

5. HOT-ROLLED PRODUCTS (STRENGTH CLASS OF 350 MPa)

Table 18. Mechanical properties of steel.

Steel Grade	Standard	Thickness, mm	Tensile strength, MPa (N/mm ²)	Yield strength, MPa (N/mm ²)	Elongation, % min	Mandrel diameter for 180° bending	Impact energy J, min (t C)
30	ASTM A 1011 (ASTM A 570)	1.5-1.59	340 min	205 min	21	d=1,0a	...
30	ASTM A 1011 (ASTM A 570)	1.6-2.49	340 min	205	24	d=1,0a	...
30	ASTM A 1011 (ASTM A 570)	2.5-4.45	340 min	205	25	d=1,0a	...
30	ASTM A 907	4.5-14.0	340 min	205	22	...	...
33	ASTM A 1011 (ASTM A 570)	1.5-1.59	360 min	230	18	d=1,0a	...
33	ASTM A 1011 (ASTM A 570)	1.6-2.45	360 min	230	22	d=1,0a	...
33	ASTM A 1011 (ASTM A 570)	2.5-4.49	360 min	230	23	d=1,0a	...
33	ASTM A 907	4.5-14.0	360 min	230	22	...	...
1012	SAE J403	1.5-4.45	...	...	...	...	...
1012	ASTM A 635	4.5-14.0	...	...	...	...	...
S235JRG2	EN 10025	1.5-2.9	360-510	235	19	d=1,5a	...
S235JRG2	EN 10025	3.0-9.9	340-470	235	24	d=2,0a	(+20)
S235JRG2	EN 10025	10.0-14.0	340-470	235	24	d=2,0a	27(+20)
S235JO	EN 10025	1.5-2.9	360-510	235	19	d=1,0a	...
S235JO	EN 10025	3.0-9.9	340-470	235	24	d=1,5a	(0)
S235JO	EN 10025	10.0-14.0	340-470	235	24	d=1,5a	27(0)
S235JRG3	EN 10025	1.5-2.9	360-510	235	19	d=1,0a	...
S235JRG3	EN 10025	3.0-9.9	340-470	235	24	d=1,5a	(-20)
S235JRG3	EN 10025	10.0-14.0	340-470	235	24	d=1,5a	27(-20)
St2sp	GOST 16523-97	1.5-3.9	300-480	...	23	d=1,0a	...
St2sp	GOST 14637-89	4.0-14.0	330-430	225	32	d=1,5a	...

... - parameter is not limited by the standard.

a - strip thickness.

* - impact energy with 5.0-9.9 mm wide specimens for steel grades: S235JRG2, S235JO, and S235J2G3 under EN 10025; S235JRG2 under EN 10025 corresponds to St 37-2 under DIN 17100; S235JO under EN 10025 corresponds to St37-3 under DIN 17100; S235J2G3 under EN 10025 corresponds to St37-3N under DIN 17100.

Previous designation of the standard is given in the brackets.

Table 19. Chemical composition.

Composition, %										
C	Si	Mn	Al	S	P	Cr	Ni	Cu	N	
0.10-0.15	0.15-0.30	0.30-0.60	0.02-0.07	0.035 max	0.030 max	0.15 max	0.20 max	0.20 max	0.008 max	

The fraction of total mass of molybdenum, which should not exceed 0.06%, is determined for all grades of ASTM A 570 and ASTM A 907; the overall content of Cu, Ni, Cr and Mo should not exceed 0.50%, and the total amount of Cr and Mo should not be more than 0.16%. Besides the fraction of total mass of titanium for all grades of ASTM A 907, which should not exceed 0.005%, is determined. The determined fraction of total mass of molybdenum, vanadium, niobium for grade 1012 under ASTM A 635 and SAE J 403 should not exceed: Mo - 0.06%, V - 0.008%, Nb - 0.008%; the overall content of Cu, Cr, Ni, Mo should not exceed 0.50%.

Table 20. Shape and dimension tolerances.

Technical specifications	GOST 16523-97	ASTM A 1011 (ASTM A 570)	ASTM A 635	EN 10025
	GOST 14637-89	SAE J403	ASTM A 907	
Product mix, dimensions and tolerances standard	GOST 19903-74	ASTM A 568	ASTM A 635	EN 10051 EN 10029

Note: Previous designation of the standard is given in the brackets.

Fig. 9. Relation of thickness to width of rolled steel products.

