High accuracy cascade impactors for collecting size-fractionated aerosol particle samples for gravimetric and/or chemical analysis:

- 30-L/min sampling flow rate
- Sharp cut-size characteristics
- Up to 2000 micro-orifice nozzles to reduce jet velocity & pressure drop
- Rotating stage to obtain uniform particle deposit and reduce particle bounce and re-entrainment

**Model 100-NR (w/o Rotator)**

**Model 100-R (with Rotator)**

**DESCRIPTION**

These precision cascade impactors are designed for sampling and collecting size-fractionated aerosol particle samples for gravimetric and/or chemical analyses. The Models 100-R and 110-R Micro-Orifice Uniform Deposit Impactors (MOUDI™) both have a sampling flow rate of 30 L/min and are provided with an 18µm inlet cut-point stage followed by additional stages to size-fractionate aerosol particle samples. The 8-stage Model 100-R has a lower cut-size of 0.18µm while the 10-stage Model 110-R has a lower cut-size of 0.056 µm.

The MOUDI differs from other, conventional cascade impactors in the use of a large number of micro-orifice nozzles to reduce jet velocity and pressure drop, minimize particle bounce and re-entrainment, and enhance collection efficiency. As many as 2,000 nozzles with diameters as small as 50 µm are used. These impactors also have the uniform-deposit feature achieved by rotating the impaction plate relative to the nozzles so that the particle deposit under the nozzles can be spread out uniformly over a 25 mm diameter impaction area on a 37mm or 47mm sampling substrate. The uniform deposit feature prevents heavy particle buildup under the nozzles to minimize bounce and re-entrainment. The mass of particles that can be collected without overloading can thus be greatly increased. Both the Models 100 and 110 are also available in non-rotating versions, Models 100-NR and 110-NR, with fixed nozzle and collection plates.
The Model 115 and Model 116 Nano-MOUDBiS are 3-stage impactors with cut-point diameters of 10, 18 and 32 nm (0.010, 0.018 and 0.032 µm). The Model 115 has a sampling flow rate of 10 L/min and must be used with Model 110-R, while the Model 116 has a flow rate of 30 L/min and must be used with Model 110-NR. Both Models 115 and 116 are available in the fixed, non-rotating version only.

A new Model 125-R 13-stage Nano-MOUDBi with internal stepper motor rotation is available for sampling and size fractionation of aerosol particles from 0.010 to 18 µm. Please refer to the Model 125 brochure for details.

The MOUDI is designed to provide particle size fractionation in four equal geometrical intervals per decade in particle size. The stage cut-sizes thus increase at a constant ratio of $10^{1/4} = 1.78$ to 1.0.

The nominal cut-sizes of the MOUDI stages are: 0.010, 0.018, 0.032, 0.056, 0.1, 0.18, 0.32, 0.56, 1.0, 3.2, 5.6, 1.8, 10 and 18 µm.

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**Sampling Substrate and Stage Rotation**—The MOUDI can accept a variety of sampling substrates, including aluminum foils and 47 mm diameter membrane or fibrous filters. The substrate is held by a clamping ring on a substrate holder and is held by a magnet on the impaction stage (see diagram below). The substrate holder is easy to remove and replace. The collected samples can also be stored in a sample holder to prevent contamination during sample transport from the field to the laboratory or vice versa.

The MOUDI has aerodynamic design features that are not available in conventional cascade impactors. The MOUDI is designed to prevent cross-flow interference between adjacent nozzles. The result is sharp cut-size characteristics not available with other cascade impactors that are less well designed aerodynamically. They are also designed to minimize inter-stage wall losses, i.e. loss of particles on the walls of the impactor, rather than being collected on the collecting substrate. The overall wall loss of the MOUDI for all stages combined is less than 5%.
Because of its superior aerodynamic design and outstanding performance characteristics, the MOUDI is synonymous with high quality research impactors preferred by aerosol researchers worldwide for environmental and laboratory research. They have become the de-facto standard for such applications and have helped to generate hundreds of precise and accurate aerosol size distribution data in air quality and air pollution studies.

**APPLICATIONS**

- Environmental air sampling for air pollution and air quality research
- Testing aerosol drug delivery devices
- Diesel blow-by size analysis
- Engine emission testing
- Automotive air bag testing
- Industrial hygiene studies
- Work place aerosol analysis

**SPECIAL IMPACTORS**

For environmental air sampling, a special 4-stage MOUDI impactor is available. The Model 100-S4 has an 18 µm inlet, followed by cut-point stages at 1.0, 2.5, and 10 µm, and a final filter. This particular combination of MOUDI stages is useful for ambient PM1.0, PM 2.5 and PM10 measurement in special research applications.

The Model 118 is a 3-stage impactor with cut point diameters of 0.01, 0.018 and 0.032 µm. It fits below the standard Andersen impactor to provide nano size separation and collection capabilities for the Andersen in the nanometer size range.

**FEATURES**

- Sampling flow rate
  - Models 100, 110 & 116: 30-L/min
  - Model 115: 10 L/min
- Size interval and stage cut-size
  - four equal geometrical increments per decade of particle size
  - Model 100: 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10, and 18 µm
  - Model 110: 0.056, 0.1, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10, and 18 µm
  - Models 115 and 116: 0.01, 0.018, 0.032 µm
- Sharp cut-point characteristics
- Low inter-stage particle losses
- Up to 2000 micro-orifice nozzles to reduce jet velocity and pressure drop
- Mechanically rotated stages to achieve uniform particle deposits and reduce particle bounce and re-entrainment.
# SPECIFICATIONS

**Subject to change without notice**

<table>
<thead>
<tr>
<th></th>
<th>Model 100-R (with rotator)</th>
<th>Model 100-NR (w/o rotator)</th>
<th>Model 110-R (with rotator)</th>
<th>Model 110-NR (w/o rotator)</th>
<th>Model 115</th>
<th>Model 116</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Impactor Stages</strong></td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>3</td>
<td>3</td>
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<tr>
<td><strong>Flow rate, L/min</strong></td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
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<td>30</td>
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<tr>
<td><strong>Cut-point diameter, µm</strong></td>
<td>0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10, 18</td>
<td>0.056, 0.10, 0.18, 0.32, 0.56, 1.0, 1.8, 3.2, 5.6, 10, 18</td>
<td>0.032, 0.018, 0.010</td>
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<tr>
<td><strong>Dimensions (DxH)</strong></td>
<td>220 x 500mm</td>
<td>80 x 360mm</td>
<td>220 x 560mm</td>
<td>80 x 420mm</td>
<td>80 x 190 mm</td>
<td>130 x 180 mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>11 Kg (24lb)</td>
<td>2 Kg (4.4 lb)</td>
<td>12 Kg (26 lb)</td>
<td>2.3 Kg (5.1 lb)</td>
<td>1.6 kg (3.6 lb)</td>
<td>3.0 kg (6.6 lb)</td>
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<tr>
<td><strong>Power (standard)</strong></td>
<td>115 VAC, 60 Hz, 3 A</td>
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<td>115 VAC, 60 Hz, 3 A</td>
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<td>115 VAC, 60 Hz, 3 A</td>
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<tr>
<td><strong>Power (optional)</strong></td>
<td>230 VAC, 50 Hz, .2 A</td>
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<td>230 VAC, 50 Hz, .2 A</td>
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<td>230 VAC, 50 Hz, .2 A</td>
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<tr>
<td><strong>Optional Pump</strong></td>
<td>GAST Model 0823 Series</td>
<td></td>
<td>Leybold Model SV-16</td>
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<td>Leybold Model SV-40</td>
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<tr>
<td><strong>Pump Power</strong></td>
<td>115 VAC, 50-60 Hz, 0.56 kW (standard); 230 VAC, 50-60 Hz, 0.56 kW (Optional)</td>
<td></td>
<td>0.75 kW</td>
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<td>1.5 kW</td>
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