



Mechanical properties: Fasteners from non-ferrous materials

The mechanical properties of fasteners from non-ferrous materials as well as their quality inspection and marking are set in ISO 8839.

Table 7: Metallic non-ferrous materials (Cu, MS, Al, Ti) for fasteners and special parts

(Extract from ISO 8839/DIN 267-18)

Material			Tensile strength R_m N/mm ²	Stress at 0.2% non-proportional elongation N/mm ²	Elongation after fracture A %	Notes
Marking	Material code	Material no.	min.	min.	min.	
CU1	E-Cu57	2.0060	240	160	14	-
CU2	CuZn37 (MS 63)	2.0321	370-440	250-340	19-11	Storage of compressed parts
CU3	CuZn39Pb3 (MS 58)	2.0401	370-440	250-340	19-11	Storage of turned parts
CU4	CuSn6	2.1020	400-470	200-340	33-32	-
CU5	CuNi1, 5Si	2.0853	590	540	12	saltwater-proof
CU6	CuZn40MnPb	2.0580	440	180	18	-
CU7	CuAl10Ni	2.0966	640	270	15	-
AL1	AlMg3	3.3535	250-270	180-230	4-3	conditionally saltwater-proof
AL2	AlMg5	3.3555	280-310	200	6	saltwater-proof
AL3	AlMgSi1	3.2315	310	250	10-7	-
AL4	AlCuMg1	3.1325	380-420	260-290	10-6	-
AL5	AlZnMgCu0.5	3.4345	460	380	7	-
AL6	AlZnMgCu1.5	3.4365	510	440	7	-
Ti 1	Titanium (Titanium 99.5)	3.7025	290	180	30	Storage (→ yellow catalogue pages)
Ti 2	TiAl6V4	3.7165	890	820	10	-

Table 8: Saltwater-proof copper alloys for fasteners and special parts

(Extract from DIN 17660, 17664, 17666)

Description	Material no.	Composition approx. %	Tensile strength R_m approx. N/mm ²	Stress at 0.2% non-proportional elongation $R_{p0.2}$ approx. N/mm ²	Elongation after fracture A_s approx. %
SO-MS 59	2.0540	Cu 59/Zn 36/Ni 2/Mn 1.5	500	300	18
RESISTIN	-	Cu 85/Mn 14/Fe 1	520	400	17-12
CuNiSi	2.0853	Cu 98/Ni 1.5/Si 0.5	590	540	10
CUNIFER	2.0872	Cu 88/Ni 10/Fe 1/Mn 0.5	280-360	100-250	30-10
CUNIFER	2.0882	Cu 69/Ni 30/Fe 0.5/Mn 0.5	340-420	120-300	35-14

Table 9: Plastic materials (thermoplastics) fasteners and special parts

(General values – Further details – Spec. coarse tolerances VDI 2544 or on request)

Material code	Material group (trade name)	Density g/cm ³	Yield stress dry-humid approx. N/mm ²	Elongation after fracture ca. %	Modulus of elasticity dry-humid approx. N/mm ²	Operating temperature -/+ approx. °C
PA 6	Polyamide 6 (Ultramide)	1.14	80-30	130-220	2700-1800	-40/+80-130
PA 66	Polyamide 6.6 (Ultramide A)	1.14	85-50	40-170	3000-1900	-20/+80-140
POM	Polyacetal (Delrin 150)	1.42	69	30	3000	-40/+100-130
PP	Polypropylene (Hostalen PPH)	0.91	30-35	15	1000-1300	-10/+100-120
PA 12	Polyamide 12	1.01	55-48	150-350	1800-1300	-0/+100
PC	Polycarbonate	1.2	60	80-100	2100	-0/+130
PA 66 (gfv)	with 35% glass fibre	1.39	190-140	5	9500-8500	-40/+100-140

Fasteners in stock = PA 6/PA 66 natural-colour/milky-white, if not specified otherwise.

From the other materials, fasteners can be supplied on short notice, other materials on request.