Pneumatic nozzles

Atomization of viscous liquids
Cooling
Gas cooling
Humidification of air
Humidification of goods
Lubrication
Web dampening
and many others...
Pneumatic atomizing nozzles are available in various designs to comply with specific spray and flow requirements:

- self-aspiration (siphon principle)
- supply of liquid from a vessel located at a higher level (gravity principle)
- supply of liquid under pressure (pressure principle)
- mixing of fluids inside or outside the nozzle
- full cone or flat fan spray pattern

**Criteria for selecting pneumatic atomizing nozzles**

1. **Spray pattern**
   - Pneumatic flat fan atomizing nozzles should be chosen for humidifying and cooling of goods, for web dampening and for a number of painting tasks; in short, wherever a broad linear impact is required. **Pneumatic full cone atomizing nozzles**, however, should be used, when a compact, circular impact or a major reach is required, e.g. for direct air humidifying, for gas cooling or for chemical process applications.

2. **Mode of liquid supply**
   - Whenever liquid can be supplied under pressure, it is recommended to use nozzles functioning by the **liquid pressure principle**. Use of pneumatic atomizing nozzles operating to the siphon or the gravity principle is recommended when liquid is to be sprayed in small quantities, e.g. for spraying of disinfectants.

3. **Mixing of fluids**
   - The supply of air or gas provides an additional breaking up of the liquid flow into finest drop particles. This supply and mixing can either take place inside or outside the nozzle. **Inside mixing** should be preferred, when water, low viscosity liquids or liquids without solid matter are to be atomized. **Outside mixing** is particularly suited for atomizing viscous liquids which are prone to impurities and therefore tend to cause clogging of the nozzle. Low liquid pressures are used with this type of nozzle due to its design.

For many applications, adjustability of liquid flow and, thereby, of the droplet size, is possible with the aid of manually operated accessory components. **A pneumatically controlled piston** (series 136) or magnetic valve (series 166) allows to perform automatic or intermittent operations. A number of special customized designs complete the nozzle range.

We can also supply complete modular nozzle lances on request. We would be happy to send you detailed product information.
### Pneumatic Atomizing Nozzles

**Series 136**

<table>
<thead>
<tr>
<th>Spray pattern</th>
<th>Mode of liquid supply</th>
<th>Mixing of fluids</th>
<th>Series</th>
<th>Water ( \dot{V} ) [l/h]</th>
<th>Application</th>
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</thead>
<tbody>
<tr>
<td>Full cone</td>
<td>Pressure principle</td>
<td>Inside</td>
<td>136.1</td>
<td>20° 0.40 – 93.20</td>
<td>Humidification of air, cooling.</td>
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<tr>
<td>Full cone</td>
<td>Pressure principle</td>
<td>Inside</td>
<td>136.2</td>
<td>60° 0.40 – 132.90</td>
<td>Humidification of air, cooling.</td>
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<tr>
<td>Full cone</td>
<td>Siphon or gravity principle</td>
<td>Outside</td>
<td>136.3</td>
<td>20° 0.30 – 66.70</td>
<td>Chemical industry, cooling, spraying of viscous liquids.</td>
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<td>Flat fan</td>
<td>Pressure principle</td>
<td>Inside</td>
<td>136.4</td>
<td>45° / 60° / 80° 0.10 – 76.10</td>
<td>Web dampening, humidification of goods, cooling.</td>
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</tr>
<tr>
<td>Flat fan</td>
<td>Siphon or gravity principle</td>
<td>Inside</td>
<td>136.5</td>
<td>60° 0.80 – 3.20</td>
<td>Web dampening, humidification of goods, cooling.</td>
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<tr>
<td>Flat fan</td>
<td>Pressure principle</td>
<td>Outside</td>
<td>136.6</td>
<td>45° / 60° 1.70 – 102.10</td>
<td>Web dampening, humidification of goods, atomization of viscous fluids.</td>
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## Pneumatic atomizing nozzles
### Series 166

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<th>Mode of liquid supply</th>
<th>Mixing of fluids</th>
<th>Series</th>
<th>Water [l/h]</th>
<th>Application</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full cone</td>
<td>Pressure principle</td>
<td>Inside</td>
<td>166.1</td>
<td>20°</td>
<td>0.40 – 90.20 Humidification of air, cooling. Version with magnetic valve.</td>
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<td>166.2</td>
<td>60°</td>
<td>0.40 – 132.90 Humidification of air, cooling. Version with magnetic valve.</td>
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<td>Pressure principle</td>
<td>Inside</td>
<td>166.4</td>
<td>45°, 60°, 80°</td>
<td>0.10 – 76.10 Web dampening, humidification of goods, cooling. Version with magnetic valve.</td>
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<td>Pressure principle</td>
<td>Outside</td>
<td>166.6</td>
<td>45°, 60°</td>
<td>1.70 – 102.10 Web dampening, humidification of goods, atomization of viscous fluids. Version with magnetic valve.</td>
<td>1.25</td>
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# Pneumatic atomizing nozzles

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<th>Mode of liquid supply</th>
<th>Mixing of fluids</th>
<th>Series</th>
<th>V Water [l/h]</th>
<th>Application</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full cone</td>
<td>Siphon or gravity principle</td>
<td>Inside</td>
<td>140</td>
<td>20° – 30°</td>
<td>4.50 – 12.00</td>
<td>Lubrication, cooling, humidification of air.</td>
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<tr>
<td>Solid stream</td>
<td>Pressure principle</td>
<td>Outside</td>
<td>176 ViscoMist™</td>
<td>variable</td>
<td>7.80 – 307.00 [l/h]</td>
<td>Coating processes, moistening, lubrication, glazing, disinfection.</td>
</tr>
<tr>
<td>Full cone</td>
<td>Pressure principle</td>
<td>Inside</td>
<td>170</td>
<td>15°</td>
<td>8.50 – 290.00 [l/min]</td>
<td>Gas cooling, flue gas desulphurisation, exhaust gas conditioning, dust control.</td>
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<tr>
<td>Full cone</td>
<td>Pressure principle</td>
<td>Outside</td>
<td>150</td>
<td>20° – 30°</td>
<td>0.15 – 63.00 [l/min]</td>
<td>Chemical process engineering, cooling, atomizing of viscous liquids.</td>
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</tbody>
</table>
**Fine full cone atomization and fogging with air or gas. Liquid pressure principle. Internal mixing of fluids.**

**Applications:**
Humidification of air, cooling.

**Series 136.1**

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>E [mm]</th>
<th>Liquid pressure $p$ [bar]</th>
<th>Spray dimensions</th>
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</thead>
<tbody>
<tr>
<td>20°</td>
<td>136.115.xx.A2</td>
<td>0.50</td>
<td>0.40 0.80 1.20 1.60 2.00 2.40 2.80 3.20 3.60 4.00 4.40 4.80</td>
<td>2.00 3.00 3.50 4.00 4.50 5.00</td>
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<tr>
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<td>136.125.xx.A2</td>
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<td>2.00 3.00 3.50 4.00 4.50 5.00</td>
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</tbody>
</table>

$E =$ narrowest free cross section (water)

**Example**

Type + Material no. (xx) = Ordering no.

for ordering: 136.115.xx.A2 + 1Y = 136.115.1Y.A2

Continued on next page.
### Pneumatic Atomizing Nozzles, Full Cone, Pressure Principle, Internal Mixing
**Series 136.1**

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</thead>
<tbody>
<tr>
<td></td>
<td>E = Narrowest Free Cross Section (Water)</td>
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<tr>
<td></td>
<td>Example Type + Material No. (xx) = Ordering No.</td>
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#### 20°

**136.134.xx.A2**

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<tr>
<td></td>
<td>Ø [mm]</td>
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</tr>
<tr>
<td></td>
<td>1.20</td>
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</tr>
<tr>
<td></td>
<td>1.60</td>
<td>12.40</td>
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<tr>
<td></td>
<td>2.00</td>
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<td></td>
<td>2.40</td>
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<td>3.20</td>
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<td>4.80</td>
<td>9.90</td>
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<td>5.20</td>
<td>9.50</td>
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<td>9.00</td>
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<tr>
<td></td>
<td>6.00</td>
<td>8.50</td>
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</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>1Y</th>
<th>35</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Ø [mm]</td>
<td>2.5</td>
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</table>

E = Narrowest Free Cross Section (Water)
Fine full cone atomization and fogging with air or gas. Especially wide spray angle of 60°. Pressure principle. Internal mixing of fluids.

Applications:
Humidification of air, cooling.

### Spray angle

<table>
<thead>
<tr>
<th>Type</th>
<th>E</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>0.7</th>
<th>1.5</th>
<th>3.0</th>
<th>4.0</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>[bar]</td>
<td>[l/h]</td>
<td>[m³/h]</td>
<td>[bar]</td>
</tr>
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<td>60°</td>
<td>0.5</td>
<td>136.215.xx.A2</td>
<td>1Y</td>
<td>1.00</td>
<td>3.00</td>
<td>5.80</td>
<td>2.80</td>
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<td></td>
<td></td>
<td></td>
<td>35</td>
<td>1.20</td>
<td>1.80</td>
<td>4.90</td>
<td>3.20</td>
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<td></td>
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<td>1.40</td>
<td>0.70</td>
<td>1.80</td>
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<td>2.00</td>
<td>2.80</td>
<td>2.80</td>
<td>4.00</td>
</tr>
</tbody>
</table>

### Accessories for series 136 please refer to page 1.27
**Pneumatic atomizing nozzles, Full cone, siphon principle, external mixing**

**Series 136.3**

Particularly fine full cone atomization with air or gas. Siphon principle or gravity principle. External mixing of fluids.

**Applications:**
Chemical industry, cooling, atomization of viscous liquids.

**Example Type + Material no. (xx) = Ordering no.**

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</thead>
<tbody>
<tr>
<td>136.316.xx.A2</td>
<td>0.4</td>
<td>0.6 0.70</td>
<td>0.8 0.90</td>
<td>1.20 1.30 1.40 1.50 1.60 1.80 2.00 2.20 2.40 2.60 3.00 3.20 3.60 4.00 4.40 4.80 5.00 5.40 5.60 6.00</td>
<td>0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0</td>
</tr>
</tbody>
</table>

**Operational information:**
Liquid flow of pneumatic atomizing nozzles with external mixing can be turned down to 0 with air pressure remaining constant.

**Continued on next page.**
### Pneumatic Atomizing Nozzles, Full Cone, Siphon Principle, External Mixing
Series 136.3

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<td>316L SS</td>
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E = narrowest free cross section (water)
### Pneumatic Atomizing Nozzles, Full Cone, Siphon Principle, External Mixing

#### Series 136.3

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- **E** = narrowest free cross section (water)
- **Example** Type + Material no. (xx) = Ordering no.

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<thead>
<tr>
<th>Type</th>
<th>Water Column [mm H₂O]</th>
<th>Aspiration Height [mm H₂O]</th>
<th>Air Pressure [bar]</th>
<th>Aspiration Height [mm WS]</th>
<th>D₁ [mm]</th>
<th>D₂ [mm]</th>
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<tbody>
<tr>
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<td>300</td>
<td>450</td>
<td>100</td>
<td>200</td>
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<td>100</td>
<td>150</td>
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<td>6.00</td>
<td>300</td>
<td>95</td>
<td>150</td>
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**Example**: For ordering, use the code `136.351.xx.A2 + 1Y = 136.351.1Y.A2`.
Pneumatic atomizing nozzles, **Flat fan, pressure principle, internal mixing** Series 136.4

Particularly fine flat fan atomization with air or gas. Pressure principle. Internal mixing of fluids.

**Applications:**
Web dampening, cooling, humidification of goods.

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Type</th>
<th>Mat. no.</th>
<th>E [mm]</th>
<th>0.7</th>
<th>1.5</th>
<th>3.0</th>
<th>4.0</th>
<th>Liquid pressure p [bar]</th>
<th>Spray dimensions</th>
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</thead>
<tbody>
<tr>
<td>45°</td>
<td>136.414.xx.A2</td>
<td>1Y</td>
<td>316L SS</td>
<td>35</td>
<td>1.00</td>
<td>1.40</td>
<td>2.00</td>
<td>2.50</td>
<td>2.10</td>
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<td>1.40</td>
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<td>2.50</td>
<td>2.10</td>
<td>2.60</td>
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</table>

E = narrowest free cross section (water) Continued on next page.

Example Type + Material no. (xx) = Ordering no. for ordering: 136.414.xx.A2 + 1Y = 136.414.1Y.A2
### Pneumatic Atomizing Nozzles, Flat Fan, Pressure Principle, Internal Mixing

**Series 136.4**

#### Spray Dimensions

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<tr>
<th>Spray Angle</th>
<th>Type</th>
<th>Material</th>
<th>1Y</th>
<th>35</th>
<th>E (mm)</th>
<th>Liquid Pressure p (bar)</th>
<th>spray dimensions</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>V˙ Water (l/h)</td>
<td>V˙ Air (m³/h)</td>
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<tr>
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</tr>
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<td>1.00</td>
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<td>2.00</td>
<td>2.60</td>
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</tr>
<tr>
<td></td>
<td>136.433.xx.A2</td>
<td>0.4</td>
<td>1.00</td>
<td>1.40</td>
<td>2.00</td>
<td>2.60</td>
<td>2.00</td>
</tr>
</tbody>
</table>

**Example**

- **Type** + **Material no. (xx)** = **Ordering no.**
  - **for ordering**: 136.462.xx.A2 + 1Y = 136.462.1Y.A2

---

**E** = narrowest free cross section (water)
Particularly fine flat fan atomization with air or gas. Siphon principle or gravity principle. Internal mixing of fluids.

**Applications:**
Web dampening, cooling, humidification of goods.

**Pneumatic atomizing nozzles, Flat fan, siphon principle, internal mixing Series 136.5**

---

### Accessories for series 136 please refer to page 1.27

---

**Diagram and Table:**

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>E [mm]</th>
<th>Mat. no.</th>
<th>1Y</th>
<th>35</th>
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</thead>
<tbody>
<tr>
<td>60°</td>
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<td>1Y 35</td>
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<table>
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<th>35</th>
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</thead>
<tbody>
<tr>
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<td></td>
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<tr>
<td>Brass plated</td>
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<td></td>
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</tbody>
</table>

<table>
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<th>p [bar]</th>
<th>V Water [l/h]</th>
<th>Spray dimensions</th>
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<tr>
<td>0.80</td>
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<td>2.60</td>
<td>3.70</td>
<td>1.83</td>
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<td>3.00</td>
<td>4.20</td>
<td>1.74</td>
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<td>4.40</td>
<td>1.71</td>
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<td>3.60</td>
<td>4.80</td>
<td>1.74</td>
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<td>3.80</td>
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<td>4.20</td>
<td>5.50</td>
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<td>5.40</td>
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<tr>
<td>6.00</td>
<td>7.40</td>
<td>2.22</td>
</tr>
</tbody>
</table>

E = narrowest free cross section (water)

Operational information:
Liquid flow of pneumatic atomizing nozzles with external mixing can be turned down to 0 with air pressure remaining constant.

Example Type Material no. (xx) = Ordering no.
for ordering: 136.516.xx.A2 + 1Y = 136.516.1Y.A2

---

Continued on next page.
## Pneumatic atomizing nozzles, Flat fan, siphon principle, internal mixing
### Series 136.5

**E = narrowest free cross section (water)**

### Spray dimensions

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
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<th></th>
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<th></th>
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<tbody>
<tr>
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**Example**

Type + Material no. (xx) = Ordering no.
for ordering: 136.525.xx.A2 + 1Y = 136.525.1Y.A2
Fine flat fan atomization with the aid of air or gas. Liquid pressure principle. External mixing of fluids.

**Applications:**
- Web dampening, cooling, humidification of goods
- Atomization of viscous liquids

**Series 136.6**

**Spray angle**

<table>
<thead>
<tr>
<th>Type</th>
<th>Mat. no. 1Y 35</th>
<th>E [mm]</th>
<th>Liquid pressure p [bar]</th>
<th>Spray dimensions</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td>0.15</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td>0.30</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Base plated</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>45°</td>
<td></td>
<td>0.4</td>
<td>1.40 0.07 80 115</td>
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</tr>
<tr>
<td>136.616.xx.A2</td>
<td></td>
<td>0.5</td>
<td>2.20 0.15 95 130</td>
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</tr>
<tr>
<td></td>
<td>316L SS</td>
<td>0.4</td>
<td>2.20 0.15 95 130</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brass plated</td>
<td>0.5</td>
<td>2.40 0.30 95 145</td>
<td></td>
</tr>
</tbody>
</table>

**Spray angle** 45°

- **Series 136.616.xx.A2**
  - Mat. no. 1Y 35
  - E [mm] 0.4
  - Liquid pressure p [bar]:
    - 0.07: 1.40 0.07 80 115
    - 0.15: 2.20 0.15 95 130
    - 0.30: 2.20 0.15 95 130
    - 0.35: 2.40 0.30 95 145

**Spray angle** 136.635.xx.A2

- Mat. no. 1Y 35
- E [mm] 0.5
- Liquid pressure p [bar]:
  - 0.07: 2.20 0.15 95 130
  - 0.15: 2.40 0.30 95 145

**Footnotes:**
- E = narrowest free cross section (water)
- Continued on next page.

**Legend:**
- 136.616.xx.A2
- 136.635.xx.A2
- E = narrowest free cross section (water)

**E. Lehner**
Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing
Series 136.6

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Mat. no</th>
<th>E [mm]</th>
<th>Liquid pressure $p$ [bar]</th>
<th>Spray dimensions</th>
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</thead>
<tbody>
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<td>0.80</td>
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<td>1.20</td>
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<td>1.60</td>
<td>2.70</td>
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<tr>
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<td>1.20</td>
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<td></td>
<td>1.60</td>
<td>1.60</td>
<td>2.70</td>
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<td></td>
<td></td>
<td>2.00</td>
<td>1.20</td>
<td>2.58</td>
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Example: Type + Material no. (xx) = Ordering no.

Continued on next page.
### Material Data

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<td>8.20</td>
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<td>8.60</td>
<td>0.75</td>
<td>510</td>
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<td>7.00</td>
<td>9.00</td>
<td>0.80</td>
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### Liquid Pressure

<table>
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<th>Liquid pressure p [bar]</th>
<th>V˙ Ar [m³/h]</th>
<th>V˙ Water [l/h]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.35</td>
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### Spray dimensions (Continued)

<table>
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<th>Type</th>
<th>Mat. no.</th>
<th>Diameter [mm]</th>
<th>B1 [mm]</th>
<th>B2 [mm]</th>
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</thead>
<tbody>
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<td>1.5</td>
<td>5.00</td>
<td>5.40</td>
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</tbody>
</table>

### Example


### Notes

- E = narrowest free cross section (water)
- Continued on next page.
## Pneumatic Atomizing Nozzles, Flat Fan, Pressure Principle, External Mixing
Series 136.6

<table>
<thead>
<tr>
<th>Spray Angle</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>1Y</th>
<th>35</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E = narrowest free cross section (water)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Operational Information:**
Liquid flow of pneumatic atomizing nozzles with external mixing can be turned down to 0 with air pressure remaining constant.

### Example

- **Type**: 136.691.xx.A2
- **Material no. (xx)**: 1Y
- **Ordering no.**: 136.691.1Y.A2

### Diagram
- **A1**: Liquid supply line
- **A2**: Control air for pneumatic valve
- **A3**: Atomizing air supply line
- **1**: Pneumatically controlled valve
- **Ordering no. 013.606.xx.10** (see Page 1.27)
- **2**: Pneumatic atomizing nozzle
- **Ordering no. 136.6xx.xx.xx**

### Cereal Dampening in a Mixing Drum

<table>
<thead>
<tr>
<th>Type</th>
<th>Mat. no.</th>
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<th>35</th>
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</table>

<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>1Y</th>
<th>35</th>
</tr>
</thead>
<tbody>
<tr>
<td>60°</td>
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<td>A1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Liquid pressure $p$ [bar]</th>
<th>$p$ [bar]</th>
<th>$V_\text{Air}$ [l/h]</th>
<th>$V_\text{Water}$ [l/h]</th>
<th>$V_\text{n Air}$ [m³/h]</th>
<th>$V_\text{n Water}$ [m³/h]</th>
<th>$B_1$ [mm]</th>
<th>$B_2$ [mm]</th>
</tr>
</thead>
<tbody>
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<td>1.40</td>
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<td>67.30</td>
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<td>92.30</td>
</tr>
<tr>
<td>1.80</td>
<td>50.00</td>
<td>16.30</td>
<td>2.40</td>
<td>64.60</td>
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<td>3.00</td>
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<td>48.60</td>
<td>18.80</td>
<td>2.80</td>
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<td>22.50</td>
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<td>58.00</td>
<td>27.30</td>
<td>4.20</td>
<td>77.00</td>
</tr>
</tbody>
</table>

### Notes
- A1: Liquid supply line
- A2: Control air for pneumatic valve
- A3: Atomizing air supply line
Pneumatic atomizing nozzles, **Full cone, pressure principle, internal mixing**

**Series 166.1**

Version with magnetic valve. Fine full cone atomization and fogging with air or gas. Liquid pressure principle. Internal mixing of fluids.

**Applications:**
- Humidification of air, cooling.

**Technical Data:**
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective system: IP 67
- Ambient temperature: 10 °C/+50 °C
- Cable length: 1.000 mm
- Material of gasket: EPDM

Accessories for series 166 please refer to page 1.28

**Example**

<table>
<thead>
<tr>
<th>Type</th>
<th>Material no. (xx)</th>
<th>Ordering no.</th>
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</thead>
<tbody>
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<td><strong>A</strong></td>
<td>303 SS</td>
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<table>
<thead>
<tr>
<th>Spray angle</th>
<th>Ordering no.</th>
<th>E [mm]</th>
<th>Liquid pressure (p) [bar]</th>
<th>Spray dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°</td>
<td>166.115.xx.A2</td>
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<td>0.80 4.70 1.50 0.30 1.20 7.00 1.80 2.80 9.10 3.30 4.40 3.00 5.20 7.00 5.80 8.90 5.80</td>
<td>166.115.16.A2</td>
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<tr>
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<td></td>
<td></td>
<td>0.80 4.70 1.50 0.30 1.20 7.00 1.80 2.80 9.10 3.30 4.40 3.00 5.20 7.00 5.80 8.90 5.80</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.80 4.70 1.50 0.30 1.20 7.00 1.80 2.80 9.10 3.30 4.40 3.00 5.20 7.00 5.80 8.90 5.80</td>
<td></td>
</tr>
</tbody>
</table>

\(E = \) narrowest free cross section (water) Continued on next page.
# Pneumatic Atomizing Nozzles, Full Cone, Pressure Principle, Internal Mixing

Series 166.1

<table>
<thead>
<tr>
<th>Spray Angle</th>
<th>Ordering No.</th>
<th>E (mm)</th>
<th>Liquid Pressure p (Bar)</th>
<th>Spray Dimensions</th>
</tr>
</thead>
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<td>16</td>
<td>Ø</td>
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<td></td>
<td>303 SS</td>
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<td>3.80 17.00 11.40 4.00 27.30 11.50 5.60 40.40 15.10 - - - - - -</td>
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<td>4.60 15.10 13.30 4.80 24.30 13.50 - - - - - - - - - - - -</td>
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</tr>
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<td></td>
<td></td>
<td>5.00 14.00 14.30 5.20 22.30 14.60 - - - - - - - - - - - -</td>
<td></td>
</tr>
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<td>5.80 12.40 16.20 6.00 21.40 16.70 - - - - - - - - - - - -</td>
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</tr>
</tbody>
</table>


E = narrowest free cross section (water)
### Pneumatic Atomizing Nozzles, Full Cone, Pressure Principle, Internal Mixing

**Series 166.2**

Version with magnetic valve. Fine full cone atomization and fogging with air or gas. Especially wide spray angle of 60°. Pressure principle. Internal mixing of fluids.

**Applications:**
- Humidification of air, cooling.

**Technical Data:**
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective System: IP 67
- Ambient temperature: 10 °C/+50 °C
- Material of gasket: EPDM

**Technical Details:**
- Pressure principle.
- Internal mixing of fluids.

**Applications:**
- Humidification of air, cooling.

**Technical Data:**
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective System: IP 67
- Ambient temperature: 10 °C/+50 °C
- Material of gasket: EPDM

**Accessories for series 166:**
Please refer to page 1.28

#### Spray Angle

<table>
<thead>
<tr>
<th>Mat. no.</th>
<th>Liquid pressure $p$ [bar]</th>
<th>Spray dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.7</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>0.7</strong></td>
<td>$V_{\text{Air}}$ [l/h]</td>
<td>$V_{\text{Water}}$ [l/h]</td>
</tr>
<tr>
<td></td>
<td>$p_{\text{Air}}$ [bar]</td>
<td>$p_{\text{Water}}$ [bar]</td>
</tr>
</tbody>
</table>

**Example Type + Material no. (xx) = Ordering no.**

Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing
Series 166.4

Version with magnetic valve. Particularly fine flat fan atomization with air or gas. Siphon principle. Internal mixing of fluids.

Applications:
- Web dampening, cooling, humidification of goods.

Technical Data:
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective system: IP 67
- Ambient temperature: 10 °C/+50 °C
- Cable length: 1.000 mm
- Material of gasket: EPDM

Accessories for series 166 please refer to page 1.28

### Technical Data

**Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing**

Series 166.4

#### Applications:
- Web dampening, cooling, humidification of goods.

#### Technical Data:
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective system: IP 67
- Ambient temperature: 10 °C/+50 °C
- Cable length: 1.000 mm
- Material of gasket: EPDM

Accessories for series 166 please refer to page 1.28

### Spray angle

<table>
<thead>
<tr>
<th>Type</th>
<th>Ordering no.</th>
<th>Mat. no.</th>
<th>spray angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>166.414.xx.A2</td>
<td>0.7</td>
<td>0.7</td>
<td>45°</td>
</tr>
<tr>
<td>136.462.xx.A2</td>
<td>1.5</td>
<td>0.7</td>
<td>45°</td>
</tr>
</tbody>
</table>

| E = narrowest free cross section (water) | Continued on next page. | **Example** | Type + Material no. (xx) = Ordering no. | for ordering: 166.414.xx.A2 + 16 = 166.414.16.A2 |

---

**Series 166.4**
### Pneumatic atomizing nozzles, Flat fan, pressure principle, internal mixing
Series 166.4

#### Spray angle

<table>
<thead>
<tr>
<th>Ordering no.</th>
<th>Type</th>
<th>Mat. no.</th>
<th>Spray angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>166.425.xx.A2</td>
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<td>080</td>
<td>60°</td>
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<tr>
<td>166.452.xx.A2</td>
<td>1.5</td>
<td>1.00</td>
<td>80°</td>
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<tr>
<td>166.433.xx.A2</td>
<td>0.4</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

#### E = narrowest free cross section (water)

**E = narrowest free cross section (water)**

**Example Type + Material no. (xx) = Ordering no.**

**for ordering: 166.425.xx.A2 + 16 = 166.425.16.A2**

**1.24**
Pneumatic atomizing nozzles, Flat fan, pressure principle, external mixing
Series 166.6

Version with magnetic valve.
Fine flat fan atomization with the aid of air or gas.
Liquid pressure principle.
External mixing of fluids.

Applications:
Web dampening, cooling, humidification of goods, atomization of viscous liquids.

Technical Data:
- Service pressure: 0-6 bar
- Voltage: 24 V DC
- Power: 8 W
- Switching frequency: ca. 500/min
- Protective system: IP 67
- Ambient temperature: 10 °C/+50 °C
- Cable length: 1.000 mm
- Material of gasket: EPDM

Accessories for series 166 please refer to page 1.28

Series 166.6

<table>
<thead>
<tr>
<th>E</th>
<th>0.07</th>
<th>0.15</th>
<th>0.30</th>
<th>0.35</th>
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<tbody>
<tr>
<td>E0</td>
<td>V_Air [l/h]</td>
<td>V_Water [l/h]</td>
<td>V_Air [l/h]</td>
<td>V_Water [l/h]</td>
</tr>
<tr>
<td>----</td>
<td>------------</td>
<td>----------------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>166.616.xx.A2</td>
<td>166.654.xx.A2</td>
<td>0.4</td>
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<td>1.00</td>
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<td>1.68</td>
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<td>2.03</td>
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<td>2.20</td>
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<td>1.92</td>
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<td>2.58</td>
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<td>2.10</td>
<td>4.30</td>
<td>2.00</td>
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<td>2.07</td>
<td>4.90</td>
<td>2.20</td>
<td>2.76</td>
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<td>2.19</td>
<td>5.50</td>
<td>2.60</td>
<td>2.79</td>
</tr>
<tr>
<td>3.20</td>
<td>2.19</td>
<td>6.10</td>
<td>3.00</td>
<td>2.73</td>
</tr>
<tr>
<td>3.60</td>
<td>2.22</td>
<td>6.70</td>
<td>3.60</td>
<td>2.76</td>
</tr>
<tr>
<td>4.00</td>
<td>2.22</td>
<td>7.30</td>
<td>4.00</td>
<td>2.76</td>
</tr>
<tr>
<td>4.40</td>
<td>2.22</td>
<td>7.90</td>
<td>4.40</td>
<td>2.76</td>
</tr>
<tr>
<td>4.80</td>
<td>2.22</td>
<td>8.50</td>
<td>4.80</td>
<td>2.76</td>
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<tr>
<td>5.20</td>
<td>2.22</td>
<td>9.10</td>
<td>5.20</td>
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<tr>
<td>5.60</td>
<td>2.22</td>
<td>9.60</td>
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<td>2.76</td>
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<tr>
<td>6.00</td>
<td>2.22</td>
<td>10.20</td>
<td>6.00</td>
<td>2.73</td>
</tr>
</tbody>
</table>

E = narrowest free cross section (water)

Continued on next page.
### Pneumatic Atomizing Nozzles, Flat Fan, Pressure Principle, External Mixing

**Series 166.6**

#### Spray Nozzle Parameters

<table>
<thead>
<tr>
<th>Spray Angle</th>
<th>Ordering no.</th>
<th>Liquid Pressure $p$ [bar]</th>
<th>Spray Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td>0.07</td>
<td>0.15</td>
</tr>
<tr>
<td>60°</td>
<td>166.626.xx.A2</td>
<td>1.00</td>
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<tr>
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<td>166.682.xx.A2</td>
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<td>1.40</td>
</tr>
<tr>
<td></td>
<td>166.691.xx.A2</td>
<td>1.00</td>
<td>1.40</td>
</tr>
</tbody>
</table>

#### Notes
- $E =$ narrowest free cross section (water)
- Example: Type + Material no. (xx) = Ordering no.
  - for ordering: 166.626.xx.A2 + 16 = 166.626.16.A2
Accessories for pneumatic atomizing nozzles
Series 136.1 - 136.6

Regulating device and shutting-off needle:

- Pneumatically controlled valve
  Opening pressure 2.1 bar, max. 180 cycles/min.

- Quick-cleaning device

- Regulating device with quick-reaching needle

Example for ordering: 013.600.xx.10 + 16 = 013.601.16.10
Accessories for pneumatic atomizing nozzles
Series 136 and 166

Screwed connection for hose diameter 6 mm

![Image of screwed connection for hose diameter 6 mm]

Ordering no.
For all nozzles of the series 136 and 166

095.016.35.11.79.0

Material: Brass plated
Weight: 12 g

Angled screwed connection for hose diameter 6 mm

![Image of angled screwed connection for hose diameter 6 mm]

Ordering no.
For all nozzles of the series 136 and 166

095.016.35.13.13.0

Material: Brass plated
Weight: 35 g

Screwed connection for hose diameter 8 mm

![Image of screwed connection for hose diameter 8 mm]

Ordering no.
For all nozzles of the series 136 and 166

095.016.35.11.80.0

Material: Brass plated
Weight: 14 g

Angled screwed connection for hose diameter 8 mm

![Image of angled screwed connection for hose diameter 8 mm]

Ordering no.
For all nozzles of the series 136 and 166

095.016.35.13.14.0

Material: Brass plated
Weight 35 g
Pneumatic atomizing nozzles, Full cone, siphon principle, internal mixing Series 140

Particularly fine full cone atomization. Siphon principle. Internal mixing of fluids. Integrated regulating device.

Applications:
Lubrication, cooling, humidification of air.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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<tbody>
<tr>
<td>20° - 30°</td>
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<td>500</td>
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<td>0.75</td>
<td>200</td>
<td>2.50</td>
<td>7.00</td>
</tr>
</tbody>
</table>

E = narrowest free cross section (water)

Assembly scheme

Accessories:
Gasket
014.040.72
7.8 x 12 x 1 (EWP 210)

Nipple
014.010.30.04
(Material brass)
Weight: 17 g

Weight brass: 70 g
The ViscoMist™ series offers independent regulation of both atomizing air and fan air, which provides the user with infinite control over the viscous fluid’s spray pattern and droplet size.

The ViscoMist™ nozzle features a standard ‘Liquid Shut-Off/ Clean-Out Needle’ function. This design element activates and deactivates the liquid supply, while simultaneously removing excess fluid from the fluid nozzle preventing clogging. This feature is especially vital when the viscous liquids are being applied in continuous process environments.

The modular design of the ViscoMist™ allows maximum flexibility to meet the exact spray requirements.

Interchangeable air caps and various flow capacities are available to suit any spraying application needs.

One nozzle – three spray characters
- Solid stream
- Full cone
- Flat fan
- Independent regulation of liquid, atomizing air and fan air
- Fluid circulation possible (Nozzle body with 5 connections)

Outside mixing to spray viscous liquids, for example:
- Coating
- Moisturising
- Lubrication
- Glazing
- Sanitising

Fluid cap options
Ø 0.38 mm to 2.54 mm

Valve position
Normally closed, fail-safe with loss of air

Signal air pressure
Min. 2 bar
Max. 3 bar

Cycles per minute (short term)
180 cycles/min

Material
1Y (316L SS)

Ports
01 (1/8 NPT (F))
11 (1/8 BSPP (F))

Flow rate range
- Water: 7.8 to 307 l/h, at 2 bar
- Air: 7.5 to 32 m³/h i.N., at 2 bar

Further information and ordering data on request.