High pressure technology that sets the standard

High pressure pumps
Ultra high pressure pumps
Pump units
**Quality**
The most modern development techniques e.g. FEM Analysis are used during the design phase to achieve optimal component configuration. Our computer controlled workshop ensures constant dimensional accuracy. Hammelmann components and products are subjected to stringent quality control procedures. All pumps, pump units and accessories are tested under maximum load in our modern test facility before delivery.

Hammelmann works in accordance with and is certified to the DIN EN ISO 9001 quality management standard.

**Water quality**
A clean medium is an advantage for all high pressure pumps. Abrasive materials in the water will shorten the lifetime of valves, valve seats and water jetting tools. An advantage of the dynamic plunger seal with labyrinth insert is that each stroke of the plunger washes away abrasive particles.

**Vertical pump configuration**
Our three and five cylinder high pressure pumps are mounted vertically. This offers certain advantages:

- The crosshead and plunger weights are neutralised within the sealing system, effectively reducing wear on all oscillating components.
- Automatic air venting is ensured which greatly decreases the possibility of cavitation.
- Enables construction of very compact units with all important components accessible from all around the pump. This simplifies maintenance works.
- The ability to position the pump completely within the framework reduces the width of units further enhancing compactness.
- Linearly aligned forces of gravity between the pump and the diesel engine reduce vibration.
**Practical ancillary components**

**Water supply**
A complete water supply system comprises header tank, boost pump and fine filter to compensate the varying on site supply conditions. Cooling water and bypass water are returned to the header tank. Advantages: lower water consumption, drainage lines are eliminated.

The header tank, boost pump and bypass line are all made from nonrusting materials.

**System status monitoring**
Monitoring water and oil pressures prevents possible pump damage by cavitation or lack of oil. Water temperature, filter differential pressure, max. operating pressure and drive motor/engine condition can also be monitored. The unit shuts down immediately preset limits are reached.

**Boost pump**
The boost pump in combination with the header tank ensures that optimal operating conditions exist for the high pressure pump. The boosters are belt driven on diesel powered units and by independent E-motor on electrically powered units.

**Electronic speed regulation for diesel powered units**
When the required working pressure is entered into the control computer the engine speed will automatically adjust to achieve it. When the pump or jetting tool switches to bypass the engine speed automatically drops to idling. This cuts down wear and saves on fuel costs.

**Hose reels**
Manual or hydraulically powered hose reels store hose neatly and ease the work on site. Hose can be wound off and on when pressurised.
High and ultra high pressure units

For the many various applications pumps are combined with systems to form self contained units. Our standard range includes stationary units with diesel or electric drive and mobile units for either on site or public road use.

Compactness, a strongly constructed frame and good access to components are the basic design principles.

Hammelmann electrically driven units incorporate NEMA specification motors and control components. Motor control options include soft start and VFD starters to latest control technology. Electric motors and controls are optionally available in explosion proof design.

The vertically acting forces of gravity allow the unit to be deployed without need for special foundations or anchors.

Diesel unit base frames have space saving integral fuel tanks.

Electric or diesel powered units can be supplied with sound dampened covers or built into containers. Due to its compactness even a 5 cylinder high pressure pump with a 310 HP diesel engine will fit neatly into a 10 ft. container.
Strong, compact crank sections built for continuous duty

Crank section
• The crank sections' calculations are made employing the “Finite element method” resulting in designs that ensure a long working life under continuous load.
• An integral speed reducer using twin helical gears arranged in herringbone configuration ensures smooth running and even power transmission without axial load to the bearings. A selection of gear ratios is available to allow the optimal choice of driver.
• Low noise level.

Pressurised lubrication system
• All moving parts are subjected to force fed lubrication.
• The pressurised circulating oil lubrication system protects the high pressure pump even under extreme operating conditions such as inclined working, continual changes in demand and very high or very low ambient/medium temperatures.
• A micro oil filter positioned in the pressurised line keeps the oil supply clean minimising wear on components and lengthening service intervals.
• An integral oil cooler controls temperature.

Pressure regulating valves
Manually or pneumatically actuated pressure regulating and bypass valves set the maximum operating pressure and enable the use of dry shut off valves in the pressure lines. When switched to bypass the medium flows without pressure to waste or to tank.

Operation of an eccentric lever on manually actuated valves results in immediate pressure relief which is a substantial safety advantage.

Electropneumatically controlled valves can be fitted with a solenoid to automate the bypass switching function.

Conversion kits
All Hammelmann high and ultra high pressure pumps can be converted with ease to different pressure/flow rate combinations.
Proven design - minimal components - high reliability

Pump head
- The pump head with antechamber is designed for high reliability. The minimal number of components, especially seals, are clear evidence of this.
- The valve housing is not subjected to alternating stress. This special design eliminates the risk of fatigue cracking and keeps pressure loaded surfaces to an absolute minimum resulting in a correspondingly reduced force.
- Parts subjected to constant loading and unloading are rotationally symmetrical and have surfaces treated to prevent metal fatigue. Long life and reliability are features of Hammelmann pump head components.

Sealing systems
The sealing systems can be matched to differing pumping duties. In addition to three standard types special designs are available for abrasive, aggressive and temperature sensitive mediums. Each individual cylinder is immersed in the medium providing the advantage of automatically balancing the temperature to prevent overheating.

Eventual leakage is retained within the suction chamber. High pressure medium cannot under any circumstances escape the chamber which is only sealed against suction pressure.

Friction free plunger seal
The patented* Hammelmann frictionfree plunger assembly has NO seals and NO packings in the high pressure area. This noncontacting sealing system is a metallic labyrinth design with controlled clearances for minimum leak and maximum pressure drop. This design is well proven to provide extended service lifetimes and allow for long intervals between scheduled maintenance.

* Patented in Germany and other countries.
**Dynamic plunger seal**

This further development of the low wear labyrinth seal features a unique, replaceable labyrinth insert. The insert is subjected to dynamic force which maintains the seal between it and the plunger. This metal to metal seal is particularly suitable for high and ultra high pressures. The small sealing area reduces friction on the plunger and combines good mechanical efficiency with very high volumetric efficiency. The special characteristics of this design are the minimal number of components and the ease of assembly.

**Uniflow piston seal assembly**

As with all Hammelmann seal assemblies the Uniflow system is always immersed in the medium. The medium passes to the pressure chamber through the hollow plungers which ensures an absolutely even fluid transportation in both upward and downward strokes of the plungers. Acceleration of the liquid column is eliminated resulting in low suction pulsation. The ceramic coated plungers are sealed either by packings or the low wear labyrinth system. The Uniflow sealing system is especially suitable for pumping high volumes.
**Functional electronics**

**Controls**

Utilising electronics makes life easier. Diesel powered units are controlled by an ES1 computer which can be programmed to display data in 12 different languages. It takes over all control and monitoring functions keeping the operator fully informed via a user friendly menu.

The control signals are given either by a jetting tool fitted with a control cable or by radio remote control.

**ES1 features and their applications**

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<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>Select pressure or r.p.m. control</td>
<td>Choice of operational mode to suit the job to be done</td>
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<tr>
<td>Adjust minimum pressure</td>
<td>Ensures constant quality of work by automatically compensating tool wear</td>
</tr>
<tr>
<td>Remote control / Radio remote control</td>
<td>Start, Stop, Increase pressure, Decrease pressure and other commands available at the jetting area</td>
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<tr>
<td>Select „Pressure step“</td>
<td>Enables one pump to be used with one or more performance conversion kits</td>
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<td>Fault display in clear text</td>
<td>Provides detailed information on faults reducing down time</td>
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<tr>
<td>Limit max. pressure</td>
<td>Precise monitoring. No need to check overpressure safety elements after overpressure cut out</td>
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<td>Function menus</td>
<td>Allows checking of various unit functions without having to start and run the pump unit</td>
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<tr>
<td>Flush fitting cabinet for enclosed units</td>
<td>Start and control functions available to operator with cover/container closed</td>
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<td>Umbilical cable connection to pump unit</td>
<td>Enables positioning of ES1 anywhere on, inside, outside or remotely from pump unit</td>
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By using a mechanical bypass jetting tool it is possible to work
- **without** control cable
- **without** valves or tumble boxes.

Pneumatic control hoses are absolutely not necessary. Hammelmann bypass tools enable flexible working regardless if you are only 60 or up to 1600 ft away from the pump unit.

**NANO-PLC control and monitoring of electrically powered high pressure pump units.**

An alternative to the ES1 computer for use with mechanical bypass tools. The control and monitoring functions are reduced to the minimum necessary.

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