

Quality	51CrV4	<i>Technical card</i> Lucefin Group
According to standards	EN 10083-3: 2006	
Number	1.8159	

Chemical composition

C%	Si% max	Mn%	P% max	S% max	Cr%	V%	Product deviations are allowed
0,47-0,55 ± 0.02	0,40 ± 0.03	0,70-1,10 ± 0.05	0,025 + 0.005	0,025 + 0.005	0,90-1,20 ± 0.05	0,10-0,25 ± 0.02	

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

Temperature °C

Hot-forming	Normalizing	Quenching on spring	Tempering	Hot moulding of springs			
1050-850	870 air	850-880 oil or polymer	400-450 air	920-830			
Soft annealing	Isothermal annealing	Natural state	End quench hardenableity test	Pre-heating welding	Stress-relieving after welding		
700 air (HB max 248)	820 furnace cooling to 710, then air (HB max 220)	(HB max 310)	850 water	not allowed			
				Ac1	Ac3	Ms	Mf
				740	790	280	60

Mechanical and physical properties

Hot-rolled mechanical properties after QT EN 10083-3: 2006							Values for springs according to Stahlschlüssel 2007 standard			
size d / t mm		Testing at room temperature (longitudinal)					R	Rp 0.2	A%	DVM
from	to	R N/mm ²	Rp 0.2 N/mm ² min.	A% min.	C% min.	Kv J min.	N/mm ²	N/mm ² min	min	J min
16/8	16/8	1100-1300	900	9	40		1400-1700	1200	6	21
16/8	40/20	1000-1200	800	10	45	30				
40/20	100/60	900-1100	700	12	50	30				
100/60	160/100	850-1000	650	13	50	30				
160/100	250/160	800-950	600	13	50	30				

d = diameter t = thickness

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

HB	615	595	577	577	550	525	504	455	421	390	371	344	297	253
HRC	58	57	56	56	54.5	53	51.5	48	45	42	40	37	31.5	25
R N/mm ²				2170	2050	1960	1840	1650	1490	1340	1250	1140	990	850
Rp 0.2 N/mm ²	1500	1590	1700	1750	1750	1720	1650	1530	1400	1270	1170	1130	900	700
A %				6.8	7.6	7.8	8.0	8.5	9.8	11.2	12.5	14.6	19.0	22.5
Kv J		8	10	16	16	15	16	26	28	31	38	46	94	135
Tempering at °C	50	100	150	200	250	300	350	400	450	500	550	600	650	700

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	Mod. of elasticity +20 °C GPa	
	25	38	E long.	G tang.
			210	80

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Cold-drawn + quenched and tempered +C +QT EN 10277-5: 2008					Hot-rolled annealed + peeled-reeled +A +SH				
size		Testing at room temperature (longitudinal) ^{e)}				^{e)}			
mm		R	Rp 0.2	A%	HB	R	Rp 0.2	A%	HB
from	to	N/mm ²	N/mm ² min	min	for inf.	N/mm ²	N/mm ² min	min	max
b)	16	1100-1300	900	9	331-380				248
	16	1000-1200	800	10	298-359				248
	40	900-1100	700	12	271-331				248

b) for thickness < 5 mm, mechanical properties can be agreed before order placement

e) values valid also for +C+QT+SL

Hot-rolled, quenched and tempered, cold-drawn +QT +C					Hot-rolled annealed + cold-drawn +A +C				
size		Testing at room temperature (longitudinal)							
mm		R	Rp 0.2	A%	HB	R	Rp 0.2	A%	HB
from	to	N/mm ²	N/mm ² min	min		N/mm ² min	N/mm ² min	min	max
b)	16								311
	16								293
	40								287

b) for thickness < 5 mm, mechanical properties can be agreed before order placement

Forged quenched and tempered EN 10250-3: 2001

size		Testing at room temperature							Kv +20 °C		HB
mm		R	Rp 0.2	A%	A%	Kv +20 °C	Kv +20 °C			HB	
from	to	N/mm ² min	N/mm ² min	min L	min T	J min L	J min T			min	
	250/160	800	600	13	9	30	16			240	
	250/160	500/330									
	500/330	750/500									

L = longitudinal T = tangential

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 EN 10083-3: 2006 **Jominy test HRC** grain size 5 min.

mm distance from quenched extremity

	1.5	3	5	7	9	11	13	15	20	25	30	35	40	45	50	Symbol
min	57	56	56	55	53	52	50	48	44	41	37	35	34	33	32	H
max	65	65	64	64	63	63	63	62	62	62	61	60	60	59	58	
min	60	59	59	58	56	56	54	53	50	48	45	43	43	42	41	HH
max	65	65	64	64	63	63	63	62	62	62	61	60	60	59	58	
min	57	56	56	55	53	52	50	48	44	41	37	35	34	33	32	HL
max	62	62	61	61	60	59	59	57	56	55	53	52	51	50	49	

EUROPE EN	ITALY UNI	CHINA GB	GERMANY DIN	FRANCE AFNOR	U.K. B.S.	RUSSIA GOST	USA AISI/SAE
51CrV4	50CrV4	50CrVA	50CrV4	50CV4	735A50	50HGF	6150