METALLURGICA VENETA
ACCIAI SPECIALI

Certified Company

51CrV4

Quality	51CrV4
According to standards	**EN 10083-3: 2006**
Number	**1.8159**

Chemical composition

C%	Si% max	Mn%	P% max	S% max	Cr%	V%	Deviations allowed for analysis product
0,47-0,55	0,40	0,70-1,10	0,025	0,025	0,90-1,20	0,10-0,25	
± 0.02	± 0.03	± 0.05	+ 0.005	+ 0.005	± 0.05	± 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 hardenability 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 Stahlschlűssel 2007 standard

size d / *t* mm		Testing at room temperature (longitudinal)								
		R	**Rp** 0.2	**A%**	**C%**	**Kv**	**R**	**Rp** 0.2	**A%**	**DVM**
from	to	N/mm²	N/mm² min.	min.	min.	J min.	N/mm²	N/mm² min	min	J min
	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/mm²				2170	2050	1960	1840	1650	1490	1340	1250	1140	990	850
Rp 0.2	N/mm²	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	Flat products thickness mm	Round products Ø mm	Mod. of elasticity +20 °C GPa	
			E long.	**G** tang.
to obtain, after quenching, internal hardness of **52 HRC**	25	38	210	80

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Cold-drawn + quenched and tempered +C +QT EN 10277-5: 2008

size mm		Testing at room temperature (longitudinal) e)				Hot-rolled annealed + **peeled-reeled** +A +SH e)			
		R	**Rp** 0.2	**A**%	***HB***	**R**	**Rp** 0.2	**A**%	**HB**
from	to	N/mm²	N/mm² min	min	*for inf.*	N/mm²	N/mm² min	min	max
b)	16	1100-1300	900	9	*331-380*				248
16	40	1000-1200	800	10	*298-359*				248
40	80	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

size mm		Testing at room temperature (longitudinal)				Hot-rolled annealed + **cold-drawn** +A +C			
		R	**Rp** 0.2	**A**%	***HB***	**R**	**Rp** 0.2	**A**%	**HB**
from	to	N/mm²	N/mm² min	min		N/mm² min	N/mm² min	min	max
b)	16								311
16	40								293
40	80								287

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

Forged quenched and tempered EN 10250-3: 2001

size mm		Testing at room temperature						
		R	**Rp** 0.2	**A**%	**A**%	**Kv** +20 °C	**Kv** +20 °C	***HB***
from	to	N/mm² min	N/mm² 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

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