High-Pressure Water Accessories

Overview
WOMA designs, manufactures and markets high-pressure water jetting accessories for cleaning, decoating, decontamination, paint stripping, surface preparation, cutting and demolition. WOMA’s high-pressure water accessories meet the requirements of the “Richtlinien für Flüssigkeitsstrahler” ZH 1/406, October 1987.

**Accessory programme:**

- Flexible high-pressure hoses for operating pressures up to 4,000 bar and nominal widths between 4 mm and 32 mm for connecting pressure generating units and water tools.
- High-pressure adapters for connecting high-pressure hoses as well as hoses and pressure generating units or water tools.
- Strain relief devices for safe positioning of high-pressure hoses.
- Sewer cleaning nozzles for operating pressures up to 300 bar with several orifices, directed sideways or backwards.
- Self-aligning nozzle for operating pressures up to 200 bar for bottom sewer cleaning.
- Pipe cleaning nozzles for operating pressures up to 2,500 bar with several orifices, directed sideways or backwards, for tube bundle cleaning.
- Pipe cleaning nozzles for operating pressures up to 1,400 bar for application in cleaning units for large-diameter pipes.
- Whirl jet nozzles for operating pressures up to 750 bar for cleaning partially or fully blocked tube bundles.
- Round jet nozzles with continuous flow channel for operating pressures up to 2,000 bar for water tools.
- Round jet nozzles with sapphire inserts for operating pressures up to 3,500 bar for ultra-high pressure water tools.
- Fan jet nozzles for operating pressures up to 2,000 bar for cleaning tools.
- Injection nozzles for operating pressures up to 400 bar for sucking and mixing of abrasives in water-abrasive cleaning tools.
- Cutting heads for operating pressures up to 3,000 bar (resp. 4,000 bar) for sucking and mixing of abrasives in on-site cutting units (resp. Jet Cutting units).
- Abrasive storage vessels and abrasive hoses for storage and transport of abrasives.
- Foot valves for operating pressures up to 1,500 bar – mechanically or electrically operated.
- Multiple consumer systems for operating pressures up to 3,000 bar for running several water tools simultaneously with one pressure generating unit.
- Accessories for high-pressure hot water jetting systems for operating pressures up to 800 bar and water temperatures up to 95°C.
- Positioning devices for operating pressures up to 1,400 bar with working lengths up to 12 m for vessel cleaning tools.
- Body support and splash guard for water tools.
- Protective clothes for water jetting operators.
- First Aid cards for water jetting operators.

**Self-aligning nozzle type Skip-Jack with fan nozzle for bottom sewer cleaning**
Decoating of pipelines

Cleaning of cement kilns

Internal cleaning of pipes

Water jet assisted pile driving

Decoating of pipelines

Hydraulically driven water tool with round jet nozzle type 1 for concrete hydrodemolition

Pneumatically driven on-site ultra-high pressure cutting system with cutting head type Cutting Head 3000 and round jet nozzle type 10 for demolition of reinforced concrete and steel

Positioning device type PV 5000-1 with self propelling rotating water tool Tankmaster® for autoclave cleaning

Special accessory with fan jet nozzle type 95 for hot descaling of steel

Cleaning of cement kilns
WOMA designs and manufactures high-pressure water systems, tools and accessories for the following tasks:

- Internal cleaning of vessels, autoclaves and containers
- Cleaning of sewers, pipes, tube bundles etc.
- Paint stripping from gridirons and body skids
- Maintenance of heavy technical equipment
- Rehabilitation of structures and buildings
- Environmentally friendly surface preparation in corrosion protection
- Heavy concrete removal and reinforcement bar exposing
- Emission-free enamel stripping and decoating of surfaces
- Descaling and derusting of steel
- Cutting and demolition of construction and heavy equipment

High-pressure water tool with rotating nozzle carrier head and foot valve type FV 1500-V-E-EXI for tube bundle cleaning

Water as a tool for a clean environment

Exposing reinforcement bars

Removal of explosives from shells

Jet-Cutting of foam
Selection of Nozzles

Calculation software
WOMA offers computer assisted calculation programmes for estimating volume flow rate, nozzle diameter, operating pressure, and hydraulic power. The diagramme shows just some examples of calculated relations.

The WOMA Nozzle Flow-Chart
The WOMA Nozzle Flow-Chart enables the estimation of a nozzle index depending on water volume flow rate and operating pressure. If, in turn, the nozzle index is given, the permissible values for operating pressure and volume flow rate can be estimated.

Attention:
The chart is valid only for operating pressures up to 1,500 bar (22,000 psi)!

Application of the WOMA Nozzle Flow-Chart:
Example: Volume flow rate: 90 l/min, Operating pressure: 900 bar, Nozzle index ?

Solution:
Mark the volume flow rate value at the horizontal axis → go upward up to the horizontal 900 bar-line → the intersection point is crossed by an inclined index-line → follow this line up to the upper rim of the diagram → read index: 3.5 → by using this index value, a suitable nozzle can be selected from WOMA’s nozzle catalogue.
High-Pressure Hoses

WOMA’s high-pressure hose programme contains hoses with the following technical parameters:

<table>
<thead>
<tr>
<th>Nominal width in mm</th>
<th>Maximum operating pressure in bar</th>
<th>Maximum delivery length in m</th>
<th>Specific weight in kg/m</th>
<th>Bend radius in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 4</td>
<td>1,000/2,800</td>
<td>200</td>
<td>0.10/0.29</td>
<td>75/140</td>
</tr>
<tr>
<td>DN 5</td>
<td>1,000/1,400</td>
<td>200</td>
<td>0.20/0.25</td>
<td>95/120</td>
</tr>
<tr>
<td>DN 6</td>
<td>2,500/4,000</td>
<td>200</td>
<td>0.41/0.54</td>
<td>150/200</td>
</tr>
<tr>
<td>DN 8</td>
<td>1,000</td>
<td>200</td>
<td>0.25</td>
<td>110</td>
</tr>
<tr>
<td>DN 10</td>
<td>750/1,000</td>
<td>200</td>
<td>0.22/0.40</td>
<td>120/175</td>
</tr>
<tr>
<td>DN 12</td>
<td>1,400/2,100</td>
<td>200</td>
<td>0.40/0.60</td>
<td>175/200</td>
</tr>
<tr>
<td>DN 20</td>
<td>2,500</td>
<td>200</td>
<td>0.75</td>
<td>200</td>
</tr>
<tr>
<td>DN 25</td>
<td>1,250</td>
<td>100</td>
<td>0.87/1.01</td>
<td>180/250</td>
</tr>
<tr>
<td>DN 32</td>
<td>700</td>
<td>100</td>
<td>2.08</td>
<td>350</td>
</tr>
<tr>
<td>DN 100</td>
<td>560</td>
<td>100</td>
<td>2.59</td>
<td>460</td>
</tr>
</tbody>
</table>

1 mm = 0.04 in 1 bar = 14.5 psi 1 m = 3.28 ft 1 kg = 2.205 lb

Estimation of pressure losses in high-pressure hoses

The WOMA Pressure Loss-Chart enables the estimation of relative pressure losses in hoses depending on water volume flow rate and nominal hose width. **Attention:** Pressure losses in armatures are not considered!

Application of the WOMA Pressure Loss-Chart:

**Example:** Volume flow rate: 100 l/min, Nominal width: 12 mm, Hose length: 40 m, Complete pressure loss?

**Solution:** Mark the volume flow rate value at the horizontal axis go upward up to the inclined DN 12-line from the intersection point go to the left meeting the pressure loss-axis read value: 1.3 bar/m → complete pressure loss: 1.3 bar/m → 40 m = 52 bar (755 psi)