Quality	**52SiCrNi5**	**Spring Steel**	*Technical card*
According to standards	**EN 10089: 2002**		***Lucefin Group***
Number	**1.7117**		*rev. 2018*

Chemical composition

C%	**Si%**	**Mn%**	**P%** max	**S%** max	**Cr%**	**Ni%**	
0,49-0,56	1,20-1,50	0,70-1,00	0,025	0,025	0,70-1,00	0,50-0,70	Product deviations are allowed
± 0.02	± 0.05	± 0.04	+ 0.005	+ 0.005	± 0.05	± 0.02	

Other elements not mentioned above should not be added to the steel, except for those necessary to casting. Cu + 10Sn ≤ 0,60

Temperature °C

Hot-forming	**Normalizing +N**	**Quenching +Q** on spring	**Tempering +T**	**Hot moulding** of springs
1100-900	870 air	840-870 oil or polymer	400-450 air	920-830

Soft annealing +A	**Spheroidized annealing +AC**	**Natural state +U**	**End quench hardenability test**	**Pre-heating welding**		**Stress-relieving after welding**	
680 air (HB max 248)	820 furnace cooling to 720, then air (HB max 230)	- (HB max 310)	850 water	not allowed			
				Ac_1	**Ac_3**	**Ms**	**Mf**
				760	810	270	50

Mechanical properties

Hot-rolled mechanical properties obtained on test blanks after quenching at 860 °C in oil and tempering at 450 °C in air
EN 10089: 2002

size mm	Testing at room temperature (longitudinal)						
	R	**Rp** 0.2	**A%**	**Z%**	**KU**	***HB***	***HRC***
	N/mm²	N/mm² min.	min.	min	J min	*for information*	
10	1450-1750	1300	6	35	10	*409-482*	*44-50*

Table of tempering values obtained at room temperature on round of Ø 10 mm after quenching at 850 °C in oil

HB		706	688	654	615	615	595	577	525	482	421	381	353	319	279
HRC		63	62	60	58	58	57	56	53	50	45	41	38	34	29
R	N/mm²	-	-	-	2340	2310	2250	2170	1950	1690	1480	1310	1190	1060	940
Rp 0.2	N/mm²	-	-	-	1900	2000	2050	1990	1750	1550	1350	1190	1020	880	750
A	%	-	-	-	-	-	-	3.0	8.0	9.8	10.6	12.2	14.0	17.0	21.0
Kv	J	-	-	-	8	8	8	9	14	26	26	26	28	42	80
Tempering at **°C**		**50**	**100**	**150**	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**	**700**

EN 10089: 2002 **Jominy test HRC** grain size 5 min.
mm distance from quenched end

	1.5	**3**	**5**	**7**	**9**	**11**	**13**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	Type **H**
min	56	56	55	55	54	53	52	51	47	42	38	35	33	31	30	
max	63	63	63	62	62	62	61	61	60	59	57	56	54	52	49	

Max thickness and diameter recommended for the spring to obtain, after quenching, internal hardness of **52 HRC**	Flat products thickness mm	Round products Ø mm
	40	60

Thermal Expansion	$10^{-6} \cdot K^{-1}$					
Mod. of Elasticity long.	GPa	206				
Mod. of Elasticity tang.	GPa	79				
Specific Heat Capacity	J/(Kg•K)					
Thermal Conductivity	W/(m•K)					
Density	Kg/dm³	7.80				
Specific Electric Resistivity	Ohm•mm²/m					
Electrical Conductivity	Siemens•m/mm²					
°C		**20**	**100**	**200**	**300**	**400**

EUROPE EN	**ITALY** UNI	**CHINA** GB	**GERMANY** DIN	**FRANCE** AFNOR	**U.K.** B.S.	**RUSSIA** GOST	**USA** AISI/SAE
52SiCrNi5	52SiCrNi5	ZG50CrMo	52SiCrNi5	52SiCrNi5		52XHC	