

Strength values of screws

The property class identification for standard steel screws consists of two figures separated by a point:

- The first figure, called the strength index, is equal to $\frac{1}{100}$ of the tensile strength R_m in N/mm^2
- The second figure, called the yield point ratio, indicates 10 times the ratio of the yield point R_e or the substitute yield point $R_{p0.2}$ to the nominal tensile strength R_m . If the tensile strength R_m is multiplied by $\frac{1}{10}$ of the second figure, the result is the yield point R_e .

Example:

Screw of the property class 5.8, strength index = 5, yield point ratio = 8

Tensile strength $R_m = \text{strength index} \times 100 = 5 \text{ N/mm}^2 \times 100 = 500 \text{ N/mm}^2$

Yield point $R_e = \text{tensile strength } R_m \times 0.8 = 500 \text{ N/mm}^2 \times 0.8 = 400 \text{ N/mm}^2$

Material characteristics	Property class						
	4.6	5.6	5.8	6.8	8.8	10.9	12.9
Tensile strength R_m in N/mm^2	400	500	500	600	800	1000	1200
Yield point R_e in N/mm^2	240	300	400	480	640	900	1080
Elongation at break A in %	22	20	10	8	12	9	8

If simply one figure is given for standard parts, e.g. "property class 5", it is equal to the strength index and must be handled correspondingly.

Strength values of nuts

The property class identification for standard steel nuts consists of only one figure. It provides information on the test stress S_p related to a hardened test mandrel and is specified in the ratio $\frac{1}{100}$. The test stress S_p is equal to the tensile strength R_m .

Example:

Nut of the property class 6

Tensile strength $R_m = \text{strength index} \times 100 = 6 \text{ N/mm}^2 \times 100 = 600 \text{ N/mm}^2$

Test stress S_p in N/mm^2 for threads	Property class				
	5	6	8	10	12
... M 4	520	600	800	1040	1150
above M 4 ... M 7	580	670	855	1040	1150
above M 7 ... M 10	590	680	870	1040	1160
above M 10 ... M 16	610	700	880	1050	1190
above M 16 ... M 39	630	720	920	1060	1200

Nuts and screws of the same property classes in combination, e.g. nut 8 - screw 8.8, can be loaded up to the yield point of the screw without damaging the nut.

Strength Values according to SAE

of Screws

Grades SAE	DIN / ISO	Strength	
		PSI	MPa
Gd 2		74.000	510
	5.8	75.419	520
	6.8	87.022	600
Gd 5 (d > 1.00 in.)		105.000	724
	8.8 (d < / = 16 mm)	116.030	800
Gd 5 (d < / = 1.00 in.)		120.000	828
	8.8 (d > 16 mm)	120.381	830
	9.8	130.534	900
Gd 8		150.000	1035
	10.9	150.839	1040
	12.9	176.946	1220

Conversion factors: 1 MPa = 1 N/mm^2 = 145.038 P.S.I., 1 P.S.I. = 0.0069 MPa

