

How a cleanroom works



1 A cleanroom is a controlled environment where products are manufactured. It is a room within a room in which the concentration of airborne particles is controlled to specific limits.

2 For example, a typical office contains about 750,000 particles per cubic foot of air. A Class 100 cleanroom can never allow more than 100 particles per cubic foot of air.

There is much more to a clean room than air filters. Air flow rates and direction, pressurization, temperature, humidity and specialized filtration all need to be tightly controlled. A cleanroom is built following strict procedures to ensure that anything manufactured inside the cleanroom is free from contamination.

3 The majority of cleanrooms are designed to keep contaminants from entering the room. Air is introduced into the cleanroom, after passing through a fan-powered HEPA filter that removes particles as small as .5 microns. The fans create air pressure in the cleanroom that is greater than outside the room. When a door is opened to the cleanroom, the higher pressure air flows out, keeping contaminants out.

There are several different levels of cleanrooms. Achieving higher levels of cleanliness is all about airflow. The greater the air flow and number of HEPA filters, the cleaner the room.

4 Placement of work tables, chairs, and equipment is critical to proper function of the cleanroom. An item incorrectly placed creates "dead air space" where particles are trapped.

5 Because people are the most common source of contamination, clean rooms must be regularly maintained and cleaned following tightly controlled procedures. There are also very strict requirements for cleanroom garments. Smocks, gloves, face masks and head covers are usually standard dress in a cleanroom environment.