

# Penthor 811

## Oil tempered silicon/chromium alloyed spring wire

### External Standard:

The materials conforms with FDSiCr according to EN 10270-2 : 2011

### Further equivalent standards:

ASTM A401/A401M JIS 3560 SWOSC- B

### 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:

1.30 to 13.00 mm Ø



### Chemical composition (heat analysis):

C %	Si %	Mn %	P Max %	S Max %	CU Max %	Cr %
0.50-0.60	1.20-1.60	0.50-0.90	0.030	0.025	0.12	0.50-0.80

### Raw material:

Wire rod according to in-house specifications.

### Mechanical Properties: Penthor 811

Wire diameter mm	Tolerance mm	Tensile strength MPa	Minimum reduction area %	Permissible depth of surf. defects <sup>1)</sup>	Permissible part decarburization depth <sup>1)</sup>
1.30 to 1.40	± 0.020	2070 to 2250	45	max. 1.5% of wire diameter	
>1.40 to 1.60		2040 to 2220			
>1.60 to 2.00	± 0.025	2000 to 2180			
>2.00 to 2.50		1970 to 2140			
>2.50 to 2.70		1950 to 2120			
>2.70 to 3.00	± 0.030	1930 to 2100			
>3.00 to 3.20		1910 to 2080			
>3.20 to 3.50		1900 to 2060			
>3.50 to 4.00		1870 to 2030			
>4.00 to 4.20	± 0.035	1860 to 2020	40		
>4.20 to 4.50		1850 to 2000			
>4.50 to 4.70		1840 to 1990			
>4.70 to 5.00		1830 to 1980			
>5.00 to 5.60	± 0.040	1800 to 1950	38		
>5.60 to 6.00		1780 to 1930			
>6.00 to 6.50		1760 to 1910			
>6.50 to 7.00	± 0.045	1740 to 1890	35		
>7.00 to 8.00		1710 to 1860			
>8.00 to 8.50		1700 to 1850			
>8.50 to 10.00	± 0.050	1660 to 1810	32		
>10.00 to 12.00	± 0.070	1620 to 1770			
>12.00 to 13.00	± 0.080	1580 to 1730	30		

- 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
- <sup>1)</sup> End samples

### Heat treatment:

After coiling, the springs should be stress relieved as soon as possible.

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