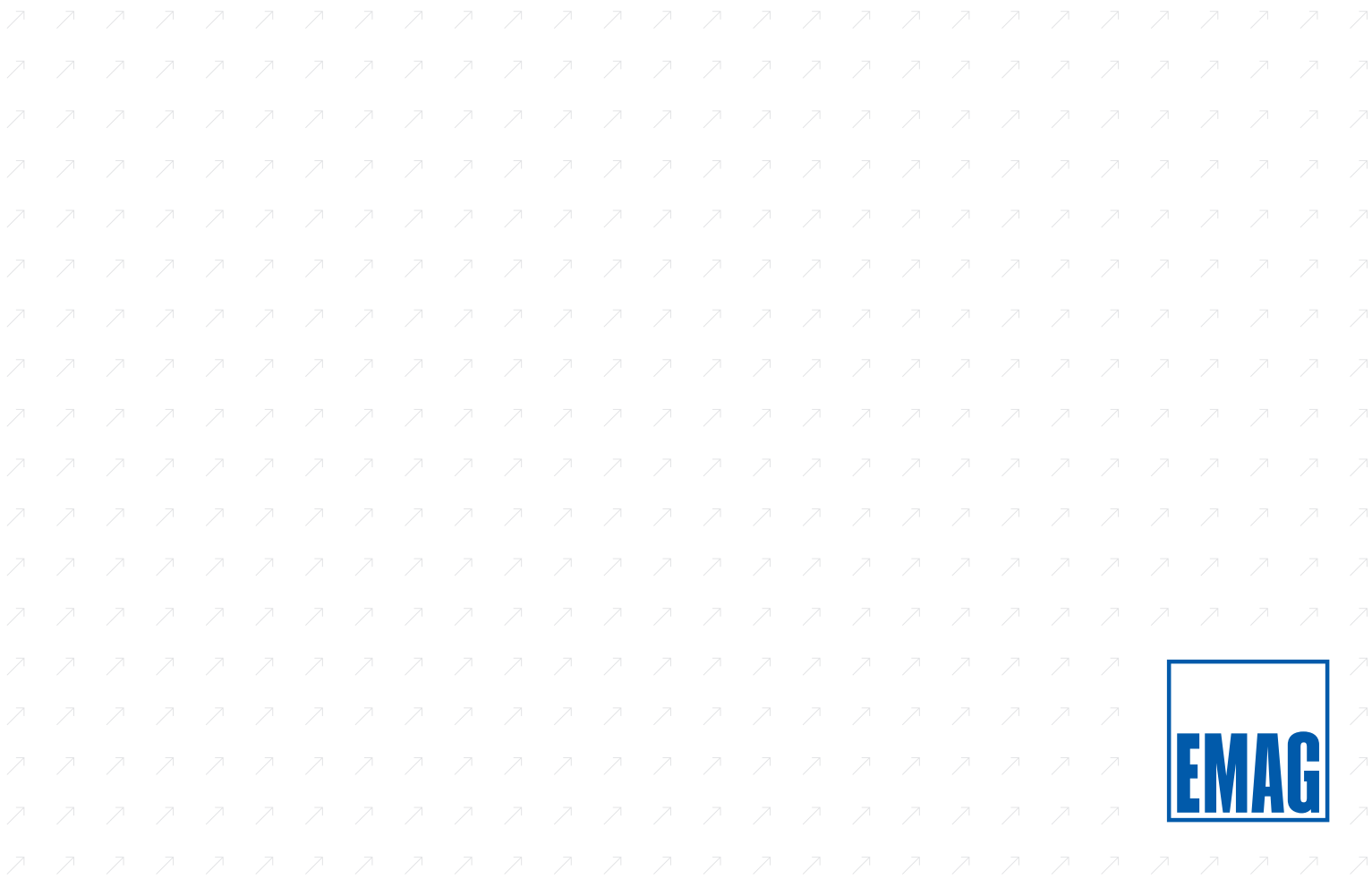
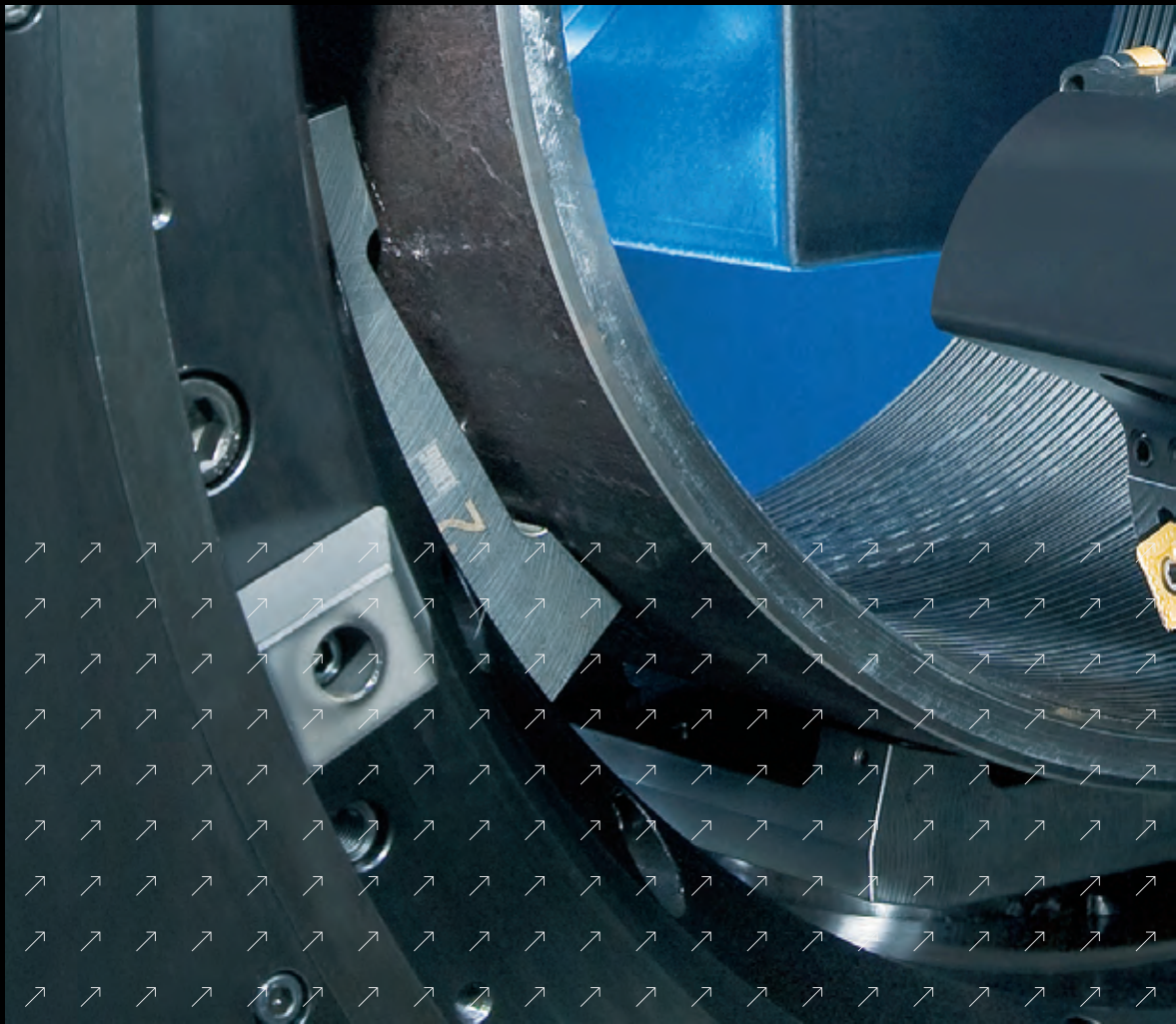


# Oil Field Technology and Mobile Hydraulics



EMAG – the leader for OCTG (Oil Country Tubular Goods) machines – offers customized solutions for the machining of oil field components. The flexible machine concepts and complete systems from EMAG offer customized solutions for the manufacture of tube ends, couplings, tool joints, drill bits, rock bit cones and pump components. EMAG also offers high quality reliable machining solutions for components in mobile hydraulics, such as hydraulic cylinders and piston rods.





OIL FIELD TECHNOLOGY AND MOBILE HYDRAULICS



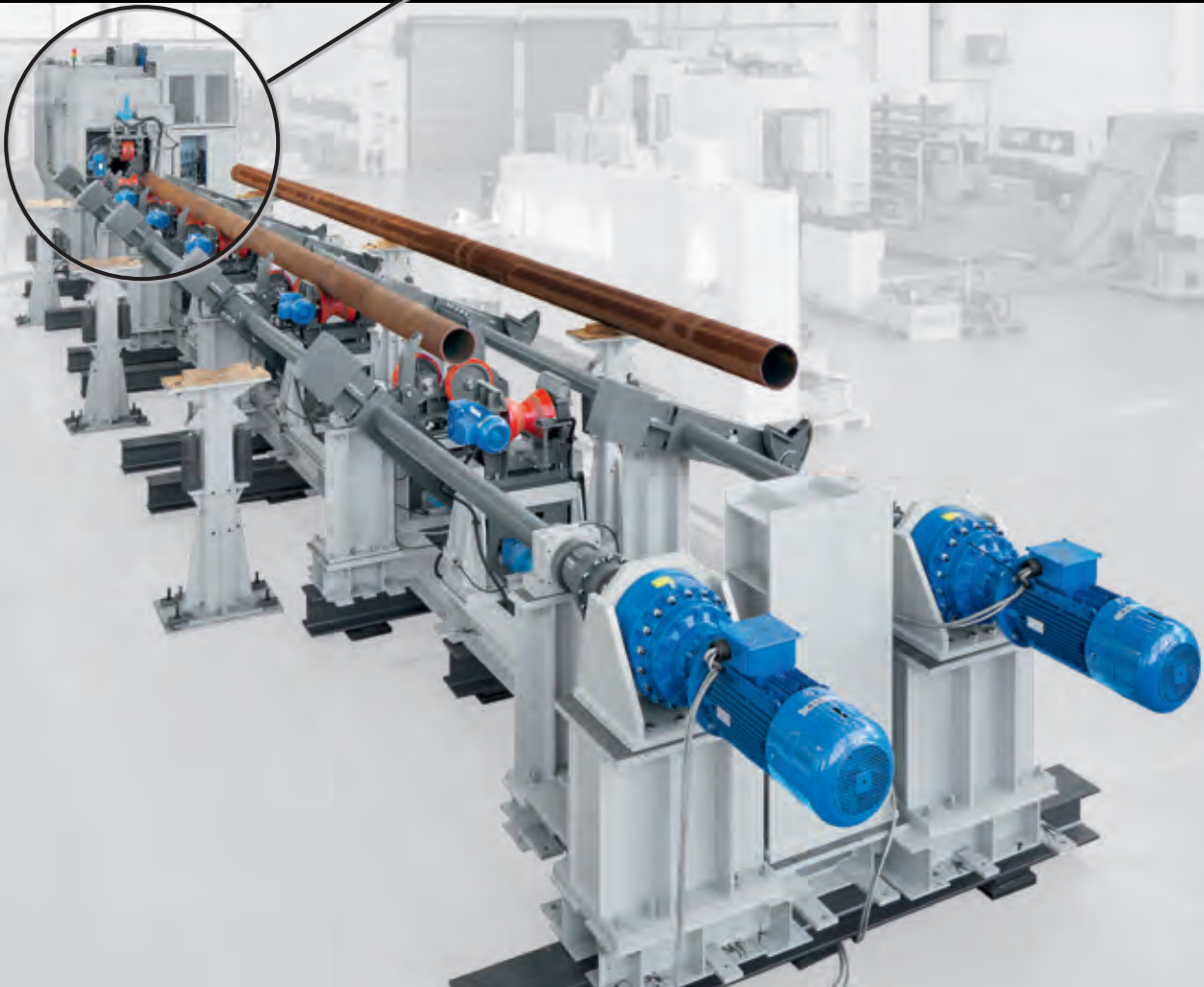
# Machines and complete manufacturing systems from a single source.

EMAG offers flexible machine concepts and complete manufacturing systems for the oil field and mobile hydraulics industries. Over 30 years experience in the machining of oil field components and over 8,000 machines in the field emphasize the quality and reliability of these manufacturing systems. Cutting edge technologies and innovative machining concepts guarantee high output rates and process integrity.

Maximum performance – “Made in Germany”: EMAG has a vertical integration of 85%.

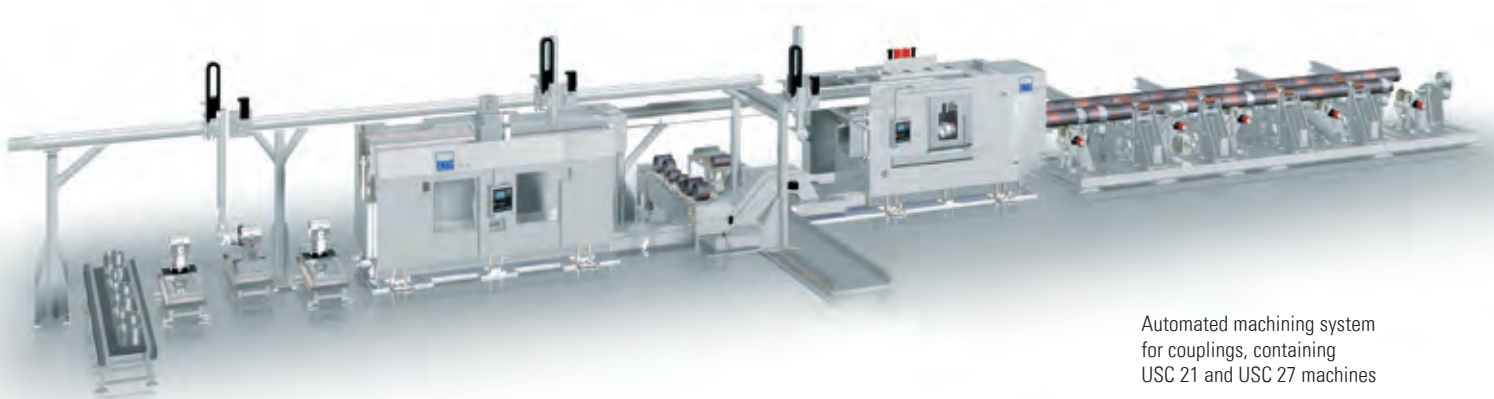


EMAG GROUP



## The advantages of EMAG machines

- Modular design
- The ideal platform for multifunctional manufacturing solutions – single- and multi-spindle – up to fully automated production systems
- Very sturdy, vibration-resistant machine base in high quality MINERALIT® polymer concrete
- Powerful, direct-driven spindle motors
- Direct-indexing tooling systems
- High-precision, preloaded linear roller guides for maximum precision and great dynamic
- Absolute position feedback systems for constantly maintained precision
- Fluid-cooled, temperature-controlled main assemblies – including spindle motor, tooling systems and electrical cabinet – form the basis for high quality workpieces
- Safe, wear resistant, maintenance free machining area
- Ideal chip flow conditions, with the chips falling unhindered to the bottom, causing no damage



Automated machining system for couplings, containing USC 21 and USC 27 machines

## USC 21 – The machine concept for the flexible machining of tube ends.

The most unique feature of the USC series is its rigid machine construction. All machine modules are mechanically sturdy, all the way down to the MINERALIT® polymer concrete machine base.

External and all internal machining operations can be carried out on a single machine. This concept is designed for the complete-machining of all popular threads to API and GOST standard and of all proprietary threads, including integral joints.

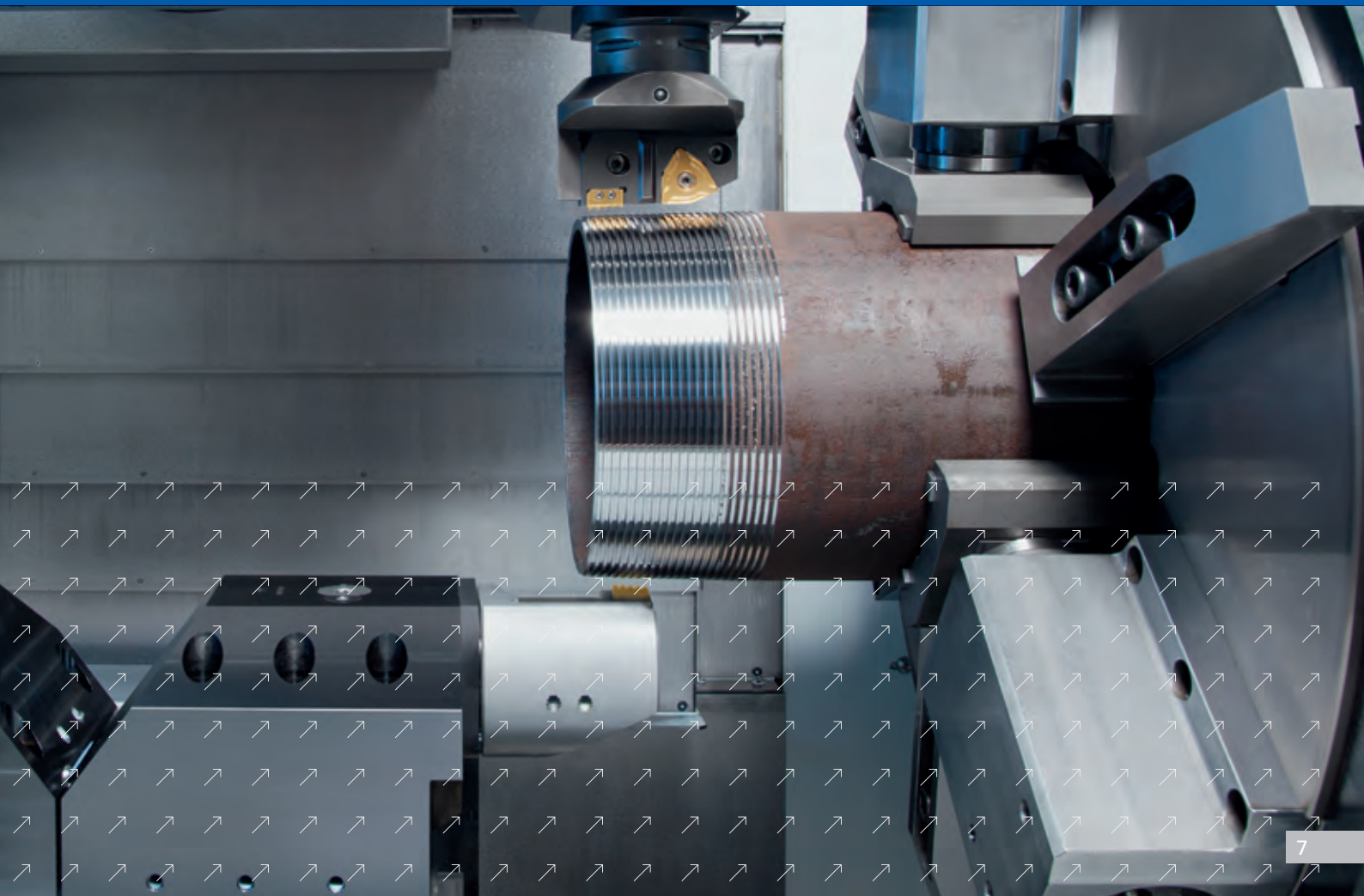
The main drive of the tube machining center forms an integral part of the spindle unit and guarantees high power and torque ratings. The direct drive consists of a highly dynamic, frequency controlled, maintenance-free AC asynchronous spindle motor. The tubes are safely clamped in pneumatically, hydraulically or mechanically operated front- and rear-end chucks.

T U B E E N D S



## Technical data

		USC 21 190	USC 21 260	USC 21 290	USC 21 450	USC 21 560
Nominal diameter	Inch	2 3/8 – 7	2 3/8 – 9 5/8	4 1/2 – 10 3/4	5 1/2 – 16	9 5/8 – 20
Max. spindle diameter	mm	190	260	290	450	560
	in	7.5	10.2	11.4	17.7	22.0
X-axis travel	mm	350	350	350	350	350
	in	13.8	13.8	13.8	13.8	13.8
Z-axis travel	mm	600	600	600	600	600
	in	23.6	23.6	23.6	23.6	23.6
Power rating of main drive unit	kW	76	76	120	120	150
	hp	102	102	161	161	201



## A unique machine with a great amount of flexibility.

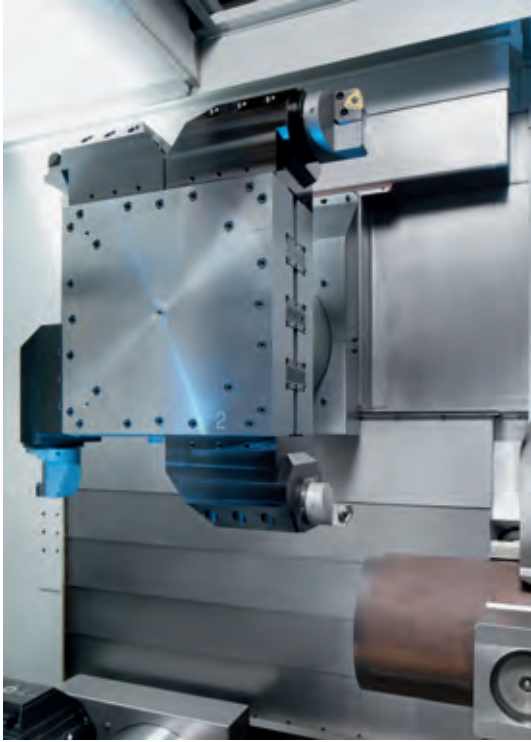
The concept of the USC 21 is specifically designed for the machining of pipe ends. It combines all the features that are responsible for quality, durability and productivity, with a flexibility that covers all the applications for standard and premium threads. With the choice of 5 spindle sizes all pipe diameter ranging from 2 3/8" to 20" can be machined with the best possible technological and customized conditions. The USC 21 series is modular and can be executed as a 2-axis-, 4-axis and 6-axis-machine concept. The separate axes accommodate the unit for external and internal centering, the tube stop, and the setting unit for the removable plug. For

integration into the overall process there are a left and right version available as well as varying control systems. The USCs are designed for API and GOST threading and really show their strengths in premium connection machining. In addition, copy-plan-and chamfer-processing applications are as important as the processing of hydraulic cylinders and pistons.

U S C 2 1





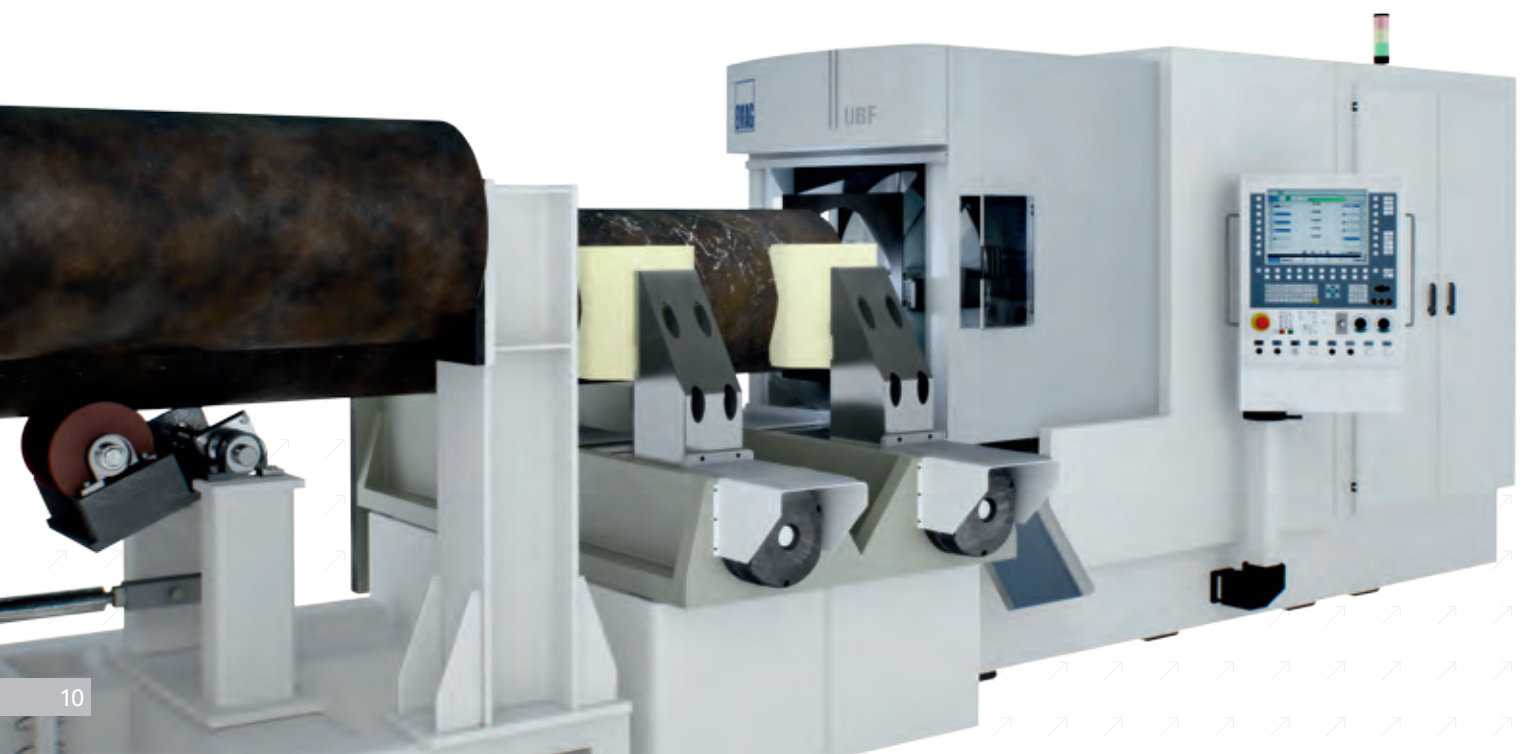


## UBF 21 – The machine concept for effective pipe beveling.

The focus for the overall machine design, was on rigidity and vibration damping. The machine base is made with MINERALIT® polymer concrete, which is ideal for this. There is also a powerful drivetrain which is used to achieve maximum removal rates even in difficult conditions. The approved processing principle with standing tube ensures the shortest possible downtime and a simple design of the machine components. The complete machining – externally, face and internal chamfer – of tube ends is completed in a single setup.

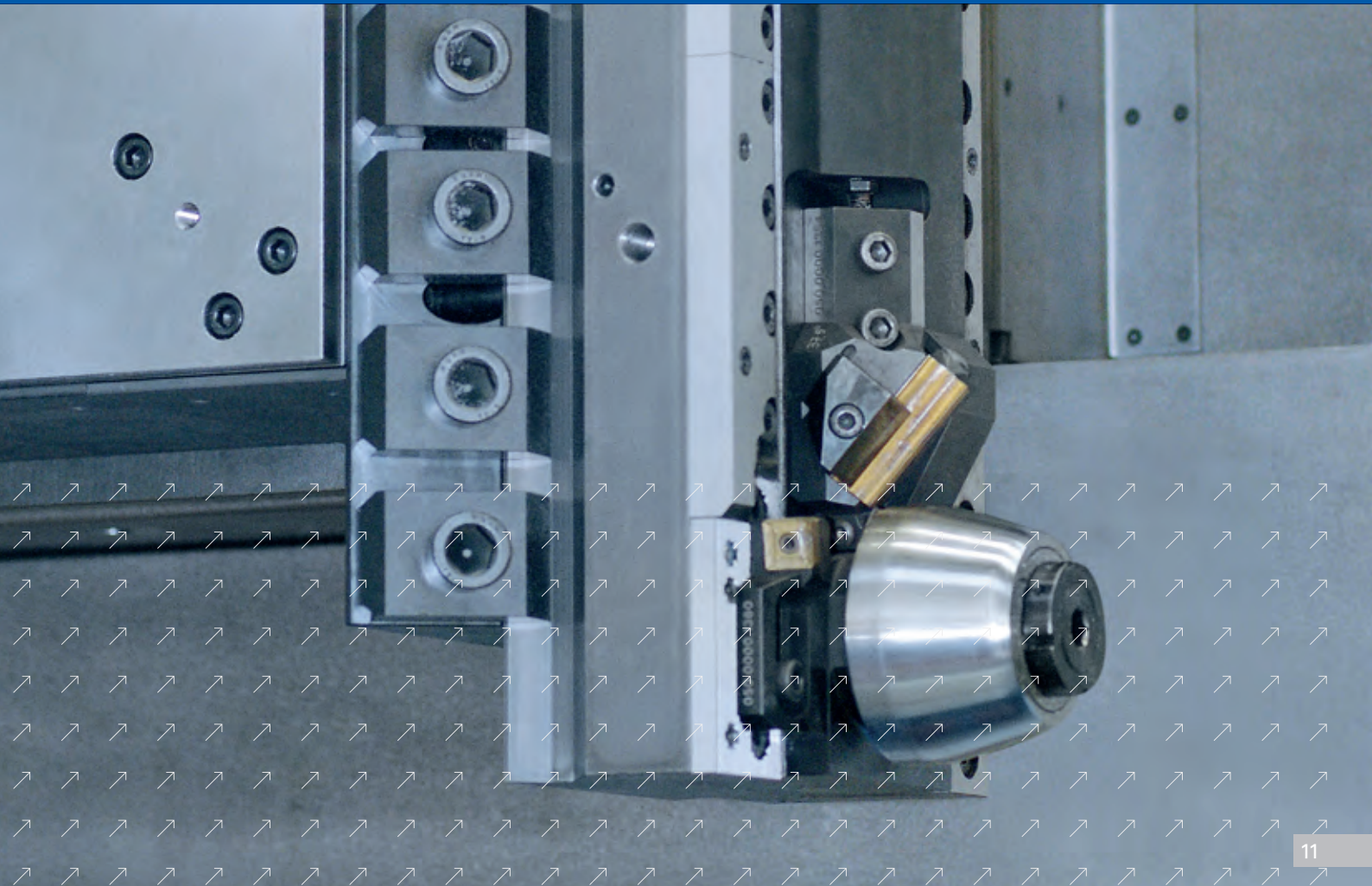
So the machines of the UBF 21-series are for the machining of all bevels according to API, ASME, GOST, as well as special bevels too. The pipes are quickly and safely clamped in front of the machine clamping module. The main drive of the face plate is run by an electric motor with a gear. During machining, the machine is completely covered and meets the highest safety standards. All these qualities guarantee minimum cost of ownership.

U B F 2 1



## Technical data

		UBF 21 290	UBF 21 560
Nominal diameter	Inch	2 3/8 – 9 3/8	6 3/8 – 20
Z-axis travel	mm in	350 13.8	350 13.8
Center height	mm in	1,100 43.3	1,100 43.3
Power rating of main drive unit	kW hp	80 107	150 201



# Customized solutions for the complete-machining of couplings and tool joints.

EMAG offers customized machining solutions for almost all sizes of couplings and tool joints. EMAG uses a wide range of vertical turning and center drive machines in order to achieve this customization. Manufacturing system configurations are engineered to suit individual machining requirements and ensure a high degree of operating efficiency. When components are produced on vertical turning machines (VL, single- or two-spindle VSC, and VLC), the pick-up spindles ensure that the machines load themselves.

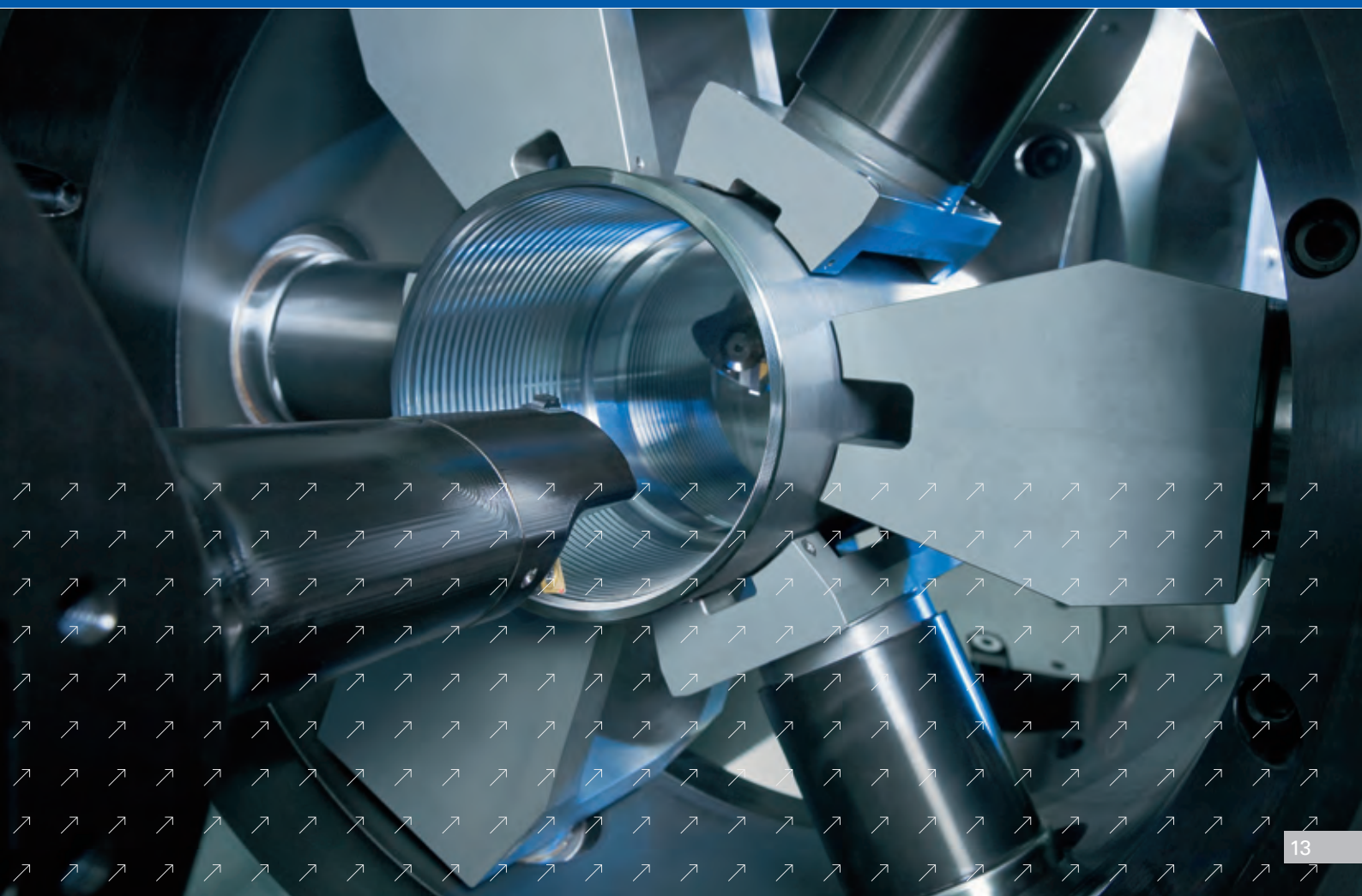
The key advantage of these machine and system concepts are the short traverses, which lead to the shortest possible work handling and machining times. The center drive machine USC 27 was built for efficiency and flexibility. It is also intriguing with its simultaneous, two-sided complete-machining of couplings and tool joints.

## COUPLINGS



## Technical data

		VL 5i	VL 7	VSC 400 CM / VSC 400 DUO CM	VSC 500 CM	USC 27 290	USC 27 380	VLC 800 CM
Chuck diameter	mm	250	400	445	500	–	–	800
	in	9.8	15.7	17.5	19.7	–	–	31.5
Spindle diameter	mm	–	–	–	–	290	380	–
	in	–	–	–	–	11.4	15.0	–
Nominal diameter	Inch	2 3/8 – 4 1/2	2 3/8 – 5 1/2	2 3/8 – 9 5/8	6 5/8 – 13 3/8	4 1/2 – 9 5/8	5 1/2 – 13 3/8	7 – 24
X-axis travel	mm	660	850	850	1,000	300	300	1,755
	in	26.0	33.5	33.5	39.4	11.8	11.8	69.1
Z-axis travel	mm	300	315	315	400	800	800	750
	in	11.8	12.4	12.4	15.7	31.5	31.5	29.5



## The complete-machining of rock bit cones.

For the machining of drill bits and rock bit cones EMAG offers a variety of customized machine and system concepts.

Drill bits are internally and externally pre-machined in two set-ups, using the VSC series machines. The bearing seats on these components are hard turned on VSC machines and / or ground on VSC DS machines. The workpieces are quickly loaded and unloaded using the pick-up spindle and a special chuck that

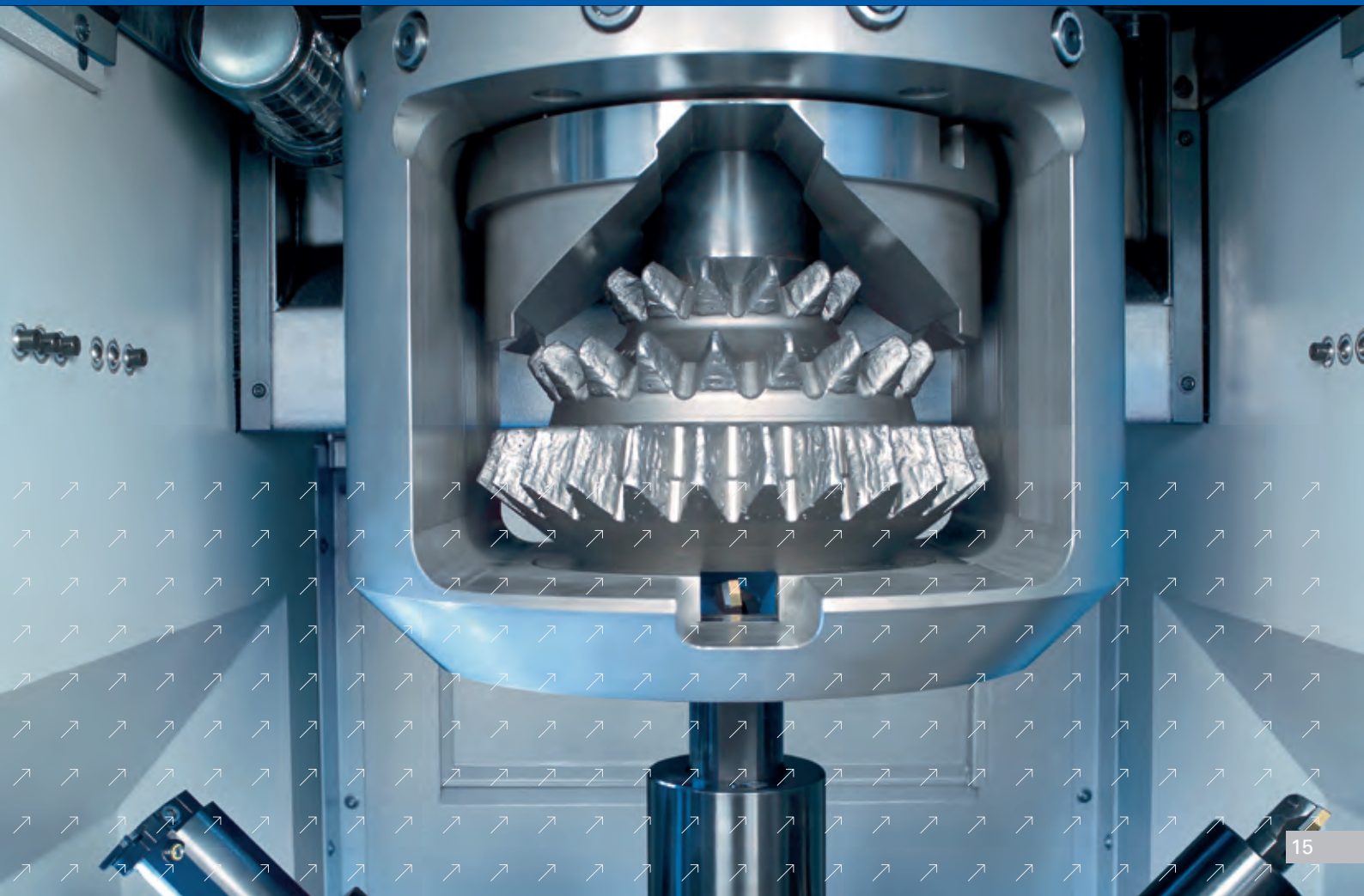
accommodates variations in the external workpiece shape and therefore guarantees that the internal shape is the highest possible precision. Drill bits and rock bit cone segments are also machined quickly and economically on VLC machines. The use of a Y-axis in conjunction with drilling /milling attachments and grinding spindles allows for the application of cost-effective combination- and complete-machining cycles.

ROCK BIT  
CONES



## Technical data

		VSC / VSC DUO	VSC DS / DDS	VLC 800
Chuck diameter	mm	200 / 500	250 / 400	800
	in	7.9 / 19.7	9.8 / 15.7	31.5
Swing diameter	mm	260 / 520	260 / 420	820
	in	10.2 / 20.5	10.2 / 16.5	32.3
X-axis travel	mm	850 / 1,100	680 / 850	1,755
	in	33.5 / 43.3	26.8 / 33.5	69.1
Y-axis travel	mm	–	– / 315	–
	in	–	– / 12.4	–
Z-axis travel	mm	200 / 400	200 / 315	750
	in	7.9 / 15.7	7.9 / 12.4	29.5



# The machining of pump components.

Various sizes of pump components – such as impellers, casings and end pieces – are complete-machined on stand alone machines or on interlinked production systems with EMAG.

The VL 5i and VL 7 are pick-up turning machines for chucked components with a diameter between 30 and 220 mm, and are characterized by high output rates, constantly maintained accuracy and operational safety.

VSC DUO – the flexible two-spindle machine is great for a variety of operations – the machine features two separate machining areas, each with its own independently programmable overhead slide.

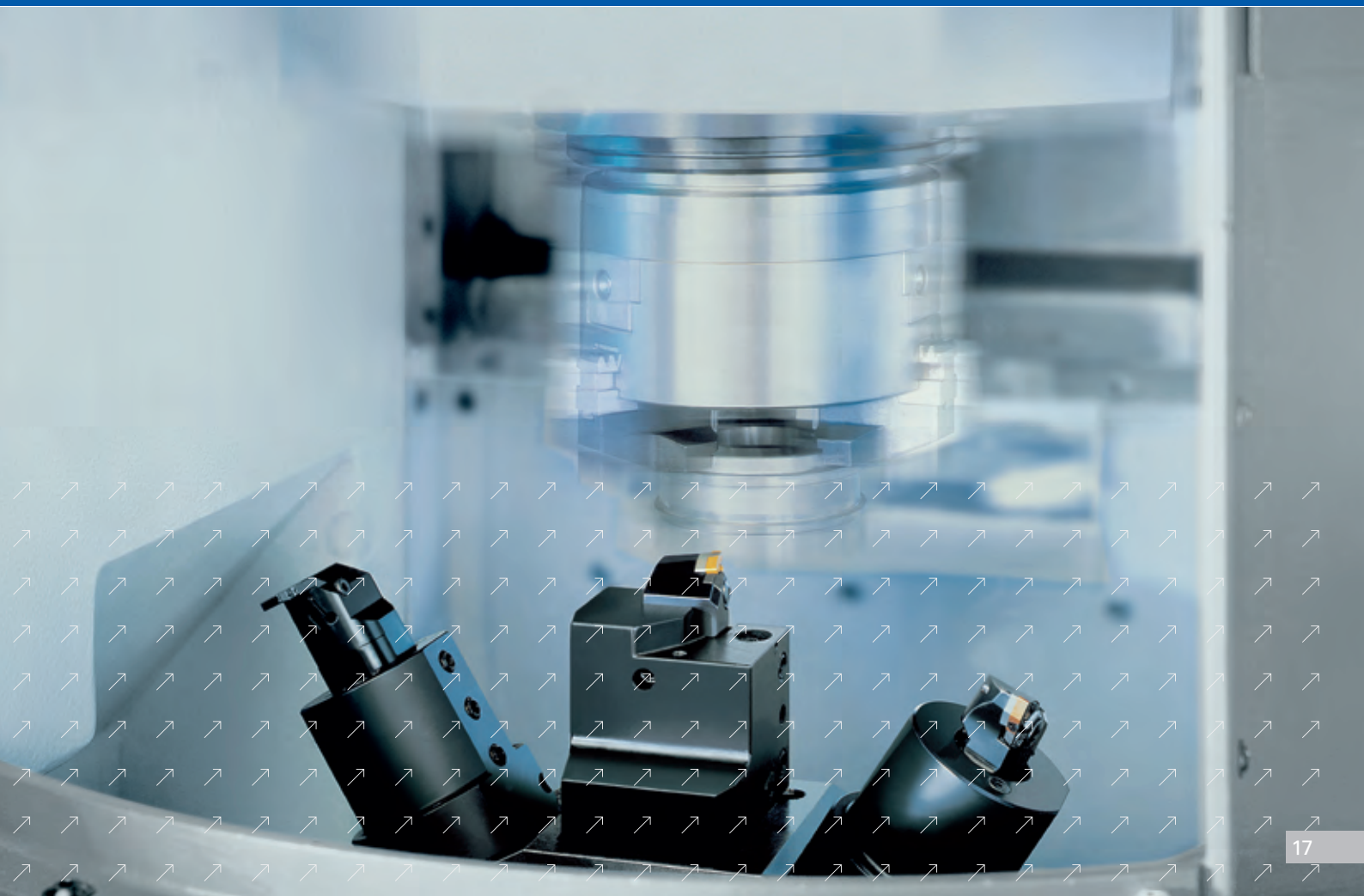
PUMP  
COMPONENTS





## Technical data

		VL 5i	VL 7	VSC / VSC DUO
Chuck diameter	mm in	250 9.8	400 15.7	200 / 500 7.9 / 19.7
Swing diameter	mm in	270 10.6	420 16.5	260 / 520 10.2 / 20.5
X-axis travel	mm in	650 25.6	850 33.5	850 / 1,000 33.5 / 39.4
Z-axis travel	mm in	300 11.8	315 12.4	200 / 400 7.9 / 15.7



## Hydraulic Cylinders and pistons made on USC machines.

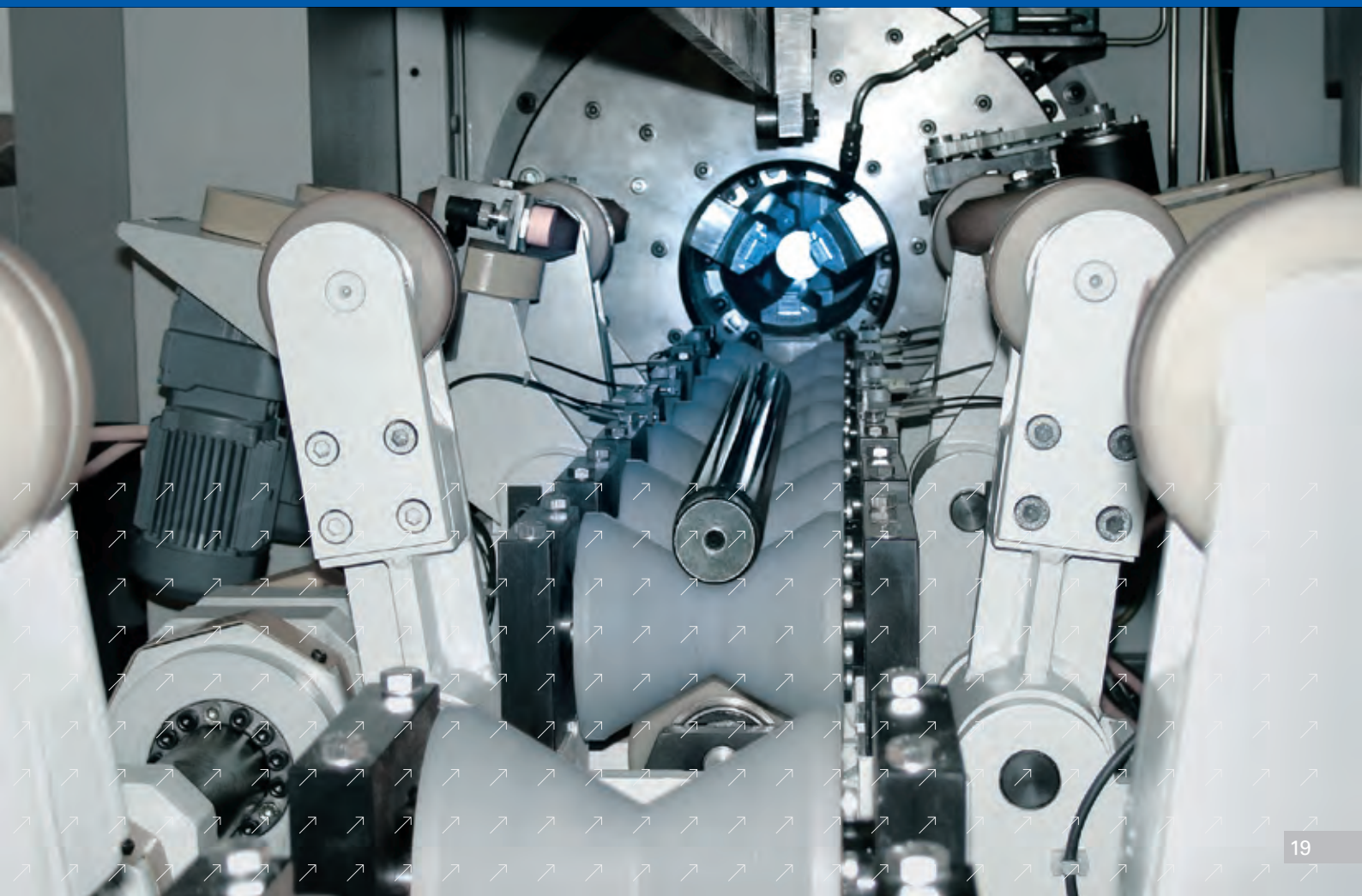
The machine concept of the USC series is ideal for machining – with the highest standard – hydraulic cylinders and pistons of varying diameter, length and down to a viable minimum batch size of one. The flexible component loading device is automatically controlled. Component transport and clamping systems adjust to the dimensions of the workpiece without having to be reset.

HYDRAULIC  
CYLINDERS  
AND PISTONS



## Technical data

		USC 21 190	USC 21 260	USC 21 290	USC 21 450	USC 21 560
Max. spindle diameter	mm	190	260	290	450	560
	in	7.5	10.2	11.4	17.7	22.0
X-axis travel	mm	350	350	350	350	350
	in	13.8	13.8	13.8	13.8	13.8
Z-axis travel	mm	600	600	600	600	600
	in	23.6	23.6	23.6	23.6	23.6
Power rating of main drive unit	kW	76	76	120	120	150
	hp	102	102	161	161	201



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