Dust generators SAG 410 and SAG 410/U with housing

The technique for the dispersion of dry dust and powders comprises two steps, the continuous supply / dosing of material to the disperser and the dispersal of the material as an aerosol.

The SAG 410 meters powder to the disperser by using a moving toothed belt. The well defined spaces between the teeth ensure a constant and reproducible supply of powder, even at low feed rates. The particle concentration of the output aerosol can easily be adjusted over a wide range by changing the speed of the feed belt.

The powder is removed from the belt by an ejector nozzle with ceramic outlet tube.

A specially designed scraper ensures even filling of the belt spaces and minimises the influence of the powder level in the reservoir on aerosol mass flow.

For critical materials with poor flow properties like titan dioxide, aluminium oxide or soot Topas has developed the SAG 410/U. The innovative principle consists of loading the dust on a dosing ring from which it is drawn off by the dispersing nozzle.

This enables reliable feed rates and dispersing of cohesive materials as well as delivery of very small quantities of powder at low dosing rates. All dosing ranges of dust feeder series SAG 410 can be realized by the easy to manage changing of the modular dispersing units. All dispersing units can be run with just one control unit.

### SAG model

<table>
<thead>
<tr>
<th>SAG model</th>
<th>Maximum filling amount [cm³]</th>
<th>Aerosol flow rate [m³/h]</th>
<th>Powder mass flow range [g/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>410/U</td>
<td>50</td>
<td>1.5 ... 4</td>
<td>0.05 ... 20 (^1), (^2)</td>
</tr>
<tr>
<td>410/L</td>
<td>400</td>
<td>1.5 ... 4</td>
<td>1.0 ... 260 (^1)</td>
</tr>
<tr>
<td>410</td>
<td>400</td>
<td>1.5 ... 4</td>
<td>10 ... 520 (^1)</td>
</tr>
<tr>
<td>410/H</td>
<td>1420</td>
<td>8 ... 20</td>
<td>100 ... 6200 (^1)</td>
</tr>
</tbody>
</table>

\(^1\) ISO 12103-A2 (Fine), bulk density 0.95 g/cm³

\(^2\) Depending on applied dosing ring

### Applications

- Filter testing: dust loading and fractional efficiency testing with one instrument (wide dosing range)
- Basic aerosol research
- Optimization of combustion processes
- Flow visualisation
- Analysis of mixing and coating processes (e.g. in engineering ceramics)

### Main Advantages

- Constant dosing of various sorts of test dusts
- Continuous dosing with high accuracy and over long operational periods nearly independent of the powder level in the reservoir
- Dispersion at small scale dosing rates
- Reliable generation of dust aerosols from poor-flow powders (test dusts)
- Interchangeable dispersing units allow a single instrument to cover several dosing ranges (from mg/h to kg/h)
- Quick and easy cleaning
- Easy device control and operation

### Device Options

- Remote control unit
- Balance for online mass determination
Dust Generators Series SAG 420

Because of its special features the dust disperser SAG 420 is particularly suitable for performing separation efficiency and dust loading tests of filters and separators, e.g. according to standard ISO 5011.

The dosing of the powder is done by conveying a solid material of rectangular cross section on a feeding or dosing belt, with following parameters:

- Belt speed
- Cross section of the solid material
- Bulk density of the material on the belt

The speed of the dosing belt is kept constant and adjustable in a very wide range.

The cross section of the solid string is height-adjustable by means of a slider.

The bulk density of the powder in the reservoir is through the rabble rake relatively independent of the level in the tank.

The control and operation of the aerosol generator is done by its own software or using the software of a test rig.

Especially for tests complying with ISO 5011 as an option a height adjustable and moveable rack is supplied, which encloses the generator on an integrated scale, what enables mass flow control with an accuracy of 0.2 g/min.

Applications

- Charging of filters, filter media and separators with dust
- Generation of dust to determine the fractional as well as the total separation efficiency
- Visualization of air streams
- Especially for test acc. to ISO 5011

Special Advantages

- Dosing continuity of different dusts over a long period of time
- Mass flow control by weigh scale option
- Easy device control

Technical Data SAG 420

<table>
<thead>
<tr>
<th>Dust not to be used for materials that are:</th>
<th>max. particle size 200µm, abrasive, sticky, aggressive, toxic, biologically active</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosing range</td>
<td>0.1g/min - 200g/min assuming 1g/cm³ bulk density</td>
</tr>
<tr>
<td>Max. capacity</td>
<td>approx. 2kg assuming 1g/cm³ bulk density</td>
</tr>
<tr>
<td>Volume flow range</td>
<td>approx. 3…18m³/h</td>
</tr>
</tbody>
</table>
ASHRAE Dust Disperser SAG 440

In the standards DIN EN 779 and ASHRAE 52.2 for the testing of particulate air filters, the equipment requirements for the safe and reproducible production of test dusts with fiber content are described.

Taking into account these standards Topas developed SAG 440 as an apparatus especially for metering and dispersion of ASHRAE dust.

To generate a test aerosol a defined amount of test dust is put on the feeding belt, the dosing wheel adds a set quantity to the dust uptake nozzle from where it is forwarded pneumatically to the test duct.

To avoid electrostatic effects it is possible to neutralise the particles with a neutraliser, e.g. Topas EAN 581.

Special Advantages

• Constant and reproducible dosing rate over a wide concentration range makes it suitable for several applications
• Continuous operation
• Refillable during operation – ideal for long term tests
• Optional remote control unit for manual or computer control

The dust paddle wheel and the dust dispersing nozzle are laid out in accordance with the EN 779 and ASHRAE standards. The concentration of the test aerosol can be varied by adjusting the speed of the belt and dust paddle wheel.

Applications

• Determination of dust holding capacity according to EN 779, ASHRAE 52.2
• Evaluation of the separating efficiency of filters
• Calibration of monitoring equipment and dust sampling devices

Specification

<table>
<thead>
<tr>
<th>Type of dust</th>
<th>ASHRAE 52.2 test dust</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>72% SAE fine</td>
</tr>
<tr>
<td></td>
<td>23% powdered carbon</td>
</tr>
<tr>
<td></td>
<td>5% cotton linters</td>
</tr>
<tr>
<td></td>
<td>Other fibre-containing dusts (e.g. DMT-dust type 8)</td>
</tr>
<tr>
<td>Dosing range</td>
<td>4…350 g/h</td>
</tr>
<tr>
<td>Max. capacity</td>
<td>ca. 110g</td>
</tr>
<tr>
<td>Belt speed</td>
<td>0.3…30 mm/min</td>
</tr>
</tbody>
</table>
To serve the variety of solids dispersion applications, different classes of devices have been developed.

The dust generator SAG 410 is available in four versions with different dosing ranges. By simply changing the dispersing unit all four dosage ranges can be realized with just one control unit. The dosage range starts for the SAG 410/U at 0.05 g/h and ends for the SAG 410/H at 6.2 kg/h. The SAG-410/U is particularly suitable for low dosing rates and cohesive powders.

Electrostatic Aerosol Neutralizer EAN 581
A common problem with dry-dispersed aerosols is the electrostatic charging of particles, especially when they touch surfaces in the generator. The problem can be solved by passing the aerosol through a chamber with a bipolar ion source. The Electrostatic Aerosol Neutralizer EAN 581 is based on the principle of Corona discharge. In different standards (EN 779, DIN 71460-1) is explicitly required to neutralize charged aerosol. The principle of corona discharge eliminates the need for a radioactive source.

SAG 410: Solids material mass flow as a function of the metering belt speed (for a selection of materials)

On the basis of its parameters, the dust generator SAG 420 is preferably suitable for performing efficiency and loading tests of filters and separators, such as for testing according to ISO 5011. Due to the concentration range that is adjustable in very wide limits, the use of the dust disperser is recommended in connection with different benches for filters and separators. The control and operation is done via the software of the test stand.

The dust generator SAG 440 is used for generation of test aerosols for testing purposes (mainly for filter testing according to EN 779 and ASHRAE 52.2.). As an aerosol substance dry fibrous dusts, primarily ASHRAE dust, can be used.