curia
Small Molecule

API Sterilization with Curia

A best-in-class aseptic API processing partner

Several methods can be used to sterilize APIs, including terminal methods such as heat (dry or wet) and radiation, among others. Curia offers technology used in situations where terminal methods do not guarantee the stability of the molecule or a good impurity profile. This is aseptic processing.

Curia applies the principles of Quality Risk Management (QRM) into the design and control of facilities, equipment, systems and procedures used for addressing projects where a sterile grade for the API formulated is a must, to ensure that microbial, particulate and endotoxin contamination is prevented in the final product.

Curia's capabilities align with the latest regulatory and compliance standards worldwide (including the latest EU GMP Annex 1 standards and 21 CFR Part 11), reinforcing our longstanding commitment to regulatory excellence and aseptic product quality. Working in state-of-the-art aseptic production suites, we efficiently support route scouting, process development and optimization.

With support from our expert team of analysts, microbiologists, chemical engineers and QA professionals, Curia is uniquely positioned to handle the most complicated challenges of manufacturing variable batch sizes for aseptic APIs, addressing each project phase as needed, from early clinical through the commercial stages, handling molecules from OEB1 up to OEB 3.

Preclinical | **Phase I** | **Phase II** | **Phase III & Process Validation** | **Commercial Supply**

Gram to 100kg+
Development

100 kg + to metric tons
Manufacturing

- European sites locations
- Center of Excellence for:
  - PSD Control and Physical Properties
  - Aseptic Packaging Solutions - Customization
- Development capabilities: Pilot plant & non-GMP suite mimicking aseptic capabilities
- Lab services in-house: including testing for particular matter, microbiological and endotoxin
- Flexibility in terms of scale: from gram-scale to MT scale & Variable batch sizes
- Containment: closed systems capabilities

When a challenge is identified in performing terminal sterilization, and the stability of the molecule or a good impurity profile cannot be guaranteed, Curia´s team of experts can design a process to sterilize your molecule aseptically by filtration.

Stage one: Dissolution and sterile filtration

- Sterile API manufacturing starts with the sterilization of the product by dissolving the product to filter through a double sterile 0.22 micron filtration system. This is where filter selection is critical (driven by process conditions, such as solvents, the nature of the API, temperature, etc.).
- Once the sterile filtration is finished, the integrity of the filter must be checked as part of the quality assurance process.
- By this point, all equipment and material in contact with the product will have been sterilized (sterilization-in-place, vacuum-hydrogen-peroxide, autoclaved, irradiated).

Stage two: Crystallization

- This stage is critical to achieve the physical properties of the product, such as crystal shape, polymorphic form and particle size.
- We have a variety of methods to achieve this, including adding anti-solvent where the product is not solvable, cooling (in cases where the solvability is different depending on the temperature), obtaining a saturated concentrator for the distillation of the dissolving solvent and using a sterile seeding.
- Crystal shape, polymorphic form and particle size distribution can be controlled through parameters such as cooling ramps, stirring speed, and additional time.

Stage three: Filtration and drying

- The goal here is to separate the API from the solvent and dry the product to remove the voluntary impurities until we achieve the desired purification.
- At this stage, we are especially careful to avoid the degradation of the product from conditions such as temperature and moisture.
- Operations are carried out through an isolator to avoid contact between people and the product.
- Different drying conditions are addressed for removing solvents. Special treatments are incorporated based on the API's needs, such as hydration and solvation, to address hygroscopic behavior.

Stage four: Physical treatment and packaging

- If necessary, the dried material can be milled or micronized to reduce particle size.
- The API is packaged according to the customer’s needs, using a range of customizable solutions.