



CLAMPING AND GRIPPING TECHNOLOGY FOR COMPONENTS USED IN ENERGY ENGINEERING

RÖHM KNOWS WHAT MATTERS

Components for energy technology applications are highly specialized. The clamping and gripping technology used in their manufacture must be equally specialized. Off-the-shelf solutions rarely meet the requirements. Customized solutions are often the key. With three core strengths, RÖHM delivers precisely what the industry needs.

Customer-Specific Products.
The Reliability of Standardization.
The Flexibility of Customization.

Our product philosophy combines proven series-production standards with customer-specific developments. By incorporating our engineering expertise and extensive know-how from standard product manufacturing into every custom-designed clamping solution, we ensure outstanding quality and cost efficiency.

In-Depth Industry Expertise.

Having worked with energy technology applications for decades, every RÖHM development is built on a deep understanding of the industry's requirements, from oil and gas to renewable energy.

Experienced Project Management.
Maximum Transparency.

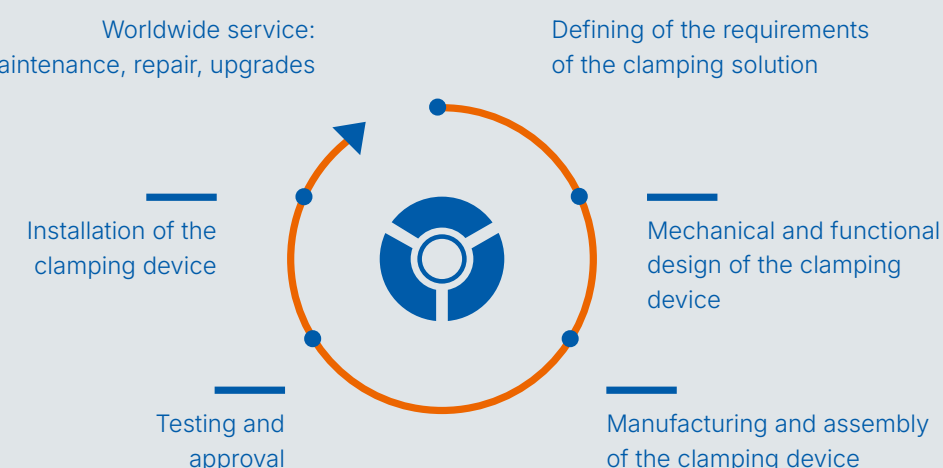
Every clamping solution is developed and implemented entirely in-house, from concept to completion. Direct communication with dedicated contacts allows our customers to actively participate in every stage of development. The requirements of the workpiece to be machined are carefully aligned with the machining environment, ensuring the optimum clamping solution. This results in reliable functionality, maximum precision, and on-time delivery.

SAFE CLAMPING AND GRIPPING OF COMPONENTS USED FOR POWER AND HEAT GENERATION

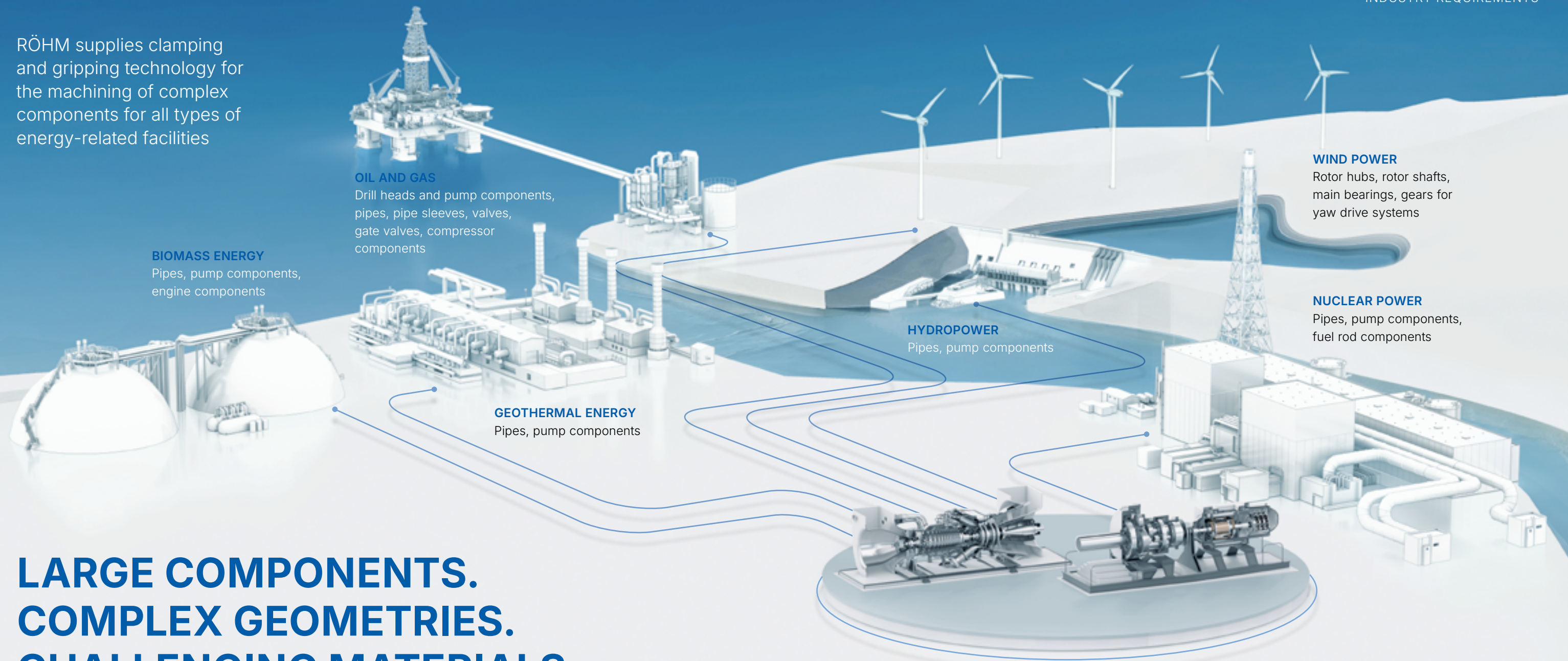
RÖHM

For more than 110 years, RÖHM has manufactured devices for clamping, gripping, and handling workpieces. Machine tool and plant manufacturers worldwide use RÖHM products as standard equipment, including power chucks, collet chucks, expanding mandrels, centers, steady rests, and robotic grippers. The products are characterized by high mechanical robustness, high dimensional accuracy, and controlled application of clamping forces and movements. RÖHM has therefore been a supplier to the energy-engineering industry for many years.

Defined process: Process reliability for customized solutions at RÖHM



RÖHM supplies clamping and gripping technology for the machining of complex components for all types of energy-related facilities



BIOMASS ENERGY

Pipes, pump components, engine components

OIL AND GAS

Drill heads and pump components, pipes, pipe sleeves, valves, gate valves, compressor components

GEOTHERMAL ENERGY

Pipes, pump components

HYDROPOWER

Pipes, pump components

WIND POWER

Rotor hubs, rotor shafts, main bearings, gears for yaw drive systems

NUCLEAR POWER

Pipes, pump components, fuel rod components

LARGE COMPONENTS. COMPLEX GEOMETRIES. CHALLENGING MATERIALS.

Energy technology systems are designed to meet the highest standards of performance, reliability, and safety. As a result, many components are large, geometrically complex, and manufactured from demanding materials. These characteristics make machining particularly challenging and often require specialized clamping and gripping solutions.

Secure Clamping of Large Workpieces

Clamping shafts, bearing sleeves, gears, flanges, and similar workpieces is standard practice in clamping technology. However, when diameters or lengths reach several meters, as is often the case in energy applications such as turbines and generators, the challenge increases significantly.

Large clamping fixtures with multiple clamping points and optimized force distribution are required to prevent distortion and deformation. With decades of experience in the energy sector, RÖHM knows exactly how these solutions must be engineered.

GENERATORS (POWER PLANT GENERATORS, DIESEL GENERATORS)

Generator shafts, bearings, rotors, engine components

TURBINES (GAS TURBINES, STEAM TURBINES, HYDRO TURBINES)

Turbine wheels, bearings, compressor wheels, combustion chamber components (gas turbines)

Mastering Complex Geometries and Materials

Many energy-sector components feature intricate geometries and are manufactured from demanding materials such as high-alloy steels or special alloys. Turbine blades are a prime example. The secure and precise clamping of such workpieces places exceptionally high demands on clamping and gripping technology. Surface damage and crack

initiation must be avoided at all costs, especially for components used in critical infrastructure. When challenging geometries and demanding materials come together in a single workpiece, RÖHM develops customized solutions precisely tailored to the application requirements.



Oil and Gas: For many years, RÖHM has supplied customized clamping and gripping technology for components used in extraction systems and pipelines.



CONVEYING TECHNOLOGY

DRILL HEAD

TASK:

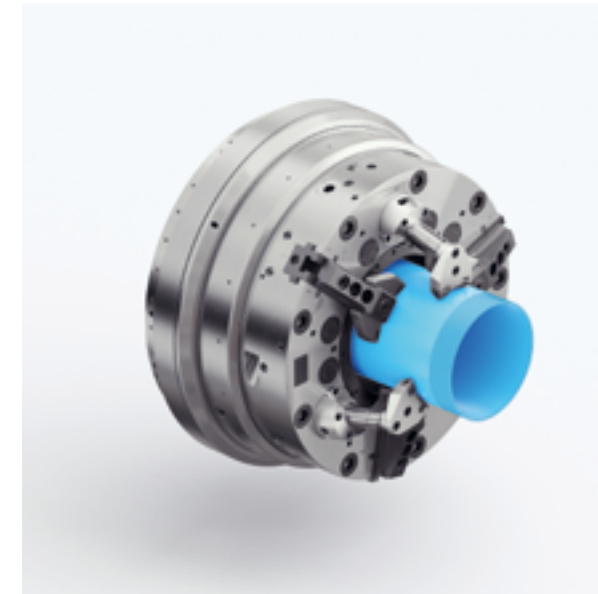
Face clamping of the complex-shaped workpiece for thread cutting at the base.

SOLUTION:

Power chuck with large through-hole
(Diameter 900 mm)

FEATURES:

- Through-hole diameter 483 mm
- Special top jaws adapted to the workpiece geometry to ensure secure clamping
- Maximum total clamping force 250 kN



PIPELINE TECHNOLOGY

PIPE

TASK:

External clamping of the workpiece (OD 339.7 mm / 13 $\frac{3}{8}$ "") for end machining and thread cutting.

SOLUTION:

Pneumatically actuated front-end chuck
(Diameter 1,000 mm)

FEATURES:

- Top jaws adapted to the pipe contour
- Spring clamping, air release as fail-safe protection
- Compensating centric clamping
- Pneumatic centering of the workpiece prior to clamping



PIPELINE TECHNOLOGY

PIPE COUPLING

TASK:

Clamping of the workpiece (OD 146 mm / 5 $\frac{3}{4}$ "") for turning and thread cutting on both sides without re-clamping.

SOLUTION:

Hydraulically actuated swivel chuck
(Diameter 500 mm)

FEATURES:

- Swivel capability eliminates re-clamping operations and reduces machining time
- Automatic indexing in 90° increments directly from the turning operation; indexing accuracy $\pm 1^\circ$
- Swivel positions mechanically indexed for maximum repeatability before release
- One jaw equipped with a fixed stop to ensure process reliability and machining accuracy



CONVEYING TECHNOLOGY

SOLIDS PUMP HOUSING COMPONENT

TASK:

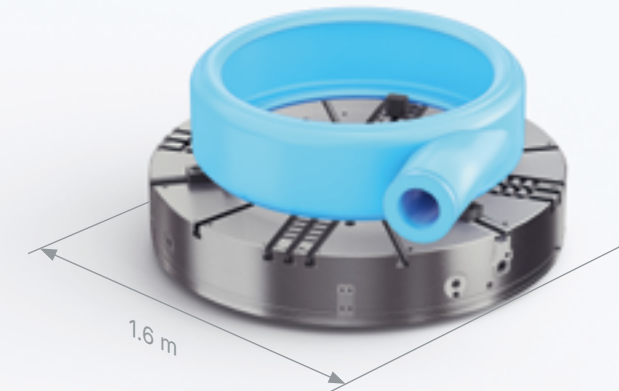
Clamping of the heavy and irregularly shaped workpiece for face milling.

SOLUTION:

Manual chuck (Diameter 1,600 mm)

FEATURES:

- Three individually adjustable reversible jaws with pointed teeth for precise alignment of the workpiece and high concentricity accuracy
- Large jaw travel provides a wide clamping range and efficient transmission of clamping force to the workpiece
- Chuck weight optimized to a minimum (only 3,700 kg)



PIPELINE TECHNOLOGY

ELBOW FITTING (90° PIPE ELBOW)

TASK:

Clamping of the workpiece (inside flow diameter 105 mm / 4.135") for turning and thread cutting on both sides without re-clamping.

SOLUTION:

Power-operated swivel chuck (Diameter 650 mm)

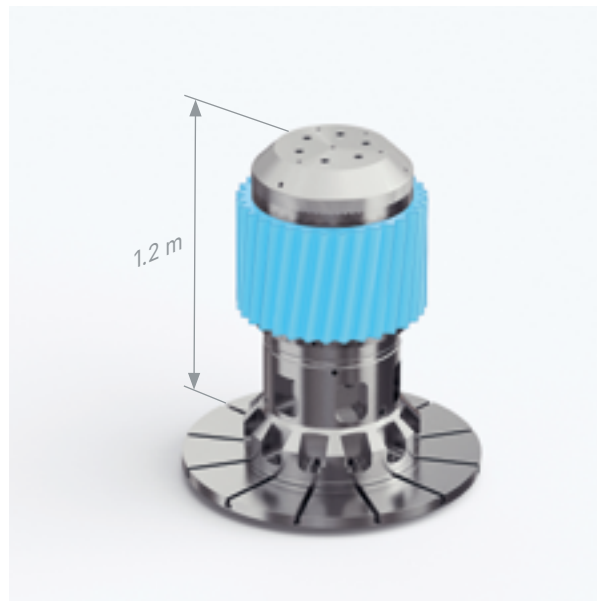
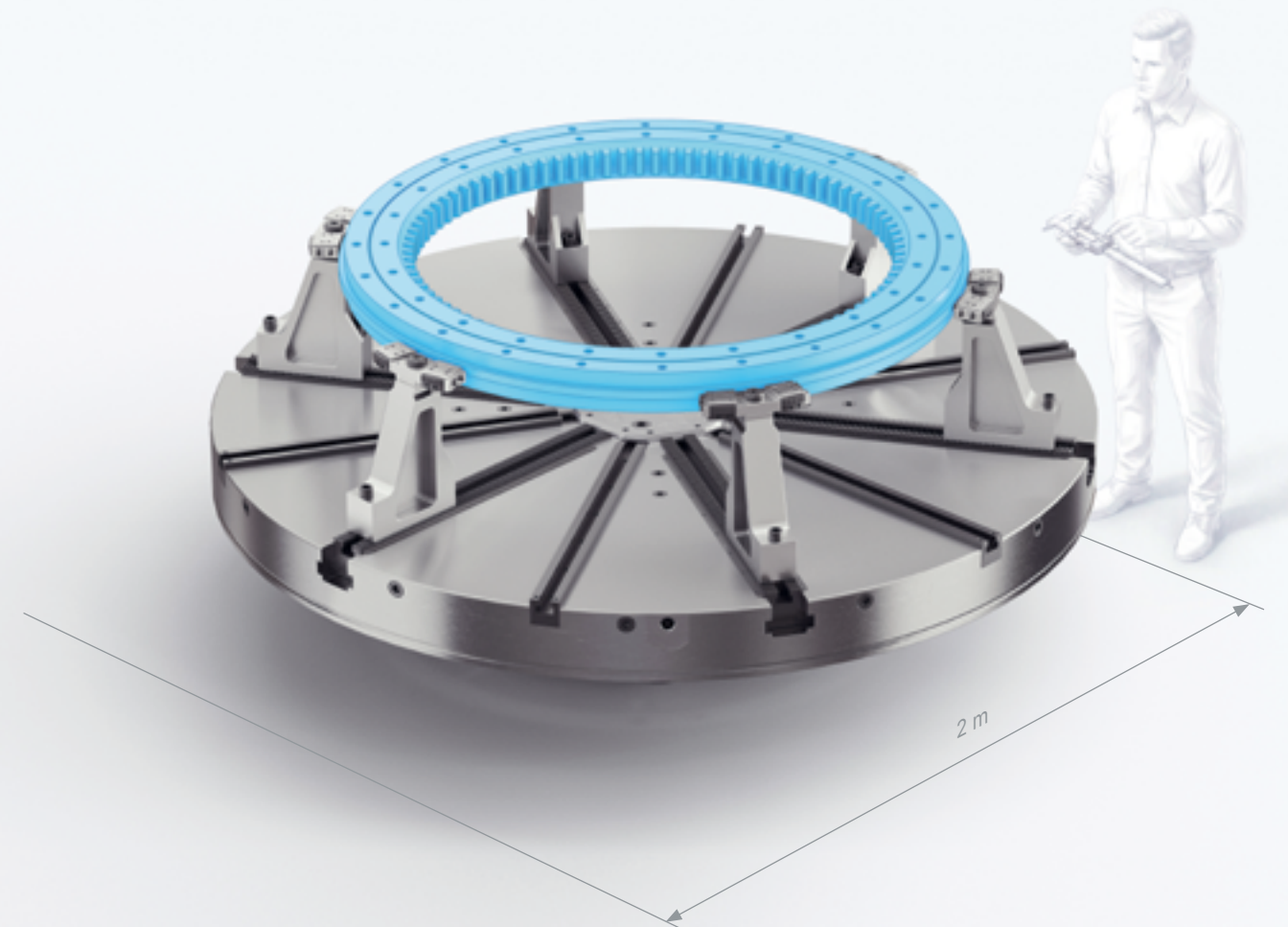
FEATURES:

- Swivel capability eliminates re-clamping operations and reduces machining time
- Fully automatic indexing in four 90° positions directly from the turning operation; indexing accuracy $\pm 1^\circ$
- Two jaws with fixed stop to ensure process reliability and accuracy
- Workpiece loaded in a position-oriented manner, including angular positioning





RÖHM supplies clamping and gripping technology for wind turbine components



DRIVETRAIN

PLANETARY GEAR

TASK:

Internal clamping of the large workpiece (root circle diameter 610 mm) for gear grinding.

SOLUTION:

Manually actuated sliding-jaw mandrel with top jaws

FEATURES:

- Actuated using a torque wrench
- Interchangeable top jaws for clamping diameters of 410 mm and 442 mm
- Concentricity accuracy 0.008 mm
- Concentricity adjustable via alignment screws

DRIVETRAIN

MAIN BEARING RING

TASK:

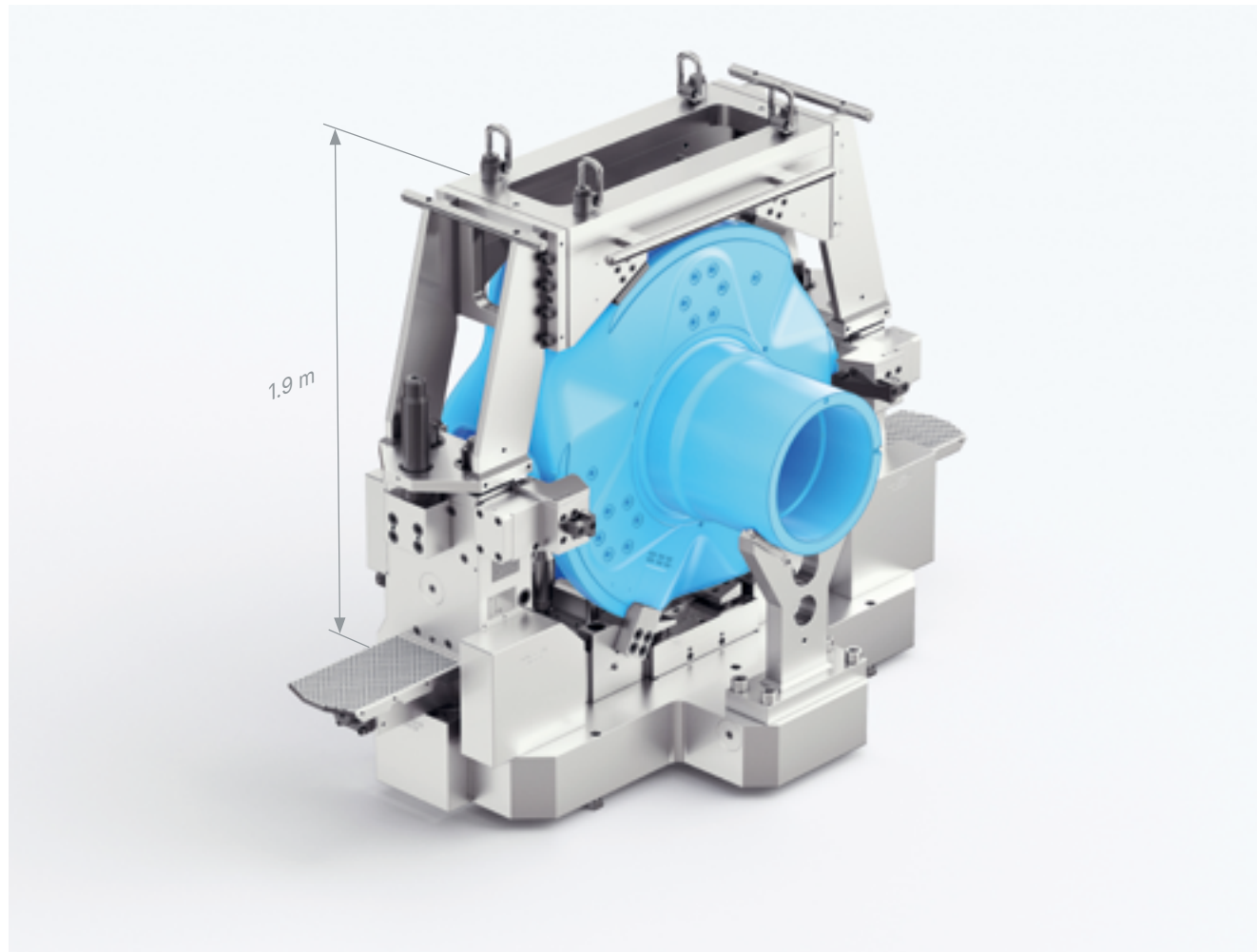
Clamping of the workpiece for turning and radial milling

SOLUTION:

Hydraulically actuated angle-lever chuck (Diameter 2,000 mm)

FEATURES:

- Hydraulic adjustment from centric compensation to centric clamping using two compensating jaws, allowing the workpiece to be aligned first and then clamped without distortion in a single operation
- High top jaws provide maximum accessibility during milling
- Compact and low-maintenance design due to integrated clamping cylinder
- Chuck weight optimized to a minimum (only 3,800 kg)



DRIVETRAIN

PLANET CARRIER

TASK:

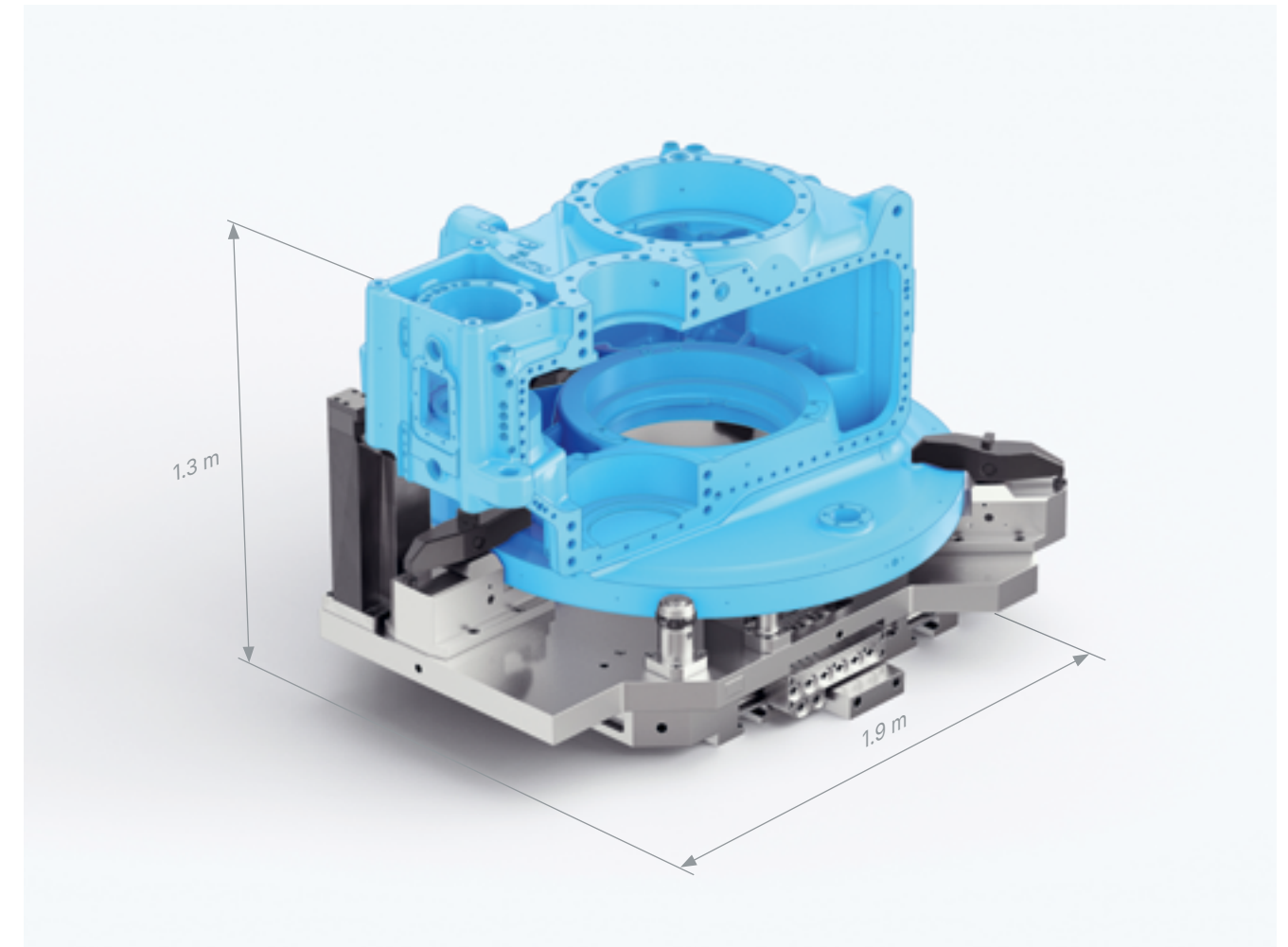
Clamping of the large workpiece
(diameter approx. 1,300 mm) for machining

SOLUTION:

Hydraulically actuated clamping device

FEATURES:

- Efficient clamping possible at a loading station outside the machine
- Independent of a permanent hydraulic connection. Pressure accumulator and clamping wedges maintain the clamping force during transport and machining
- Partially spring-loaded clamping points prevent distortion of the workpiece



DRIVETRAIN

GEARBOX HOUSING

TASK:

Clamping of the asymmetrical workpiece (weight 2,437 kg)
for face milling and drilling

SOLUTION:

Hydraulically actuated clamping device

FEATURES:

- Efficient clamping possible at a loading station outside the machine
- Workpiece automatically aligned, centered and clamped
- Clamping wedges with wedge-locking mechanism ensure secure multi-point clamping
- Integrated pressure accumulator ensures constant clamping force

CHALLENGING CLAMPING AND GRIPPING APPLICATIONS: GAS TURBINES AND WIND TURBINES

When machining components for gas turbines and wind turbines, clamping and gripping technology is pushed to its limits. Few industries require workpieces that are as large, complex in geometry, and manufactured from such demanding materials.

1

COMPRESSOR DISKS (GAS TURBINE)

Machining the large, complex-shaped and thin-walled workpieces requires highly sensitive clamping. Distortion and crack initiation must be prevented at all times.

2

COMBUSTION CHAMBER (GAS TURBINE)

These sheet-metal components are manufactured from high-strength steels and nickel-based superalloys such as Inconel. Their low rigidity makes them highly susceptible to deformation. Clamping and gripping technology must meet these demanding requirements.

3

TURBINE DISKS (GAS TURBINE)

These components are large, delicate and geometrically complex. In addition, they are manufactured from difficult-to-machine superalloys. Special clamping devices are required to provide careful yet secure workpiece holding.

4

ROTOR HUB (WIND TURBINE)

The heavy, bulky and complex-shaped workpiece made from cast iron can exceed 2 m in diameter. Machining the rotor hub flange requires customized special clamping devices.

5

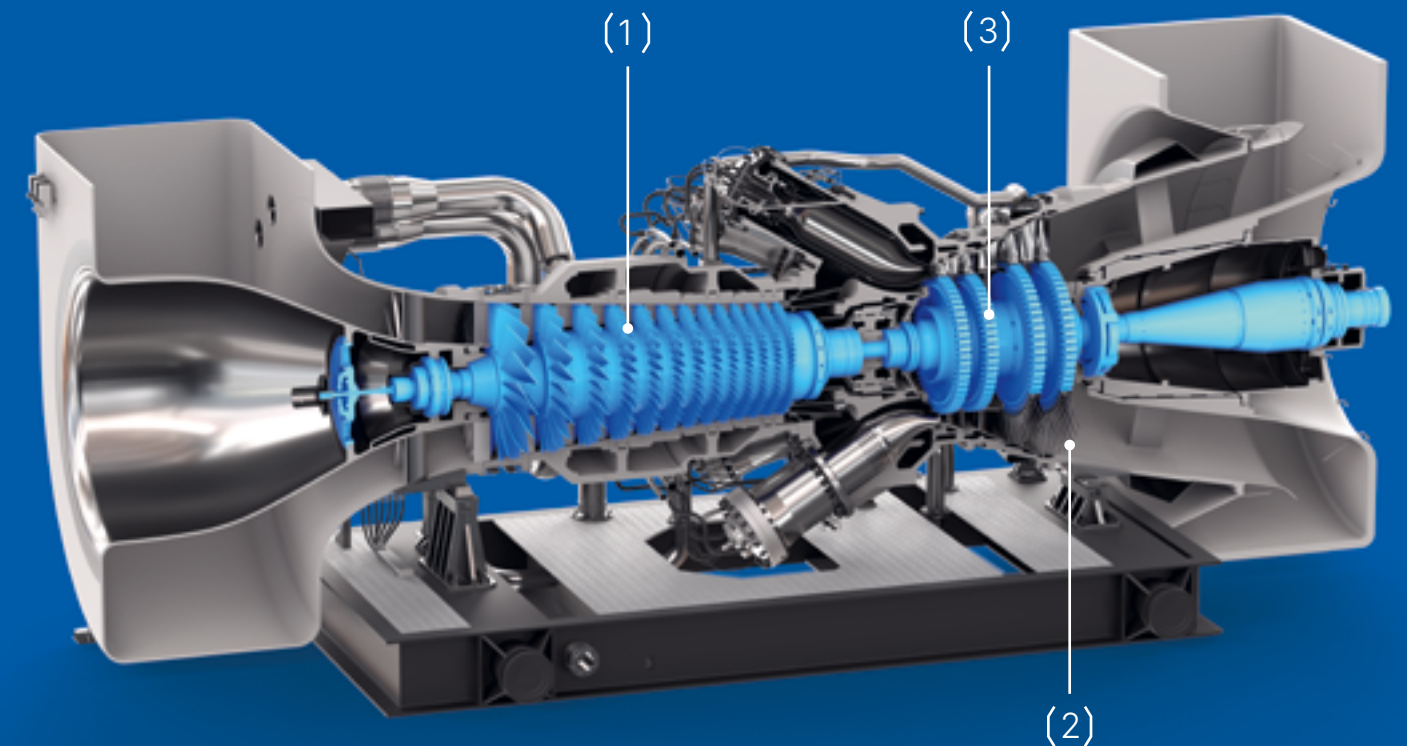
PLANETARY GEARBOX (WIND TURBINES)

This assembly consists of large gears and precision components. Turning, gear cutting and grinding operations require maximum machining accuracy. The gearbox contributes to speed reduction and noise reduction within the wind turbine.

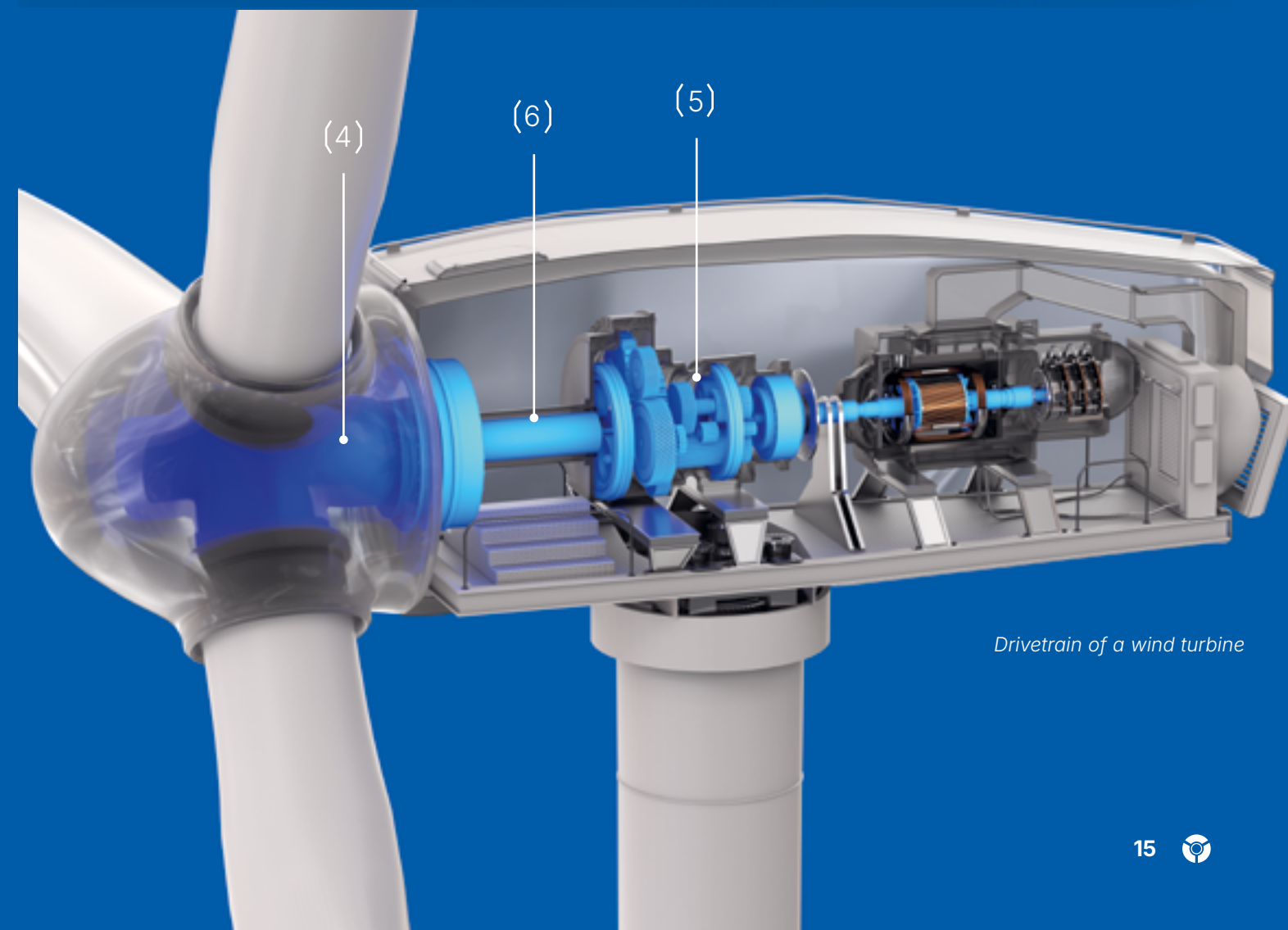
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ROTOR SHAFT (WIND TURBINE)

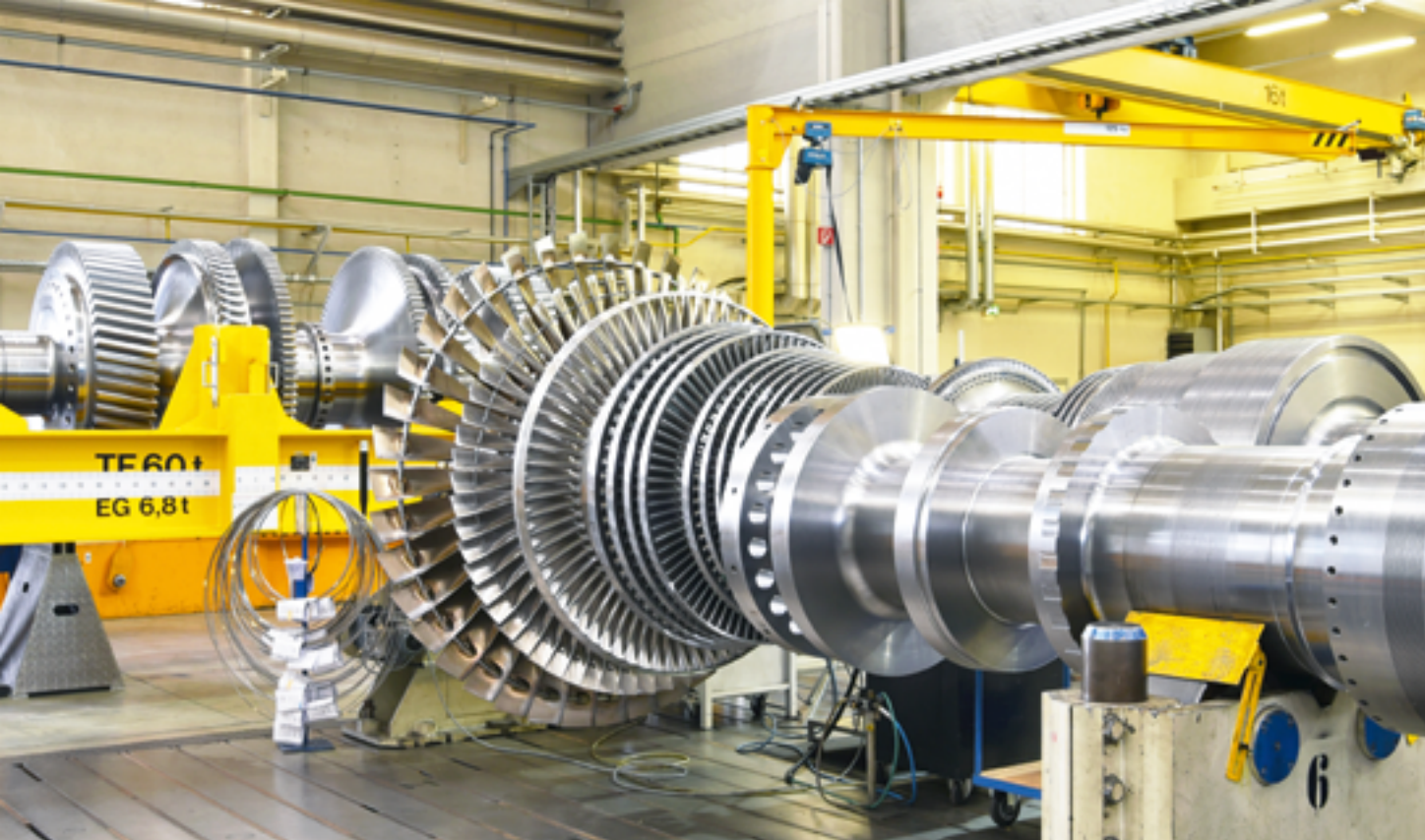
The rotor shaft, often several meters long and weighing several tons, drives the ring generator of the wind turbine. Turning and milling operations are typically performed on specialized machine tools. Double-end clamping and longitudinal support are required.



Gas turbine



Drivetrain of a wind turbine



RÖHM has extensive experience in supplying clamping and gripping technology for turbine components



GAS TURBINE

STARTER GEAR

TASK:

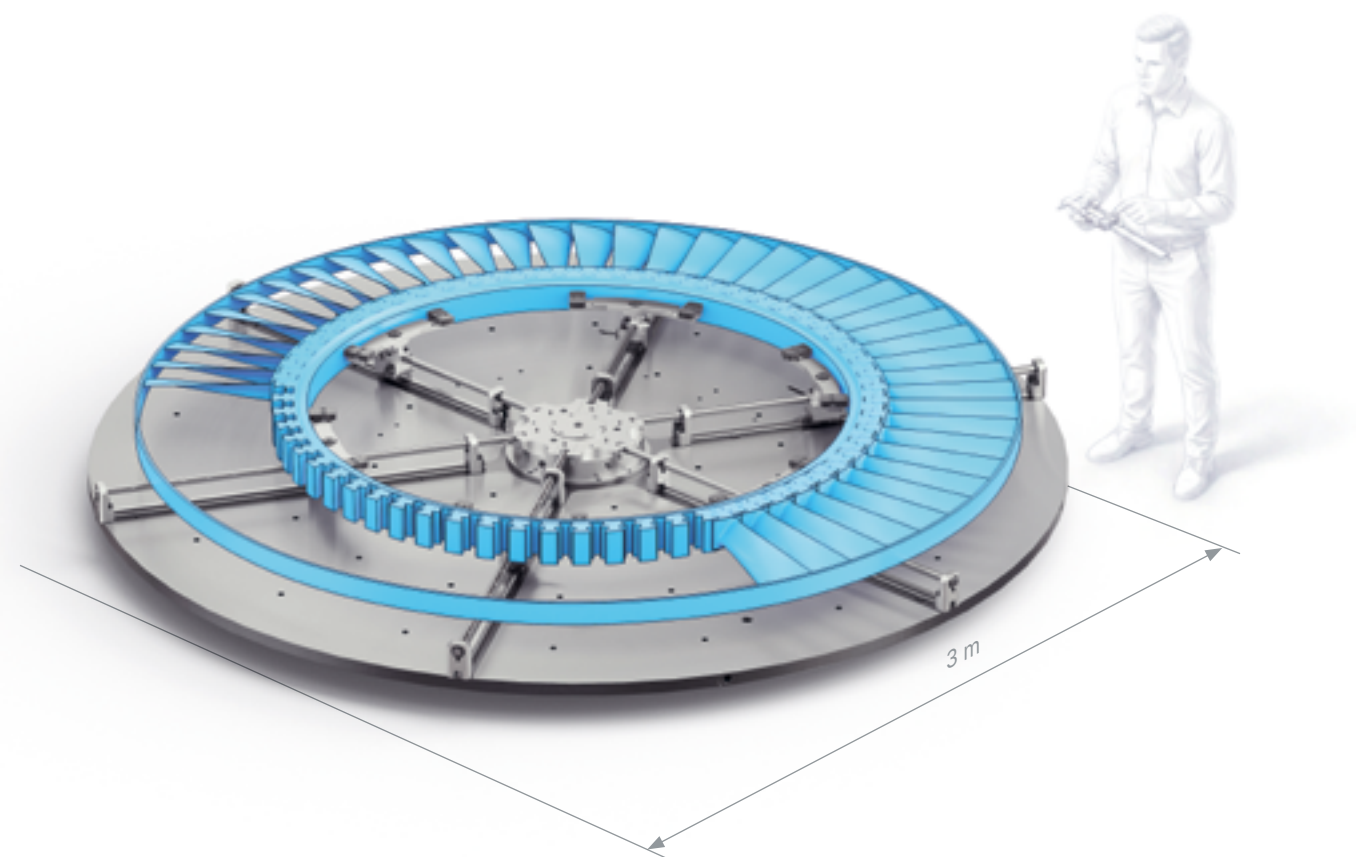
Clamping of the workpiece on the gear teeth for turning

SOLUTION:

Power-operated diaphragm chuck (diameter 315 mm)

FEATURES:

- Friction-free diaphragm principle provides excellent concentricity and repeatability (< 0.005 mm)
- Concentricity finely adjustable in the micron range via adjustment screws
- Integrated air blast ensures continuous cleaning of the clamping and contact surfaces



GAS TURBINE

COMPRESSOR STATOR VANE CARRIER

TASK:

Clamping of the workpiece (weight 500 kg) for automated assembly of the vanes into the inner ring and subsequent welding to the outer ring

SOLUTION:

Power chuck (diameter 2,900 mm)

FEATURES:

- Clamping range from 950 mm to 2,700 mm for internal or external clamping
- Total clamping force up to 149 kN
- Integrated clamping cylinder in a compact design, without separate draw tube
- Manual changeover from centric clamping to compensating centric clamping
- Quick jaw adjustment for simplified maintenance and cleaning

GAS TURBINE

ROTOR SHAFT

TASK:

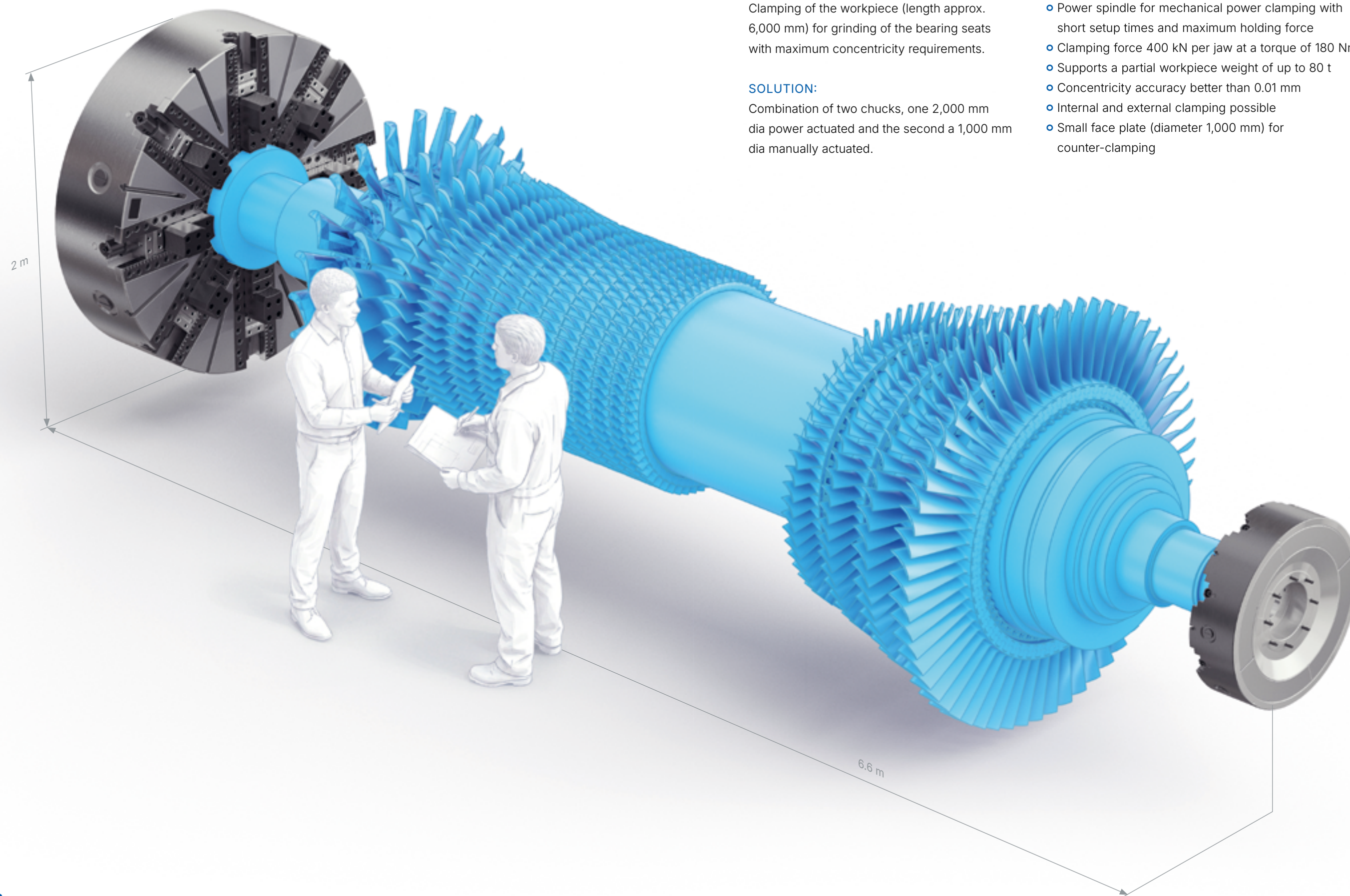
Clamping of the workpiece (length approx. 6,000 mm) for grinding of the bearing seats with maximum concentricity requirements.

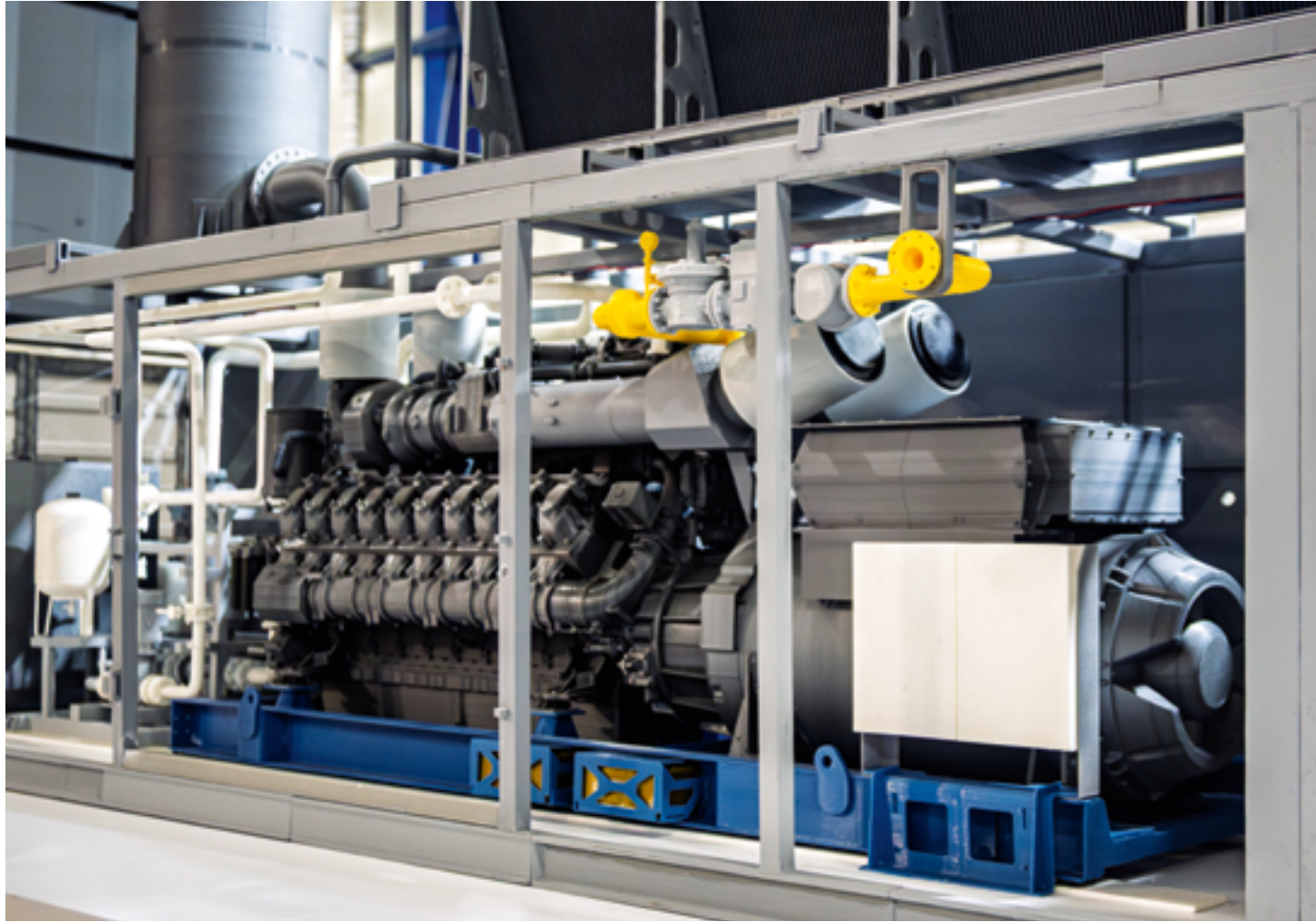
SOLUTION:

Combination of two chucks, one 2,000 mm dia power actuated and the second a 1,000 mm dia manually actuated.

FEATURES:

- Power spindle for mechanical power clamping with short setup times and maximum holding force
- Clamping force 400 kN per jaw at a torque of 180 Nm
- Supports a partial workpiece weight of up to 80 t
- Concentricity accuracy better than 0.01 mm
- Internal and external clamping possible
- Small face plate (diameter 1,000 mm) for counter-clamping





RÖHM supplies clamping and gripping technology for power plant generator components and for stationary and mobile diesel generators



DIESEL GENERATOR

TRANSMISSION GEAR

TASK:

Clamping of the workpiece on the gear teeth for turning

SOLUTION:

Collet chuck (diameter 320 mm)

FEATURES:

- Air sensing for verification of the correct axial workpiece position
- Flat contact surface with maximum concentricity accuracy (0.01 mm), ensuring maximum axial precision and absolute perpendicularity to the axis of rotation
- Spring-loaded clamping bell with integrated air blast

DIESEL GENERATOR

POWER OUTPUT SHAFT

TASK:

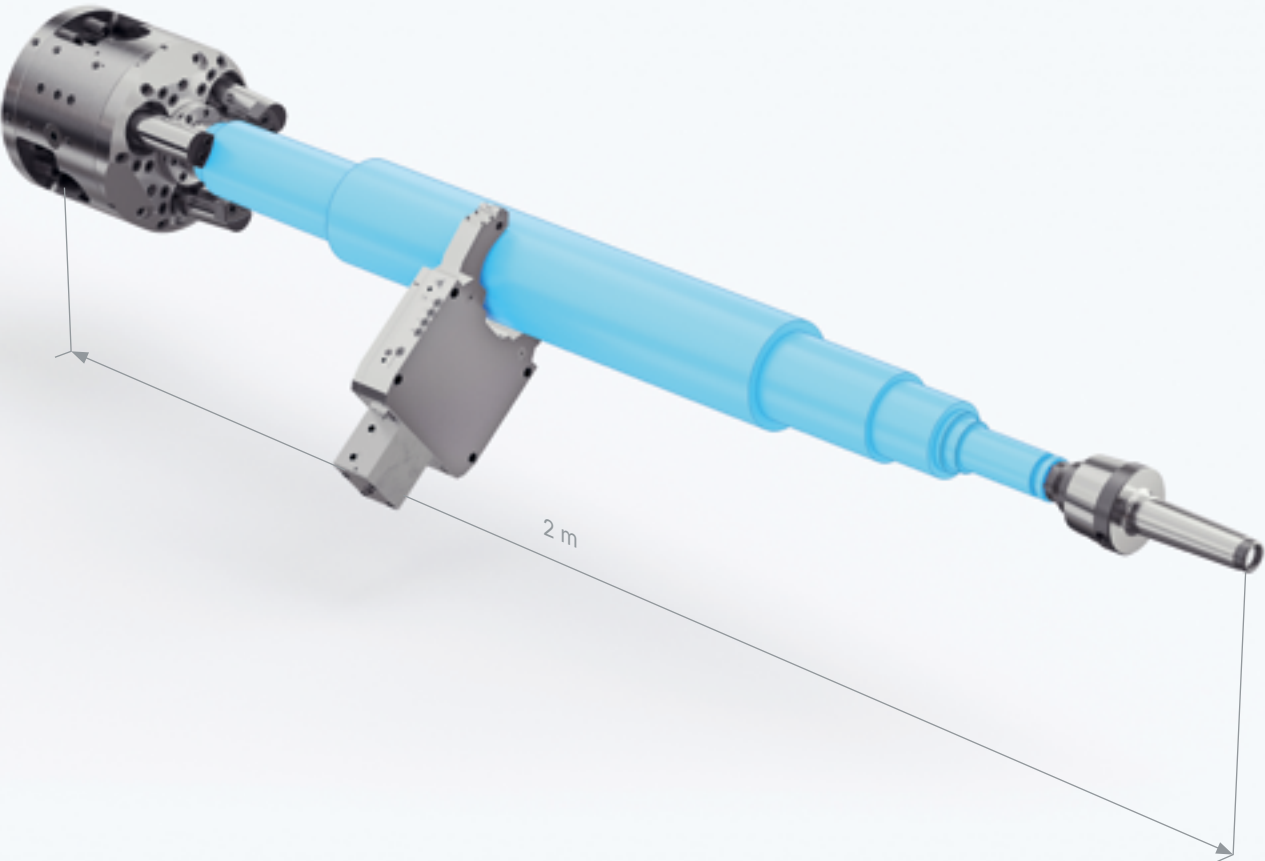
Clamping of the workpiece (length 1,470 mm) for turning and milling in a single setup

SOLUTION:

Combination of a power-operated lever chuck, a live center and a steady rest

FEATURES:

- Changeover from centric clamping to compensating clamping
- Retractable clamping arms allow machining of the clamping area before or after clamping
- Provision for mounting a face driver or a clamping mandrel for machining with retracted clamping arms



DIESEL GENERATOR

CRANKSHAFT

TASK:

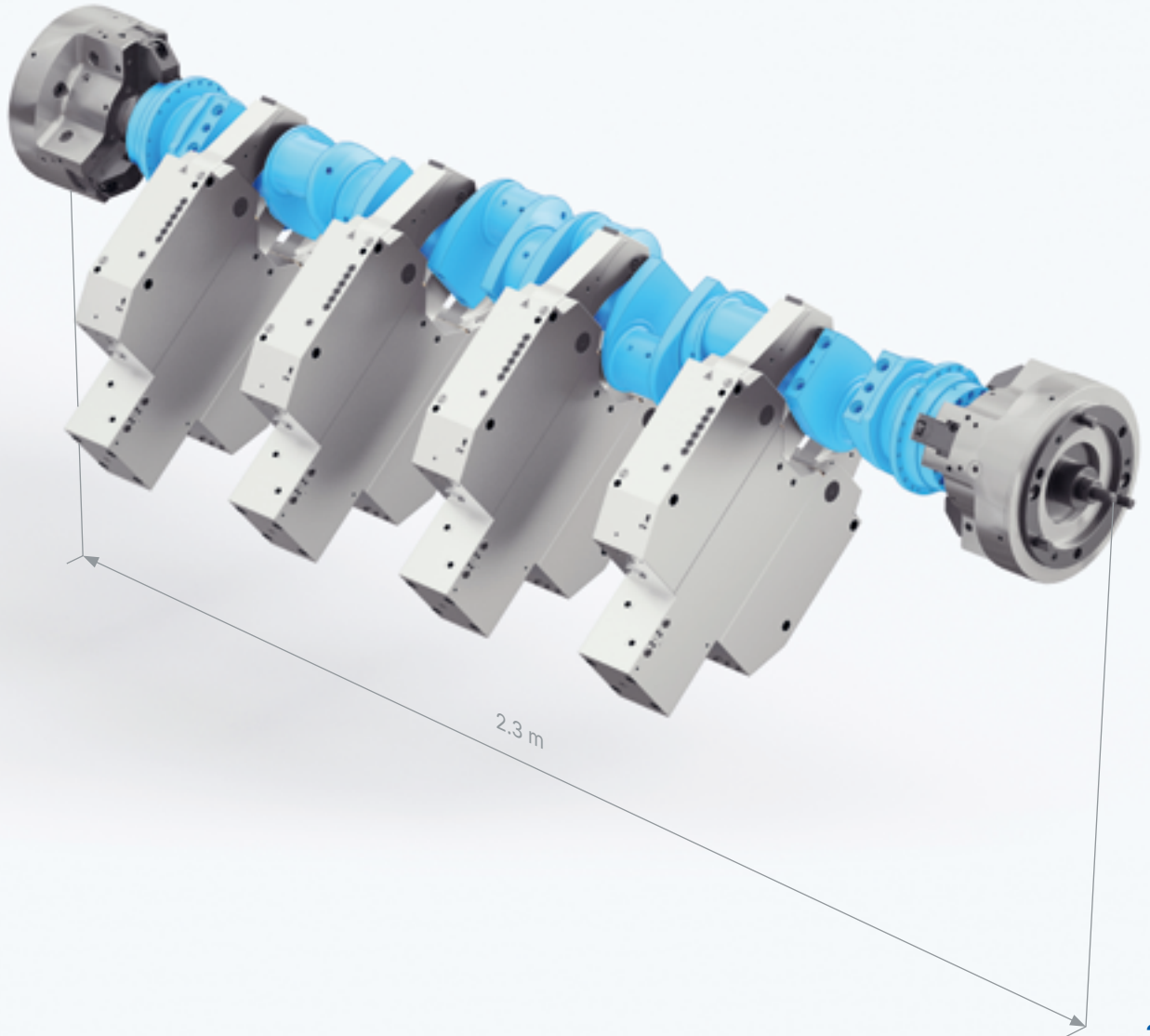
Clamping of the long asymmetrical workpiece (length 1,800 mm) for turning and milling

SOLUTION:

Two power-operated chucks of different design, one at each end of the workpiece, plus four steady rests

FEATURES:

- Angle-lever chuck with three compensating master jaws arranged at 90°; equipped with seats for rigid, radially adjustable centering cones
- Compensating chuck with extendable quill (100 mm stroke) and centering tip for machining; runout of the quill adjustable via wedge elements
- Both chucks provide high clamping force (250 kN each)
- Four steady rests distributed along the workpiece length, designed for heavy milling operations (rollers with wear-resistant PCD inserts)



RÖHM has the right answer for all clamping tasks, both in workpiece and tool clamping. For the manufacture of products to the highest standards, all requirements are met from customer consultation, design and production through to service. Our specialised consultants will be happy to give you any more detailed information.



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