



Activating Your Ideas

In Stainless Steel Pipe

**OUTO
KUMPU**



Applications

Outokumpu produces austenitic and duplex pipe products from small diameter pipe to large diameter, heavy wall pipe, with thicknesses up to 2" on certain materials for use in industries including:

- chemical and petrochemical processing
- pulp and paper
- liquid natural gas piping
- power generation
- offshore construction
- food and pharmaceutical processing
- hydrometallurgy
- desalination and wastewater projects

Extreme Performance

The consumption of stainless steel — including pipe — is growing faster than that of any other metal in the world. As a global leader in stainless steel, Outokumpu fuels this demand by supplying our customers with even better steels to meet their needs. Our pipe products are used in the most challenging environments, offering a combination of high strength, corrosion resistance and cost savings for customers in a wide range of industries.

Outokumpu offers a broad range of austenitic and duplex grades including our proprietary duplex grade LDX 2101® which combines low nickel content with high mechanical strength.



North American Production

We recognize the need to be close to our customers to ensure that the process of purchasing stainless steel is as simple as possible. We meet this need through a responsive supply chain that includes our ISO 9001-2000-certified mill in Wildwood, Florida. Outokumpu quality and cost controls begin at our company-operated chromite mine and ferrochrome smelter in Europe. This quality is supported by our state-of-the-art melt shops that ensure superior control of product composition, structure, and inclusion pattern resulting in very clean steel.

Outokumpu meets your need for austenitic and duplex pipe products with ten continuous welding lines including two small diameter pipe mills with in-line annealing capabilities. Pipe sizes 1/2" through 14" can be manufactured at our continuous mills. Large diameter, heavy wall pipe is an essential element to our manufacturing program and in fulfilling customer project requirements. Pipe sizes from 8" through 80" are manufactured utilizing our batch process. Wall thicknesses up to 2" are achievable in certain diameters and materials. Girth welding is available to produce double random lengths.

Your Complete Stainless Steel Supplier

To meet the diverse requirements of many industries in the most economical way, we offer a full line of corrosion-resistant and heat-resistant stainless steel pipes in a wide range of grades, including:

- 304/304L and 316/316L, our most popular grades;
- 254 SMO[®], used for over 20 years to provide longer material life in most corrosive environments;

- Duplex grades 2205 Code Plus Two[®], LDX 2101[®], and Outokumpu 2507, for corrosion resistance, toughness, weldability, and high strength; and
- 253 MA[®], designed for use in lower and higher temperature ranges.

Superior Performance with Duplex

Outokumpu is one of the world's largest producers of duplex stainless steels, and offers a full range of grades and product forms in this increasingly important family of corrosion resistant steels.

Outokumpu pioneered the development of duplex stainless steel with duplex 2205 Code Plus Two[®]. This popular grade combines pitting and crevice corrosion cracking superior to 317L or 904L with high resistance to chloride and sulfide stress corrosion, high strength, thermal conductivity, and superior weldability.

Outokumpu continues its pioneering work developing new duplex grades with the introduction of LDX 2101[®]. This low alloy, general purpose, duplex features the corrosion resistance of ASTM 304 and 316L in most environments – along with excellent stress corrosion cracking resistance – but with twice the mechanical strength of both 304 and 316L and only one-fifth the nickel content for better price stability. LDX 2101 is an engineering solution for chloride stress corrosion cracking of Types 304 and 316 which may occur in process industry tanks, reactors, and heat exchangers. The higher strength of LDX 2101 also translates into thinner gauges for material cost savings. LDX 2101 has been field-tested and is easy to weld, which makes it perfect for oil and gas pipelines and other line pipe that requires excellent weld strength under all conditions, and it is approved under NSF Standard 61 for products used in drinking water applications.

Outokumpu 2304 is the duplex grade equivalent to 316L in all environments. Both LDX 2101 and Outokumpu 2304 combine high tensile strength with low thermal expansion and high conductivity, which make them suitable for many structural and mechanical components and for use in hot water tanks, water heaters, and cladding applications.

Outokumpu super duplex Outokumpu 2507 has even higher strength and higher pitting corrosion resistance and its duplex structure gives it superior chloride and sulfide stress corrosion cracking resistance. Outokumpu 2507 is the duplex equivalent to 254 SMO® and is suitable for seawater and marine applications, such as seawater desalination and offshore platform applications. Outokumpu 2507 is superior to 2205 Code Plus Two® and comparable to 254 SMO.

Outokumpu 2507, 2205 Code Plus Two® and 254 SMO® are all approved by NACE for sour service.

Technical Support

Choosing the right grade can offer substantial rewards. In this regard, our technical team assists users and fabricators in the selection, installation, operation, and maintenance of our stainless steel applications. We also offer end-users the opportunity to test materials on their own premises. This testing is supported by extensive testing in our state-of-the-art laboratory where our personnel can draw upon years of field experience with stainless steel to help customers make technically and economically correct materials decisions. Outokumpu is prepared to discuss individual applications

and to provide data and experience as a basis for specific material selection and application. For assistance with technical questions, please call Outokumpu pipe operations at 1.800.731.7473.

Size Program, Grades, and Specifications

Size Program — Pipe

Table 1

Nominal Pipe Size	Production Method	5S	10S	20	40S	80S	Maximum Length	Full Finished
1/2 in. through 14 in.	C	✓	✓	✓	✓	✓	60 ft.	✓
8 in. through 80 in.	B		0.188-2.000 in. nominal wall				20 ft.*	

*longer lengths available with girth weld
 Note: Minimum wall available
 C = continuous welded
 B = batch welded

Grades

Table 2

Austenitic Stainless Steel	304/304L, 304H, 316/316L, 317L, 321, 321H, 347, 347H, 309S, 310S
Duplex Stainless Steel	LDX 2101®, 2205 Code Plus Two®, Outokumpu 2507, Outokumpu 2304
Special Grades — Austenitic Stainless Steel	317LM, 254 SMO®, 904L, 253 MA®
Special Alloys and Titanium	Alloy 20, 200, C-276, 400, 600, 625, 800H/800HT, 825, CP-2 Titanium

ASTM and ASME Specifications for Tube and Piping

Table 3

A 249/SA 249	Welded austenitic steel for boiler, superheater, heat exchanger, and condenser tubes
A 269	Seamless and welded austenitic stainless steel tubing for general service
A 312/SA 312	Seamless and welded austenitic stainless steel pipes (welded without filler metal)
A 358	Electric-fusion-welded austenitic chromium-nickel alloy steel pipe for high-temperature service (welded with filler metal)
A 409/SA 409	Welded large diameter austenitic steel pipe for corrosive or high-temperature service
A 778	Welded unannealed austenitic stainless steel tubular products
A 789/SA 789	Seamless and welded ferritic/austenitic stainless tubing for general service
A 790/SA 790	Seamless and welded ferritic/austenitic stainless steel pipe (welded without filler metal)
A 928	Welded ferritic/austenitic stainless steel pipe (welded with filler metal)
B 464/SB 464	Welded UNS N08020, UNS N08024 and N08026 alloy pipe
B 474	Electric fusion welded UNS N08020, UNS N08024, UNS N08026 nickel alloy pipe
B 514/SB 514	Welded nickel-iron-chromium alloy pipe
B 517/SB 517	Welded nickel-chromium-iron alloy pipe
B 619/SB 619	Welded nickel and nickel-cobalt alloy pipe
B 673/SB 673	Welded UNS N08904, UNS N08925 and UNS N08926 welded pipe
B 705/SB 705	Nickel-alloy welded pipe
B 725	Welded nickel and nickel copper alloy pipe
B 775/SB 775	General requirements for nickel and nickel alloy welded pipe
B 862	Titanium and titanium alloy welded pipe

Sizes and Weights

Austenitic Stainless Pipe

Table 4

Nominal Pipe Size	Outside Diameter inches	Schedule 5S		Schedule 10S		Schedule 40S		Schedule 80S		Schedule 10		Schedule 20	
		Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs
1/8	—	—	—	—	—	—	—	—	—	—	—	—	—
1/4	—	—	—	—	—	—	—	—	—	—	—	—	—
3/8	—	—	—	—	—	—	—	—	—	—	—	—	—
1/2	0.840	0.065	0.5431	0.083	0.6773	0.109	0.8590	0.147	1.098	—	—	—	—
3/4	1.050	0.065	0.6902	0.083	0.8652	0.113	1.141	0.154	1.487	—	—	—	—
1	1.315	0.065	0.8759	0.109	1.417	0.133	1.695	0.179	2.192	—	—	—	—
1 1/4	1.660	0.065	1.118	0.109	1.822	0.140	2.294	0.191	3.025	—	—	—	—
1 1/2	1.900	0.065	1.286	0.109	2.104	0.145	2.743	0.200	3.665	—	—	—	—
2	2.375	0.065	1.619	0.109	2.663	0.154	3.687	0.218	5.069	—	—	—	—
2 1/2	2.875	0.083	2.498	0.120	3.564	0.203	5.847	0.276	7.733	—	—	—	—
3	3.500	0.083	3.057	0.120	4.372	0.216	7.647	0.300	10.348	—	—	—	—
3 1/2	4.000	0.083	3.505	0.120	5.019	0.226	9.194	0.318	12.622	—	—	—	—
4	4.500	0.083	3.952	0.120	5.666	0.237	10.891	0.337	15.124	—	—	—	—
5	5.563	0.109	6.409	0.134	7.842	0.258	14.754	0.375	20.972	—	—	—	—
6	6.625	0.109	7.656	0.134	9.376	0.280	19.152	0.432	28.841	—	—	—	—
8	8.625	0.109	10.01	0.148	13.52	0.322	28.82	0.500	43.79	—	—	0.250	22.57
10	10.750	0.134	15.33	0.165	18.83	0.365	40.86	0.500	55.25	—	—	0.250	28.30
12	12.750	0.156	21.18	0.180	24.39	0.375	50.03	0.500	66.03	—	—	0.250	33.69
14	14.000	0.156	23.28	0.188	27.99	0.375	55.08	0.500	72.77	0.250	37.06	0.312	46.04
16	16.000	0.165	28.17	0.188	32.05	0.375	63.16	0.500	83.55	0.250	42.45	0.312	52.76
18	18.000	0.165	31.72	0.188	36.10	0.375	71.25	0.500	94.33	0.250	47.84	0.312	59.49
20	20.000	0.188	40.15	0.218	46.49	0.375	79.33	0.500	105.11	0.250	53.23	0.375	79.33
22	22.000	0.188	44.21	0.218	51.19	0.375	87.42	0.500	115.89	0.250	58.62	0.375	87.42
24	24.000	0.218	55.89	0.250	64.01	0.375	95.50	0.500	126.67	0.250	64.01	0.375	95.50
26	26.000	—	—	—	—	—	—	—	—	0.312	86.40	0.500	148.23
28	28.000	—	—	—	—	—	—	—	—	0.312	93.12	0.500	159.01
30	30.000	0.250	80.18	0.312	99.85	—	—	—	—	—	—	—	—
32	32.000	0.250	85.57	—	—	—	—	—	—	—	—	—	—

Austenitic Stainless Pipe

Table 5

Nominal Pipe Size	Outside Diameter inches	Schedule 10 through NPS 36											
		Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs
32	32.000	0.250	85.57	0.281	96.08	0.312	106.58	0.344	117.39	0.375	127.84	0.406	138.28
34	34.000	0.250	90.96	0.281	102.14	0.312	113.20	0.344	124.81	0.375	135.93	0.406	147.08
36	36.000	0.250	96.35	0.281	108.20	0.312	120.03	0.344	132.22	0.375	144.01	0.406	155.78
38	38.000	0.250	101.74	0.281	114.26	0.312	126.76	0.344	139.64	0.375	152.10	0.406	164.54
40	40.000	0.250	107.13	0.281	120.32	0.312	133.49	0.344	147.06	0.375	160.15	0.406	173.29
42	42.000	0.250	112.52	0.281	126.37	0.312	140.21	0.344	154.47	0.375	168.27	0.406	182.04
44	44.000	0.250	117.91	0.281	132.43	0.312	146.94	0.344	161.89	0.375	176.35	0.406	190.80
46	46.000	0.250	123.30	0.281	138.49	0.312	153.67	0.344	169.31	0.375	184.44	0.406	199.55
48	48.000	0.250	128.69	0.281	144.55	0.312	160.39	0.344	176.72	0.375	192.52	0.406	208.30

Schedule 30		Schedule 40		Schedule 60		Schedule 80		Schedule 100		Schedule 120		Schedule 140		Schedule 160	
Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs
-	-	-	-	-	-	0.095	0.3175	-	-	-	-	-	-	-	-
-	-	-	-	-	-	0.119	0.5400	-	-	-	-	-	-	-	-
-	-	-	-	-	-	0.126	0.7457	-	-	-	-	-	-	-	-
-	-	0.109	0.8590	-	-	0.147	1.098	-	-	-	-	-	-	0.188	1.321
-	-	0.113	1.141	-	-	0.154	1.487	-	-	-	-	-	-	0.219	1.962
-	-	0.133	1.695	-	-	0.179	2.192	-	-	-	-	-	-	0.250	2.870
-	-	0.140	2.294	-	-	0.191	3.025	-	-	-	-	-	-	0.250	3.800
-	-	0.145	2.743	-	-	0.200	3.665	-	-	-	-	-	-	0.281	4.904
-	-	0.154	3.687	-	-	0.218	5.069	-	-	-	-	-	-	0.344	7.532
-	-	0.203	5.847	-	-	0.276	7.733	-	-	-	-	-	-	0.375	10.106
-	-	0.216	7.647	-	-	0.300	10.348	-	-	-	-	-	-	0.438	14.458
-	-	0.226	9.194	-	-	0.318	12.622	-	-	-	-	-	-	-	-
-	-	0.237	10.891	-	-	0.337	15.124	-	-	0.438	19.179	-	-	0.531	22.719
-	-	0.258	14.754	-	-	0.375	20.972	-	-	0.500	27.290	-	-	0.625	33.27
-	-	0.280	19.152	-	-	0.432	28.841	-	-	0.562	36.73	-	-	0.719	45.78
0.277	24.93	0.322	28.82	0.406	35.97	0.500	43.79	0.594	51.43	0.719	61.28	0.812	68.39	0.906	75.39
0.307	34.56	0.365	40.85	0.500	55.25	0.594	65.03	0.719	77.75	0.844	90.13	1.000	105.11	1.125	116.73
0.330	44.18	0.406	54.03	0.562	73.84	0.688	89.46	0.844	108.32	1.000	126.67	1.125	140.98	1.312	161.77
0.375	55.08	0.438	64.03	0.594	85.84	0.750	107.13	0.938	132.08	1.094	152.20	1.250	171.81	1.406	190.88
0.375	63.16	0.500	83.55	0.656	108.51	0.844	137.89	1.031	166.37	1.219	194.23	1.438	225.73	1.594	247.54
0.438	82.92	0.562	105.65	0.750	139.47	0.938	172.52	1.156	209.90	1.375	246.42	1.562	276.79	1.781	311.39
0.500	105.11	0.594	124.26	0.812	167.96	1.031	210.82	1.281	258.49	1.500	299.15	1.750	344.29	1.969	382.72
0.500	115.89	-	-	0.875	199.26	1.125	253.16	1.375	305.71	1.625	356.92	1.875	406.78	2.125	455.29
0.562	142.00	0.688	172.90	0.969	240.58	1.219	299.36	1.531	370.83	1.812	433.41	2.062	487.65	2.344	347.21
0.625	184.44	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0.625	197.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Schedule 20 through NPS 36		Schedule 30 through NPS 36		Schedule 40 through NPS 36		Schedule 40 through NPS 32 & 34		Schedule 40 through NPS 36	
				Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs	Wall inches	Wt/Ft lbs
0.438	149.02	0.469	159.42	0.500	169.79	0.562	190.46	0.625	211.39	0.688	232.23	0.750	252.66
0.438	158.47	0.469	169.53	0.500	180.57	0.562	202.58	0.625	224.86	0.688	247.86	0.750	268.83
0.438	167.91	0.469	179.64	0.500	191.35	0.562	214.70	0.625	238.34	0.688	261.90	0.750	285.00
0.438	177.35	0.469	189.75	0.500	202.13	0.562	226.81	0.625	251.81	0.688	276.73	0.750	301.17
0.438	186.80	0.469	199.86	0.500	212.91	0.562	238.93	0.625	265.29	0.688	291.56	0.750	317.34
0.438	196.24	0.469	209.97	0.500	223.69	0.562	251.05	0.625	278.76	0.688	306.40	0.750	333.51
0.438	205.68	0.469	220.08	0.500	234.47	0.562	263.16	0.625	292.24	0.688	321.24	0.750	349.68
0.438	215.13	0.469	230.20	0.500	245.25	0.562	275.28	0.625	305.71	0.688	336.06	0.750	365.25
0.438	224.57	0.469	240.31	0.500	256.03	0.562	287.40	0.625	319.19	0.688	319.19	0.750	382.02

*LDX 2101, 253 MA, and 254 SMO are trademarks of Outokumpu Stainless.
2205 Code Plus Two is a trademark of Outokumpu Stainless, Inc.*

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Outokumpu is a global leader in stainless steel. Our vision is to be the undisputed number one in stainless, with success based on operational excellence. Customers in a wide range of industries use our stainless steel and services worldwide. Being fully recyclable, maintenance-free, as well as very strong and durable material, stainless steel is one of the key building blocks for sustainable future.

What makes Outokumpu special is total customer focus – all the way, from R&D to delivery. You have the idea. We offer world-class stainless steel, technical know-how and support. We activate your ideas.



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