New Star Environmental LLC

"Providing Instrumentation for Air Quality"

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Eight Stage Non-Viable Impactor

The Eight Stage Non-Viable Sampler is a multi-stage, multi-orifice impactor designed to measure the aerodynamic size distribution and mass concentration of solid particulates and liquid aerosols directly.

DESIGN

The Eight Stage Ambient / Non-Viable Impactor is comprised of an optional preseparator and nine aluminum stages (including a backup filter holder) that are held together by three spring clamps and gasketed with O-ring seals. Stages 0 and 1 have 96 tapered orifices arranged in a radial pattern. Stages 2 through 6 have integral air inlet sections that contain 400 orifices. Stage 7 contains 201 orifices. This section of each stage is approximately 3.125" (7.94 cm) in diameter. The orifices are progressively smaller from top to bottom stages, ranging from 0.1004" (0.2550 cm) diameter in stage 0 to 0.0100" (0.0254 cm) diameter in stage 7.

Each stage has a removable stainless steel (3.25" [8.19 cm] diameter) collection plate (glass is optional) which can accomodate an 81mm collection substrate / final filter. The exhaust section of each stage is approximately 0.75" (1.90 cm) larger in diameter than the collection plate, allowing unimpacted particles to flow around the plate and into the next stage.

Many years of data proves only the flowrate of the impactor needs to be verified to provide "calibrated performance!"

A constant air-sample flow of 1 cfm (28.3 lpm) is provided by a continuous duty vacuum pump. Flow rate is controlled by an adjustable valve on the pump and periodic calibration is recommended.

FEATURES

- PM10 high capacity pre-impactor/preseparator eliminates bounce & reentrainment
- Gravimetric analysis allows reference method precision
- Highest collection efficiency, reproducibility & accuracy
- Sample flow rate at 28.3 liters per minute; ideal for in-plant particulate levels
- Gravimetric or chemical sample analysis
- Aerodynamic sizing of particles from > 10•m to < 0.4•m in eight stages
- Universal usage by Federal & State regulatory agencies, universities, research institutes & industry
- Constant pressure drop; accurate flow measurement
- Corrosion-resistant aluminum components
- Also available in stainless steel and titanium construction

The Eight Stage Impactor is made up of classification stages consisting of a series of jets and impaction surfaces. At each specific stage, an aerosol stream passes through the jets and impacts upon the surface. Particles in the aerosol stream with significant inertia will settle on the impaction plate, smaller particles pass as aerosols on to the next jet stage. The design criteria following consecutive stages with higher aerosol jet velocities, the smaller diameter particles are collected at each subsequent stage, giving the cascade affect of

Downloads

- 8StageNV_manual (.manuals)

Product ID #:

- view all

Specifications:

Height	8.5" (21.6 cm)
Diameter	3.75" (9.5 cm)
Net Weight	3.5 lbs (1.6 kg)
Preseparator Dimensions	3" (7.6 cm) H x 3.75" (9.5 cm) D
Pump Dimensions, WxHxD	9.5" (24.1 cm) x 5.5" (14 cm) x 4.85" (11.4 cm)
Pump Weight	8.6 lbs (3.9 kg)
Flow Rate	Calibrated for operation at 28.3 lpm (1 CFM)
Carrying Case Dimensions, WxHxD	22" (55.9 cm) x 10" (25.4 cm) x 5" (12.7 cm)
Carrying Case Weight	8 lbs (3.6 kg)

separation.

The particle size range collected at each of the eight stages depends on the jet orifice velocity of the specific stage, the distance between the orifices and the collection surface, and the collection characteristics of the preceding stage.

The combination of a constant flow rate and smaller diameter orifices increase the velocity of sample air as it cascades through the sampler, resulting in the impaction of progressively smaller particles in the succeeding stages. At 1 CFM (28.3 LPM), the particle fraction ranges from 10.0um (with preseparator) to 0.4um. The particles that are too small to be impacted on the last collection plate are then collected on a backup filter, the final filter can be quartz, glass fiber or Teflon™, depending on the type of chemical analysis desired.

Pharmaceutical Research

The Eight Stage Sampler meets the guidelines of the various world pharmacopoeias (e.g., United States Pharmacopoeia Chapter 601 "USP <601>") to characterize metered-dose (MDI) and dry powder-dose inhalers (DPI), nebulizers, nasal sprays and other pulmonary drugs. Non-viable cascade impactors are important while performing research, quality assurance and equivalency testing. Introduction accessories and kits are available for these specialized applications (See USP Accessory Parts). The testing of inhalation drugs goes hand and hand with cascade impactors, the size ranges collected are considered inhalable (generally <10 •m), just as the inhalation drugs should consistently arrive within the respiratory system into their target regions, the various stages represent the cut-off sizes when deposition may occur within the lungs.

Eight-Stage Ambient Sampler System (P.N.# NS-8S-20-800) includes:

- 8 aluminum orifice stages
- 8 stainless steel collection plates
- back-up 81mm filter holder
- silicone o-ring gaskets
- vacuum pump assembly
- carrying case

Series NS-8S-20-800

The Eight Stage Cascade Impactor utilizes eight jet stages for classification of aerosols from 9 micrometers and above, to 0.4 micrometers (at 28.3 lpm) this permits airborne particulate to impact upon stainless steel impaction surfaces or your choice of filter media, depending on type of chemical analysis. A final filter collects all particles smaller than 0.4•m. Preseparators and special jet stages and optional inlets allow the cascade impactor to operate at higher flow rates, particularly 60 liters per minute (lpm) and 90 liters per minute (lpm), permitting collection of sub-micron particulate.

Cut Points for the Eight Stage Non-Viable Impactor

Note: The jet on every stage of the impactor is individually inspected by an advanced digital video optical comparator. The IVIS (Impactor Visual Inspection System) allows for documentation of the jet critical diameters in a graph type report. The permanent record verifies the placement and diameters of each jet, verifying the instrument performance and can be used as a future reference to recertify the impactor. USP <601> for Pharmaceutical applications requires this stage mensuration procedure first, as well as periodic inspection to insure jet opening quality is maintained and optimum performance occurs.

Standard Flow Configuration

Operating at 28.3 lpm (um)
Stage 0 = 9.0
Stage 1 = 5.8
Stage 2 = 4.7
Stage 3 = 3.3
Stage 4 = 2.1
Stage 5 = 1.1
Stage 6 = 0.7
Stage 7 = 0.4

60 lpm Flow Rate Configuration Kit Installed

Operating at 60 lpm (um)
Stage -1 = 8.6
Stage -0 = 6.5
Stage 1 = 4.4
Stage 2 = 3.3
Stage 3 = 2.0
Stage 4 = 1.1
Stage 5 = 0.54
Stage 6 = 0.25

90 lpm Flow Rate Configuration Kit Installed

Operating at 90 lpm (um)
Stage -2 = 8.0
Stage -1 = 6.5
Stage -0 = 5.2
Stage 1 = 3.5
Stage 2 = 2.6
Stage 3 = 1.7
Stage 4 = 1.0
Stage 5 = 0.43