

CLEAN ROOMS IN DAIRY AND BEVERAGE INDUSTRIES

Strict requirements for maintaining a clean environment are upheld when it comes to products that are consumed by humans; because of this, specific standards are set and regulated by governments across the world. When handling dairy products, it is not enough to simply manufacture them in a Cleanroom. Their packages and containers are also compounded, extruded, and molded in a Cleanroom environment to ensure maximum cleanliness and purity.

Contaminated dairy or beverage products can cause illness or death. Also, the cost of recalling a product due to contamination is significant. Because of this, there is a need for effective measures to combat contamination risk. This has led to the dairy & beverage sector embracing the use of Cleanroom processing and contamination control.

ISO Classification of Cleanrooms

ISO 14644-1 states that a cleanroom is “a room in which the concentration of airborne particles is controlled, and which is constructed and used in a manner to minimize the introduction, generation, and retention of particles and microbes inside the room and in which other relevant parameters, e.g., temperature, humidity, and pressure, are controlled as necessary,” according to the National Science Foundation. Cleanrooms are classified according to the cleanliness needed for the product. Classifications are determined by the maximum number of particulates for each particle size found in a cubic meter of air. Table 1 shows the classifications of clean room as determined by ISO 14644-1.

ISO Classification Number	Maximum Concentration Limits (particles/m ³ of air) for Particles Equal to and Larger Than the Considered Sizes Shown Below					
	0.1 µm	0.2 µm	0.3 µm	0.5 µm	1 µm	5 µm
ISO Class 1	10	2				
ISO Class 2	100	24	10	4		
ISO Class 3	1,000	237	102	35	8	
ISO Class 4	10,000	2,370	1,020	352	83	
ISO Class 5	100,000	23,700	10,200	3,520	832	29
ISO Class 6	1,000,000	237,000	102,000	35,200	8,320	293
ISO Class 7				352,000	83,200	2,930
ISO Class 8				3,520,000	832,000	29,300
ISO Class 9				35,200,000	8,320,000	293,000

NOTE: Uncertainties related to the measurement process require that concentration data with no more than three significant figures be used in determining the classification level.



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Filtration.

The effectiveness of air filters is determined primarily by particle size but can be affected by the relative electrical charges of particles and filters. Bacteria typically are quite small, requiring filters that remove particles below 1 micron in size. ANSI/ASHRAE Standard. Specifies a test procedure for evaluating the performance of air-cleaning devices as function of particle size.

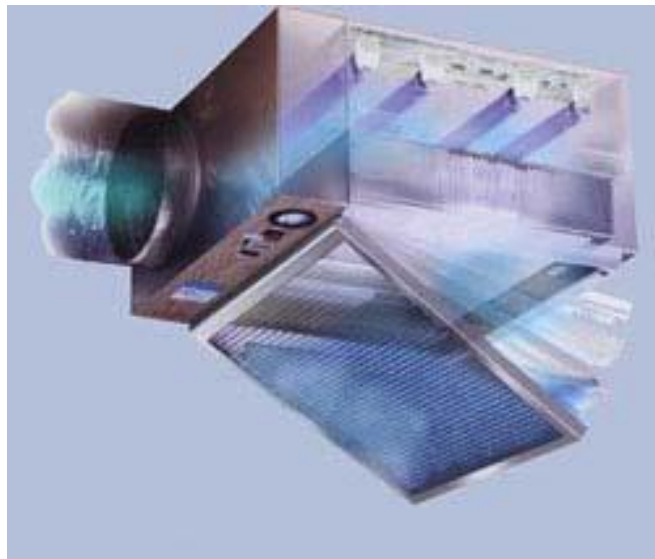
The true HEPA 99.99% filters required only for protective environment rooms.

Laminar Array System.

Laminar flow diffusers are non-aspirating diffusers with air flowing downward from the ceiling and minimum entrainment of room air. All laminar diffusers must be room-side accessible for cleaning and/or filter replacement.

The laminar diffusers are set into arrays intended to create uniform laminar airflow profile covering a critical zone.

FFU with UV Light
Pre-Filter & HEPA Filter with Side
Air inlet Connection



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