

TURN CHALLENGES INTO OPPORTUNITIES

SANDVIK TUBE BUYERS REFERENCE GUIDE



SEAMLESS TUBE, PIPE, HOLLOW & SOLID BAR

AUSTENITIC STAINLESS S	SEAMLESS PIP	E & TUBE ALLOYS		Chemic	al comp	osition	(nomir	ıal) %	
Sandvik grade	ASTM grade	ASTM spec	UNS#	С	Cr	Ni	Мо	Cu	Others
Sandvik 3R12	304/304L	A213, A269, A312	S30400/S30403	≤0.03	18.5	10			
Sandvik 3R19	304LN		S30453	≤0.03	18.5	9			N=0.14
Sandvik 3R60™	316/316L	A213, A269, A312	S31600/S31603	≤0.030	17.5	13	2.6*		*2.5% Min Mo
Sandvik 3R60 Urea Grade	316L	A213, A312	S31603	≤0.020	17.5	14	2.6		
Sandvik 3R64	317L	A213, A312	S31703	≤0.03	18.5	14.5	3.1		
Sandvik 3R65	316/316L	A213, A269, A312	S31600/S31603	≤0.030	17	11.5	2.1		
Sandvik 3R69	316LN		S31653	≤0.03	17.5	13.5	2.6		N
Sandvik 5R10	304/304H	A213, A376	S30400/S30409	0.04	18.5	9.5			
Sandvik 5R60	316		S31600	≤0.05	17	12.5	2.6		
Sandvik 5R75	316Ti	A312	S31635	0.05	17	12	2.1		Ti=>5xC
Sandvik 6LR62	316/316H		S31600/S31609	0.05	17	11.5	2.1		
Sandvik 6R35	321/321H	A213, A312, A269, A376, A511	S32100/S32109	0.05	17.5	10.5			Ti=>5xC
Sandvik 6R44	347/347H	A213, A269, A312, A376	S34700/S34709	0.05	17.5	10	0.7		
Sandvik 8R40	347/347H	A213, A269, A312, A376	S34700/S34709	0.06	17.5	11			Nb=≥10xC
MEDICAL APPLICATION GR	RADES			Chemical composition (nominal) %			ıal) %		
Sandvik grade	ASTM grade	ASTM spec	UNS#	С	Cr	Ni	Мо	Cu	Others
Sandvik 316LVM		F138	S31673	≤0.025	17.5	14	2.8	≤0.10	0 N=≤0.10
Sandvik 3R12	304/304L	A213, A269, A312, F899	S30400/S30403	≤0.030	18.5	10			
Sandvik 3R65	316/316L	A213, A269, A312, F899	S31600/S31603	≤0.030	17	11.5	2.1		
Sandvik High-N		F1586	S31675	≤0.06	20.5	9.5	2.4	≤0.20	N, Nb
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FERRITIC STAINLESS STEE		40714	11107	Chemic					0.1
FERRITIC STAINLESS STEE Sandvik grade	ASTM grade		UNS#	С	Cr	osition Ni	(nomir Mo	al) % Cu	Others
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48	ASTM grade 446-2	A268	S44600	C 0.09	Cr 23.5				N
FERRITIC STAINLESS STEE Sandvik grade	ASTM grade			С	Cr				
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54	ASTM grade 446-2 446-1	A268 A268	S44600 S44600	C 0.09 ≤0.20	Cr 23.5 26.5	Ni	Мо	Cu	N
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN	ASTM grade 446-2 446-1	A268 A268 ITY - IMPROVED ALLOY GRADES	S44600 S44600	C 0.09 ≤0.20 Chemic	23.5 26.5 al comp	Ni osition	Mo (nomin	Cu nal) %	N N
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade	ASTM grade 446-2 446-1	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec	S44600 S44600 UNS#	C 0.09 ≤0.20 Chemic C	23.5 26.5 al comp	Ni osition Ni	Mo (nomin	Cu nal) %	N N Others
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507 TM	ASTM grade 446-2 446-1	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790	S44600 S44600 UNS# S32750	C 0.09 ≤0.20 Chemic C ≤0.030	23.5 26.5 al comp Cr 25	osition Ni 7	Mo (nomin Mo 4	Cu nal) %	N N Others
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507™ Sanmac® 2205	ASTM grade 446-2 446-1 ID MACHINABIL ASTM grade	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511	S44600 S44600 UNS# S32750 S31803/S32205	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030	Cr 23.5 26.5 al comp Cr 25 22.5	osition Ni 7 5.5	Mo (nomin	Cu nal) %	N N Others
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507 TM Sanmac® 2205 Sanmac 304/304L	ASTM grade 446-2 446-1 ID MACHINABIL ASTM grade 304/304L	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511 A511	S44600 S44600 UNS# S32750 S31803/S32205 S30400/S30403	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030	Cr 23.5 26.5 26.5 Cr 25 22.5 18.5	osition Ni 7 5.5	Mo (nomin Mo 4 3.2	Cu nal) %	N N Others
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507 TM Sanmac® 2205 Sanmac 304/304L Sanmac 316/316L	ASTM grade 446-2 446-1 ID MACHINABIL ASTM grade - - 304/304L 316/316L	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511 A511 A511	S44600 S44600 UNS# S32750 S31803/S32205 S30400/S30403 S31600/S31603	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030 ≤0.030	Cr 23.5 26.5 26.5 Cr 25 22.5 18.5 16.5	osition Ni 7 5.5 9 11	Mo (nomin Mo 4	Cu nal) %	N N Others N N
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507™ Sanmac® 2205 Sanmac 304/304L Sanmac 316/316L Sanmac 4305	ASTM grade 446-2 446-1 ID MACHINABIL ASTM grade 304/304L 316/316L 303	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511 A511 A511 A511	S44600 S44600 UNS# S32750 S31803/S32205 S30400/S30403 S31600/S31603 S30300	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030 ≤0.030 ≤0.030 ≤0.035	Cr 23.5 26.5 26.5 25 22.5 18.5 16.5 17.5	Ni osition Ni 7 5.5 9 11	(nomin Mo 4 3.2 2.1 -	Cu nal) %	N N Others
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507 TM Sanmac® 2205 Sanmac 304/304L Sanmac 316/316L	ASTM grade 446-2 446-1 ID MACHINABIL ASTM grade - - 304/304L 316/316L	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511 A511 A511	S44600 S44600 UNS# S32750 S31803/S32205 S30400/S30403 S31600/S31603	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030 ≤0.030	Cr 23.5 26.5 26.5 25 22.5 18.5 16.5 17.5	osition Ni 7 5.5 9 11	Mo (nomin Mo 4 3.2	Cu nal) %	N N Others N N
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507™ Sanmac® 2205 Sanmac 304/304L Sanmac 316/316L Sanmac 4305 Sanmac 4435	ASTM grade 446-2 446-1 ID MACHINABIL ASTM grade - - 304/304L 316/316L 303 316/316L	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511 A511 A511 A511	S44600 S44600 UNS# S32750 S31803/S32205 S30400/S30403 S31600/S31603 S30300	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030 ≤0.035 ≤0.035	Cr 23.5 26.5 26.5 27.5 22.5 18.5 16.5 17.5	Ni osition Ni 7 5.5 9 11 9 12.5	(nomin Mo 4 3.2 2.1 - 2.6	Cu aal) % Cu ≤0.5	N N Others N N
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507 TM Sanmac® 2205 Sanmac 304/304L Sanmac 316/316L Sanmac 4305 Sanmac 4435 ROUND BAR SIZES AND GR	ASTM grade 446-2 446-1 D MACHINABIL ASTM grade - 304/304L 316/316L 303 316/316L	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511 A511 A511 A511 A511	S44600 S44600 UNS# S32750 S31803/S32205 S30400/S30403 S31600/S31603 S30300 S31600/S31603	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030 ≤0.035 ≤0.030 Chemic	Cr 23.5 26.5 al comp Cr 25 22.5 18.5 17.5 17.5 al comp	osition Ni 7 5.5 9 11 9 12.5 osition	Mo (nomin Mo 4 3.2 2.1 - 2.6 (nomin Mo	Cu al) % Cu ≤0.5	N N Others N N
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507™ Sanmac® 2205 Sanmac 304/304L Sanmac 316/316L Sanmac 4305 Sanmac 4435	ASTM grade 446-2 446-1 ID MACHINABIL ASTM grade - - 304/304L 316/316L 303 316/316L	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511 A511 A511 A511 A511 AS11 AS11	S44600 S44600 UNS# S32750 S31803/S32205 S30400/S30403 S31600/S31603 S31600/S31603	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030 ≤0.035 ≤0.030 Chemic C	Cr 23.5 26.5 26.5 27.5 28.5 16.5 17.5 17.5 28.1 comp Cr	osition Ni 7 5.5 9 11 9 12.5 osition Ni	Mo (nomin Mo 4 3.2 2.1 - 2.6 (nomin Mo	Cu al) % Cu ≤0.5	N N Others N N
FERRITIC STAINLESS STEE Sandvik grade Sandvik 2C48 Sandvik 4C54 HOLLOW BAR GRADES AN Sandvik grade Sandvik SAF 2507 TM Sanmac® 2205 Sanmac 304/304L Sanmac 316/316L Sanmac 4305 Sanmac 4435 ROUND BAR SIZES AND GR	ASTM grade 446-2 446-1 D MACHINABIL ASTM grade - 304/304L 316/316L 303 316/316L	A268 A268 LITY - IMPROVED ALLOY GRADES ASTM spec A511, A790 A511 A511 A511 A511 A511	S44600 S44600 UNS# S32750 S31803/S32205 S30400/S30403 S31600/S31603 S30300 S31600/S31603	C 0.09 ≤0.20 Chemic C ≤0.030 ≤0.030 ≤0.035 ≤0.030 Chemic	Cr 23.5 26.5 al comp Cr 25 22.5 18.5 17.5 17.5 al comp	osition Ni 7 5.5 9 11 9 12.5 osition	Mo (nomin Mo 4 3.2 2.1 - 2.6 (nomin Mo	Cu al) % Cu ≤0.5	N N Others N N

		L GRADES

Chemical	composition	(nominal) %
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Sandvik grade	ASTM grade	ASTM spec	UNS#	С	Cr	Ni	Мо	Cu	Others
Sandvik 10RE51	-	A790	S32900	0.04	26	5	1.3		
Sandvik 3RE60		A789, A790	S31500	≤0.030	18.5	4.5	2.6		N
Sandvik SAF 2205	-	A789, A790	S31803/S32205	≤0.030	22	5	3.2		Ν
Sandvik SAF 2304™		A789, A790	S32304	≤0.030	22.5	4.5	0.3	0.3	N
Sandvik SAF 2507™	-	A789, A790	S32750	≤0.030	25	7	4		N
Sandvik SAF 2707 HD™	-	A789, A790	S32707	≤0.030	27	6.5	4.8		N, Co
Sandvik SAF 2906™	-	A789, A790	S32906	≤0.030	29	7	2.9	≥0.080	Ν
Sandvik SAF 3207 HD	-	A789, A790	S33207	≤0.030	32	7	3.5		N
Sanmac® 2205	-	A479, A276	S31803/S32205	≤0.030	22.5	5.5	3.2		N

Sandvik grade ASTM grade ASTM spec	
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HIGH-ALLOY AUSTENITIC STAINLESS STEELS AND NICKEL ALLOYS Chemical composition (nominal) %									
Sandvik grade	ASTM grade	ASTM spec	UNS#	С	Cr	Ni	Мо	Cu	Others
Sandvik 253 MA	-	A213, A312	S30815	0.08	21	11			N, Ce
Sandvik 254 SMO	-	A213, A269, A312	S31254	≤0.020	20	18	6.1	0.7	N
Sandvik 2RE10	-	A213, A312	S31002	≤0.015	24.5	20	≤0.10)	
Sandvik 2RE69	-	A213, A312	S31050	≤0.020	25	22	2.1		N
Sandvik 2RK65	904L	A213, A269, A312, ASME B677	N08904	≤0.020	20	25	4.5	1.5	
Sandvik 353 MA	-	A312	S35315	0.07	25	35			N, Ce
Sandvik 7RE10	310S/310H	A213, A312	S31008/S31009	0.06	24.5	21			
Sandvik 8RE18	309S/309H	A213, A312	S30908/S30909	0.07	22.5	14			
Sandvik Alloy 400		B163, B165	N04400	0.2		63		28	
Sanicro™ 25	-	A213, A312	S31035	≤0.1	22.5	25		3	W, Co, N, Nb
Sanicro 28		A213, A312, B668	N08028	≤0.020	27	31	3.5	1	
Sanicro 29		A213, A312, B668	N08029	≤0.020	27	31.5	4.4	1	
Sanicro 30	Alloy 800	A213, A312, B163, B407	N08800	≤0.030	20	32		≤0.10	Ti, Al
Sanicro 31HT	Alloy 800HT	A213, A312, B163, B407	N08810/N08811	0.07	20.5	30.5	0.5		Al
Sanicro 32Cu	Alloy 20	A213, A312, B729	N08020	0.02	20	34	2.1		Nb
Sanicro 41	Alloy 825	B163, B423	N08825	≤0.030	20	38.5	2.6	1.7	Ti
Sanicro 60	Alloy 625	B444	N06625	0.025	21.5	61	8.7		Nb
Sanicro 61	Alloy 601	B167, ASME SB167	N06601	0.03	23	60			Al=1.3
Sanicro 69	Alloy 690	B163, B167	N06690	0.02	30	60			Fe
Sanicro 70	Alloy 600	B163, B167	N06600	≤0.05	16.5	72.5		≤0.5	Fe
Esshete 1250	-	A213	S21500	0.1	15	9.5	1		V, Nb, B

OVERVIEW OF PRODUCT APPLICATIONS

Sandvik grade/ ASTM grade	ASTM spec.	Primary application for product
Esshete 1250	A213	Superheaters and reheaters operating at 570°C (1058°F), steam pressure 170 bar (superheaters) and 40 bar (reheaters).
Sandvik 10RE51	A790	A duplex (austenitic-ferritic) stainless steel characterized by resistance to stress corrosion cracking (SCC), high resistance to pitting, crevice and general corrosion and very high mechanical strength.
Sandvik 253 MA	A213, A312	Excellent high temperature oxidation resistance. Heat recovery systems, furnace tubes, thermocouple protection tubes.
Sandvik 254 SMO	A213, A269, A312	6% Mo stainless steel. Piping & heat exchangers in seawater service & pulp & paper industry.
Sandvik 2C48/ 446-2	A268	Recuperators in the metallurgical and glass industries, thermocouple protection tubes, cable tubing, sootblower tubes, injection nozzles.
Sandvik 2RE10	A213, A312	Nitric acid cooler/condensers, tail gas heaters & boiler feedwater heaters.
Sandvik 2RE69	A213, A312	Urea strippers, condensers, decomposers & reactor coils.
Sandvik 2RK65/ 904 L	A213, A312, A269, B677	Sulfuric & phosphoric acid service, oil refinery, chemical & petrochemical & pulp & paper industry.
Sandvik 353 MA	A312	Excellent carburization & oxidation resistance. Ethylene furnace tubes, recuperator tubes, thermocouple protection tubes, muffle tubes.

OVERVIEW OF PRODUCT APPLICATIONS

OVERVIEW OF PRODU	CTAPPLICATIO	one control of the co
Sandvik grade/ ASTM grade	ASTM spec.	Primary application for product
Sandvik 3RE60	A789, A790	Duplex stainless steel for pulp & paper, chemical plants and refineries.
Sandvik 4C54/ 446-1	A268	Chosen mainly for service at temperatures above 700°C (1290°F) where the excellent resistance of the material to slag corrosion and sulphidizing gases is particularly advantageous.
Sandvik 7RE10/ 310S/310H	A213, A312	Furnace tubes, recuperators, muffle tubes in continuous wire annealing furnaces, thermocouple protection tubes, radiant tubes, tube hangers in petroleum and steam boilers, burners.
Sandvik 8RE18/ 309S/309H		An austenitic chromium-nickel steel for high-temperature applications.
Sandvik Alloy 400	B163, B165	Seawater, hydrofluoric acid, sulfuric acid & alkali service.
Sandvik SAF 2205	A789, A790	Duplex stainless steel resistant to chlorides and $\rm H_2S$. Problem solver in most industry segments. Heat exchangers and piping in oil & gas, oil refinery, chemical & petrochemical industry.
Sandvik SAF 2304™	A789, A790	Duplex stainless steel. Technically & economically superior alternate to austenitic & ferritic stainless steels. Feedwater heater tubing, heat exchangers, piping & instrumentation tubing in general service.
Sandvik SAF 2507™	A789, A790	Provides the best corrosion resistance to high chloride environment & maintains excellent resistance to pitting, crevice corrosion & SCC. Used for heat exchangers, piping for seawater cooling, geothermal wells, refineries, desalination plants & gas production.
Sandvik SAF 2707 HD™	A789, A790	Provides increased corrosion resistance to high chloride environments & higher temperature maintaining excellent resistance to pitting & SCC. Used for heat exchangers primarily in overhead condensers & seawater cooling.
Sandvik SAF 2906™	A789, A790	Caustic soda production; Alumina production; environments where high resistance to pitting and crevice corrosion is required.
Sandvik SAF 3207 HD	A789, A790	Deepwater umbilicals; an application with extreme requirements on pitting and crevice corrosion resistance, mechanical strength and fatigue properties.
Sanicro™ 25	A213, A312	The high creep strength of Sanicro 25 combined with its good corrosion resistance makes it an extremely suitable option for use in super-heaters and reheaters in advanced coal fired power boilers. Use in high temperature applications in other types of steam boilers employing different fuel types is also possible. The material has been specifically developed for use at material temperatures up to around 700°C (1300°F).
Sanicro 28	A213, A312, B668	Super austenitic stainless steel for every demanding conditions in phosphoric acid, sulfuric acid, seawater and oil & gas production.
Sanicro 29	A213, A312, B668	High-alloy austenitic stainless steel (CRA) for OCTG downhole applications in particularly corrosive conditions.
Sanicro 30/ Alloy 800	A213, A312, B163, B407	Steam generator tubing in nuclear stations (PWR) and other heat exchangers for temperature up to about 550°C (1020°F) where good resistance to stress corrosion cracking (SCC) and intergranular corrosion is required.
Sanicro 31 HT/ Alloy 800 HT	A213, A312, B163, B407	Same basic composition as Sanicro 30, but with significant higher creep-rupture strength. Furnace tubes, pigtails, headers.
Sanicro 32Cu/ Alloy 20	A213, A312, B729	Sulfuric acid applications as well as phosphoric acid. Piping & heat exchangers for chemical plants.
Sanicro 41/ Alloy 825	B163, B423	Particularly suited for use in heat exchangers for crude oil and oil refineries, especially where high concentrations of hydrogen sulphide and chloride are present.
Sanicro 60/ Alloy 625	B444	Extremely good corrosion resistance in widely varying acidic and chloride containing environments. Uses in hydraulic and instrumentation systems, heat exchanger, high pressure and high temperature applications.
Sanicro 61/ Alloy 601	B163, B167	Excellent high temperature oxidation resistance. Furnace tubes, heat-treat furnaces & thermocouples.
Sanicro 69/ Alloy 690	B163, B167	Excellent resistance to stress corrosion cracking in high purity water. Primary use is for nuclear steam generators.
Sanicro 70/ Alloy 600	B163, B167	Good resistance to chlorine and hydrogen chloride at high temperatures and can therefore be used in the production of chlorinated hydrocarbons, e.g. in the oxychlorination reactor and the cracking furnace in vinylchloride plants. Can also be used in wet corrosive conditions, where austenitic 18Cr/8Ni steels would be susceptible to stress corrosion cracking.

Size Pipe	O.D In Inches	5	10	20	30	STD.	40	60	E.H.	80	100	120	140	160	XXH
1/8	.405	.035	.049			.068	.068		.095	.095					
170		.1383	.1863			.2447	.2447		.3145	.3145					
1/4	.540	.049	.065			.088	.088		.199	.199					
174		.2570	.3297			.4248	.4248		.5351	.5351					
3/8	.675	.049	.065			.091	.091		.126	.126					
3/0		.3276	.4235			.5676	.5676		.7388	.7388					
1/2	.840	.065	.083			.109	.109		.147	.147				.187	.294
1/2		.5380	.6710			.8510	.8510		1.088	1.088				1.304	1.714
3/4	1.050	.065	.083			.113	.113		.154	.154				.218	.308
3/4		.6838	.8572			1.131	1.131		1.474	1.474				1.937	2.441
1	1.315	.065	.109			.133	.133		.179	.179				.250	.358
1		.8678	1.404			1.679	1.679		2.172	2.172				2.844	3.659
1 1/4	1.660	.065	.109			.140	.140		.191	.191				.250	.382
1 1/4		1.107	1.806			2.273	2.273		2.997	2.997				3.765	5.214
1 1/0	1.900	.065	.109			.145	.145		.200	.200				.281	.400
1 1/2		1.274	2.085			2.718	2.718		3.631	3.631				4.859	6.408
0	2.375	.065	.109			.154	.154		.218	.218				.343	.436
2		1.604	2.638			3.653	3.653		5.022	5.022				7.444	9.029
0.1/0	2.875	.083	.120			.203	.203		.276	.276				.375	.552
2 1/2		2.475	3.531			5.793	5.793		7.661	7.661				10.01	13.69
0	3.5	.083	.120			.216	.216		.300	.300				.438	.600
3		3.029	4.332			7.576	7.576		10.25	10.25				14.32	18.58
0.1/0	4.0	.083	.120			.226	.226		.318	.318					.636
3 1/2		3.472	4.973			9.109	9.109		12.50	12.50					22.85
4	4.5	0.83	.120			.237	.237	.281	.337	.337		.438		.531	.674
4		3.915	5.613			10.79	10.79	12.66	14.98	14.98		19.00		22.51	27.54
4.1/0	5.0					.247			.355						.710
4 1/2						12.53			17.61						32.53
Г	5.563	.109	.134			.258	.258		.375	.375		.500		.625	.750
5		6.349	7.770			14.62	14.62		20.78	20.78		27.04		32.96	38.55
C	6.625	.109	.134		.250	.280	.280		.432	.432		.562		.718	.864
6		7.585	9.289		17.02	18.97	18.97		28.57	28.57		36.39		45.30	53.16
7	7.625					.301			.500						.875
7						23.57			38.05						63.08
0	8.625	.109	.148	.250	.277	.322	.322	.406	.500	.500	.593	.718	.812	.906	.875
8		9.914	13.40	22.36	24.70	28.55	28.55	35.64	43.49	43.49	50.87	60.63	67.76	74.69	72.42

COMPOSITE TUBING

This unique Sandvik product consists of two components metallurgically bonded to each other. By selecting the right materials for the components, each optimized with respect to corrosion resistance and mechanical properties, it is possible to obtain a tube that meets conflicting requirements.

Typically a stainless or high nickel component is chosen for flue gas corrosion protection and a pressure vessel approved, carbon or low alloyed material for the steam side. Other material combinations are also possible. Common applications for composite tubes are found in steam generation such as black liquor recovery boilers in pulp and paper industry, waste to energy boilers, waste heat boilers in metal industry and syngas coolers in IGCC (gasification) plants.

HIGH PRESSURE

Our seamless high pressure tubes have been developed using optimal properties for various applications involving suitable liquid or gas mediums.

In addition to outstanding resistance to corrosive atmospheres, these specialty tubes are characterized by tight dimensional tolerances, high yield and tensile strength in connection with a high elongation, and a very smooth and precise inner diameter surface to guarantee the appropriate pressure resistance.

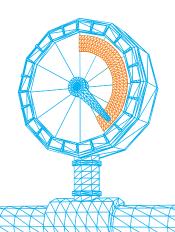
Typical applications include water jet cutting facilities, chemical production processes, hydraulic installations, test benches in the oil & gas industry, and hydrogen fuel stations.

MEDICAL

Ideal for surgical implants and medical equipment, Sandvik offers high purity melted materials distinguished by a homogeneous structure, tight dimensional tolerances, and consistency in chemical composition, which can reduce setup times and increase cutting speeds in manufacturing. Our medical tubes also provide exceptional resistance to intergranular corrosion, stress corrosion cracking, and pitting and crevice corrosion.

An intense cold-working process supports the avoidance of material fatigue and allows us to achieve high fatigue strengths under reversed bending stresses.

Our excellent outer and inner surface finish help minimize polishing time and contribute to an overall better end-product.



AVAILABILITY

STAINLESS STEELS:

Sandvik, along with being a leading manufacturer, has one of the largest seamless stainless inventories in the United States, available to meet any delivery demand. As the foremost manufacturer of tubing in the United States, Sandvik is committed to competitive deliveries and a large backup inventory to meet the unexpected. The following is a brief outline of our program:

Boiler Tubes:

Grades: Sandvik 5R10 (304/304H), Sandvik 6LR62 (316/316H), Sandvik 6R35 (321/321H), Sandvik 6R44 (347/347H), Sandvik 7RE10 (310S/310H). Sandvik 8R40 (347/347H)

OD: 11/4"-21/2"

WT: 0.125"-0.400" MW

OD.

Grade: Sandvik 3R60™ (316/L 2.5%

Min Moly) 1/4" - 1/2"

0.035", 0.049", 0.065" Coil lengths vary depending on the OD Level wound on wooden reels

Fertilizer:

Grades: Bimetallic tubing (Sandvik

2RE69/Zr702), Safurex, Sandvik 2RE10, Sandvik 2RE69, Sandvik 3R60 Urea Grade (316L). Sanicro 28, Sanicro 32Cu (Alloy 20),

Sanicro 60 (Alloy 625) 1/2"-21/2"

OD: 0.035"-0.156" WT.

Other sizes available upon request, Also fittings, flanges, bar & plate products.

Heat Exchanger Tubes:

Grades: All OD: 1/2"-21/2" WT: 0.035"-0.156"

Other sizes available upon request

High Pressure:

Grades: HP 160, Sandvik SAF 2507™,

Sandvik 3R12 (304/L), Sandvik 3R60™ (316/L 2.5% Min

Molv)

OD: 1/16" (1.59 mm) - 1.181" (30 mm) Wall: 0.075" (1.9 mm) - 0.394" (10 mm) 0.087" (2.2 mm) - 0.394" (10 mm)

Other sizes available upon request

High Temperature Pipe/Tube:

Grades: Sandvik Alloy 400, Sandvik 2C48 (446-2),

Sandvik 253 MA, Sandvik 353 MA, Sandvik 4C54 (446-1), Sandvik 5R10 (304/304H), Sandvik 6LR62 (316/316H), Sandvik 6R35 (321/321H). Sandvik 6R44 (347/347H), Sandvik 7RE10 (310S/310H), Sandvik 8RE18 (309S/309H), Sandvik 8R40 347/347H),

Sanicro 28, Sanicro 30 (Alloy 800), Sanicro 31HT (Alloy 800HT), Sanicro 41 (Alloy 825),

Sanicro 60 (Alloy 625), Sanicro 61 (Alloy 601), Sanicro 69 (Alloy 690), Sanicro 70 (Alloy 600)

1/4 "- 8" OD: Wall: 0.035"-0.109"

Other sizes available upon request

Hollow Bar:

Grades: Sanmac® 2205, Sanmac 304/304L.

Sanmac 316/316L, Sanmac 4435

OD. 11/4"-10.82'

Other grades & sizes available upon request

Hydraulic & Instrumentation Tube:

Grades: Sandvik 3R12 (304/L), Sandvik 3R60™ (316/L 2.5%

> Min Moly), Sandvik SAF 2507™, Sandvik 3R64 (317L),

Sanicro 41 (Alloy 825), 2RK65 (904L), Sanicro 60 (Alloy 625), C276

OD: 1/4"- 1/2"

WT: 0.035", 0.049", 0.065"

OD: 5/8" - 1"

0.035", 0.049", 0.065", 0.083", WT.

0.095", 0.109", 0.120"

(Depending on OD & Grade) Other grades & sizes available upon request

Medical:

Grades: 304LVM, Sandvik Bioline 316LVM,

Sandvik Bioline 3R65, Sandvik Bioline High-N,

Ti6AI4V ELI Bar and tube made to order

Special sizes available upon request

Grades: Sandvik 3R12 (304/L),

Sandvik 3R60™ (316/L 2.5%

Min Moly),

Sandvik 3R69 (316LN), Sandvik 6R35 (321/321H), Sandvik 6R44 (347/347H), Sanicro 69 (Alloy 690), Sanicro 70 (Alloy 600), 304L/316L-special low cobalt

0.05% max., 304L/316L Vacuum Arc Remelt (VAR),

Standard pipe and tubing sizes:

0.250" - 8.5" OD: 0.025" - 1.000" Wall.

Special dimensions and chemistry available

upon request.

Pipe:

Grades: Sandvik 3R12 (304/L), Sandvik 3R65 (316/L)

SCH 10: 1/2" - 6" IPS SCH 40: 1/2" - 8" IPS SCH 80: 1/2" - 8" IPS SCH 160: 1/2" - 6" IPS SCH XXH: 1/2" - 4" IPS

Reactive Metals Tubing:

Grade: Zr 702 0.312"-1" OD: 0.020"-0.157" WT:

Grades: 304LVM, Titanium Grades 1, 2, 3,

7, 9, 11, 12, 16, 17, 26, 28, Sandvik Bioline High-N, Ti6Al4V ELI, Zr 702

OD: 0.375"-1" WT: 0.016"-0.157"

Solid Bar:

Grades: Sanmac® 2205, Sanmac 316/316L

0.787" - 18" Grade: Sandvik SAF 2507™

0.787" - 10"OD:

Contact your local sales representative for stock availability

LOCATIONS

Scranton, Pennsylvania – North American Distribution Center (NADC): This 65,000 sq. ft. facility handles all customer orders shipping into the North America region. It serves as our main depot for stock standard products.

Houston, Texas -

Houston Texas Distribution Center (HTDC): This 80,000 sq. ft. facility inventories a full line of pipe, instrumentation and coiled tubing, solid and hollow bar. The Houston Warehouse is the global supply point for control line tubing. Additional services being offered include: cut to length, fluid filling, color coding and hydro testing.

SANDVIK SERVICES:

Orders received by 12:00 Noon EST ship next day routinely from either location. Under critical circumstances same day shipments can be arranged. Minimal cutting capability, samples and parting of randoms is available from both sites. Cutting, along with other upgrade processes (source inspection, export boxing, etc.) are subject to a lead time quotation.

In January 1994 Sandvik's Tubular Products Division's manufacturing systems were approved by Lloyd's Register Quality Assurance. Lloyd's ISO 9001 approval means further assurance for our customers that the ferrous and non-ferrous seamless tubular products they buy from us are certified as world-class in quality. Quality and on-time delivery – an unbeatable combination.

Sandvik SAF 2205, Sandvik SAF 2304, Sandvik 3RE60, Sandvik SAF 2507, Sandvik SAF 2707HD, Sandvik SAF 2906, Pressurfect and Sanicro are trademarks owned by Sandvik Intellectual property AB. 800HT is a trademark of the Inco Family of Companies. 253MA, 353MA and 254SMO are trademarks owned by Outokumpo.

CONTACT US

TUBULAR PRODUCTS DIVISION:

MAIN OFFICE AND WAREHOUSE
Mailing and Shipping Address:
Sandvik
Tubular Products
982 Griffin Pond Road
Ivy Industrial Park
Clarks Summit, PA 18411

Phone: 570-585-7500, 800-755-8823 **Email**: tubesales-us.smt@sandvik.com

HOUSTON OFFICE AND WAREHOUSE Mailing Address:

Sandvik Tubular Products 8618 W. Little York Road, Suite 100 Houston, TX 77040 Phone: 866-615-1752

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STOCKING

PIPE INVENTORY IN NADC & HTDC:

Stock: Sandvik 3R12 (304/L), Sandvik 3R65 (316/L) 3/8" through 8" Schedule: 10, 40, 80, 160, XXH.

Standard: Sandvik 3R12 (304/L), Sandvik 3R65 (316/L), ASTM A312 incl. corrosion test acc. To ASTM A262 Pr.E. NACE MR0175 / ISO 15156, PED CERTIFIED, Stocked in R/L's of 17/24' *unless otherwise noted Tolerance and lead test acc. to ASTM A312/999.

Upgrades Available: MIL-P-24691/3, ASTM A376.

COIL TUBE INVENTORY IN HTDC:

Stock: Sandvik 3R60™ (316/L 2.5% Min

Moly) OD: 1/4"- 1/2"

WT: 0.035", 0.049", 0.065"

Standard: Sandvik 3R60 (316/L 2.5% Min Moly), ASTM A213/269 incl. corrosion test acc. to ASTM A262 Pr.E. NACE MR0175 / ISO 15156. Coil lengths vary depending on the OD. Level wound on wooden reels. Min. length / restricted length. End capping.

STAINLESS BAR INVENTORY IN HTDC:

Stock: Sanmac® 2205, Sandvik SAF 2507 $^{\text{TM}}$ OD: 0.787"-17.820" in 1 4" increments

Standard: Tight OD tolerances with peel turned and burnished surface.

HYDRAULIC AND INSTRUMENTATION TUBE INVENTORY IN NADC & HTDC:

Stock: Sandvik 3R12 (304/L), Sandvik 3R60™ (316/L 2.5% Min Moly) OD: ¼"- ½"

WT: 0.035", 0.049", 0.065"

OD: 5/8"-1"

NT: 0.035", 0.049", 0.065", 0.083",

0.095", 0.109", 0.120"

(Depending on OD & Grade)

Standard: Sandvik 3R12 (304/L), Sandvik 3R60™ (316/L 2.5% Min Moly), ASTM A213/269 incl. corrosion test acc. to ASTM A262 Pr.E. NACE MR0175 / ISO 15156. Stocked in 20' fixed lengths.

STAINLESS HOLLOW BAR INVENTORY IN HTDC:

Stock: Sanmac® 2205, Sanmac 304/304L, Sanmac 316/316L, Sanmac 4305 (303)

OD: 11/4"-10.82"

ASTM A511, ASTM/ASME-479 (chem. & mech prop. only), Leakage test deferred to finished component.

OD Tolerance: +2/-0% but minimum +1/-0 mm (+0.04/-0").

ID: +0/-2% but minimum +0/-1 mm (+0/-0.04").

Straightness: Straightness deviation max. 1.5 mm per 1000 mm (0.059 inch per 3'). Other tolerances can be offered to special order. Guaranteed Component Size: The values indicated are valid for lengths of max. 2.5 x OD.

Standard:Sanmac 304/304L & Sanmac 316/316L: PED 97/23/EC, EN 10216-5, EN 10294-2 IC-test EN ISO 3651-2A in delivery condition. NACE MR0175 / ISO 15156. Sanmac® 2205: PED 97/23/EC, EN 10216-5, EN 10294-2, EN 10297-2, Norsok MDS 041, ASTM A790, Corrosion test acc. to ASTM G-48 A. NACE MR0175 / ISO 15156. Standard 2.5 to 6.5m (8-22') R/L's, depending on diameter and grade.



