SANDVIK HIGH-PRECISION TUBING SOLUTIONS
FOR SUPERIOR PERFORMANCE

PRECISION PERFORMANCE DELIVERED
We keep on going where others stop

Nothing about your business is standard. Whether you’re in the aerospace industry, designing medical implants or working 10,000 feet below the sea, you demand high-precision materials that deliver superior performance. Safe. Reliable. No surprises. Such extreme conditions also require high quality precision tubing that sets a higher standard – your standard!

This is where Sandvik’s high-precision stainless steel tubing unit in Werther, Germany can help. With a Swedish steelmaking legacy dating back 150 years and a 70-year German tradition of high-quality precision tube production, we’re proud to serve some of the most demanding customers in the world. From the high-quality melt in our own mill to the final pilgering or drawing and rigorous testing, we keep a close eye on every tube.

Going a step beyond
Maybe it’s something in our DNA, but we love tough challenges – the ones where others simply give up. Like producing thick-walled seamless tube that can resist pressures up to 160,000 psi (12,000 bar), with extremely low defects (maximum 50 µm). Or making tubing that maintains its mechanical properties even when cooling a plasma reactor operating at 100 million degrees centigrade.

Innovating for your sake
But like you, we’re never satisfied. We continue to develop new processes, materials and delivery formats to meet your exacting needs. And we’re intent on providing you with just the right high level of personalized service you require, anywhere in the world.

Industry sectors we serve
- Oil and gas
- Medical
- Aerospace
- Nuclear power generation
- Chemical
- Food processing
- Instrumentation and measurement
Heat. Pressure. Corrosion. These are just a few of the challenges our customers face every day. Tough as they may be, there is often a profitable business opportunity behind each one. How do we know?

Because as the high-precision tubing specialists within Sandvik, we often get requests for thick-walled precision tube (OD 1-70 mm) in everything from advanced stainless steel to special nickel alloys, titanium and other high performance materials. Over the years we’ve seen, firsthand, how superior stainless alloy grades play a vital role in improving our customers’ safety, reliability and, ultimately, their profitability.

NEVER CRACK UNDER PRESSURE
Take the challenge of high pressure. Here, our tubes are often used in situations where working pressure starts at 700 bar (10,000 psi) and runs on up to 11,032 bar (160,000 psi) for ultra-high pressure needs. Whether used in water jet cutting machines, chemical processes (LDPE), hydrogen fuel stations or the oil and gas industry, the ability to successfully combat dynamic pressure is crucial to extending lifetime.

ULTRA-SMOOTH SURFACES
For other applications, such as implants, bone screws or chromatographic columns, the absence of defects is clearly essential. Every imperfection on the tube’s inner surface can be the starting point for crack growth. Here Sandvik can offer a maximum defect level of 50 µm, compared to the industry standard defect level of 100 µm.

STRONG AND ANTI-CORROSIVE
Finally, since we define the chemical composition of each alloy in our melt, we can fine-tune its properties to reach a very high standard within the accepted ASTM standard. For example, our ASTM 316L grade has a minimum of 2.5% molybdenum vs. the industry standard of 2.0%. This might not sound like much, but when humidity starts to exceed 75% in high-chloride environments, it can extend tube lifetime by many years.

Our high-precision tubing is used to cool a 100 million °C plasma fusion reactor at the Max Planck Institute in Greifswald, Germany.

EXTREME PRESSURES
Our high-pressure tubing is capable of handling pressures up to 12,000 bar (160,000 psi).

THICK WALLED TUBING
We specialize in tubing with outer diameters of 1-70 mm.

PREMIUM MATERIAL
We often deliver a higher standard within the ASTM industry standard. For example, our 316L tubing contains 2.5% molybdenum vs. the industry standard of only 2.0%.

TIGHT TOLERANCES
We offer outer and inner diameters with +/- 0.1 mm tolerance and wall thickness of +/- 0.05 mm. Tighter tolerances can also be achieved upon request.

ULTRA-SMOOTH SURFACE
The industry standard for maximum surface defects is 100 µm, whereas we deliver 50 µm maximum.

EXTRA CHALLENGES OPEN UP NEW OPPORTUNITIES
The starting point is our steel plant in Sandviken, Sweden, which has built a global reputation for developing some of the world’s most advanced corrosion-resistant alloys. With a global staff of 2,700 R&D experts and one of the largest R&D facilities of its kind in Europe, we have about 900 different grades in our range, including a number of duplex grades which we have pioneered. The group currently holds 8,000 patents, and Forbes recently ranked us as one of the world’s top 100 innovative companies.

**FROM PILGERING TO COLD DRAWING**

With few exceptions, Sweden is where we get the seamless extruded hollows used in our high-precision tube unit in Germany. Following rigorous testing in Sandviken (mechanical, corrosion, etc.), the hollows arrive in Werther for further processing and certification. This is where the magic happens – a unique combination of modern pilgering and handcrafted precision drawing, coupled with modern manufacturing. Every day, we produce 16,000 meters of tailor-made solutions for demanding customers.

**OBSESSSED WITH QUALITY**

As high-precision performance specialists, we place high value on quality control and run extensive testing during production and at our own in-house lab – pressure, ultrasonic, eddy current, corrosion, etc. Should you require it, we can also perform special tests for you. Quality certificates include: ISO 9001, ISO 14001, ISO 50001, ISO 17025, OHSAS 18001, and PED 97/23/EC. Most recently, we received NORSOK (TR 2001) approvals for our super duplex SAF 2507 (UNS S32750) and 254 SMO (UNS S32154). And we’re now DIN EN 9100 certified for the aircraft industry.

Unlike most tube distributors or fabricators, we’re fortunate to have a world-class steel mill right in our backyard. Not only is this reassuring to our precision-minded German tube engineers, but it means we can tightly control the quality – from a single high-quality melt to the tube you receive. Every batch is fully certified, documented and traceable.
When choosing suppliers, you naturally look for those with the best quality, service and competitive prices. But as your industry evolves and new requirements emerge, it’s good to know that your partners are working sustainably and thinking ahead. After all, we’re living in a world where “green” is more than just a color and terms like Industry 4.0 are a reality.

As a forward-thinking company, we believe that successful businesses are sustainable ones. That is why we strive to care for our people, products and processes in a responsible manner (3Ps). But more than just talking about this, we’re proud to have received ISO 50001 Standard Approval for Energy Management – a major part of the Green Factory approach. It means you can rest assured we are taking concrete steps to reduce our energy consumption and thus our carbon footprint. In addition, we’ve taken steps to use chlorine-free lubricants in our pilgering and drawing processes as well as carrying out pickling free from nitric gases and much more.

**ZERO ACCIDENTS – OUR AMBITION**

When it comes to our own people, we’ve set up processes so that our night and day shifts are shielded from potentially dangerous moving machinery or operations. This has helped us reduce accidents (or potential ones) so much that we’ve received the Sandvik Gold Helmet Award, a group honor established to promote corporate safety initiatives and recognize stand-out performance and adherence to safety procedures.

**TOMORROW’S SMART FACTORIES**

Finally, we’re actively involved, together with German universities, in developing cutting edge new materials for Industry 4.0 – a kind of “fourth industrial revolution,” where a number of automation, data and manufacturing technologies are coming together. The so-called Smart Factories of tomorrow, with sensors and monitoring systems, will drive new needs for high-precision tubing – and we want you to be fully prepared.

**GREEN FACTORY AND READY FOR INDUSTRY 4.0**
Regardless of your specific industry, our aim is to provide you with a complete range of precision solutions that enable your high performance. One concrete example just came on stream recently - our “extra long” seamless tubing production line, which delivers weld-free coiled tubing in reels exceeding 1,000 meters.

**ETERNAL LENGTHS - ZERO WELDS**

Weld-free long tubing, developed mainly for the oil and gas industry, eliminates the risk of potential cracking or corrosion due to “sigma phase” around the weld. Using a single 125kg extruded hollow of seamless tube, we are capable of producing a weld-free coiled tubing in excess of 1,000 meters. Even longer lengths can be butt welded with a single weld, depending on the total length required and your order requirements. Special delivery requests are being handled on a case-by-case basis.

**WHICH PRECISION PERFORMANCE SOLUTION IS BEST FOR YOU?**

What alloy is most suitable for your exacting requirements? Which are the most suitable lengths and dimensions? What certifications do you require? In the table below you’ll find an overview of specifications relating to some key questions that arise about our high-performance product offering. For additional information, our team in Werther is happy to help. We want to make sure you get just the right alloy, on time and in just the right format you need.

### SANDVIK HIGH PRECISION TUBING RANGE – MATERIAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>GRADES</th>
<th>SIZE RANGE</th>
<th>LENGTHS</th>
<th>TOLERANCES</th>
<th>SURFACE REQUIREMENTS</th>
<th>APPROVALS</th>
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<tbody>
<tr>
<td>Austenitic (TP 304, 316, 316 TI, 904 L), Duplex and super duplex, Nickel-based alloys (600, 601, 625, 630, C276), Special alloys (254 SMO, Alloy 286)</td>
<td>OD from 0.8 to 100 mm, Wall thickness from 0.25 to 30 mm</td>
<td>Random lengths 4 to 6 meters, Cutlengths 2 to 12 meters, Weld-free coiled tubing reels exceeding 1,000 meters</td>
<td>OD +/- 0.05 mm, ID +/- 0.05 mm, Wall thickness +/- 7.5%</td>
<td>OD +/- 0.05 mm, ID +/- 0.05 mm, Wall thickness +/- 7.5%</td>
<td>EN 9100, ISO 14004, ISO 9001, OHSAS 18001, Accreditation ISO 17025, ISO 50001, NORSOK 650M / TR2000</td>
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Note: The specifications above are for high-performance tubing only and represent only a fraction of the 900 active grades in the total Sandvik portfolio.

**SANDVIK HIGH-PRECISION TUBE**

Sandvik Werther is a high-precision tubing unit within Sandvik, a Swedish high-tech engineering group with global operations and more than 150 years of steelmaking experience. The unit focuses on corrosion-resistant stainless steels and nickel alloys with outside diameters from 1 to 70 mm, where smooth surfaces and tight dimensional tolerances are essential. Sandvik is one of the world’s leading manufacturers of tube, strip, wire and bar for advanced applications. Products are produced mainly in stainless steel and special alloys. In addition to the main plants in Sandviken, Sweden, there are 20 plants in 11 countries with some 47,000 employees worldwide.

**CONTACT US**

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