



MECHANICAL PROPERTIES

OF STEEL BOLTS, SCREWS AND STUDS AS PER ISO STANDARD

ROCKSIDE
EXPORT LIMITED

DIMENSIONS :

Sub-clause No.	Mechanical Property	Property Class												
		3.6	4.6	4.8	5.6	5.8	6.8	8.8 ¹⁾ d < 16mm d > 16mm ²⁾	9.8 ³⁾	10.9	12.9			
5.1 and 5.2	Tensile strength, R _m ^{4),5)} N/mm ²	nom.	300	400		500		600	800	800	900	1 000	1 000	
		min.	330	400	420	500	520	600	800	830	900	1 040	1 220	
5.3	Vickers hardness, HV, F ≥ 98 N	min.	95	120	130	155	160	190	250	255	290	320	385	
		max.	250						320	335	360	380	435	
5.4	Brinell hardness, HB, F = 30 D ²	min.	90	114	124	147	152	181	238	242	276	304	366	
		max.	238						304	318	342	361	414	
5.5	Rockwell hardness, HR	min.	HRB	52	67	71	79	82	89					
			HRC	—	—	—	—	—	—	22	23	28	32	39
		max.	HRB	99.5						—	—	—	—	—
			HRC	—						32	34	37	39	44
5.6	Surface hardness, HV 0.3	max.	—						6)					
5.7	Lower yield stress, Re _L ⁷⁾ N/mm ²	nom.	180	240	320	300	400	480	—	—	—	—	—	
		min.	190	240	340	300	420	480	—	—	—	—	—	
5.8	Proof stress, R _{p0.2} N/mm ²	nom.	—						640	640	720	900	1 080	
		min.	—						640	660	720	940	1 100	
5.9	Stress under proofing load, S _p N/mm ²	S _p /Re _L or S _p /R _{p0.2}	0.94	0.94	0.91	0.93	0.90	0.92	0.91	0.91	0.90	0.88	0.88	
		N/mm ²	180	225	310	280	380	440	580	600	650	830	970	
5.10	Elongation after fracture, A	min.	25	22	14	20	10	8	12	12	10	9	8	
5.11	Strength under wedge loading ⁵⁾	The Values For Full Size Bolts And Screws (not studs) shall not be smaller than the minimum values for tensile strength shown in 5.2												
5.12	Impact strength, J	min.	—			25	—		30	30	25	20	15	
5.13	Head soundness	No fracture												
5.14	Minimum height of non-decarburized thread zone, E	mm	—						$\frac{1}{2} H_1$		$\frac{2}{3} H_1$	$\frac{3}{4} H_1$		
	Maximum depth of complete decarburization, G	—						0.015						

- 1) For bolts of property class 8.8 in diameters d < 16 mm, there is an increased risk of nut shipping in the case of inadvertent overtightening inducing a load in excess of proofing load. Reference to ISO 898-2 is recommended.
- 2) For structural bolting the limit is 12 mm
- 3) Applies only to nominal thread diameters d < 16mm
- 4) Minimum tensile properties apply to products of nominal length l > 2.5 d. Minimum hardness applies to products of length l < 2.5d and other products which cannot be tensile-tested (e.g. due to head configuration).
- 5) For testing of full-size bolts, screws and studs, the loads given in tables 6 to 9 shall be applied.
- 6) Surface hardness shall not be more than 30 Vickers points above the measured core hardness on the product when readings of both surface and core are carried out at HV 0.3. For property class 10.9, any increase in hardness at the surface which indicates that the surface hardness exceeds 390 HV is not acceptable.
- 7) In cases where the lower yield stress Re_L cannot be determined, it is permissible to measure the proof stress R_{p0.2}
- 8) The surface condition of bolts, screws and nuts should be in accordance with the requirement of the relevant parts of ISO 6157.