

## Schnorr Disc Springs - Materials – synoptic table

Short name	AISI / ASIM	Material No	Standard	Chemical composition in % by weight										Physical & mechanical properties				
				C	Si	Mn	P Max	S Max	Cr	V	Mo	Ni	N	E module in kN/mm <sup>2</sup> at RT	Working temp. Co	Thickness range mm	Procurement	
<b>Steel grades for normal operating demands</b>																		
Standard material grade																		
C 60S	1060	1.211	DIN EN10132-4	0.57-0.65	0.15-0.35	0.60-0.90	0.025	0.025	max. 0.40	-	max. 0.10	max. 0.40	-	206	-20+100	0.2-7.0	Easy	
C 67S	1070	1.1231	DIN EN10132-4	0.65-0.73	0.15-0.35	0.60-0.90	0.025	0.025	max. 0.40	-	max. 0.10	max. 0.40	-	206	-	0.1-2.5	Easy	
C 75S	1078	1.1248	DIN EN10132-4	0.70-0.80	0.15-0.35	0.60-0.90	0.025	0.025	max. 0.40	-	max. 0.10	max. 0.40	-	206	-20+100	0.1-1.5	Easy	
51 CrV 4	6150	1.8159	DIN EN10132-4	0.47-0.55	max. 0.40	0.70-1.10	0.025	0.025	0.90-1.20	0.10-0.25	max. 0.10	max. 0.40	-	206	-50+200	0.3-80	Easy	
<b>Special material grades for particular operating demands</b>																		
Corrosion-resistant steel grades																		
X 10 CrNi 18-8	301	1.4310	DIN EN10151	0.05-0.15	max. 2.0	max. 2.0	0.045	0.015	16.0-19.0	-	max. 0.8	6.0-9.5	-	190	-200+200	0.2-2.5	Easy	
X 7 CrNiAl 17-7	631	1.4568	DIN EN10151	max. 0.09	max. 0.7	max. 1.0	0.040	0.015	16.0-18.0	-	-	6.5-7.8	-	195	-200+300	0.2-4.0	Difficult	
X 5 CrNiMo 17-12-2	316	1.4401	DIN EN10151	max. 0.07	max. 1.0	max. 2.0	0.045	0.015	16.5-18.5	-	2.0-2.5	10.0-13.0	max. 0.11	180	-200+200	0.2-1.6	Difficult	
X 5 CrNi 18-10	304	1.4301	DIN EN10151	max. 0.07	max. 1.0	max. 2.0	0.045	0.015	17.5-19.5	-	-	8.0-10.5	max. 0.11	185	-200+200	0.2-1.6	Difficult	
Heat-resistant steel grades																		
X 22 CrMoV 12-1	-	1.4923	DIN EN10269	0.18-0.24	max. 0.5	0.40-0.90	0.025	0.015	11.0-12.5	0.25-0.35	0.80-1.20	0.30-0.80	-	216	-50+500	1.5-20	Easy	
X 39 CrMo 17-1	-	1.4122	DIN EN10088-1	0.33-0.45	max. 1.0	max. 1.5	0.040	0.03	15.5-17.5	-	0.8-1.3	max. 1.0	-	215	-50+400	0.3-6.0	Easy	
Copper alloys				<b>Sn</b>	<b>P</b>	<b>Be</b>	<b>Ni+ Co</b>	<b>Cu</b>										
CuSn 8	-	2.1030	DIN EN1654	7.5-8.5	0.01-0.4	-	-	Rest						115	-50+100	0.1-6.0	Easy	
CuBe 2	-	2.1247	DIN EN1654	-	-	1.8-2.1	max. 0.3	Rest						135	-260+200	0.1-2.5	Easy	
Nickel and cobalt alloys				<b>Ni</b>	<b>Cr</b>	<b>Co</b>	<b>Ti</b>	<b>Al</b>	<b>C</b>	<b>Si</b>	<b>Mn</b>	<b>Fe</b>	<b>Cu</b>	<b>Zr</b>				
NiCr 20 Co 18 Ti (Nimonic 90)	HEV6 5829C (AMS)	2.4632/ 2.4969	DIN EN10302	Rest	18.0-21.0	15.0-21.0	2.0-3.0	1.0-2.0	max. 0.13	max. 1.0	max. 1.0	max. 1.5	max. 0.2	max. 0.15	220	-200+700	until 6.35	Difficult
NiCr 15 Fe 7 TiAl (Inconel X 750)	688 5542L (AMS)	2.4669	DIN EN10302	min. 70.0	14.0-17.0	max. 1.0	2.25-2.75	0.40-1.00	max. 0.08	max. 0.50	max. 1.0	5.0-9.0	max. 0.5	-	214	-200+600	until 6.35	Difficult
NiCr 19 NbMo (Inconel 718)	5596J (AMS)	2.4668	DIN EN10302	50.0-55.0	17.0-21.0	max. 1.0	0.70-1.15	0.3-0.7	0.02-0.08	max. 0.35	max. 0.35	Rest	max. 0.2	-	199	-200+600	until 6.35	Difficult
Nickel and cobalt alloys (continued)				<b>S</b>	<b>P</b>	<b>B</b>	<b>Nb+Ta</b>	<b>Mo</b>	<b>W</b>									
NiCr 20 Co 18 Ti (Nimonic 90)	HEV6 5829C (AMS)	2.4632/ 2.4969		max. 0.015	max. 0.03	max. 0.02	-	-	-									
NiCr 15 Fe 7 TiAl (Inconel X 750)	688 5542L (AMS)	2.4669		max. 0.015	max. 0.02	-	0.7-1.2	-	-									
NiCr 19 NbMo (Inconel 718)	5596J (AMS)	2.4668		max. 0.015	max. 0.015	max. 0.006	4.8-5.5	2.8-3.3	-									

With regards to the maximum working temperatures listed it must be taken into consideration that the setting height of the springs depends on the height of the tensions occurring and on the operating time on temperature. Furthermore, it has to be taken into consideration that with increasing temperature of the elasticity module of the material the strength diminishes. The operating temperature and thickness ranges can serve as reference values only. With heat-resistant steel grades, heat treatment and hardness deviate from the information given in the mentioned standards. In case of any queries regarding material grade selection, please contact us.