

Stainless Precision Europe



ArcelorMittal

Our Precision Stainless Steel Range

K30 18-11 MLK41 50μ
ONP PRECISION
8-11 MLK41 K30 17-7A
ML 0.2mm 17-7A 50μ
PRECISION NP
K30 17-7A 50u K41 K30

Stainless Precision Europe Grades

	Commercial designation	Norms				
		ASTM		EN		JIS
		Designation		N°	EN 10088-2	
		Type	UNS			
Martensitic Stainless Steel	MA1⁽¹⁾	410	S41000	1.4006	X12Cr13	SUS410
	MA2	420		1.4021	X20Cr13	SUS420J1
	MA3	420	S42000	1.4028	X30Cr13	SUS420J2
Ferritic Stainless Steel	K09	409	S40900	1.4512	X2CrTi12	
	K10	410S	S41008	1.4000	X6Cr13	SUS410S
	K30	430	S43000	1.4016	X6Cr17	SUS430
	K30⁽²⁾	430L				
	K31			1.4017	X6CrNi17-1	
	K34X	434	S43400	1.4113	X6CrMo17-1	SUS434
	K36	436	S43600	1.4526	X6CrMoNb17-1	SUS436
	K39M	430Ti	S43036	1.4510	X3CrTi17	
	K41	441	S43932	1.4509	X2CrTiNb18	SUS441
	K44	444	S44400	1.4521	X2CrTiNb18-2	SUS444
Austenitic Stainless Steel with manganese	16-4Mn	201		1.4372	X12CrMnNi17-7-5	SUS201
	17-4Mn⁽⁴⁾	201.1	S20100	1.4618	X9CrMnNiCu17-8-5-2	
Austenitic Stainless Steel	17-7A et C	301	S30100	1.4310	X10CrNi18-8	SUS301
	17-7E⁽³⁾	301	S30100	1.4310	X10CrNi18-8	
	18-9E	304	S30400	1.4301	X5CrNi18-10	SUS304
	18-9DDQ	304	S30400	1.4301	X5CrNi18-10	SUS304
	18-12D	305	S30500	1.4303	X4CrNi18-12	SUS305
	18-10L	304L	S30403	1.4306	X2CrNi19-11	SUS304L
	18-10T	321	S32100	1.4541	X6CrNiTi18-10	SUS321
Austenitic Stainless Steel with Molybdenum	18-11ML	316L	S31603	1.4404	X2CrNiMo17-12-2	SUS316L
	18-13MS	316L	S31603	1.4435	X2CrNiMo18-14-3	SUS316L
	17-11MT	316Ti	S31635	1.4571	X6CrNiMoTi17-12-2	SUS316Ti
Refractory Stainless Steel	R20-12		S30908	1.4828	X15CrNiSi20-12	
	R25-20	310S	S31008	1.4845	X8CrNi25-21	SUS310S

(1) On special request : please consult us - (2) Low carbon : please consult us - (3) Molybdenum content - (4) Addition of copper

Designation, chemical compositions

Commercial designation	Chemical composition (indicative values)						
	C	Si	Mn	Cr	Mo	Ni	Others
MA1⁽¹⁾	0,11	0,35	0,33	12,30			
MA2	0,21	0,35	0,35	13,30			
MA3	0,32	0,20	0,30	13,70			
K09	0,01	0,45	0,20	11,30			Ti=0,19
K10	0,05	0,35	0,33	12,70			
K30	0,04	0,27	0,30	16,15			
K30⁽²⁾	<0,02	0,30	0,40	16,15			
K31	0,02	0,15	0,40	16,80		1,40	
K34X	0,05	0,35	0,40	16,15	1,00		
K36	0,04	0,40	0,30	17,30	1,25		Nb=0,55
K39M	0,02	0,35	0,30	16,15			Ti=0,40
K41	0,02	0,60	0,25	17,80			Ti=0,16 Nb=0,48
K44	0,015	0,40	0,30	17,70	1,85		Ti=0,17 Nb=0,28
16-4Mn	0,09	0,50	6,50	16,30		4,15	
17-4Mn⁽⁴⁾	0,05	<0,50	6,00	16,80		4,50	Cu=1,60
17-7A et C	0,10	0,60	0,85	16,80		6,55	
17-7E⁽³⁾	0,10	1,15	1,20	16,65	0,70	6,65	
18-9E	0,05	0,42	1,10	18,15		8,05	
18-9DDQ	0,04	0,40	1,10	18,15		9,06	
18-12D	0,025	0,42	1,32	18,40		12,55	
18-10L	0,02	0,42	1,32	18,15		10,06	
18-10T	0,025	0,42	1,10	17,15		9,06	Ti=0,30
18-11ML	0,025	0,42	1,35	16,85	2,05	10,05	
18-13MS	0,02	0,42	1,35	17,25	2,55	12,67	
17-11MT	0,035	0,42	1,10	16,65	2,05	10,60	Ti=0,34
R20-12	0,05	1,60	1,32	19,15		11,40	
R25-20	0,05	0,50	1,00	25,20		19,70	

Characteristics

Mechanical characteristics (indicative values)															
Annealed condition (typical values)				Temper rolled condition range according to EN 10088-2 ⁽⁴⁾								Quenched condition		Textured condition	
Rm Mpa	Rp 0.2 Mpa	A %	Hardness HV	C600	C700	C850	C1000	C1150	C1300	C1500	C1700	C1900	Rm Mpa	Hardness HRC	Rm Mpa
				600 à 700	700 à 850	850 à 1000	1000 à 1150	1150 à 1300	1300 à 1500	1500 à 1700	1700 à 1900	>1900			
530	320	28	160		x								1100 to 1300	38 to 42	
600	380	23	170		x								1400 to 1550	42 to 46	
660	430	21	185		x								1550 to 1700	46 to 49	
450	280	30	130		x										
530	315	28	155		x										
510	350	26	160												
460	310	30	145												
700	500	18	190												1100 to 1250
540	400	26	175												
520	370	28	170												
460	310	30	150												
520	340	27	170												
560	370	25	170												
825	420	45	210			x									
710	350	55	175		x	x	x	x	x	x	x				
770	350	45	180												
830	360	45	200												
670	310	50	170												
640	280	55	155												
600	270	55	150												
600	270	55	150												
640	280	50	155												
630	310	50	155												
610	310	50	155												
630	300	50	155												
660	330	50	160			x									
650	330	50	160			x									

NB : For the ultra-fine thicknesses (< 0,10 mm) in temper rolled condition, please consult us. : workable x : please consult : not workable 1 Mpa = 1 N/mm² = 145 psi

(4) The rupture strength range is measured longitudinally, according to EN 10088-2. It is possible to produce specific tensile strengths.

Properties and Applications




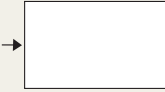

Commercial designation	Deformation	Weldability	Corrosion resistance	Exemples of applications
MA1⁽¹⁾	★★	★★	★	Brake disc, distillation columns
MA2	★	★	★	Compressor valves, machine blades, building tools
MA3	★	★	★	Sharp tools, knives, surgical instruments, razor parts and blades
K09	★★★	★★★	★★	Deep drawn components for the automotive industry, exhaust systems
K10	★★★	★★★	★★	Distillation columns for chemicals industry
K30	★★	★★	★★	Electrical appliances, automotive lamp parts, photovoltaic cells support
K30⁽²⁾	★★	★★★	★★	Flux cored welding wires
K31	★	★	★★	Textured Stainless with diphase structure : building tools, springs, reeds
K34X	★★	★★	★★★	Profiled or decorative parts, automotive trims
K36	★★★	★★	★★★	Drawn parts, diverse highly reflective parts
K39M	★★★	★★★	★★★	Welded and drawn parts subjected to high temperatures, exhaust systems, tubes
K41	★★★	★★★★	★★★★	Welded and drawn parts subjected to high temperatures, thermal insulation
K44	★★★	★★★	★★★★★	Flexible tubing, heat exchangers, deep drawn parts
16-4Mn	★★★	★★★	★★★	Springs, windows spacers
17-4Mn⁽⁴⁾	★★★	★★★	★★★	Drawn parts, windows spacers
17-7A et C	★★	★★	★★★	Springs, automotive heat gaskets, safety soles, building tools, clamps
17-7E⁽³⁾	★★	★★	★★★	High yield springs, connectors
18-9E	★★★	★★★	★★★	Drawn parts (ratio : diameter / deep ≤ 1)
18-9DDQ	★★★★	★★★	★★★	Deep drawn parts (ratio : diameter / deep ≤ 2), microtubes
18-12D	★★★★★	★★★	★★★	Ultra deep drawn pieces (ratio : diameter / deep ≤ 2), non magnetic pieces
18-10L	★★★★	★★★★★	★★★★	Flux cored welding wires, hypodermic needles, fuel cells elements, filters
18-10T	★★★	★★★★	★★★★	Flexible tubing, bellows, electric resistors (high temperature)
18-11ML	★★★	★★★★	★★★★	Chimney flue liners, flexible tubing, distillation columns, heat exchangers, parts for a marine environment
18-13MS	★★★	★★★★	★★★★★	Chimney flue liners, tubes for chemicals applications, heat exchangers, surgical instruments
17-11MT	★★★	★★★★	★★★★	Chimney flue liners, welded flexible tubes
R20-12	★★	★★★	★★★★★	Bellows for high temperature, filters
R25-20	★★	★★★	★★★★★	Furnace parts, insulation pieces

★ Medium ★★ Quite good ★★★ Good ★★★★ Very good ★★★★★ Excellent

Surface finishes









Condition	Appearance	Standard designation		Description and specific roughness
		En 10088	ASTM	
Annealed	Matt/dull	2D	2D	$Ra \leq 0.30 \mu\text{m}$
	Mirror	2B	2B	$Ra \leq 0.30 \mu\text{m}$
	Bright	2R	BA	$Ra \leq 0.30 \mu\text{m}$ standard $Ra \leq 0.10 \mu\text{m}$ high brightness
	Controlled roughness			Rough finish, non-directional $0.1 < Ra \leq 0.5 \mu\text{m}$ $0.5 < Ra \leq 1.0 \mu\text{m}$ $1.0 < Ra \leq 1.5 \mu\text{m}$
Temper rolled	Matt/dull	2H		$Ra \leq 0.30 \mu\text{m}$ standard
	Bright	2H		$Ra \leq 0.10 \mu\text{m}$ bright
	Controlled roughness			Rough finish, non-directional $0.1 < Ra \leq 0.5 \mu\text{m}$ $0.5 < Ra \leq 1.0 \mu\text{m}$ $1.0 < Ra \leq 1.5 \mu\text{m}$
Quenched	Bright	2Q		$Ra \leq 0.10 \mu\text{m}$ standard
	Polished G220	2G		Polished finish, grain size 220 - 2 sides
Textured	Bright			Quenched condition followed by a rolling operation

Edge conditions

Slit edges	Slit / deburred	Machined / deburred	Square edges	Round edges
 <p>Slitting leaves a straight edge without excessive burr</p> <p>ASTM : Edge N°3 Germany : GK</p> <p>Burr height : Normal $\leq 10\%$ of thickness Precision $\leq 5\%$ of thickness</p>	 <p>After slitting, the corners are mechanically removed</p> <p>ASTM : Edge N°3 Germany : SK</p>	 <p>After slitting, the 4 corners are machined</p> <p>ASTM : Edge N°5 Germany : SK</p>	 <p>After slitting, the 4 edges are machined to remove all burr</p> <p>ASTM : Edge N°1 Germany : SK</p>	 <p>After slitting, the edges are mechanically rounded</p> <p>ASTM : Edge N°1 Germany : SK</p>
For standard applications : cutting, stamping, drawing.	Slit edges without burr : welded microtubes.	Edge dressed to avoid any damage to elements in contact : connections, clamps, springs, subject to alternate use fatigue.	Edge dressed to guarantee the geometry of the cutting tools, measuring tools and building tools.	Safety edges for secure handling : handles, kitchen utensils and springs.

Size range

Finished products : coils, sheets, discs, traverse wound coils

Condition	Thickness (mm)	Finish	Widths (mm)
Annealed	$0,05 \leq e < 0,40$	2R	5  1000
	$0,20 \leq e < 2,20$	2R - 2B	5  680
	$2,20 \leq e \leq 2,50$	2B - 2D	15  680
Temper rolled	$0,05 \leq e < 0,40$	2H	5  1000
	$0,40 \leq e \leq 2,50$	2H	5  680
Quenched	$0,20 \leq e < 0,60$	2Q	5  500
	$0,60 \leq e \leq 2,00$	2Q - 2G	12  500
Textured	$0,20 \leq e < 2,00$	Bright	12  500

Dimensional tolerances

Tolerances (in mm) on thickness according to EN ISO 9445 norm

Thickness (e)	Thickness (mm)														
	l < 125			125 ≤ l < 250			250 ≤ l < 600			600 < l ≤ 1000			1000 < l ≤ 1300		
	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Special	Precision	Standard	Tight	
0,05 ≤ e < 0,10	±0,10 e	±0,06 e	±0,04 e	±0,12 e	±0,10 e	±0,08 e	±0,15 e	±0,10 e	±0,08 e	±0,20 e	±0,15 e	±0,10 e			
0,10 ≤ e < 0,15	±0,10	±0,008	±0,006	±0,015	±0,012	±0,008	±0,020	±0,015	±0,010	±0,025	±0,018	±0,012			
0,15 ≤ e < 0,20	±0,015	±0,010	±0,008	±0,020	±0,012	±0,010	±0,025	±0,015	±0,012	±0,030	±0,020	±0,012			
0,20 ≤ e < 0,25	±0,015	±0,012	±0,008	±0,020	±0,015	±0,010	±0,025	±0,020	±0,012	±0,030	±0,020	±0,015			
0,25 ≤ e < 0,30	±0,017	±0,012	±0,009	±0,025	±0,015	±0,012	±0,030	±0,020	±0,015	±0,030	±0,020	±0,015			
0,30 ≤ e < 0,40	±0,020	±0,015	±0,010	±0,025	±0,020	±0,012	±0,030	±0,025	±0,015	±0,040	±0,025	±0,015	±0,040	±0,030	
0,40 ≤ e < 0,50	±0,025	±0,020	±0,012	±0,030	±0,020	±0,015	±0,035	±0,025	±0,018	±0,040	±0,025		±0,040	±0,030	
0,50 ≤ e < 0,60	±0,030	±0,020	±0,014	±0,030	±0,025	±0,015	±0,040	±0,030	±0,020	±0,045	±0,030		±0,050	±0,030	
0,60 ≤ e < 0,80	±0,030	±0,025	±0,015	±0,035	±0,030	±0,018	±0,040	±0,035	±0,025	±0,050	±0,035		±0,050	±0,040	
0,80 ≤ e < 1,00	±0,030	±0,025	±0,018	±0,040	±0,030	±0,020	±0,050	±0,035	±0,025	±0,055	±0,035		±0,060	±0,040	
1,00 ≤ e < 1,20	±0,035	±0,030	±0,020	±0,045	±0,035	±0,025	±0,050	±0,040	±0,030	±0,060	±0,040		±0,070	±0,040	
1,20 ≤ e < 1,50	±0,040	±0,030	±0,020	±0,050	±0,035	±0,025	±0,060	±0,045	±0,030	±0,070	±0,045		±0,080	±0,050	
1,50 ≤ e < 2,00	±0,050	±0,035	±0,025	±0,060	±0,040	±0,030	±0,070	±0,050	±0,035	±0,080	±0,050		±0,090		
2,00 ≤ e < 2,50	±0,050	±0,035	±0,025	±0,070	±0,045	±0,030	±0,080	±0,060	±0,040	±0,090	±0,060		±0,010		

■ : For this special tolerance, please consult us.

NB : These tolerances can either be totally + or totally - or unevenly split between the two, the total range of the tolerance must remain as indicated in the table.

Tolerances (in mm) on width according to EN ISO 9445 norm

Thickness (e)	width (mm)														
	l ≤ 40			40 < l ≤ 125			125 < l ≤ 250			250 < l ≤ 690			690 < l ≤ 1000		
	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight	Precision	Standard	Tight	
e < 0,25	+0,17 0	+0,13 0	+0,10 0	+0,20 0	+0,15 0	+0,12 0	+0,25 0	+0,20 0	+0,15 0	+0,50 0	+0,50 0	+0,40 0	+1,50 0	+0,60 0	
0,25 ≤ e < 0,50	+0,20 0	+0,15 0	+0,12 0	+0,25 0	+0,20 0	+0,15 0	+0,30 0	+0,22 0	+0,17 0	+0,60 0	+0,50 0	+0,40 0	+1,50 0	+0,60 0	
0,50 ≤ e < 1,00	+0,25 0	+0,22 0	+0,15 0	+0,25 0	+0,22 0	+0,17 0	+0,40 0	+0,25 0	+0,20 0	+0,70 0	+0,60 0	+0,50 0	+1,50 0		
1,00 ≤ e < 1,50	+0,25 0	+0,22 0	+0,15 0	+0,30 0	+0,25 0	+0,17 0	+0,50 0	+0,30 0	+0,22 0	+1,00 0	+0,70 0	+0,60 0	+1,50 0		
1,50 ≤ e < 2,50				+0,40 0	+0,25 0	+0,20 0	+0,60 0	+0,40 0	+0,25 0	+1,00 0	+0,80 0	+0,60 0	+2,00 0		

NB : These tolerances can either be totally + or totally - or unevenly split between the two, the total range of the tolerance must remain as indicated in the table.

Edge camber tolerances - Based on 1000mm length

	Width (mm)						
	5 ≤ l < 8	8 ≤ l < 10	10 ≤ l < 25	25 ≤ l < 40	40 ≤ l < 125	125 ≤ l < 600	600 ≤ l < 1300
Standard	≤ 6 mm/m	≤ 5 mm/m	≤ 4 mm/m	≤ 3 mm/m	≤ 2 mm/m	≤ 1,5 mm/m	≤ 1,0 mm/m
Tight	≤ 4 mm/m	≤ 2,5 mm/m	≤ 1,5 mm/m	≤ 1,25 mm/m	≤ 1,0 mm/m	≤ 0,75 mm/m	

Flatness tolerances : waviness

	H/L en %	
	Annealed	Temper rolled ≤ 1,5 mm
Standard	≤ 3 %	≤ 2 %
Tight	≤ 2 %	≤ 1 %
Precision	≤ 1 %	≤ 0,75 %

Coil set tolerances

	Coil mm EN 10151
Standard	≤ 20 mm
Tight	≤ 10 mm
Precision	≤ 6 mm

Cross Bow tolerances

	l ≤ 10	10 < l ≤ 150	150 < l ≤ 720
Standard	2 %	1 %	0,80 %
Precision	1 %	0,50 %	0,50 %

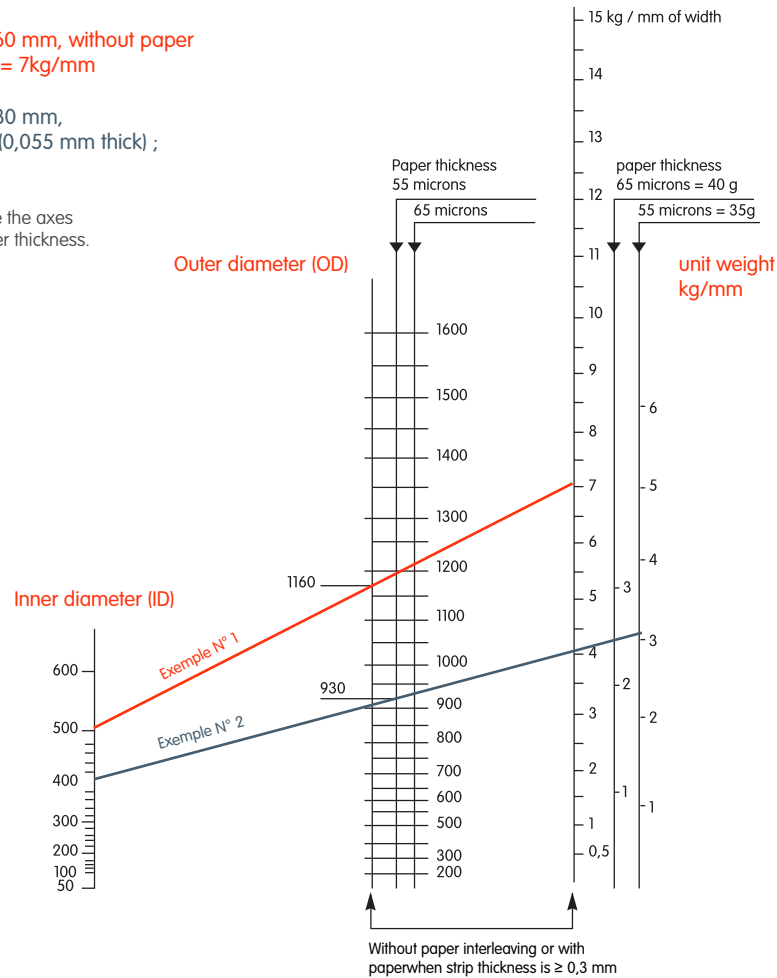
Relationship between coil size and unit weight

Examples :

N°1 : ID 500 mm, OD 1160 mm, without paper interleaving unit weight = 7kg/mm

N°2 : ID 400 mm, OD 930 mm, with paper interleaving (0,055 mm thick) ; Unit weight = 3 Kg/mm

with paper interleaving, use the axes that correspond to the paper thickness.



Plants

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