Penthor 111

Oil tempered unalloyed spring wire

External Standard:
The materials conforms with FDC acc. to EN 10270-2 : 2011

Further equivalent standards:
ASTM A229/A229M JIS G3560 SWO - A

Applications:
For statically stressed springs and springs working in the finite life range,

Range of diameters:
1.30 to 6.50 mm Ø

Chemical composition (heat analysis):

C %	Si %	Mn %	P Max %	S Max %	CU Max %
0.60-0.75	0.15-0.35	0.50-1.20	0.030	0.025	0.120

Raw material:

Wire rod according to in-house specifications.

Mechanical Properties: Penthor 111

Wire diameter mm	Tolerance mm	Tensile strength MPa	Minimum reduction area %	Permissible depth of surf. defects [1]	Permissible part decarburization depth [1]
1.30 to 1.40	± 0.020	1810 to 1970	45	max. 1.0% of wire diameter	
>1.40 to 1.60		1760 to 1940			
>1.60 to 2.00	± 0.025	1720 to 1890			
>2.00 to 2.50		1670 to 1820			
>2.50 to 2.70		1640 to 1790			
>2.70 to 3.00	± 0.030	1620 to 1770			
>3.00 to 3.20		1600 to 1750			
>3.20 to 3.50		1580 to 1730	42		
>3.50 to 4.00		1550 to 1700			
>4.00 to 4.20	± 0.035	1540 to 1690	40		
>4.20 to 4.50		1520 to 1670			
>4.50 to 4.70		1510 to 1660			
>4.70 to 5.00		1500 to1650			
>5.00 to 5.60		1470 to1620	38		
>5.60 to 6.00	± 0.040	1460 to 1610			
>6.00 to 6.50		1440 to 1590	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 (Standard)
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.

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