

## ISO898 for bolts, screws and studs

Mechanical Properties (at 20 °C)

			3.6	4.6	4.8	5.6	5.8	6.8	8.8 (a)		9.8 (b)	10.9	12.9	
			–	–	–	–	–	–	</-M16 (c)	>M16 (c)	–	–	–	
Nominal tensile strength, Rm	nom	N/mm <sup>2</sup>	300	400		500		600	800	800	900	1000	1200	
Minimum tensile strength, Rm <sub>(d,e)</sub>	min	N/mm <sup>2</sup>	330	400	420	500	520	600	800	830	900	1040	1220	
Vickers hardness HV F >= 98 N	min		95	120	130	155	160	190	250	255	290	320	385	
	max		max. 220 (250 at the screw end)					250	320	335	360	380	435	
Brinell hardness HB F = 30 D2	min		90	114	124	147	152	181	238	242	276	304	366	
	max		max. 209 (f) (238 at the screw end)					238	304	318	342	361	414	
Rockwell hardness HR	min	HRB	52	67	71	79	82	89	–	–	–	–	–	
		HRC	–	–	–	–	–	–	22	23	28	32	39	
	max	HRB	95,0 (h) (99,5 at the screw end)					99,5	–	–	–	–	–	
		HRC	–					–	32	34	37	39	44	
Surface hardness			(g)											
Lower yield stress, ReL (h), N/mm <sup>2</sup>	nom.		180	240	320	300	400	480	–	–	–	–	–	
	min		190	240	340	300	420	480	–	–	–	–	–	
Stress at 0,2% non-proportional elongation Rp 0,2 (i), in N/mm <sup>2</sup>	nom.		–						640	640	720	900	1080	
	min		–						640	660	720	940	1100	
Stress under proof load Sp	Sp /ReL or Sp /Rp 0,2		0,94	0,94	0,91	0,93	0,90	0,92	0,91	0,91	0,90	0,88	0,88	
	N/mm <sup>2</sup>		180	225	310	280	380	440	580	600	650	830	970	
Elongation after fracture, A	min. %		25	22	–	20	–	–	12	12	10	9	8	
Reduction of area after fracture	min. %		–	52	52	48	48	44	–	–	–	–	–	
Strength under wedge loading (e)			The values for full size bolts and screws (not studs) shall not be smaller than the minimum values											
Impact strength,	J min.		–			25	–		30	30	25	20	15	
Head soundness			no fracture											
Minimum height of non-decarburized thread zone, E			–						1/2 H1		2/3 H1	3/4 H1		
Maximum depth of mm complete decarburization, G			–						0,015					

a For bolts of property class 8.8 in diameters d < 16 mm, there is an increased risk of nut stripping in the case of inadvertent over-tightening inducing a load in excess of proof load.

b Applies only to nominal thread diameters d < 16 mm.

c For structural bolting the limit is 12 mm.

d Minimum tensile properties apply to products of nominal length l > 2,5 d. Minimum hardness applies to products of length l , 2,5 d and other products which cannot be tensile tested (e.g.

e When testing full-size bolts, screws and studs, the tensile loads, which are to be applied for the calculation of Rm, shall meet the values given in tables 6 and 8.

f A hardness reading taken at the end of bolts, screws and studs shall be 250 HV, 238 HB or 99,5 HRB maximum.

g 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

h In cases where the lower yield stress ReL cannot be determined, it is permissible to measure the stress at 0,2 % non-proportional elongation Rp0,2. For the property classes 4.8, 5.8 and

i The yield stress ratio according to the designation of the property class and the minimum stress at 0,2 % non-proportional elongation Rp0,2 apply to machined test specimens