

**Petrochemicals, Oil & Gas.**

**Setting higher standards in  
hydraulic and instrumentation tubing.**



## Peace of mind – the perfect balance between safety and performance.

Whether you're operating an oil rig or petrochemicals plant, the need to boost output without sacrificing safety is ever-present. In the big scheme of things, your choice of hydraulic and instrumentation tubing might not seem critical. But it does make a major difference in eliminating unnecessary risks. No unscheduled downtime. No leaks. Zero accidents. And immediate support if you need it. It's what we call The Sandvik Peace of Mind Standard.

There's more than one reason why Sandvik tubing is used by leading multinationals for some of the world's most demanding upstream and downstream applications. For some, it's the ability to handle hotter, more sour wells under extreme pressures – in highly corrosive environments. For others, it's to ensure failsafe hydraulic control lines or subsea umbilicals for years to come. Because when it comes to the world's toughest jobs, only the most advanced and well-proven materials will deliver safe and reliable performance.

### TOMORROW'S ENERGY CHALLENGES

From the early days of subsea exploration to today's industry leading refineries and deep sea rigs, we've led the way in engineering the market's most comprehensive range of stainless steel and nickel alloy tubing. And backed it up with a global service network that's always on call, and always close at hand. All

so you can push the limits of performance, without putting your investments, or your people, on the line.

### NO COMPROMISES ON SAFETY

In the end, striking the right balance all comes down to your ability to achieve your engineering designs in a responsible manner. Our aim is to provide petrochemical and oil and gas producers with the lightest, strongest, most reliable tubing to make it possible. No compromises. It's how we bring you peace of mind.

>50  
years

serving the world's  
largest oil and gas and  
petrochemical  
companies.



Zero  
Accidents

is the vision of our "Safety First" program, which also extends to our customers and suppliers. It's an integral part of our EHS program.



# Temp 35°C. Humidity 99%. Chloride 30+ ppm.

*Hot sour wells. High humidity. Salt spray. As many of our oil and gas customers drill deeper into harsh environments, the need for reliable, leak-free, corrosion-resistant seamless tube is rising to the forefront. For years, we've provided hydraulic and instrumentation tubing that goes into the umbilicals, christmas trees and manifolds required to extract oil from the depths of the ocean under immense pressures. Not to mention top-side applications.*

Experience has taught us that there's a big difference between barely meeting a standard and setting a "standard within the standard". When it comes to hydraulic and instrumentation tubing for oil and gas extraction, it's a difference that can mean millions to your bottom line. Any pitting, contamination or loss of containment can bring operations to a halt. And every moment spent waiting for replacements by barge is another missed opportunity.

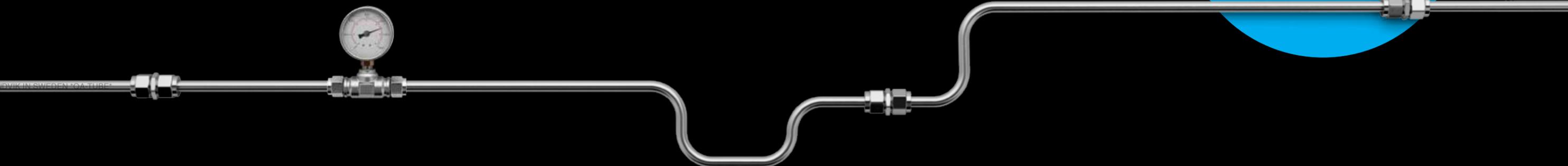
**TAKING RISK OUT OF THE EQUATION**  
With stakes this high, and in conditions this unpredictable, your tubing should be one thing you can count on. And that's where

we come in. With standard or custom grade tubing known worldwide for its cleanliness, corrosion resistance and superior dimensional tolerances.

**RIGHT MATERIAL AT THE RIGHT TIME**  
Whether your business is in exploration or production, on land or at sea, you can rely safely on our decades of experience in the most demanding oil, gas and petrochemical applications. More than just the right quality, right specifications and right timing, it's about applying leading materials technology to give your business a competitive edge in any imaginable environment.



**100%**  
of all major fabricators and oil companies in all offshore regions are Sandvik customers.



## The less you think of us, the happier we are.

*Don't get us wrong, we love being top of mind. But when serving our production- and safety-conscious petrochemical customers we want to be remembered for all the right reasons. And when it comes to seamless stainless hydraulic and instrumentation tubing – once properly selected and fitted – that means being able to forget about us. Literally. Sandvik tubing just keeps working, day in and day out. No corrosion or pitting. No downtime. No worries.*

Serving forward-thinking petroleum engineers keeps us on our toes. Their ongoing drive to develop innovative refining solutions places increasing demands on new materials and more inspired engineering. We're also proud to collaborate closely with many of the world's leading engineering companies as well as original equipment manufacturers in tackling the future challenges of the industry.

### FULLY INTEGRATED REFINERIES

Take, for example, the trend towards constructing mega-scale refineries alongside petrochemical facilities in the Middle East and China. This desire to integrate facilities opens up new business opportunities as well as challenges. To better utilize all feedstocks at refineries, chemical crackers and derivative plants, there is often a greater need for safe

and reliable premium quality hydraulic and instrumentation tubing. Unforeseen downtime is out of the question. Indeed, the engineering specifications are higher, but so are the business opportunities.

### IN ALL REFINING HUBS

As one manager said: "Secondary or by-product streams from refining units may have their highest value as feedstock for chemical units. Likewise, by-products from chemical units may be most cost-effective as refinery feeds or fuel blending components." We see this integration happening in places

**\$791  
billion**

*projected size of global  
petrochemicals market by 2018.  
Source: AT Kearney.*

like Singapore, the Gulf and elsewhere. But getting the most value out of such world-scale, fully integrated refining and petrochemicals hubs is something that places strong demands for top-quality materials.

### LONG LIFETIME, SHORT MAINTENANCE

For more than half a century, Sandvik has been a world-leading developer of tube for oil refining, petrochemicals and gas processing. Whether you're distilling light crude, producing olefins or aromatics, you can count on us to provide tubular products made of top-quality corrosion-resistant alloys (CRA) that contribute to longer service life and reduced maintenance. We also provide duplex stainless steel and nickel alloys for sour crude oil. In short, a premium range tube that's so safe and reliable, you can practically forget about it.

**More  
profitable**

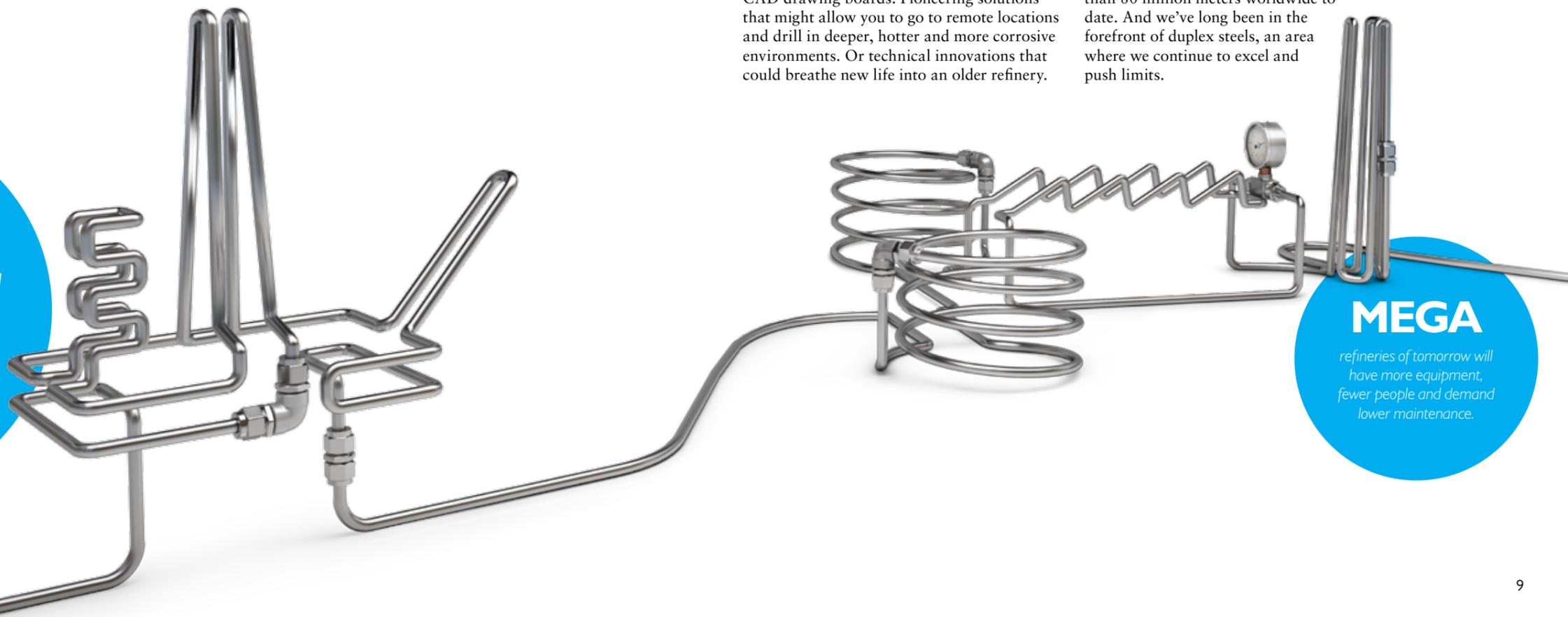
*refining of xylene, ethylene,  
propylene, butadiene,  
benzene, toluene, vinyls,  
styrene and methanol.*





**Put our  
2,700 researchers  
to work on your  
toughest challenges.**

**100,000,000  
meters of hydraulic and  
instrumentation tubing**  
Since 1980, we've supplied more than 100 million meters of consistent, high-quality hydraulic and instrumentation stainless tubing for demanding customers in the oil and gas, petrochemicals and other industries.



**MEGA**  
refineries of tomorrow will have more equipment, fewer people and demand lower maintenance.



**70%  
weight  
reduction**  
By using Sandvik SAF 2507, it's possible to reduce the weight in the hydraulic line of a drilling riser by up to 70% compared with using tubes in conventional ASTM 316L materials.



**20,000 psi**  
**Sandvik SAF 3207™ HD hyper-duplex tubing**  
Always pushing limits, Sandvik has introduced a new hyper-duplex material that offers excellent corrosion resistance in chloride environments and is ideal for challenging deepwater projects with pressures up to 20,000 psi.

In a recent customer survey, we heard a common refrain: Our metallurgists are regarded as being “obsessed” with technical challenges. We take this as a huge compliment. With one of the largest R&D teams in the world, our mission is to apply our expertise to make our customers more productive and profitable. It's a quest that has led to many engineering firsts and more than 8,000 Sandvik Group patents, many of them relating to extreme uses of tube and wire as well as cutting and drilling tools.

With more than 50 years of experience serving the oil and gas and petrochemicals industries, we've built up a wealth of application knowledge. We love those visionary and extreme engineering challenges you've got up on your CAD drawing boards. Pioneering solutions that might allow you to go to remote locations and drill in deeper, hotter and more corrosive environments. Or technical innovations that could breathe new life into an older refinery.

**80 MILLION METERS OF UMBILICALS**  
How do we know? For starters, we've been heavily involved as a tube supplier to umbilical manufacturers since they came into use in the late 1980s, having supplied more than 80 million meters worldwide to date. And we've long been in the forefront of duplex steels, an area where we continue to excel and push limits.

1.

### **Broadest Range**

We offer more choices and greater flexibility to find the “right” solution by providing the world’s broadest in-stock range of seamless stainless hydraulic and instrumentation tubing in the outer diameters of 1.59 to 50 mm (larger diameters available upon request).

2.

### **Global Production & Stocks**

To ensure 24/7 availability, we operate three dedicated mills for hydraulic and instrumentation tubing on three continents and several comprehensive local stock warehouses on all continents.

3.

### **Consistent Quality**

When it comes to quality standards like corrosion resistance, dimensional tolerance, and hardness control, we set a higher standard within the standard – with all batches traceable back to the original melt at our plant in Sweden.

4.

### **R&D Expertise**

With some 2,700 researchers pushing the boundaries of advanced materials, we are constantly pioneering forward-thinking solutions. Should a situation arise, we can provide local support at your facility.

## **A six-star approach to make you even more successful.**

What do you look for in a producer of seamless tubing? Premium grades that meet ASTM and EN standards? A comprehensive stock range? Stock availability to ensure on-time deliveries? Whatever your specific needs, you demand

five-star service. But let’s face it, there are standards and there are standards. Good may not be good enough. That is why we at Sandvik are adding a sixth star to set an even higher standard. We call it the Sandvik Peace of Mind Standard.

5.

### **150 Year Heritage**

Having produced steel products for more than 150 years and seamless stainless steel tubes for 90 years, you can trust that we have the depth of expertise to support you.

6.

### **Safe Environment**

We place a very high premium on safety routines within all aspects of our company and work with ongoing CSR and EHS programs.



# Three mills. Three continents. One source.

Are you absolutely certain that the quality of your hydraulic and instrumentation tubing is consistent from batch to batch? Day in and day out? Or do you find yourself constantly performing Positive Material Identification (PMI) tests on supplier deliveries to control that you've got the right grade and quality?

### DEMANDING TIME SCHEDULES

As a global supplier to leading petrochemical, engineering and service companies, we are fully aware of the pressures you face. What used to be a 24-month build is now an 18-month race to the finish line. In such situations, a delay with your tubing can put

everything else behind schedule. Once you're up and running, unscheduled maintenance is simply not an option. In short, the new challenges demand trusted suppliers with a proven track record of delivering on time.

### ULTRAMODERN SHIPPING FACILITIES

So you'll be glad to know that Sandvik is the only stainless tube producer in the world to operate dedicated hydraulic and instrumentation mills on three continents. Alongside these mills and spread across major industrial hubs, we also have tons of comprehensive tube stock at our warehouses. Ultramodern shipping facilities allow for fast, efficient service.

As a result, we've gained a reputation for having the world's broadest in-stock range of corrosion-resistant stainless steel tubing with outside diameters from (OD) 1.59 to 50 mm (0.0625 to 1.968 in.).

### WIDEST RANGE WORLDWIDE

This means you can choose from literally hundreds of thousands of meters of different grades and wall thicknesses (straight length or coiled). You can also rest a little easier knowing that you are getting the right product at the right time. It's our way of offering petrochemical and oil and gas customers a bit more peace of mind.

## MATERIALS EXPERTS

*in 130 countries, including hubs in Aberdeen, Stavanger, Houston, São Paulo, Dubai and Singapore.*

# Corrosion-proof your business.

When humidity starts to exceed 75% and temperatures are warm, the risk of corrosion increases exponentially. Add to this salt water in a tropical environment and you'll notice that poor quality seamless tubing will rapidly start to pit or corrode. There can also be big differences – within the standard – for tubing, as tests with major oil companies and fitters show.

**2.5% moly**  
Compared to min. 2.0% for ASTM.

Peace of mind is having a corrosion expert that helps you choose the right chemical composition for safe, trouble-free operations.

**KEY BENEFITS**

- Zero corrosion quality issues
- Access to our corrosion expertise
- Well-documented high performance
- Resistant to pitting and crevice corrosion
- Stable level of consistent, high-quality stock

Whether it's topside, downhole or in another challenging environment, hydraulic and instrumentation tubing tends to pit and corrode when placed in inaccessible locations containing chlorides. Tube material that would normally last 100 years or more in dry conditions could have a service life of five years or less in an aggressive chloride-rich environment.

**TESTS BY LEADING MULTINATIONALS**

"Says who?" you ask. Well, this was the conclusion of two of the world's largest oil companies and one major fitter after conducting a joint field trial in tropical waters. Our own lab results concurred. Most of the pitting and crevice corrosion occurred beneath clamps, support trays and connections.

**THE TOP OF THE STANDARD**

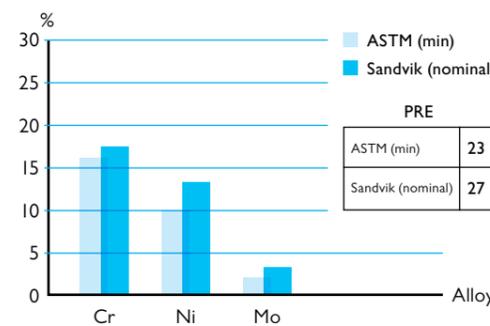
The study also showed a big difference in the pitting resistance of the Sandvik 3R60 versus

the minimum requirements for the international standard ASTM 316L (see Diagram 1). Sandvik was always at the top of the standard, with high percentages of nickel, chrome and molybdenum to combat corrosion. For example, we had a minimum of 2.5% moly vs. the 2.0% minimum required by ASTM. Pitting Resistance Equivalent (PRE) is calculated from the level of Cr, Mo, and N present in an alloy (PRE = 1 x %Cr + 3.3 x %Mo + 16 x %N).

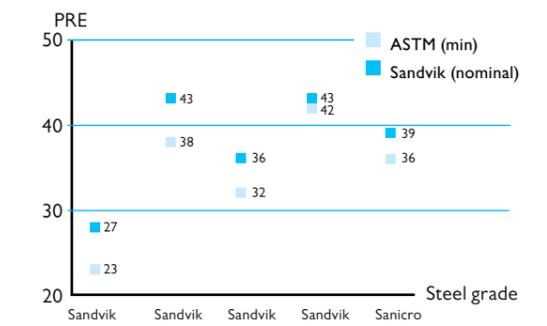
**CORROSION-RESISTANT DUPLEX TUBES**

While Sandvik 3R60 is a reliable all-round material choice, we recommend the Sandvik SAF 2507™ super duplex for more corrosive chloride-bearing environments where weight reduction is desirable. And of course, there are even more corrosion-resistant grades too. In all cases, Sandvik grades performed at the top of the standard compared with the ASTM minimum value (see Diagram 2).

**1.** Key alloy content Sandvik 3R60 vs ASTM 316/316L  
PRE value of Sandvik and ASTM (min)



**2.** PRE values for Sandvik grades vs ASTM (min)



\*254 SMO is a trademark owned by Outokumpu OY.

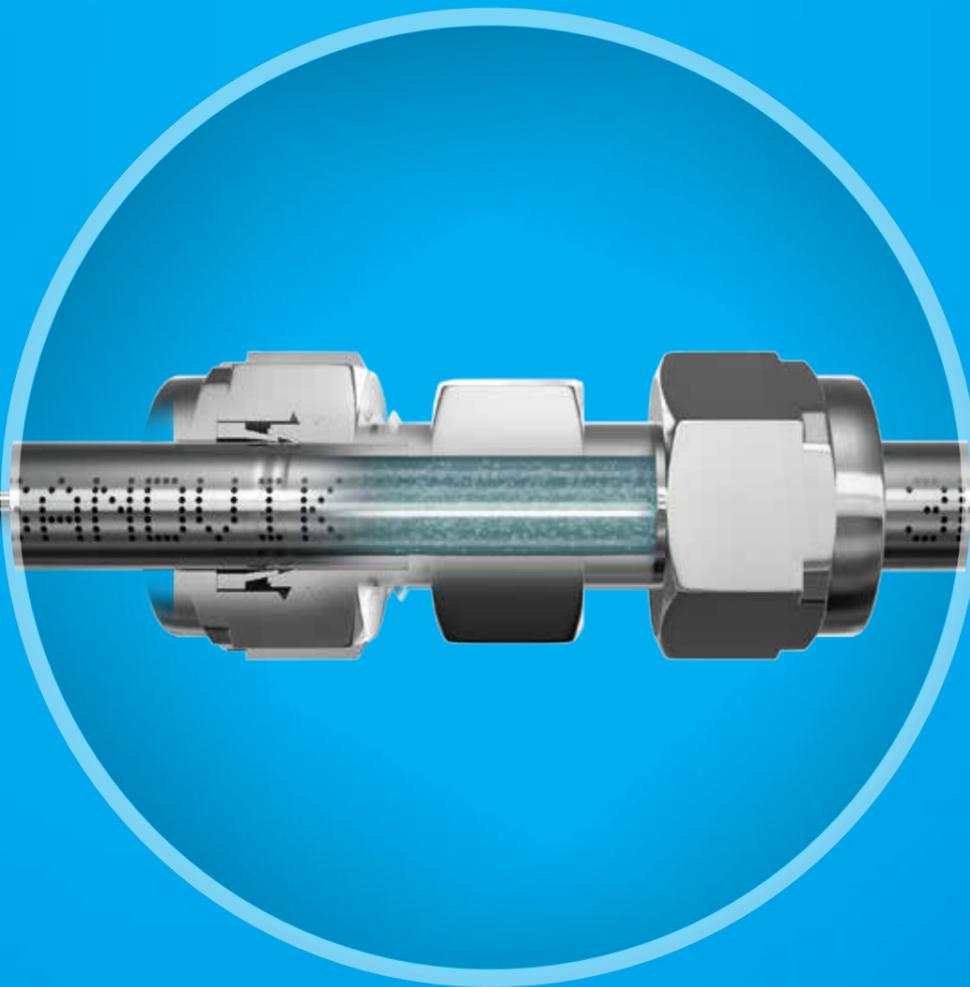


**HOW CORROSION-PROOF ARE YOU?**

Are your tubes made of the right alloy? Just because a material meets the minimum standard does not necessarily make it right for you. As shown in this pitting corrosion test according to ASTM G48, there are differences. From left to right: Sandvik 3R60, Sandvik 2RK65, SAF 2304, SAF 2205 and SAF 2507.

# We have ZERO tolerance for leaks.

Unscheduled downtime due to a hydraulic line that needs repairing can be a major inconvenience and cost. Even worse, the loss of hydraulic fluids or chemicals could lead to a valve shutdown or a loss of instrumentation control. So ask yourself: Is your tube supplier giving tight enough dimensional tolerances to ensure leak-tight seals? Do you get even consistency from batch to batch?



Peace of mind is having a tube with nearly twice as tight tolerance, a prerequisite for leak-tight seals.

#### KEY BENEFITS

- Zero dimensional tolerance issues
- Leak-free fittings or couplings
- Recommended by leading connector companies
- Proven performance to most multinationals
- Consistent stock availability; 24/7 delivery

The reason for mentioning this is that our laboratory tests – together with some of the world's leading connector and fitting manufacturers – show significant differences in the standards applied for dimensional tolerance. Unfortunately, such deviations can increase the risk of leaks, depending on the pressure, flow and medium used.

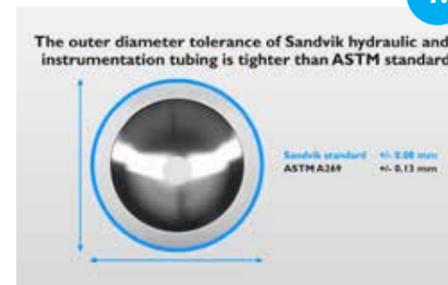
compared to just 0.16 mm for the equivalent Sandvik tube.

#### NEARLY TWICE AS TIGHT TOLERANCE

In other words, Sandvik is often providing tubing that has *nearly twice as tight tolerance* as the minimum accepted by the ASTM standard. And tighter tolerance is key to getting a leak-proof joint between the connector and tube – letting you compress the ferrule in the connector onto the tube to create a vacuum-tight seal as it moves down the cone of the body. If the tube is too hard or has an uneven wall thickness, it's going to be difficult to get a strong mechanical hold on the ferrules, increasing the chance of leakage.

#### CONSISTENCY IS THE KEY

The secret to the Sandvik tubing is that the tight tolerances are maintained from batch to batch, meter after meter, year in and year out. In fact, our three dedicated mills have the capacity to produce millions of meters of hydraulic and instrumentation tubing annually with OD tolerance of +/-0.08 on all tubes with OD of 6 to 25.4 mm. So it's little wonder that the world's leading manufacturers of fittings and connectors recommend us.



#### BEATING THE ALLOWABLE VARIANCE

Take, for example, ASTM A269 tube, which has an outer diameter dimensional tolerance of +/- 0.13 mm. By contrast, the allowable variance for the comparable Sandvik tube is just +/- 0.08 – a major difference (see Figure 1). This means that when evaluating ASTM A269, the variance is a full 0.26 mm,

Nearly twice

as tight tolerance as the ASTM standard.

# All bends, no breaks.

Can you afford to have wall collapses and cracks in the hydraulic or instrumentation tubing in your system? Is the tubing you are currently using giving you controlled hardness for easy bending and leak-free connections? Beware: There are many definitions of what is a good standard. Fortunately, our tube is at the top of the standard on all counts.



Peace of mind is having a tube that is consistently strong, yet pliable.

- KEY BENEFITS**
- Avoid wall collapses and breaks
  - Easy, reliable bending
  - Consistent quality for automated bending
  - No leakage

The good news is that Sandvik tubing is optimized for hardness that allows easy, reliable bending and consistent quality – with no wall collapse or cracks. This is important whether you are using a hand-held bender, an automated bender or simply a spanner. By knowing you are getting a consistent hardness – not too stiff, not too pliable – you can work quickly and with confidence.

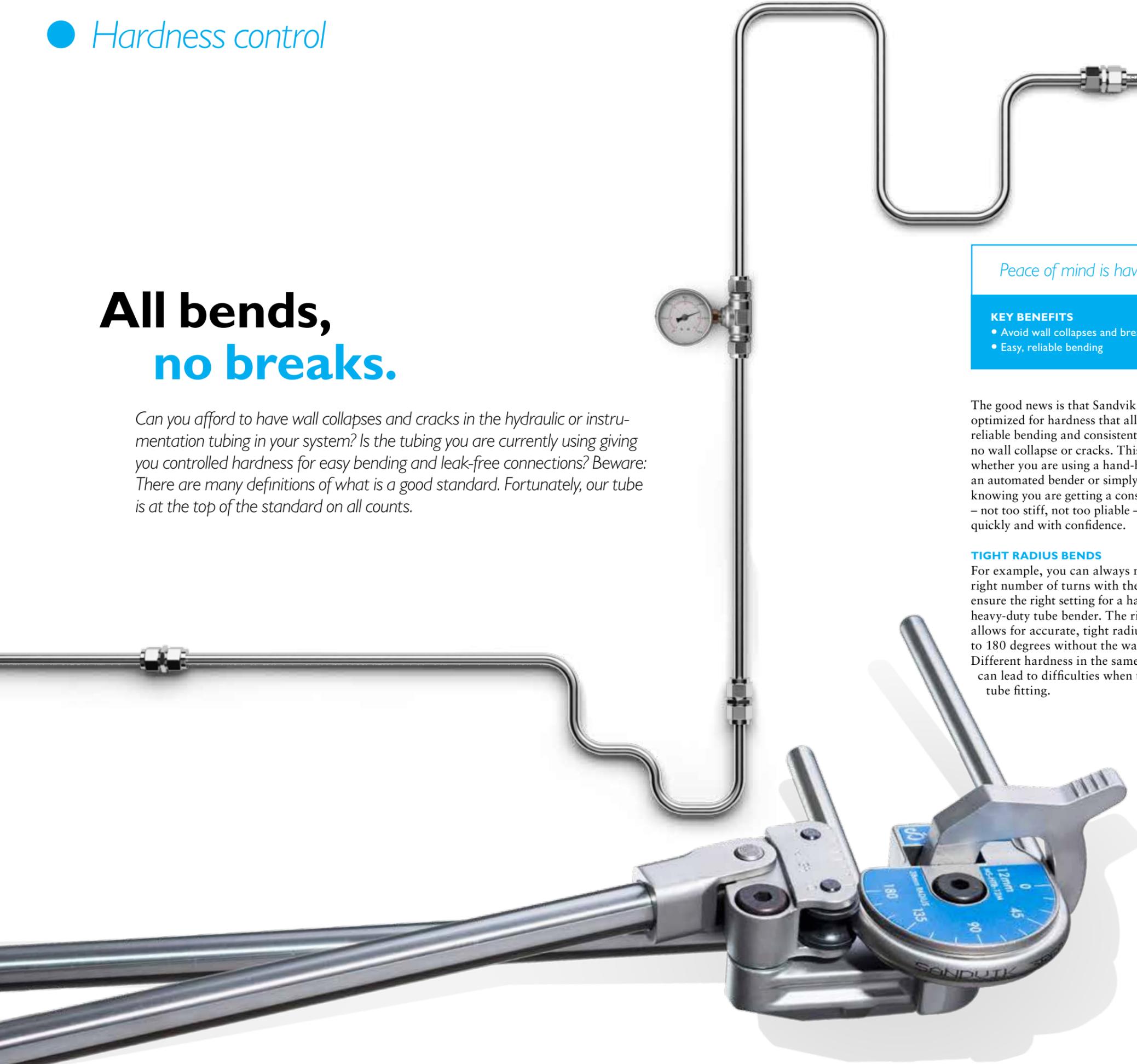
**TIGHT RADIUS BENDS**  
For example, you can always make just the right number of turns with the spanner or ensure the right setting for a hand-held or heavy-duty tube bender. The right hardness allows for accurate, tight radius bends of up to 180 degrees without the walls collapsing. Different hardness in the same tube batch can lead to difficulties when tightening the tube fitting.

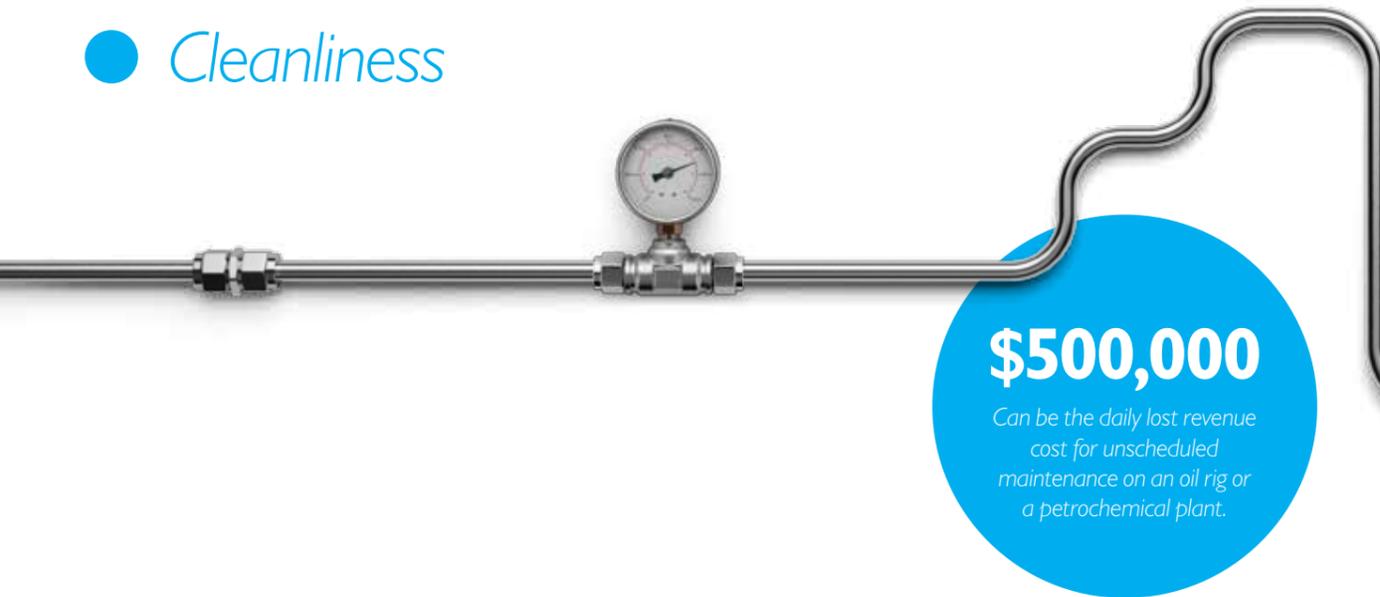
**PIONEERED BY SANDVIK**  
So what is an acceptable standard for hardness? As shown in *Table 1*, the maximum requirement for an ASTM 316L tube is a hardness level of HRB 90. Here, Sandvik was the first to achieve an HRB 80 (low numbers are better). This means we provide a tube that's strong, yet a bit softer than the standard, making it easier to grip and bend. We are also able to supply a hardness of "30 HCR" with our Sandvik SAF 2507™ super duplex tubes.

**OPENING NEW OPPORTUNITIES**  
Our aim is to apply our metallurgical knowledge to offer you controlled hardness that sets a standard of its own for easy bending and leak-free connections. Just the right hardness is enabled by Sandvik's unique combination of technology, equipment and know-how within the pilgering, drawing and heat-treating processes, which makes the material strong, yet pliable. In all cases, Sandvik tube grades performed at the optimum level of the standard compared with the ASTM maximum hardness values.

Seamless stainless tube hardness comparison

ASTM grade	Sandvik grade	ASTM	Sandvik
ASTM 316L	Sandvik 3R60	max HRB 90	max HRB 80
UNS S32750	Sandvik SAF 2507	max HRC 32	max HRC 30





**\$500,000**

Can be the daily lost revenue cost for unscheduled maintenance on an oil rig or a petrochemical plant.

## Nine steps towards a clean conscience.

Our conscience, that is. We can't have any peace of mind until we're sure that you're getting ultra-clean hydraulic and instrumentation tubing. After all, when you've spent in excess of \$500 million on a refinery or oil platform, you should not risk having contaminated hydraulic fluids in a pump – a situation that could lead to unscheduled maintenance or production stops costing millions.

Peace of mind is receiving clean tubing from your tube supplier to safeguard your trouble-free operations.

### KEY BENEFITS

- No issues with dirty tubes
- Avoid costly shutdowns
- Interior free of scale and contamination
- Reduced risk of system failure or unplanned maintenance
- Protects against malfunctioning pumps, filters, valves and actuators

### NO TIME FOR CLEANING AT REMOTE SITES

So what cleaning method does your current supplier use? Do they plug their tubes? Have you ever noticed dirt? The fact is that small impurities in your tube can cause problems in other parts of your system. And nobody has time to clean shipments of tube that are arriving, especially on remote sites like offshore oil platforms.

### CLEAN TUBES, TROUBLE-FREE SYSTEMS

To prevent unplanned malfunctions due to impurities, Sandvik uses a nine-step cleaning process. This means that before shipping, all Sandvik hydraulic and instrumentation tubes routinely undergo a rigorous, proprietary cleansing process to ensure the highest degree of cleanliness. It's just another way we offer our customers complete peace of mind.

**Millions**

of meters of clean, bright hydraulic and instrumentation tubing are produced by Sandvik every year.

### 1. Exterior alkaline bath

The outer tube surface receives an alkaline bath to clean and passivate it.

### 2. Removal of impurities

Under high pressure, oil and other impurities are flushed from inside the tube.

### 3. Interior alkaline bath

The interior of the tube is given an alkaline bath to clean and passivate it.

### 4. Interior water cleaning

Water is flushed through the interior to further clean it.

### 5. Interior air drying

High-pressure air is blown through the interior to clean out any impurities.

### 6. Bright annealing

All sizes with an OD up to and including 25.4 mm are supplied bright annealed.

### 7. Polishing

To provide a bright, smooth finish, all tube is carefully polished.

### 8. Interior cleaning

Air and foam plugs are blown through the tube to remove any impurities or particles.

### 9. Protection plugs

All tubes with outer diameters larger than 6 mm are supplied with plugged ends.

## Steel grades

Grade	Standards		Chemical composition (nominal), %					PRE (nominal)	Mechanical properties		Elong. A % min.
	ASTM TP UNS	EN steel no.	C	Cr	Ni	Mo	Others	Proof strength R <sub>p0.2</sub> MPa min.	Tensile strength R <sub>m</sub> MPa min.		
Sandvik 3R12	304/304L	1.4306	≤0.030	18.5	10	–	–	19	210	515–680	45
Sandvik 3R60™	316/316L	1.4435	≤0.030	17.5	13	2.6	–	27	220	515–690	45
Sandvik 5R75	316Ti	1.4571	0.05	17	12	2.1	Ti	24	220	510–710	45
Sandvik 2RK65™	N08904	1.4539	≤0.020	20	25	4.5	Cu	36	230	520–720	35
Sanicro™ 28	N08028	1.4563	≤0.020	27	31	3.5	Cu	39	220	550–750	40
Sandvik 254 SMO™	S31254	1.4547	≤0.020	20	18	6.1	N,Cu	43	310	655–850	35
Sandvik SAF 2507™	S32750	1.4410	≤0.030	25	7	4	N	43	550	800–1000	25

## Tolerances

### Metric sizes

#### Sandvik 3R60™

##### OD <6 mm, tolerances according to ASTM A632

Size OD, mm	Tolerances OD, mm	Wall thickness %
<4.76-2.38	+0.08/-0	+/-10

#### Sandvik 3R60, 3R12, 5R75

##### OD 6-42 mm EN 10305-I

Size OD, mm	Tolerances OD, mm	Wall thickness %
6-30	+/-0.08	+/-10
32-40	+/-0.15	+/-10
42	+/-0.20	+/-10

#### Sandvik 254 SMO™

Size OD, mm	Tolerances OD, mm	Wall thickness %
6-25	+/-0.13	+/-10

## Standards

#### Sandvik 3R12 and Sandvik 3R60™

EN 10216-5 TC1  
ASTM A213-AW  
ASTM A269  
PED 97/23/EC  
NACE MR0175/ISO 15156  
OD<6 mm acc to A632  
NACE MR0175/ISO 15156

#### Sandvik 5R75

EN 10216-5 TC1  
PED 97/23/EC

#### Sandvik 254 SMO™ (UNS S31254)

EN 10216-5 TC1  
ASTM A269  
PED 97/23/EC  
NACE MR0175/ISO 15156

#### Sandvik 2RK65™ (UNS N08904)

EN 10216-5 TC1  
ASTM A213 A269  
PED 97/23/EC  
NACE MR0175/ISO 15156

#### Sanicro™ 28 (UNS N08028)

EN 10216-5 TC1  
ASTM B668  
PED 97/23/EC  
NACE MR0175/ISO 15156

#### Sandvik SAF 2507™ (UNS S32750)

EN 10216 TC1  
ASTM A789  
PED 97/23/EC  
NACE MR0175/ISO 15156

### Imperial sizes

#### Sandvik 3R60

##### OD <6 mm, tolerances according to ASTM A632

Size OD, mm	Tolerances OD, mm	Wall thickness %
<6-4.76	+0.10/-0	+/-10
<4.76-2.38	+0.08/-0	+/-10
<2.38	+0.05/-0	+/-10

#### Sandvik 3R60

##### OD 6.35-25.4 mm according to EN 10305-I

Size OD, mm	Tolerances OD, mm	Wall thickness %
6.35-25.4	+/-0.08	+/-10

#### Sandvik 2RK65™ and Sanicro™ 28

Size OD, mm	Tolerances OD, mm	Wall thickness %
≤25.4	+/-0.10	+/-10

#### Sandvik SAF 2507™ and Sandvik 254 SMO

Size OD, mm	Tolerances OD, mm	Wall thickness %
≤19.05	+/-0.13	+/-10

## Tubes in straight lengths – stock program

### Metric sizes

Outside diameter	Wall thickness	Weight	Sandvik 3R12 ASTM TP 304/304L EN 1.4306 Max. working pressure in bar		Sandvik 3R60™ ASTM TP 316/316L EN 1.4435		Sandvik 5R75 ASTM TP 316Ti EN 1.4571		Sandvik 254 SMO™ UNS S31254 EN 1.4547	
			EN	ASME	EN	ASME	EN	ASME	EN	ASME
3	0.5	0.03			• 510	470				
	0.7	0.04			• 718	684				
6	1.0	0.13	• 470	470	• 510	470	• 550	470	• 720	632
	1.5	0.17			• 774	738	• 835	738		
8	1.0	0.18	• 338	340	• 366	340	• 395	340		
	1.5	0.24	• 541	537	• 587	537	• 633	537		
10	2.0	0.30	• 714	738	• 774	738				
	1.0	0.23	• 263	267	• 286	267	• 308	267		
12	1.5	0.32	• 416	417	• 451	417	• 486	417	• 636	561
	2.0	0.40	• 585	577	• 635	577	• 684	577		
14	1.0	0.28	• 216	220	• 234	220	• 252	220	• 330	295
	1.5	0.39	• 338	340	• 366	340	• 395	340	• 517	458
16	2.0	0.50	• 470	470	• 510	470	• 550	470	• 720	632
	1.0	0.33	• 183	186	• 198	186				
18	1.5	0.47					• 332	288		
	2.0	0.60	• 393	395	• 426	395	• 460	395		
20	1.0	0.35	• 170	173	• 184	173				
	1.5	0.51	• 263	267	• 286	267	• 308	267		
22	2.0	0.65	• 363	366	• 394	366	• 425	366		
	1.0	0.38	• 158	162	• 172	162				
24	1.5	0.54	• 245	249	• 266	249	• 287	249		
	2.0	0.70	• 338	340	• 366	340	• 395	340		
26	2.5				• 473	437	• 506	437		
	1.0	0.43	• 140	143	• 152	143				
28	1.5	0.62	• 216	220	• 234	220	• 252	220		
	2.0	0.80	• 296	299	• 321	299	• 346	299	• 453	402
30	2.5	0.97					• 445	383		
	1.5	0.69			• 209	196	• 223	196		
32	2.0	0.90	• 263	267	• 286	267	• 308	267		
	2.5	1.09			• 366	340	• 395	340		
34	3.0	1.28			• 486	417	• 486	417		
	1.5	0.77	• 174	177	• 189	177	• 203	177		
36	2.0	1.00	• 237	241	• 257	241	• 278	241		
	1.5	0.88	• 152	155						
38	2.0	1.15	• 206	210	• 224	210	• 242	210	• 316	283
	2.5	1.41	• 263	267	• 286	267	• 308	267		
40	3.0	1.65			• 350	326	• 377	326		
	1.5	1.00	• 135	138	• 146	138	• 158	132		
42	2.0	1.30			• 198	186	• 214	186		
	2.5	1.60			• 252	236				
44	2.5	1.72			• 234	220				
	3.0	2.03	• 263	267	• 286	267	• 308	267		
46	4.0	2.60			• 394	366	• 425	366		
	2.0	1.65	• 144	147	• 156	147	• 167	147		
48	2.5	2.03					• 214	186		
	3.0	2.40			• 241	226				
50	2.0	1.80			• 143	135				
	3.0	2.63	• 203	207	• 221	207	• 238	207		
52	4.0	3.41			• 302	282	• 326	282		
	5.0	4.13			• 388	360	• 419	360		
54	2.0	2.00			• 129	122	• 138	122		
	3.0	2.93			• 198	186	• 214	186		
56	5.0	5.63			• 286	267				

• Size in stock

Stock standard length is 6000 mm, for OD up to 25.4 mm. Tubes in other lengths on request.

Line marking, example: SANDVIK 3R60 ASTM A-269 TP316/316L SMLS NDE I2.7 x 1.24 mm HT"number" LOT"number" QA-TUBE

Other steel grades or dimensions can be produced on request.

### Imperial sizes

Outside diameter	Wall thickness	Imperial size	Weight	Sandvik 3R12 ASTM TP 304/304L EN 1.4306 Max. working pressure in bar		Sandvik 3R60™ ASTM TP 316/316L EN 1.4435		Sandvik 2RK65™ UNS N08904 EN 1.4539		Sandvik SAF 2507™ UNS S32750 EN 1.4410		Sanicro™ 28 UNS N08028 EN 1.4563		Sandvik 254 SMO™ UNS S31254 EN 1.4547		
				EN	ASME	EN	ASME	EN	ASME	EN	ASME	EN	ASME	EN	ASME	
1.59	0.36	1/16"	x 28 BWG	0.011				• 740	662							
	0.51		25 BWG	0.014				• 1008	961							
3.18	0.71	1/8"	x 22 BWG	0.044				• 727	652							
	0.89		20 BWG	0.051				• 874	834							
4.76	0.89	3/16"	x 20 BWG	0.086				• 585	536							
	0.71	1/4"	x 22 BWG	0.100				• 323	301							
6.35	0.89				• 384	386		• 417	386	• 469	392	• 962	748		• 588	520
	0.91				• 394	396		• 428	396	• 481	402					
7.94	1.22							• 604	552	• 680	560					
	1.24							• 616	562	• 693	570	• 1421	1088		• 869	756
9.53	1.63							• 797	759	• 896	771					
	1.65							• 807	770	• 908	781	• 1861	1490			
12.7	0.89	5/16"	x 20 BWG	0.157				• 324	302							
	0.91	0.91	20 SWG	0.160				• 332	310							
15.88	0.89	3/8"	x 20 BWG	0.193				• 265	248	• 298	252	• 611	480			
	0.91							• 272	254	• 305	258					
19.05	1.22							• 376	350	• 423	355			• 416	362	
	1.24							• 383	356	• 431	361	• 884	689	• 424	368	
25.4	1.63							• 526	484	• 591	491					

## Coiled tubing – standard size range

### Imperial sizes

Size inch		Single coil length* ft	Orbital welded length ft
1/8	x .020	1,300	
	x .028	1,300	
	x .035	1,300	
	x .049	1,300	
3/16	x .020	1,000	
	x .028	950	
	x .035	750	
	x .049	600	
1/4	x .035	2,005	36,551
	x .049	1,528	27,864
	x .065	1,256	22,903
3/8	x .035	1,267	23,100
	x .049	941	17,162
	x .065	749	13,661
	x .083	612	11,345
1/2	x .035	927	16,899
	x .049	681	12,411
	x .065	534	9,740
	x .083	427	7,949
5/8	x .035	446	13,313
	x .049	325	9,711
	x .065	253	7,565
	x .083	203	6,112
3/4	x .035	367	10,990
	x .049	266	7,982
	x .065	207	6,187

Other sizes and lengths available on request.

\* Minimum guaranteed length for TP 316/316L.

### Metric sizes

Size mm		Single coil length* m	Orbital welded length m
3.0	x 0.5	400	
	x 0.75	400	
	x 1.0	400	
3.5	x 0.5	400	
	x 0.75	400	
	x 1.0	350	
4.0	x 1.5	280	
	x 0.5	350	
	x 0.75	350	
6.0	x 1.0	300	
	x 1.5	230	
	x 1.0	594	10,828
8.0	x 1.2	515	9,399
	x 1.5	440	8,021
	x 1.0	424	7,734
10.0	x 1.2	364	6,635
	x 1.5	304	5,553
	x 1.0	330	6,016
12.0	x 1.2	281	5,127
	x 1.5	233	4,246
	x 2.0	182	
12.0	x 1.0	270	4,922
	x 1.2	229	4,177
	x 1.5	188	3,437
	x 2.0	146	

Sizes above 12 mm – please inquire.

## Steel grades

Grade	ASTM	UNS	EN steel no.
Sandvik 3R12	304/	S30400/	1.4306/
	304L	S30403	1.4301
Sandvik 3R60™	316/	S31600/	1.4435
	316L	S31603	
Sandvik 3R65	316/	S31600/	1.4404
	316L	S31603	
Sandvik 6R35	321/	S32100/	1.4541/
	321H	S32109	1.4940
Sandvik 5R75	316Ti	S31635	1.4571
Sandvik 8R40	347/	S34700/	1.4550/
	347H	S34709	1.4912
Sandvik SAF 2205™		S31803/	1.4462
		S32205	
Sandvik SAF 2304™		S32304	1.4362
Sandvik SAF 2507™		S32750	1.4410
Sandvik 2RK65™		N08904	1.4539
Sanicro™ 28		N08028	1.4563
Sanicro 30	Alloy 800	N08800	1.4558
Sanicro 41	Alloy 825	N08825	
Sanicro 70	Alloy 600	N06600	
		N04400	
		N02200	

Other steel grades can be produced on request.

## Standards

ASTM: A213, A269, B163, B167, B668, A632, A789, A790

ASME: SA213, SB163, SB167, SB 668, SA789, SA790

NACE: MR 0175

EN: 10216-5 TC1

Eddy Current or hydrostatic test at option of Sandvik.





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