



Water as a tool
for a clean environment

High-Pressure Water Accessories

Overview

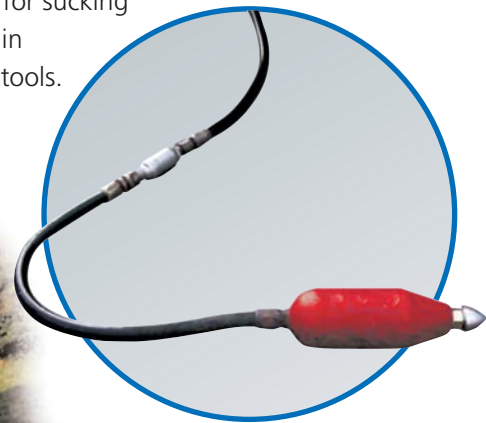


Hoses · Nozzles · Valves · Applications

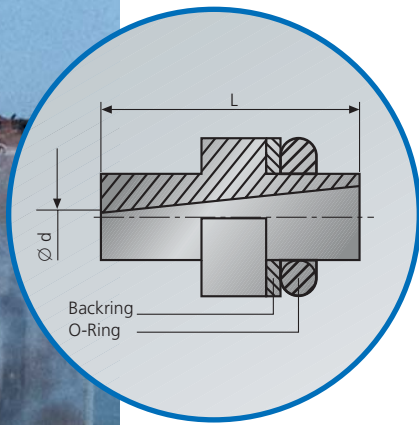
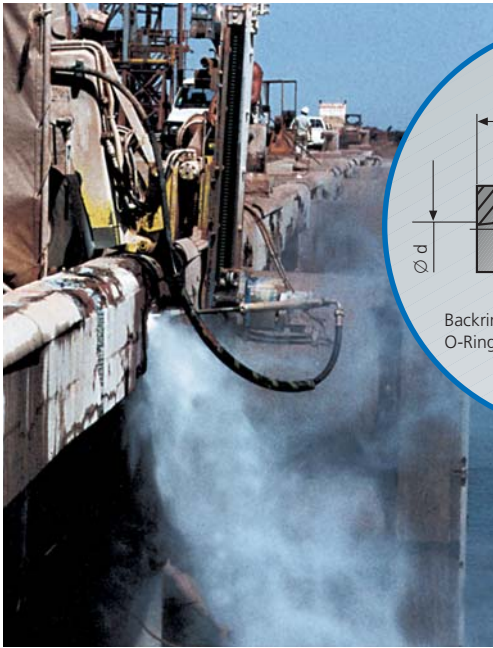
WOMA designs, manufactures and markets high-pressure water jetting accessories for cleaning, decoating, decontamination, paint stripping, surface preparation, cutting and demolition. WOMA's high-pressure water accessories meet the requirements of the "Richtlinien für Flüssigkeitsstrahler" ZH 1/406, October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



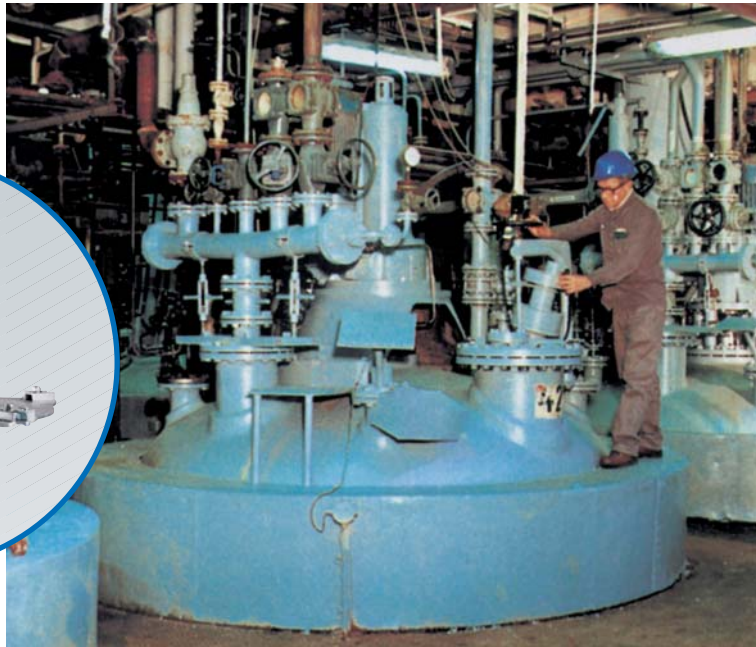
Pneumatically driven on-site ultra-high pressure cutting system with cutting head type **Cutting Head 3000** and round jet nozzle type **10** for demolition of reinforced concrete and steel



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



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



Water jet assisted pile driving

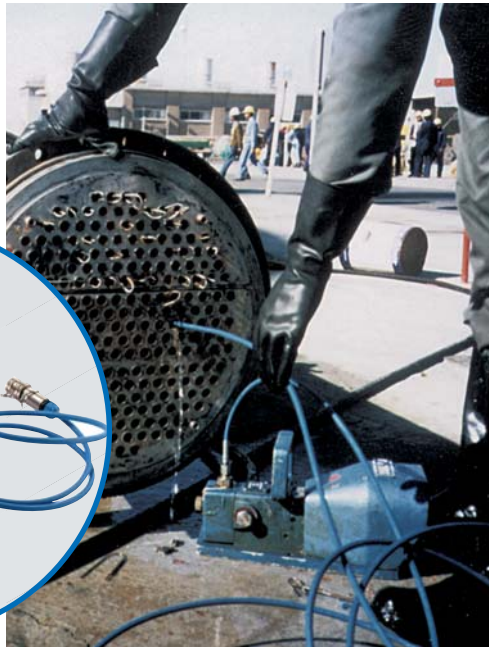


Internal cleaning of pipes



Decoupling of pipelines

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

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

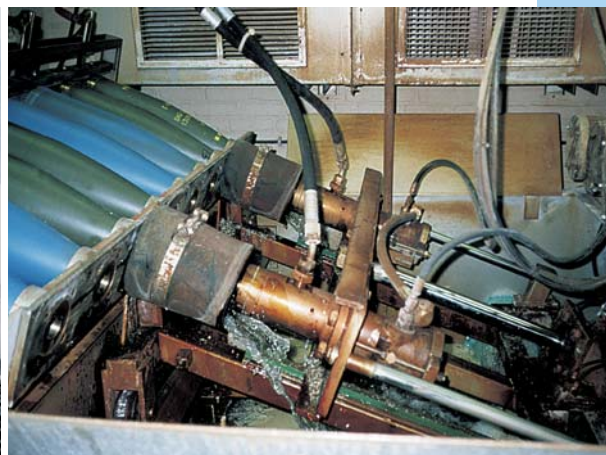
- ▶ Internal cleaning of vessels, autoclaves and containers
- ▶ Cleaning of sewers, pipes, tube bundles etc.
- ▶ Paint stripping from gridirons and body skids
- ▶ Maintenance of heavy technical equipment
- ▶ Rehabilitation of structures and buildings
- ▶ Environmentally friendly surface preparation in 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



Exposing reinforcement bars



Removal of explosives from shells



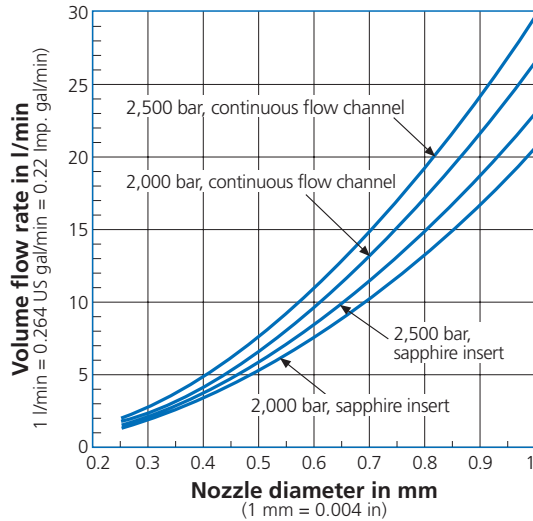
Jet-Cutting of foam



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.

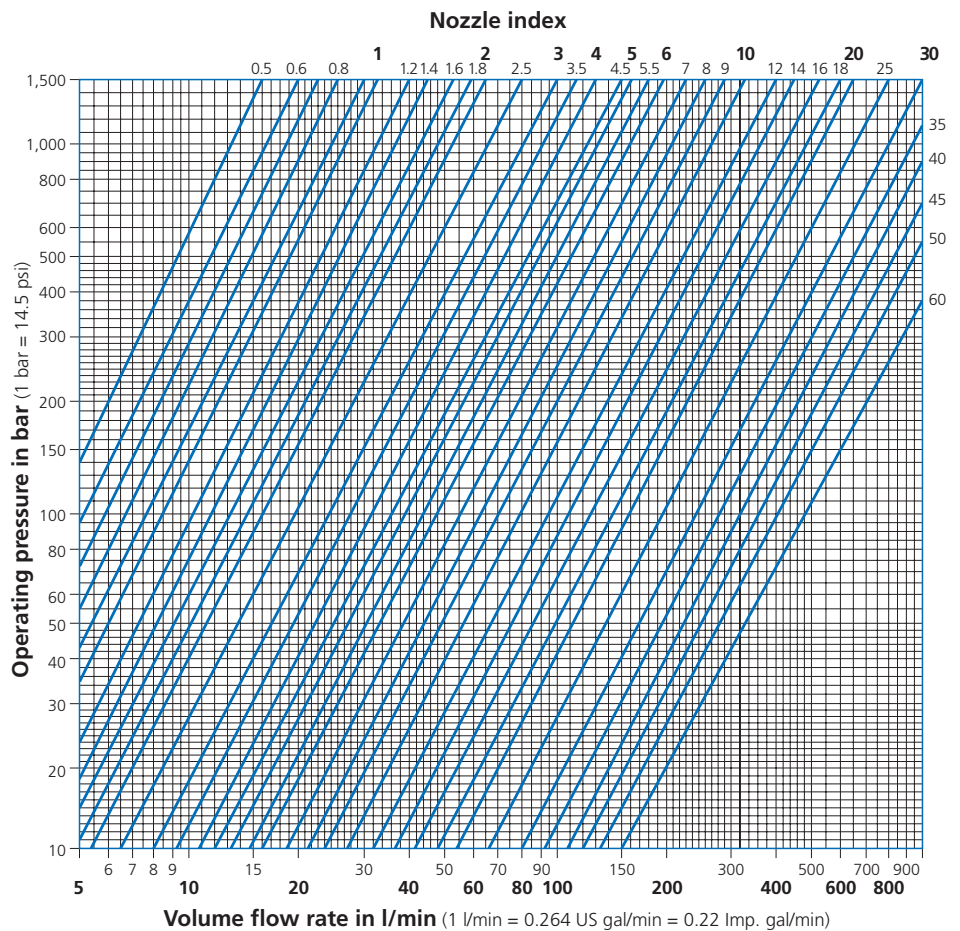


The WOMA Nozzle Flow-Chart

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 Apparatebau GmbH

Werthaus Str. 77 – 79 · D-47226 Duisburg
 P.O. Box 14 18 20 · D-47208 Duisburg
 Phone +49 2065 304-0 · Fax +49 2065 304-200
 Internet: www.woma.de

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

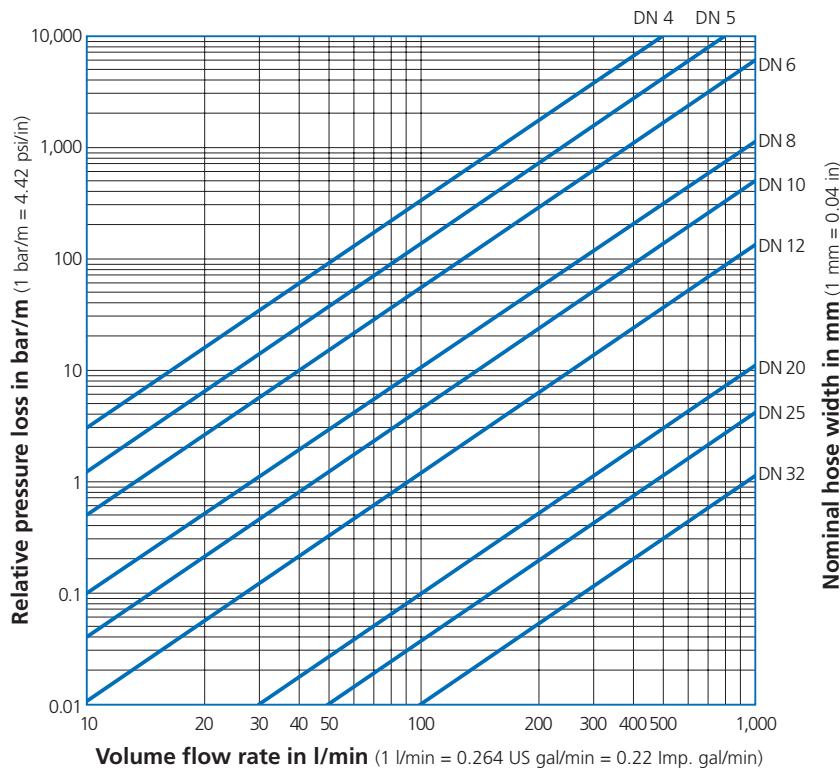
Nominal width in mm	Maximum operating pressure in bar	Maximum delivery length in m	Specific weight in kg/m	Bend radius in mm
DN 4	1,000/2,800	200	0.10/0.29	75/140
DN 5	1,000/1,400	200	0.20/0.25	95/120
	2,500/4,000	200	0.41/0.54	150/200
DN 6	1,000	200	0.25	110
DN 8	750/1,000	200	0.22/0.40	120/175
	1,400/2,100	200	0.40/0.60	175/200
	2,500	200	0.75	200
DN 10	1,250/2,000	100/200	0.87/1.01	180/250
DN 12	1,100/1,400	100/200	1.22/1.36	200/300
DN 20	1,000/1,400	100/200	2.10/1.82	280/350
DN 25	700	100	2.08	350
DN 32	560	100	2.59	460

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)

Delivery Programme

High-pressure plunger pumps
 High-pressure water jet systems
 High-pressure water tools and accessories

Fields of Application

Agriculture
 Automotive and aviation industry
 Beverage industry
 Cement industry
 Chemical industry
 Construction and concrete industry
 Engineering industry
 Food industry
 Glass, porcelain, ceramic industry
 Iron, steel and metal industry
 Mining
 Municipal services
 Offshore industry
 Power industry
 Public transport
 Pulp and paper industry
 Ship building
 Wood working industry