

## SOFTWALL MODULAR CLEANROOMS: SIMPLE, MOBILE AND COST EFFECTIVE

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

Unlike their fixed-wall counterparts, softwall cleanrooms are generally smaller, portable and can fit into tight spaces. The portable design enables the cleanroom units to be easily moved to another location or disassembled and stored. Because of their relative low cost, softwall cleanrooms are ideal for small or startup businesses, or manufacturers looking for a quick, easy way to expand their cleanroom operations.

The cleanrooms are available in a variety of sizes and classifications, with options to match a customer's specific needs. From

standard 4-by-4-ft units, to sizes as large as 24-by-36-ft. Larger, custom sizes can be designed and built to meet customer requirements. Because of their modular design, rooms can be expanded or reduced in size without taking the entire cleanroom down, making it easy to add or remove sections. Softwall rooms are also available in a variety of cleanroom classifications, but most commonly in Class 100,000 to Class 10 (ISO 8 to ISO 4) designs.

A wide variety of industries use softwall cleanrooms – medical device, microelectronics and semiconductor manufacturers – as well as electronics repair industries where contaminants cannot be allowed into sensitive areas of electronic devices.

### DESIGNED FOR EASY ASSEMBLY

The basic building block of the softwall cleanroom's modular design is a sectioned ceiling framework made up of tubular steel beams with T-bar cross members. This interlocking ceiling grid system enables easy assembly and cleanroom expansion. The ceiling is supported by tubular steel legs at each of the four corners and reinforced with heavy gauge, triangular steel gussets. Powered HEPA filter units, lighting systems and ceiling panels are sealed to the grid using gaskets, providing a zero-leak cleanroom.

Interior height of the ceiling framework is commonly 8, 9 or 10 feet, although various heights are available depending on the customer application. Standard filter unit height is 14 inches, with a two-inch

A modular softwall cleanroom is a low-cost investment that provides a highly functional cleanroom solution for manufacturers.



minimum space required between the filter unit and facility ceiling. The common structure height enables the modular softwall cleanroom to easily fit within an existing building.

Softwall cleanrooms without a center support have a maximum size of 12-by-12-ft with a leg on each corner. Larger rooms can be constructed, but additional support posts within the structure are required. For example, a room 16-by-20-ft would have one center post or a room 20-by-32-ft would have three center posts. Other options are available for clear spans without center legs. For example, ceiling-suspended softwall cleanrooms eliminate the need for all support legs and columns. This configuration allows the cleanroom to easily accommodate equipment layout and maximizes floor space utilization.

### WALL AND DOOR CONSTRUCTION

The walls of most standard softwall modular cleanrooms are made of 20 or 40 mil clear vinyl and are fire retardant with an anti-static additive. Cleanroom-grade softwalls with low outgassing and static-dissipative vinyl are an option. Vinyl strip doorways commonly consist of eight-inch-wide, 80-mil thick strips with a two-inch overlap on each side along the length. The strips are pushed apart for entry/exit and automatically reseal as they come back together. The strip doors are pre-assembled and are easily mounted to the ceiling structure. Swinging doors in metal frames are an available option when acrylic or Lexan walls are used.

### FILTER REQUIREMENTS

The controlled level of contamination will vary depending on quantity and configuration of filters. For example, the ceiling structure of a Class 10,000 (ISO 7) cleanroom will have a combination of

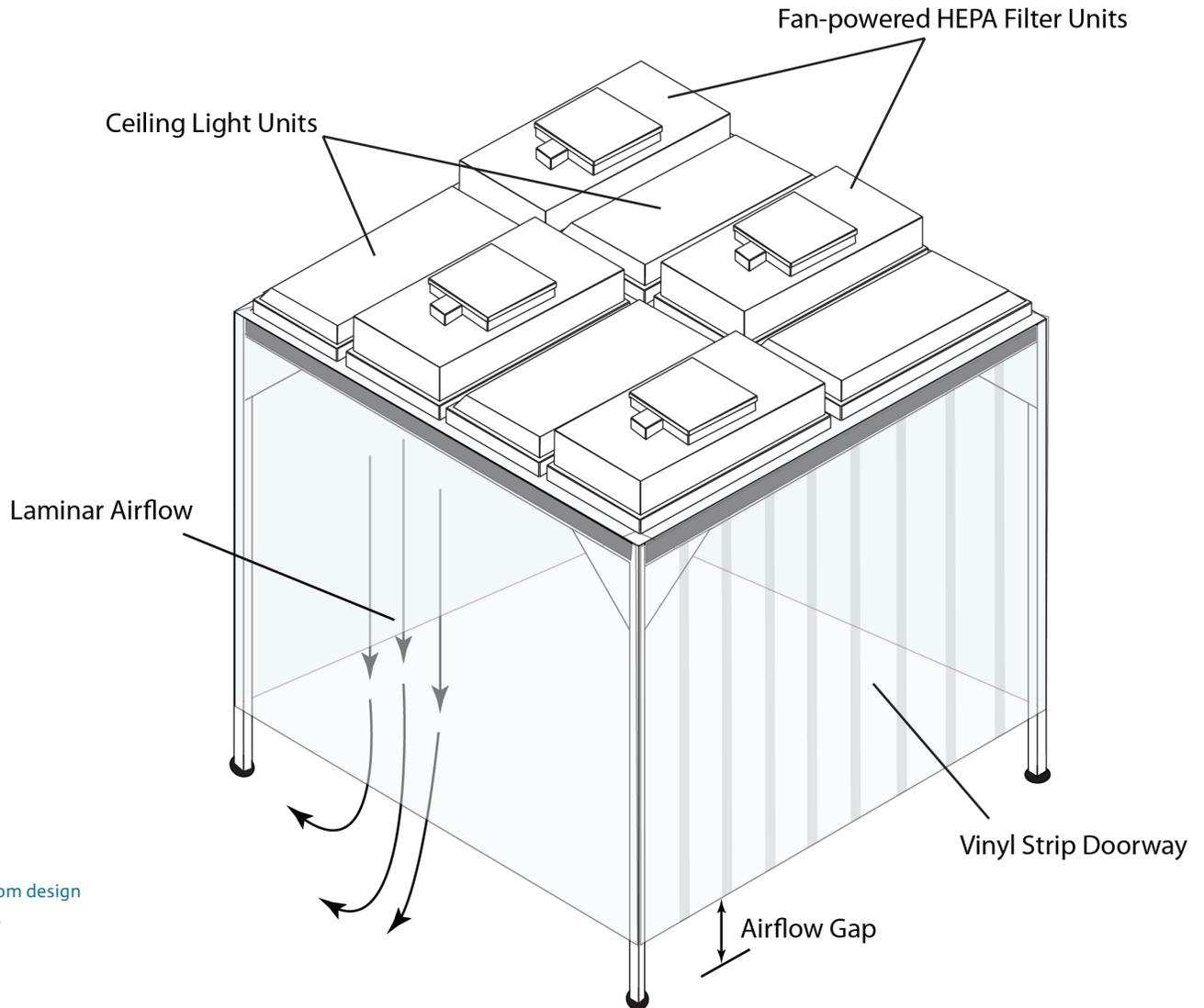
ISO Class	Fed-Std 209E Class	Maximum Number of Particles in Air (Particles per cubic meter)					
		Particle Size					
		≥ 0.1µm	≥ 0.2µm	≥ 0.3µm	≥ 0.5µm	≥ 1µm	≥ 5µm
ISO 1		10	2				
ISO 2		100	24	10	4		
ISO 3	(Class 1)	1,000	237	102	35	8	
ISO 4	(Class 10)	10,000	2,370	1,020	352	83	
ISO 5	(Class 100)	100,000	23,700	10,200	3,520	832	29
ISO 6	(Class 1,000)	1,000,000	237,000	102,000	35,200	8,320	293
ISO 7	(Class 10,000)				352,000	83,200	2,930
ISO 8	(Class 100,000)				3,520,000	832,000	29,300

Cleanroom classification chart

powered HEPA filters, lights and blank panels. In contrast, Class 10 (ISO 4) cleanrooms require 100-percent ceiling coverage with powered filters in all ceiling grid sections.

When ceiling space for lighting is limited due to filter requirements, flow-thru lights can be used. These are similar to standard clean room lights with the exception that a motorized ceiling HEPA filter unit is mounted directly on top of the light. This fixture is designed with open areas so filtered air is able to flow through the light fixture down into the clean room. Flow-thru lights are also valuable in situations where concentrated “clean areas” and lighting need to be achieved within a cleanroom. The filter unit and light fixture are pre-assembled together to form one complete flow-thru light unit.

Filtered air is exhausted from the cleanroom beneath the flexible vinyl walls. An adequate gap of about 6 inches between walls and floor is necessary for air to flow through the room and escape. Air volume is typically about 200 feet per minute, and at that rate the flexible walls tend to bow outward a little because of positive air pressure created by the powered filters. A small amount of wall flex is normal, but if the wall-to-floor gap



Softwall cleanroom design and components

is too small, the air will push the panels outward to an unacceptable distance and inhibit good laminar airflow. If the gap is too large, the cleanroom will not keep enough positive pressure to push contaminants out.

### OPTIONS FOR SPECIAL REQUIREMENTS

Like their hardwall counterparts, softwall cleanrooms have a large number of options available depending on customer needs. Anterooms or gowning rooms can easily be added to the cleanroom. They, too, are portable and can be relocated

along the outside perimeter of the cleanroom for adaptation or modifications to manufacturing processes.

If needed, softwall cleanrooms can be mobile. When equipped with optional braked casters, they can easily be moved to a different location within a facility or stored. Casters are used for smaller cleanrooms, and customers who wish to install casters on rooms larger than 12-by-12-ft should seek advice from their supplier.

Optional acrylic or Lexan panels provide a flexible, yet sturdy and attractive wall alternative. Product pass-throughs can

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also be included in the design. Additional options include: special room heights, solid doors, yellow or opaque sidewalls for ultraviolet light filtration and security, stainless steel frames, building suspension brackets and ionization equipment.

Modular softwall cleanrooms are pre-fabricated at the factory for quick installation. Customers can easily install standard rooms onsite within one-to-two days. All electrical connections are simplified using a continuous series of plug-together pre-fabricated wiring system. Starting at the room's electrical junction box, power cable segments are connected to each ceiling light and powered filter unit. This allows the user to connect any number of lights or filter units within their circuit.

Softwall cleanroom maintenance is simple, but requires regular cleaning to

ensure optimum performance. Powered filter units use a prefilter and these must be visually checked on a regular basis. If the filters are dirty, they must be changed. The HEPA filters are somewhat maintenance free, but it is recommended they be re-certified by a third party every year. All interior surfaces and floors must be cleaned on a regular basis.

A modular softwall cleanroom is a low-cost investment that provides a highly functional cleanroom solution for manufacturers. The flexible structure creates a controlled environment that is able to meet the needs and requirements of small- to large-sized companies. Softwall cleanrooms are designed with the customer in mind, covering a wide range of industries and diverse applications.

## About Clean Air Products

*Since 1969, Clean Air Products has been designing and manufacturing high quality cleanroom systems, components, equipment and supplies for the semiconductor, medical, pharmaceutical and aerospace/military manufacturing industries, among others. Clean Air Products offers a broad line of horizontal- and vertical-flow clean benches, with multiple standard and custom options from temperature control options to table-top designs. Applications engineering assistance is available for designing and specifying cleanroom solutions. For more information, visit [www.cleanairproducts.com](http://www.cleanairproducts.com).*

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