CSF
Colombo Special Fasteners

MECHANICAL PROPERTIES OF FASTENERS (EN ISO 898-1: 2013)

No.	Mechanical and physical properties		Strength class									
			4.6	4.8	5.6	5.8	6.8	8.8		9.8	10.9	12.9
								d ≤ 16 a	d > 16 mm b	d ≤ 6 mm		
1	Nominale tensile strength,, R_m, 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 ,R_{eL} d, Mpa	nom.[c]	240	—	300	—	—	—	—	—	—	—
		min.	240	—	300	—	—	—	—	—	—	—
3	Stress at 0,2% non-proportional elongation, R_{p02}, MPa	nom.[c]	—	—	—	—	—	640	640	720	900	1080
		min.	—	—	—	—	—	640	660	720	940	1100
4	Stress at 0,0048d non-proportional elongation for full-size fasteners, R_{pf},MPa	nom.[c]	—	320	—	400	480	—	—	—	—	—
		min.	—	340e	—	420e	480e	—	—	—	—	—
5	Stress under proof load, S_p , MPa	nom.	225	310	280	380	440	580	600	650	830	970
	Proof strength ratio	$S_{p,nom}$ /R_{eLmin} or $S_{p,nom}$ /$R_{p0,2\ min}$ or $S_{p,nom}$ /$R_{pf,min}$	0,94	0,91	0,93	0,9	0,92	0,91	0,91	0,9	0,88	0,88
6	Percentage elongation after fracture for machined test pieces, A, %	min.	22	—	20	—	—	12	12	10	9	8
7	Percentage reduction of area after fractured for machined test pieces, Z, %	min.	—					52		48	48	44
8	Elongation after fracture for full-size fasteners A, %	min.	—	0,24	—	0,22	0,2	—	—	—	—	—
9	Head soundness		No fracture									
10	Vickers hardness HV	min.	120	130	155	160	190	250	255	290	320	385
	F≥ 98 N	max.	220 f				250	320	335	360	380	435
11	Brinell hardness, HBW	min.	114	124	147	152	181	238	242	276	304	366
	F=30D^2	max.	209 f				238	304	318	342	361	414
12	Rockwell hardness HRB	min.	67	71	79	82	89	—				
		max.	95,0 f				99,5	—				
	Rockwell hardness HRC	min.	—					22	23	28	32	39
		max.	—					32	34	37	39	44
13	Surface hardness, HV 0,3	max.	—					h			h,h	h,i
14	Height of non-decarburized thread zone, E mm	min.	—					1/2 H1			2/3 H1	3 /4 H1
	Depth of complete decarburization in the thread, G, mm	max.	—					0,015				
15	Reduction of hardness after retempering, HV	max.	—					20				
16	Breaking torque, M_B, N.m	min.	—					in accordance with ISO 898-7				
17	Impact strength, K_v [h,i], J	min.	—		27	—		27	27	27	27	j
18	Surface integrity in accordance with		ISO 6157-1 k									ISO 6157-3

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.
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 Rp0,2.
e. For the property classes 4.8, 5.8 and 6.8, the values for Rpf,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.
f. Hardness determined at the end of a fastener 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 base metal hardness of the fastener when determination of both surface hardness and base metal hardness are carried out with HV 0,3 (see 9.11).
h. Values are determined at a test temperature of −20 °C (see 9.14).
i. Applies to d ≥ 16 mm.
j. Value for KV is under investigation.
k. Instead of ISO 6157-1, ISO 6157-3 may apply by agreement between the manufacturer and the purchaser.