Technical data sheet for hardened and tempered spring steel wire

VG 04 - H/2019-02 Revision A

Scope

This technical data sheet covers hardened and tempered spring steel wires in **SiCr alloyed** steel grades with **high tensile** strengths.

Chemical composition (heat analysis)

	C %	Si %	Mn %	P %	S %	Cu %	Cr %
min.	0,50	1,20	0,50				0,50
max.	0,60	1,60	0,90	0,030	0,025	0,12	0,80

Mechanical properties

Dia. of wire			Tensile strength		Min. reduction of area
d		Tolerance	Rm		Z
mm		mm	MPa		%
>	≤	±	min.	max.	-
2,50	3,80	0,025	1.970	2.100	45
3,80	5,00	0,030	1.930	2.060	
5,00	7,50		1.900	2.030	40
7,50	9,00	0,035	1.870	2.000	
9,00	11,00	0,040	1.840	1.970	35
11,00	13,00	0,050	1.810	1.940	
13,00	15,00		1.770	1.900	30
15,00	18,50		1.730	1.860	
The out of roundness shall not be more than 50% of the total diameter tolerance.			The tensile strength within one coil can scatter by max. 50 MPa, within one delivery by max. 70 MPa.		

Physical properties

Modulus of elasticity	E [GPa]	206
Shear modulus	τ [GPa]	79,5
Yield strength 0,2%	$R_{p0,2}$	min. 0,9 x tensile strength of the wire

Surface finish

Permissible depth of surface defects	max. 1% of the wire-∅, max. 0,1 mm
Partial decarburization	max. 0,5% of the wire-∅

Heat treatment - recommended values for tempering temperature

After coiling the springs	≈ 400°C, 30 min.
After shot peening the springs	≈ 250°C, 30 min.