

## Mechanical properties

\* Grade  
\* Threads  
\* Values

4.6, 4.8, 5.6, 6.8, 8.8, 10.9, 12.9  
Metric  
MM

Sl. No.	Mechanical or physical property		4.6	4.8	5.6	5.8	6.8	8.8		9.8	10.9	12.9
								d < 16 mm	d > 16 mm	d < 16 mm		
1	Tensile strength, R <sub>m</sub> , Mpa	Nom.	400		500		600	800		900	1000	1200
		Min.	400	420	500	520	600	800	830	900	1040	1220
2	Lower yield strength, R <sub>el</sub> , MPA	Nom.	240	-	300	-	-	-	-	-	-	-
		Min.	240	-	300	-	-	-	-	-	-	-
3	Stress at 0,2% non-proportional elongation, R <sub>p0,2</sub> , MPA	Nom.	-	-	-	-	-	640	640	720	900	1080
		Min.	-	-	-	-	-	640	660	720	900	1100
4	Stress at 0,0048 d non-proportional elongation for full-size fasteners, R <sub>pf</sub> , Mpa	Nom.	-	320	-	400	480	-	-	-	-	-
		Min.	-	340	0	420	480	-	-	-	-	-
5	Stress under proof load, Sp <sub>f</sub> , Mpa	Nom.	225	310	280	380	440	580	600	650	830	970
		Proof stress ratio	0,94	0,91	0,93	0,90	0,92	0,91	0,91	0,90	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 fracture for machined test pieces, Z, %	Min.	-					50		48	48	44
8	Elongation after fracture for full-size fasteners, Af	Min.	-	0,24	-	0,22	0,20	-	-	-	-	-
9	Head soundness		No Fracture									
10	Vickers hardness, HV F > 98N	Min.	120	130	155	160	190	250	255	290	320	385
		Max.	220 g					250	320	335	360	380
11	Brinell hardness, HBW F = 30 D2	Min.	114	124	147	152	181	238	242	276	304	366
		Max.	290 g					238	304	318	342	361
12	Rockwell hardness, HRB	Min.	67	71	79	82	89	-				
		Max.	95,0 g					99,5	-			
12	Rockwell hardness, HRC	Min.	-					22	23	28	32	39
		Max.	-					32	34	37	39	44
13	Surface hardness, HRC	Max.	-					h			h, i	h, j
14	Height of non-decarburized thread zone, E, mm	Min	-					1/2H1			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, Mb, N.m	Min.	-					in accordance with ISO 898-7				
17	Impact strength, Kv, kJ, J	Min.	-	27	-	-	27	27	27	27	m	
18	Surface integrity in accordance with		ISO 6157-1n									ISO 6157-3