



Cleanroom

- Definition
 - Space where activities can take place in a very controlled environment. Tightly controlled atmosphere:
 - Temperature
 - Humidity
 - Electrostatic Discharge (ESD)
 - Particulates
 - Pressure
 - Activities
 - Others
 - The basic operation of a Cleanroom involves Filtering airborne particulates entering the clean area. In addition to the filtration process, however, the Cleanroom must also isolate itself from the surrounding environment. This is done by slightly pressurizing the room so that it maintains a higher pressure level than the ambient area around it.
- Airborne Particles Control
 - Particles Sources.- in general, particles sources, with respect to the clean spaces, are grouped in two categories:
 - External Sources.- Are those particles that enter the Cleanroom from outside, normally via infiltration through doors, windows and wall and ceiling penetrations. However, the largest external source is usually outside makeup air entering through the air conditioning. External sources are controlled primarily by air filtration, room pressurization and sealing of space penetrations.
 - Internal Sources.- Particles in the clean space are generated by people, Cleanroom surface shedding, process equipment and the manufacturing process itself. Cleanroom personnel can be the largest source of internal particles. Personnel-generated particles are controlled with new Cleanroom garments, proper gowning procedures and airflow designed to continually shower the workers with clean air.
 - Airborne Particulate Cleanliness Classes.- Classification of cleanliness levels define the maximum number of airborne submicron particles measured in volume unit (cubic foot (ft³) or cubic meter (m³)) of air. A micron is a measurement equal to one millionth of an inch. The Lower the classification number, the less airborne particles in the space (The lower, the cleaner). Classes for cleanrooms and clean zones was defined by Federal Standard 209E (FS 209), but FS 209, a benchmark the contamination control industry lived and died by for more than 40 years, has been officially cancelled, paving the way for worldwide harmonization promised by new Cleanroom protocols from the International Organization for Standardization (ISO 14644).

- Uses of Cleanroom
 - Electronics Industry
 - Semiconductor Manufacturing
 - Disk & Display Manufacturing
 - Research & Development of new products
 - Pharmaceutical & Medical Industries
 - Manufacturing and Packing of Medicine/Medical supplies
 - Hospitals for surgeries and labs for medical research
 - Labs for research and development of new products
 - Miscellaneous Applications
 - Food processing & packing
 - Automotive paint booths
 - Crystal
 - Laser/Optic industries
 - Advanced material research

- Cleanroom Construction Types.- Construction types, with respect to the Cleanrooms, are grouped in two categories:
 - Conventional or Traditional Construction Cleanroom.-
 - **General.-** The finishes depend on the Cleanroom classes, in general use smooth materials, monolithic, cleanable and chip resistant, with minimum seams or joints.
 - **Walls.-** FRP, epoxy painted drywall, plastic covered.
 - **Floors.-** Epoxy and/or polyurethane coating, seamless sheet vinyl with wall base carried-up, raised floor with or without perforations.
 - **Ceilings.-** Vinyl finish gasketed tile (T-bar ceiling), when entire ceiling is not fully HEPA or ULPA filtered.
 - **Lights.-** Teardrops-shaped single lamps fixtures mounted between filters or flush mounted and sealed.
 - **Perforations.-** All penetrations for pipes, ducts, electrical conduits, fully sealed.
 - **Doors and Windows.-** All doors, windows, vision panels, switches, etc. either flush mounted or sloped tops.
 - Modular Cleanroom.- Modular rooms, freestanding enclosures placed inside of a larger structure, have been used in office and industrial applications for about 40 years, and in Cleanroom applications for twenty. With the contamination control industry growing, there is a whole new crop of users facing the choice of conventional drywall vs. modular construction. Many of these users will discover that the advantages of modularity clearly outweigh building a new facility from scratch. In fact, modular construction is favored for a wide range of Cleanroom applications.

- Softwall Cleanroom.- Softwall Modular Cleanrooms provide an economical, versatile solution to clean manufacturing requirements in semiconductor, medical device, and many other industries. Portable, expandable, and easy to assemble/disassemble, these cleanrooms are also available on an accelerated delivery program to meet your tight production schedule!



- Hardwall Cleanroom.- Hardwall Modular Cleanrooms provide the rigidity and durability of a freestanding room. All components are factory-assembled and tested before shipping, and installation is usually completed in less than a day. Most standard models ship within 2 - 3 weeks.

