

A man with a beard and a headlamp on his forehead is shown in a close-up, looking off to the side. He is wearing a dark jacket and a patterned scarf, both covered in snow. The background is a dark, snowy landscape with an offshore oil rig illuminated by lights in the distance. Snow is falling heavily around him.

TRUSTED IN EXTREME CONDITIONS

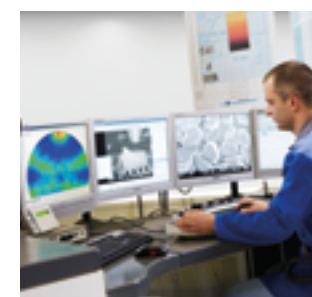
Pushing steel solutions to new limits

- SAFETY
- EFFICIENCY
- CONSISTENCY
- THROUGHOUT THE VALUE CHAIN

A STRONG NETWORK OF OIL AND GAS COMPETENCE, SOLUTIONS TO THE POINT

At voestalpine, our specialized companies offer competence throughout the value chain in the field of steel-based and nickel-based materials. From exploration to production and transportation to refinement, our global network addresses all the requirements of the oil and gas industry.

A strong network of oil and gas competence, solutions to the point



Steel development



Steel production



Steel processing



Distribution & Services

TRUST IN SAFETY

We ensure that our customers get the highest quality, not only in terms of products, but also in terms of advice, individualized solutions, and global supply continuity. Our experts, strong group of specialized companies, world-wide presence, and high-performance logistics enable us to ensure this quality – in every respect. To us, health, safety, environment, and quality have the utmost priority.

TRUST IN EFFICIENCY

We provide ultra-high strength products with long service lives, and the quality of our solutions goes beyond day to day use. It is also our ambition to offer our customers the best life cycle value. Our competence throughout the value chain in the field of steel-based and nickel-based materials, our reliable and innovative products, and our flexible and customized approach enable us to deliver tailor-made and economically efficient quality solutions.

TRUST IN CONSISTENCY

Consistency and reliability characterize our companies. Through our research and development and lasting partnerships we create innovative, customer-oriented solutions that continuously advance our clients' leading edge. Our dedication to consistency goes beyond our product offerings. The strength of our group ensures financial stability and independence so that our partners can rely on us in the long term.



COUNT ON A COMPREHENSIVE PORTFOLIO OF PRODUCTS AND SERVICES

Trust in benchmark solutions for exploration, production, transportation, and refinement

STRONG PRODUCTS – CERTIFIED QUALITY

Whether used thousands of meters below sea level, in the cold of the Arctic, or under the most demanding conditions in terms of sour-gas resistance, our products are dependable. Our mills and products meet the most stringent quality requirements of the industry (i.e. API, NORSOK, TUV, ABS, DNV, ISO etc) with service quality of “First among Equals - second to None!”



STRONG COMPANIES – PROVEN SPECIALISTS

At voestalpine, we have a special edge: our products and services are provided and rendered by highly specialized and closely networked companies. Each of our companies has many years of experience and knowledge in its field of activity. Our group of highly specialized companies ensures the high flexibility needed to quickly and reliably meet even the most intense of individual requirements.

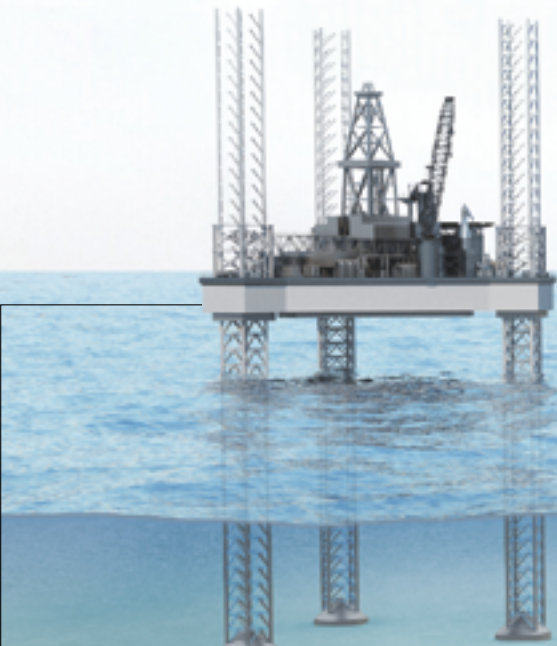
A COMPLETE PORTFOLIO – STRONG OVERALL BENEFITS

Together, our group of companies creates a comprehensive portfolio along the entire value chain. Our customers benefit from coordinated services, cross-disciplinary cooperation, market-oriented research and development, and reliable availability all over the world.

| | voestalpine BÖHLER Bleche | voestalpine BÖHLER Edeltahl | Buderus Edeltahl | Villares Metals | voestalpine Böhler Welding | voestalpine Foundry Group | voestalpine Grobblech | voestalpine Rotec | voestalpine Tubulars | voestalpine Wire Technology | Global Value Added Services Network | voestalpine Additive Manufacturing Center |
|-----------------------------|---------------------------|-----------------------------|------------------|-----------------|----------------------------|---------------------------|-----------------------|-------------------|----------------------|-----------------------------|-------------------------------------|---|
| Bars & Billets | | | | | | | | | | | | |
| Open & Closed Die Forgings | | | | | | | | | | | | |
| Sheets & Plates | | | | | | | | | | | | |
| Pipes | | | | | | | | | | | | |
| Steel Castings | | | | | | | | | | | | |
| Welding Consumables | | | | | | | | | | | | |
| Round, Flat and Shaped Wire | | | | | | | | | | | | |
| Additive Manufacturing | | | | | | | | | | | | |

OFFSHORE

Trust in the fulfillment of the highest standards



Jack-up Rig

- BOPs (Forgings, Castings)
- Chords (Sheets & Plates, Pipes)
- Fasteners, Bolts, Connectors (Bars)
- Housings for Gas Turbines (Castings)
- Internals for Gas Turbines (Forgings, Bars)
- Nodes (Castings)
- Offshore Plates (Sheets & Plates)
- Pumps, Valves, High Pressure Components (Bars & Billets, Castings)
- Separators (Forgings)
- Welding Consumables
- Cranes (Sheets & Plates, Pipes)



(Semi) Submersible

- BOPs (Forgings, Castings)
- Buoyancy Tanks (Sheets & Plates)
- Clad Plates (Sheets & Plates)
- Fasteners, Bolts, Connectors (Bars)
- Housings for Gas Turbines (Castings)
- Internals for Gas Turbines (Forgings, Bars)
- Lattice Boom Cranes (Pipes)
- Offshore Plates (Sheets & Plates)
- Pumps, Valves, High Pressure Components (Bars & Billets, Castings)
- Receptacles (Castings)
- Risers (Sheets & Plates)
- Separators (Forgings)
- Tendon Porches (Castings)
- Tendons (Sheets & Plates)
- Welding Consumables
- Cranes (Sheets & Plates, Pipes)

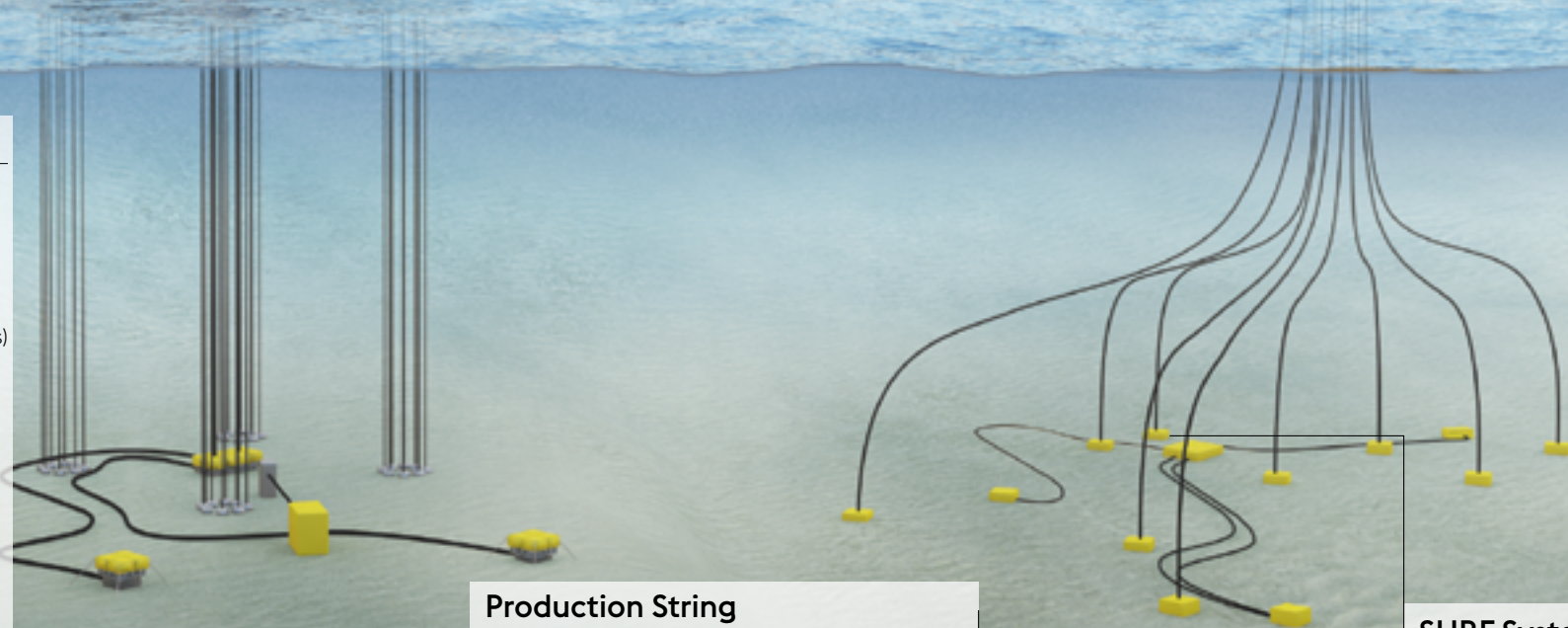
Drill String

- Casing Hangers (Forgings)
- Casings (Pipes, Bars & Billets)
- Drill Bits (Closed Die Forgings)
- Drill Pipes (Pipes, Bars & Billets)
- MWD, LWD (Bars & Billets)
- Non-Mag Drill Collars (Bars & Billets)
- Wirelines (Wire)



FPSO

- BOPs (Forgings, Castings)
- Fasteners, Bolts, Connectors (Bars)
- Housings for Gas Turbines (Castings)
- Internals for Gas Turbines (Forgings, Bars)
- Offshore Plates (Sheets & Plates)
- Pumps, Valves, High Pressure Components (Bars & Billets, Castings)
- Risers (Sheets & Plates, Wire)
- Separators (Forgings)
- Turrets, Uni Joints (Castings)
- Welding Consumables
- Cranes (Sheets & Plates, Pipes)



Production String

- Accessories: Pup Joints, Crossovers, Couplings (Pipes)
- BOPs (Forgings, Castings)
- Completion Tools (Bars & Billets)
- Gas Lift Mandrels (Closed Die Forgings)
- High Pressure Components (Bars & Billets)
- Pumps, Valves, Fasteners (Bars & Billets, Castings)
- Tubing Hangers, Casing Hangers (Forgings, Bars & Billets)
- Tubing, Casing (Pipes, Bars & Billets)
- Welding Consumables
- Wellhead (Forgings)
- Wire Wrapped Screens (Pipes, Wire, Welding Consumables)



SURF Systems

- BOPs (Forgings, Castings)
- Connectors (Sheets & Plates, Forgings, Bars & Billets)
- Flexible Pipes, Umbilicals (Wire)
- Flowlines (Bars & Billets, Wire)
- Manifolds (Forgings)
- Pipelines (Bars & Billets)
- Tubing Hangers, Casing Hangers (Forgings, Bars & Billets)
- Umbilical Seamless Tubes (Bars & Billets)
- Valves, Pumps (Bars & Billets, Castings)
- Welding Consumables

ONSHORE

Count on quick solutions and flexible partners

Drill String

Casings (Pipes, Bars & Billets)
Drill Bits (Closed Die Forgings)
Drill Pipes (Pipes, Bars & Billets)
MWD, LWD (Bars & Billets)
Non-Mag Drill Collars (Bars & Billets)
Tubing Hangers, Casing Hangers (Forgings, Bars & Billets)
Wirelines (Wire)

Refinery

Boiler, Pressure & Superheater Tubes (Pipes)
Clad Plates (Sheets & Plates)
Fittings, Flanges, ... (Sheets & Plates, Forgings, Bars & Billets)
Heat Exchanger Components (Sheets & Plates)
Housings for Compressors (Castings)
Lattice Boom Cranes (Pipes)
Line Pipe (Pipes, Sheets & Plates)
Pressure Vessels (Sheets & Plates)
Pumps, Valves, Fasteners, Bolts (Bars & Billets, Castings)
Welding Consumables

LNG, LPG

Fasteners, Bolts (Bars)
Fittings, Flanges, ... (Sheets & Plates, Forgings, Bars & Billets)
Housings for Compressors (Castings)
Nickel Plates (Sheets & Plates)
Pumps, Valves (Bars & Billets, Castings)
Storage (Sheets & Plates, Wire)
Tubes (Pipes, Bars & Billets, Sheets & Plates)
Welding Consumables

Transportation

Clad Line Pipe (Sheets & Plates)
Disks, Impellers & Shafts for Compressors & Gas Turbines (Forgings, Castings, Bars)
Fasteners, Bolts (Bars)
Housings for Compressors & Gas Turbines (Forgings, Castings)
Line Pipe (Sheets & Plates, Pipes)
Valves (Forgings, Castings, Bars & Billets)
Welding Consumables

Production String

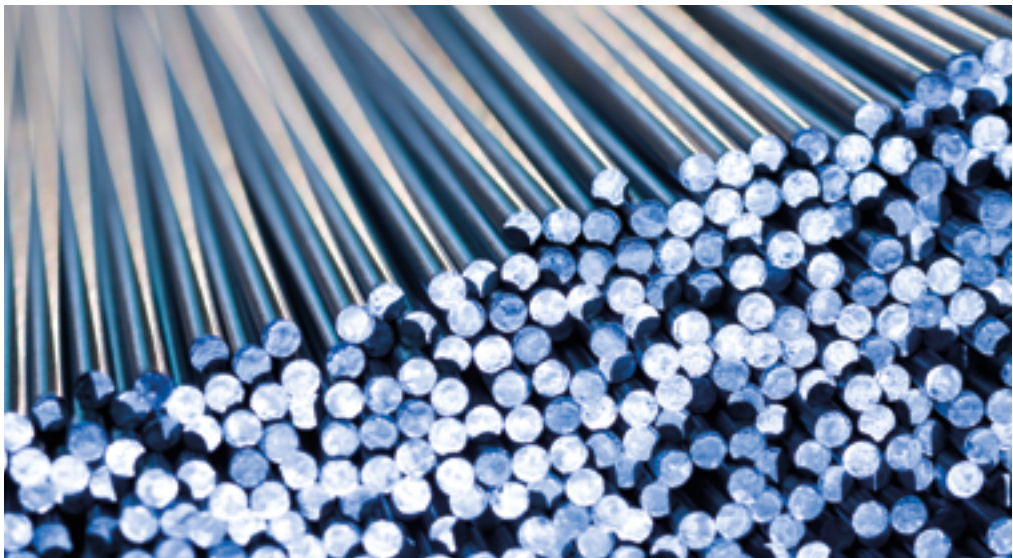
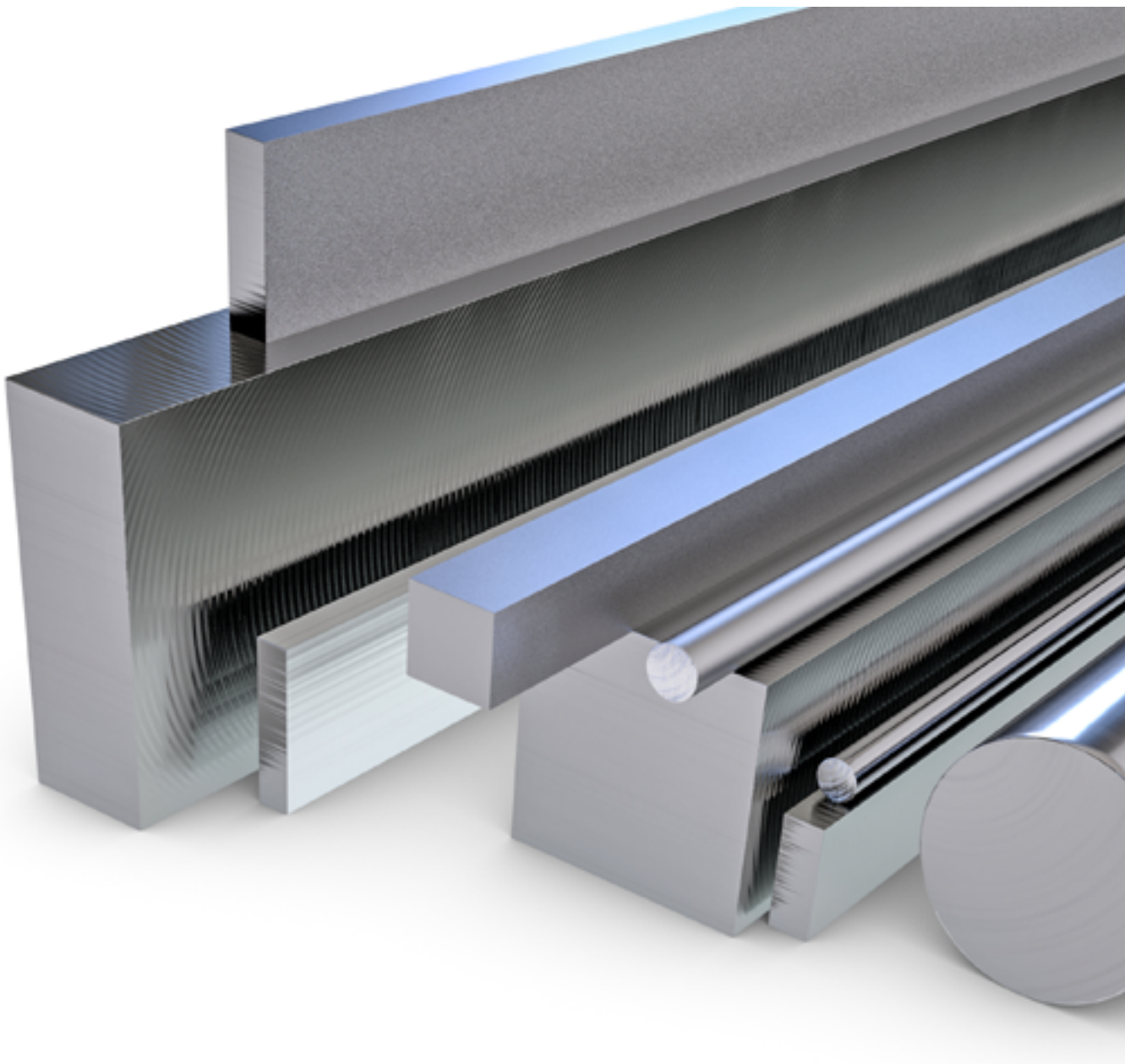
Accessories: Pup Joints, Crossovers, Couplings (Pipes)
BOPs (Forgings, Castings)
Completion Tools (Bars & Billets)
Connectors (Bars & Billets)
Fasteners, Bolts (Bars)
Gas Lift Mandrels (Closed Die Forgings)
Housings for Compressors (Castings)
Pumps, Valves (Bars & Billets, Castings)
Tubing Hangers, Casing Hangers (Forgings, Bars & Billets)
Tubing, Casing (Pipes, Bars & Billets)
Welding Consumables
Wellhead (Forgings)
Wire Wrapped Screens (Pipes, Wire, Welding Consumables)



BARS & BILLETS

Count on reliable and consistently high quality

Quality knows no compromise. We deliver materials of highest metallurgical purity for use in the most extreme environments. We are one of very few suppliers worldwide having all kinds of melting and remelting plants at our disposal (ESR, PESR, VAR).



Bars, round



Bars, flat

BARS – ROLLED, FORGED

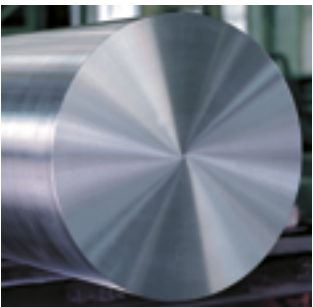
With decades of industry experience and a focus on creating solutions using cutting-edge technologies (melting & remelting, rolling & forging, heat treatment, machining and testing), we are a leading specialist for low-alloyed, medium-alloyed, and high-alloyed special steels, as well as nickel-based alloys. We excel in the development of customized solutions. The features of our products, such as tight tolerances or extremely small machining allowances, are impressive, innovative, and specialized.

BILLETS – ROLLED, FORGED

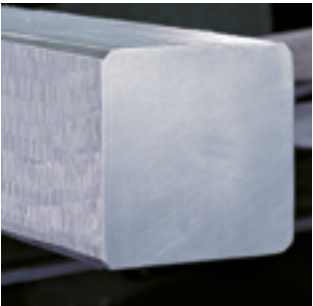
We deliver billets in accordance with international quality standards in a broad range of steel grades and nickel-based alloys. On request, we also melt metals beyond the standard grades to individual specifications.

QUICK AVAILABILITY

To us, quality goes beyond product performance. Best quality solutions must be available reliably and quickly. We ensure that our warehouses are stocked with materials needed by the Oil & Gas Industry, and our Value Added Services segment works actively to secure safety stock for all important customer markets.



Bars and Billets – round, machined



Billets – square, bright ground (RCS)

| Companies | Your specialist for |
|------------------------------|--|
| voestalpine BÖHLER Edelstahl | Duplex, Super Duplex, Austenitics, Martensitics, PH-grades, Ni-based alloys; unit weights up to 40 tons |
| Buderus Edelstahl | Low-alloyed and medium-alloyed Engineering Steels |
| Villares Metals | Engineering Steel, Duplex, Super Duplex, Austenitics, Martensitics, PH-grades, Maraging, Special Stainless and Ni-based alloys; unit weights up to 24 tons |

OPEN & CLOSED DIE FORGINGS

Trust in competence from the melt to the finished product

SAFETY TO THE THIRD POWER

We are your partner when high mechanical stress has to be considered and highest reliability under aggressive environmental or ambient conditions is demanded.

PRODUCTION FROM ONE SOURCE

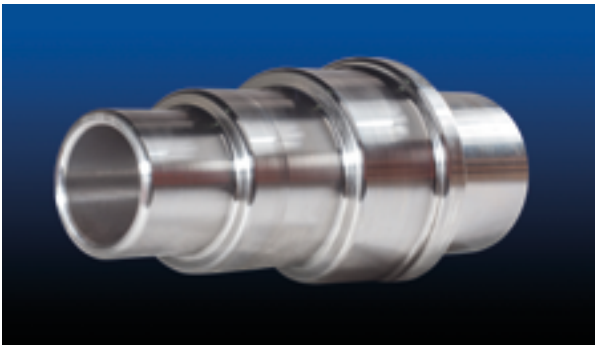
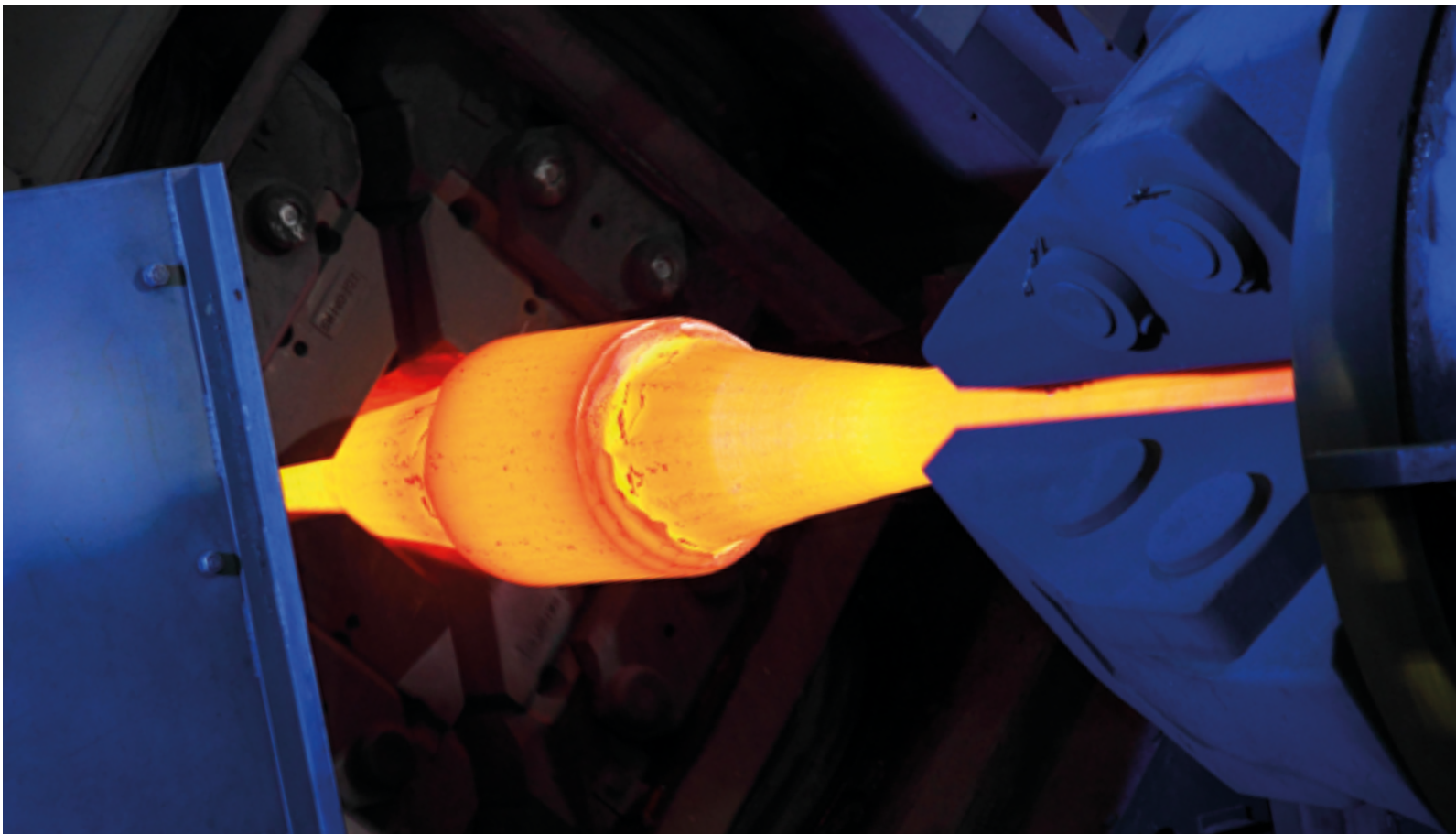
From steel production to forged product completion, we preform every step in the production process at our own plants. We take responsibility into our own hands, and we ensure that our customers get end-to-end quality assurance. We check and document the quality of our products at every point in the production chain.

OPEN DIE FORGINGS

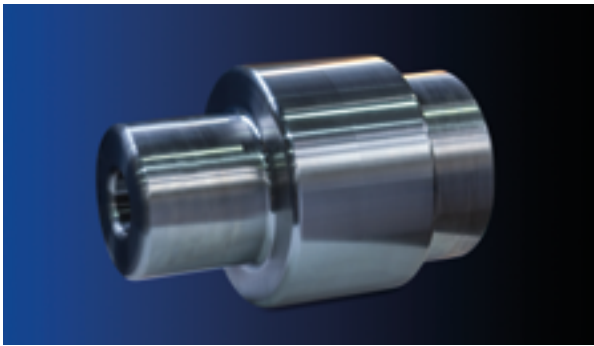
Our open die forgings are characterized by the tightest tolerances and big dimensions. In our state-of-the-art plants, we produce drawing-based forgings weighing up to 40 tons. We have many areas of expertise, including the production of impellers, disks, and shafts for compressors or gas turbines; tubing and casing hangers for wellheads; and components for Christmas trees, separators, pumps and valves in rough-machined condition.

CLOSED DIE FORGINGS

Precision and ruggedness, as demanded, for example, in the case of drill bits or gas lift mandrels, characterize our closed die forgings. The products we develop together with our customers have proven successful under the toughest operating conditions, and they are excellently reputed all over the world.



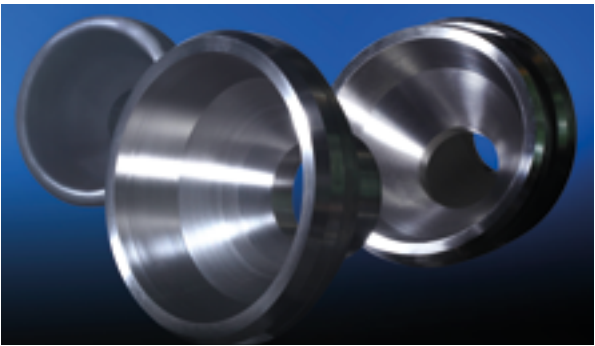
Premachined casing hanger



Premachined tubing hanger



Preclad HP Housing Body



Separator parts

| Companies | Your specialist for |
|---------------------------------|---|
| voestalpine BÖHLER Edelstahl | Open Die Forgings up to 40 tons of Duplex, Super Duplex, Austenitics, Martensitics, PH-grades, Ni-based alloys |
| Buderus Edelstahl | Open & Closed Die Forgings of un-alloyed, low-alloyed and medium-alloyed Engineering Steels |
| Villares Metals | Open Die Forgings up to 23 tons of Engineering Steel, Duplex, Super Duplex, Austenitics, Martensitics, PH-grades, Maraging, Special Stainless and Ni-based alloys |



SHEETS & PLATES

Count on the optimum material for each and every application

Special tasks demand special solutions. We provide a broad range of special sheets and plates.

The applications of our sheets and plates may vary, but they have one thing in common:

they are all customized solutions for heaviest duties.

HIGH PERFORMANCE PLATES

Our sheets and plates are primarily used for fittings, flanges, heat exchangers, or welded pipes for offshore applications. Our range of products includes seawater-resistant super duplex and super austenitic steels, nickel and nickelbased alloys, as well as titanium and titanium alloys for highest corrosion resistant applications. By using our particular cross rolling technology, we ensure the homogeneous isotropic material properties of our sheets and plates are achieved. Our special sheets and plates are available from a thickness of 2 mm, both in standard formats and in customized sizes.

CLAD LINE PIPE PLATES

Manufacturing top quality clad line pipe plates is one of our specialties; we are the biggest manufacturer worldwide in this segment. The fortes of our roll-bonded clad plates with corrosion-resistant cladding are high strength with good toughness, and they have the best corrosion protection features. Special materials such as our X65 product with the nickel-based alloy 625 ensure these optimum physical properties. With the help of our partners, our clad plates are processed into metallurgically bonded clad line pipes.

LINE PIPE PLATES

We are a pioneer in the development of thermo-mechanical rolling processes, and we are among the world market leaders in the field of sour-gas-resistant line pipe plates. Whether used for a pipeline 2,800 m below sea level, or for an on-land pipeline of up to 48" (1,220 mm) in diameter, our line pipe plates provide for safe and reliable transportation.

OFFSHORE STRUCTURAL PLATES

Our offshore structural plates are in a class of their own, especially when applied in cold conditions. They are characterized by extremely good toughness that can withstand arctic temperatures, and their weldability is setting industry standards. Our offshore structural plates have a variety of applications and can be used as an element in oil rigs, as a foundation for offshore wind parks, or as a part in FPSOs (Floating Production Storage and Offloading Units).

CHORDS

Chords reinforce the gear racks of the feet of offshore platforms. We provide the optimum solution for this application by offering high-strength, hot-formed elements that are produced by means of a manufacturing process specifically developed by our team at voestalpine.

NICKEL PLATES

We are an industry leader in LNG and LPG storage solutions, and we have an extensive portfolio to ensure we can meet all of our customers' needs. Featuring proven weldability and resistance to low temperatures, our 9% nickel steels are the proper solution for LNG storage. For this application, we offer extra wide plates, even with a thickness of 5 mm. Moreover, with our 5% nickel steel plates we are also the specialist for LPG storage and transportation. We supply shell plates and heads from one single source.

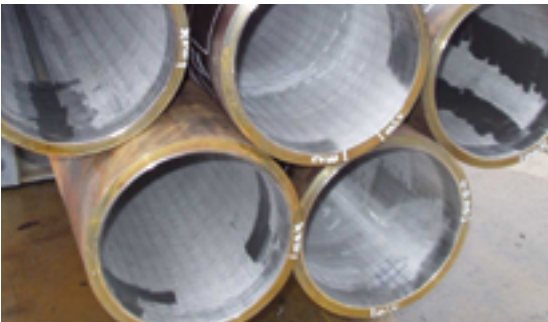
PRESSURE VESSEL PLATES

We are the world's only manufacturer to deliver shell plates, heads, and cones in plain-carbon steel – roll-clad on demand – from one single source. Our customers benefit from coordinated solutions of optimum processing. By using our high-strength CrMo und CrMoV steels we are able to reduce the wall thicknesses of pressure vessels.

TOUGH TO THE CORE

Our new generation of thermomechanically rolled (TMCP) toughcore® heavy plates are characterized by their excellent toughness at extremely low temperatures, even to the core. This steel is manufactured in a completely new and patented process that enables unique combinations of properties with respect to thickness, strength, excellent toughness and best weldability. This new technology provides higher levels of safety, allows for exploration of extreme regions, and ensures cost savings for our customers.

| Companies | Your specialist for |
|---------------------------|--|
| voestalpine BÖHLER Bleche | Hot and cold rolled Sheets & Plates, Ni and Ni-based alloys, Super Duplex, Super Austenitics, Titanium and Titanium alloys |
| voestalpine Grobblech | TMCP Steels, CrMoV Steels, Clad Plates, Ni-based alloyed Plates, toughcore® |



Clad plates for clad line pipes



Plates

PIPES – OCTG & LINE PIPES

Trust in the combination of advanced technology and high performance

High-tech seamless pipes are our specialty. We manufacture seamless pipes with an outside diameter of up to 7 5/8 inches (193.7 mm) according to all common international standards, as well as pipes tailored to individual customer requirements. State-of-the-art production, practice-oriented competence, and an uncompromising emphasis on quality have made us a partner who is renowned worldwide for:

- » Oil Country Tubular Goods (OCTG): Tubing, Casing, Accessories (Pup Joints, Crossovers, Couplings)
- » Line Pipes, Boiler, Pressure and Superheater Tubes, Heat Exchanger Tubes
- » Construction Tubes for Lattice Boom Cranes, Span Braker Pipes

SPECIAL AND API STANDARD GRADES

Apart from the API standard grades, we offer a broad range of special grades to meet individual customer specifications going beyond the API requirements, such as low-temperature resistance, sour-gas resistance, highest pressure resistance, and much more.

COMPETENCE FOR THREADED CONNECTIONS

By offering in-house developments, we set the standard for gas-tight threaded connections for demanding applications (VAsuperior®, VAGT®), for rotated strings (VARoughneck®), for slim hole applications (VAF), and for extreme torques combined with extended reach (VAXplorer®). These premium connections are also available with DryTec® – the

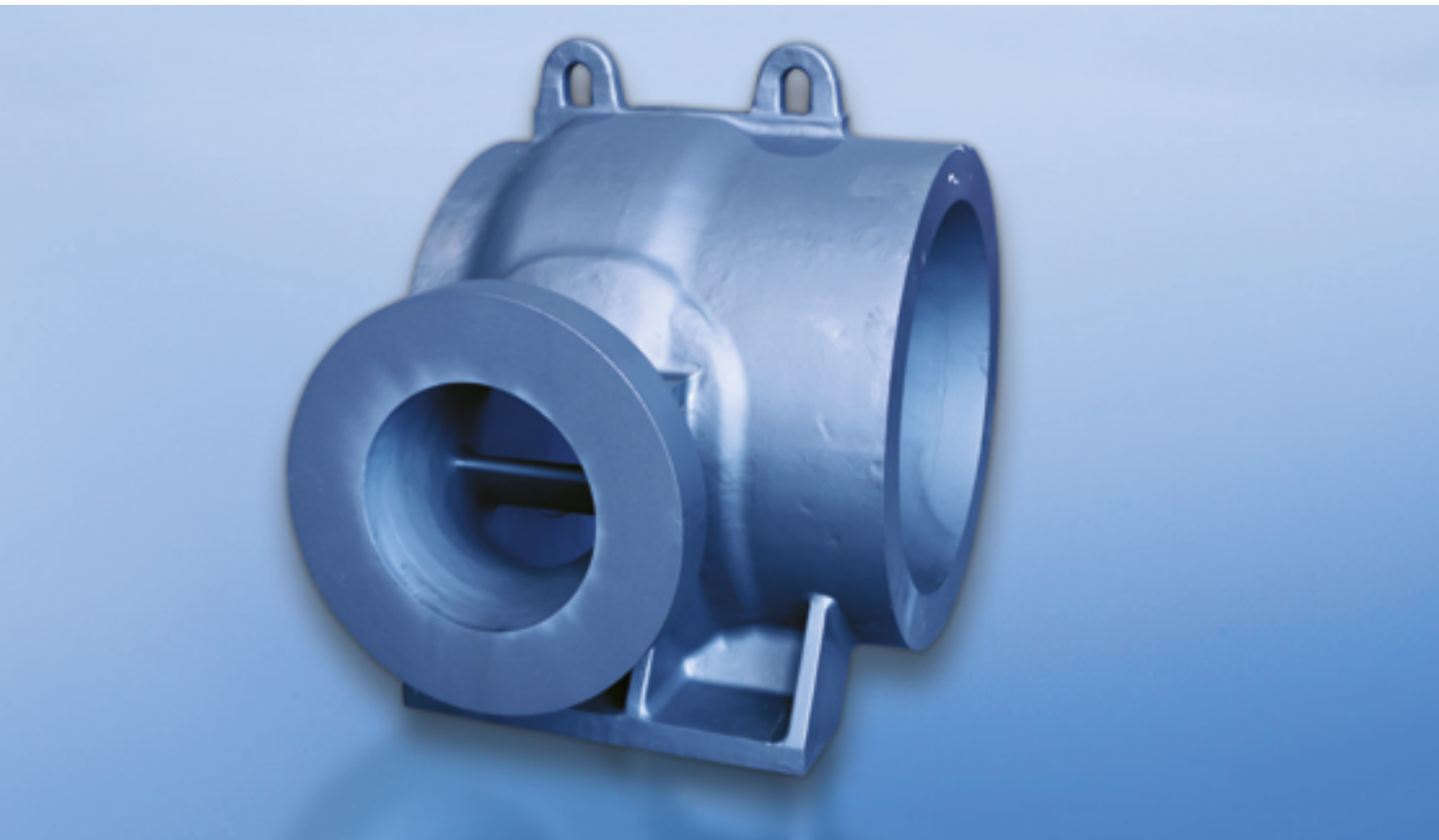
lubricant-free solution, which makes your work more efficient, safe and environmentally friendly.

PRECISION STEEL TUBES

We specialize in the production and processing of cold drawn precision steel tubes for a wide range of applications (tube diameters up to approx. 180 mm, wall thicknesses up to 22 mm). The tubes are cold formed on state-of-the-art drawing lines. Moreover, we deliver sections on the basis of customer drawings and specifications up to a maximum circumference of 160 mm and wall thickness of up to 14 mm.

| Companies | Your specialist for |
|----------------------|---|
| voestalpine Tubulars | Hot rolled Seamless Tubes, OCTG (Casing and Tubing, Accessories); Pressure Pipes, Line Pipes, Heat Exchanger Tubes and High-Temperature-Resistant Pipes |
| voestalpine Rotec | Cold drawn Precision Steel Tubes, seamless or welded |





STEEL CASTINGS

Trust in pre-assembled components ready for installation

We are a worldwide leading supplier and partner for steel castings up to a weight of 200 tons. We master and supply steel castings of all materials customary within the industry, and we develop new and complex alloys according to our customers' requirements and for extreme applications. Our nickel-based alloys have the highest possible corrosion resistance and are reliable even in extremely low temperatures. All steel castings are available both roughed down and finished. Our pre-assembled components are ready for installation, which helps our customers save time and money.



| Companies | Your specialist for |
|---------------------------|--|
| voestalpine Foundry Group | Un-alloyed and low-alloyed, high-alloyed, stainless, Ni-based alloys |



ROUND, FLAT & SHAPED WIRE

Trust in safety for standard products and a leading edge for customized solutions

We combine experience with quality production and leading know-how, making us a specialist in the manufacturing of shaped wire. We provide customized solutions and set industry trends, offering a broad portfolio of standard wires with high economic efficiency. The top quality we deliver is based on the integrated production chain from our own steel mill to our state-of-the-art rolling mills, which ensure the tightest possible tolerances. Long-standing customer partnerships, customer-oriented research & development, simulation activities, and customized heat and surface treatment, as well as logistic solutions testify to our competence and expertise. We are a dedicated partner, and we are committed to fulfilling special requirements and creating solutions for specific applications.



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| Companies | Your specialist for |
|------------------------------|--|
| voestalpine Wire Technology | Flat and Shaped Wire, e.g. for Flexible Pipes, Wire Wrapped Screens, Umbilicals; Drawn Wire, e.g. Prestressing concrete strand (defcor®) for LNG Tanks |
| voestalpine BÖHLER Edelstahl | Wire Rod of Duplex, Super Duplex, Austenitics, Martensitics, PH-grades and Ni-based alloys |
| Villares Metals | Wire Rod of Duplex, Super Duplex, PH-grades, Special Stainless, and Ni-based alloys |

WELDING CONSUMABLES

Trust in perfectly coordinated solutions



Our team at voestalpine Böhler Welding, with the brands Böhler Welding and UTP Maintenance, offers solutions to the oil & gas upstream, midstream, and downstream segments based on high quality welding consumables to ensure safe, efficient, and cost effective operations of production equipment and plants.



Upstream



Midstream



Downstream



LNG & LPG

OIL & GAS UPSTREAM

Under the roof of our brand Böhler Welding, we provide high quality, low hydrogen consumables for welding high strength steels used in drilling units or offshore cranes. With our brand UTP Maintenance, we also offer corrosion resisant alloys used for subsea and top side processing applications, as well as low alloyed consumables for the welding of pressure control equipment. In addition to joining applications, we have expertise in cladding. We offer high quality nickel-based wires for the hot wire GTAW process and the most advanced solutions for electroslog strip cladding.



UTP Maintenance

OIL & GAS MIDSTREAM

Meeting our customers' demands is of the utmost importance. We offer a full range of consumables for the welding of low strength, high strength, stainless, duplex, super duplex and corrosion resistant alloy (CRA) pipes, meeting the highest requirements in transportation and distribution pipeline projects. This includes solid wires, flux and metal-cored wires, and self-shielded flux-cored wires for semi and fully mechanized welding processes, as well as submerged wire/flux combinations and GTAW wires and rods that offer outstanding welding performance and mechanical properties. Our manual metal arc electrodes are manufactured with cellulosic coating systems or with basic, low-hydrogen coating systems suitable for vertical up and down welding.

OIL & GAS DOWNSTREAM

We have more than 30 years of experience in the production of welding consumables for critical processes equipment (CPE) and furnace tubes for demanding applications at voestalpine Böhler Welding. We provide best-in-class CrMo and CrMoV welding consumables that fulfill or even exceed the requirements of relevant API recommended practices, applicable codes, and industry specifications. Our welding consumables have all the necessary mechanical properties for even the most demanding of conditions. They retain excellent toughness at low temperatures and have high resistance to temper embrittlement and creep. We supply weld overlay solutions for a wide number of alloys, including innovative single layer and high speed strip cladding with proven corrosion resistance and disbonding properties. Additionally, we provide well-referenced solutions for centrifugal casting tubes with filler metals that match the base material grades.

LNG & LPG

With our brands Böhler Welding and UTP Maintenance, we offer welding consumables for the construction of LNG, LEG, and LPG production equipment; regasification equipment, transportation equipment, and storage units. Welding consumables play an important role in the construction of an LNG project. The use of high quality products is imperative to the safety and cost efficiency of the building of an LNG plant; materials and structures must meet the most stringent specifications. A variety of materials is used for LNG plants, such as carbon steel, stainless steel, 3.5% to 9% Nickel steel, and aluminum. Nickel-based and austenitic welding consumables are used in low temperature cryogenic applications where high ductility and strength are required. At voestalpine Böhler Welding, we offer an extensive portfolio of specialized products for the main welding processes (SMAW, SAW, GMAW, and FCAW) with the required qualifications, certifications, and documentation that meet the industry demands.

| Company | Your specialist for |
|----------------------------|--|
| voestalpine Böhler Welding | Welding Consumables for Upstream, Downstream, Transportation, Storage (e.g. deep-sea applications, high-pressure and temperature-critical refinery equipment, pipelines); LNG, LPG Solutions |



ADDITIVE MANUFACTURING

From concept to component

Additive manufacturing – popularly known as 3D printing – is one of the most innovative and revolutionary manufacturing methods. At voestalpine, we are implementing this new technology while making use of our in-house expertise to develop it further. Customers benefit from our leading-edge competence throughout the value chain, which ranges from powder and wire development to the delivery of finished products.

Additive manufacturing (AM) uses electric arc or laser technology to fuse fine metal powders or wire into complex and high-strength components. Starting with three-dimensional CAD data, AM enables the wasteless production of even the most complex shapes. With the use of conven-

tional technologies like milling, drilling etc., such structures would be impossible to produce or would require extreme efforts. Simply put, “printers” manufacture the components layer by layer. Depending on the application, various methods (Powder Bed or Direct Deposition Process with powder or wire) are used. Currently, we are using machines from Trumpf, DMG Mori, Renishaw, SLM Solutions, and EOS in our additive manufacturing processes. A crucial part of AM is using the correct process parameters for each type of printing machine and material. If a specific process parameter is not already available, we develop it in-house.

| Companies | Your specialist for |
|--|--|
| voestalpine Additive Manufacturing Center Düsseldorf | Innovation and R & D Hub, Consultancy, Application Development, Design, Manufacturing (Powder Bed) |
| voestalpine Additive Manufacturing Center Singapore | Manufacturing (Laser Metal Deposition Process) |
| voestalpine BÖHLER Edelstahl | Powder Development |
| Uddeholm | Powder Development |
| voestalpine Böhler Welding | Additive Manufacturing Wire |
| + further sites in Toronto, Houston and Taiwan | |

POWDER & WIRE DEVELOPMENT

We are laying the foundation for innovation in additive manufacturing by developing new metal powders and wires that can be adapted to specific applications. Equipped with the knowledge of our material experts, we are a frontrunner in this revolutionary technology.

GLOBAL PRESENCE

We strive to expand the network of our additive manufacturing technologies, both in location and diversity of applications. Through our international Additive Manufacturing Competence Network, we cover a variety of industries worldwide, such as tooling, aerospace, mechanical engineering, and Oil & Gas/CPI. Our central innovation hubs for metal powder printing and wire are located in Düsseldorf and Hamm, Germany, but we also have experts located in places such as Singapore, Toronto, Houston and Taiwan to ensure that our customers have access to the best support possible no matter where they are.

LEADING IN R & D

We develop our fine, high-quality metal powders at voestalpine BÖHLER Edelstahl in Kapfenberg, Austria and at Uddeholm in Hagfors, Sweden. Right now, we offer the following powder types: Böhler L718, Böhler L625, Böhler N700 (17-4PH), Böhler W722 (1.2709), Böhler M789 and Uddeholm Corrax. voestalpine Böhler Welding offers already different wires for the Wire-Arc Additive Manufacturing process: high strength, duplex, stainless, nickel, titanium, and aluminum. However, we are continuously developing new powder and wire types for your special needs.

COMPLETE SOLUTIONS FROM A SINGLE SOURCE

An essential part of the success of our additive manufacturing operations is a comprehensive understanding of each and every process in the value chain. We provide additive manufacturing solutions from start to finish, from the develop-

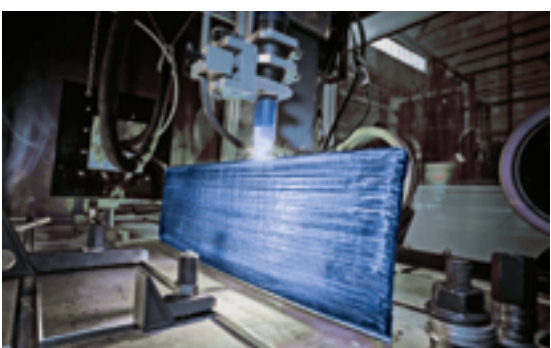
ment & production of the powder and wire, and design of the parts to the actual manufacturing process, machining, and coating of the finished component.

ADDITIVE ADVANTAGES

- » Increased geometric freedom
- » Increased part functionality
- » Weight reduction of parts
- » No tooling costs
- » Economical low volume production
- » Production on demand
- » Reduced lead times
- » Reduced raw material consumption
- » Thermal and flow optimization
- » New repair possibilities



Powder Development, Production and Parameters Definition



Wire-Arc Additive Manufacturing



VALUE ADDED SERVICES

Trust in our global distribution & service network

voestalpine Specialty Metals is a leading player in the Oil & Gas market. We are a global company specializing in High Performance Metals, including nickel-based & special steel alloys. We deliver innovative materials and customer specific solutions to the Oil & Gas industry, and we are committed to maintaining our global presence. We have access to high quality products through our own mills, and our group of specialized companies allows us to provide customers with technical expertise and support. We offer advanced supply chain solutions, customer specific inventory management, and consignment stocking to ensure our customers

can work as efficiently as possible. We are where our customers are. With locations in Houston, Singapore, the North Sea (UK, Scotland and Norway), Brazil and the Middle East, voestalpine Specialty Metals has full coverage in all relevant Oil & Gas centers. Our global distribution network with more than 150 sites and 90 storage facilities worldwide serves not only the Oil & Gas industry, but also other industries such as power generation, aerospace, and tooling. Our specialized presence ensures that we meet our customers' demands.

| Companies | Location |
|--|----------------------|
| voestalpine Specialty Metals | Houston, TX, USA |
| | Singapore |
| | Oldbury, UK |
| | Kirkcaldy, Scotland |
| | Oslo, Norway |
| | Dubai, UAE |
| Villares Metals Services & Solutions Center Sumaré | Sumaré, SP, Brazil |
| Enpar Sonderwerkstoffe | Gummersbach, Germany |
| +150 distribution centers worldwide | |

VALUE ADDED SERVICES

Beyond our extensive portfolio of products, we offer a variety of services to ensure that our solutions are fitted to our customers' needs and are the highest quality possible.

- » Cutting
- » Additive Manufacturing
- » Machining
- » Heat Treatment
- » Coating
- » Material Testing (Metallurgical Analysis, Ultrasonic, Hardness, etc.)
- » Inspection
- » Mechanical Testing
- » Crating
- » Ring Rolling
- » Cold Drawing
- » Hot Work Hardening

MATERIAL GRADES

We offer a wide variety of high quality steel grades catered to our customers' needs to ensure that our solutions will perform in even the most demanding conditions.

- » Nickel-based Alloys
- » Duplex and Super Duplex
- » Stainless Steels (F44, 13Cr, S13Cr, 304L, 316L, 321H, etc.)
- » Super Austenitic Steels (XM19HS – N50, N60)
- » Precipitation Hardening (17-4PH, 15-5PH, etc.)
- » Zirconium (Zr 702, Zr 705, etc.)
- » Engineering steels (F22, 8630 Mod, 4140, 4130, etc.)
- » Commercially Pure Nickel (Nickel 200 & 201)
- » Copper Alloys (C63000, C17200, etc.)
- » Nickel Copper Alloys (400, K-500)
- » Titanium Alloys (Grade 2, Grade 5, Grade 7, Grade 12, etc.)

MACHINING SERVICES

We offer a wide variety of machining technologies, and we are determined to meet the needs of our customers, no matter how demanding the specifications.

- » Pre- and finished Machining
- » Milling, Turning
- » Boring & Honing
- » Drilling
- » Deep Hole Drilling
- » Trepanning
- » Surface Grinding
- » Straightening
- » Water Jet Cutting

PRODUCT RANGE

We are a partner for every step in the Oil & Gas industry value chain with an extensive product portfolio.

- » Bars & Billets
- » Open & Closed Die Forgings
- » Special Steel Sheets & Plates
- » Tubes & Pipes
- » Wire, Flat & Round
- » Additive Manufacturing Powder
- » Forged Shafts
- » Seamless Rolled Rings
- » Water Jet Cut Products
- » Additive Manufactured Parts

COUNT ON PROXIMITY ALL OVER THE WORLD

Trust in specialized companies



It is our ambition to meet the qualified requirements of the oil and gas industry safely, efficiently and reliably. We achieve this with our specialized companies, which combine personal proximity and flexibility with the capacity, innovative strength and reliability of the voestalpine Group.

The voestalpine companies, production sites, value added services and sales sites are ready for you. Talk to us, test us, and benefit from our customized solutions.

Find more about our oil and gas activities at
www.voestalpine.com/oilandgas

HEADQUARTERS AND PRODUCTION

voestalpine BÖHLER Bleche GmbH & Co KG
Sheets & Plates
www.voestalpine.com/bohler-bleche

voestalpine BÖHLER Edelstahl GmbH & Co KG
Bars & Billets, Forgings, Wire Rod, AM Powder
www.voestalpine.com/bohler-edelstahl

Buderus Edelstahl GmbH
Bars & Billets, Forgings
www.buderus-steel.com

Villares Metals S.A.
Bars & Billets, Forgings
www.villaresmetals.com

voestalpine Additive Manufacturing Center GmbH
Additive Manufacturing Center
www.voestalpine.com/additivemanufacturing

voestalpine Böhler Welding Group GmbH
Welding Consumables, AM Wire
www.voestalpine.com/welding

voestalpine Foundry Group
Castings
www.voestalpine.com/giesserei_linz

voestalpine Grobblech GmbH
Sheets & Plates
www.voestalpine.com/grobblech

voestalpine Rotec GmbH
Cold Drawn Pipes
www.voestalpine.com/rotec

voestalpine Tubulars GmbH & Co KG
Pipes – OCTG & Line Pipes
www.voestalpine.com/tubulars

voestalpine Wire Technology GmbH
Round, Flat and Shaped Wire
www.voestalpine.com/wire

VALUE ADDED SERVICES, SALES & LOGISTICS

voestalpine Specialty Metals
Houston, TX, USA
Singapore
Oldbury, UK
Kirkcaldy, Scotland
Oslo, Norway
Dubai, UAE

Enpar Sonderwerkstoffe GmbH
Gummersbach, Germany

Villares Metals Services & Solutions Center Sumaré
Sumaré, SP, Brazil

www.voestalpine.com/specialtymetals

