



MSLI

MULTISTAGE LIQUID IMPINGER

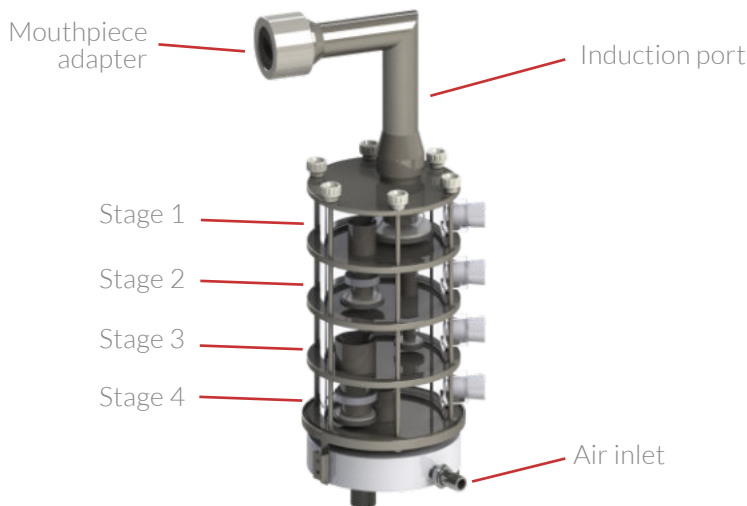
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MSLI

MULTISTAGE LIQUID IMPINGER



A Multistage Liquid Impinger (MSLI) is a device used to collect and analyze airborne particles by drawing air through a series of liquid-filled stages. Each stage captures particles of different sizes by impaction into the liquid, which allows for subsequent analysis of the particles.

The Multistage Liquid Impinger (MSLI), referred to as Apparatus 4 in the Pharmacopeia, has a limited number of stages and is specifically used for Dry Powder Inhalers (DPIs). It comprises Impaction Stages 1, 2, 3, and 4, along with an integral after filter, Stage 5.

Unlike traditional impactors, the collection stages of the Liquid Impinger are kept moist. This wetting can produce an effect similar to coating the stages of other apparatus (Apparatus 1, 2, 3, 5 and 6) at certain flow rates. However, this should be verified by demonstrating control over re-entrainment.

STRUCTURE

An impaction stage consists of several key components. There is an upper horizontal metal partition wall through which a metal inlet jet tube protrudes, along with its corresponding impaction plate. A glass cylinder with a sampling port forms the vertical wall, connecting the jet tube to the lower stage. In Stage 4, the tube ends in a multi-jet arrangement.

The impaction plate is held in place within a metal frame, which is fastened by two wires to a sleeve on the jet tube. The collection plate's horizontal plane is perpendicular to the jet tube's axis and centrally aligned. The upper surface of the impaction plate is slightly elevated above the edge of the metal frame. A groove around the perimeter of the horizontal partition wall helps position the glass cylinder.

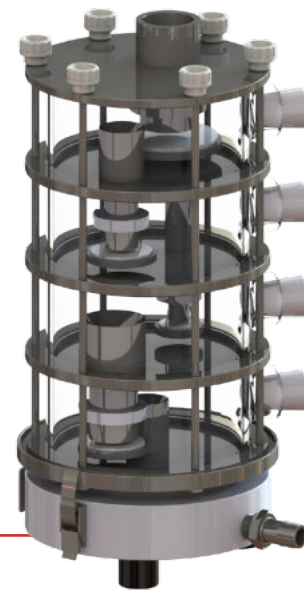
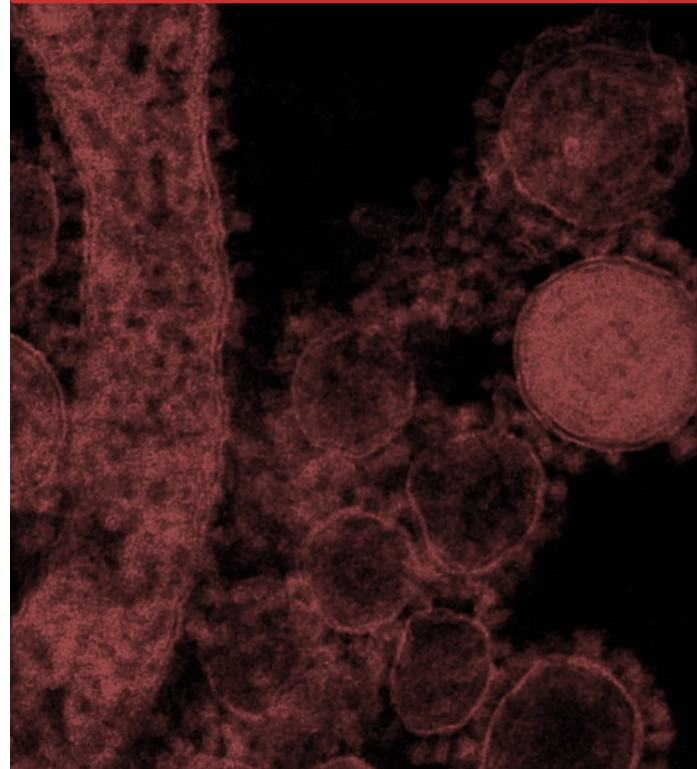
The glass cylinders are sealed to the horizontal partition walls with gaskets and clamped together by six bolts. The sampling ports are sealed with stoppers. The underside of the lower partition wall of Stage 4 has a concentric protrusion with a rubber O-ring that seals against the edge of a filter placed in the filter holder.

The filter holder is designed as a basin with a concentric recess where a perforated filter support fits flush. It is made to accommodate 76-mm diameter filters. The entire impaction stage assembly is secured onto the filter holder using two snap locks.

The impinger comes with an induction port that attaches to the Stage 1 inlet jet tube. A rubber O-ring on the jet tube ensures an airtight connection to the induction port. An elastomeric mouthpiece adapter, tailored to the inhaler being tested, provides an airtight seal between the inhaler and the induction port.

Compliant with:

USP, PhEur



MSLI Configuration





MSLI

MULTISTAGE LIQUID IMPINGER

APPLICATIONS

- **Pharmaceutical Testing.** In the pharmaceutical industry, MSLIs are used to test inhalers and nebulizers by analyzing the size distribution and concentration of aerosolized drugs. This helps in ensuring the efficacy and safety of the inhaled medications.
- **Environmental Monitoring.** MSLIs are employed in environmental science to monitor air quality by collecting and analyzing airborne pollutants, such as dust, pollen, and microorganisms.
- **Occupational Health.** In occupational health, MSLIs help assess worker exposure to airborne contaminants in various industrial settings, ensuring compliance with safety standards.

BENEFITS

- **Accurate Size Distribution Analysis.** By capturing particles of different sizes at different stages, the MSLI provides detailed information on the size distribution of airborne particles.
- **Efficient Particle Collection.** The liquid media effectively captures particles, preventing re-entrainment and ensuring accurate quantification.
- **Versatility.** MSLIs can be adapted to various research and industrial applications by selecting appropriate liquids and adjusting the airflow rates.
- **Ease of Use.** The design of the MSLI allows for straightforward operation, maintenance, and sample analysis, making it a practical tool for routine use.





Main Characteristics and materials:

| | |
|--------------------------|----------------------|
| Weight (kg) | 6 |
| Stages | 4 and Filter Stage 5 |
| Calibrated flowrate | 30 - 100 L/min |
| Cylinder material | Pyrex glass |
| Partition wall material | Stainless Steel |
| Impaction plate material | Stainless Steel |
| Jet tube material | Stainless Steel |

Cut-off diameters (μm) with flowrate 60 L/min:

| | |
|------------------|------|
| Stage 1 | 13 |
| Stage 2 | 6,8 |
| Stage 3 | 3,1 |
| Stage 4 | 1,7 |
| Stage 5 (filter) | <1,7 |

Codes:

| | |
|-----------------------------------|-----------------|
| Multistage Liquid Impinger (MSLI) | AC99-122-0915SP |
| Induction Port for MSLI | AC99-120-0094SP |

