

# TOLERANCE TABLES

## HOT-ROLLED PICKLED AND UNPICKLED HOT-ROLLED STEEL SHEET

### 1. Thickness tolerance EN 10051

General tolerances					
Nominal thickness		Normal tolerances for a nominal width of:			
From	To	≤ 1200	> 1200 ≤ 1500	> 1200 ≤ 1500 > 1500 ≤ 1800	> 1800
	2.00	± 0.13	± 0.14	± 0.16	—
2.00	2.50	± 0.14	± 0.16	± 0.17	± 0.19
2.50	3.00	± 0.15	± 0.17	± 0.18	± 0.20
3.00	4.00	± 0.17	± 0.18	± 0.20	± 0.20
4.00	5.00	± 0.18	± 0.20	± 0.21	± 0.20
5.00	6.00	± 0.20	± 0.21	± 0.22	± 0.23
6.00	8.00	± 0.22	± 0.23	± 0.23	± 0.26
8.00	12.00	± 0.25	± 0.26	± 0.27	± 0.28

Tolerances for Re ≤ 300 N/mm <sup>2</sup>					
Nominal thickness		Normal tolerances for a nominal width of:			
From	To	≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	> 1800
	2.00	± 0.17	± 0.19	± 0.21	—
2.00	2.50	± 0.18	± 0.21	± 0.23	± 0.25
2.50	3.00	± 0.20	± 0.22	± 0.24	± 0.26
3.00	4.00	± 0.22	± 0.24	± 0.26	± 0.27
4.00	5.00	± 0.24	± 0.26	± 0.28	± 0.29
5.00	6.00	± 0.26	± 0.28	± 0.29	± 0.31
6.00	8.00	± 0.29	± 0.30	± 0.31	± 0.35
8.00	10.00	± 0.32	± 0.33	± 0.34	± 0.40
10.00	12.50	± 0.35	± 0.36	± 0.37	± 0.43

Tolerances for 300 < Re ≤ 360 N/mm <sup>2</sup>					
Nominal thickness		Normal tolerances for a nominal width of:			
From	To	≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	> 1800
	2.00	± 0.20	± 0.22	± 0.24	—
2.00	2.50	± 0.21	± 0.24	± 0.26	± 0.29
2.50	3.00	± 0.23	± 0.25	± 0.28	± 0.30
3.00	4.00	± 0.25	± 0.28	± 0.30	± 0.31
4.00	5.00	± 0.28	± 0.30	± 0.32	± 0.33
5.00	6.00	± 0.30	± 0.32	± 0.33	± 0.36
6.00	8.00	± 0.33	± 0.35	± 0.36	± 0.40
8.00	10.00	± 0.37	± 0.38	± 0.39	± 0.46
10	12.50	± 0.40	± 0.41	± 0.43	± 0.49

Tolerances for 360 < Re ≤ 420 N/mm <sup>2</sup>					
Nominal thickness		Normal tolerances for a nominal width of:			
From	To	≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	> 1800
	2.00	± 0.22	± 0.25	± 0.27	—
2.00	2.50	± 0.23	± 0.27	± 0.30	± 0.33
2.50	3.00	± 0.26	± 0.29	± 0.31	± 0.34
3.00	4.00	± 0.29	± 0.31	± 0.34	± 0.35
4.00	5.00	± 0.31	± 0.34	± 0.36	± 0.38
01/05/00	6.00	± 0.34	± 0.36	± 0.38	± 0.40
6.00	8.00	± 0.38	± 0.39	± 0.40	± 0.46
8.00	10.00	± 0.42	± 0.43	± 0.44	± 0.52
10	12.50	± 0.46	± 0.47	± 0.48	± 0.56

Tolerances for 420 < Re ≤ 900 N/mm <sup>2</sup>					
Nominal thickness		Normal tolerances for a nominal width of:			
From	To	≤ 1200	> 1200 ≤ 1500	> 1500 ≤ 1800	> 1800
	2.00	± 0.24	± 0.27	± 0.29	—
2.00	2.50	± 0.25	± 0.29	± 0.32	± 0.35
2.50	3.00	± 0.28	± 0.31	± 0.34	± 0.36
3.00	4.00	± 0.31	± 0.34	± 0.36	± 0.38
4.00	5.00	± 0.34	± 0.36	± 0.39	± 0.41
5.00	6.00	± 0.36	± 0.39	± 0.41	± 0.43
6.00	8.00	± 0.41	± 0.42	± 0.43	± 0.49
8.00	10.00	± 0.45	± 0.46	± 0.48	± 0.56
10	12.50	± 0.49	± 0.50	± 0.52	± 0.60

## 2. Width tolerance

### **EN 10051**

Nominal thickness		Deviation			
		Normal tolerances for a nominal width of:			
From	To	Lower	Upper	Lower	Upper
	1200	0	+ 20	0	+ 3
1200	1500	0	+ 20	0	+ 5
1500		0	+ 25	0	+ 6

## 3. Length tolerance

### **EN 10051**

Nominal length		Deviation	
From	To	Lower	Upper
	2000	0	+ 10
2000	8000	0	+ 0.005 x nominal length
8000		0	+ 40

## 4. Flatness tolerance

### **EN 10051**

Flatness tolerances $Re \leq 300 \text{ N/mm}^2$				
Nominal thickness	Nominal width		Flatness tolerances	
	From	Hasta incluido	Flatness tolerances	Special flatness tolerances
$\leq 2,00$		1200	18	9
	1200	1500	20	10
		1500	25	13
$2,00 \leq 25$		1200	15	8
	1200	1500	18	9
		1500	23	12

Flatness tolerances $300 < Re \leq 900 \text{ N/mm}^2$				
Nominal thickness	Nominal width		Flatness tolerances	
	From	Hasta incluido	B	C
$\leq 25,00$		1200	18	23
	1200	1500	23	30
		1500	28	38

## 5. Mechanical characteristics of thermomechanically rolled steels, longitudinal direction EN 10149

Steel Grade		Minimum yield strength $R_{eH}$	Tensile strength $R_m$ MPa	Minimum elongation at break A % Nominal thickness in mm	
Grade	Number			<3 $L_0 = 80$ mm	$\geq 3$ $L_0 = 5,65$
S315MC	10972	315	390 – 510	20	24
S355MC	10976	355	430 – 550	19	23
S420MC	10980	420	480 – 620	16	19
S460MC	10982	460	520 – 670	14	17
S500MC	10984	500	550 – 700	12	14
S550MC	10986	550	600 – 760	12	14
S600MC	18969	600	60 – 820	11	13
S650MC	18976	650	700 – 880	10	12
S700MC	18974	700	750 – 950	10	12
S900MC	18798	900	930 – 1200	7	8
S960MC	18799	960	980 – 1250	6	7

## 6. Chemical composition of casting analysis for thermomechanically rolled steels EN 10149

Steel Grade		C	Mn	Si	P	S	Al total	Nb	V	Ti	Mo	B
Grade	Number	% máx	% máx	% máx	% máx	% máx	% min	% máx	% máx	% máx	% máx	% máx
S315MC	10972	0,12	1,30	0,50	0,025	0,020	0,015	0,09	0,20	0,15		
S355MC	10976	0,12	1,50	0,50	0,025	0,025	0,015	0,09	0,20	0,15		
S420MC	10980	0,12	1,60	0,50	0,025	0,015	0,015	0,09	0,20	0,15		
S460MC	10982	0,12	1,60	0,50	0,025	0,015	0,015	0,09	0,20	0,15		
S500MC	10984	0,12	1,70	0,50	0,025	0,015	0,015	0,09	0,20	0,15		
S550MC	10986	0,12	1,80	0,50	0,025	0,015	0,015	0,09	0,20	0,15		
S600MC	18969	0,12	1,90	0,50	0,025	0,015	0,015	0,09	0,20	0,22	0,50	0,005
S650MC	18976	0,12	2,00	0,60	0,025	0,015	0,015	0,09	0,20	0,22	0,50	0,005
S700MC	18974	0,12	2,10	0,60	0,025	0,015	0,015	0,09	0,20	0,22	0,50	0,005
S900MC	18798	0,20	2,20	0,60	0,025	0,010	0,015	0,09	0,20	0,25	1,00	0,005
S960MC	18799	0,20	2,20	0,60	0,025	0,010	0,015	0,09	0,20	0,25	1,00	0,005

## 7. Mechanical characteristics, longitudinal direction

### **EN 10111**

Steel Grade	Grade Number	Deoxidation method	R <sub>eL</sub>		R <sub>m</sub>  Máx MPa	Minimum elongation after breakage			
			1,0 mm ≤ e < 2mm  MPa	2 mm ≤ e ≤ 11mm  MPa		L <sub>0</sub> = 80 mm			L <sub>0</sub> = 5,65 3mm ≤ e ≤ 11mm  %
						1,0 mm ≤ e < 1,5mm  %	1,5 mm ≤ e < 2mm  %	2 mm ≤ e < 3mm  %	
DD11	1.0332	At the manufacturer's discretion	170 a 360	170 a 340	440	22	23	24	28
DD12	1.0398	Fully Killed	170 a 340	170 a 320	420	24	25	26	30
DD13	1.0335	Fully Killed	170 a 330	170 a 310	400	27	28	29	33
DD14	1.0389	Fully Killed	170 a 310	170 a 290	380	30	31	32	36

## 8. Chemical composition in casting analysis

### **EN 10111**

Grade	Grade	Deoxidation method	Chemical composition in casting analysis			
			C Máx %	Mn Máx %	P Máx %	S Máx %
DD11	1.0332	At the manufacturer's discretion	0.12	0.60	0.045	0.045
DD12	1.0398	Fully Killed	0.10	0.45	0.035	0.035
DD13	1.0335	Fully Killed	0.08	0.40	0.030	0.030
DD14	1.0389	Fully Killed	0.08	0.35	0.025	0.025

9. Room temperature mechanical properties for flat and long products in types and grades of steel with shock bending values **EN 10025**

According to EN 10027-1 and CR 10260	According to EN 10027-2	Minimum yield strength Re MPa Nominal thickness	Tensile strength Rm MPa Nominal thickness		At % of 80	Al % L <sub>0</sub> = 5,65
		≤ 16	< 3	≥ 3 ≤ 100	>2,5 <3	>3 ≤ 40
S235JR	1.0038	235	360 a 510	360 a 510	21	26
S235J0	1.0114	235	360 a 510	360 a 510		
S235J2	1.0117	235	360 a 510	360 a 510	19	24
S275JR	1.0044	275	430 a 580	410 a 560	19	23
S275J0	1.0143	275	430 a 580	410 a 560		
S275J2	1.0145	275	430 a 580	410 a 560	17	21
S355JR	1.0045	355	510 a 680	470 a 630	18	22
S355J0	1.0553	355	510 a 680	470 a 630		
S355J2	1.0577	355	510 a 680	470 a 630		
S355K2	1.0596	355	510 a 680	470 a 630	16	20
S450J0	1.0590	450	-	550 a 720	-	17