

Seamless stainless tubes
**for hydraulic and
instrumentation systems**





technical knowledge



integrated production



stock assortment



network of sales and service

Reduce your lifecycle costs

When selecting tubes for your hydraulic or instrumentation systems, some critical questions are often raised. For example, how knowledgeable are your suppliers about your process? How good are their products? If something goes wrong, how quickly can you get support or a replacement part?

As a leading worldwide supplier of seamless stainless tubes in both straight lengths and coils, Sandvik is uniquely equipped to help you address these challenges. With more than 100 years of experience in producing stainless steel, we continue to support our customers with the following:



Sandvik's **technical knowledge** is based on a long tradition of R&D, which has resulted in a wide range of new products over the years. Combined with hands-on experience dealing with a variety of process environments, Sandvik and its representatives are equipped with the knowledge you need for the solution you want.



Our **integrated production** system ensures quality control through the entire manufacturing chain, from our steel melting plant to the finished product. Our quality standards help to ensure the long lifecycle of the tubes we deliver, as well as their traceability.



With a **wide stock assortment and distribution capacity**, we can deliver the product you want when you want it. Our tubes are end-capped and carefully packed to ensure you get the product you want in the same shape it left the mill.



And, finally, with an extensive **global network of sales and service** units, our representatives are locally available to help you find the most cost-effective long-term solution. You are in safe hands.

“With Sandvik, you are putting yourself in safe hands.”





What makes a high-quality tube?

The tubes we manufacture and deliver for hydraulic and instrumentation systems are noted for their quality and low lifecycle costs for the following reasons:

- ✓ We control every step in the tube production process, ensuring **consistent quality** in our product.
- ✓ We have well equipped corrosion testing laboratories, used for research purposes and for control of the influence of the production procedures on the material, that result in a product that offers **high corrosion resistance**.
- ✓ **High surface smoothness and close dimensional tolerances** ensure there are no leakages when connecting straight tubes with couplings.
- ✓ All our products are characterized by the **ovality, eccentricity and controlled hardness** required for superior performance for hydraulic and instrumentation systems.

Two delivery forms: straight lengths and coiled

In answer to our customers' needs, we have developed two primary delivery forms of seamless stainless tubes – straight lengths and coiled. Your choice will depend on your process environment and your requirements. We can help you arrive at the most cost-effective solution for your needs.

SANDVIK GROUP

The Sandvik Group is a global high technology enterprise with 49,000 employees in 130 countries. Sandvik's operations are concentrated on five business areas in which the group holds leading global positions in selected niches: Sandvik Mining, Sandvik Machining Solutions, Sandvik Materials Technology, Sandvik Construction and Sandvik Venture.

SANDVIK MATERIALS TECHNOLOGY

Sandvik Materials Technology is a world-leading developer and manufacturer of products in advanced stainless steels and special alloys for the most demanding environments, as well as products and systems for industrial heating.

QUALITY MANAGEMENT

Sandvik Materials Technology has quality management systems approved by internationally recognized organizations. We hold, for example, the ASME Quality Systems Certificate as a materials organization, approval to ISO 9001, ISO/TS 16949, ISO 17025 and PED 97/23/EC. We also have product and/or shop approvals from bodies such as TÜV, JIS, DNV and Lloyd's Register.

ENVIRONMENT, HEALTH AND SAFETY

Environmental awareness, health and safety are integral parts of our business and are at the forefront of all activities within our operation. We hold ISO 14001 and OHSAS 18001 approvals.

Sandvik, Sanicro, Sandvik SAF 2205, Sandvik SAF 2507, Sandvik 3R60 are trademarks owned by Sandvik Intellectual Property AB.

254 SMO is a trademark owned by Outokumpu OY.





Engineer your cost savings with coiled tubing

When you want to reduce the risk of leakages in your hydraulic and instrumentation system, consider **Sandvik seamless stainless steel coiled tubing**. By reducing the number of connections in your system, you make it easier to install, especially in vertical installation applications. Coiled tubing increases the integrity of the overall system, reducing not only the risk of leakage but maintenance costs as well.

Coiled tubing can be cut according to exact requirements. They are available in single coils or multiple coils orbitally welded together. Since lengths of coiled tubes can be cut according to need, there's less labor and no scrap. Together, all these benefits result in significant cost savings over time.

A material of choice

Our coiled tubing is the material of choice for control lines and chemical injection lines, instrument lines, steam or electrically traced tubing, pre-insulated tubing, stack tubing and heater hose, among others.

Sandvik coiled tubing is supplied with a continuous line marked, bright annealed and buffed surface. Coils with special cleaning or coils with special ID surface can be supplied.

If required, the coiled tubing can be supplied with a PVC coated surface for double corrosion protection. Sandvik coiled tubing is packaged either level wound on wooden or steel reels, which are plastic wrapped, or loosely wound and individually secured and protected in dawghouse/crates for shipping.

Key advantages of Sandvik coiled tubing



Fewer connections mean fewer couplings, which reduce the risk of leakage and the need for inspection and maintenance.



High degree of material utilization reduces scrap generation.



Compact packaging facilitates shipping and storage.



Improved system integrity enhances operational safety and security.

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 0.5	350	
	x 0.75	350	
	x 1.0	300	
6.0	x 1.5	230	
	x 1.0	594	10,828
	x 1.2	515	9,399
8.0	x 1.5	440	8,021
	x 1.0	424	7,734
	x 1.2	364	6,635
10.0	x 1.5	304	5,553
	x 1.0	330	6,016
	x 1.2	281	5,127
12.0	x 1.5	233	4,246
	x 2.0	182	
	x 1.0	270	4,922
15.0	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 may be produced on request.

Standards

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

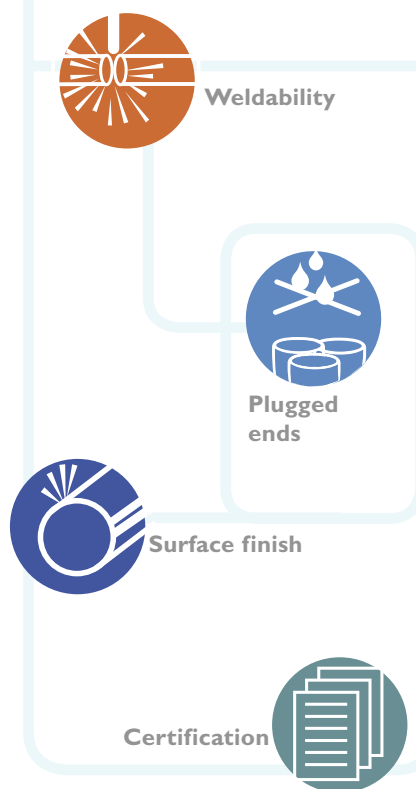
ASME: SA213, SB163, SB167, SB 668, SA789, SA790

NACE: MR 0175

EN: 10216-5 TC1

Eddy Current or hydrostatic test at option of Sandvik.

Key product features



Get the best of straight-length tubes


Sandvik seamless stainless tubes in straight lengths offer a number of specific benefits.


The structure, corrosion resistance and mechanical properties of a steel product are carefully fine-tuned during **integrated production**. Sandvik 3R60™ (ASTM TP 316/316L), for example, is a steel grade that contains a minimum of 2.5 percent molybdenum, which greatly improves resistance to corrosion in hydraulic and instrumentation systems.


Whether you are a designer, fabricator, distributor or the actual end-user, Sandvik delivers high-quality products, backed up by laboratory testing, that are **consistent from delivery to delivery**.


Sandvik offers one of the **widest varieties** of standard straight-length tube sizes and grades from stock. Upon request, we will manufacture special grades.

Key product features:

 **Weldability.** Thanks to the controlled and consistent quality of our steel grades, Sandvik hydraulic tubes are very easy to weld. Sandvik also supplies a complete range of filler materials for welding.

 **Plugged ends.** From stock, all tubes with outside diameter (OD) larger than 5 mm can be supplied with transport protection against inside contamination.

 **Surface finish.** Sizes OD up to and including 25.4 mm are supplied bright annealed.

 **Certification.** Testing performed according to the standard is reported in material and test certificates issued by our quality assurance department.



Testing of stock standard tubing in straight condition

Sandvik hydraulic and instrumentation tubing are tested according to the standards as follows.

Standard	Tests Chemical analysis	Tensile	Hardness	Flattening	Flaring	Corrosion	Hydrostatic
EN 10216-5 TC1	S	S	–	S	S ¹⁾	– ⁴⁾	T ²⁾
ASTM A269	S	–	S	–	S	– ⁵⁾	T ²⁾
ASTM A213	S ³⁾	S	S	S	S	– ⁵⁾	T ²⁾
ASTM A789	S ³⁾	S	S	–	S	–	T ²⁾
ASTM B668	S	S	– ⁶⁾	–	S	–	T ²⁾
ASTM A632	S	S	– ⁶⁾	–	S	– ⁵⁾	T

S = Sampling T = 100%

¹⁾ Either flaring or flattening test depending on tube size.

²⁾ Eddy Current or hydrostatic test at option of Sandvik.

³⁾ Also product analysis of a billet or tube from each heat.

⁴⁾ Sandvik performs EN ISO 3651-2 Method A.

⁵⁾ Sandvik performs ASTM A262 PrE.

⁶⁾ Sandvik performs hardness test.

Tubes in straight lengths – stock program

Metric sizes

Outside diameter mm	Wall thickness mm	Weight kg/m	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		
	2.0	0.30	• 714	738	• 774	738				
10	1.0	0.23	• 263	267	• 286	267	• 308	267		
	1.5	0.32	• 416	417	• 451	417	• 486	417	• 636	561
	2.0	0.40	• 585	577	• 635	577	• 684	577		
12	1.0	0.28	• 216	220	• 234	220	• 252	220	• 330	295
	1.5	0.39	• 338	340	• 366	340	• 395	340	• 517	458
	2.0	0.50	• 470	470	• 510	470	• 550	470	• 720	632
14	1.0	0.33	• 183	186	• 198	186				
	1.5	0.47					• 332	288		
	2.0	0.60	• 393	395	• 426	395	• 460	395		
15	1.0	0.35	• 170	173	• 184	173				
	1.5	0.51	• 263	267	• 286	267	• 308	267		
	2.0	0.65	• 363	366	• 394	366	• 425	366		
16	1.0	0.38	• 158	162	• 172	162				
	1.5	0.54	• 245	249	• 266	249	• 287	249		
	2.0	0.70	• 338	340	• 366	340	• 395	340		
	2.5				• 473	437	• 506	437		
18	1.0	0.43	• 140	143	• 152	143				
	1.5	0.62	• 216	220	• 234	220	• 252	220		
	2.0	0.80	• 296	299	• 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	• 263	267	• 286	267	• 308	267		
	2.5	1.09			• 366	340	• 395	340		
	3.0	1.28					• 486	417		
22	1.5	0.77	• 174	177	• 189	177	• 203	177		
	2.0	1.00	• 237	241	• 257	241	• 278	241		
25	1.5	0.88	• 152	155						
	2.0	1.15	• 206	210	• 224	210	• 242	210	• 316	283
	2.5	1.41	• 263	267	• 286	267	• 308	267		
	3.0	1.65			• 350	326	• 377	326		
28	1.5	1.00	• 135	138	• 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	• 263	267	• 286	267	• 308	267		
	4.0	2.60			• 394	366	• 425	366		
35	2.0	1.65	• 144	147	• 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	• 203	207	• 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 25.4 mm. Tubes in other lengths on request.

Line marking, example: SANDVIK 3R60 ASTM A-269 TP316/316L SMLS NDE 12.7 x 1.24 mm HT"number" LOT"number" QA-TUBE

Other steel grades or dimensions may be produced on request.

Imperial sizes

Outside diameter mm	Wall thickness mm	Imperial size		Weight kg/m	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															
	0.51			25 BWG	0.014														
3.18	0.71	1/8"	x 22 BWG	0.044															
	0.89			20 BWG	0.051														
4.76	0.89	3/16"	x 20 BWG	0.086															
6.35	0.71	1/4"	x 22 BWG	0.100															
	0.89			20 BWG	0.122														
	0.91			20 SWG	0.124		• 384	386	• 417	386	• 469	392	• 962	748			• 588	520	
	1.22			18 SWG	0.157		• 394	396	• 428	396	• 481	402							
	1.24			18 BWG	0.159				• 604	552	• 680	560							
	1.63			16 SWG	0.193				• 616	562	• 693	570	• 1421	1088			• 869	756	
7.94	0.89	5/16"	x 20 BWG	0.157															
	0.91			20 SWG	0.160														
9.53	0.89	3/8"	x 20 BWG	0.193															
	0.91			20 SWG	0.196														
	1.22			18 SWG	0.254														
	1.24			18 BWG	0.257														
	1.63			16 SWG	0.322														
	1.65			16 BWG	0.326														
	2.03			14 SWG	0.381														
	2.11			14 BWG	0.391														
12.7	0.89	1/2"	x 20 BWG	0.263															
	0.91			20 SWG	0.268														
	1.22			18 SWG	0.350														
	1.24			18 BWG	0.356		• 252	256	• 273	256	• 313	264							
	1.63			16 SWG	0.452		• 256	260	• 278	260	• 313	264	• 642	504					
	1.65			16 BWG	0.456		• 348	351	• 377	351	• 430	361			• 423	368			
	2.03			14 SWG	0.542		• 353	355	• 383	355	• 430	361	• 882	688	• 423	368	• 540	477	
	2.11			14 BWG	0.559				• 486	448	• 546	455							
15.88	1.22	5/8"	x 18 SWG	0.448															
	1.24			18 BWG	0.454														
	1.63			16 SWG	0.582														
	1.65			16 BWG	0.588														
19.05	1.22	3/4"	x 18 SWG	0.544															
	1.24			18 BWG	0.553														
	1.63			16 SWG	0.711														
	1.65			16 BWG	0.718														
	2.11			14 BWG	0.895														
	2.41			13 BWG	1.00														
25.4	1.22	1"	x 18 SWG	0.739															
	1.24			18 BWG	0.750														
	1.65			16 BWG	0.981														
	2.11			14 BWG	1.23														
	2.41			13 BWG	1.39														
	3.20			-	1.78														

• 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 SWG = 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 3R12 = ASTM TP 304 and for Sandvik 3R60 = ASTM TP 316.

Calculated wall thickness tolerance -10%.

Other steel grades or dimensions may be produced on request.

Steel grades

Grade	Standards		C	Chemical composition (nominal), %				PRE (nominal)	Mechanical properties		
	ASTM TP UNS	EN steel no.		Cr	Ni	Mo	Others		Proof strength $R_{p0.2}$ MPa min.	Tensile strength R_m MPa min.	Elong. A % 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 10305-1

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

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 10305-1

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

Standards

Sandvik 3R12 and Sandvik 3R60™

EN 10216-5 TC1
ASTM A213-AW
ASTM A269
PED 97/23/EC
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)

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)

ASTM A789
NACE MR0175/ISO 15156



Sandvik Materials Technology
SE-811 81 Sandviken, Sweden, Phone +46 26-26 30 00, Fax +46 26-26 02 20
www.smt.sandvik.com