

Mechanical properties of steel bolts and screws

Mechanical property			4.6	4.8	5.6	5.8	6.6	6.8	8.8	10.9	12.9
			Tensile strength R_m	min.	kgf/mm ²	40		50		60	
N/mm ^{2*}	392				490		588		785	981	1177
max.	kgf/mm ²	55		70		80		100	120	140	
	N/mm ^{2*}	539		686		785		981	1177	1373	
Brinell hardness	min.	HB	110		140		170		225	280	330
	max.	HB	170		215		245		300	365	425
Rock well hardness	min.	HRB	62		77		88		—	—	—
		HRC	—		—		—		18	27	34
	max.	HRB	88		97		102		—	—	—
		HRC	—		—		—		31	38	44
Vickers hardness HV30	min.		110		140		170		225	280	330
	max.		170		215		245		300	370	440
Yield stress R_e	min.	kgf/mm ²	24	32	30	40	36	48	—	—	—
		N/mm ^{2*}	235	314	294	392	353	471	—	—	—
Stress at permanent set limit	min	kgf/mm ²	—	—	—	—	—	—	64	90	108
		N/mm ^{2*}	—	—	—	—	—	—	628	883	1059
Stress under proofload S_p (see Note 2)		S_p/R_e	0.94	0.91	0.94	0.91	0.94	0.91	0.91	0.88	0.88
		kgf/mm ²	22.6	29.1	28.2	36.4	33.9	43.7	58.2	79.2	95.0
		N/mm ^{2*}	222	286	276	357	333	429	571	777	932
Elongation A after fracture	min. percent		25	14	20	10	16	8	12	9	8
Charpy Impact strength	min.	kgfm/cm ²	—						6	4	3
		ft lbf	—						22	14	11

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