Differential Pressure Devices
Orifices / Nozzles / Venturi Tubes and Nozzles / (Restriction) Orifice Plates
Measuring Flanges

Orifice Plate with Female Face

Venturi Tube

Orifice Plate with Annular chamber in section

Orifice with Annular Chamber
(Starting from NPS 2 not over Class 600)

Annular chamber orifices consist of 2 fitting rings between which a measuring disc is clamped. Pressure is tapped via the annular gap directly on the front and rear side of the measuring disc.

The annular gaps lead to annular chambers, from which the pressure is tapped via the tapping nozzles.

The annular chamber orifice is advantageous in that the chamber allows uneven pressure ratios on the measuring disc to be equalised. And in that the measuring disc is able to be replaced.

We manufacture the orifices in all materials requested and with corresponding certifications.

Orifice with Individual Bore
(Starting from NPS 2)

Orifices have a stronger outer ring which allows the tapping nozzle to be fitted directly on the orifice plate. Pressure is tapped via single bores. The orifice is clamped between normal flanges.

They are mainly manufactured from heat-resistant or stainless steel, or from special material when requested.

Orifice Plates (Starting from NPS 2)

Orifice plates are measuring discs that are fixed in between special orifice flanges. As the pressure pulse cannot be tapped directly at the measuring disc, pressure taps are conducted via bores in the flange (flange pressure tap) or by tapping the tubing (D:D/2 pressure tap).

Compared to all other differential pressure devices, orifice plates are the most cost-effective.

We manufacture the orifice plates from all materials requested with the desired certifications that correspond to these - mainly, however, in CrNi steel.

Welded devices (Starting from NPS 2)

Differential pressure devices to be welded into installations are mainly manufactured out of heat-resistant, stainless, or special material.

We manufacture them in all forms, chiefly as orifices with single bore and venturi nozzles.

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**Nozzles** (starting from NPS 2)
Standard nozzles are clamped between flanges either directly or with 2 fitting rings. Pressure is tapped via single bores or via annular gaps directly on the front or rear side. The annular gaps lead to an annular chamber, from which the pressure is tapped via tapping nozzles. The following are available:
- ISA-1932 nozzles
- Long-radius nozzles
- 1/4-circle nozzles

**Venturi Nozzles** (starting from NPS 2)
Standard venturi nozzles have a low residual pressure loss due to the rounded inlet edge and the conical gradient. The outlet cone is usually shortened with this design. Pressure can be tapped either directly as a single bore, or via a ring line.

**Meterrun (NPS ¼ to NPS 2)**
Meterruns consist of an orifice plate, as well as the uninterrupted in-feed and out-feed sections stipulated by the standard. Differential pressure devices in the form of a meterrun are supplied predominantly for nominal widths DN 10 to DN 50. The tube for the in-feed and out-feed is a special tube with a guaranteed surface roughness, dimensional stability and roundness.

**Venturi Tubes** (starting from NPS 2)
Out of all the Differential pressure devices, venturi tubes have the lowest residual pressure loss and require the shortest in-feed and out-feed sections. We produce the venturi tubes in various designs, all materials requested, and with the desired certifications that correspond to these. Mainly from solid rods in order to avoid longitudinal and circular weld seams.

**Special Devices**
Deviating from the principle of scaling down tubing cross-sections, special devices allow the kinetic flow energy to be converted into differential pressure without any significant change to the cross-section. The integrating pressure tube, as well as the Pitot tube or Prandtl pressure tube, detects the plus pulse via bores in the direction of the flow, and the minus pulse via bores at right angles to these in order to obtain a measurement.
The advantage here is the low residual pressure loss, reduced assembly costs, and, in the case of large nominal widths, the relatively low price.
It is important to note that this type of device uses very little differential pressure and gets dirty more easily.

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## Selection of Choke Devices

The selection of choke devices should be made according to the type of device, price (relative), residual pressure loss in-feed section, and in-feed section.

<table>
<thead>
<tr>
<th>Type of Choke Device</th>
<th>Price (Relative)</th>
<th>Residual Pressure Loss</th>
<th>In-feed Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annular chambered and standard orifice</td>
<td>Low</td>
<td>Medium</td>
<td>Higher</td>
</tr>
<tr>
<td>Orifice plate</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Standard nozzle</td>
<td>Low</td>
<td>High</td>
<td>None required</td>
</tr>
<tr>
<td>Venturi nozzle</td>
<td>Low</td>
<td>High</td>
<td>None required</td>
</tr>
<tr>
<td>Meterrun</td>
<td>Low</td>
<td>High</td>
<td>None required</td>
</tr>
<tr>
<td>Venturi tube</td>
<td>Low</td>
<td>High</td>
<td>None required</td>
</tr>
<tr>
<td>Pressure tube</td>
<td>Low</td>
<td>High</td>
<td>None required</td>
</tr>
</tbody>
</table>

### Optional Accessories (available upon request)

- Shut-off or control valves
- (Orifice) flange in accordance with DIN, ANSI and JIS
- Condensation and equalisation vessels
- Screw connections and fittings
- Valve blocks
- Thermometer protective hulls
- Evaluation electronics
- Signal converter
- Custom-made products according to customer request or drawing

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**Download our detailed questionnaire for calculating a differential pressure devices from our website [www.barthel-armaturen.de](http://www.barthel-armaturen.de) in the measuring and controlling engineering section.**

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