

GENERAL MECHANICAL PROPERTIES

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GENERAL MECHANICAL PROPERTIES

Property		3.6	4.6	4.8	5.6	5.8	6.8	8.8		10.9	12.9
								<= 16mm	> 16mm		
Tensile Strength R_m in MPa (N/mm ²)	nominal value	300	400	400	500	500	600	800	800	1000	1200
	minimum	330	400	420	500	520	600	800	830	1040	1220
Vickers Hardness HV=F 98N	minimum	95	120	130	155	160	190	230	255	310	372
	maximum	220	220	220	220	220	250	300	336	382	434
Brinell Hardness HB F=30D ²	minimum	90	114	124	147	152	181	219	242	295	353
	maximum			209			238	285	319	363	412
Rockwell Hardness HR	minimum HRB	52	67	71	79	82	89				
	minimum HRC							20	23	31	38
	maximum HRB	95	95	95	95	95					
	maximum HRC							30	34	39	44
Surface Hardness HV 0.3	maximum							320	356	402	454
Yield Stress R_{eL} in MPa(N/mm ²)	nominal value	180	240	320	300	400	480				
	minimum	190	240	340	300	420	480				
0.2% elongation limit $R_{p0.2}$ in Mpa (N/mm ²)	nominal value							640	640	900	1080
	minimum							640	660	940	1100
Test stress S_p	S_p/R_{eL} or $R_{p0.2}$	0.94	0.94	0.91	0.94	0.91	0.91	0.91	0.91	0.88	0.88
	MPa (N/mm ²)	180	225	310	280	380	440	580	600	830	970
Elongation after fracture A_5 in %	minimum	25	22	14	20	10	8	12	12	9	8

Minimum notch impact energy in Joules				25			30	30	20	15
Head Impact Toughness	No Fracture									
Maximum Height of the Thread Zone Not Decarburized E							1/2H ₁	1/2H ₁	2/3H ₁	3/4H ₁
Maximum Depth of Decarburization Gmm							.015	.015	.015	.015

MECHANICAL PROPERTIES FOR SOCKET PRODUCTS

DIN 912 SOCKET CAP SCREWS

Property Class	12.9
Hardness (HRC)	39-44
Tensile Strength (Mpa)	1,220 min.
Yield Strength at 0.2% Offset (Mpa)	1,100 min.
Elongation (%)	8 min.

DIN 7984 LOW HEAD SOCKET CAPS

Property Class	10.9
Hardness (HRC)	32-39
Tensile Strength (Mpa)	832 min.

DIN 7991 FLAT HEAD COUNTERSUNK SOCKET CAP SCREWS

Property Class	10.9
Hardness (HRC)	32-39
Tensile Strength (Mpa)	835 min.

ASME B18.3 SOCKET CAP SCREWS

Diameter d	d ≤ 1/2	d > 1/2
Hardness (HRC)	39-45	37-45
Tensile Strength (psi)	180,000 min.	170,000 min.
Yield Strength at 0.2% Offset (psi)	153,000 min.	153,000 min.
Elongation (%)	10 min.	10 min.

ASME B18.3 LOW HEAD SOCKET CAPS

Diameter d	d ≤ 1/2	d > 1/2
Hardness (HRC)	39-44	37-44
Tensile Strength (psi)	145,000 min.	135,000 min.

ASME B18.3 FLAT HEAD COUNTERSUNK SOCKET CAP SCREWS

Diameter d	d ≤ 1/2	d > 1/2
Hardness (HRC)	39-44	37-44
Tensile Strength (psi)	145,000 min.	135,000 min.

ISO 7380 BUTTON HEAD SOCKET CAP SCREWS

Property Class **10.9**
Hardness (HRC) 32-39
Tensile Strength (Mpa) 835 min.

ISO 7379 SOCKET SHOULDER SCREWS

Property Class **12.9**
Hardness (HRC) 39-44
Tensile Strength (Mpa) 1,100 min.

DIN 916 SET SCREWS

Property Class 45H
Hardness (HRC) 45-53

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ASME B18.3 BUTTON HEAD SOCKET CAP SCREWS

Diameter d **d ≤ 1/2** **d > 1/2**
Hardness (HRC) 39-44 37-44
Tensile Strength (psi) 145,000 min. 135,000 min.

ASME B18.3 SOCKET SHOULDER SCREWS

Hardness (HRC) 39-43
Tensile Strength (psi) 140,000 min.

ASME B18.3 SET SCREWS

Property Class 45H
Hardness (HRC) 45-53

MECHANICAL PROPERTIES FOR HEX PRODUCTS

ISO 4014 / 4017 HEX HEAD BOLTS

Property Class	10.9	12.9
Hardness (HRC)	32-39	39-44
Tensile Strength (Mpa)	1,040 min.	1,220 min.
Yield Strength at 0.2% Offset (Mpa)	940 min.	1,100 min.
Elongation (%)	9 min.	8 min.

ASME B18.2.1 HEXAGON HEAD CAP SCREWS

Property Class	SAE J429-Grade 8
Hardness (HRC)	33-39
Surface Hardness (30N)	58.6 max.

ISO 4162 HEXAGON FLANGE BOLTS

Property Class	10.9	12.9
Hardness (HRC)	32-39	39-44
Tensile Strength (Mpa)	1,040 min.	1,220 min.
Yield Strength at 0.2% Offset (Mpa)	940 min.	1,100 min.
Elongation (%)	9 min.	8 min.

Tensile Strength (psi)	150,000 min.
Yield Strength at 0.2% Offset (psi)	130,000 min.
Elongation (%)	12 min.

IFI-111 HEXAGON FLANGE SCREWS

Property Class	SAE J429-Grade 8
Hardness (HRC)	33-39
Surface Hardness (30N)	58.6 max.
Tensile Strength (psi)	150,000 min.
Yield Strength at 0.2% Offset (psi)	130,000 min.
Elongation (%)	12 min.