

Table 13: Properties of Disc Spring materials

Abbreviated Name	Material Number	DIN	Thickness ¹⁾ mm	Material Condition	Yield Point ^{2(a)} N/mm ² min.	Tensile Strength ³⁾ N/mm ²	Modulus of Elasticity ³⁾ in kN/mm ² at									Operating Temperature Range		Remarks
							20 °C	100 °C	200 °C	300 °C	400 °C	500 °C	600 °C	700 °C	800 °C	°C	K	
Ck 67	1.1231	17 222	2.5	Heat Treated	1000	1330–1780	206	–	–	–	–	–	–	–	–	–20 to 60	253 to 333	Disc Spring Material for DIN 2093
Ck 75	1.1248	17 222	4.5	Heat Treated	1050	1330–1780	206	–	–	–	–	–	–	–	–	–20 to 60	253 to 333	Disc Spring Material for DIN 2093
50 CrV 4	1.8159	17 222	30	Heat Treated	1100	1330–1780	206	202	196	–	–	–	–	–	–	–50 to 100	223 to 373	Disc Spring Material for DIN 2093 ⁴⁾
51 CrMoV 4	1.7701	17 221	50	Heat Treated	1100	1330–1780	206	202	196	–	–	–	–	–	–	–50 to 100	223 to 373	Disc Spring Material for DIN 2093 ⁴⁾
48 CrMoV 6 7	1.2323	17 350	50	Heat Treated	1100	1330–1780	206	202	196	189	179	–	–	–	–	–60 to 300	213 to 573	
X 30 WCrV 5 3	1.2567	–	30	Heat Treated	1100	1300–1600	206	202	196	189	179	168	–	–	–	–60 to 400	213 to 673	
X 35 CrMo 17	1.4122	–	20	Heat Treated	1000	1200–1600	209	205	199	192	181	172	–	–	–	–60 to 400	213 to 673	
X 22 CrMoV 12 1	1.4923	17 240	20	Heat Treated	1000	1200–1600	206	202	196	189	179	168	–	–	–	–60 to 500	213 to 773	
X 7 CrNiAl 17 7	1.4568	17 224	2.5 (3.0) 2.5–7.0	K ²⁾ + Age Hardened Double Age Hardened	1150 1000	1300–1700 1250–1600	200	195	185	175	165	–	–	–	–	–200 to 350	73 to 623	DIN 17 224 for Coils ≤ 1.6 mm
X 12 CrNi 17 7	1.4310	17 224	2.0	K	960	1200–1600	190	185	–	–	–	–	–	–	–	–200 to 100	73 to 373	DIN 17 224 for Coils ≤ 1.6 mm
X 5 CrNiMo 17 12 2	1.4401	17 224	1.6	K	720	900–1500	185	180	–	–	–	–	–	–	–	–200 to 100	73 to 373	DIN 17 224 for Coils ≤ 1.6 mm
NiCr 19 NbMo (Inconel 718)	2.4668	65 021	< 100	Age Hardened	1030	≥ 1240	200	195	190	184	178	172	167	160	–	–260 to 700	13 to 973	Curie Temperature about –112° C (161 K)
NiCr 15 Fe 7 TiAl (Inconel X 750)	2.4669	–	0.25–6.30 < 100	Age Hardened	790 720	≥ 1170 ≥ 1100	214	207	198	190	179	170	158	–	–	–260 to 600	13 to 873	Curie Temperature about –125° C (148 K)
NiCr 20 Co 18 Ti (Nimonic 90)	2.4969	17 754 59 745	< 100	Age Hardened	700	≥ 1100	206	201	195	189	181	175	167	160	151	–260 to 800	13 to 1073	Curie Temperature about –112° C (161 K)
Duratherm 600	–	–	≤ 3.0 (1/2 hard) ≤ 20	Age Hardened	1000 500	≥ 1200 ≥ 850	220	214	207	200	193	185	–	–	–	–260 to 500	13 to 773	Curie Temperature about – 50° C (223 K)
CuBe 1.7	2.1245	17 666 17 670	< 20 (1/2 hard)	Age Hardened	1000	1170–1340	135	131	125	–	–	–	–	–	–	–260 to 200	13 to 473	DIN 17 670 for Coils ≤ 3.0 mm DIN 17 777 for Coils ≤ 1.0 mm
CuBe 2	2.1247	17 666 17 670	< 20 (1/2 hard)	Age Hardened	1120	1270–1450	135	131	125	–	–	–	–	–	–	–260 to 200	13 to 473	DIN 17 670 for Coils ≤ 3.0 mm DIN 17 777 for Coils ≤ 1.0 mm
TiAl 6 V 4	3.7165	17 851 17 860	< 19 < 50	Age Hardened	1000 930	≥ 1100 ≥ 1000	114	110	105	98	93	–	–	–	–	– 70 to 350	203 to 623	

¹⁾ Typical values up to which materials can be used.

²⁾ $K \triangleq$ Strip in the Spring-Hard Condition.

³⁾ The Values which are Printed are Valid up to the Dimensions Shown in the Column Headed "Thickness" whereby, Depending upon the Semi-Finished Product (Strip, Sheets or Forgings), the Upper or Lower Limiting Values can be Achieved.

⁴ The Upper Temperature Shown can be Exceeded by an Additional 100° C for a Very Short Period of Time.

⁵⁾ The Standard Modulus of Elasticity Value as Shown may Exhibit a Deviation in the Semi-Finished Product.

^a Yield Point or 0.2 % Proof Stress.