MECHANICAL OR PHYSICAL PROPERTIES OF BOLTS, SCREWS AND STUDS (ISO 898-1)

NO.	MECHANICAL OR PHYSICAL PROPERTY		PROPERTY CLASS									
			4.6	4.8	5.6	5.8	6.8	8.8		9.8	10.9	12.9
								d ≤ 16mm[a]	d > 16mm[b]	d ≤ 16mm		
1	Tensile strength, Rm, Mpa	nom.[c]	400		500		600	800		900	1000	1200
		min.	400	420	500	520	600	800	830	900	1040	1220
2	Lower yield strength, Rel[d], Mpa	nom.[c]	240	-	300	-	-	-	-	-	-	-
		min.	240	-	300	-	-	-	-	-	-	-
3	Stress at 0.2% non-proportional elongation $R_{p0.2}$, Mpa	nom.[c]	-	-	-	-	-	640	640	720	900	1060
		min.	-	-	-	-	-	640	660	720	940	1100
4	Stress at 0.0048d non-proportional elongation for full-size fasteners, R_pf, Mpa	nom.[c]	-	320	480	-	-	-	-	-	-	-
		min.	-	340[e]	480[e]	-	-	-	-	-	-	-
5	Percentage elongation after fracture for machined test pieces, A, %	min.	22	-	20	-	-	12	12	10	9	8
6	Percentage reduction of area after fracture for machined test pieces, Z, %	min.	-					52		48	48	44
7	Vickers hardness, HV	min.	120	130	155	160	190	250	255	290	320	385
	F ≥ 98 N	max.	220[g]				250	320	335	360	380	435
8	Brinell hardness, HBW	min.	114	124	147	152	181	245	250	286	316	380
	F = 30 D²	max.	209[g]				238	316	331	355	375	429
9	Rockwell hardness, HRB	min.	67	71	79	82	89	-				
		max.	95,0[g]				99,5	-				
	Rockwell hardness, HRC	min.	-					22	23	28	32	39
		max.	-					32	34	37	39	44

[a] Values do not apply to structural bolting.

[b] For structural bolting d ≥ M12.

[c] Nominal values are specified only for the purpose of the designation system for property classes. See clause 5.

[d] In cases where the lower yield strength, Rel, cannot be determined. It is permissible to measure the stress at 0.2% non-proportional elongation $R_{p0.2}$

[e] For the property classes 4.8, 5.8 and 6.8, the values for R_pf min are under investigation. The values at the time of publication of this part of ISO 898 are given for calculation of the proof stress ratio only. They are not test values

[g] Hardness determined at the end of a fastener shall be 250 Hv, 238 HB or 99.5 HRB maximum.