



Model 120, 122 and 125—MOUDI-II™ Impactors

Second generation, Micro-Orifice Uniform-Deposit Impactor (MOUDI-II™ Impactor), with internal stepper-motor stage rotation to provide uniform particle deposit on collection substrates, for precision, high accuracy, wide-range aerosol sampling from 10 nm to 10,000 nm with 13 impaction stages



Model 122
30 L/min 13 Stage MOUDI-II



Model 125
10 L/min 13 Stage MOUDI-II

INTRODUCTION

MOUDI-II™ are second generation MOUDI™ impactors. Both the MOUDI-II and the original MOUDI impactors are precision cascade impactors for high accuracy aerosol sampling in order to collect size-fractionated particle samples for gravimetric and/or chemical analysis. The primary difference between MOUDI and MOUDI-II impactors is the use of internal embedded stepper motors in the MOUDI-II to spread out the particle deposit to achieve a nearly uniform deposition on the collection substrate, while in the original MOUDI impactor external mechanical gear rotation is used to achieve the uniform particle deposition.

Both impactors use micro-orifice nozzles to reduce jet velocity, pressure drop, particle bounce, re-entrainment and evaporative loss. Up to 2,000 micro-orifice nozzles as small as 50µm in diameter are used in the 10 L/min Model 125. In the 30 L/min Model 122 up to 6,000 micro-orifice nozzles of 50 µm diameter are used.

The original MOUDI impactors are noted for their superior aerodynamic design, sharp cut-size characteristics and low inter-stage particle losses. These features, together with their accurate cut-size calibration, have made the MOUDI™ impactor the impactor of choice for high quality aerosol and

environmental research. The same characteristics are retained in the MOUDI-II impactors.

Both the Model 122 and Model 125 MOUDI-II impactors have 13 impactor stages, with the Model 122 operating at 30 L/min sampling flow rate, while the Model 125 at 10 L/min flow rate. They both are available in the rotating version (122-R and 125-R) and in the non-rotating version (122-NR and 125-NR). In addition 10-stage versions of the 30 L/min MOUDI-II are available for sampling to a lower size limit of 56nm, in the rotating (120-R), and non-rotation (120-NR) versions.

Model 120-R MOUDI-II™ is a 10 stage, 30 L/min impactor with internal embedded stepper motors for the rotation of the impaction plates. This impactor is a second generation MOUDI™ Model 110-R impactor.

Models 122-R & 122-NR NanoMOUDI-II™ impactors are 13 stage, 30 L/min impactors. The Model 122-R has internal embedded stepper motors for the rotation of the impaction plates, while Model 122-NR has stationary impaction plates.

Models 120-R, 122-R and 125-R have electronic control for stage rotation, and built-in sensors that continuously monitor the ambient temperature and pressure during sampling.

Absolute pressure sensors monitor the pressure in the micro-orifice stages and the stability of flow. Should the micro-orifice nozzles of a stage become partially clogged during sampling, change in stage pressure drop will be quickly noted. Built-in electronics oversees the entire instrument operation and records environmental and pressure data generated for post-sampling review.

DESCRIPTION

The rotating versions of the MOUDI-II™ impactors are 2nd generation MOUDI impactors using individual stepper motors embedded in each stage to rotate the collecting substrate for uniform deposition. Power for the stepper motors comes from a single electronic package in the instrument cabinet, with power distributed to the individual motors by miniature flat-ribbon cables. Figure 1 shows a typical rotating stage and Figure 2, a photograph of the stage with the uniform particle having been deposited on the center circular area.

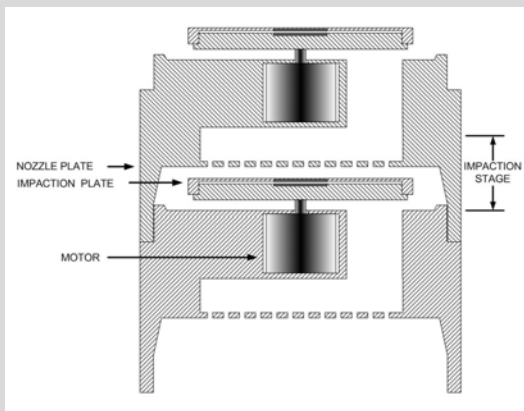


Figure 1. Typical Stepper Motor Operated Impaction Stage



Figure 2. Typical Rotating Stage with Uniform Deposit in Center

All MOUDI-II™ impactors have the same aerodynamic design as in the original MOUDI™ impactors that has led to sharp cut characteristics (see Figure 3) and low inter-stage wall losses. The available impactor cut-sizes are: 0.010, 0.018, 0.032, 0.056, 0.10, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10 & 18 μm.

Because the motors in the MOUDI-II™ impactors are internal at each stage, each stage can be operated independent of the others and can be added or removed to suit the individual measurement needs. However, removing a high pressure-drop stage from the cascade impactor can cause the absolute pressure and the cut-size characteristics to change for down-stream micro-orifice stages. For this reason, only the upper stages with cut-size $\geq 0.56 \mu\text{m}$ should be considered for removal where necessary.

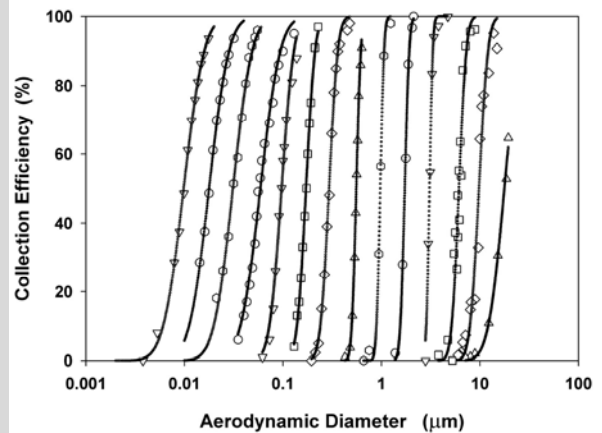


Figure 3. Stage Efficiency Curves

The Models 120-R, 122-R & 125-R are provided with instrument cabinets that also house the electronics for controlling the volumetric flow, monitoring and recording the output of the six pressure transducers for absolute pressure monitoring at the more critical micro-orifice stages. The absolute pressure indicates possible flow instability due to nozzle clogging or leakage in the system. These features insure the high quality samples are collected that would lead to high data quality for the collected particle samples. For applications that do not require stage rotation, Models 122-NR and 125-NR can be ordered with mechanical gages.

FEATURES

- Sampling flow rate:
 - Models 120-R, 122-R, & 122-NR: 30 L/min
 - Models 125-R & 125-NR: 10 L/min
- Size intervals and stage cut-sizes
 - four equal geometrical increments per decade of particle size
 - Model 120-R: 0.056, 0.1, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6 and 10 μm
 - Models 122-R & 122-NR: 0.01, 0.018, 0.032, 0.056, 0.1, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10, and 18 μm
 - Models 125-R & 125-NR: 0.01, 0.018, 0.032, 0.056, 0.1, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6 and 10 μm
- Easily removable collection substrates allow for quick turn-around time for productive use of the instrument.
- Models 120-R, 122-R, & 125-R:
 - Volumetric flow control
 - Programmable logic controller (PLC) controls instrument operation including start- and stop-times. Temperature and pressures are measured, recorded, and stored at pre-determined time intervals.

- Absolute pressures are monitored on the lower stages to provide indication for possible clogging of nozzles as small as 50 μm in diameter
- Sharp cut-off size characteristics
- Low inter-stage losses
- Up to 6000 micro-orifice nozzles to reduce jet velocity, pressure drop, particle bounce and re-entrainment.

APPLICATIONS

- Sampling of atmospheric aerosols for research and environmental monitoring
- Work place aerosol analysis
- Diesel emission analysis and monitoring
- Exposure monitoring
- Industrial hygiene studies

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SPECIFICATIONS

Subject to change without notice

	Model 120-R (with internal rotation)	Model 122-R (with internal rotation)	Model 122-NR (w/o rotation)	Model 125-R (with internal rotation)	Model 125-NR (w/o rotation)
Impactor Stages	10	13		13	
Flow rate, L/min	30	30		10	
Cut-point diameter, μm	0.056, 0.10, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10, 18	0.01, 0.018, 0.032, 0.056, 0.10, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10, 18		0.01, 0.018, 0.032, 0.056, 0.10, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10	
Dimensions (DxH)	220 x 500mm	80 x 360mm	220 x 560mm	80 x 420mm	80 x 190 mm
Weight	11 Kg (24lb)	2 Kg (4.4 lb)	12 Kg (26 lb)	2.3 Kg (5.1 lb)	1.6 kg (3.6 lb)
Power (standard)	115 VAC, 60 Hz, .3 A	115 VAC, 60 Hz, 15 A		115 VAC, 60 Hz, 7 A	
Power (optional)	230 VAC, 50 Hz, .2 A	230 VAC, 50 Hz, 8 A		230 VAC, 50 Hz, 4 A	
Optional Pump	GAST Model 0823 Series	Leybold Model SV-40		Leybold Model SV-16	
Pump Power	115 VAC, 50-60 Hz, 0.56 kW (standard); 230 VAC, 50-60 Hz, 0.56 kW (Optional)	1.5 kW		0.75 kW	