues of contamination control on a microscopic or smaller scale has led to the creation of the modern clean room and along with it, the air shower.

The primary focus of a cleanroom is to control the levels of contamination by creating a differential pressure between the cleanroom and the



surrounding area and to filter the air entering the room to prevent the entry of unwanted particulate matter and to change the air in the room with an air-handling system to purge particulate matter created within the room. The cleanroom itself is constructed of materials that tend to resist particle generation, hence minimizing additional contamination. More sophisticated cleanrooms can also control temperature and humidity in the workspace.

In the conventional cleanroom, low velocity air enters from the ceiling plenum through perforated diffusers and carries



out contamination through wall exhausts close to floor level. In the laminar flow clean room, air is introduced uniformly at low velocities into a space confined on four sides and through an opening equal to the cross sectional area of the confined space - a technique that stratifies the air and minimizes cross-stream contamination.

To keep this particulate matter from being recycled, both types of rooms use HEPA (high efficiency particulate air) filters. HEPA filters are manufactured from glass fiber, accordion-style pleated filters that can be up to 99.99% efficient in removing particles 0.3 microns and larger. For more stringent requirements, an ULPA (ultra low particulate air filter) filter may be used. An ULPA filter has the ability to remove a higher percentage of 0.3 micron particles than a HEPA filter.

Product Overview and Explanation (Air shower Technology)

Our air shower is a fully self contained unit with high degree of maneuverability. They are fully equipped to provide complete de-contamination solutions to the clean room or

manufacturing/assembly area from personnel entering the space. The ease of operation of our air shower is such that, one just needs to roll it at the door of the clean room, plug in and it is ready to be used.

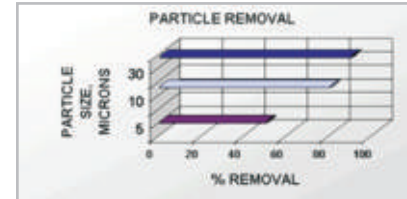
Our air showers are closed cubicles and work on the principle of subjecting the personnel through adequate velocity of clean air coming through a pre filter assembly comprising of poly fiber synthetic media of approximately 1" thickness (washable). And then the same air is passed through a high efficiency perfect air filter made from glass pleated non woven filter media having a minimum efficiency of 99.99% at 0.3 micron particle size.

The normal face velocity of air coming through different jets of the air shower have a thorough cleaning effect and dislodges the suspended/stuck particles lying on the surface of the garment/body of the personnel entering the air shower and thus making him/her virtually free from the particulate matter.

Two way operation:

- In this mode, the cycle runs in both directions.

- Only one door at a time can be opened. The user can go in
- in either direction and the air shower will cycle.



Test data has been obtained which prove that air showers are effective in reducing contamination brought into the cleanroom.

Data developed by series of tests, indicates that, depending upon the particle size, particle removal can be up to 90%. The larger the particle, the higher the efficiency, as illustrated in the accompanying chart:



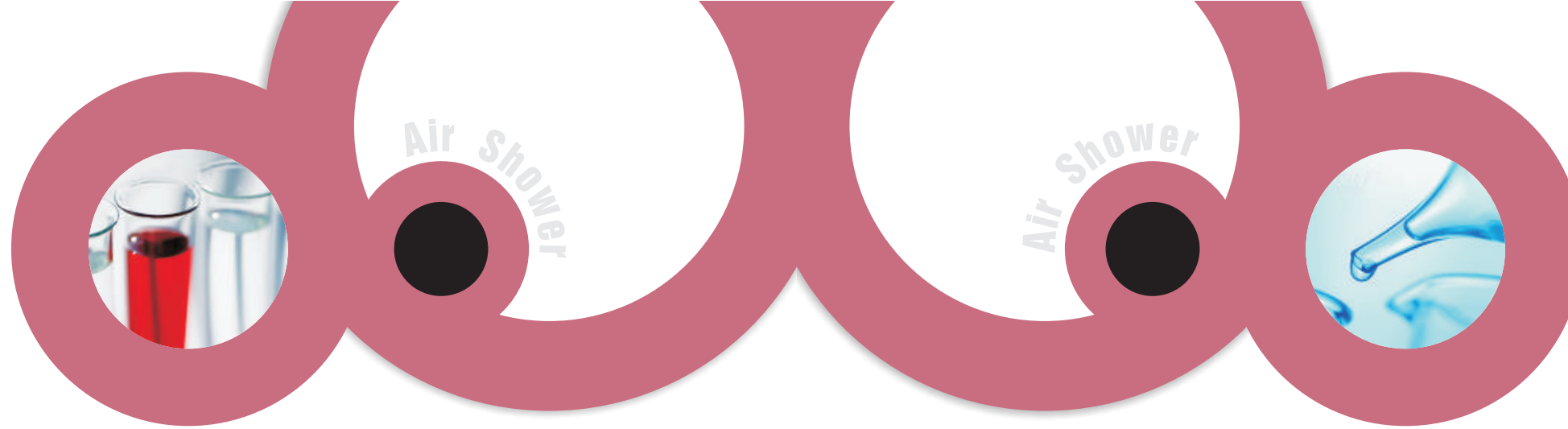
It is to be noted that proper operating protocol in using an air shower weighs greatly on its effectiveness. Training is of

utmost importance to insure reduced contamination levels in cleanrooms and to ensure that the air shower is operating at maximum effectiveness. Proper protocol suggests personnel should be trained to rotate continuously 360 degrees, with hands on their heads as illustrated during the air shower cycle to insure contamination removal is as efficient as possible.

The Air Force has very exacting standards regarding acceptable levels of contamination while at the same time, has equally exacting standards when it comes to investing in equipment. In order to determine the efficacy of air showers the Air Force conducted tests of its own.

The test consisted of sending a team of twenty (20) operating personnel through two (2) air showers, one located before the entrance to the change room and the other before the entrance to the cleanroom itself with a cycle time of eight (8) seconds each. Operators were instructed to raise their arms and make a 360° turn. Prior to the entrance to the first air shower, outer garments are removed and stored.

Once past the first air shower, the individual enters the change room where he puts on the cleanroom garments and



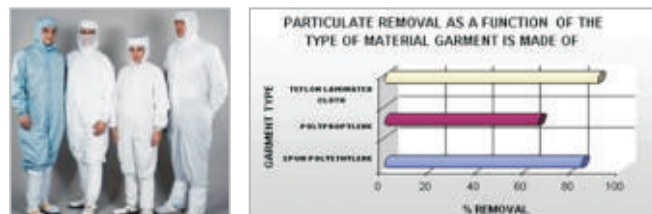
goes through the second air shower, entering the cleanroom. After each test condition, the cleanroom was allowed to return to the normal contaminant level before a new test was begun and collections of samples were made.

Results are tabulated below:

TEST 1	BOTH AIR SHOWERS OFF	94,990 PARTICLES	BASE READING
TEST 2	FIRST ON, SECOND OFF	52,920 PARTICLES	44%REDUCTION
TEST 3	SECOND ON, FIRST OFF	37,100 PARTICLES	61%REDUCTION
TEST 4	BOTH ON	19,290 PARTICLES	80%REDUCTION

All samples are taken from inside the cleanroom and 0.5 micron particles are measured

Further independent testing on the type of material workers are clothed in demonstrates that what the worker wears can make a significant difference in the amount of particulate removed by the air shower as indicated in the chart below:



Today's air showers can keep a significant amount of residual contamination from entering a cleanroom workplace as long as certain criteria are met:

1. The air shower must be properly designed and sized to maintain effective and efficient operations.
2. At a minimum, HEPA filters are 99.99% efficient at 0.3 microns or optional ULPA filter at 99.999% efficient at 0.12 microns.
3. Sufficient "wash down time" - at least 45 seconds - must be allowed in the air shower.
4. The air supplied to the shower must be finely filtered to prevent personnel from being impinged with contaminants during the actual cleaning cycle.
5. A fixed nozzle pattern must be followed and the nozzles must be preset to direct air in a downward flow to produce shearing, wash down effect. It is essential to have a fluttering of garments strong enough to loosen dust.

6. The garments themselves must be made of material such as Tyvek®, teflon, dacron or nylon that is less likely to shed than cloth; comfort and cost must not be the determining factor.

7. The air shower must operate at a negative pressure. In other words, the pressure in the air shower must not exceed the pressure outside. The pressure must be less than the cleanroom side to prevent contaminates.

8. Very importantly, personnel must act responsibly, i.e., when they stand off-center or crouch in a corner to avoid the air flow, they are defeating the whole purpose of the air shower. The individual must center himself in the shower and execute several complete 360° turns during the 45 second duration of the air shower, with hands positioned over the head.

9. The individual must remain in the air shower for several moments as specified in the company's protocol after it has stopped to allow enough "purge time," or "dwell time"

so that the particles may drift downward through the floor grate and are not drawn into the cleanroom by the movement of the individual as he leaves the air shower.

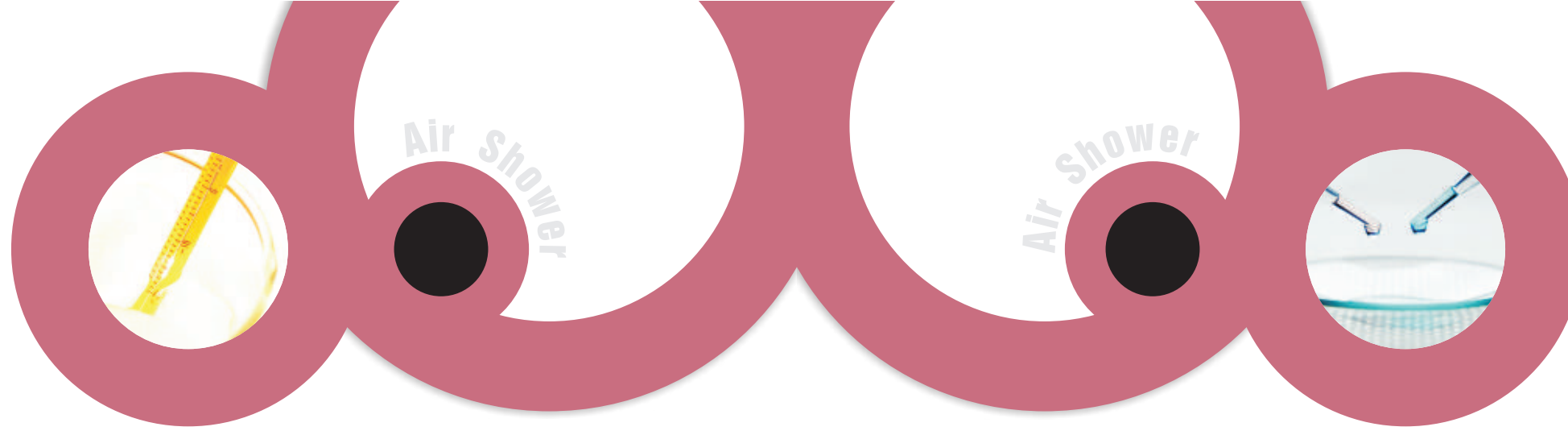
10. Air showers, like cleanrooms or for that matter any process equipment, must be properly maintained in order to function properly. Lack of proper maintenance can become a major source of contamination.

Applications

- Clean Room
- Pharma Production
- Micro-Electronic Fabrications and Production Units
- Semi-Conductor Production Lines
- Basic And Applied Science Research Laboratories.

Construction Details Of Air Shower

Our air showers are constructed out of heavy industrial grade wooden mica clad wooden boards or stainless steel sheets of grade ss-304/ss-316. The internal cubicle of air showers are plastic laminated and attractively finished. The unit is



provided with blower access panel at the side of the shower. The two doors provided on the either side of the air shower are inter locked and operate on magnetic system. The compartment access panels are hinged and made of coated aluminum. The doors are made of aluminum panel and have clear view glass/acrylic windows.

The HEPA filter and pre-filter assembly is mounted on the top of the air shower. The unit is controlled through a programmable solid state circuit control system, located at the junction box of the unit. This control unit facilitates the user to adjust the air nozzles and operation time. The operation timer of the air shower can be adjusted from 0-9,990 seconds, depending on various standard and customized requirements.

The junction box is a tamper proof enclosure that ensures that the pre-set range or value is maintained. It is also provided with an emergency setting button to switch off the

unit with audio visual alarm. The sequential operation of our air shower is operated through floor matting operated switch. Our air shower has adequate lighting arrangement and ensures a minimum illumination level of 800 Lux

Filter Assembly

All our air shower are fitted with fully washable synthetic pre-filter units and secondary high efficiency perfect air filters made of mini pleated non woven fabric. The efficiency of our filters has a rating better than 99.99% at DOP (cold) and 99.97% at DOP (Hot). Our units have the capacity to hold all suspended particles of size > 0.3 micron.

Motor And Blower Assembly

All our air shower are provided with perfectly balanced (Static as well as dynamic) motor and blower motors bearing ISI mark. The rating of the assembly is 1/5 HP. Our high efficiency pumps which have lifelong lubricated bearings ensure a trouble free operation for a long time.

Illumination

All the units are provided with adequate illumination at the work table by means of fluorescent lights panel concealed at the upper portion of the unit. This light arrangement conforms to the guidelines laid down in US federal standard . The illumination at the work table is approx > 800 lux

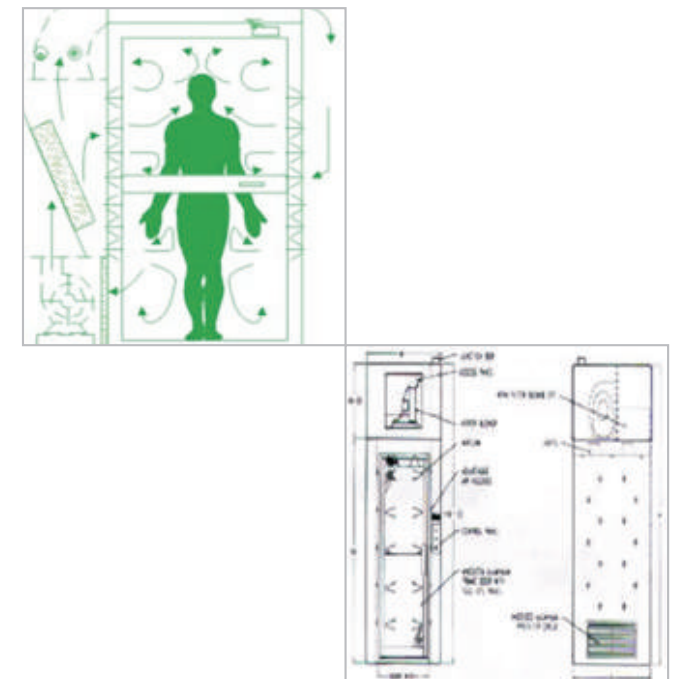
Noise Level

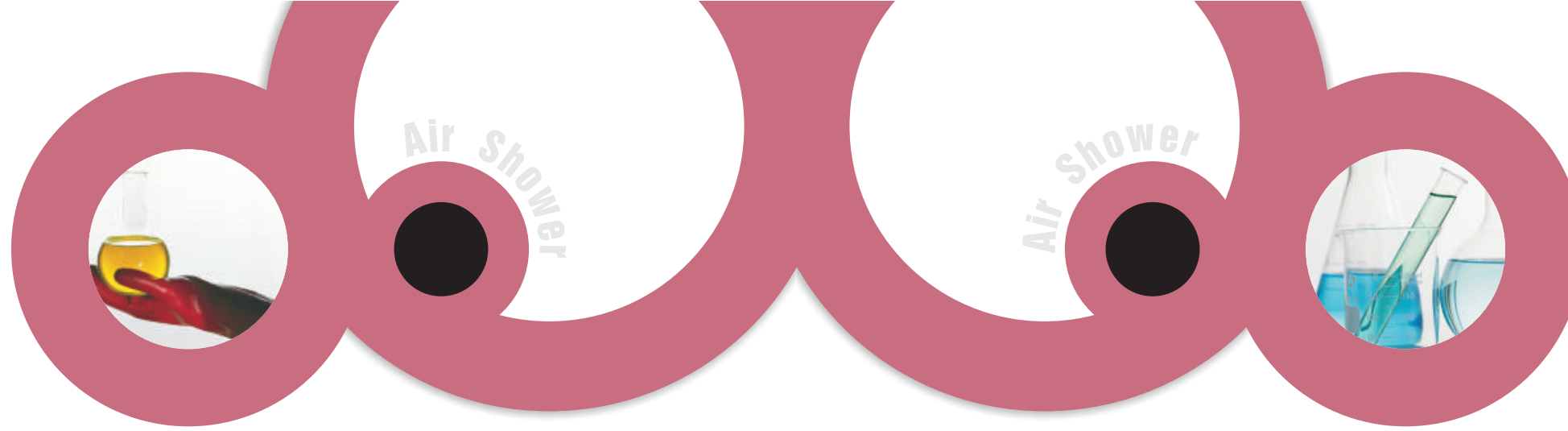
Our air shower are designed to ensure that the work enclosure have minimum possible vibration levels and noise level is also contained below 60 db.

Salient Features

- Ergonomic Design
- Versatile Usage
- Low Noise And Vibration Levels
- Conforms to US Federal Standards
- Calibration And Protocol Documentation.
- Programmable operation

AIR FLOW PATTERN IN WEIBER AIR SHOWERS





Constructions	Industrial grade mica clad wooden board/MS Sheet/Stainless Steel
Face velocity	6000 ft/min + 20 feet
Operation Time (Adjustable)	0-9,990 seconds
Pre Filter	Washable pre-filter unit (Non Woven-Synthetic Polyester)
HEPA Filters	Glass pleated non woven fabric filter having 99.99% efficiency 0.3 micron particle size.
Air Flow	Multi Directional
Air Flow Control	Solid State Control Unit
Blower Assembly	Centrifugal lubricated bearing type ISI marked assembly

Illumination	Fluorescent light illumination greater than 800 lux on work table
Noise level	Noise level less than 60 db
Add on features	Sequential feature operation by door mat magnetic switch.
Power Requirements	500 watts - 950 watts (Model specific)
Internal Work Space	1 meter x 1 meter x 2 meter
Nominal voltage	220-230 Volts, 50 Hz Single Phase
Frequency	50/60

Note: We undertake to manufacture customized air shower sizes as per the specific requirements.



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