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For further information, please contact:

Department:	Technical Customer Services	OR	Commercial
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1 TYPES AVAILABLE

Below are the types available with general chemistry limits based on the tightest limits for the most common certifications, typically ASTM, EN and Columbus Stainless mill specification. For actual limits consult the applicable specification.

1.1 Chemistry

1.1.1 Ferritics

Classification	Type		Compositions[1]										
	General	ACX	C	Si	Mn	P	S	N	Cr	Ni	Ti	Nb	Other
Utility Ferritic	3CR12	C211	0.030	1.00	1.50	0.040	0.015	0.030	10.5-12.5	0.30-1.50	4x(C+N) to 0.6	-	-
	3CR12L	C220	0.030	1.00	1.50	0.040	0.015	0.030	10.5-12.5	0.30-1.00	-	-	-
	410S	C420	0.080	1.00	1.00	0.040	0.015	-	11.5-13.5	0.60	-	-	-
Standard Ferritic	40910	C800	0.030	1.00	1.00	0.040	0.015	0.030	10.5-11.7	0.50	6x(C+N) to 0.5	0.1	-
	40920	C801	0.030	1.00	1.00	0.040	0.005	0.030	10.5-11.7	0.50	8x(C+N) & 0.15 to 0.5	0.1	-
	40975	C700	0.030	1.00	1.00	0.040	0.030	0.030	10.5-11.7	0.50-1.00	6x(C+N) to 0.75	-	-
	430	C500	0.08	1.00	1.00	0.040	0.015	-	16.0-18.0	0.75	-	-	-
	430DDQ	C530	0.08	1.00	1.00	0.040	0.015	-	16.0-18.0	-	-	-	Al: 0.30 max
	439Nb	C515	0.05	1.00	1.00	0.040	0.015	-	17.0-17.5	-	Ti+Nb: 4x(C+N)+0.20 to 0.8[2]		-
	43920	C590	0.025	0.50	0.50	0.040	0.015	0.015	17.0-17.5	-	Ti+Nb: 4x(C+N)+0.20 to 0.8[2]		-
	441	C845	0.030	0.75	1.00	0.040	0.015	-	17.5-18.5	-	0.1-0.6	3xC+0.3 to 1.00	-
		C843									0.15-0.6		
		C841							18.0-18.5		0.1-0.6		
		C840							17.5-18.5				Al: 0.015 max
Moly Ferritic	436	C550	0.08	1.00	1.00	0.040	0.015	0.040	16.0-18.0	-	-	7x(C+N)+0.1 to 0.8	Mo: 0.80-1.25
	436M/T	C553	0.08	1.00	1.00	0.040	0.015	0.040	16.0-18.0	-	-	7x(C+N)+0.1 to 0.8	Mo: 1.20-1.25
	444	C555	0.025	1.00	1.00	0.040	0.015	0.030	17.5-19.5	0.40	Ti+Nb: 4x(C+N)+0.20 to 0.8[2]		Mo: 1.80-2.50
	444T	C982	0.025	1.00	1.00	0.040	0.015	0.030	17.5-19.5	0.40	Ti+Nb: 4x(C+N)+0.20 to 0.8[2]		Mo: 2.00-2.50

Notes

1. *Compositions are maximum values, unless otherwise stated. Balance is iron*
2. *For EN10088-2 Ti+4/7Nb>4(C+N)+0.15, according to the atomic mass of these elements: Nb (% by mass) ≡ 7/4 Ti (% by mass).*

1.1.2 Duplexes

Classification	Type		Compositions[1]										
	General	ACX	C	Si	Mn	P	S	N	Cr	Ni	Mo	Cu	PRE[2]
Lean Duplexes	2001	C920	0.030	1.00	4.0-6.0	0.035	0.015	0.05-0.17	19.5-21.5	1.00-3.00	0.60	1.00	22.0
	2304	C940	0.030	1.00	2.00	0.035	0.015	0.05-0.20	22.0-24.0	3.5-5.5	0.10-0.60	0.10-0.60	25.0
Standard Duplex	2205	C900	0.030	1.00	2.00	0.035	0.015	0.14-0.20	22.0-23.0	4.5-6.5	2.5-3.5	-	35.0

Notes

1. *Compositions are maximum values, unless otherwise stated. Balance is iron*
2. *PRE is Pitting Resistance Equivalent = Cr + 3.3Mo + 16N*

1.1.3 Austenitics

Classification	Type		Compositions[1]									
	General	ACX	C	Si	Mn	P	S	N	Cr	Mo	Ni	Others
Cr-Mn-Ni Austenitic	CS202	C335	0.08	0.75	6.5-8.0	0.045	0.015	0.15	15.0-17.0	-	3.5-5.0	Cu: 2.0
Cr-Ni Austenitic	304	C120	0.07	0.75	2.00	0.045	0.015	0.10	18.0-19.5	-	8.0-10.5	-
	304H		0.04-0.10						18.0-20.0			
	304DQ	C160	0.07	0.75	2.00	0.045	0.015	0.10	18.0-19.5	-	8.5-10.5	-
	304DDQ	C181	0.07	0.75	2.00	0.045	0.015	0.10	18.0-19.5	-	9.0-10.5	-
	304L	C150	0.030	0.75	2.00	0.045	0.015	0.10	17.5-19.5	-	8.0-10.5	-
		C151							18.0-19.5			
	304LDDQ	C200	0.030	0.75	2.00	0.045	0.015	0.10	18.0-20.0	-	10.0-10.5	-
	321	C315	0.08	0.75	2.00	0.045	0.015	0.10	17.0-19.0	-	9.0-12.0	Ti: 5x(C+N) to 0.7
Cr-Ni-Mo Austentic	316L-1.4404	C240	0.030	0.75	2.00	0.045	0.015	0.10	16.5-18.0	2.00-2.50	10.0-13.0	-
	316L-1.4435	C300	0.030	0.75	2.00	0.045	0.015	0.10	17.0-18.0	2.50-3.00	12.5-13.0	-
	316LN	C320	0.030	0.75	2.00	0.045	0.015	0.12-0.16	16.5-18.0	2.00-2.50	10.0-12.5	-
	316Ti	C280	0.08	0.75	2.00	0.045	0.015	0.10	16.5-18.0	2.00-2.50	10.5-13.5	Ti: 5x(C+N) to 0.7
Heat Resistant Austenitic	309S-1.4833	C340	0.08	0.75	2.00	0.045	0.015	0.11	22.0-24.0	-	12.0-14.0	-
	1.4828 (309Si)	C309	0.20	1.50-2.50	2.00	0.045	0.015	0.11	19.0-21.0	-	11.0-13.0	-
	310S-1.4845	C350	0.04-0.08	0.75	2.00	0.045	0.015	0.11	24.0-26.0	-	19.0-22.0	-
	1.4841 (310Si)	C351	0.20	1.50-2.50	2.00	0.045	0.015	0.11	24.0-26.0	-	19.0-22.0	-

Notes

1. Compositions are maximum values, unless otherwise stated. Balance is iron

1.2 Equivalents

Classification		Internal Types				External Types				
		General	ACX	Columbus	Common or AISI	UNS	EN	BIS	JIS	SANS
Ferritic	Utility	3CR12	C211	41211	3CR12	S41003	1.4003	409M	-	-
		3CR12L	C220	41220	3CR12L	S41003 S40977			-	
		410S	C420	41011	410S	S41008	-	410S	SUS410L SUS410L-HR	-
	Standard	40910	C800 C801	40962 40963	409	S40910	1.4512	409	SUH409 SUH409L	-
		40920	C802	40964		S40920		409Ti1		
		40975	C700	41262	409Ni	S40975	-	409Ti3	-	-
		430	C500	43012	430	S43000	1.4016	430	SUS430 SUS430-HR	-
		430DDQ	C530	43311	430DDQ					
		439Nb	C515	43911	439Nb	S43932	1.4510	439Ti1	-	-
		43920	C590	43920			1.4510 1.4520			
		441	C845	44101	441	S43940	1.4509	441 439Ti2	SUS430LX	-
			C843	44103						
			C841	44102						
			C840	44104						
	Moly	436	C550	43611	436	S43600	1.4513 1.4526	436 436L	SUS436L	-
		436M/T	C553	436M/T			1.4526			
		444 444T	C555 C982	44411 444T	444	S44400	1.4521	444	SUS444	-
Duplex	Lean	2001	C920	22112	2001	S32001	1.4482		-	-
		2304	C940	23041	2304	S32304	1.4362	2304	-	-
	Standard	2205	C900	22051	2205	S32205 S31803	1.4462	2205	-	-
Austenitic	Cr-Mn-Ni	CS202	C335	20211	CS20211	-	-	-	-	-
	Cr-Ni	304 304H	C120	30431	304 304H	S30400	1.4301	304 304H	SUS304 SUS304-HR	-
		304DQ	C160	30423	304DQ					
		304DDQ	C181	30428	304DDQ					
		304L	C150	30411	-	-	1.4307 1.4301	304L 304	-	-
			C151	30412	304L 304	S30403 S30400			SUS304L	
		304LDDQ	C200	30442	304LDDQ	S30403	1.4306	304L	-	-
		321	C315	32113	321	S32100	1.4541 1.4878	321	SUS321 SUS321-HR	-
	Cr-Ni-Mo	316L	C240	31613	316L 316	S31603 S31600	1.4404 1.4401	316L 316	SUS316 SUS316L SUS316-HR	1.4402
		316L	C300	31628	-	S31603 S31600	1.4432 1.4435 1.4436	-	-	-
		316LN	C320	31619	316LN 316N	S31653 S31651	1.4406	-	-	-
		316Ti	C280	31663	316Ti	S31635	1.4571	316Ti	SUS316Ti SUS316Ti-HR	-
	Heat Resisting	309S-1.4833	C340	30911	309S 309H	S30908 S30909	1.4833 1.4950	309 309S 309H	SUS309S SUS309S-HR SUH309	-
		1.4828 (309Si)	C309	30921	309Si	-	1.4828	-	-	-
		310S-1.4845	C350	31085	310S 310H	S31008 S31009	1.4845 1.4951	310S 310H	SUS310S SUS310S-HR SUH310	-
		1.4841 (310Si)	C351	31084	310Si	-	1.4841	310 310N	-	-

2 FINISHES AVAILABLE

Columbus	Acerinox	ASTM/ ASME	EN	BIS	JIS	Description
Unground	595	-	-	-	-	Slabs with no grinding.
Ground	596	-	-	-	-	Slabs with grinding.
HR	599	-	1U	No. 0	-	Hot rolled (not heat treated, not descaled). Suitable for products which are to be further worked (e.g. re-rolling).
HRA	504	-	1C	No. 0	-	Hot rolled and heat treated (not descaled). Suitable for industrial heat resisting and materials handling applications.
No. 1	501	No. 1	1D	No. 1	No. 1	Hot rolled, heat treated and descaled. Suitable when smoothness and uniformity of finish are not important.
2D	512	No. 2D	2D	No. 2D	No. 2D	Cold rolled, heat treated and pickled. Dull, smooth finish. Suitable for forming applications.
2B	522	No. 2B	2B	No. 2B	No. 2B	Cold rolled, heat treated and pickled. Bright and smoother finish than 2D (obtained by skin passing or tension levelling).
2E	524	No. 2B	2E	No. 2B	-	Cold rolled, heat treated and mechanically descaled, may be followed by pickling. Rough and dull finish.
No. 3[2]	531	No. 3	2G	No. 3	HL No. 3	A linearly textured polished finish, one or both sides, typically using 120 grit polishing belts, with a transverse Ra <1.5 μm.
No. 4[2]	543 523	No. 4	2G	No. 4	HL No. 4	A linearly textured polished finish, one or both sides, typically using 180 to 240 grit polishing belts, with a transverse Ra <1 μm.
SB[2]	551	No. 6	2J	No. 6	-	ScotchBrite finish, one or both sides, with a transverse Ra <0.5 μm.
SSB[2]	553	-	-		-	Superior ScotchBrite finish, one or both sides, with a transverse Ra <0.25 μm.
BA	571	Bright Annealed Finish	2R	BA	BA	Cold rolled, bright annealed finish, retained by final annealing in a controlled atmosphere furnace and skin passed. Smooth, bright, reflective finish.
BE	510	-	-	BA	BA	Columbus 2B cold rolled, but final anneal in a controlled atmosphere furnace.
TR	572 / 573	TR	2H	-	-	Finish obtained by Cold Rolled, annealed pickled and Temper Rolled.

Notes

1. *Each type is available in one or more, but not necessarily all of the finishes listed above.*
2. *Material is polished on one or both sides at mill's option. When polished on both sides, the superior finish will be on top. Where polyethylene (PE) coating is specified, this will only be applied to the superior surface. If the bottom requires a specific finish it should be specified with order placement.*

3 DIMENSIONS

3.1 Gauge

3.1.1 Standard Hot Rolled Gauges

Metric Gauges		Imperial Gauges		
mm	Equivalent inch	inch	inch	Equivalent mm
3	0.118	1/8	0.1250	3.18
3.5	0.138	-	-	-
4	0.157	-	-	-
4.5	0.177	-	-	-
5	0.197	3/16	0.1875	4.76
6	0.236	1/4	0.2500	6.35
8	0.315	5/16	0.3125	7.94
10	0.394	3/8	0.3750	9.53
12	0.472	7/16	0.4375	11.11
14	0.551	1/2	0.5000	12.70
15	0.591	-	-	-
16	0.630	5/8	0.6250	15.88
18	0.709	-	-	-
20	0.787	3/4	0.7500	19.05
22	0.866	7/8	0.8750	22.23
25	0.984	1	1.0000	25.40
28	1.102	1 1/8	1.1250	28.58
30	1.181	-	-	-
32	1.260	1 1/4	1.2500	31.75
35	1.378	-	-	-
40	1.575	1 1/2	1.5000	38.10
45	1.772	1 3/4	1.750	44.45
50	1.969	2	2.000	50.80
55	2.165	2 1/4	2.250	57.15
60	2.362	-	-	-
65	2.559	2 1/2	2.500	63.50

Notes:

1. Other gauges are available on request and may be subject to minimum order quantities.

3.1.2 Hot Rolled Gauge Ranges for Coil and Sheet

General Type		Width ≤ 1 400 mm			Width > 1 400 mm		
		HR[8]	HRA	No. 1	HR[8]	HRA	No. 1
Ferritics	3CR12	-	3 - 8	3 - 8	-	3 - 8	3 - 8
	3CR12L	-	3 - 8	3 - 8	-	3 - 8	3 - 8
	410S	-	-	3 - 6.35	-	-	3 - 6.35
	40910	3 - 6.35	-	3 - 6.35	3 - 6.35	-	3 - 6.35
	40920	3 - 6.35	-	3 - 6.35	3 - 6.35	-	3 - 6.35
	40975		3 - 8	3 - 8	-	3 - 8	3 - 8
	430	3 - 6.35	-	3 - 6.35	3 - 6.35	-	3 - 6.35
	430DDQ	-	-	3 - 6.35	-	-	3 - 6.35
	439Nb	-	-	3 - 6.35	-	-	3 - 6.35
	43920	-	-	3 - 6.35	-	-	3 - 6.35
	441[6]	-	-	3 - 6.35	-	-	3 - 6.35
	436	-	-	3 - 6.35	-	-	3 - 6.35
	436M/T	-	-	3 - 6.35	-	-	3 - 6.35
	444	-	-	3 - 6.35	-	-	3.5 - 6.35
	444T	-	-	3 - 6.35	-	-	3.5 - 6.35
Duplex	2001	-	-	4 - 6.35	-	-	4 - 6.35
	2304	-	-	4 - 6.35	-	-	4 - 6.35
	2205	-	-	4 - 6.35	-	-	4 - 6.35
Austenitics	CS202	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8
	304	3 - 16	-	3 - 8	3 - 16	-	3 - 8
	304H[7]	3 - 16	-	3 - 8	3 - 16	-	3 - 8
	304DQ	3 - 16	-	3 - 8	3 - 16	-	3 - 8
	304DDQ	3 - 16	-	3 - 8	3 - 16	-	3 - 8
	304L	3 - 16	-	3 - 8	3 - 16	-	3 - 8
	304LDDQ	3 - 16	-	3 - 8	3 - 16	-	3 - 8
	321	3 - 16	-	3 - 8	3 - 16	-	3 - 8
	316L-1.4404	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8
	316L-1.4435	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8
	316LN	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8
	316Ti	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8
	309S-1.4833[7]	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8
	1.4828 (309Si)	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8
	310S-1.4845[7]	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8
	1.4841 (310Si)	3 - 16	-	3 - 8	3.5 - 16	-	3.5 - 8

Notes:

1. *Minimum and maximum gauges might be restricted by specifications*
2. *Maximum gauge for trimmed coil is 8 mm*
3. *Negative tolerances are not available on minimum gauges*
4. *Positive tolerances are not available on maximum gauges*
5. *If actual gauge is above maximum the material may be processed as plate*
6. *441 only certifiable to ASTM A240*
7. *H-grade equivalents are only available if grain size requirement is wavered*
8. *HR material above maximum up to 12 mm is available in coil form with certification to Chemistry only due to sampling constraints*

3.1.3 Hot Rolled Gauge Ranges for Plate

General Type		Width ≤ 1 400 mm		Width > 1 400 mm	
		HRA	No. 1	HRA	No. 1
Ferritics	3CR12	8 - 35	8 - 35	8 - 35	8 - 35
	3CR12L	8 - 35	8 - 35	8 - 35	8 - 35
	410S	-	8 - 20	-	8 - 20
	40910[4]	-	8 - 16	-	8 - 16
	40920[4]	-	8 - 16	-	8 - 16
	40975	8 - 35	8 - 35	8 - 35	8 - 35
	430	-	8 - 12	-	8 - 12
	430DDQ	-	8 - 12	-	8 - 12
	439Nb	-	8 - 12	-	8 - 12
	43920	-	8 - 12	-	8 - 12
	441[4]	-	8 - 12	-	8 - 12
	436	-	8 - 12	-	8 - 12
	436M/T	-	8 - 12	-	8 - 12
	444	-	8 - 12	-	8 - 12
	444T	-	8 - 12	-	8 - 12
Duplex	2001	-	8 - 40	-	8 - 40
	2304	-	8 - 50.8	-	8 - 50.8
	2205	-	8 - 40	-	8 - 40
Austenitics	CS202	-	-	-	-
	304	-	8 - 63.5	-	8 - 63.5
	304H	-	8 - 63.5	-	8 - 63.5
	304DQ	-	8 - 63.5	-	8 - 63.5
	304DDQ	-	8 - 63.5	-	8 - 63.5
	304L	-	8 - 63.5	-	8 - 63.5
	304LDDQ	-	8 - 63.5	-	8 - 63.5
	321	-	8 - 63.5	-	8 - 63.5
	316L-1.4404	-	8 - 63.5	-	8 - 63.5
	316L-1.4435	-	8 - 63.5	-	8 - 63.5
	316LN	-	8 - 63.5	-	8 - 63.5
	316Ti	-	8 - 63.5	-	8 - 63.5
	309S-1.4833	8 - 50.8	8 - 50	8 - 50.8	8 - 50
	1.4828 (309Si)	8 - 50.8	8 - 50	8 - 50.8	8 - 50
	310S-1.4845	8 - 50.8	8 - 50	8 - 50.8	8 - 50
	1.4841 (310Si)	8 - 50.8	8 - 50	8 - 50.8	8 - 50

Notes:

1. *Minimum and maximum gauges might be restricted by specifications*
2. *Negative tolerances are not available on minimum gauges*
3. *Positive tolerances are not available on maximum gauges*
4. *409 and 441 only certifiable to ASTM A240*

3.1.4 Standard Cold Rolled Gauges

Metric Gauges		Imperial Gauges	
(mm)	Equivalent (in.)	Equivalent (in.)	Equivalent (mm)
0.4	0.0157	-	-
0.5	0.0197	0.018	0.452
0.6	0.0236	0.024	0.597
0.7	0.0276	0.029	0.739
0.8	0.0315	0.032	0.818
0.9	0.0354	0.036	0.902
1.0	0.0394	0.040	1.028
1.2	0.0472	0.048	1.219
1.5	0.0591	0.060	1.511
1.6	0.0630	0.067	1.702
1.8	0.0709	0.075	1.905
2.0	0.0787	0.090	2.286
2.5	0.0984	0.105	2.667
3.0	0.1181	0.120	3.048
3.5	0.1378	0.135	3.429
4.0	0.1575	0.150	3.813
4.5	0.1772	0.165	4.191
5.0	0.1969	0.187	4.760
5.5	0.2165	0.219	5.556
6.0	0.2362	0.25	6.35

Notes:

1. *Only Metric Gauges are standard.*
2. *Decimal thickness, and not gauge number, should be specified when ordering as recommended in ASTM A480, to prevent any confusion with the various gauge number scales in use.*

3.1.5 Cold Rolled Gauge Ranges for Coil and Sheet

General Type		Width < 1 300 mm				Width ≥ 1 300 mm	
		2D/2B/2E[6]	BA	BE	Polished	2D/2B/2E[6]	Polished
Ferritics	3CR12[7]	0.5 - 3.5	-	-	-	0.7 - 3.5	-
	3CR12L[7]	0.5 - 3.5	-	-	-	0.7 - 3.5	-
	410S	0.5 - 3.5	-	-	-	0.7 - 3.5	-
	40910	0.4 - 3	-	-	-	0.7 - 3	-
	40920	0.4 - 3	-	-	-	0.7 - 3	-
	40975	0.5 - 3.5	-	-	-	0.7 - 3.5	-
	430	0.4 - 3	0.4 - 1.6	0.4 - 2.0	0.4 - 3	0.7 - 3	0.7 - 3
	430DDQ	0.4 - 3	0.4 - 1.6	0.4 - 2.0	0.4 - 3	0.7 - 3	0.7 - 3
	439Nb	0.4 - 3	-	-	0.4 - 3	0.7 - 3	0.7 - 3
	43920	0.4 - 3	-	-	0.4 - 3	0.7 - 3	0.7 - 3
	441	0.4 - 3	-	0.4 - 1.6	0.4 - 3	0.7 - 3	0.7 - 3
	436	0.4 - 3	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.7 - 3	0.7 - 3
	436M/T	0.4 - 3	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.7 - 3	0.7 - 3
	444	0.4 - 3	-	0.4 - 1.6	0.4 - 3	0.7 - 3	0.7 - 3
	444T	0.4 - 3	-	0.4 - 1.6	0.4 - 3	0.7 - 3	0.7 - 3
Duplex	2001	0.7 - 3	-	-	-	0.7 - 3	-
	2304	0.7 - 3	-	-	-	0.7 - 3	-
	2205	0.7 - 3	-	-	-	0.7 - 3	-
Austenitics	CS202	0.4 - 6.35	-	-	0.4 - 3	0.7 - 6.35	0.7 - 3
	304	0.4 - 6.35	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.5 - 6.35	0.5 - 3
	304H[8]	0.4 - 6.35	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.5 - 6.35	0.5 - 3
	304DQ	0.4 - 6.35	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.5 - 6.35	0.5 - 3
	304DDQ	0.4 - 6.35	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.5 - 6.35	0.5 - 3
	304L	0.4 - 6.35	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.5 - 6.35	0.5 - 3
	304LDDQ	0.4 - 6.35	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.5 - 6.35	0.5 - 3
	321	0.4 - 6.35	-	0.4 - 1.6	-	0.7 - 6.35	-
	316L-1.4404	0.4 - 6.35	0.4 - 1.6	0.4 - 1.6	0.4 - 3	0.7 - 6.35	0.7 - 3
	316L-1.4435	0.4 - 6.35	-	0.4 - 1.6	0.4 - 3	0.7 - 6.35	-
	316LN	1 - 6.35	-	-	-	1.5 - 6.35	-
	316Ti	0.4 - 6.35	-	0.4 - 1.6	-	0.7 - 6.35	-
	309S-1.4833[8,9]	0.4 - 6.35	-	0.4 - 2.0	-	0.7 - 6.35	-
	1.4828(309Si)[9]	0.4 - 6.35	-	0.4 - 2.0	-	0.7 - 6.35	-
	310S-1.4845[8,9]	0.4 - 6.35	-	0.4 - 1.6	-	0.7 - 6.35	-
	1.4841 (310Si) [9]	0.4 - 6.35	-	0.4 - 1.6	-	0.7 - 6.35	-

Notes:

1. *Minimum and maximum gauges might be restricted by specifications*
2. *Gauges other than the ones quoted may be available on enquiry and may be subject to minimum order quantities.*
3. *Gauges less than 0.4 mm are only available in the local market.*
4. *Negative tolerances are not available on minimum gauges*
5. *Positive tolerances are not available on maximum gauges*
6. *Minimum gauge on 2E finish is 0.8 mm.*
7. *Roofing quality 3CR12 is available in 0.6 mm and 925 mm wide, suitable for roofing, cladding, etc.*
8. *H-grade equivalents are only available if grain size requirement is wavered*
9. *Heat resisting grades are only available as BE or 2E. 2B and 2D are only available with the understanding that the surface will be lightly shot blasted.*

3.2 Coil Dimensions

3.2.1 Standard Widths

Trimmed Width
1 000
1 219.2
1 250
1 500
1 524

3.2.2 Maximum width

The maximum trimmed or good width is 1524 mm, except for 409 cold rolled and 439Nb cold rolled and hot rolled coil and sheet with a maximum of 1520 mm.

3.2.3 Slit Widths

Gauge Range (mm)	Minimum Slit Width (mm)
≤0.7	10
>0.7 to 3.0	25
>3.0 to 5.0	35
>5.0 to 6.35	45

3.3 Plate/Sheet/Blank Dimensions

3.3.1 Standard Dimensions

Below are the standard sheet and plate dimensions and should be considered along with the possible thicknesses for the particular type.

Width		Length		Length		Length		Length		Length	
(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)	(mm)	(in.)
1 000		2 000				3 000		6 000		8 000	
1 219.2	**48**			2 438.4	96	3 048	120	6 096	240	7 315.2	288
1 250				2 500		3 000		6 000		8 000	
1 500						3 000		6 000		8 000	
1 524	**60**					3 048	120	6 096	240	7 315.2	288

Notes:

1. *Other widths and length may be available on request and may be subject to minimum order quantities.*
2. *Plates longer than 6096mm may be plasma cut at mill's option.*

3.3.2 Sheet and Plate Lengths

Gauge (mm)		Length (mm)[1]		
min	**max**	**Minimum**	**Maximum**	**Exceptions**
0.4	2	600	7 000	
>2	2.5	1 250	5 500	
>2.5	6.35	1 100	6 700	
>6.35	<8	1 100	6 700	1 560-6 100 mm for duplexes 1 560-8 000 mm for ferritics (excluding 3CR12)
8	10	1 560	8 000[2]	Duplexes: maximum length is 6 100 mm
>10	16	1 560	8 000[2]	Duplexes & ferritics (excluding 3CR12): maximum length is 6 100mm
>16	63	1 560	8 000	Length is limited by a maximum allowable piece mass of 5 000 kg

Notes:

1. *Plates lengths greater than the above may be available on enquiry.*
2. *Maximum length is 6100 mm for shear cut edges*

3.3.3 Blank dimensions

Attribute	Min	Max
Gauge	0.40	2.50
Width	65	750
Length	75	1000

4 DELIVERY CONDITIONS

4.1 Order Information Requirements

In order to ensure accurate product definition and manufacturing the minimum requirements specified by the various standards should be supplied. Any additional requirements should also be given to ensure the accuracy of the final product. The information can supplied via a customer's technical product/delivery specification, on the purchase order or using the Product Specification Sheet in Annexure A.

Minimum information required:

- Steel/Alloy type,
- Specification and grade, including multiple and dual certification,
- Product form
- Finish and/or condition
- Edge condition
- Dimensions
- Certification requirements, including the certificate type and any regulatory requirements
- Pack mass limits
- Coating or interleaving, if other than default as defined in paragraph 4.9.

Optional information:

- Dimensional tolerance and delivery condition standard, if not specified by the required standards and any special tolerances in the standard
- Packing and delivery requirements
- Special marking requirements
- Chemical exceptions
- Mechanical exceptions
- Any other special requirements not covered above

4.2 Certification

Hot and Cold rolled products can be certified to the most recent, active revision of the following specifications:

ASTM	ASTM A240/A240M
ASME	ASME BPVC IIA SA240 / SA240M
EN	EN 10088-1
	EN 10088-4
	EN 10088-2
	EN 10028-7
	EN 10095
SANS	SANS 50028-7
IS	IS 6911
JIS	JIS G 4304
	JIS G 4305
	JIS G 4312

Other specifications can be supplied based upon agreement between the customer and Columbus.

Regardless of the specification and tolerances required by the customer, all certificates are issued in terms of EN 10204. The following certificates are available:

EN 10204	Description	Conditions of Issue
3.1	Internal Independent Inspection	Issued unless otherwise specified
3.2	External Independent Inspection	Inspected and certified by TÜV Rheinland, when requested

For detail of approved certifications consult the Quality Product Certifications page at www.columbus.co.za. Approved product certifications are given below.

4.2.1 Certification to AD Merkblatt

Certain approved steel types manufactured to EN 10028-7 are available for certification to AD 2000 W2 and AD 2000 W10 (TÜV certification), with the approval as below.

4.2.1.1 Certification to Pressure Equipment Directive (PED 2014/68/EU)

Certification to PED 2014/68/EU is available on Columbus material produced to EN 10028-7, ASME SA240 and ASTM A240 to accredited dimensions, with the approval of TÜV Rheinland Polska. For the details of approved grades and thicknesses consult the certificate and annexure.

4.2.1.2 Certification to Pressure Equipment Safety Regulations 2016 (SI 2016 No.: 1105 as amended)

Certification to Pressure Equipment Safety Regulations 2016. SI 2016 No.: 1105 as amended is available on accredited grades and thicknesses according to the scope of certification, with the approval of TÜV Rheinland UK. For the details of approved grades and thicknesses consult the certificate and annexure.

4.2.2 Certification to Construction Product Regulation/CE Mark (CPR 305/2011/EU and EN 10088-4)

CE mark certification to EN 10088-4 and CPR 305/2011/EU is available on material up to the maximum gauges specified in the scope of certification, as approved by TÜV Rheinland Polska. For the details of approved grades and thicknesses consult the certificate and annexure.

4.2.3 Certification to Construction Product Regulation 2011 (retained EU law 305/2011/EU) as amended - UKCA mark (EN 10088-4)

UKCA mark certification to EN 10088-4 is available on material up to the maximum gauges specified in the scope of certification, as approved by TÜV Rheinland UK. For the details of approved grades and thicknesses consult the certificate and annexure.

4.2.4 IS 6911 Certification

Certification to IS 6911:2017 is available according to the scope of certification as defined in the licence for the period defined in the renewal.

4.2.5 JIS Certification

JIS certification is available on material up to the maximum gauges specified in the scope of certification, as approved by JQA. For the details of approved grades and thicknesses consult the certificates for Stainless Steel and Heat-resisting Steel.

4.3 Tolerances

Material can be ordered to the tolerances listed below:

Product Group	Specification
All	ASTM A480/ASTM A480M
	ASME SA480/ASME SA480M
	IS 6911
	JIS G 4312
Plate	ISO 18286
	EN 10051
	JIS G 4304
Hot rolled coil and sheet	ISO 9444-2
	EN 10029
	JIS G 4304
Cold rolled coil and sheet	ISO 9445-2
	JIS G 4305

Material tolerances are only guaranteed to the ASTM, ASME, EN, ISO, IS and JIS tolerances listed above. Any special customer requirements should be agreed upon order placement.

All gauge measurements are taken 25 mm from the edge on trimmed material. On mill edge material, the measurement is taken at least 25 mm from the edge, depending on the tolerance specification requirement.

4.3.1 Hot Rolled Gauge Tolerances

Material will be rolled to either of the mill's best aim tolerances listed below, although tolerances are only guaranteed to the tolerance standards listed in 4.3 above. If special limits, as defined in the standard, are required it should be specified with order placement. Tolerance outside these standards and the limits below may be available on request.

Nominal Gauge (mm)	Mill's Best Range (mm)	Normal (mm)		Positive (mm)	
		-	+	-	+
3.0	0.29	0.25	0.04	-	-
>3.0 to 3.5	0.31	0.25	0.06	-	-
>3.5 to 4.0	0.33	0.25	0.08	0.00	0.33
>4.0 to 4.5	0.35	0.25	0.10	0.00	0.35
>4.5 to 5.0	0.36	0.25	0.11	0.00	0.36
>5.0 to 6.0	0.40	0.25	0.15	0.00	0.40
>6.0 to 8.0	0.48	0.25	0.23	0.00	0.48
>8.0 to 10	0.55	0.30	0.25	0.00	0.55
>10 to 12	0.63	0.30	0.33	0.00	0.63
>12 to 14	0.70	0.30	0.40	0.00	0.70
>14 to 15	0.74	0.30	0.44	0.00	0.74
>15 to 16	0.78	0.30	0.48	0.00	0.78
>16 to 18	0.85	0.30	0.55	0.00	0.85
>18 to 20	0.93	0.30	0.63	0.00	0.93
>20 to 22	1.00	0.30	0.70	0.00	1.00
>22 to 25	1.11	0.30	0.81	0.00	1.11
>25 to 28	1.23	0.30	0.93	0.00	1.23
>28 to 30	1.30	0.30	1.00	0.00	1.30
>30 to 32	1.38	0.30	1.08	0.00	1.38
>32 to 35	1.49	0.30	1.19	0.00	1.49
>35 to 40	1.68	0.30	1.38	0.00	1.68
>40 to 50	2.05	0.30	1.75	0.00	2.05
> 50 to 60	2.43	0.30	2.13	0.00	2.43

4.3.2 Cold Rolled Gauge Tolerances

Material will be rolled to either of the mill's best aim tolerances listed below, although tolerances are only guaranteed to the tolerance standards listed in 4.3 above, unless otherwise agreed at order placement. If special limits, as defined in the standard, are required it should be specified with order placement. Tolerance outside these standards and the limits below may be available on request. Normal tolerance will be rolled to either the Split or Negative tolerances at mill's option.

Nominal Gauge (mm)	Mill's Best Range (mm)	Split (mm)		Negative (mm)		Positive (mm)	
		-	+	-	+	-	+
≤0.25	0.026	0.013	0.013	-	-	-	-
>0.25 to 0.3	0.026	0.013	0.013	0.026	0.000	0.000	0.026
>0.3 to 0.4	0.030	0.015	0.015	0.030	0.000	0.000	0.030
>0.4 to 0.45	0.038	0.019	0.019	0.038	0.000	0.000	0.038
>0.45 to 0.5	0.042	0.021	0.021	0.042	0.000	0.000	0.042
>0.5 to 0.6	0.046	0.023	0.023	0.046	0.000	0.000	0.046
>0.6 to 0.7	0.050	0.025	0.025	0.050	0.000	0.000	0.050
>0.7 to 0.8	0.054	0.027	0.027	0.054	0.000	0.000	0.054
>0.8 to 0.9	0.058	0.029	0.029	0.058	0.000	0.000	0.058
>0.9 to 1.0	0.062	0.031	0.031	0.062	0.000	0.000	0.062
>1.0 to 1.2	0.068	0.034	0.034	0.068	0.000	0.000	0.068
>1.2 to 1.5	0.078	0.039	0.039	0.078	0.000	0.000	0.078
>1.5 to 1.6	0.080	0.040	0.040	0.080	0.000	0.000	0.080
>1.6 to 1.8	0.086	0.043	0.043	0.086	0.000	0.000	0.086
>1.8 to 2.0	0.090	0.045	0.045	0.090	0.000	0.000	0.090
>2.0 to 2.5	0.102	0.051	0.051	0.102	0.000	0.000	0.102
>2.5 to 3.0	0.112	0.056	0.056	0.112	0.000	0.000	0.112
>3.0 to 3.5	0.122	0.061	0.061	0.122	0.000	0.000	0.122
>3.5 to 4.0	0.132	0.066	0.066	0.132	0.000	0.000	0.132
>4.0 to 4.5	0.140	0.070	0.070	0.140	0.000	0.000	0.140
>4.5 to 5.0	0.148	0.074	0.074	0.148	0.000	0.000	0.148
>5.0 to 5.5	0.156	0.078	0.078	0.156	0.000	0.000	0.156
>5.5 to 6.35	0.164	0.082	0.082	0.164	0.000	0.000	0.164

Notes:

1. Slits for gauge > 6 mm is rolled to the min of the specification and mill's best for the max.

4.3.3 Plate Trimmed Width Tolerance

Plate material is produced to the aim width tolerances below. For certain standards there are too many ranges to summarise. The standard should be consulted for the correct limits. If special limits, as defined in the standard, are required it should be specified with order placement. Tighter tolerances should be negotiated with order placement.

Specification	Gge Min	Gge Max	Width Min	Width Max	-	+
ASTM A480	-	-	1 000	1 524	0	15
ISO 18286	-	-	600	1 524	0	15
EN 10029	6	40	-	-	0	20
	40.01	75	-	-	0	25
IS 6911	6	<10	-	-	0	5
	10	12	-	-	0	10
	>12	50	-	-	0	30
JIS G 4304 JIS G 4305 JIS G 4312	Consult standard					

4.3.4 Hot Rolled Trimmed Coil and Sheet Width Tolerance

Hot rolled coil and sheet material are produced to the aim width tolerances below. For certain standards there are too many ranges to summarise. The standard should be consulted for the correct limits. If special limits, as defined in the standard, are required it should be specified with order placement. Tighter tolerances should be negotiated with order placement.

Specification	Gge Min	Gge Max	Width Min	Width Max	-	+
ASTM A480	3	5	600	1 199.9	0	2
			1 200	1 524	0	6
	5.01	8	600	1 199.9	0	4
			1 200	1 524	0	9
ISO 9444-2			600	1 524	0	5
EN 10051			600	1 200	0	3
			1 200.1	1 524	0	5
IS 6911			Consult standard			
JIS G 4304						
JIS G 4305						
JIS G 4312						

4.3.5 Cold Rolled Trimmed Coil and Sheet Width Tolerances

Cold rolled coil and sheet material are produced to the aim width tolerances below. For certain standards there are too many ranges to summarise. The standard should be consulted for the correct limits. If special limits, as defined in the standard, are required it should be specified with order placement. Tighter tolerances should be negotiated with order placement.

	Gge Min	Gge Max	Width Min	Width Max	-	+
ASTM A480	0.2	1.5	600.1	1 000	0	1.5
			1 000.1	1 524	0	2.0
	1.51	2.5	600.1	1 000	0	2.0
			1 000.1	1 524	0	2.5
	2.51	3.5	600.1	1 524	0	3.0
	3.51	8	15	1 524	0	4.0
ISO 9445-2	0.2	0.99	15	250	0	0.5
			250.1	599.9	0	0.7
			600	1 000	0	1.5
			1 000.1	1 524	0	2.0
	1.0	1.49	15	250	0	0.7
			250.1	599.9	0	1.0
			600	1 000	0	1.5
			1 000.1	1 524	0	2.0
	1.5	2.49	15	250	0	1.0
			250.1	599.9	0	1.2
			600	1 000	0	2.0
			1 000.1	1 524	0	2.5
	2.5	3.49	15	250	0	1.2
			250.1	599.9	0	1.5
			600	1 524	0	3.0
	3.5	8	15	599.9	0	2.0
			600	1 524	0	4.0
IS 6911	Consult standard					
JIS G 4304						
JIS G 4305						
JIS G 4312						

4.3.6 Untrimmed Width Tolerance

Below are the aim width tolerances. Tighter tolerance should be negotiated with order placement. Orders may be rejected if the standard requires a tighter tolerance which cannot be achieved.

Final good width	1 000	1 200	1 220	1 250	1 500	1 524
Untrimmed width	1 045	1 245	1 265	1295	1545	1 569
Min width[1]	1 030	1 230	1 250	1 280	1 530	1 554
Max width[2]	1 060	1 260	1 280	1 310	1 560	1 584

Notes:

1. *Minimum is wider than nominal due to mill edge defects*
2. *Due to flare the first and last 2.5% may exceed these values*

4.3.7 Slit Coils Width Tolerance

Slit material is produced to the aim width tolerances listed below although tolerances are only guaranteed to the tolerance standards listed in 4.3 above.

Gauge Range (mm)	Slit Width (mm)	Tolerance (mm)
≤1.0	≤300	±0.15
	>300 to 600	±0.25
	>600 to 990	±0.50
>1.0 to 1.75	≤200	±0.15
	>200 to 300	±0.20
	>300 to 600	±0.30
	>600 to 990	±0.50
>1.75 to 3.0	≤100	±0.20
	>100 to 200	±0.25
	>200 to 300	±0.30
	>300 to 600	±0.35
	>600 to 990	±0.50
>3.0 to 6.35	≤200	±0.25
	>200 to 300	±0.35
	>300 to 600	±0.35
	>600 to 990	±0.50

4.3.8 Plate Length Tolerance

Plate material is produced to the aim length tolerances below. For certain standards there are too many ranges to summarise. The standard should be consulted for the correct limits. If special limits, as defined in the standard, are required it should be specified with order placement. Tighter tolerances should be negotiated with order placement.

Specification	Length Min	Length Max	-	+
ASTM A480 ISO 18286 EN 10029	2 000	3 999.9	0	20
	4 000	5 999.9	0	30
	6 000	7 999.9	0	40
	8 000	8 000	0	50
IS 6911	Consult standard			
JIS G 4304				
JIS G 4305				
JIS G 4312				

4.3.9 Hot Rolled Trimmed Sheet Length Tolerance

Hot rolled coil and sheet material are produced to the aim length tolerances below. For certain standards there are too many ranges to summarise. The standard should be consulted for the correct limits. If special limits, as defined in the standard, are required it should be specified with order placement. Tighter tolerances should be negotiated with order placement.

Specification	Length Min	Length Max	-	+
ASTM A480	2 000	6 000	0	0.005 x length
ISO 9444-2 EN 10051	2 000	7 000	0	0.005 x length
IS 6911	Consult standard			
JIS G 4304				
JIS G 4305				
JIS G 4312				

4.3.10 Cold Rolled Trimmed Sheet Length Tolerances

Cold rolled coil and sheet material are produced to the aim length tolerances below. For certain standards there are too many ranges to summarise. The standard should be consulted for the correct limits. If special limits, as defined in the standard, are required it should be specified with order placement. Tighter tolerances should be negotiated with order placement.

Specification	Length Min	Length Max	-	+
ASTM A480	75	2 000	0	5
ISO 9445-2	2 000.1	7 000	0	0.0025 x length
IS 6911	Consult standard			
JIS G 4304				
JIS G 4305				
JIS G 4312				

4.3.11 Blank Tolerance

Width is as per the slit coil width tolerances. Lengths are produced to ±1.0 mm.

4.3.12 Flatness

Flatness is measured on a flat surface against the applicable standard. Tighter tolerances need to be negotiated with order placement. Flatness on 2D coils cannot be guaranteed.

4.3.13 Camber

Camber can only be measured on sheet and plate. Camber on coil cannot be measured if the concave side is on the opposite side of the inspection point due to safety restrictions in accessing other side of the coil.

4.4 Testing and Releasing

Material will be tested in accordance with the requested certifications. Additional test requirements and exceptions need to be specified and negotiated with order acceptance. Rp1.0 might be reported, even if it is not specified, for information. The intergranular corrosion test ASTM A262 Practise E is routinely done on austenitic material from 0.5 mm upward and might be reported for information.

On 3.1 and 3.2 certificates the tightest limits among the certifications and exception will be printed.

4.5 Material Quality

4.5.1 Surface Condition

Trimmed coil material is guaranteed with at least 97% of surface as prime. Untrimmed coils may be available on enquiry, with 97% of the surface guaranteed as prime after trimming to final width by the customer.

On plate material, surface reclamation is done in accordance with EN10163-2. Note, Columbus do not perform weld repair on plate material.

4.5.2 Seconds Quality

As part of the normal stainless steel production process, there is some inevitable generation of Seconds quality material. Seconds conform to the ASTM or EN requirements for steel type, gauge,

width, finish and mechanical properties. In addition, the coil must be capable of further processing by the customer. Typically, this would mean that the steel has surface defects or flatness deviations which can either be polished out or that the defect is relatively isolated and that prime material can be obtained by cutting out the defects. Typical defects that would cause material to be seconds would be skin laminations, stains (or streaks and related defects), scratches, roll marks, indentations, dents, residual scale, etc. Seconds can be untrimmed.

4.5.3 Fourths Quality

Fourths is coil or sheet of Prime or Seconds surface quality. Fourths do not necessarily conform to the ASTM or EN mechanical property requirements. Fourths may include coil ends (which may thus not be properly skin passed or polished). In addition to typical Seconds defects, Fourths can also have edge damage and portions with folds. Coils are supplied with no inner core and thus the inner diameter may be somewhat oval. Fourths can be untrimmed.

4.6 Coil Diameter

4.6.1 Inner Diameter

Mill Edge Black Hot Band

762 mm (30") or 610 mm (24") at Mill's option.

All Other Coils

All coils will have an internal diameter of 610 mm (24"). However, 508 mm (20") coils may be available on enquiry. For material less than 0.7 mm thick and narrower than 600 mm a 406 mm (16") is available on request.

4.6.2 Outer Diameter

Mill Edge Coils

Maximum of 2 100 mm

Trimmed Coils

Maximum of 1 900 mm

4.7 Slit Coils

Slit coils are available up to a maximum gauge of 6 mm. The maximum slit width is 500 mm and can be packed eye to sky, with a maximum pack mass of 5000 kg. Widths above 500 mm will be handled as coil and packed as eye to wall and the coil height will be less than two times the width.

4.8 Coil Supplied for Cutting to Sheet or Slitting

Coil purchased for the purpose of cutting to sheet or slitting is supplied on the understanding that it is the converter's responsibility to ensure that the facilities utilised are capable of producing material that conforms to the specification to which it is processed.

4.9 Paper Interleaving

Hot rolled products are not paper interleaved.

All 2B, 2D, polished and BA finish products will be paper interleaved unless coated or otherwise agreed.

409, 412, 439 and 441 is usually supplied for tube or coil fed press applications and is therefore not paper interleaved unless otherwise agreed.

Slits are usually supplied without paper interleaving, unless otherwise agreed.

4.10 Polyethylene (PE) Coating

PE coating (formerly PVC coating) is not available on coils with a gauge of less than 0.4 mm.

Slit coil products are usually supplied without PE coating, unless otherwise agreed.

The following PE coatings are available and should be specified upon order placement:

Coating	Description	Thickness (µm)
LNC	Novacel Fibre laser Protective Film (Grey)	100
LPF	Polifilm Fibre laser Protective Film (Dark Grey)	100
LAA	Any suitable Fibre Laser Protective Film	100
PVC	PE Black / White Laser Protective Film suitable for CO_2 Lasers.	70/80
PEB	PE Blue Translucent Protective Film	60
P80	PE Blue Translucent Protective Film for DDQ	80
PLD	Low Density, Low Glue PE Protective Film (Transparent)	50
~	No Coating	-

4.11 Marking

4.11.1 Material Marking

Below is the standard marking that will be applied. Detailed requirements must be noted on order placement.

For continuous line marking the material is marked with the incoming ID. If the outgoing material is split, i.e. smaller coils or different cases for sheets, additional characters will be assigned as identification for traceability and the new ID will be reported on the test certificate and the case label.

HR and HRA Coils

Coils are stencilled on the outer wrap with gauge, type and MPO (coil) number. If required, labels with order information such as customer's name, destination, type, width, gross and net mass, case no., etc. will be placed on each coil.

No. 1 Coil, Sheet and Plate

Coil, sheet and plate material are continuously line marked on the top with MPO (coil) number, type, gauge, dimensions, finish and specification, unless otherwise specified. Detailed requirements must be noted on order placement.

Cold rolled

All cold rolled coils and normal sheet will be continuously line marked on the top surface, unless otherwise specified. For BA, BE and polished material, coil will be marked with a sticker at the beginning and end, while for sheets the top sheet will be marked. Coil and sheet will be marked with MPO (coil) number, type, gauge, dimensions, finish and specification, unless otherwise specified.

4.11.2 Case Marking

Below is an example of a typical case label. The part number will only be displayed if supplied and captured on the Columbus system. If required, additional information can be added as text or in a barcode.

For certified or licenced products the relevant marking and information will be included on the case label.

4.12 End Use

Products are produced to suit customers' end use as far as possible. It is essential therefore when ordering that the end use is stated. Customers are encouraged to consult with Columbus Stainless' Technical Customer Services Department to obtain the material which best suits their purpose. Should no end use be supplied any claims relating to the material will be handled accordingly.

4.13 Pack Masses

4.13.1 Coil Mass

Delivery tolerances are ± 10% on order mass.

HR Minimum Coil Mass

The minimum pack mass is 3 500 kg.

Typical Coil Mass

The maximum length of a slab is 11.95 m due to the size of the reheat furnace. Since the thickness of the slab is fixed, the mass of the slab is therefore determined by the width. It is given by the factor of 19.2 kg/mm width (i.e. a 1000 mm wide slab will be 19 200 kg, and 1500 mm slab will be 29 300 kg). The rolled coil yields on average a factor of 17 kg/mm width. Orders for product of a slab as a minimum must consider this. Orders for coils bigger than a single coil must also be optimised to multiples of a single coil.

Number of Full Size Coils for Order

Width	Mass (t)				
	1	2	3	4	5
1000	17.0	34	51	68	85
1219	20.7	41	62	83	104
1250	21.3	43	64	85	106
1500	25.5	51	77	103	128
1524	25.9	52	78	104	130

Ideal Pack Mass

For coil material, pack mass needs to be in subdivisions of a single coil. The table below gives the ideal pack mass ranges for the standard width coils, split into n-parts.

Width	Mass (kg)	1	2	3	4	5
1000	**min**	14400	7200	4800	3600	2900
	max	19200	12000	8000	6000	4800
1219	**min**	17600	8800	6200	4700	3700
	max	23400	14600	7800	5900	4700
1250	**min**	18000	9000	6000	4500	3600
	max	24000	15000	10000	7500	6000
1500	**min**	21600	10800	7200	5400	4300
	max	28800	18000	12000	9000	7200
1524	**min**	21900	11000	7300	5500	4400
	max	29300	18300	12200	9100	7300

The minimum mass is calculated as 75% of average coil size or subdivision of it. Maximum mass is capped at the theoretical maximum of an 11.95 m slab; for split coils a 25% head room is added in case where a coil with a defective portion is used and split.

For material thinner or equal to 0.9mm, the risk for collapsing of coils (oval coils) exist. This risk is increased when material is coated with a plastic product (e.g. PVC, LPF, LNC, PEB). For this reason, the maximum pack mass is limited by the height of the coil or slit. Typical values are given below:

Type	Ferritic		Austenitic	
ID	**508**	**610**	**508**	**610**
Width	**Maximum mass for 2H=W**			
500	2320	2630	2380	2700
710	5330	5960	5470	6110
914	9880	10920	10130	11200
1000	12000	12000	12000	12000
1219	14600	14600	14600	14600
1250	21690	23650	22250	24250
1500	28800	28800	28800	28800
1524	29300	29300	29300	29300

Notes

1. Only if plastic coated

The formula to calculate the maximum pack mass for another width is given as:

$$\text{MaxPackMass} = \pi.\text{density}.\text{width}^2(\text{width} + 2.\text{innerdiameter})/4.\text{Plate and Sheet Mass}$$

Slit Pack Mass

For slits, the same formulas as above can be applied. Due to the infinite number of variations it is not given in this document. Consult with TCS if there is uncertainty. The absolute maximum for slit mass is 5 t, due to lifting and packing equipment constraints (eye to sky). Minimum mass is determined by minimum outer diameter of 950 mm.

Maximum width to pack eye to sky is 499 mm. For packing eye to wall, the constraint is the outer diameter vs width ratio (OD/W) with a maximum of 2, to comply with safety regulations.

4.13.2 Plate Mass

Minimum Plate Pack Mass

Plate will be supplied with a minimum Pack Mass of 2 000 kg.

Maximum Plate Pack Mass

The maximum Pack Mass depends on the skid carrying capacity, which is dependent on the gauge and case length.

Gauge (mm)	Skid Length (mm)			
	≤ 2 800	> 2 800 to ≤ 4 000	> 4 000 to ≤ 6 200	>6 200
2.5 to 3	4 000kg	3 500kg	3 000kg	-
>3 to 60	4 000kg	4 000kg	3 000kg	5 000kg
>60	5 000kg	5 000kg	5 000kg	5 000kg

4.13.3 Sheet Mass

Minimum Sheet Pack Mass

Sheet will be supplied with a minimum Pack Mass of 1 500 kg.

Maximum Sheet Pack Mass

The maximum Pack Mass depends on the skid carrying capacity, which is dependent on the gauge and case length.

Gauge (mm)	Skid Length (mm)			
	≤ 2 400	>2 400 to ≤2 800	>2 800 to ≤4 000	>4 000 to ≤7 100
0.3 to <1.0	2 500kg	2 000kg	2 000kg	1 000kg
1.0 to <1.5	3 000kg	3 000kg	2 500kg	1 500kg
1.5 to 1.9	3 500kg	3 500kg	3 000kg	2 000kg
>1.9 to 2.0	3 500kg	3 500kg	3 000kg	2 500kg
>2.0 to 3.0	4 000kg	4 000kg	3 500kg	2 500kg
>3.0 to <3.8	4 000kg	4 000kg	4 000kg	2 500kg
3.8 to <4.0	4 000kg	4 000kg	4 000kg	3 000kg
≥4.0	4 000kg	4 000kg	4 000kg	3 300kg

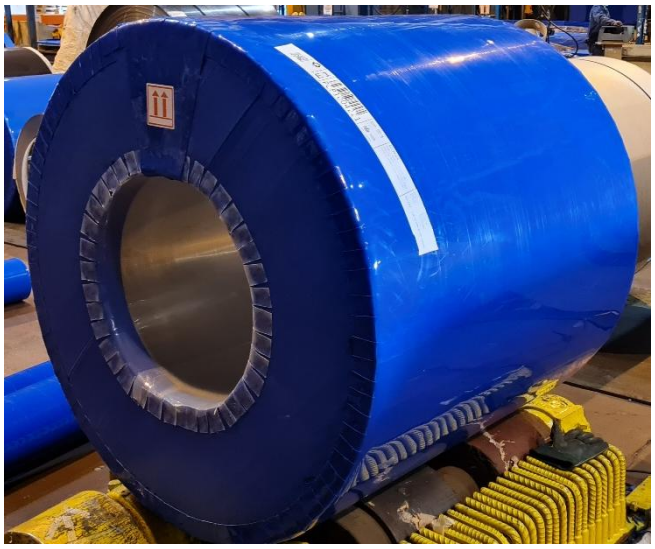
4.14 Packing

Full packing details are available on request. However, some generalised packing methods are given below.

4.14.1 Coils

No. 1 Coil

Packing is suitable for rail/road/sea transport. Coil axis is horizontal. Coil has no wooden base, unless shipped in containers. The coil is labelled with two bar code labels, one on either side of the coil.



Black Hot Band Coil

Packing is suitable for rail/road/sea transport. Coil axis is horizontal. Coil is without packing material. Strapping is with a suitable steel strapping. The coil is labelled with two bar code labels, one on either side of the coil.

Cold Rolled Coil

Packing is suitable for rail/road/sea transport. Coil may have inner cores in gauges of 0.8 mm and less. Coil axis is horizontal. Coil has no wooden base, unless shipped in containers. The coil is labelled with bar code labels, on either side of the coil.

Fourths Cold Rolled Coil

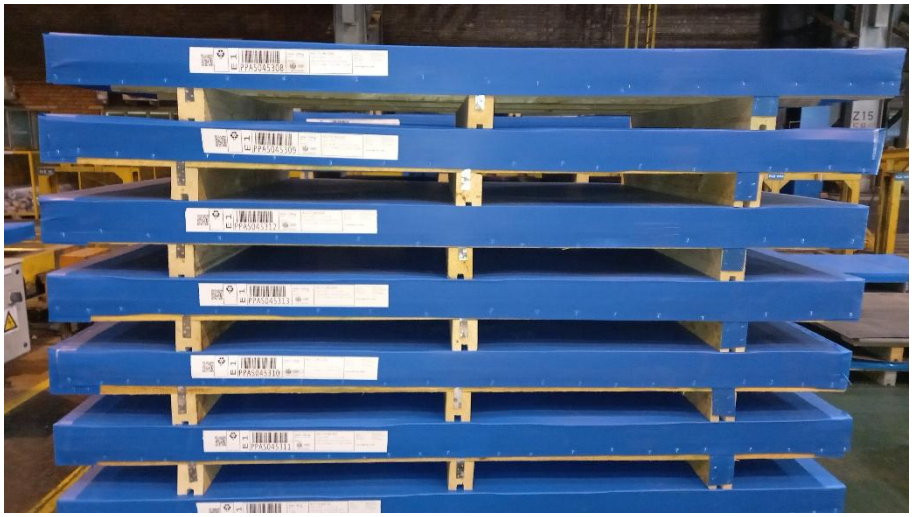
Coil axis is horizontal. Coil has no wooden base. The coil is labelled with bar code labels, on either side of the coil.

Slit Coil

The slit is placed onto an eye to the sky wooden pallet with blue low density polyethylene plastic sheet between the slit and the wooden pallet. Two bar code labels are stapled to the wooden pallet. The slit is labelled with bar code labels.

4.14.2 Plate and Sheet

Hot rolled plate and Hot and Cold rolled sheet packing is suitable for rail/road/sea transport. The case is labelled with two bar code labels, one on either side of the case.



5 SLAB SUPPLIED FOR ROLLING OR FORGING

Types

Austenitic and ferritic types are available for re-rolling to ASTM A240, viz. 304, 304L, 310S, 316, 316L, 321 and 430. Other types may be available on enquiry.

Austenitic types are available for forging to ASTM A182, viz. F304, F304L, F316, F316L, F310 and F321 and F430. Other types may be available on enquiry.

Widths

The standard nominal slab widths are 1 030, 1 250, 1 280, 1 540 and 1 575 mm. Other widths may be available on enquiry.

Typical tolerance on width is ±10 mm for austenitic material and ±15 mm on ferritic material.

Lengths

Slab lengths are available between 4 100 mm and 12 000 mm, with a tolerance of ±50 mm.

Thicknesses

Slabs are only available in thicknesses of 200 mm with a tolerance of ±5 mm.

6 SUMMARY OF CHANGES

Revision	Paragraph	Detail of Change
9	4	Removed 410S equivalent to 1.4000.
	15.9	Min gauge for PE coating changed from 0.5 mm to 0.4 mm.
	15.2.1	Split BA / BE Column
10	15.2.1	Heat resisting grades only available as BE or 2E. 2B and 2D only available with the understanding that the surface will be lightly shot blasted.
	22	Correct reference to F310, not F310S
11		Updated Board of Directors
		Include document number and revision in Footer
		General numbering corrections and layout changes
		Moved Changes to end.
	1.1	Added C843 variation to 441 and 436M/T. Updated the Chemical compositions and Fixed errors.
	1.3	Removed 304LN. Fixed Errors
	1.4	Added C843 variation to 441 and 436M/T. Removed 304LN. Added full description to General field for 310S, as per 1.1
	3.2.2.1	Added 436M/T. Removed 304LN
	3.2.2.2	Removed 304LN. Added note for 441 certification
	3.3	Corrected measurement position for mill edge material
	3.3.1.1	Added explanation for Typical Coil Mass. Added Ideal Pack Mass
	3.8	Added EN 10095 and IS 6911. Corrected name for ASME specification and removed revision. Noted that other specifications are possible.
	4.2.2.1	Added 436M/T. Removed 304LN. Removed duplicate note.
	4.3.3.1	Added explanation for Typical Coil Mass. Added Ideal Pack Mass. Section on pack mass limitation to prevent coils collapsing.
	4.10	Added EN 10095 and IS 6911. Corrected name for ASME specification and removed revision. Noted that other specifications are possible. Corrected certificate number for analysis only certification
	4.3	Corrected measurement position for mill edge material
	15.2.1	Removed “Unity”
12		Consolidation of data between hot and cold products and sequence changes
	1	Explain that the general chemistry is displayed
	1.4	Added additional equivalents 1.4513 for 431612, 1.4950 for 30911 and 1.4951 for 31085.
		Removed 30427
	3.1.1	Display correct imperial dimensions
	3.1.2	Added comment of maximum piece mass for >16 mm plates
	3.2.3	Maximum gauges changed for 3CR12, 3CR12L & 40975, with the accompanying note removed
		Maximum gauges for all changed from 6 mm to 6.35 mm for standard imperial dimension
		Minimum for 202 and 301LN/301L changed to 3.5 mm
		Inserted Note 1 for specification restrictions on gauge
		Inserted Note 6 for H-grade and grain size limitation
		Updated Note 7
		Inserted Note 8for gauge above maximum processed as plate
	3.2.4	Updated maximum for 3CR12, 3CR12L & 40975
		Added 436M/T
		Removed 202 and 301LN as possibilities
		Added HRA ranges for 309S, 309S Si & 310S
		Inserted Note 1 for specification restrictions on gauge
	3.2.5	Inserted mill’s best gauge tolerances
	4.1	Display correct imperial dimensions
	4.2.2	Added 40975
		Maximum gauges for all changed from 6mm to 6.35mm for standard imperial dimension
		Inserted 301LN range for polished wider than 1 300mm
		Inserted Note 1 for specification restrictions on gauge
	4.2.3	Inserted mill’s best gauge tolerances
	5	Inserted Delivery Conditions with consolidated data
	5.1	Removed 2.2 analysis only certificates

Revision	Paragraph	Detail of Change
	5.1.1	ASME SA240 and ASTM A240 now also accredited
	5.3	Added Testing and Releasing
	5.4.3	Remove mass restriction on fourths
	5.5.1	Corrected available inner diameters
	5.6	Expanded on packing restrictions vs mass and width for slit coils
	5.9	Updated remark for slit coils
		Inserted code P80
	5.10.2	Case marking added
	5.12.1	Removed CR Minimum Coil Mass
		Added minimum mass limitations
	6	Added F430
13		Changed layout and sequence of some data to remove duplication for hot and cold rolled products
		Corrected Technical email address
	1	Clarified limits given
	1.1	Corrected 3CR12 limits
	1.1.3	Split between 17.5% and 18.0% minimum C for 304/304L
	1.2	Changes for 3CR12/3CR12L, 40920 and 304L
	2	Clarification on bottom finish for polished top finish
	3.1.5	Increased maximum gauge for 430, 430DDQ and 309 BE finish
	3.2	Insert Coil Dimensions
	3.3.2	Consolidated hot and cold rolled sheet and plate dimensions
		Updated with current capabilities of plant
	3.3.3	Insert blank dimensions
	4.1.3	Add CPR regulation number
	4.2.1	Add Mill's Best Range
		Shifted plate normal tolerance down to specification minimum of -0.30mm
	4.2.2	Add Mill's Best Range
		Added comment on Normal tolerance aim ranges
		Changed Normal to Split
	4.2.3-4.2.12	Add Width and Length Tolerances for the various products
	4.10.1	Added explanation for material marking differing from final material number
		Added sheet for No1 products
		No. 1 coil is line marked
14	1	Removed 1.4318 and 301LN for all product forms
	1.1	Corrected 410S Cr minimum
		Add 444T
	1.3	Removed 17.5-19.5 range for 304
	1.4	Removed 1.4003 equivalent for 40975
		Corrected equivalent types for 30423, 30431, 30442,30911 and 31085
		Add 444T
	3.1.3	Add 444T
	3.1.4	Add 444T
		Updated the correct minimum plate thicknesses
		Add notes about the available tolerance for min and max gauges
	3.1.5	Added imperial equivalents for 5.5 mm and 6.0 mm
	3.1.6	Add 444T
		Add notes about the available tolerance for min and max gauges
	3.2.2	Added maximum widths
	3.3.2	Add minimum length
	3.3.3	Add minimum dimensions
	4.2.2	Added positive tolerances
	4.5.1	4.6mm ID added as option
	4.10.2	Update case label image
	4.13	Updated photos to display new packing material
15		Added new products C590, C840 and C351
		Changed general type of 202 to CS202, 43612 to 436M/T and 44412 to 444T
	IV	Disclaimer updated
	1.1.1	Removed zirconium as stabilisation alternative
		Correct Ni for 3CR12
		Changed 439Nb, 43920, 444 and 444T to Ti+Nb stabilisation in table, quoting the ASTM formula and updated Note 2 accordingly

Revision	Paragraph	Detail of Change
	1.2	Added BIS equivalents
		Changed CS202 to CS20211
	2	All BA is skin passed
	3.1.2	Minimum gauge for 439Nb changed to 3
	3.2.3	Maximum slit width is 6.35
	3.3.2	10-16 mm max not restricted for 3CR12
	4.1	Added direct links to certificates and annexures
		Moved PED and PESR under AD Mekblatt
	4.1.1.2	Added UKCA PESR
	4.1.3	Added UKCA CPR amend
	4.2.2	Added statement for deviation from specifications
		Added note about aim tolerances for slit on gauge > 6 mm
	4.2.7	Max gauge for slits increased
	4.4.2	Added flatness as seconds
	4.9	Added LAA as coating option
	4.10.1	Clarity added for continuously marked splits
	4.12.3	Updated table as per PAC-PRO-004
16		New letterhead and logos
	IV	New disclaimer
	4.2.8	Width / Length correction
17	1.2	Added JIS
	2	Added JIS
	3.3.3	Corrected max blank length
	4.1	Added approved JIS specifications
		Changed web page name and links to new document paths on extranet
	4.1.5	Added JIS certification
	4.2	JIS added
	4.2.3-4.2.5, 4.2.8-4.2.10	Expanded on requirements for special tolerances and standards to be consulted for specific tolerances
	4.2.12	Flatness added
	4.2.13	Camber added
	4.10.2	Added statement on marking on case label
18	III	Remove Fax numbers
	4.1	Ordering Information added
	4.2	Grammatical changes to certification types
	Annex A	Product Specification Sheet added

7 DOCUMENT APPROVAL

	Job Title	Co No
Prepared by	Engineer: Technical Customer Services	**5736**
Checked by	Manager: Technical Customer Services	**1885**
Accepted by	Business Unit Manager: Technical	**8412**
Approved by	Chief Operations Officer	**5565**

Annexure A

Product Specification Sheet

Mandatory		Optional	
Steel/Alloy Type:		Additional Specifications and Certifications: (Additional dual and multiple certifications required)	
Specification[1]:			
Grade:			
Form:			
Finish / Condition:		Dimensional Tolerances and Delivery Conditions: (other than required by specification)	
Edge Condition:	Trimmed ☐ | Mill Edge ☐		
Thickness:			
Width:		Special Tolerance Requirements: (other than default)	
Length:			
Certificate[2]:	3.1 ☐ or 3.2 ☐ PED ☐ CPR ☐	Special Packing and Delivery:	
Other:			
Pack Mass Limits		Special Marking:	
Interleaving:			
Coating:		Chemical Exceptions:	
		Mechanical Exceptions:	
		Any Special Requirements:	

Notes:

1. *Default is current revision unless specified*
2. *Default certificate type is 3.1 according to EN 10204*