

Common Cleanroom Contamination Causes

Once a cleanroom is built and activated constant monitoring and maintenance is required. The people, equipment, tools, chairs and even paper will have to be examined for contamination risk before being allowed to enter the area. Material with conductive properties, anti-static characteristics, out gassing properties or even anti-microbial aspects may be required. The objective of cleanroom environmental control is to provide contamination-free space in which to manufacture contamination free products, but contamination has a way of unexpectedly occurring without any indication of its origin.

The following are only basic contamination causes, a regular evaluation by a Flowstar contamination control engineer is recommended.

1. **People:** Improper cleanroom gowning protocol, insufficient gowning for a particular class, or infrequent change out intervals of suits, socks and floor mats. This is estimated to be 80% of all infusion of contamination in most cleanrooms.

2. **Paper, pencils and retractable pens:** A major cause of particle contamination is writing supplies. Special cleanroom writing materials and paper is recommended. If non-approved cleanroom paper is used it must be enclosed in sealed plastic (anti-static plastic may be required in certain applications).

3. **Processing equipment and tools:** Introduction of equipment and even running equipment are sources of contamination. Proper evaluation of the materials used in manufacturing the equipment and any chemicals used internally or externally must be done. Some tools and equipment generate contamination during use and must be kept away from processes or product. Additionally, thorough cleaning of these items after approval of introduction into the cleanroom must also be performed. Specialized cleaning methods are used for difficult access surfaces. It is imperative that all items brought into the cleanroom are examined and cleaned.

4. **Raw Material and Product:** Before any raw material or product is brought into the cleanroom it must be cleaned. The extent of cleaning depends upon the class of cleanroom, the destination of the raw material or product and the possibility of any cross contamination to other processes. Isolation of material with transport tunnels, hanging shields, nitrogen purged processing, vacuum processing, SMIF, laminar flow stations, or isolation carriers can dramatically reduce contamination.

5. **Cleaning Products:** Regular household or industrial cleaning products are not acceptable for cleanroom maintenance. Non-particulating wipes must be used for all cleaning. Special cleaners designed for specific cleanroom use must also be used.