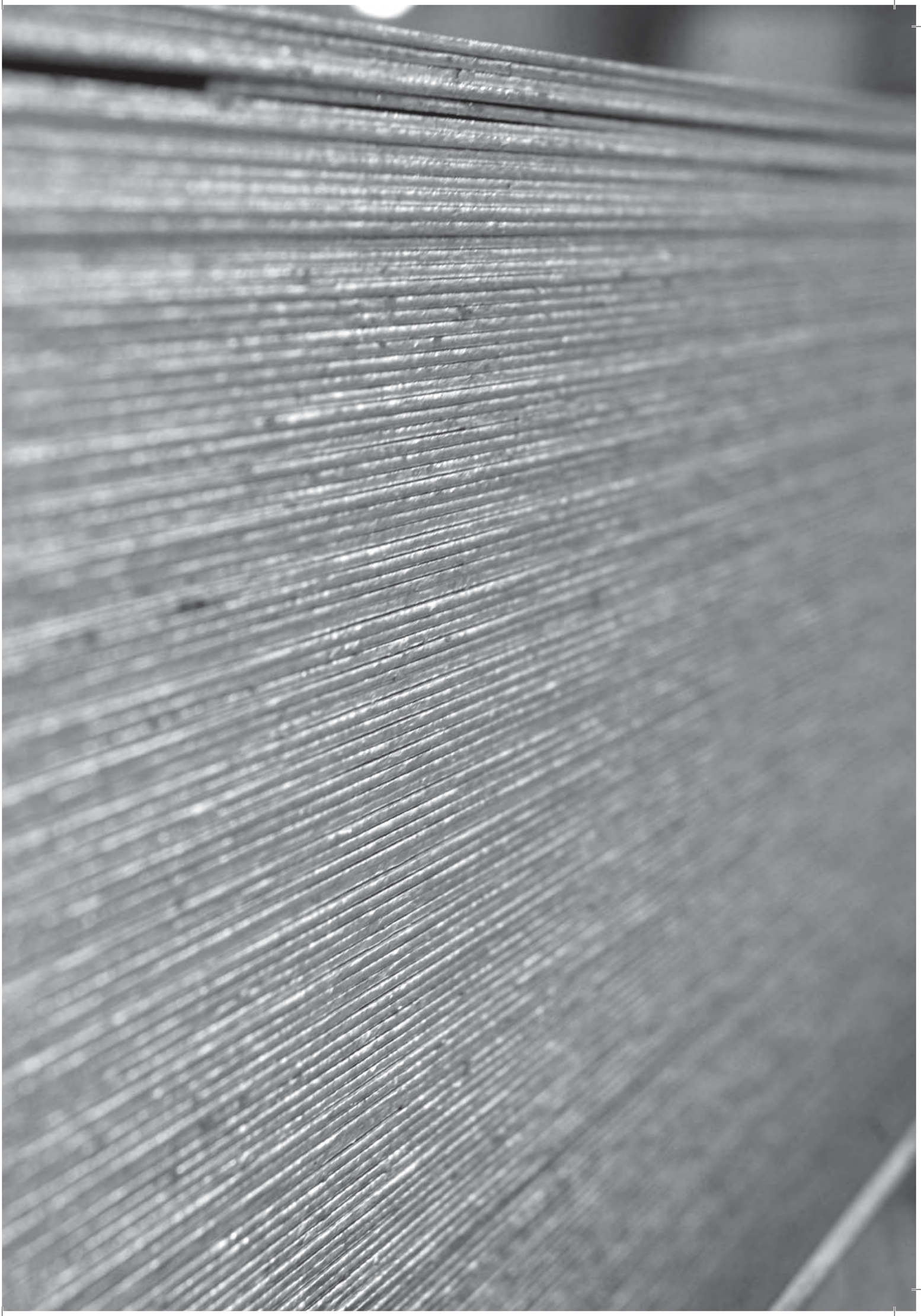
ΕΛΑΣΤΡΟΝ

ΧΑΛΥΒΟΥΡΓΙΚΑ ΠΡΟΪΟΝΤΑ

ΛΑΜΕΣ (κατά DIN 1016 & DIN 1017)
S235 (EN 10025)

Βάρος ανά μέτρο (m)														
Πάχος Smm / Πλάτος Wmm	3	4	5	6	8	10	12	16	20	25	30	40	50	60
10	0,24	0,31	0,39											
12	0,28	0,38	0,47											
14	0,33	0,44	0,55	0,66	0,88									
16	0,38	0,50	0,63	0,75	1,00									
18	0,42	0,57	0,71	0,85	1,13									
20	0,47	0,63	0,79	0,94	1,26	1,57	1,88	2,51						
25	0,59	0,79	0,98	1,18	1,57	1,96	2,36	3,14						
30	0,71	0,94	1,18	1,41	1,88	2,36	2,83	3,77	4,71	5,89				
35	0,82	1,10	1,37	1,65	2,20	2,75	3,30	4,40	5,50	6,87				
40	0,94	1,26	1,57	1,88	2,51	3,14	3,77	5,05	6,28	7,85	9,42			
45			1,77	2,12	2,83	3,53	4,24	5,65	7,07	8,83	10,60			
50			1,96	2,36	3,14	3,93	4,71	6,28	7,85	9,81	11,78	15,70		
55			2,16	2,59	3,45	4,32	5,18	6,91	8,64	10,79	12,95			
60			2,36	2,83	3,77	4,71	5,65	7,54	9,42	11,78	14,13	18,84	23,55	
65			2,55	3,06	4,08	5,10	6,12	8,16	10,21	12,76	15,31	20,41		
70			2,75	3,30	4,40	5,50	6,59	8,79	10,99	13,74	16,49	21,98	27,48	
75			2,94	3,53	4,71	5,89	7,07	9,42	11,78	14,72				
80			3,14	3,77	5,02	6,28	7,54	10,05	12,56	15,70	18,84	25,12	31,40	
90			3,53	4,24	5,65	7,07	8,48	11,30	14,13	17,66	21,20	28,26	35,33	
100			3,93	4,71	6,28	7,85	9,42	12,56	15,70	19,63	23,55	31,40	39,25	47,10
110			4,32	5,18	6,91	8,64	10,36	13,82	17,27	21,59	25,91	34,54	43,18	
120			4,71	5,65	7,54	9,42	11,30	15,07	18,84	23,55	28,26	37,68	47,10	
130			5,10	6,12	8,16	10,21	12,25	16,33	20,41	25,51	30,62	40,82	51,03	
140			5,50	6,59	8,79	10,99	13,19	17,58	21,98	27,48	32,97	43,96	54,95	
150			5,89	7,07	9,24	11,78	14,13	18,84	23,55	29,44	35,33	47,10	58,88	
160						12,56	15,07	20,10	15,12	31,40	37,68	50,24	62,80	
180						14,13	16,96	22,61	28,26	35,33	42,39	56,52	70,65	
200						15,70	18,84	25,12	31,40	39,25	47,10	62,80	78,50	

Ειδικές διαστάσεις για εργαλεία, ειδικές κατασκευές κλπ.



ΑΝΤΙΣΤΟΙΧΙΕΣ ΠΟΙΟΤΗΤΩΝ

EN					GERMANY	FRANCE	U.K.	SPAIN	ITALY	BELGIUM	SWEDEN	PORTUGAL	AUSTRIA	NORWAY
EN 1005-2:2004		**EN 10025:1990 +A1:1993**		**EN 10025:1990**	**DIN 17100**	**NF A 35-501**	**BS 4360**	**UNE 36-080**	**UNI 7070**	**NBN A 21-101**	**SS 14**	**NP 1729**	**N 3116**	
S185	1.0035	S185	1.0035	Fe 310-0	St 33	A 33		A 310-0	Fe 320	A 320	13 00-00	Fe 310-0	St 320	
		S235JR	1.0037	Fe 360 B	St 37 – 2	E24-2			Fe 360 B	AE 235-B	13 11-00	Fe 360-B		NS 12 120
		S235JRG1	1.0036	Fe 360 BFU	Ust 37 -2			AE 235 B-FU					Ust 360 B	NS 12 122
S235JR	1.0038	S235JRG2	1.0038	Fe 360 BFN	RSt 37 -2		40B	AE 235 B- FN			13 12-00		Rst 360 B	NS 12 123
S235JO	1.0114	S235JO	1.0114	Fe 360 C	St 37- 3 U	E24-3	40C	AE 235 C	Fe 360 C	AE 235-C		Fe 360-C	St 360 C	NS 12 124
												Fe 360-CE		
		S235J2G3	1.0116	Fe 360 D1	St 37-3 N	E24-4	40D	AE 235 D	Fe 360 D	AE 235-D		Fe 360-D	St 360 D	NS 12 124
S235J2	1.0117	S235J2G4	1.0117	Fe 360 D2										
S275JR	1.0044	S275JR	1.0044	Fe 430 B	St 44-2	E 28-2	43B	AE 275 B	Fe 430 B	AE 255-B	14 12-00	Fe 430-B	St 430 B	NS 12 142
S275JO	1.0043	S275JO	1.0143	Fe 430 C	St 44-3 U	E 28-3	43C	AE 275 C	Fe 430 C	AE 255-C		Fe 430-C	St 430 C	NS 12 143
													St 430 CE	
		S275JOG3	1.0144	Fe 430 D1	St 44-3 N	E 28-4	43D	AE 275 D	Fe 430 D	AE 255-D	14 14-00	Fe 430-D	St 430 D	NS 12 143
S275J2	1.0145	S275JOG4	1.0145	Fe 430 D2										
S355JR	1.0045	S355JR	1.0045	Fe 510 B		E 36-2	50B	AE 355 B	Fe 510 B	AE 355-B		Fe 510-B		
S355JO	1.0553	S355JO	1.0553	Fe 510 C	St 52-3 U	E 36-3	50C	AE 355 C	Fe 510 C	AE 355-C		Fe 510-C	St 51C	NS 12 153
		S355J2G3	1.0570	Fe 510 D1	St 52-3N		50D	AE 355D	Fe 510 D	AE 355-D		Fe 510-D	St 51 D	NS 12 153
S355J2	1.0577	S355J2G4	1.0577	Fe 510 D2										
		S355K2G3	1.0595	Fe 510 DD1		E 36-4	50DD			AE 355-DD		Fe 510-DD		
S355K2	1.0596	S355K2G4	1.0596	Fe 510 DD2										
S450JO	1.0590						55C							
E295	1.0050	E295	1.0050	Fe 490 – 2	St 50-2	A 50-2		A 490	Fe 490	A 490-2	15 50-00	Fe 490-2	St 490	
											15 50-01			
E335	1.0060	E335	1.0060	Fe 590 – 2	St 60-2	A 60-2		A 590	Fe 590	A 590-2	16 50 00	Fe 590-2	St 590	
											16 50 01			
E360	1.0070	E360	1.0070	Fe 690 - 2	St 70-2	A 70-2		A 690	Fe 690	A 690-2	16 55 00	Fe 690-2	St 690	
											16 55 01			

CHEMICAL COMPOSITION OF THE PRODUCT ANALYSIS

Designation		Method of deoxidation [b]	C in % max. for nominal product thickness in mm			Si % max.	Mn % max.	P % max. [d]	S % max. [d, e]	N % max. [f]	Cu % max. [g]	Other % max. [h]
According EN 10027-01 and CR 10260	According EN 10027-2		≤ 16	> 16 ≤ 40	> 40[c]							
S235JR	1.0038	FN	0,19	0,19	0,23	-	1,50	0,045	0,045	0,014	0,60	-
S235J0	1.0114	FN	0,19	0,19	0,19	-	1,50	0,040	0,040	0,014	0,60	-
S235J2	1.0117	FF	0,19	0,19	0,19	-	1,50	0,035	0,035	-	0,60	-
S275JR	1.0044	FN	0,24	0,24	0,25	-	1,60	0,045	0,045	0,014	0,60	-
S275J0	1.0143	FN	0,21	0,21	0,23[i]	-	1,60	0,040	0,040	0,014	0,60	-
S275J2	1.0145	FF	0,21	0,21	0,23[i]	-	1,60	0,035	0,035	-	0,60	-
S355JR	1.0045	FN	0,27	0,27	0,27	0,60	1,70	0,045	0,045	0,014	0,60	-
S355J0	1.0553	FN	0,23[j]	0,23[k]	0,24	0,60	1,70	0,040	0,040	0,014	0,60	-
S355J2	1.0577	FF	0,23[j]	0,23[k]	0,24	0,60	1,70	0,035	0,035	-	0,60	-
S355K2	1.0596	FF	0,23[j]	0,23[k]	0,24	0,60	1,70	0,035	0,035	-	0,60	-
S450J0[l]	1.0590	FF	0,23	0,23k	0,24	0,60	1,80	0,040	0,040	0,027	0,60	[m]

[b] FN = rimming steels not permitted; FF = fully killed steel
[c] For sections with nominal thickness > 100 mm the C content by agreement.
[d] For long products the P and S content can be 0,005% higher.
[e] For long products the max. S content can be increased for improved mach inability by 0,015% by agreement if the steel is treated to modify the sulphide morphology and the chemical composition shows min. 0,0020% Ca.
[f] The max. value for nitrogen does not apply if the chemical composition shows a minimum total Al content of 0,015% or alternatively min. 0,013% acid soluble Al or if sufficient other N binding elements are present. In this case the N binding elements shall be mentioned in the inspection document.
[g] Cu content above 0,45% may cause hot shortness during hot forming.
[h] If other elements are added, they shall be mentioned on the inspection document.
[i] For nominal thickness > 150 mm: C = 0,22% max.
[j] For grades suitable for cold roll forming C = 0,24% max.
[k] For nominal thickness > 30 mm: C = 0,24% max.
[l] Applicable for long products only.
[m] The steel may show a Nb content of max. 0,06%, a V content of max. 0,15% and a Ti content of max. 0,06%.
(according to EN10025)

MECHANICAL PROPERTIES AT AMBIENT TEMPERATURE FOR FLAT AND LONG PRODUCTS OF STEEL GRADES AND QUALITIES WITH VALUES FOR THE IMPACT STRENGTH

Designatio n		Minimum yield strength R_{eH}[a] MPa[b] Nominal thickness mm									Tensile strength R_m[a] MPa[b] Nominal thick-ness mm				
According EN 10027-1 and CR 10260	Accord-ing EN 10027-2	≤ 16	> 16 ≤ 40	> 40 ≤ 63	> 63 ≤ 80	> 80 ≤ 100	> 100 ≤ 150	> 150 ≤ 200	> 200 ≤ 250	> 250 ≤ 400[c]	> 3	≥ 3 ≤ 100	> 100 ≤ 150	> 150 ≤ 250	> 250 ≤ 400[c]
S235JR	1.0038	235	225	215	215	215	195	185	175	-	360 to 510	360 to 510	350 to 500	340 to 490	-
S235J0	1.0114	235	225	215	215	215	195	185	175	-	360 to 510	360 to 510	350 to 500	340 to 490	-
S235J2	1.0117	235	225	215	215	215	195	185	175	165	360 to 510	360 to 510	350 to 500	340 to 490	330 to 480
S275JR	1.0044	275	265	255	245	235	225	215	205	-	430 to 580	410 to 560	400 to 540	380 to 540	-
S275J0	1.0143	275	265	255	245	235	225	215	205	-	430 to 580	410 to 560	400 to 540	380 to 540	-
S275J2	1.0145	275	265	255	245	235	225	215	205	195	430 to 580	410 to 560	400 to 540	380 to 540	380 to 540
S355JR	1.0045	355	345	355	325	315	295	285	275	-	510 to 680	470 to 630	450 to 600	450 to 600	-
S355J0	1.0553	355	345	355	325	315	295	285	275	-	510 to 680	470 to 630	450 to 600	450 to 600	-
S355J2	1.0577	355	345	355	325	315	295	285	275	265	510 to 680	470 to 630	450 to 600	450 to 600	450 to 600
S355K2	1.0596	355	345	355	325	315	295	285	275	265	510 to 680	470 to 630	450 to 600	450 to 600	450 to 600
S450J0[d]	1.0590	450	430	410	390	380	380	-	-	-	-	550 to 720	530 to 700	-	-

[a] For plate and wide flats with widths ≥ 600 mm the direction transverse (t) to the rolling applies. For all other products the values apply for the direction parallel (l) to the rolling direction.
[b] 1 MPa = 1 N/mm2.
[c] The values apply to flat products.
[d] Applicable for long products only.
(according to EN10025)

MECHANICAL PROPERTIES AT AMBIENT TEMPERATURE FOR FLAT AND LONG PRODUCT OF STEEL GRADES AND QUALITIES WITH VALUES FOR THE IMPACT STRENGTH (CONCLUDED)

Designation		Position of test pieces [a]	Minimum percentage elongation after fracture [a] %										
			$L_o = 80$ mm Nominal thickness mm					$L_o = 5{,}65\sqrt{S_o}$ Nominal thickness mm					
According EN 10027-1 and CR 10260	According EN 10027-2		≤ 1	> 1 ≤ 1,5	> 1,5 ≤ 2	> 2 ≤ 2,5	>2,5 < 3	≥ 3 ≤ 40	> 40 ≤ 63	> 63 ≤ 100	> 100 ≤ 150	> 150 ≤ 250	> 250[c] ≤ 400 only for J2 and K2
S235JR	1.0038	l	17	18	19	20	21	26	25	24	22	21	-
S235J0	1.0114												-
S235J2	1.0117	t	15	16	17	18	19	24	23	22	22	21	21 (l and t)
S275JR	1.0044	l	15	16	17	18	19	23	22	21	19	18	-
S275J0	1.0143												-
S275J2	1.0145	t	13	14	15	16	17	21	20	19	19	18	18 (l and t)
S355JR	1.0045	l	14	15	16	17	18	22	21	20	18	17	-
S355J0	1.0553												-
S355J2	1.0577												17 (l and t)
S355K2	1.0596	t	12	13	14	15	16	20	19	18	18	17	17 (l and t)
S450J0[d]	1.0590	l	-	-	-	-	-	17	17	17	17	-	-

[a] For plate, strip and wide flats with widths ≥600 mm the direction transverse (t) to the rolling direction applies. For all other products the values apply for the direction parallel (l) to the rolling direction.

[c] The values apply to flat products.

[d] Applicable for long product only.

(according to EN10025)