PENTHOR 911

Edition 04/2016
Replaces edition 01/2012

Oil tempered silicon/chromium/vanadium alloyed spring wire

External standard :
The material conforms to FDSiCrV according to EN 10270 - 2 : 2011

Applications:
For statically stressed springs or springs working in the finite life range, requiring strength at elevated temperatures (up to approx. 250 °C).

Range of diameters :
0.40 to 6.50 mm Ø

Chemical composition (heat analysis):

C %	Si %	Mn %	P max. %	S max. %	Cu max. %	Cr %	V %
0.50 - 0.70	1.20 - 1.65	0.40 - 0.90	0.030	0.025	0.12	0.50 - 1.00	0.10 - 0.25

Raw material :
Wire rod according to in-house specifications.

Mechanical properties: Penthor 911 - Edition 04/2016 (replaces edition 01/2012)

Wire diameter mm	Tolerance mm	Tensile strength MPa	Minimum reduction %	Permissible depth of surf. defects [1])	Permissible part. decarburization depth [1]
0.40 to 0.60	± 0.010	2280 to 2430	-	max. 0.009 mm	
> 0.60 to 0.80		2280 to 2430		max. 1.5% of wire diameter	
> 0.80 to 1.00	± 0.015	2280 to 2430			
> 1.00 to 1.30	± 0.020	2280 to 2430	45		
> 1.30 to 1.40		2260 to 2410			
> 1.40 to 1.60		2260 to 2410			
> 1.60 to 2.00	± 0.025	2210 to 2360			
> 2.00 to 2.50		2160 to 2310			
> 2.50 to 2.70		2110 to 2260			
> 2.70 to 3.00	± 0.030	2110 to 2260			
> 3.00 to 3.20		2110 to 2260			
> 3.20 to 3.50		2110 to 2260	42		
> 3.50 to 4.00		2060 to 2210			
> 4.00 to 4.20	± 0.035	2060 to 2210	40		
> 4.20 to 4.50		2060 to 2210			
> 4.50 to 4.70		2010 to 2160			
> 4.70 to 5.00		2010 to 2160			
> 5.00 to 5.60		2010 to 2160	38		
> 5.60 to 6.00	± 0.040	1960 to 2110			
> 6.00 to 6.50		1960 to 2110	35		

a) Range of tensile strength within one coil max. 70 MPa
b) Ovality: Difference between the largest and smallest diameter of a cross section does not exceed 50 % of the diameter tolerance.
c) Yield point (0.2% limit) at least 90 % of the tensile strength
d) Modulus of elasticity E = 206.000 MPa
Shear modulus G = 79.500 MPa } Standard
e)Torsion tests are carried out according to EN 10218 - 1
[1]) End samples.

Heat treatment:
After coiling, the springs should be stress relieved as soon as possible at 380 - 425 °C, with a holding time of 30 minutes at temperature.

Please inquire for special tolerances, tensiles, sections, etc.