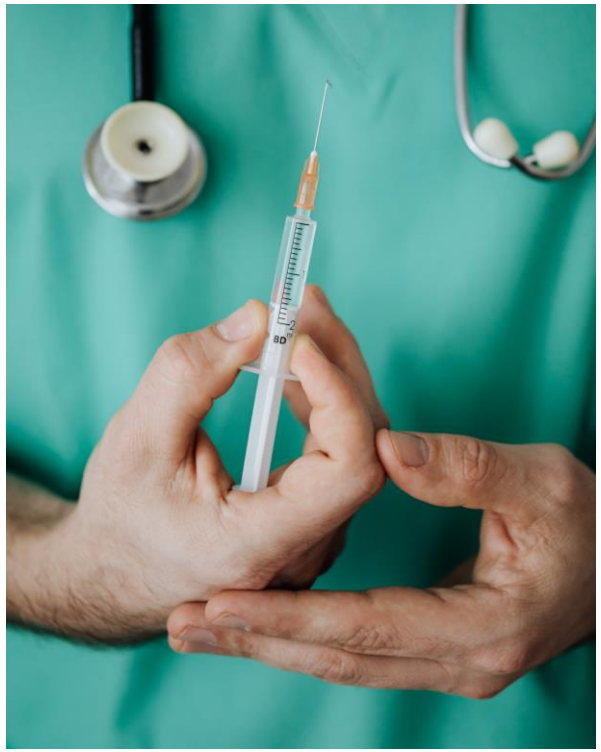
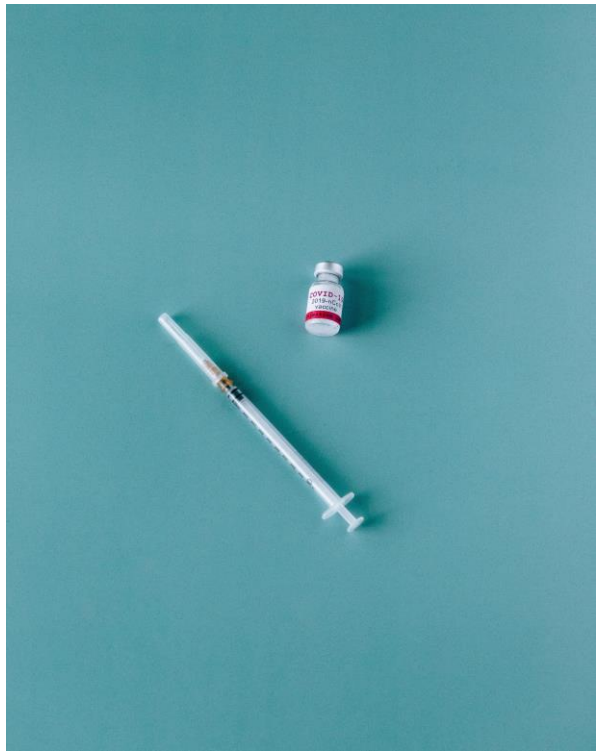




Difference between Aseptic and Terminal sterilization Process

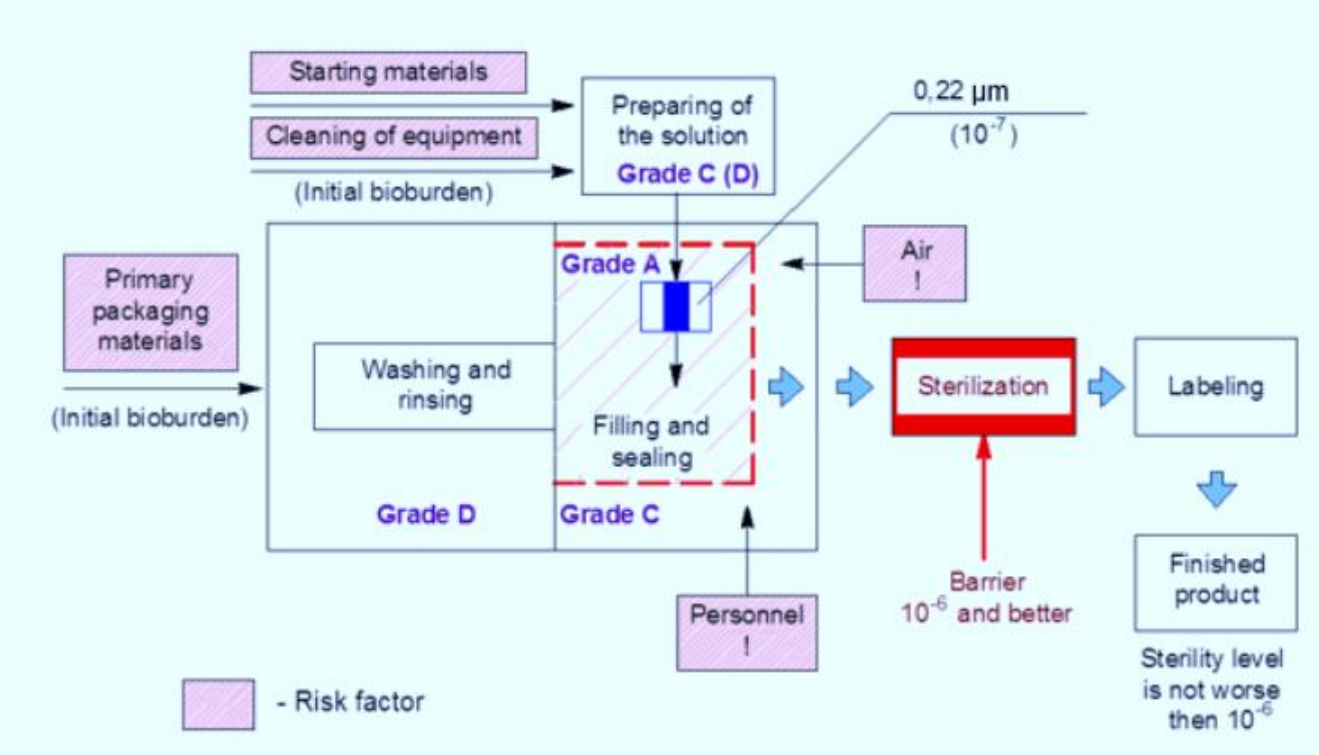
By-Palash Chandra Das

SME in Sterile operation and practices

Difference between Aseptic and Terminal sterilization Process

- There are basic differences between the production of sterile drug products using aseptic processing and production using terminal sterilization.
- Terminal sterilization usually involves filling and sealing product containers under high-quality environmental conditions to minimize the microbial and particulate content from the in-process product and to help ensure that the subsequent sterilization process is successful.
- In most cases, the product, container, and closure have low bioburden, but they are not sterile at the time of filling. The product in its final container is then subjected to a sterilization process such as heat or irradiation.

Terminal Moist Heat Sterilization Process



Overkill method:

- Generally used for heat stable materials.
- Results in greater heat/exposure input to the product or items being sterilized.
- Designed to provide a significant level of sterility assurance regardless of the number and resistance of the actual bioburden organisms in the load.

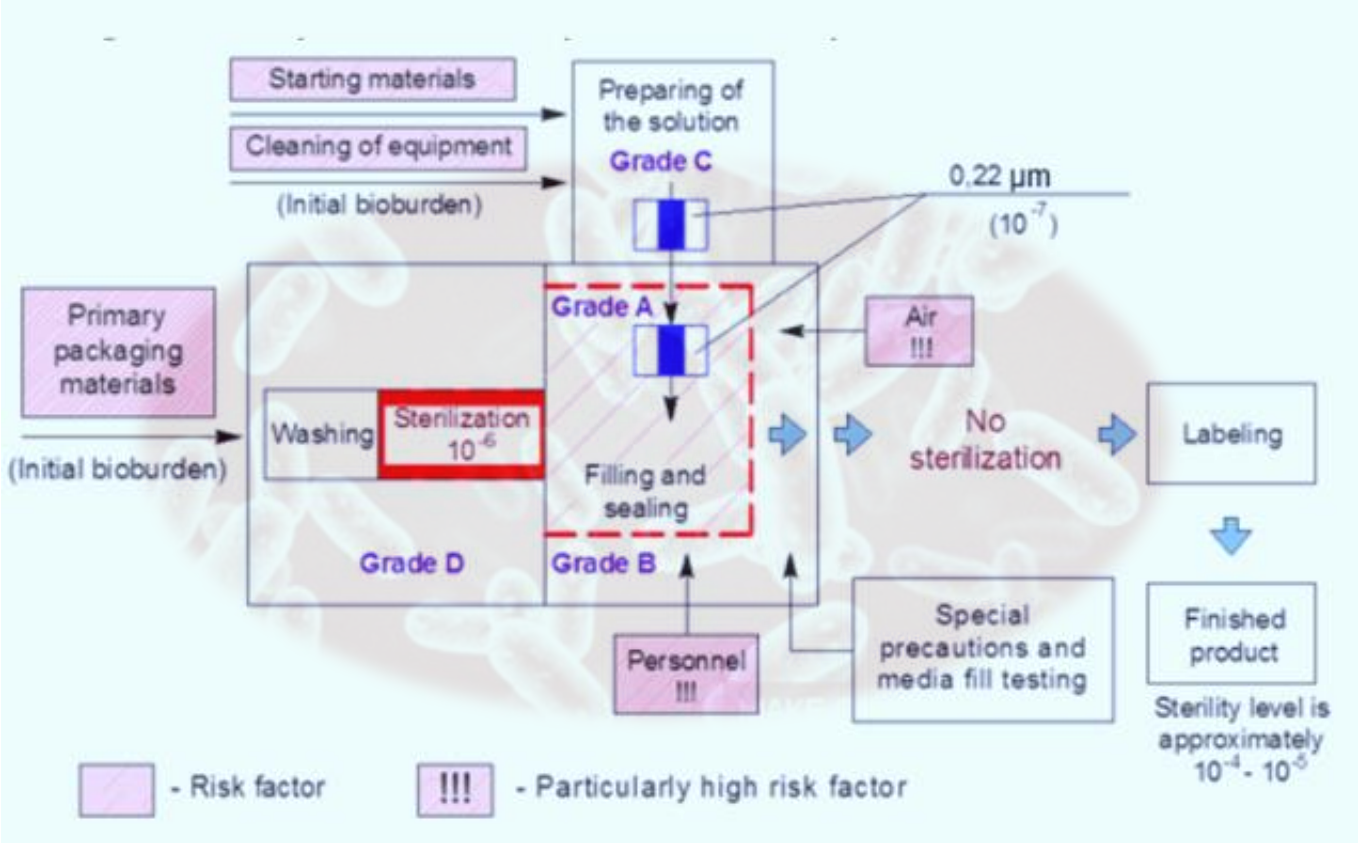
Bioburden Based cycle:

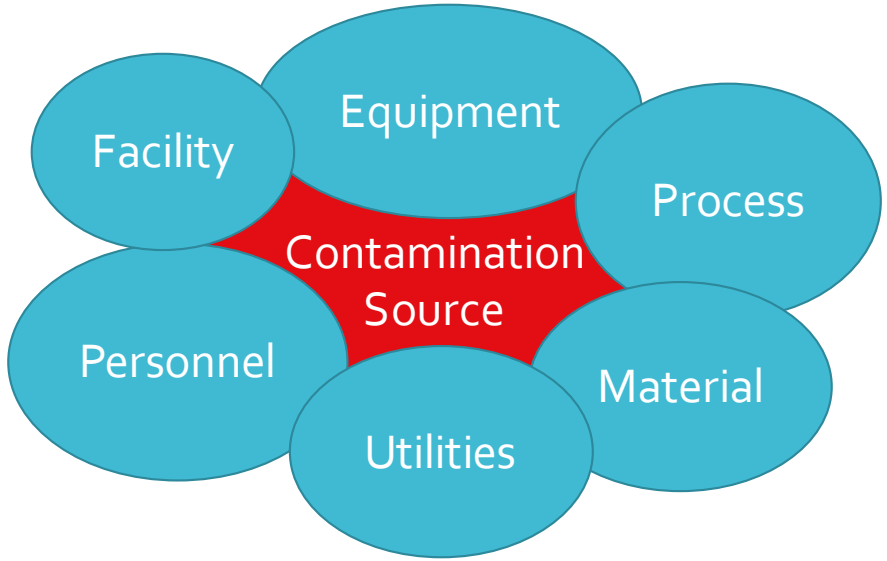
- Requires studies to determine the number and resistance of the microorganisms found in the product and the bioburden load of the incoming components and containers/closures.
- Cycle development to destroy the microbial load, but not degrade the product.
- Routine bioburden monitoring of batches and ongoing knowledge of the heat/exposure resistance of organisms found in product bioburden, container/closure bioburden and environmental monitoring samples.

Difference between Aseptic and Terminal sterilization Process

- In an aseptic process, the drug product, container, and closure are first subjected to sterilization methods separately, as appropriate, and then brought together and it is critical that containers be filled and sealed in an extremely high-quality environment.
- Aseptic processing involves more variables than terminal sterilization. Before aseptic assembly into a final product, the individual parts of the final product are generally subjected to various sterilization processes. For example, glass containers are subjected to dry heat; rubber closures are subjected to moist heat; and liquid dosage forms are subjected to filtration. Each of these manufacturing processes requires validation and control.
- Each process could introduce an error that ultimately could lead to the distribution of a contaminated product. Any manual or mechanical manipulation of the sterilized drug, components, containers, or closures prior to or during aseptic assembly poses the risk of contamination and thus necessitates careful control. A terminally sterilized drug product, on the other hand, undergoes final sterilization in a sealed container, thus limiting the possibility of error.
- Sterile drug manufacturers should have a keen awareness of the public health implications of distributing a nonsterile product. Poor CGMP conditions at a manufacturing facility can ultimately pose a life-threatening health risk to a patient.

Aseptic Process





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Moist Heat sterilization used for ,

- Component preparation and machine change part
- Closure e.g. Rubber stopper / seal
- Operator Gown
- Product Holding Vessel

Dry heat Sterilization used for,

- Glass containers (Applying radiation for if not heat compatible containers are used)

Sterile Filtration use for,

- Disinfectant preparation
- Process Air e.g compressed air or Nitrogen
- Final product solution in holding vessel

Source of aseptic process Image :https://www.raps.org/news-and-articles/news-articles/2019/7/fda-and-eu-gmp-annex-1-differences-in-cleanroom-sp

Difference between Aseptic and Terminal sterilization Process

References:

- FDA and EU GMP Annex 1 Differences in Cleanroom Specifications, https://www.raps.org/news-and-articles/news-articles/2019/7/fda-and-eu-gmp-annex-1-differences-in-cleanroom-sp
- Guidance for Industry Sterile Drug Products Produced by Aseptic Processing —Current Good Manufacturing Practice
- Reference to terminal sterilization: PDA Technical Report No. 1 (Revised 2007) *Validation of Moist Heat Sterilization Processes: Cycle Design, Development, Qualification and Ongoing Control.*
- STERILE DRUG PROCESS INSPECTIONS , FDA COMPLIANCE PROGRAM GUIDANCE MANUAL

ThankYou