Tolerance tables

In this section you will find designations and details of guarantees provided by ArcelorMittal in terms of tolerances in accordance with the European standards referenced.

Note:
In the event of any deviation from the current standard, the latter shall prevail.

Hot rolled products

In this catalogue, steel grades are classified according to their deformation resistance at elevated temperatures.

Table 1 shows the results of this classification for our range of steel grades.

A new version, undergoing final validation at the time of publication of this catalogue, will classify steel grades according to yield strength (R_e).

Five classes will retain the same requirements:

- Table 2: Hot rolled low carbon steel sheet/plate and strip for cold forming
- Category A: $R_e \leq 300$ MPa
- Category B: 300 MPa $< R_e \leq 360$ MPa
- Category C: 360 MPa $< R_e \leq 420$ MPa
- Category D: 420 MPa $< R_e \leq 900$ MPa

Table 1

Data sheet	Grades	Table 2	Category A	Category B	Category C	Category D
A10	DD11	■				
	DD12	■				
	DD13	■				
	DD14	■				
	DD15	■				
A14	S200		■			
	S200D	■				
	S240D		■			
A20	S240MC		■			
	S280MC		■			
	S315MC			■		
	S355MC			■		
	S390MC				■	
	S420MC				■	
	S460MC				■	
	S500MC					■
	S550MC					■
A22	S600MC					■
	S700MC					■

Data sheet	Grades	Table 2	Category A	Category B	Category C	Category D
A30	S185		■			
	S235		■			
	S275		■			
	S355			■		
A34	Indaten® 355A			■		
	Indaten® 355D			■		
A40	S200 Laser		■			
	S240 Laser		■			
	S275 Laser		■			
	S355 Laser			■		
	S320MC Laser			■		
	S360MC Laser			■		
	S420MC Laser				■	
A52	C22E		■			
	C40E			■		
	C45E			■		
	C50E			■		
	C60E				■	
	C67S				■	
	C75S					■
	C100S					■
A54	22MnB5			■		
	30MnB5			■		
A62	P235		■			
	P265		■			
	P275		■			
	P295			■		
	P355			■		
	P420				■	
	16Mo3		■			
A64	P245NB		■			
	P265NB		■			
	P310NB			■		
	P355NB			■		

Tolerances on thickness according to EN 10051

Table 2. – Tolerances on thickness for continuously hot rolled low carbon steel sheet/plate for cold forming according to EN 10111

	Width (mm)			
Thickness (mm)	w ≤ 1200	1200 < w ≤ 1500	1500 < w ≤ 1800	w > 1800
th ≤ 2.00	± 0.13	± 0.14	± 0.16	-
2.00 < th ≤ 2.50	± 0.14	± 0.16	± 0.17	± 0.19
2.50 < th ≤ 3.00	± 0.15	± 0.17	± 0.18	± 0.20
3.00 < th ≤ 4.00	± 0.17	± 0.18	± 0.20	± 0.20
4.00 < th ≤ 5.00	± 0.18	± 0.20	± 0.21	± 0.22
5.00 < th ≤ 6.00	± 0.20	± 0.21	± 0.22	± 0.23
6.00 < th ≤ 8.00	± 0.22	± 0.23	± 0.23	± 0.26
8.00 < th ≤ 11.00[1]	± 0.24	± 0.25	± 0.25	± 0.28

(1) New range provided for in the update of EN 10051:1991+A1:1997

Category A

	Width (mm)			
Thickness (mm)	w ≤ 1200	1200 < w ≤ 1500	1500 < w ≤ 1800	w > 1800
th ≤ 2.00	± 0.17	± 0.19	± 0.21	-
2.00 < th ≤ 2.50	± 0.18	± 0.21	± 0.23	± 0.25
2.50 < th ≤ 3.00	± 0.20	± 0.22	± 0.24	± 0.26
3.00 < th ≤ 4.00	± 0.22	± 0.24	± 0.26	± 0.27
4.00 < th ≤ 5.00	± 0.24	± 0.26	± 0.28	± 0.29
5.00 < th ≤ 6.00	± 0.26	± 0.28	± 0.29	± 0.31
6.00 < th ≤ 8.00	± 0.29	± 0.30	± 0.31	± 0.35
8.00 < th ≤ 10.00	± 0.32	± 0.33	± 0.34	± 0.40
10.00 < th ≤ 12.50	± 0.35	± 0.36	± 0.37	± 0.43
12.50 < th ≤ 15.00	± 0.37	± 0.38	± 0.40	± 0.46
15.00 < th ≤ 25.00	± 0.40	± 0.42	± 0.45	± 0.50

Category B

	Width (mm)			
Thickness (mm)	w ≤ 1200	1200 < w ≤ 1500	1500 < w ≤ 1800	w > 1800
th ≤ 2.00	± 0.20	± 0.22	± 0.24	-
2.00 < th ≤ 2.50	± 0.21	± 0.24	± 0.26	± 0.29
2.50 < th ≤ 3.00	± 0.23	± 0.25	± 0.28	± 0.30
3.00 < th ≤ 4.00	± 0.25	± 0.28	± 0.30	± 0.31
4.00 < th ≤ 5.00	± 0.28	± 0.30	± 0.32	± 0.33
5.00 < th ≤ 6.00	± 0.30	± 0.32	± 0.33	± 0.36
6.00 < th ≤ 8.00	± 0.33	± 0.35	± 0.36	± 0.40
8.00 < th ≤ 10.00	± 0.37	± 0.38	± 0.39	± 0.46
10.00 < th ≤ 12.50	± 0.40	± 0.41	± 0.43	± 0.49
12.50 < th ≤ 15.00	± 0.43	± 0.44	± 0.46	± 0.53
15.00 < th ≤ 25.00	± 0.46	± 0.48	± 0.52	± 0.58

Category C

	Width (mm)			
Thickness (mm)	w ≤ 1200	1200 < w ≤ 1500	1500 < w ≤ 1800	w > 1800
th ≤ 2.00	± 0.22	± 0.25	± 0.27	-
2.00 < th ≤ 2.50	± 0.23	± 0.27	± 0.30	± 0.33
2.50 < th ≤ 3.00	± 0.26	± 0.29	± 0.31	± 0.34
3.00 < th ≤ 4.00	± 0.29	± 0.31	± 0.34	± 0.35
4.00 < th ≤ 5.00	± 0.31	± 0.34	± 0.36	± 0.38
5.00 < th ≤ 6.00	± 0.34	± 0.36	± 0.38	± 0.40
6.00 < th ≤ 8.00	± 0.38	± 0.39	± 0.40	± 0.46
8.00 < th ≤ 10.00	± 0.42	± 0.43	± 0.44	± 0.52
10.00 < th ≤ 12.50	± 0.46	± 0.47	± 0.48	± 0.56
12.50 < th ≤ 15.00	± 0.48	± 0.49	± 0.52	± 0.60
15.00 < th ≤ 25.00	± 0.52	± 0.55	± 0.58	± 0.65

Category D

	Width (mm)			
Thickness (mm)	w ≤ 1200	1200 < w ≤ 1500	1500 < w ≤ 1800	w > 1800
th ≤ 2.00	± 0.24	± 0.27	± 0.29	-
2.00 < th ≤ 2.50	± 0.25	± 0.29	± 0.32	± 0.35
2.50 < th ≤ 3.00	± 0.28	± 0.31	± 0.34	± 0.36
3.00 < th ≤ 4.00	± 0.31	± 0.34	± 0.36	± 0.38
4.00 < th ≤ 5.00	± 0.34	± 0.36	± 0.39	± 0.41
5.00 < th ≤ 6.00	± 0.36	± 0.39	± 0.41	± 0.43
6.00 < th ≤ 8.00	± 0.41	± 0.42	± 0.43	± 0.49
8.00 < th ≤ 10.00	± 0.45	± 0.46	± 0.48	± 0.56
10.00 < th ≤ 12.50	± 0.49	± 0.50	± 0.52	± 0.60
12.50 < th ≤ 15.00	± 0.52	± 0.53	± 0.56	± 0.64
15.00 < th ≤ 25.00	± 0.56	± 0.59	± 0.63	± 0.70

Width according to EN 10051

	Mill edges		Edge trimmed[3]	
Width (mm)	Lower	Upper	Lower	Upper
w ≤ 1200	0	+ 20	0	+ 3
1200 < w ≤ 1500 (1850)[2]	0	+ 20	0	+ 5
w > 1500 (1850)[2]	0	+ 25	0	+ 6

(2) New width limit provided for in the update of EN 10051:1991+A1:1997
(3) Tolerances for trimmed edges apply to products with nominal thickness th ≤ 10 mm; for nominal thickness th > 10 mm the upper tolerances shall be agreed at the time of enquiry and order.

Length according to EN 10051

Length (mm)	Lower	Upper
L < 2000	0	+ 10
2000 ≤ L < 8000	0	+ 0.005 x length
L ≥ 8000	0	+ 40

Flatness according to EN 10051[4]

Table 1 and category A

		Tolerances on	
Thickness (mm)	Width (mm)	normal flatness (mm)	special flatness (mm)
th ≤ 2.00	w ≤ 1200	18	9
	1200 < w ≤ 1500	20	10
	w > 1500	25	13
2.00 < th ≤ 25.00	w ≤ 1200	15	8
	1200 < w ≤ 1500	18	9
	w > 1500	23	12

(4) The flatness tolerances only apply to sheet and plate.

Category B, C, D

		Tolerances on normal flatness (mm)		
Thickness (mm)	Width (mm)	Category B	Category C	Category D
th ≤ 25.00	w ≤ 1200	18	23	after prior agreement
	1200 < w ≤ 1500	23	30	
	w > 1500	28	38	

(4) The flatness tolerances only apply to sheet and plate.

Cold rolled products

Thickness according to EN 10131

R_e < 260 MPa

Thickness (mm)	Width (mm)					
	Normal tolerances (mm)			Special tolerances (mm)		
	w ≤ 1200	1200 < w ≤ 1500	w > 1500	w ≤ 1200	1200 < w ≤ 1500	w > 1500
0.35 ≤ th ≤ 0.40	± 0.03	± 0.04	± 0.05	± 0.020	± 0.025	± 0.030
0.40 < th ≤ 0.60	± 0.03	± 0.04	± 0.05	± 0.025	± 0.030	± 0.035
0.60 < th ≤ 0.80	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
0.80 < th ≤ 1.00	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
1.00 < th ≤ 1.20	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
1.20 < th ≤ 1.60	± 0.08	± 0.09	± 0.10	± 0.050	± 0.060	± 0.070
1.60 < th ≤ 2.00	± 0.10	± 0.11	± 0.12	± 0.060	± 0.070	± 0.080
2.00 < th ≤ 2.50	± 0.12	± 0.13	± 0.14	± 0.080	± 0.090	± 0.100
2.50 < th ≤ 3.00	± 0.15	± 0.15	± 0.16	± 0.100	± 0.110	± 0.120

260 MPa ≤ R_e < 340 MPa

Thickness (mm)	Width (mm)					
	Normal tolerances (mm)			Special tolerances (mm)		
	w ≤ 1200	1200 < w ≤ 1500	w > 1500	w ≤ 1200	1200 < w ≤ 1500	w > 1500
0.35 ≤ th ≤ 0.40	± 0.04	± 0.05	± 0.06	± 0.025	± 0.030	± 0.035
0.40 < th ≤ 0.60	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
0.60 < th ≤ 0.80	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
0.80 < th ≤ 1.00	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
1.00 < th ≤ 1.20	± 0.07	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
1.20 < th ≤ 1.60	± 0.09	± 0.11	± 0.12	± 0.060	± 0.070	± 0.080
1.60 < th ≤ 2.00	± 0.12	± 0.13	± 0.14	± 0.070	± 0.080	± 0.100
2.00 < th ≤ 2.50	± 0.14	± 0.15	± 0.16	± 0.100	± 0.110	± 0.120
2.50 < th ≤ 3.00	± 0.17	± 0.18	± 0.18	± 0.120	± 0.130	± 0.140

340 MPa ≤ R_e ≤ 420 MPa

Thickness (mm)	Width (mm)					
	Normal tolerances (mm)			Special tolerances (mm)		
	w ≤ 1200	1200 < w ≤ 1500	w > 1500	w ≤ 1200	1200 < w ≤ 1500	w > 1500
0.35 ≤ th ≤ 0.40	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
0.40 < th ≤ 0.60	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
0.60 < th ≤ 0.80	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
0.80 < th ≤ 1.00	± 0.07	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
1.00 < th ≤ 1.20	± 0.09	± 0.10	± 0.11	± 0.060	± 0.070	± 0.080
1.20 < th ≤ 1.60	± 0.11	± 0.12	± 0.14	± 0.070	± 0.080	± 0.100
1.60 < th ≤ 2.00	± 0.14	± 0.15	± 0.17	± 0.080	± 0.100	± 0.110
2.00 < th ≤ 2.50	± 0.16	± 0.18	± 0.19	± 0.110	± 0.120	± 0.130
2.50 < th ≤ 3.00	± 0.20	± 0.20	± 0.21	± 0.130	± 0.140	± 0.150

Thickness according to EN 10131

R_e > 420 MPa

Thickness (mm)	Width (mm)					
	Normal tolerances (mm)			Special tolerances (mm)		
	w ≤ 1200	1200 < w ≤ 1500	w > 1500	w ≤ 1200	1200 < w ≤ 1500	w > 1500
0.35 ≤ th ≤ 0.40	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
0.40 < th ≤ 0.60	± 0.05	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
0.60 < th ≤ 0.80	± 0.06	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
0.80 < th ≤ 1.00	± 0.08	± 0.10	± 0.11	± 0.060	± 0.070	± 0.080
1.00 < th ≤ 1.20	± 0.10	± 0.11	± 0.13	± 0.070	± 0.080	± 0.100
1.20 < th ≤ 1.60	± 0.13	± 0.14	± 0.16	± 0.080	± 0.100	± 0.110
1.60 < th ≤ 2.00	± 0.16	± 0.17	± 0.19	± 0.100	± 0.110	± 0.130
2.00 < th ≤ 2.50	± 0.19	± 0.20	± 0.22	± 0.130	± 0.140	± 0.160
2.50 < th ≤ 3.00	± 0.22	± 0.23	± 0.24	± 0.160	± 0.170	± 0.180

Width according to EN 10131

Width ≥ 600 mm

Width (mm)	Normal tolerances (mm)		Special tolerances (mm)	
	Lower	Upper	Lower	Upper
w ≤ 1200	0	+ 4	0	+ 2
1200 < w ≤ 1500	0	+ 5	0	+ 2
w > 1500	0	+ 6	0	+ 3

Width < 600 mm

Tolerances (mm)	Thickness (mm)	Width (mm)							
		Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
		w < 125		125 ≤ w < 250		250 ≤ w < 400		400 ≤ w < 600	
Normal	th < 0.6	0	+ 0.4	0	+ 0.5	0	+ 0.7	0	+ 1.0
	0.6 ≤ th < 1.0	0	+ 0.5	0	+ 0.6	0	+ 0.9	0	+ 1.2
	1.0 ≤ th < 2.0	0	+ 0.6	0	+ 0.8	0	+ 1.1	0	+ 1.4
	2.0 ≤ th ≤ 3.0	0	+ 0.7	0	+ 1.0	0	+ 1.3	0	+ 1.6
Special	th < 0.6	0	+ 0.2	0	+ 0.2	0	+ 0.3	0	+ 0.5
	0.6 ≤ th < 1.0	0	+ 0.2	0	+ 0.3	0	+ 0.4	0	+ 0.6
	1.0 ≤ th < 2.0	0	+ 0.3	0	+ 0.4	0	+ 0.5	0	+ 0.7
	2.0 ≤ th ≤ 3.0	0	+ 0.4	0	+ 0.5	0	+ 0.6	0	+ 0.8

Length according to EN 10131

Length (mm)	Normal tolerances (mm)		Special tolerances (mm)	
	Lower	Upper	Lower	Upper
L < 2000	0	+ 6	0	+ 3
L ≥ 2000	0	0.3% of the length	0	0.15% of the length

Flatness according to EN 10131[5]

R_e < 260 MPa

		Thickness (mm)		
Tolerances (mm)	Width (mm)	th < 0.7	0.7 ≤ th < 1.2	th ≥ 1.2
Normal	w < 600	7	6	5
	600 ≤ w < 1200	10	8	7
	1200 ≤ w < 1500	12	10	8
	w ≥ 1500	17	15	13
Special	w < 600	4	3	2
	600 ≤ w < 1200	5	4	3
	1200 ≤ w < 1500	6	5	4
	w ≥ 1500	8	7	6
	w < 1500	Height of edge wave of length over 200 mm must be less than 1% of its length.		
	w ≥ 1500	Height of edge wave of length over 200 mm must be less than 1.5% of its length.		
		For edge waves of length less than 200 mm, the maximum height must not exceed 2 mm.		

(5) The flatness tolerances only apply to sheet.

260 MPa ≤ R_e < 340 MPa

		Thickness (mm)		
Tolerances (mm)	Width (mm)	th < 0.7	0.7 ≤ th < 1.2	th ≥ 1.2
Normal	600 ≤ w < 1200	13	10	8
	1200 ≤ w < 1500	15	13	11
	w ≥ 1500	20	19	17
Special	600 ≤ w < 1200	8	6	5
	1200 ≤ w < 1500	9	8	6
	w ≥ 1500	12	10	9

(5) The flatness tolerances only apply to sheet.

R_e ≥ 340 MPa

For these steel grades, flatness tolerance values shall be specified at the time of enquiry and order.

Coated products

Thickness according to EN 10143

R_e or $R_{p0.2}$ < 260 MPa

Thickness (mm)	Width (mm)					
	Normal tolerances (mm)			Special tolerances (mm)		
	w ≤ 1200	1200 < w ≤ 1500	w > 1500	w ≤ 1200	1200 < w ≤ 1500	w > 1500
0.20 < th ≤ 0.40	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
0.40 < th ≤ 0.60	± 0.04	± 0.05	± 0.06	± 0.035	± 0.040	± 0.045
0.60 < th ≤ 0.80	± 0.05	± 0.06	± 0.07	± 0.040	± 0.045	± 0.050
0.80 < th ≤ 1.00	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
1.00 < th ≤ 1.20	± 0.07	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
1.20 < th ≤ 1.60	± 0.10	± 0.11	± 0.12	± 0.060	± 0.070	± 0.080
1.60 < th ≤ 2.00	± 0.12	± 0.13	± 0.14	± 0.070	± 0.080	± 0.090
2.00 < th ≤ 2.50	± 0.14	± 0.15	± 0.16	± 0.090	± 0.100	± 0.110
2.50 < th ≤ 3.00	± 0.17	± 0.17	± 0.18	± 0.110	± 0.120	± 0.130
3.00 < th ≤ 5.00	± 0.20	± 0.20	± 0.21	± 0.15	± 0.16	± 0.17
5.00 < th ≤ 6.50	± 0.22	± 0.22	± 0.23	± 0.17	± 0.18	± 0.19

260 MPa ≤ $R_{p0.2}$ < 360 MPa and grades DX51D & S550GD

Thickness (mm)	Width (mm)					
	Normal tolerances (mm)			Special tolerances (mm)		
	w ≤ 1200	1200 < w ≤ 1500	w > 1500	w ≤ 1200	1200 < w ≤ 1500	w > 1500
0.20 < th ≤ 0.40	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.045
0.40 < th ≤ 0.60	± 0.05	± 0.06	± 0.07	± 0.040	± 0.045	± 0.050
0.60 < th ≤ 0.80	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
0.80 < th ≤ 1.00	± 0.07	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
1.00 < th ≤ 1.20	± 0.08	± 0.09	± 0.11	± 0.060	± 0.070	± 0.080
1.20 < th ≤ 1.60	± 0.11	± 0.13	± 0.14	± 0.070	± 0.080	± 0.090
1.60 < th ≤ 2.00	± 0.14	± 0.15	± 0.16	± 0.080	± 0.090	± 0.110
2.00 < th ≤ 2.50	± 0.16	± 0.17	± 0.18	± 0.110	± 0.120	± 0.130
2.50 < th ≤ 3.00	± 0.19	± 0.20	± 0.20	± 0.130	± 0.140	± 0.150
3.00 < th ≤ 5.00	± 0.22	± 0.24	± 0.25	± 0.17	± 0.18	± 0.19
5.00 < th ≤ 6.50	± 0.24	± 0.25	± 0.26	± 0.19	± 0.20	± 0.21

►

Thickness according to EN 10143

360 MPa ≤ $R_{p0.2}$ ≤ 420 MPa

Thickness (mm)	Width (mm)					
	Normal tolerances (mm)			Special tolerances (mm)		
	w ≤ 1200	1200 < w ≤ 1500	w > 1500	w ≤ 1200	1200 < w ≤ 1500	w > 1500
0.35 < th ≤ 0.40	± 0.05	± 0.06	± 0.07	± 0.040	± 0.045	± 0.050
0.40 < th ≤ 0.60	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
0.60 < th ≤ 0.80	± 0.07	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
0.80 < th ≤ 1.00	± 0.08	± 0.09	± 0.11	± 0.060	± 0.070	± 0.080
1.00 < th ≤ 1.20	± 0.10	± 0.11	± 0.12	± 0.070	± 0.080	± 0.090
1.20 < th ≤ 1.60	± 0.13	± 0.14	± 0.16	± 0.080	± 0.090	± 0.110
1.60 < th ≤ 2.00	± 0.16	± 0.17	± 0.19	± 0.090	± 0.110	± 0.120
2.00 < th ≤ 2.50	± 0.18	± 0.20	± 0.21	± 0.120	± 0.130	± 0.140
2.50 < th ≤ 3.00	± 0.22	± 0.22	± 0.23	± 0.140	± 0.150	± 0.160
3.00 < th ≤ 5.00	± 0.22	± 0.24	± 0.25	± 0.17	± 0.18	± 0.19
5.00 < th ≤ 6.50	± 0.24	± 0.25	± 0.26	± 0.19	± 0.20	± 0.21

420 MPa < $R_{p0.2}$ ≤ 900 MPa

Thickness (mm)	Width (mm)					
	Normal tolerances (mm)			Special tolerances (mm)		
	w ≤ 1200	1200 < w ≤ 1500	w > 1500	w ≤ 1200	1200 < w ≤ 1500	w > 1500
0.35 < th ≤ 0.40	± 0.06	± 0.07	± 0.08	± 0.045	± 0.050	± 0.060
0.40 < th ≤ 0.60	± 0.06	± 0.08	± 0.09	± 0.050	± 0.060	± 0.070
0.60 < th ≤ 0.80	± 0.07	± 0.09	± 0.11	± 0.060	± 0.070	± 0.080
0.80 < th ≤ 1.00	± 0.09	± 0.11	± 0.12	± 0.070	± 0.080	± 0.090
1.00 < th ≤ 1.20	± 0.11	± 0.13	± 0.14	± 0.080	± 0.090	± 0.110
1.20 < th ≤ 1.60	± 0.15	± 0.16	± 0.18	± 0.090	± 0.110	± 0.120
1.60 < th ≤ 2.00	± 0.18	± 0.19	± 0.21	± 0.110	± 0.120	± 0.140
2.00 < th ≤ 2.50	± 0.21	± 0.22	± 0.24	± 0.140	± 0.150	± 0.170
2.50 < th ≤ 3.00	± 0.24	± 0.25	± 0.26	± 0.170	± 0.180	± 0.190
3.00 < th ≤ 5.00	± 0.26	± 0.27	± 0.28	± 0.23	± 0.24	± 0.26
5.00 < th ≤ 6.50	± 0.28	± 0.29	± 0.30	± 0.25	± 0.26	± 0.28

Width according to EN 10143

Width ≥ 600 mm

	Normal tolerances (mm)		Special tolerances (mm)	
Width (mm)	Lower	Upper	Lower	Upper
600 ≤ w ≤ 1200	0	+ 5	0	+ 2
1200 < w ≤ 1500	0	+ 6	0	+ 2
1500 < w ≤ 1800	0	+ 7	0	+ 3
w > 1800	0	+ 8	0	+ 3

Width < 600 mm

		Width (mm)							
Tolerances (mm)	Thickness (mm)	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
		w < 125		125 ≤ w < 250		250 ≤ w < 400		400 ≤ w < 600	
Normal	th < 0.6	0	+ 0.4	0	+ 0.5	0	+ 0.7	0	+ 1.0
	0.6 ≤ th < 1.0	0	+ 0.5	0	+ 0.6	0	+ 0.9	0	+ 1.2
	1.0 ≤ th < 2.0	0	+ 0.6	0	+ 0.8	0	+ 1.1	0	+ 1.4
	2.0 ≤ th ≤ 3.0	0	+ 0.7	0	+ 1.0	0	+ 1.3	0	+ 1.6
	3.0 < th ≤ 5.0	0	+ 0.8	0	+ 1.1	0	+ 1.4	0	+ 1.7
	5.0 < th ≤ 6.5	0	+ 0.9	0	+ 1.2	0	+ 1.5	0	+ 1.8
Special	th < 0.6	0	+ 0.2	0	+ 0.2	0	+ 0.3	0	+ 0.5
	0.6 ≤ th < 1.0	0	+ 0.2	0	+ 0.3	0	+ 0.4	0	+ 0.6
	1.0 ≤ th < 2.0	0	+ 0.3	0	+ 0.4	0	+ 0.5	0	+ 0.7
	2.0 ≤ th ≤ 3.0	0	+ 0.4	0	+ 0.5	0	+ 0.6	0	+ 0.8
	3.0 < th ≤ 5.0	0	+ 0.5	0	+ 0.6	0	+ 0.7	0	+ 0.9
	5.0 < th ≤ 6.5	0	+ 0.6	0	+ 0.7	0	+ 0.8	0	+ 1.0

Length according to EN 10143

	Normal tolerances (mm)		Special tolerances (mm)	
Length (mm)	Lower	Upper	Lower	Upper
L < 2000	0	+ 6	0	+ 3
2000 ≤ L ≤ 8000	0	+ 0.3% of the length	0	+ 0.15% of the length
L > 8000	after prior agreement			

Flatness according to EN 10143[5]

R_e or $R_{p0.2}$ < 260 MPa

		Width (mm)		
Tolerances (mm)	Thickness (mm)	w < 1200	1200 ≤ w < 1500	w ≥ 1500
Normal	th < 0.7	10	12	17
	0.7 ≤ th < 1.6	8	10	15
	1.6 ≤ th < 3.0			
	3.0 ≤ th ≤ 6.5	15	18	23
Special	th < 0.7	5	6	8
	0.7 ≤ th < 1.6	4	5	7
	1.6 ≤ th < 3.0	3	4	6
	3.0 ≤ th ≤ 6.5	8	9	12

(5) The flatness tolerances only apply to sheet.

260 MPa ≤ $R_{p0.2}$ < 360 MPa and grades DX51D & S550GD

		Width (mm)		
Tolerances (mm)	Thickness (mm)	w < 1200	1200 ≤ w < 1500	w ≥ 1500
Normal	th < 0.7	13	15	20
	0.7 ≤ th < 1.6	10	13	19
	1.6 ≤ th < 3.0			
	3.0 ≤ th ≤ 6.5	18	25	28
Special	th < 0.7	8	9	12
	0.7 ≤ th < 1.6	6	8	10
	1.6 ≤ th < 3.0	5	6	9
	3.0 ≤ th ≤ 6.5	9	12	14

(5) The flatness tolerances only apply to sheet.

$R_{p0.2}$ ≥ 360 MPa

For these steel grades, flatness tolerance values shall be specified at the time of enquiry and order.

Conversion tables

In this section you will find conversion tables, a table comparing hardness values and correspondence tables between tensile strength and hardness.

Conversion tables

	Units of length
1 inch	25.40 mm
1 foot (ft) (= 12 inches)	30.48 cm
1 yard (yd) (= 3 feet)	91.44 cm
1 terrestrial mile	1609.3 m
1 centimetre (cm)	0.3937 inches
1 metre (m)	39.37 inches = 3.2808 feet
1 kilometre (km)	0.62137 miles = 1093.6 yards

	Units of surface
1 square inch (sq. inch)	6.4516 cm^2 = 645.16 mm^2
1 square foot (sq. ft)	0.0929 m^2
1 square yard (sq. yd)	0.8361 m^2
1 acre	40.47 ares
1 square mile	2.59 km^2
1 square millimetre (mm^2)	0.00155 sq. inches
1 square centimetre (cm^2)	0.155 sq. inches
1 square metre (m^2)	10.7639 sq. feet = 1.196 sq. yards
1 are (100 m^2)	119.6 sq. yards
1 hectare (10000 m^2)	2.4711 acres

	Units of capacity
1 pint (UK)	0.568 l
1 gallon (UK)	4.546 l
1 gallon (USA)	3.785 l
1 bushel (USA)	35.239 l
1 l	1.759 pints
1 cubic metre (m^3)	35.315 cubic feet
1 cubic foot	0.028 cubic metres (m^3)
1 register tonne (100 cu. ft)	2.83 cubic metres (m^3)

	Thermometric equivalents
- 20° Celsius	- 4° Fahrenheit
- 10° Celsius	14° Fahrenheit
0° Celsius	32° Fahrenheit
10° Celsius	50° Fahrenheit
30° Celsius	86° Fahrenheit
37° Celsius	98° Fahrenheit
50° Celsius	122° Fahrenheit
100° Celsius	212° Fahrenheit

	Units of weight
1 ounce	28.35 g
1 pound (lb)	453.6 g
1 stone	6.35 kg
1 hundredweight (cwt)	45.36 kg
1 gross (long) tonne (2240 lb)	1016 kg = 22.4 cwt
1 metric tonne	1000 kg = 2204 lb = 22.04 cwt
1 net (short) tonne (2000 lb)	907.2 kg
1 kg	2.204 pounds
1 metric tonne	2204.6 pounds = 0.9842 gross tonnes = 1.1023 net t.
1 pound per foot	1.4882 kg/m
1 pound per yard	0.4961 kg/m
1 kg/m	0.672 pounds per foot
1 pound per sq. inch (= 1 lb/in^2 = psi)	0.0703 kg/cm^2
1 pound per sq. foot	4.8825 kg/m^2
1 kg/mm^2	1422.32 lb/in^2
1 kg/cm^2	14.2232 lb/in^2
1 kg/m^2	0.2048 pounds per sq. foot = 1.8433 pounds per sq. yard

Approximate comparison of hardness values

Vickers P = 10 kg	Vickers P = 2 kg	HR 15 T 0.50 mm	HR 30 T 0.50 - 0.79 mm	HRB 0.80 mm
80	90	72.0	40.0	36
85	95	73.5	43.0	40
90	100	75.0	45.5	44
95	103	76.0	47.5	47
100	108	76.5	49.0	49
105	112	77.0	50.5	51
110	117	78.0	51.5	53
115	121	78.5	53.0	55
120	126	79.0	54.5	57
125	130	80.0	56.0	59
130	135	80.5	57.0	61
135	138	81.0	58.5	63
140	144	81.5	60.0	65
145	149	82.5	61.5	67
150	154	83.0	62.5	69
155	158	83.5	64.0	71
160	163	84.5	65.5	73
165	168	85.0	67.0	75
170	172	85.5	68.0	77
175	177	86.0	69.5	79

Correspondence table between tensile strength and hardness

Conversion table between Brinell hardness and tensile strength
Median values and dispersion range (with a probability of 95%)

HBS HBW[1]	Min R_m MPa	Median R_m MPa	Max R_m MPa	HBS HBW[1]	Min R_m MPa	Median R_m MPa	Max R_m MPa
85	270	370	470	285	860	960	1060
90	280	380	480	290	880	980	1080
95	290	390	490	295	890	990	1090
100	310	410	510	300	910	1010	1110
105	320	420	520	310	950	1050	1150
110	330	430	530	320	980	1080	1180
115	350	450	550	330	1020	1120	1220
120	360	460	560	340	1050	1150	1250
125	370	470	570	350	1090	1190	1290
130	390	490	590	360	1120	1220	1320
135	400	500	600	370	1160	1260	1360
140	410	510	610	380	1200	1300	1400
145	430	530	630	390	1240	1340	1440
150	440	540	640	400	1270	1370	1470
155	460	560	660	410	1310	1410	1510
160	470	570	670	420	1350	1450	1550
165	490	590	690	430	1390	1490	1590
170	500	600	700	440	1430	1530	1630
175	510	610	710	450	1470	1570	1670
180	530	630	730	460	1510	1610	1710
185	540	640	740	470	1550	1650	1750
190	560	660	760	480	1590	1690	1790
195	570	670	770	490	1630	1730	1830
200	590	690	790	500	1680	1780	1880
205	600	700	800	510	1720	1820	1920
210	620	720	820	520	1760	1860	1960
215	630	730	830	530	1800	1900	2000
220	650	750	850	540	1850	1950	2050
225	670	770	870	550	1890	1990	2090
230	680	780	880	560	1940	2040	2140
235	700	800	900	570	1980	2080	2180
240	710	810	910	580	2030	2130	2230
245	730	830	930	590	2070	2170	2270
250	750	850	950	600	2120	2220	2320
255	760	860	960	610	2160	2260	2360
260	780	880	980	620	2210	2310	2410
265	790	890	990	630	2260	2360	2460
270	810	910	1010	640	2310	2410	2510
275	830	930	1030	650	2350	2450	2550
280	840	940	1040	-	-	-	-

(1) HBS, HBW for values ≤ 450 and only HBW above 450

Conversion table between Vickers hardness and tensile strength
Median values and dispersion range (with a probability of 95%)

HV	Min R_m MPa	Median R_m MPa	Max R_m MPa	HV	Min R_m MPa	Median R_m MPa	Max R_m MPa
85	200	310	420	285	800	910	1020
90	220	320	430	290	820	930	1030
95	230	340	440	295	840	940	1050
100	240	350	460	300	850	960	1070
105	260	370	470	310	880	990	1100
110	270	380	490	320	920	1020	1130
115	290	390	500	330	950	1060	1160
120	300	410	520	340	980	1090	1200
125	320	420	530	350	1020	1120	1230
130	330	440	540	360	1050	1160	1260
135	340	450	560	370	1080	1190	1300
140	360	470	570	380	1120	1220	1330
145	370	480	590	390	1150	1260	1370
150	390	500	600	400	1190	1290	1400
155	400	510	620	410	1220	1330	1430
160	420	530	630	420	1250	1360	1470
165	430	540	650	430	1290	1400	1500
170	450	550	660	440	1320	1430	1540
175	460	570	680	450	1360	1470	1570
180	480	580	690	460	1400	1500	1610
185	490	600	710	470	1430	1540	1650
190	510	610	720	480	1470	1570	1680
195	520	630	740	490	1500	1610	1720
200	540	650	750	500	1540	1650	1750
205	550	660	770	510	1580	1680	1790
210	570	680	780	520	1610	1720	1830
215	580	690	800	530	1650	1760	1860
220	600	710	810	540	1690	1790	1900
225	610	720	830	550	1720	1830	1940
230	630	740	840	560	1760	1870	1980
235	650	750	860	570	1800	1910	2010
240	660	770	880	580	1840	1940	2050
245	680	780	890	590	1880	1980	2090
250	690	800	910	600	1910	2020	2130
255	710	820	920	610	1950	2060	2170
260	720	830	940	620	1990	2100	2210
265	740	850	950	630	2030	2140	2240
270	760	860	970	640	2070	2180	2280
275	770	880	990	650	2110	2220	2320
280	790	890	1000	-	-	-	-

Coil weight chart

The chart below can be used to calculate the outside diameters or metric weights that are compatible with your systems.

For example, if you order a 25-tonne coil, 1250 mm in width (i.e. 20 t/m), with an inside diameter of 762 mm, you can work out from the chart that the outside diameter will be 1960 mm.

Coil weight chart / external diameter