

Industrial Solutions  
Electrolysis & Polymers Technologies

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Industrial Solutions

## Waterjet cutting pumps



thyssenkrupp

# Water simply cuts everything



## We experience the power of water daily

We experience the power of water daily. Water has been creating new shapes by erosion for millions of years. Uhde High Pressure Technologies simply reduces this time by increasing the pressure of the water.

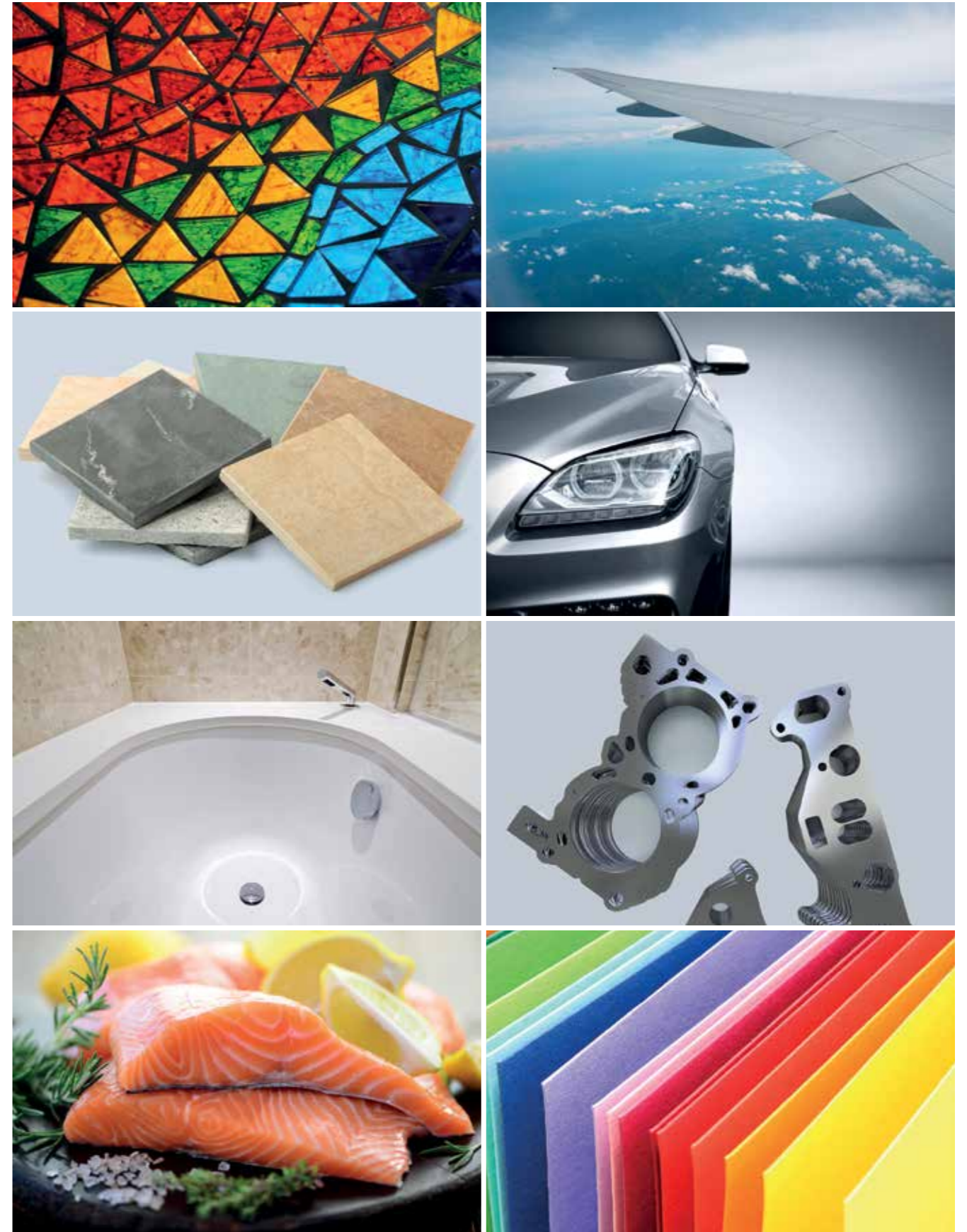
Regardless of the material composition and type, water cuts with maximum precision and flexibility. High pressure waterjet cutting is characterized by environmental and user friendliness. Due to its advantages it is superior to other cutting processes and thus has evolved into one of the most important processes at all.

## Product range

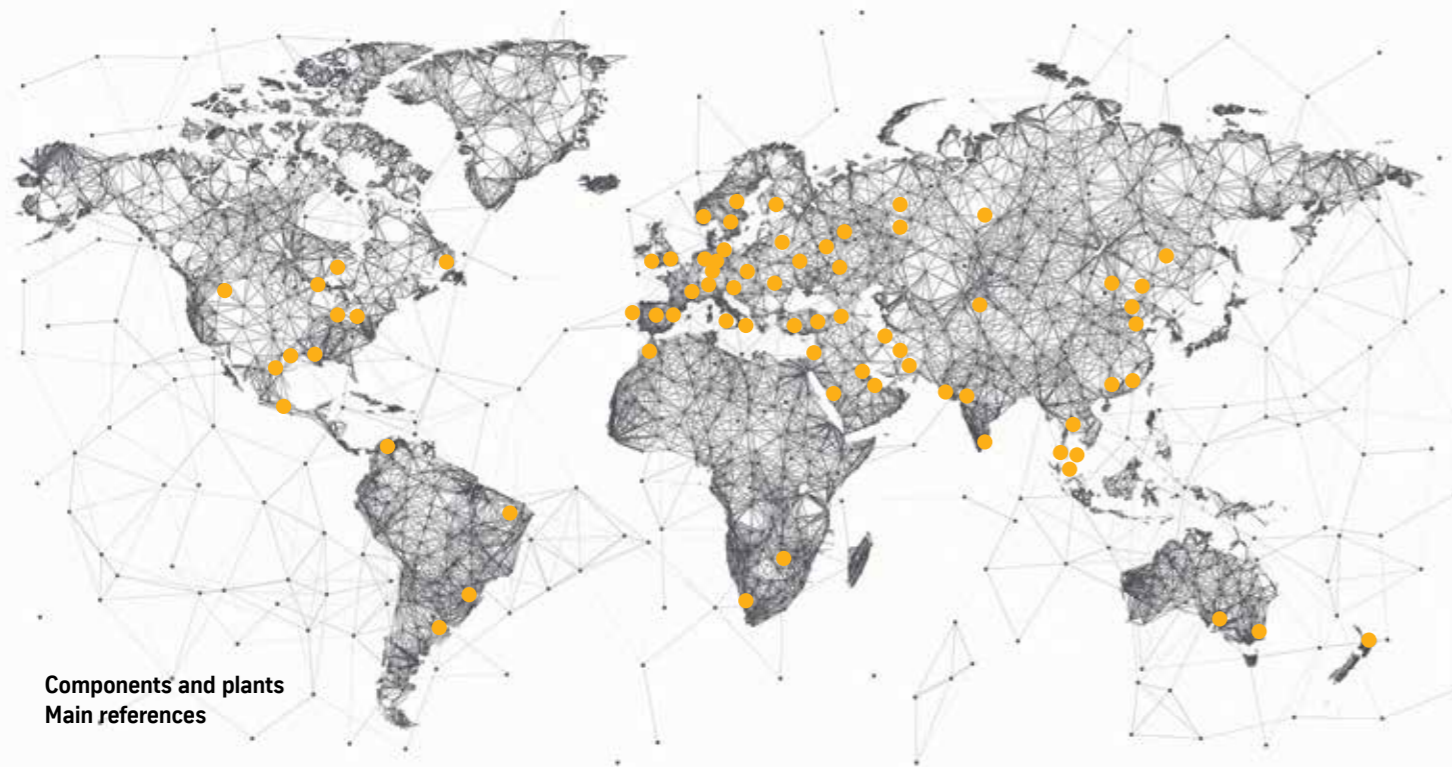
For nearly half a century we have been designing and manufacturing ultrahigh pressure pumps for incredible pressures of up to 14,000 bar for industrial use. Whenever reliability at high pressures is of utmost importance, Uhde High Pressure Technologies in Hagen, Germany is a name which is recognized worldwide.

Our high pressure pumps - the core element of the waterjet cutting system - with stepless working pressures of up to 6,000 bar are implemented in all relevant industrial sectors, from the food industry over glass and stone to aerospace.

Starting at the first development stage and continuing with manufacturing of parts, software programming, assembly until the final testrun: Everything takes place at our factory in Hagen, Germany.



# Uhde – acknowledged specialist in high pressure technology

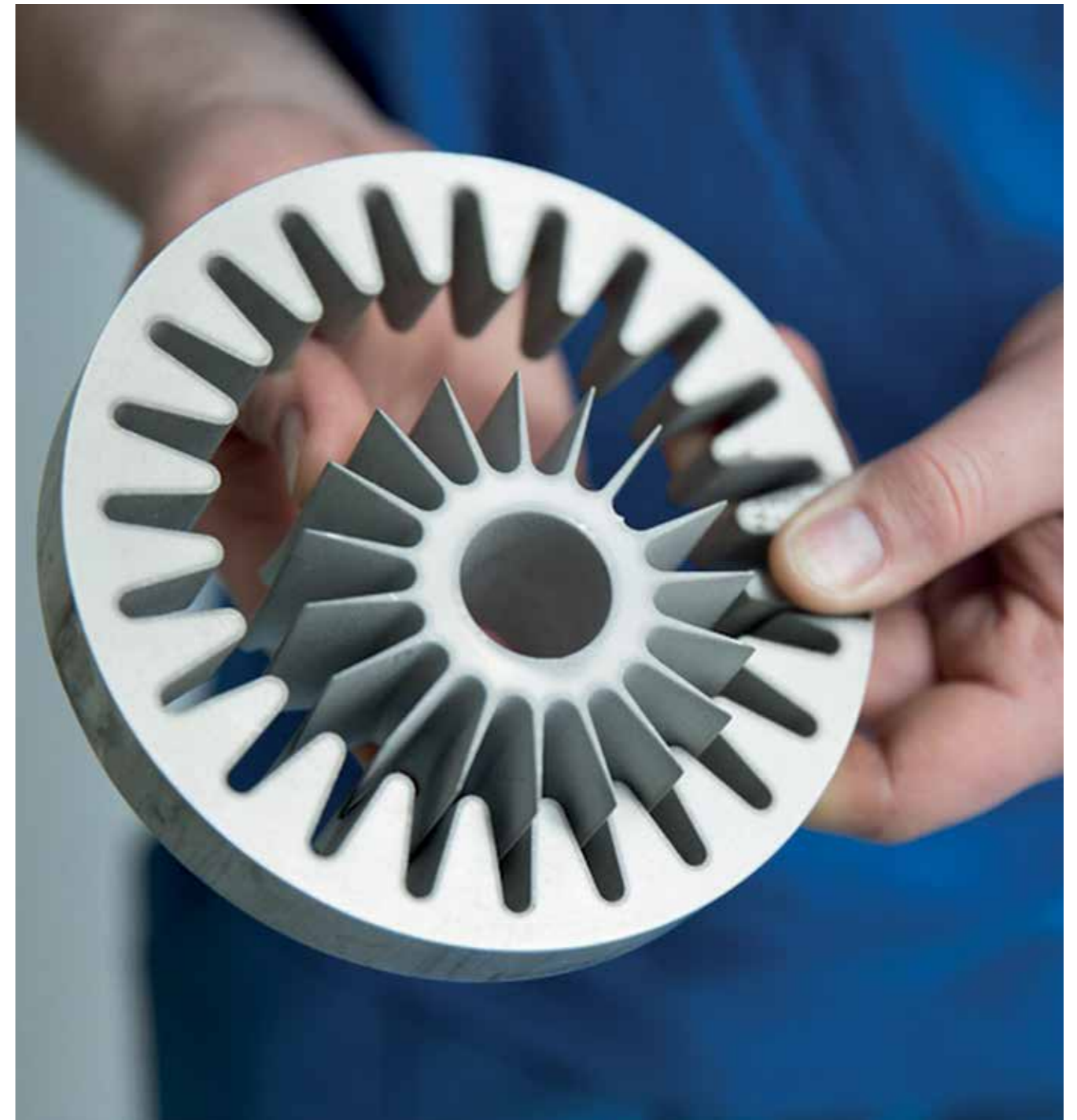


Friedrich Uhde – the man who gave his name to Uhde High Pressure Technologies – was one of the founding fathers of chemical engineering; in the 1920s he developed methods for manufacturing and processing nitric acid and ammonia fertilizer. Being a pioneer of high pressure technology he built his own factory for high pressure equipment and laid the foundation for an enterprise which – in the meantime – is acknowledged worldwide and confirms its reputation as a specialist in high pressure technologies again and again. Today Uhde High Pressure is worldwide known as a subsidiary of thyssenkrupp Industrial Solutions.

## Tailor-made, accurate, reliable

The idea of finding solutions for technological problems has remained vivid for Uhde until today: creative and competent teams, modern machinery and high quality standards help develop innovations continuously and shape technological progress in all industries.

The tailor-made development and high quality production of most different components for high pressure applications convince clients from most different industries all over the world, because waterjet cutting pumps “made by Uhde” stand for maximum precision and reliability.



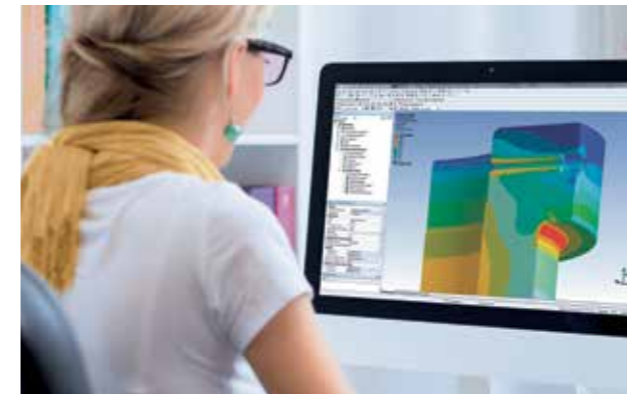
# Uhde high pressure pumps

## Type HPS and HPD



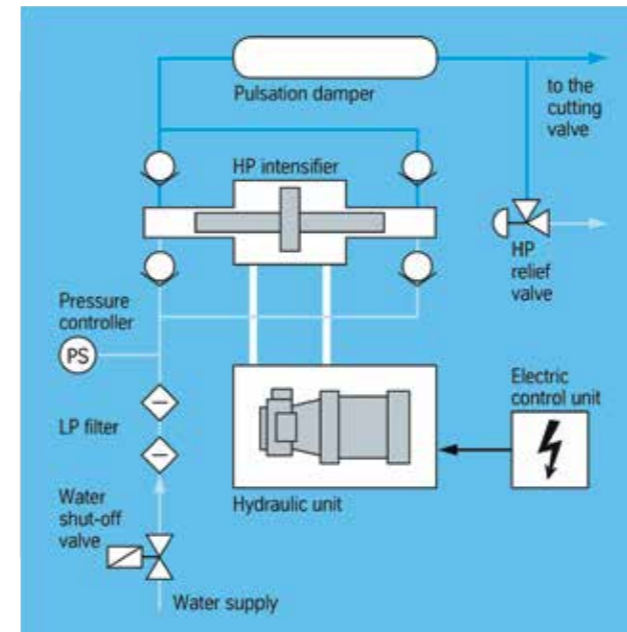
### Characteristics of the Uhde high pressure pumps

- Compact design
- Easy installation and commissioning
- STANDARD series is immediately operational
- Maintenance-friendly arrangement of all components
- Low investment and operating costs
  - due to sophisticated, service-friendly high pressure technology
  - due to minimal number of parts subject to wear
  - due to straightforward servicing and maintenance
  - due to long servicing intervals and long service life of main wear parts
- Infinitely variable cutting pressure over the entire pressure range
- Constant pressure amplitude, low pressure fluctuation
- Minimized cycling load as a result of the long stroke
- Autofrettage treatment of main high pressure components
- No booster pump required
- Patented HP check valve cartridges with exchangeable valve seats
- Exchange and removal of piston rod seals without disassembly of the hydraulic cylinder
- Variable displacement axial piston pump with a highly dynamic controller saves energy costs due to optimized pressure and volume adjustment
- Quick 4/3 way hydraulic valve for low pulsation, material-friendly reversal
- Double-acting synchronous cylinder with easy to install plunger coupling
- The installed oil-air cooling and filtration system permits permanent cooling and filtering of hydraulic oil
- Material certifications for parts subjected to pressure according to standard EN10204 / 3.1
- CE certification / declaration of conformity or manufacturer's declaration according to EC guidelines 98/37/EC
- Compliance with the directive for pressure vessels PED 97/23/EC
- Installed automatic HP relief system
- Selectable languages on display



PLAN

ENGINEERING



BUILD

MANUFACTURING  
ERECTION



RUN

SERVICE  
MAINTENANCE

# High performance with 6,000 bar step to greater productivity



## 6,000 bar technology

In competition with other processes such as laser and plasma cutting, waterjet cutting is increasingly developing into a real highperformance process. Nowadays, technology has advanced so much that multi-head and 5-axis systems are in operation, enabling cutting to be carried out on 3D components. Today mostly pressures up to 4,000 bar are used in waterjet or abrasive waterjet cutting technology. A further considerable increase in performance and therefore, increased productivity is only possible by raising the cutting pressure. Economic efficiency increases way above average when the cutting pressure is raised from 4,000 to 6,000 bar.

## Convincing advantages

- Increase in power density by 83 %
- Up to 2 times faster cutting speed
- Up to 40% reduction of abrasive mass flow
- Up to 25% reduction in operating costs
- Deeper cuts possible without the use of abrasive

## 6,000 bar high pressure pumps

The development of 6,000 bar high pressure pumps is based on Uhde's many years of experience in the production of 14,000 bar autofrettage pumps and 6,000 bar high pressure pumps for pasteurization plants (HPP).

In the year 2001 Uhde High Pressure Technologies was the first manufacturer to put a 2-stage high pressure pump system for an operating pressure of 6,000 bar into series production. A singlestage pump followed as a consequent improvement and resulted in the technically mature system being integrated into the new pump generation HPS/HPD.

### Technical data for the 4,000 and 6,000 bar pump series

Description	Unit	HPS 4008	HPS 4011	HPS 4022	HPS 4037 HPD 4037	HPD 4055	HPD 4075	HPS 6045 HPD 6045	HPD 6090
Main motor power	kW	7.5	11	22	37	55	75	45	90
Max. flow rate	l/min	0.8	1.2	2.3	3.8	5.7	7.6	3.0****	6.0
Operating pressure	bar	400 - 3,800	400 - 3,800	400 - 3,800	400 - 3,800	400 - 3,800	400 - 3,800	500 - 6,000	500 - 6,000
Max. operating press.	bar	4,000	4,000	4,000	4,000	4,000	4,000	6,000	6,000
Number of HP-units		1	1	1	1*	2	2	1*	2
Double strokes, max	1/min	8	12	24	39	2 x 30	2 x 39	28	2 x 32
Permissible ambient temperature with oil/air cooler	°C	5 - 35	5 - 35	5 - 35	5 - 35	5 - 35	5 - 35	5 - 35	5 - 35
Oil/water heat exchanger		optional	optional	optional	optional	optional	optional	optional	optional
Permissible water temperature with oil/water heat exchanger	°C	25	25	25	25	25	25	25	25
Pulsation damper vol.	l	0.6	0.6	2	2	2	2	2	2
Oil tank volume	l	100	100	100	200	200	200	200	200
Max. sound level **	dB (A)								
Standard / OEM Version		≤ 75	≤ 75	≤ 75	≤ 75	≤ 75	≤ 75	≤ 75	≤ 75
Basic Version		≤ 80	≤ 80	≤ 82	≤ 82	≤ 85	≤ 87	≤ 85	≤ 87

### Dimensions

Length	mm								
Standard		2,300	2,300	2,300	2,300	2,300	2,650	2,650	2,650
OEM / Basic Version		2,000	2,000	2,000	2,000	2,000	2,350	2,350	2,350
Width	mm	760	760	760	1050	1050	1200	1200	1200
Height	mm								
Standard / OEM		1,410	1,410	1,410	1,470	1,470	1,470	1,470	1,470
Basic Version		1,280	1,280	1,280	1,360	1,360	1,360	1,410	1,410
Total weight ***	kg								
Standard		990	990	1,055	1,520	2,025	2,195	1,840	2,625
OEM		935	935	1,000	1,445	1,930	2,105	1,765	2,350
Basic Version		760	830	895	1,345	1,825	1,995	1,665	2,425

### Connections

Suction water press.	bar	4 - 7	4 - 7	4 - 7	4 - 7	4 - 7	4 - 7	4 - 7	4 - 7
Pneumatic supply pressure	bar	6 - 8	6 - 8	6 - 8	6 - 8	6 - 8	6 - 8	6 - 8	6 - 8
High pressure connection for HP-tube	mm	9.53 (3/8")	9.53 (3/8")	9.53 (3/8")	9.53 (3/8")	14.3 (9/16")	14.3 (9/16")	9.53 (3/8")	14.3 (9/16")

\* = Stand-by HP-unit possible    \*\* = Tolerance +/- 3 dB(A)    \*\*\* = others on request    \*\*\*\* = without oil and optional accessories    \*\*\*\*\* = 4,0 l/min @ 3,800 bar

# Tailor-made equipment for maximum performance

## Standard equipment

- Double suction water filters
- Automatic suction water shut-off valve
- Pressure switch for monitoring the required suction pressure
- TÜV approved high pressure pulsation damper
- Automatic HP relief system
- Soundproof casing and hood with window
- Stainless steel drip tray underneath the high pressure unit
- Welded and oil-proof base, capable to contain the tank volume
- Multirange motors (400 V / 50 Hz and 480 V / 60 Hz)
- Integrated switch and control unit with PLC and control panel (3 languages selectable)
- Interface for data exchange with waterjet system controller (CNC)

## Customized solutions

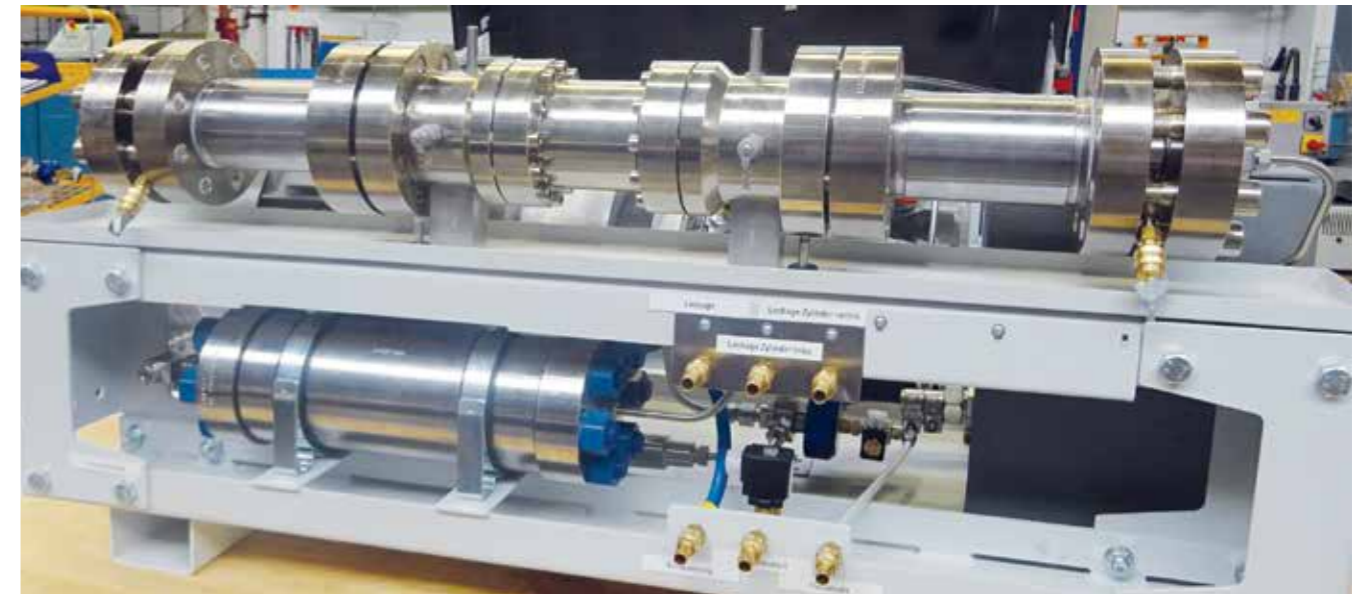
We understand that every customer has specific needs and sometimes needs specialized solutions for his applications. Uhde High Pressure Technologies has many years of experience to find a solution perfectly fitted for your needs. This includes specialized valve boards, customized piping at site and much more.

## High pressure pumps BASIC and OEM – economical and flexible

Uhde High Pressure Technologies has extended its pump product range exclusively for industrial system partners to include

customer-oriented and inexpensive “BASIC” and “OEM” versions.

- OEM = delivery without control cabinet and control system
- BASIC = delivery without casing elements, hood, control cabinet and control system



# Optional high pressure equipment



## Options / Accessories

- HP cutting valves
- Abrasive cutting heads
- Abrasive dosing and supply systems
- High pressure piping components: pipes, fittings, valves etc.
- HP filters (4,000 und 6,000 bar)
- HP pulsation damper (4,000 und 6,000 bar)
- Special tools
- Piping and gauge boards
- Large-surface high pressure filters (1, 5 or 20 µm) for 4,000 and 6,000 bar
- Stand-by high pressure unit
- Oil/water heat exchanger
- Booster pump

- Alternative voltages and frequencies available upon request, e.g. 500 V / 50 Hz., etc.
- UL approved version of electric components for USA and Canada
- Thermocouple for HP tubes/check valve cartridges
- Further accessories available upon request

## Technical Support / Service

High pressure waterjet cutting systems require high-quality services and professional technical support. Thus, Uhde High Pressure

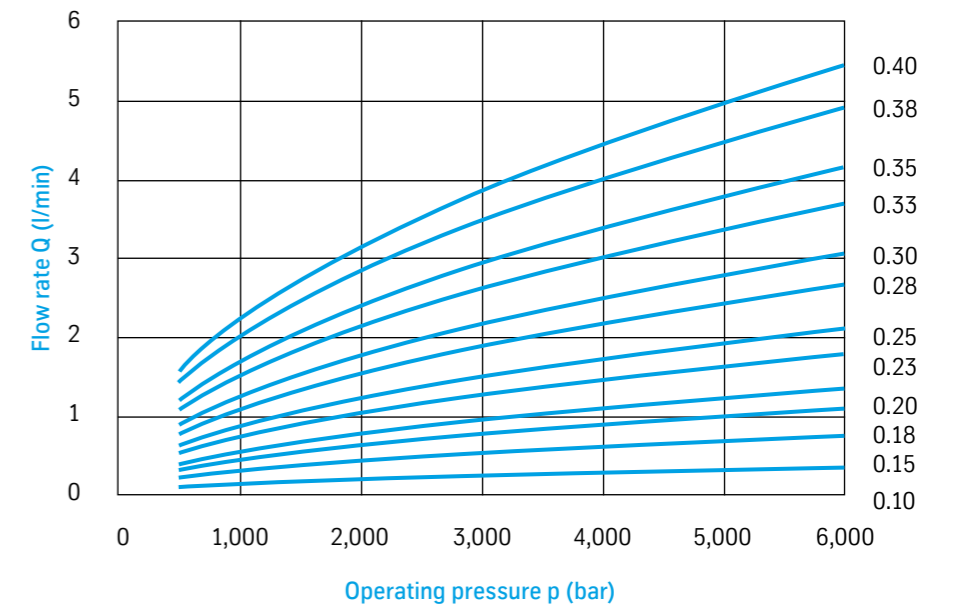
Technologies offers a comprehensive range of services from a single source:

- Competent installation and erection of the HP pump and interconnecting piping for trouble-free commissioning
- Training courses and service seminars for operating and maintenance staff
- Repair of HP components
- Complete overhaul service
- Customised piping of systems
- Life-long availability of high-quality original spare parts
- Cutting tests
- 24-hour customer service
- Maintenance video (several languages selectable)

## Feasible nozzle constellation for the 4,000 and 6,000 bar pump series

Nozzle Ø [mm]	Number of nozzles							
	HPS 4008*	HPS 4011*	HPS 4022*	HPS 4037* HPD 4037*	HPD 4055*	HPD 4075*	HPS 6045 HPD 6045	HPD 6090
0.10	2	4	8	13	20	27	8 / 14*	17
0.12	2	3	5	9	13	19	6 / 10*	12
0.15	1	1	3	6	8	12	3 / 6*	7
0.18	-	1	2	4	6	8	2 / 4*	5
0.20	-	1	2	3	5	6	2 / 3*	4
0.23	-	-	1	1	2	3	1 / 2*	3
0.25	-	-	1	2	3	4	1 / 2*	2
0.28	-	-	1	1	2	3	1 / 2*	2
0.30	-	-	-	1	2	3	- / 1*	1
0.33	-	-	-	1	1	2	- / 1*	1
0.35	-	-	-	1	1	2	- / 1*	1
0.38	-	-	-	-	1	1	- / 1*	1
0.40	-	-	-	-	1	1	-	-
0.45	-	-	-	-	1	1	-	-
0.50	-	-	-	-	-	1	-	-

\* Values determined for 3,800 bar



# Complex solutions from one source



Especially if a job demands more than just the replacement of a component, Uhde High Pressure Technologies is the right partner. In case of a planned modernization or expansion of an existing plant Uhde High Pressure Technologies accompanies you from the analysis and first preliminary decisions through the entire process.

## Planning safety from the beginning

Our experience gained in engineering helps us to competently assess the necessary efforts as to process engineering, plants or rearrangement of plants, adaptations to the control system and safety. Due to the fast

developments in control technology the continuous adaptation of that technology to the state of the art is often reasonable or even necessary. Our engineers specialized in modernization do not only plan the full innovation process, but also support you in the transitional phase with words and deeds.

## From the analysis to implementation

If the capacity of the plant is to be increased, Uhde High Pressure Technologies offers you all necessary performances – from the entire preliminary works as to purchasing, design and manufacture up to assembly and supervision of the construction works. At the

beginning, Uhde High Pressure Technologies supports you – in cooperation with other companies in the Uhde group, if required – to compile possibilities and prepare the best possible concept for you. Laser-based measurements on site are applied to compile the necessary data for the replacement of pipes.

Again Uhde High Pressure Technologies offers modernization or replacement from one source and therefore the basis for a quick and efficient implementation: we can order necessary materials already during the process development and thus minimize the project period.

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