QUALITY KNOWS NO COMPROMISES

MORE EFFICIENT, SAFER –

These are concepts to which great significance is assigned particularly when it comes to the production of energy. Covering daily energy needs while simultaneously practicing environmental conservation is a challenge for engineers and their materials alike.

For generations voestalpine BÖHLER has been facing up to this challenge by developing and producing materials of the highest metallurgical purity for use in extreme environments. The material properties there are as varied as the manufacturing possibilities at voestalpine BÖHLER. As one of the few producers of steel we at voestalpine BÖHLER have all of the melting and remelting facilities (ESR, DESR, VAR) here at our disposal.

NI-SUPERALLOYS
SUPER-DUPLEX
AUSTENITICS
DUPLEX
HEAT TREATABLE STEELS
voestalpine BÖHLER is and always has been the world leader in melting and remelting technology. Our 120-year experience, our metallurgical know-how and focusing our innovative strength on the development and production of high performance materials have meant voestalpine BÖHLER has become one of the most important producers of special steel in the world.

The most modern vacuum induction melting (VIM) and vacuum arc remelting units (VAR) or Pressure electroslag remelting units are what we have at our disposal as a matter of course.
TRENDSETTING TECHNOLOGIES FOR METALLURGICAL TOP PERFORMANCE

FLOW OF MATERIAL

MELTING  SECONDARY METALLURGY  CASTING  SPECIAL MELTING  REMELTING

POWDER METALLURGY

EAF 50 t

VID 13 t

Ladle Furnace

VOD

AOD Converter

Ingot Casting (electrodes, ingots)

HCC

ESR

PESR

VAR

VIM

ESR

PESR

VAR

HIP

Melting

Atomising

Filling capsules

Welding
SUPERLATIVE TOOLS

We at voestalpine BÖHLER use state-of-the-art high-performance forging units to produce the most suitable raw-material for your products.

The following units are available:

» With the 5,200 tons forging press we produce open-die forgings up to a piece weight of 40 tons

» Another focus is the RF 100 long forging machine. We produce rods and semi-finished products up to a length of 15 m and a diameter of 550 mm with a piece weight of max. 8 tons. A maximum force of 2,000 tons and the powerful manipulators for precise movement of the bars or blocks during the forging process guarantee the highest quality and precision.

» Another highlight is the new P 44: a rapid forging line for the production of the most sophisticated components for the aviation industry or the oil & gas industry. The optimized design of the entire infrastructure, the plant layout and the high achievable forging frequencies make this unit particularly suitable for the deformation of highly demanding materials, such as Nickel-based alloys. All processes are fully automatic and digitally controlled, a prerequisite for the highest quality standards.
THE QUALITY OF YOUR COMPONENTS STARTS HERE
**BAR forged**

**Round**: 110 – 1200 mm (4.33 – 47.24”)

**Square**: 90 – 1200 mm (3.54 – 47.24”)

**Flat**: width, mm (inch) thickness, mm (inch)

- 120 (4.72) 50 (1.97) min.
- 1600 (62.99) 1000 (39.37) max.

Ratio width/thickness maximum 10:1

**BAR pre-machined**

- **IBO ECOMAX**: 12.5 – 425 mm (0.49 – 16.73”)

**BRIGHT STEEL**

- **ECOBLANK**: peeled and polished
- **ECOFINISH**: band ground
- **BRIGHT BAR**: ground and polished

**Open die forgings**

Premachined or ready machined according to customer requirements, up to 45 tons.

**Cross sections of round billets**

Surface ground to remove defects or bright ground 100 – 1200 mm (3.94 – 47.24”)

With peeled surface 100 – 425 mm (3.94 – 16.73”)

With turned surface 425 – 900 mm (16.73 – 35.43”)

**Cross sections of square billets**

Surface bright ground 100 – 600 mm (3.94 – 23.62”)

**BAR rolled**

- **Round**: 12.5 – 150 mm (0.49 – 5.91”)
- **Square**: 15 – 130 mm (0.59 – 5.12”)
- **Flat**: width, mm (inch) thickness, mm (inch)
  - 15 – 60 (0.59 – 2.36)
  - 5 – 41 (0.20 – 1.61)
  - 60 – 200 (2.36 – 7.87)
  - 5 – 86 (0.20 – 3.39)
  - 100 – 300 (3.94 – 11.81)
  - 15 – 80 (0.59 – 3.15)

**ROLLED WIRE**

- **Rolled**: dia. 5.0 – 13.5 mm (0.20 – 0.53”)
- **Drawn**: dia. 1.0 – 12.0 mm (0.04 – 0.47”)

**MATERIALS FOR OIL, GAS & CPI**
MATERIALS FOR OIL AND GAS APPLICATIONS

Below is a survey of our common materials for the oil and gas industry. We supply materials according to current specifications and standards.

## DUPLEX AND SUPER-DUPLEX GRADES

<table>
<thead>
<tr>
<th>BÖHLER grade</th>
<th>Market grade</th>
<th>Melting route</th>
<th>UNS</th>
<th>ASTM</th>
<th>Others</th>
<th>Industry specifications</th>
<th>Products and Size Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A903</td>
<td>-</td>
<td>Airmelted</td>
<td>1.4462 S31803 / S32205</td>
<td>F51</td>
<td>X2CrNiMoN 22-5-3</td>
<td>Norsok-M-650 (MDS D47, size mill request necessary) DIN EN 10086-3 ASTM A182, A276, A479</td>
<td>Round bar: 12.5 - 304.8 mm (0.5 - 12”) Flat bar, Billet</td>
</tr>
<tr>
<td>A903SA</td>
<td>-</td>
<td>Airmelted</td>
<td>1.4501 S32760</td>
<td>F55</td>
<td>X2CrNiMoCuWN 25-7-4</td>
<td>Norsok-M-650 (MDS D57, size mill request necessary) DIN EN 10086-3 ASTM A182, A276, A479</td>
<td>Round bar: 12.5 - 304.8 mm (0.5 - 12”) Flat bar, Billet</td>
</tr>
<tr>
<td>A913</td>
<td>-</td>
<td>Airmelted</td>
<td>1.4410 S32750</td>
<td>F53</td>
<td>X2CrNiMoN 25-7-4</td>
<td>Norsok-M-650 (MDS D57, size mill request necessary) DIN EN 10086-3 ASTM A182, A276, A479</td>
<td>Round bar: 12.5 - 304.8 mm (0.5 - 12”) Flat bar, Billet</td>
</tr>
<tr>
<td>A930</td>
<td>-</td>
<td>Airmelted</td>
<td>1.4507 S32550</td>
<td>F61</td>
<td>X2CrNiMoCuN 25-6-3</td>
<td>DIN EN 10086-3 ASTM A182, A276, A479</td>
<td>Round bar: 12.5 - 304.8 mm (0.5 - 12”) Flat bar, Billet</td>
</tr>
</tbody>
</table>

## AUSTENITICS

<table>
<thead>
<tr>
<th>BÖHLER grade</th>
<th>Market grade</th>
<th>Melting route</th>
<th>UNS</th>
<th>ASTM</th>
<th>Others</th>
<th>Industry specifications</th>
<th>Products and Size Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A20</td>
<td>-</td>
<td>Airmelted + ESR</td>
<td>1.4435 S31603</td>
<td>316LUG</td>
<td>X2CrNiMo 18-14-3</td>
<td>STAC 18005 DIN EN 10086-3 ASTM A182, A276, A479</td>
<td>Round bar: 12.5 - 600 mm (0.5 - 23.62&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>A40</td>
<td>-</td>
<td>Airmelted + ESR</td>
<td>1.4466 S31050</td>
<td>310MoLN</td>
<td>X2CrNiMoN 25-22-2</td>
<td>STAC 18005 DIN EN 10086-3 ASTM A182</td>
<td>Round bar: 12.5 - 600 mm (0.5 - 23.62&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>A99</td>
<td>Alloy 28</td>
<td>Airmelted</td>
<td>1.4563 N08028</td>
<td>–</td>
<td>–</td>
<td>DIN EN 10086-3</td>
<td>Round bar: 12.5 - 203.2 mm (0.5 - 8&quot;) Billet</td>
</tr>
<tr>
<td>A965SA</td>
<td>-</td>
<td>Airmelted</td>
<td>1.4547 S31254</td>
<td>F44</td>
<td>X1CrNiMoCuN 20-18-7</td>
<td>Norsok-M-650 (MDS R17, size mill request necessary) DIN EN 10086-3 ASTM A182, A276, A479</td>
<td>Round bar: 12.5 - 228.6 mm (0.5 - 9&quot;) Billet</td>
</tr>
<tr>
<td>A970</td>
<td>-</td>
<td>Airmelted</td>
<td>1.4529 N08926</td>
<td>-</td>
<td>X1NiCrMoCuN 25-20-7</td>
<td>DIN EN 10086-3 ASTM B649</td>
<td>Round bar: 12.5 - 228.6 mm (0.5 - 9&quot;) Billet</td>
</tr>
<tr>
<td>P511</td>
<td>XM-19</td>
<td>Airmelted</td>
<td>520910</td>
<td>–</td>
<td>X3CrNiMoCuNbN 21-13-3</td>
<td>ASTM A276, A479, A182</td>
<td>Round bar: 12.5 - 304.8 mm (0.5 - 12&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>P513</td>
<td>–</td>
<td>Airmelted</td>
<td>521800</td>
<td>–</td>
<td>–</td>
<td>ASTM A276, A479, A193, A194 AMS 5846</td>
<td>Round bar: 12.5 - 304.8 mm (0.5 - 12&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>T200</td>
<td>660</td>
<td>Airmelted + ESR</td>
<td>1.4960 S66286</td>
<td>–</td>
<td>X5NiCrTi 26-15</td>
<td>VaTU V 435 DIN EN 10269, 10302 ASTM A453 AMS 5731, 5732</td>
<td>Round bar: 12.5 - 254 mm (0.5 - 10&quot;) Flat bar, Billet</td>
</tr>
</tbody>
</table>
**NICKEL BASE ALLOYS**

<table>
<thead>
<tr>
<th>BÖHLER grade</th>
<th>Market grade</th>
<th>Melting route</th>
<th>UNS</th>
<th>ASTM</th>
<th>Others</th>
<th>Industry specifications</th>
<th>Products and Size Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>L625</td>
<td>Alloy 625</td>
<td>VIM + ESR</td>
<td>2.4856, N06625</td>
<td>-</td>
<td>NiCr22Mo9Nb</td>
<td>AMS 5666, ASTM B446, B564</td>
<td>Round bar: 12.5 - 254 mm (0.5 - 10&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>L725</td>
<td>Alloy 725</td>
<td>VIM + VAR</td>
<td>N07725</td>
<td>-</td>
<td>-</td>
<td>API 6A CRA NACE MR0175 / ISO15156</td>
<td>Round bar: 12.5 - 203.2 mm (0.5 - 8&quot;) Billet</td>
</tr>
<tr>
<td>L825</td>
<td>Alloy 825</td>
<td>Airmelted</td>
<td>N08825</td>
<td>-</td>
<td>-</td>
<td>ASTM B425</td>
<td>Round bar: 12.5 - 304.6 mm (0.5 - 12&quot;) Billet</td>
</tr>
<tr>
<td>L750</td>
<td>Alloy X750</td>
<td>VIM + VAR</td>
<td>N07750</td>
<td>-</td>
<td>-</td>
<td>ASTM B657 NACE MR0175 / ISO15156</td>
<td>Wire: 5 - 15.5 mm (0.2 - 0.6&quot;)</td>
</tr>
<tr>
<td>L925</td>
<td>Alloy 925</td>
<td>VIM + VAR</td>
<td>N09925</td>
<td>-</td>
<td>NiCr21TiCuMo</td>
<td>API 6A CRA NACE MR0175 / ISO15156</td>
<td>Round bar: 12.5 - 355.6 mm (0.5 - 14&quot;) Billet</td>
</tr>
<tr>
<td>L718API</td>
<td>Alloy 718API</td>
<td>VIM + VAR</td>
<td>N07716</td>
<td>-</td>
<td>NiCr19NbMo</td>
<td>API 6A CRA NACE MR0175 / ISO15156</td>
<td>Round bar: 12.5 - 355.6 mm (0.5 - 14&quot;) Billet</td>
</tr>
<tr>
<td>L716AMS</td>
<td>Alloy 716AMS</td>
<td>VIM + VAR</td>
<td>2.4668, N07716</td>
<td>-</td>
<td>NiCr19NbMo</td>
<td>AMS 5662, ASTM B637, AMS 5663</td>
<td>Round bar: 12.5 - 203.2 mm (0.5 - 8&quot;)</td>
</tr>
<tr>
<td>L059</td>
<td>Alloy 59</td>
<td>VIM + ESR</td>
<td>2.4605, N06059</td>
<td>-</td>
<td>NiCr23Mo16Al</td>
<td>ASTM B574</td>
<td>Round bar: 12.5 - 203.2 mm (0.5 - 8&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>L276</td>
<td>Alloy 276</td>
<td>VIM + ESR</td>
<td>2.4819, N10276</td>
<td>-</td>
<td>NiCr21 Mo14W</td>
<td>VdTÜV 400 (max. 360 mm / ~14&quot;)</td>
<td>Round bar: 12.5 - 355.6 mm (0.5 - 14&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>L004</td>
<td>Alloy 004</td>
<td>VIM + ESR</td>
<td>2.4610, N06455</td>
<td>-</td>
<td>NiMo16Cr15W</td>
<td>VdTÜV 424 (max. 360 mm / ~14&quot;)</td>
<td>Round bar: 12.5 - 355.6 mm (0.5 - 14&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>L022</td>
<td>Alloy 022</td>
<td>VIM + ESR</td>
<td>2.4602, N08022</td>
<td>-</td>
<td>NiMo16Cr16Ti</td>
<td>VdTÜV 479 (max. 360 mm / ~14&quot;)</td>
<td>Round bar: 12.5 - 355.6 mm (0.5 - 14&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>L015</td>
<td>R30035</td>
<td>VIM + VAR</td>
<td>R30035</td>
<td>-</td>
<td>-</td>
<td>AMS 5844</td>
<td>Wire: 5 - 15.5 mm (0.2 - 0.6&quot;)</td>
</tr>
</tbody>
</table>

**HEAT TREATABLE STEELS**

<table>
<thead>
<tr>
<th>BÖHLER grade</th>
<th>Market grade</th>
<th>Melting route</th>
<th>UNS</th>
<th>ASTM</th>
<th>Others</th>
<th>Industry specifications</th>
<th>Products and Size Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>N400</td>
<td>F6NM</td>
<td>Airmelted</td>
<td>1.4313, S41500</td>
<td>F6NM</td>
<td>X4CrNi 13 4</td>
<td>DIN EN 10088-3 ASTM A182</td>
<td>Round bar: 12.5 - 1,040 mm (0.5 - 40.94&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>N404</td>
<td>-</td>
<td>Airmelted</td>
<td>1.4418</td>
<td>-</td>
<td>X4CrNiMo 16 5</td>
<td>DIN EN 10088-3</td>
<td>Round bar: 12.5 - 500 mm (0.5 - 19.68&quot;) Flat bar, Billet</td>
</tr>
</tbody>
</table>

**PH GRADES**

<table>
<thead>
<tr>
<th>BÖHLER grade</th>
<th>Market grade</th>
<th>Melting route</th>
<th>UNS</th>
<th>ASTM</th>
<th>Others</th>
<th>Industry specifications</th>
<th>Products and Size Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>N705A</td>
<td>17-4 PH</td>
<td>Airmelted</td>
<td>1.4542</td>
<td>630</td>
<td>X5CrNiCuNb 17 4</td>
<td>DIN EN 10088-3 ASTM A564</td>
<td>Round bar: 12.5 - 203.2 mm (0.5 - 8&quot;) Flat bar, Billet</td>
</tr>
<tr>
<td>N701</td>
<td>15-5 PH</td>
<td>Airmelted + VAR</td>
<td>1.4545</td>
<td>XM 12</td>
<td>X5CrNiCuNb 15 5</td>
<td>ASTM A564</td>
<td>Round bar: 12.5 - 203.2 mm (0.5 - 8&quot;) Flat bar, Billet</td>
</tr>
</tbody>
</table>
TESTING QUALITY YOU CAN TRUST.

Our testing laboratory is responsible for conducting all of the mechanical, technological and metallographic tests on test pieces at voestalpine BÖHLER Edelstahl. voestalpine BÖHLER has been accredited by the American approval and licensing authorities NADCAP as one of the few testing centers in Europe approved for conducting tests in the sensitive aerospace sector.

Prompt availability of raw material is an essential factor in the offshore industry. Our stocks have been set up to meet this requirement.

GENERAL STOCKING LOCATIONS

Production Company and Central Stock
voestalpine BÖHLER Edelstahl GmbH & Co KG
Mariazeller Straße 25, 8605 Kapfenberg, Austria
P. +43/50304/200
E. oil.gas@bohler-edelstahl.at
www.voestalpine.com/bohler-edelstahl

The dimensions available depend on the materials required. Please enquire.
Main Quality System approvals
» ISO 9001
» EN 9100

Main Laboratory Approvals
» bmwfw, EN ISO/IEC 17025
» PRI Performance Review Institute (NADCAP)

Main Material Approvals:
» NORSOK M-650, Teknologisk Institut Certification AS
» Equinor, rolled and forged bars in ASTM A276 grade, Norsok Standard M-650
» Lloyds Register, Steelmaking and bars, Forgings in carbon, carbon-manganese and alloy steel
» PRI (NADCAP), AC7114, AC7114/3
» TÜV-Süd, AD2000 Merkblatt / Instruction W0/TRD100/HP0, Pressure equipment directive 97/23/EG
The data contained in this brochure is merely for general information and therefore shall not be binding on the company. We may be bound only through a contract explicitly stipulating such data as binding. Measurement data are laboratory values and can deviate from practical analyses. The manufacture of our products does not involve the use of substances detrimental to health or to the ozone layer.