Basic principles of safety – Air classification particulates

Your Objectives:

At the end of this lesson "Basic principles of safety – Air classification particulates" you should be able to explain the IMPLICATIONS if an area is contaminated.

Because different drugs interact differently, cross contamination will negatively impact the product's efficacy, and can, for instance, cause further health problems or trigger an allergic reaction in the patient.

Even **contamination** via particle buildup from a single substance can cause complications, such as altering the intended dosage of the product.

Types Of Contaminants

We need to consider contamination to be anything that might render the product impure or unfit for use:

- **Microbial** contaminants include such things as bacteria, yeasts, fungi, molds, and viruses. Cleaning, disinfecting, and steam sterilization help control microbial contaminants.
- **Endotoxins** are found in the cell walls of some bacteria and can cause fever, even if the bacteria are dead. Steam and heat can destroy some endotoxins, but in many cases, endotoxins must be removed by filtration and distillation.
- **Chemical** contaminants may occur not only from residue of chemicals left in containers or on surfaces, but also from spillage or improperly sterilized solutions.
- **Particulate** matter includes human skin cells, dust particles, bits of packaging material, or hair.
- **Aerosols** are tiny droplets of liquid that are created when liquid is agitated. Aerosols cause contamination because they float on air currents and can easily drop into open containers or surfaces. Sources of aerosols include sneezing, expelling liquids forcefully and(/or) splashing spilled liquids.

What is Biosafety?

Biosafety is the application of safety precautions that reduces a worker's risk of exposure to a potentially infectious microbe and thereby limits contamination of the work environment and therefore, ultimately, the community.

What are Biosafety Levels (BSLs)?

There are four biosafety levels. Each level has specific controls for containment of microbes and biological agents. The primary risks that determine levels of containment are infectivity, severity of disease, transmissibility, and the nature of the work conducted. Origin of the microbe, or the agent in question, and the route of exposure are also important.

Each biosafety level has its own specific containment controls that are required for the following:

- Laboratory practices
- Safety equipment
- Facility construction

The biosafety levels range from BSL-1 to BSL-4.

Each biosafety level builds upon the controls of the level before it.

Every microbiology laboratory, regardless of biosafety level, follows standard microbiological practices.

	Maximum Number of Particles per Cubic Meter						FED-STD-209E
Class	≥0.1 µm	≥0.2 µm	≥0.3 µm	≥0.5 µm	≥1 µm	≥5 µm	Equivalent
ISO 1	10	2					
ISO 2	100	24	10	4			
ISO 3	1000	237	102	35	8		Class 1
ISO 4	10,000	2370	1020	352	83		Class 10
ISO 5	100,000	23,700	10,200	3520	832	29	Class 100
ISO 6	1,000,000	237,700	102,000	35,200	8320	293	Class 1000
ISO 7				352,000	83,200	2930	Class 10,000
ISO 8				3,520,000	832,000	29,300	Class 100,000
ISO 9				35,200,000	8,320,000	293,000	Room air