



## What is Cleanroom?

A cleanroom is an enclosed area utilized to manufacture electronics, pharmaceutical, semiconductor products, solar panels or life science products. It is designed to maintain low levels of particulates, such as dust, airborne organisms, or vaporized particles. The air entering the cleanroom is filtered to exclude dust and any particles and the air inside is constantly circulated through high efficiency filters to remove any internally generated particles.

A cleanroom is an area or enclosure in which the air has to be cleaned to a defined particle limit. Particle limits are defined in "particles per cubic foot". In the United States most cleanrooms are discussed in terms of Classification Limits. For example, a "Class 1000" cleanroom means that a maximum of only 1000 particles that are 0.5 microns in size would be allowed in a cubic foot of air. A micron is equivalent to one millionth of a meter.

A typical office building air contains from 500,000 to 1,000,000 particles (0.5 microns or larger) per cubic foot of air. A Class 100 cleanroom is designed to never allow more than 100 particles (0.5 microns or larger) per cubic foot of air. Class 1000 and Class 10,000 cleanrooms are designed to limit particles to 1000 and 10,000 respectively as described in the following table.

### ISO 14644-1 cleanroom standards

Class	maximum particles/m <sup>3</sup>						FED STD 209E equivalent
	≥0.1 μm	≥0.2 μm	≥0.3 μm	≥0.5 μm	≥1 μm	≥5 μm	
ISO 1	10	2.37	1.02	0.35	0.083	0.0029	
ISO 2	100	23.7	10.2	3.5	0.83	0.029	
ISO 3	1,000	237	102	35	8.3	0.29	Class 1
ISO 4	10,000	2,370	1,020	352	83	2.9	Class 10
ISO 5	100,000	23,700	10,200	3,520	832	29	Class 100
ISO 6	1.0×10 <sup>6</sup>	237,000	102,000	35,200	8,320	293	Class 1,000
ISO 7	1.0×10 <sup>7</sup>	2.37×10 <sup>6</sup>	1,020,000	352,000	83,200	2,930	Class 10,000
ISO 8	1.0×10 <sup>8</sup>	2.37×10 <sup>7</sup>	1.02×10 <sup>7</sup>	3,520,000	832,000	29,300	Class 100,000
ISO 9	1.0×10 <sup>9</sup>	2.37×10 <sup>8</sup>	1.02×10 <sup>8</sup>	35,200,000	8,320,000	293,000	Room air