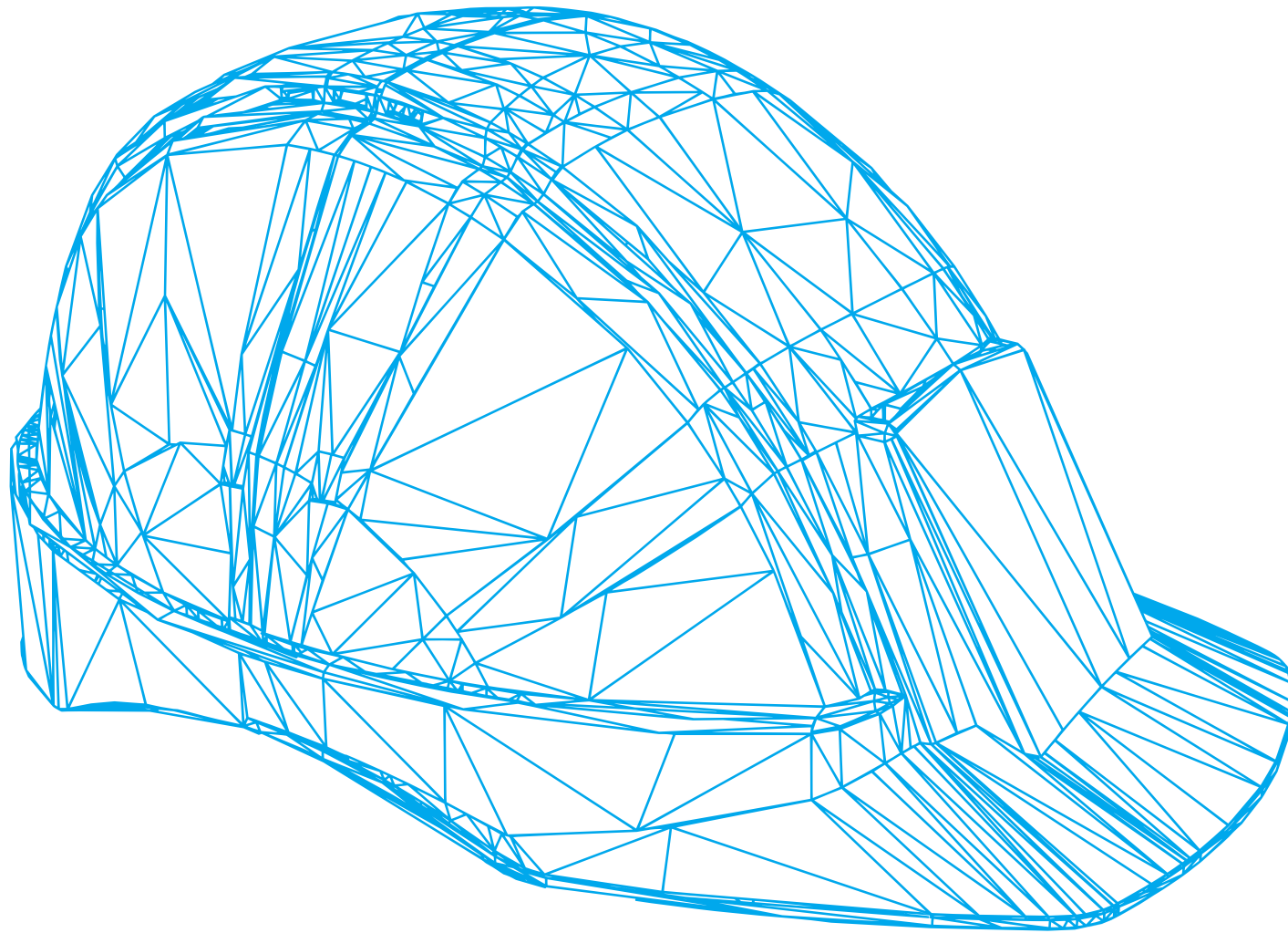


SHUT DOWN CORROSION OPEN UP NEW POSSIBILITIES

HYDRAULIC AND INSTRUMENTATION TUBING FOR THE PETROCHEMICALS AND OIL & GAS INDUSTRIES





ZERO ACCIDENTS
IS THE VISION OF OUR
“SAFETY FIRST” PROGRAM,
WHICH ALSO EXTENDS
TO OUR CUSTOMERS AND
SUPPLIERS, FORMING AN
INTEGRAL PART OF OUR
EHS PROGRAM.

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.

50 YEARS OF SERVING THE INDUSTRY

For more than 50 years, we’ve been serving some of the most demanding customers in the global oil and gas industry. 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.



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 that is widely appreciated 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 that give your business a competitive edge in any 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 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.

SUPPORTING MORE
PROFITABLE REFINING
OF XYLENE, ETHYLENE,
PROPLYLENE BUTADIENE,
BENZENE, TOLUENE, VINYL,
STYRENE AND METHANOL.

**\$791 BILLION –
THE PROJECTED SIZE
OF THE GLOBAL
PETROCHEMICALS
MARKET BY 2018.**

Source: AT Kearney

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.



PUT OUR 2,700 RESEARCHERS TO WORK ON YOUR TOUGHEST CHALLENGES

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.

100 MILLION METERS OF UMBILICALS

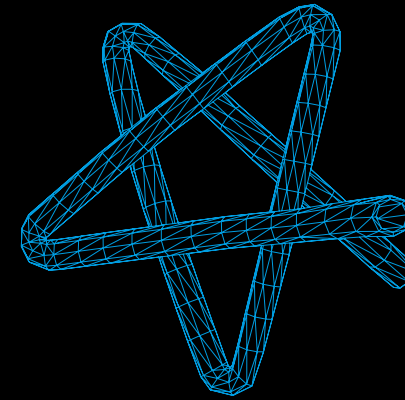
How do we know? For starters, we've been heavily involved as a tube supplier to umbilical manufacturers since they came into use in the late 1980s, having supplied more than 100 million meters (330 million feet) worldwide to date. And we've long been in the forefront of duplex steels, an area where we continue to excel and push limits.



Our lightweight corrosion-resistant tubing for subsea umbilicals is used by 70% of major oil companies for the extraction of oil and gas in harsh offshore conditions at depths of up to two kilometers.

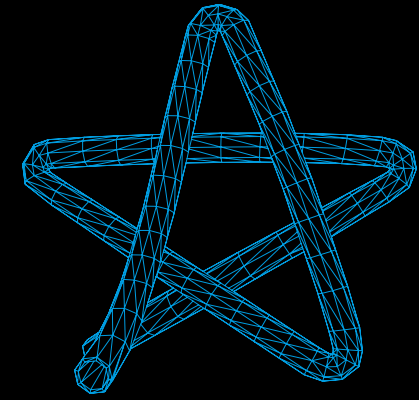
A SIX-STAR APPROACH TO MAKING YOU AND YOUR CUSTOMERS MORE SUCCESSFUL

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.



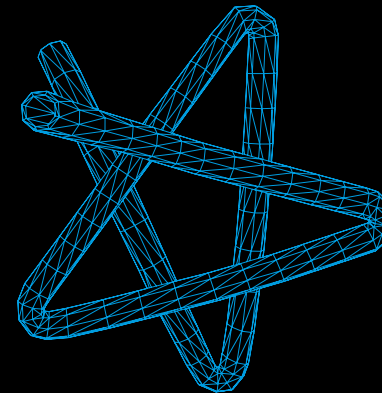
1. BROADEST RANGE

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).



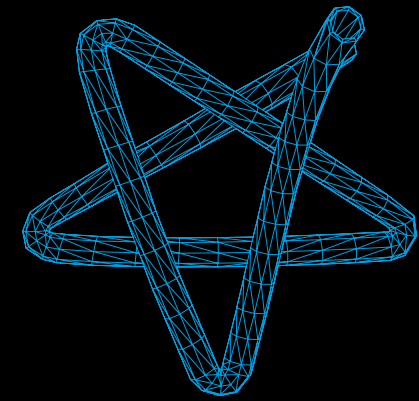
2. GLOBAL PRODUCTION & STOCKS

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.



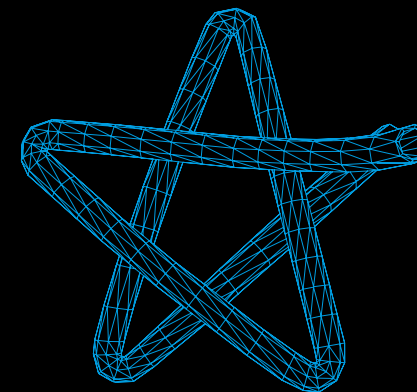
3. CONSISTENT QUALITY

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.



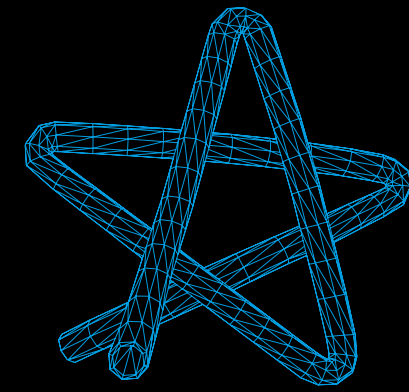
4. R&D EXPERTISE

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.



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 very high requirements 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.

TAKE ADVANTAGE OF
OUR MATERIALS EXPERTS
IN 130 COUNTRIES,
INCLUDING HUBS IN
STAVANGER, HOUSTON,
SÃO PAULO, DUBAI AND
SINGAPORE.

IT'S TIME TO 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.

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.

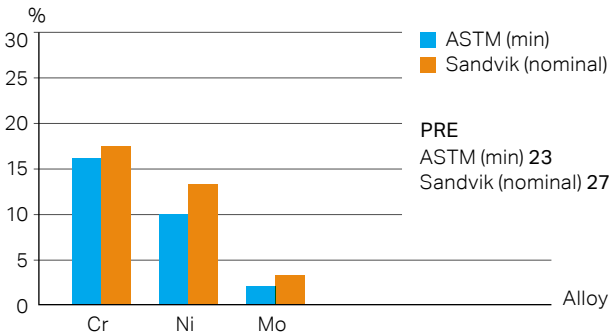
2.6% MOLYBDENUM VS 2.0% REQUIRED BY ASTM

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 2.6% 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 ($PRE = 1 \times \%Cr + 3.3 \times \%Mo + 16 \times \%N$).

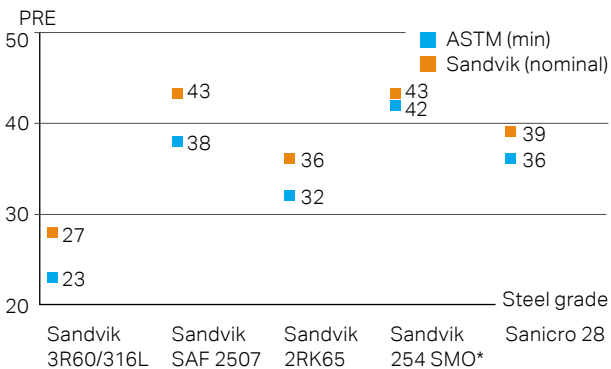
CORROSION-RESISTANT DUPLEX TUBES

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)



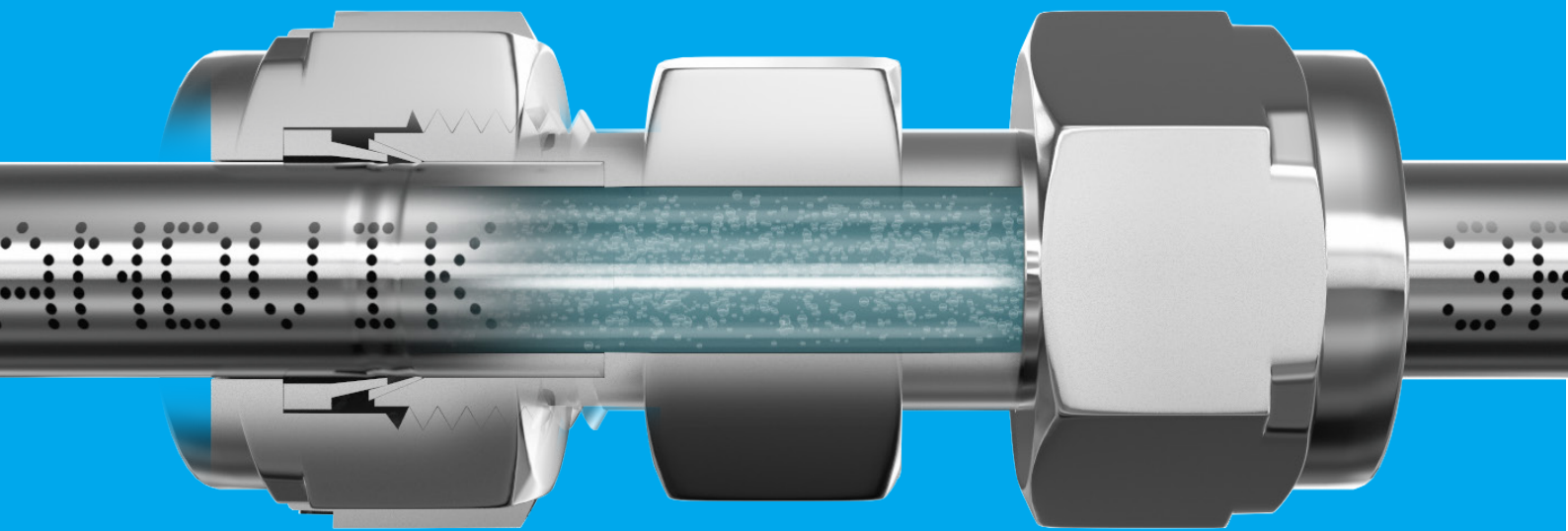
2. PRE VALUES FOR SANDVIK GRADES VS ASTM (MIN)



*254 SMO is a trademark owned by Outokumpu OY.

- CORROSION RESISTANCE BENEFITS
- ZERO CUSTOMER COMPLAINTS OR RECALLS
- ACCESS TO OUR CORROSION EXPERTISE
- WELL-DOCUMENTED HIGH PERFORMANCE
- RESISTANT TO PITTING AND CREVICE CORROSION
- STABLE LEVEL OF CONSISTENT, HIGH-QUALITY STOCK

WE HAVE ZERO TOLERANCE FOR LEAKS



DIMENSIONAL TOLERANCE BENEFITS

- ZERO CUSTOMER COMPLAINTS OR RECALLS
- LEAK-FREE FITTINGS OR COUPLINGS
- RECOMMENDED BY LEADING CONNECTOR COMPANIES
- PROVEN PERFORMANCE TO MOST MULTINATIONALS
- CONSISTENT STOCK AVAILABILITY; 24/7 DELIVERY

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?

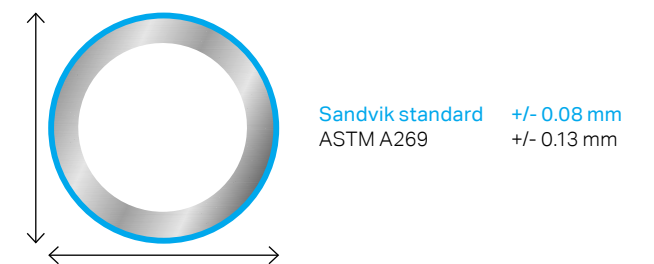
The reason for mentioning this is that our laboratory tests – together with some of the world's leading connector and fitting manufacturers – show significant differences in the standards applied for dimensional tolerance. Unfortunately, such deviations can increase the risk of leaks, depending on the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

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, 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-



1. KEY ALLOY CONTENT SANDVIK 3R60 VS ASTM 316/316L

The outer diameter tolerance of Sandvik hydraulic and instrumentation tubing is tighter than ASTM standard.

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 30,0 mm. So it's little wonder that the world's leading manufacturers of fittings and connectors recommend us.

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.

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.

HRB 80 – PIONEERED BY SANDVIK FOR ASTM 316L

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.

1. 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

HARDNESS CONTROL BENEFITS

- AVOID WALL COLLAPSES AND BREAKS
- EASY, RELIABLE BENDING
- CONSISTENT QUALITY FOR AUTOMATED BENDING
- NO LEAKAGE





NINE STEPS TOWARDS A CLEAN CONSCIENCE

CLEANLINESS BENEFITS

- NO COMPLAINTS ABOUT DIRTY TUBES
- CUSTOMERS 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

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.

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.

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.

TUBES IN STRAIGHT LENGTHS
– STOCK PROGRAM

METRIC SIZES

			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	
Outside diameter mm	Wall thickness mm	Weight kg/m	MAX. WORKING PRESSURE IN BAR					
			EN		ASME		EN	
3	0.5	0.03	• 510	470				
	0.7	0.04	• 718	684				
6	1.0	0.13	• 510	470	• 550	470	• 720	632
	1.5	0.17	• 774	738	• 835	738	• 1213	993
8	1.0	0.18	• 366	340	• 395	340	• 574	458
	1.5	0.24	• 587	537	• 633	537	• 920	723
	2.0	0.30	• 774	738			• 1213	993
10	1.0	0.23	• 286	267	• 308	267	• 448	359
	1.5	0.32	• 451	417	• 486	417	• 636	561
	2.0	0.40	• 635	577	• 684	577	• 995	776
12	1.0	0.28	• 234	220	• 252	220	• 330	295
	1.5	0.39	• 366	340	• 395	340	• 517	458
	2.0	0.50	• 510	470	• 550	470	• 720	632
14	1.0	0.33	• 198	186				
	1.5	0.47			• 332	288		
	2.0	0.60	• 426	395	• 460	395		
15	1.0	0.35	• 184	173				
	1.5	0.51	• 286	267	• 308	267		
	2.0	0.65	• 394	366	• 425	366		
16	1.0	0.38	• 172	162				
	1.5	0.54	• 266	249	• 287	249		
	2.0	0.70	• 366	340	• 395	340		
	2.5		• 473	437	• 506	437		
18	1.0	0.43	• 152	143				
	1.5	0.62	• 234	220	• 252	220		
	2.0	0.80	• 321	299	• 346	299	• 453	402
	2.5	0.97			• 445	383		
20	1.5	0.69	• 209	196	• 223	196		
	2.0	0.90	• 286	267	• 308	267		
	2.5	1.09	• 366	340	• 395	340		
	3.0	1.28			• 486	417		
22	1.5	0.77	• 189	177	• 203	177		
	2.0	1.00	• 257	241	• 278	241		
25	1.5	0.88						
	2.0	1.15	• 224	210	• 242	210	• 316	283
	2.5	1.41	• 286	267	• 308	267		
	3.0	1.65	• 350	326	• 377	326		
28	1.5	1.00	• 146	138	• 158	132		
	2.0	1.30	• 198	186	• 214	186		
	2.5	1.60	• 252	236				
30	2.5	1.72	• 234	220				
	3.0	2.03	• 286	267	• 308	267		
	4.0	2.60	• 394	366	• 425	366		
35	2.0	1.65	• 156	147	• 167	147		
	2.5	2.03			• 214	186		
	3.0	2.40	• 241	226				
38	2.0	1.80	• 143	135				
	3.0	2.63	• 221	207	• 238	207		
	4.0	3.41	• 302	282	• 326	282		
	5.0	4.13	• 388	360	• 419	360		
42	2.0	2.00	• 129	122	• 138	122		
	3.0	2.93	• 198	186	• 214	186		
50	5.0	5.63	• 286	267				

• Size in stock

Stock standard length is 6000 mm, for OD up to 50,0 mm.

For latest information, please refer to: www.smt.sandvik.com

IMPERIAL SIZES

					Sandvik 3R60™ ASTM TP 316/316L EN 1.4435	Sandvik 2RK65™ UNS N08904 EN 1.4539	Sandvik SAF 2507™ UNS S32750 EN 1.4410	Sandvik Sanicro™ 28 UNS N08028 EN 1.4563	Sandvik 254 SMO™ UNS S31254 EN 1.4547	Sandvik Sanicro™ 60					
Outside diameter mm	Wall thickness mm	Imperial size	Weight kg/m	MAX. WORKING PRESSURE IN BAR											
				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	20 BWG	0.122	• 417	386	• 469	392	• 962	748			• 588	520	• 773	
	0.91	20 SWG	0.124	• 428	396	• 481	402								
	1.22	18 SWG	0.157	• 604	552	• 680	560								
	1.24	18 BWG	0.159	• 616	562	• 693	570	• 1421	1088			• 869	756	• 1124	
	1.63	16 SWG	0.193	• 797	759	• 896	771								
	1.65	16 BWG	0.194	• 807	770	• 908	781	• 1861	1490			• 1265	1035	• 1540	
7.94	0.89	5/16" x 20 BWG	0.157	• 324	302										
	0.91	20 SWG	0.160	• 332	310										
9.53	0.89	3/8" x 20 BWG	0.193	• 265	248	• 298	252	• 611	480			• 415	334	• 497	
	0.91	20 SWG	0.196	• 272	254	• 305	258								
	1.22	18 SWG	0.254	• 376	350	• 423	355			• 416	362				
	1.24	18 BWG	0.257	• 383	356	• 431	361	• 884	689	• 424	368	• 601	479	• 712	
	1.63	16 SWG	0.322	• 526	484	• 591	491			• 582	501				
	1.65	16 BWG	0.326	• 534	490	• 600	498	• 1230	950	• 590	508	• 753	660	• 981	
	2.03	14 SWG	0.381	• 686	619										
12.7	2.11	14 BWG	0.391	• 720	646							• 1062	869		
	0.89	1/2" x 20 BWG	0.263	• 194	183	• 219	185	• 448	354	• 219	189	• 305	246	• 366	
	0.91	20 SWG	0.268	• 199	187	• 224	190								
	1.22	18 SWG	0.350	• 273	256	• 313	264								
	1.24	18 BWG	0.356	• 278	260	• 313	264	• 642	504	• 314	269	• 436	350	• 521	
	1.63	16 SWG	0.452	• 377	351	• 430	361			• 423	368				
	1.65	16 BWG	0.456	• 383	355	• 430	361	• 882	688	• 423	368	• 540	477	• 711	
15.88	2.03	14 SWG	0.542	• 486	448	• 546	455								
	2.11	14 BWG	0.559	• 508	468	• 571	475			• 574	484	• 717	629	• 936	
	1.22	5/8" x 18 SWG	0.448	• 214	201										
	1.24	18 BWG	0.454	• 218	205										
	1.63	16 SWG	0.582	• 294	275										
19.05	1.65	16 BWG	0.588	• 298	278										
	1.22	3/4" x 18 SWG	0.544	• 176	166			• 414	328						
	1.24	18 BWG	0.553	• 180	169										
	1.63	16 SWG	0.711	• 241	226										
	1.65	16 BWG	0.718	• 244	229										
	2.11	14 BWG	0.895	• 320	298										
	2.41	13 BWG	1.00	• 371	345										
25.4	2.77	12 BWG	1.13	• 435	403										
	1.22	1" x 18 SWG	0.739	• 130	123										
	1.24	18 BWG	0.750	• 132	125										
	1.65	16 BWG	0.981	• 179	169										
	2.11	14 BWG	1.23	• 233	219										
	2.41	13 BWG	1.39	• 270	252										
	3.20	–	1.78	• 370	343										

• Size in stock

¹⁾SWG = Standard Wire Gauge, BWG = Birmingham Wire Gauge

28 BWG = 0.014 inch 25 BWG = 0.020 inch 22 BWG = 0.028 inch 20 BWG = 0.035 inch 20 BWG = 0.036 inch 18 BWG = 0.049 inch 18 SWG = 0.048 inch 16 BWG = 0.065 inch 16 SWG =0.064 inch 14 BWG = 0.083 inch 14 SWG = 0.080 inch 13 BWG = 0.095 inch 12 BWG = 0.109 inch 11 BWG = 0.120 inch

²⁾ 1 bar = 0.1 MPa, 1 ksi = 6.895 MPa

³⁾ EN 13480-3 at 50°C.

⁴⁾ ASME B31.3 at 40°C. Max. allowed stress for Sandvik 3R60 = ASTM TP 316.

Calculated wall thickness tolerance -10%.

For latest information, please refer to: www.smt.sandvik.com

STEEL GRADES

	STANDARDS		CHEMICAL COMPOSITION (nominal), %					PRE (nominal)	MECHANICAL PROPERTIES		
Grade	ASTM TP UNS	EN steel no.	C	Cr	Ni	Mo	Others		Proof strength R _{p0.2} MPa min.	Tensile strength R _m MPa	Elong. A % min.
Sandvik 3R60™	316/316L	1.4435	≤0.030	17.5	13	2.6	–	27	220	515	45
Sandvik 5R75	316Ti	1.4571	0.05	17	12	2.1	Ti	24	220	510	45
Sandvik 2RK65™	N08904	1.4539	≤0.020	20	25	4.5	Cu	36	230	520	35
Sanicro™ 28	N08028	1.4563	≤0.020	27	31	3.5	Cu	39	220	550	40
Sanicro™ 60	N06625	2.4856	≤0,025	21,5	60	8.3	-	48	276	690	30
Sandvik 254 SMO™	S31254	1.4547	≤0.020	20	18	6.1	N,Cu	43	310	655	35
Sandvik SAF 2507™	S32750	1.4410	≤0.030	25	7	4	N	43	550	800	25

* 254 SMO is a trademark owned by Outokumpu OY.

TOLERANCE

METRIC/IMPERIAL SIZES

SANDVIK 3R60™ OD <6 mm,
TOLERANCES ACCORDING TO ASTM A632

Size OD, mm	Tolerances OD, mm	Wall thickness %
<2.38	+0.05/-0	+/-10
<4.77-2.38	+0.08/-0	+/-10
<6-4.77	+0.10/-0	+/-10

SANDVIK 3R60™, SANDIK 5R75, SANDVIK 254SMO™,
SANDVIK 2RK65™, SANICRO™ 60, SANICRO™ 28, OD 6-50
MM EN 10305-1

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

SANDVIK SAF 2507™

Size OD, mm	Tolerances OD, mm	Wall thickness %
≤19,05	+/- 0,13	10%

FIXED LENGTHS

6000 -0/+5 mm

STRAIGHTNESS

Maximum deviation from a straight line = 1,5 mm/1000mm.

OVALITY

Ovality is calculated as OD_{MAX} - OD_{MIN}
Max allowed is 0.005", (0.127 mm) for OD < 30 mm.
For OD > 30 mm, max allowed is same as OD tolerances
according to EN 10305-1

STANDARDS

Sandvik 3R60™

ASME/ASTM SA/A-213 AW
ASTM A-269
ASTM A-1016
EN 10216-5 TC-1
ISO EN 3651-2 A
EN 10305-1 (Only Tolerances
- Table 5)
PED /2014/68/EU

Sandvik 5R75

ASTM A-1016
EN 10216-5 TC-1
ISO EN 3651-2 A
EN 10305-1 (Only Tolerances
- Table 5)
PED /2014/68/EU

Sandvik 254 SMO™

ASME/ASTM SA/A-213 AW
ASTM A 269
ASTM A-1016
EN 10216-5 TC-1
EN 10305-1 (Only Tolerances
- Table 5)
PED /2014/68/EU
NORSOK M630, MDS R18

Sandvik 2RK65™

ASTM A-213/A-269
ASTM A-1016/A-999
EN 10216-5 TC-1
ISO EN 3651-2 C
EN 10305-1 (Only Tolerances
- Table 5)
PED /2014/68/EU
NACE MR 0175/ISO 15156

Sanicro 28

ASTM B668
ASTM B829
EN 10216-5 TC-1
EN 10305-1 (Only Tolerances
- Table 5)
PED /2014/68/EU
NACE MR 0175/ISO 15156

Sandvik SAF 2507™

ASTM A-789
ASTM A-1016
EN 10216-5 TC-1
PED /2014/68/EU
NORSOK M630, MDS D58
NACE MR 0175/ISO 15156

Sandvik Sanicro™ 60

ASME/ASTM SB/B 444
ASTM B-829
PED /2014/68/EU
Grade 2

COILED TUBING – STANDARD SIZE RANGE

IMPERIAL SIZES

Size, inch	Single coil 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
	x .049	1,528
	x .065	1,256
3/8	x .035	1,267
	x .049	941
	x .065	749
	x .083	612
1/2	x .035	927
	x .049	681
	x .065	534
	x .083	427
5/8	x .035	446
	x .049	325
	x .065	253
	x .083	203
3/4	x .035	367
	x .049	266
	x .065	207

* Minimum guaranteed length for TP 316/316L.

METRIC SIZES

Size, mm	Single coil 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
	x 1.5	280
4.0	x 0.5	350
	x 0.75	350
	x 1.0	300
	x 1.5	230
6.0	x 1.0	594
	x 1.2	515
	x 1.5	440
8.0	x 1.0	424
	x 1.2	364
	x 1.5	304
10.0	x 1.0	330
	x 1.2	281
12.0	x 1.5	233
	x 2.0	182
	x 1.0	270
	x 1.2	229
	x 1.5	188
	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	17,162
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	



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