

## Raajratna Age-hardenable Stainless Steel Spring Wire (631/S17700)

### DESCRIPTION

Raajratna manufactures high quality stainless steel spring wire in bright as well as in stearate coated surface finish.

Stainless steel spring wires can be supplied in ½ hard, ¾ hard & full hard conditions as well. We are using drawing lubricants from CONDAT and also of Japanese origin.

### APPLICATIONS

Stainless steel spring wires are used for producing various types of springs like Aerosol spring, Compression spring, Extension spring, and Torsion spring as well as for wire form, Straight Pin etc.

### STANDARDS

The stainless steel wires are manufactured as per **ASTM A 313, EN 10270-3, JIS G4314, BS 2056 & DIN 17224** and other equivalent international standards.

### SURFACE FINISH

Size (mm)	Finish
0.10 – 0.80	Bright
0.20 – 16.00	Coated
0.15 – 2.00	Ni Coated

### CHEMICAL ANALYSIS

Element	ASTM A 313 (Requirement)	Typical values
%C	0.09 Max	0.080
%Mn	1.00 Max	0.850
%Si	1.00 Max	0.400
%P	0.040 Max	0.020
%S	0.030 Max	0.0005
%Cr	16.00 - 18.00	16.300
%Ni	6.50 – 7.80	7.600
%Al	0.75 – 1.50	0.900

### PHYSICAL PROPERTIES

Density (20°C)	7.9 g/cm <sup>3</sup>
Thermal conductivity (20°C)	14.9 W/m.K.
Specific heat (20°C)	480 J/Kg.K
Electrical resistivity (20°C)	0.85 Ωmm <sup>2</sup> /m
Permeability (μ <sub>max</sub> )	70 Approx.
<b>Shear modulus</b>	
As drawn: 73 GPa approx	Tempered: 78 GPa approx
<b>Modulus of elasticity</b>	
As drawn: 190 GPa approx	Tempered: 200 GPa approx
<b>Thermal expansion coefficient</b>	
20 <sup>0</sup> – 100 <sup>0</sup> C	12.5
20 <sup>0</sup> – 200 <sup>0</sup> C	13.5
20 <sup>0</sup> – 300 <sup>0</sup> C	14.5

- Data shown are typical, and should not be construed as max & min values for specification. Data on any particular piece of material may vary from those shown herein.

## MECHANICAL PROPERTIES

Mechanical properties of supplied wire (As drawn condition & condition CH-900) as per **ASTM A 313/A 313M** are mentioned below.

Tensile strength as per ASTM A313				
Sizes (mm)		Cold drawn condition C (MPa)	Condition CH-900 (MPa)	
From	To	Nominal	Minimum	Maximum
0.25	0.38	2035	2310	2515
>0.38	0.51	2000	2275	2480
>0.51	0.74	1965	2240	2450
>0.74	1.04	1895	2205	2415
>1.04	1.30	1860	2135	2345
>1.30	1.55	1825	2100	2310
>1.55	1.80	1770	2050	2255
>1.80	2.18	1760	2015	2220
>2.18	2.29	1690	1945	2150
>2.29	2.54	1670	1925	2130
>2.54	2.69	1640	1890	2095
>2.69	3.30	1625	1875	2080
>3.30	3.50	1585	1795	2000
>3.50	3.71	1570	1780	1985
>3.71	4.11	1560	1765	1970
>4.11	4.57	1545	1750	1960
>4.57	5.26	1530	1740	1945
>5.26	5.72	1505	1710	1915
>5.72	7.77	1470	1670	1875
>7.77	11.20	1425	1620	1825
>11.20	15.88	1400	1585	1795

- Condition CH 900 – Aged at 900<sup>0</sup>F [482<sup>0</sup>C] for 1 h and air cooled.
- This tempering treatment also affects the YS/UTS ratio. In as drawn condition this ratio is about 0.86 & after tempering treatment, the same would be around 0.95.
- After straightening, TS may be reduced by up to 10%.
- 1 MPa = 1 N/mm<sup>2</sup>, 1 GPa = 1 KN/mm<sup>2</sup>
- When better formability required or in case of thicker sizes, Tensile strength values may be agreed upon.