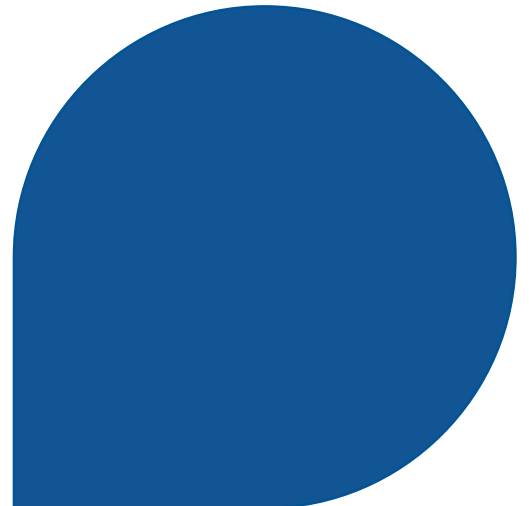




D.P. WIRES LIMITED

An IS/ISO 9001:2015 Company



**Alloyed & Unalloyed,
Induction Hardened and
Tempered Spring Steel Wire**



Company Profile

D.P. Wires Limited established in 1971, is one of the leading Steel Wire manufacturers in India with a manufacturing facility at Ratlam (Madhya Pradesh).

Our company is ISO 9001:2008 accredited by the Joint Accreditation System of Australia, New Zealand (JAS-ANZ).

Our infrastructural facilities with a robust production capacity of 50000 MT per annum are equipped with the latest state-of-the-art high-capacity machines. We plan to enhance our production capacity to 70000 MT per annum to serve our world-class products to our customers.

Our Quality Control & Research Laboratory conducts concurrent testing to **assure consistency and conformity to quality parameters**. We endeavor to develop and improve our products assimilating the latest **research and feedback from all stakeholders**.

We manufacture a wide range of Wires for **Automotive, Construction, Infrastructure, and Power Industries**. Our extensive experience and specialized knowledge makes us a leading manufacturer, exporter and supplier of premium quality **Steel Wires**.

Quality Policy

**To achieve ‘Customer Delight’
by providing
highest quality products
& service with
‘Value Proposition’**

Quality Assurance

D.P. Wires Limited boasts of an ISO9001 compliant quality system. Our manufacturing quality assurance policy mandates all employees to strictly adhere to all published quality control standards at all times. Quality compliance as an attribute among all employees coupled with a strong quality control program, ensures the best quality product. **We strive for continuous improvement and have a well-equipped in-house Physical, Mechanical & Metallurgical testing facilities as per National/International Standards to cater to our goals.**



UTM Machine



Spectrometer



Metallurgical Microscope



Hardness Testing Machine



Eddy Current Testing Machine

We have well equipped in-house Physical, Mechanical & Metallurgical testing facilities as per National/International Standards

Our Business

Our Company was incorporated as DP Wires Private Limited under the provisions of the Companies Act 1956 vide **certificate of incorporation dated** February 26, 1998, issued by the Registrar of Companies, Maharashtra, Mumbai. The **registered office was shifted to Ratlam, Madhya Pradesh** in 2012 to achieve **operational & administrative efficiency**. Our Auto grade wires are trusted by many auto ancillaries and that itself is the testimony of our credentials

Our Product Range:

- Low Relaxation Pre-stressing Concrete Strand (LRPC)
- PE-coated HT Strands
- PC Wire / Indented Wire
- Induction Hardened & Tempered Steel Wire
- Spring Steel Wire
- LDPE / HDPE Sheet, Geomembrane Sheet (Pond Lining Film)

Induction Tempered Wire

Normally Induction Tempered Wire is categorized as Oil Tempered Wire for its mechanical **properties**, however, **DP Wire's advanced and unique production system uses electric power instead of gas as an energy source for heating and water instead of oil for quenching.**

Principle of Induction Heat Treatment:

Induction **heat treatment is, as you can see in fig 1**, one of the **heat treatment** methods assembled, under accurate control, with the Induction Heating Process and Rapid Cooling System which can **cool wire material uniformly besides rapidly.**

This system not only materializes excellent properties of the material but also enables us to heat **material so rapidly up to targeted temperature** per its application without touching anything.

Induction Heat Treatment is quite **effective for non-pollution systems** suitable for saving **resources and energy.**

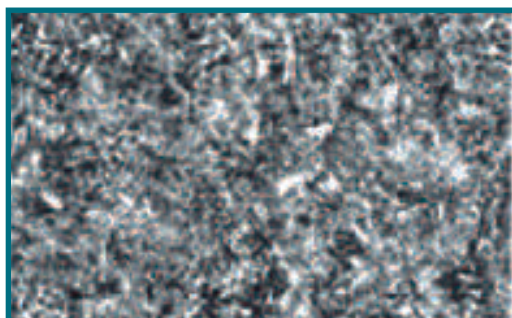


Features

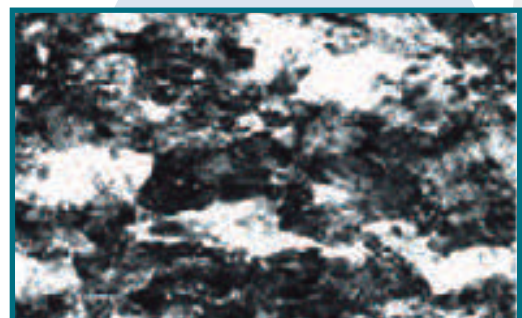
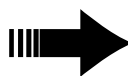
From the wire rods to finished products, it is manufactured following perfect quality control by latest facilities and supreme technology, with an automatic induction heating **system developed by us** . D.P. Wires Induction Tempered Wire **has the following features:**

Because of rapid and short time induction heat treatment for austenitization,

- Fine grain structure **can be gained.**
- Decarburization or oxidation of grain boundary. Because of the interaction of fine quenched structure and short time induction tempering,
- High strength and toughness **can be obtained at the same time** by using the precise control system for heating, quenching & tempering. Temperature is controlled **for each wire at each stage of operations.**
- **Product's Tensile strength** can be achieved according to the customer's specification.
- Uniform strength for the entire length of wire can be obtained.
- Possible to form smaller D/d springs even using higher strength of wire.
- Fatigue and **sag resistance** remains at high level.
- Cost reduction will be possible by weight saving due to high applied stress.

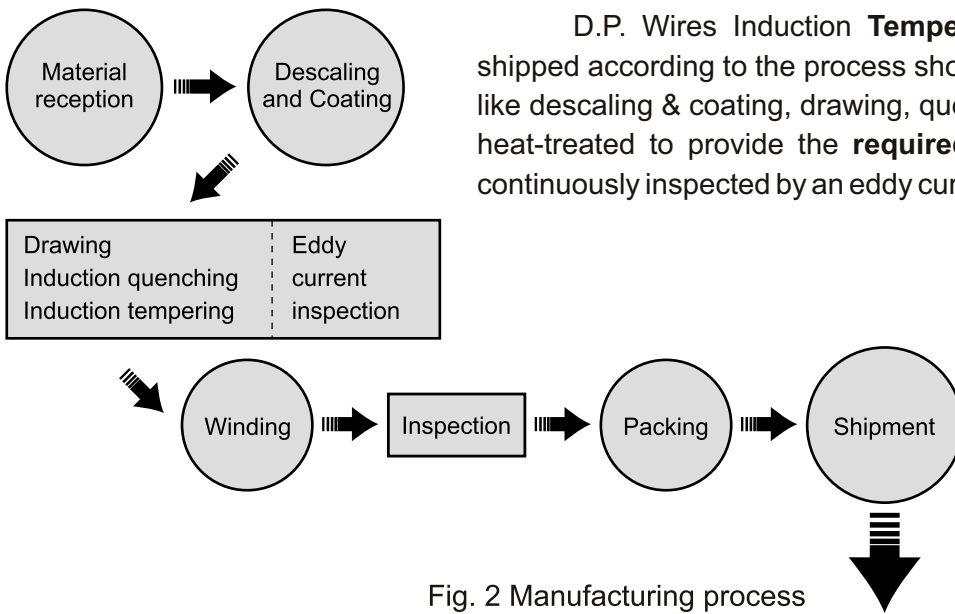


Raw material



Finished product

Manufacturing Process



D.P. Wires Induction **Tempered Wire is manufactured** and shipped according to the process shown in Fig. 2. Through this process like descaling & coating, drawing, quenching, and tempering the wire is heat-treated to provide the **required mechanical properties** and is continuously inspected by an eddy current flow detector.

Fig. 2 Manufacturing process



Heat treatment process



Finished products in coil

Standard Specifications

Chemical composition Wire rod of SAE9254 mainly and other similar grades with special elements are used as raw material.

Table 1 Chemical composition (%)

Material	C	Si	Mn	P	S	Cr
SAE9254	0.51 - 0.59	1.20 - 1.60	0.60 - 0.80	0.035 or less	0.040 or less	0.60 - 0.80
JIS G 3560-1994 SWOSC-B	0.51 - 0.59	1.20 - 1.60	0.50 - 0.90	0.035 or less	0.035 or less	0.55 - 0.90

Diameter range :

Size : 6.0 mm to 17.0 mm. (Please ask us for smaller diameters than 6.0 mm)

Tolerance and Out of roundness

Tolerance and Out of roundness are as shown in Table 2.

Table 2 Tolerance and Out of roundness (mm)

Diameter	Tolerance	Out of roundness
6.0 to 17.0	±0.05	0.05 or less

Mechanical properties

Standard mechanical properties are as shown in Table 3.

Table 3 Mechanical properties

Grade symbol	Tensile strength (N/mm ²)	Reduction of area (%)
SWI-180	1,750 - 1,850	Min. 35
SWI-190	1,850 - 1,950	Min. 35
SWI-200	1,950 - 2,050	Min. 35

Other tensile strength range than above standard is applicable.

Instructions for safety use

Handling and Storage :

Pay strong attention to ensure that the wires do not have flaws, scratches, abrasions, bruises, and other wounds on the wire.

Keep away the wire from moisture such as rain, high humidity, or chemical to ensure that corrosion on the wire doesn't take place.

Keep away from the electric or cutting spark. Even such small surface defects may cause the breakage of spring.

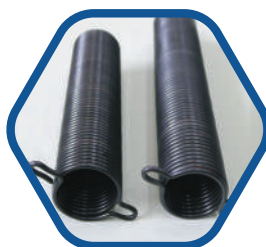
- Do not use steel wire rope but use nylon sling for lifting.
- **It is recommended to put the wire on a rubber sheet or squared timber for storage.**
- Rewinding stand must be used for rewinding of wire in the coil. It is **recommended to use a rewinding stand with low frictional resistance.**
- Be careful with the spring back of the wire's end when cutting the bindings for wire in the coil.
- Do not apply plating to the springs processed from the wire.
- **Low annealing temperature must be done after the formation of coil spring within 24 hours.**

Application

Spring Steel Wire

Seat Spring for two-wheeler & four-wheeler. Suspension/Compression Springs

- Tension Springs
- Torque Spring

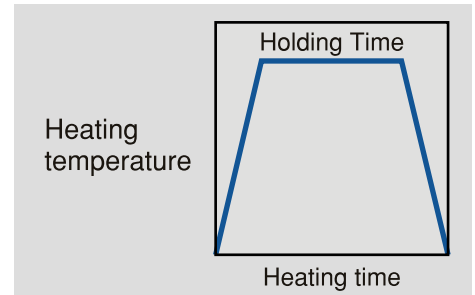


Conditions of low temperature annealing

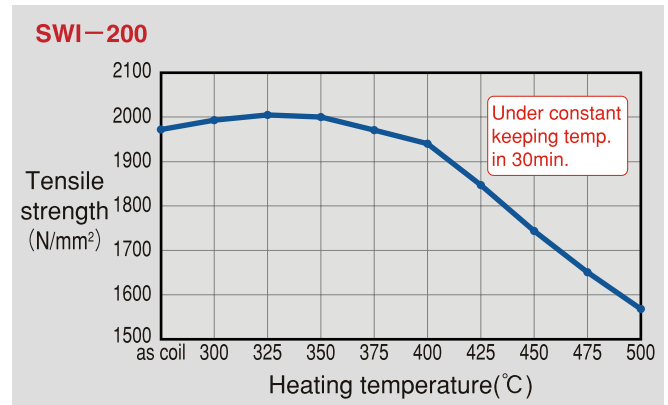
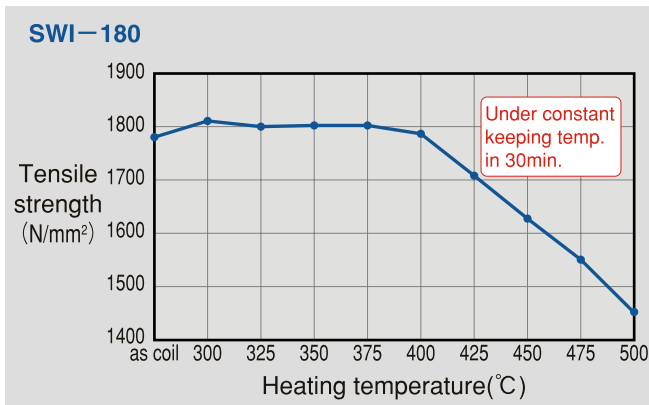
Recommended conditions

Following are the recommended conditions for low temperature annealing to be processed after forming of coil spring using SWI-180 and SWI-200 respectively.

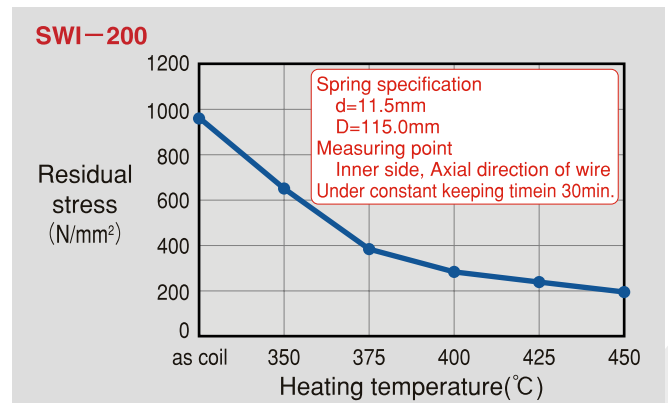
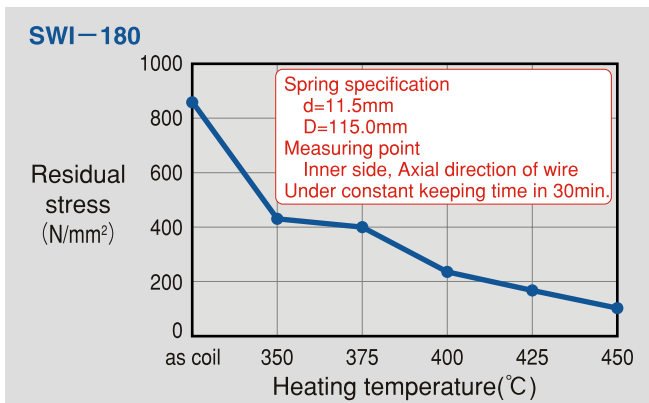
Grade symbol (Tensile strength)	Heating temperature	Holding Time
SWI-180 (1750~1850N/mm ²)	400°C ± 10°C	30min. or more
SWI-200 (1950~2050N/mm ²)	380°C ± 10°C	



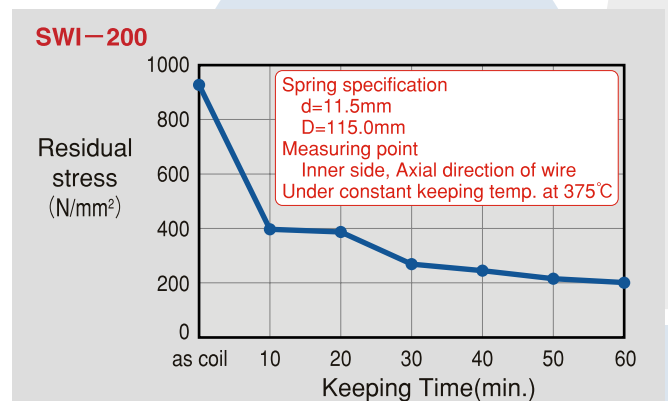
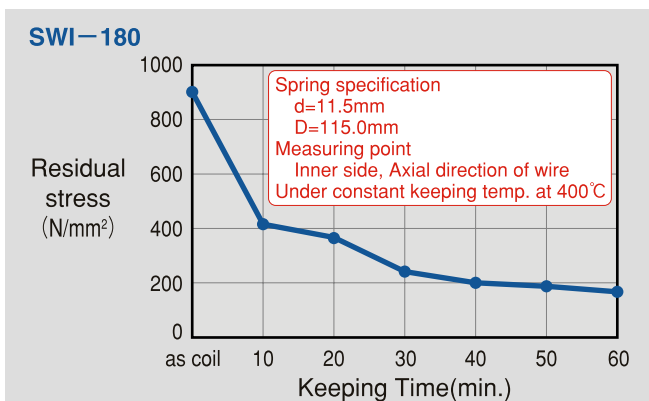
Relationship between temperature and tensile strength



Relationship between temperature and residual strength



Relationship between holding time of heating and residual stress



Comparison between "JIS G 3560" and "D.P. Wires"

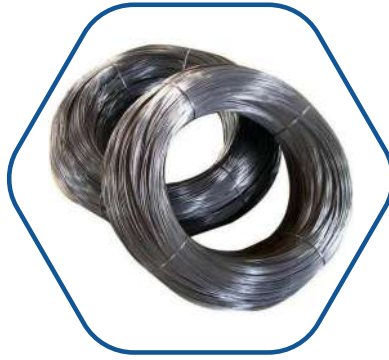
Dia. (mm)	Tensile strength(N/mm ²)			Tolerance(mm)		Roundness(mm)		Reduction of area(%)		Dia. (mm)
	JIS G 3560 SWOSC-B	D.P. Wires		JIS G 3560 SWOSC-B	D.P. Wires	JIS G 3560 SWOSC-B	D.P. Wires	JIS G 3560 SWOSC-B	D.P. Wires	
6.0	1,710-1,860 (150)	SWI-200 1,950-2,050 (100)	SWI-190 1,850-1,950 (100)	SWI-180 1,750-1,850 (100)	±0.060	±0.050	0.060 or less	0.050 or less	>35	6.0
6.5										6.5
7.0	1,660-1,810 (150)									7.0
7.5										7.5
8.0										8.0
8.5										8.5
9.0					±0.070		0.070 or less		>30	9.0
9.5										9.5
10.0										10.0
10.5										10.5
11.0										11.0
11.5										11.5
12.0	1,610-1,760 (150)									12.0
12.5										12.5
13.0										13.0
13.5										13.5
14.0										14.0
14.5										14.5
15.0										15.0
15.5										15.5
16.0										16.0
16.5										16.5
17.0										17.0

* Numerical figures in parentheses show the specified range of tensile strength.

• USAGE

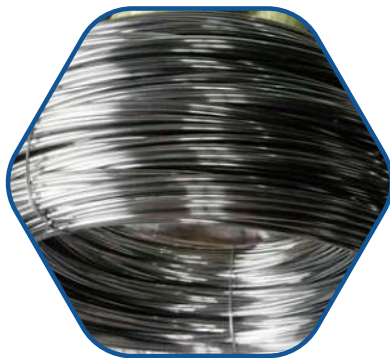
Suspension in two and four wheel vehicles,
 emergency brake for large-sized vehicles,
 shutter, industrial machine and other springs need
 high fatigue resistance and high sag resistance.
 (ITW is not available for valve springs.)

Spring Steel Range



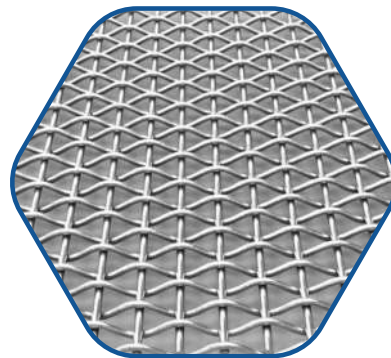
Spring Wire

Size : 1.20 mm to 16 mm (SL, SM, SH, DM, DH)



Shutter Wire

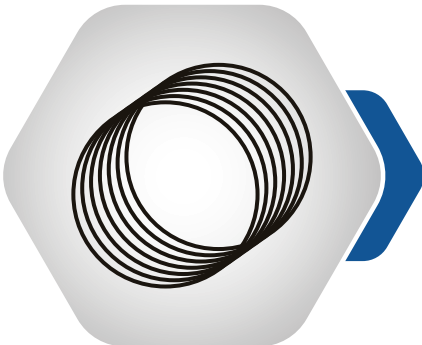
Size : 5.30 mm to 9 mm



Crimping Wire

Size : 5.50 mm to 20.00 mm

Quality & Process Control During Manufacturing



Wire Rod

- Visual Examination
- Dimensional Check
- Mechanical Properties
- Chemical Analysis
- Microstructure



Surface Cleaning & Coating

- Visual Check
- Maintain Acid% in tank.



Wire Drawing

- Dimensional
- Check Mechanical Properties Wire Ductility

Spring Steel Wires

Indian Specification IS 4454:2001 Part-1

Table 5 Tensile Strength Requirements
(Clause 10.1)

Nominal Diameter of Wire, mm (1)	Tensile Strength for Grades, MPa				
	SL (2)	SM (3)	DM (4)	SH (5)	DH (6)
1.40	1620-1860	1870-2100	1870-2100	2110-2340	2110-2340
1.50	1600-1840	1850-2080	1850-2080	2090-2310	2090-2310
1.60	1590-1820	1830-2050	1830-2050	2060-2290	2060-2290
1.70	1570-1800	1810-2030	1810-2030	2040-2260	2040-2260
1.80	1550-1780	1790-2010	1790-2010	2020-2240	2020-2240
1.90	1540-1760	1770-1990	1770-1990	2000-2220	2000-2220
2.00	1520-1750	1760-1970	1760-1970	1980-2200	1980-2200
2.10	1520-1750	1760-1970	1760-1970	1980-2200	1980-2200
2.25	1490-1710	1720-1930	1720-1930	1940-2150	1940-2150
2.40	1470-1690	1700-1910	1700-1910	1920-2130	1920-2130
2.50	1460-1680	1690-1890	1690-1890	1900-2110	1900-2110
2.60	1450-1660	1670-1880	1670-1880	1890-2100	1890-2100
2.80	1420-1640	1650-1850	1650-1850	1860-2070	1860-2070
3.00	1410-1620	1630-1830	1630-1830	1840-2040	1840-2040
3.20	1390-1600	1610-1810	1610-1810	1820-2020	1820-2020
3.40	1370-1580	1590-1780	1590-1780	1790-1990	1790-1990
3.60	1350-1560	1570-1760	1570-1760	1770-1970	1770-1970
3.80	1340-1540	1550-1740	1550-1740	1750-1950	1750-1950
4.00	1320-1520	1530-1730	1530-1730	1740-1930	1740-1930
4.25	1310-1500	1510-1700	1510-1700	1710-1900	1710-1900
4.50	1290-1490	1500-1680	1500-1680	1690-1880	1690-1880
4.75	1270-1470	1480-1670	1480-1670	1680-1840	1680-1840
5.00	1260-1450	1460-1650	1460-1650	1660-1830	1660-1830
5.30	1240-1430	1440-1630	1440-1630	1640-1820	1640-1820
5.60	1230-1420	1430-1610	1430-1610	1620-1800	1620-1800
6.00	1210-1390	1400-1580	1400-1580	1590-1770	1590-1770
6.30	1190-1380	1390-1560	1390-1560	1570-1750	1570-1750
6.50	1180-1370	1380-1550	1380-1550	1560-1740	1560-1740
7.00	1160-1340	1350-1530	1350-1530	1540-1710	1540-1710
7.50	1140-1320	1350-1500	1330-1500	1510-1680	1510-1680
8.00	1120-1300	1310-1480	1310-1480	1490-1660	1490-1660
8.50	1110-1280	1290-1460	1290-1460	1470-1630	1470-1630
9.00	1090-1260	1270-1440	1270-1440	1450-1610	1450-1610
9.50	1070-1250	1260-1420	1260-1420	1430-1590	1430-1590
10.00	1060-1230	1240-1400	1240-1400	1410-1570	1410-1570
10.50	-	1220-1380	1220-1380	1390-1550	1390-1550
11.00	-	1210-1370	1210-1370	1380-1530	1380-1530
12.00	-	1180-1340	1180-1340	1350-1500	1350-1500
12.50	-	1170-1320	1170-1320	1330-1480	1330-1480
13.00	-	1160-1310	1160-1310	1320-1470	1320-1470
14.00	-	1130-1280	1130-1280	1290-1440	1290-1440

NOTES

- 1 MPa = 1 N/mm² = 0.1020 kgf/mm²
- For DH grade in the size range 0.08 mm to 0.18 mm, a restricted tensile strength range of 300 MPa within the specified range may be mutually agreed to.
- For intermediate values of the wire diameter, the values given for next larger diameter are applicable.

Table 6 Torsion Test Requirements
(Clause 10.3.3)

Nominal Diameter of Wire, mm		Minimum Number of Twists for Grades	
Over (1)	Up to and Including (2)	SL, SM and SH (3)	DM and DH (4)
0.69	1.40	20	25
1.40	2.00	18	22
2.00	3.50	16	20
3.50	6.00	14	18
6.00	8.00	7 ¹⁾	9 ¹⁾
8.00	10.00	5 ¹⁾	7 ¹⁾

¹⁾ For guidance only.

Application

Spring Steel Wire

- Seat Spring for two-wheeler & four-wheeler.
- Tension Springs
- Suspension / Compression Springs
- Torque Spring

Shutter Wire

- Use for shutter spring

Crimping Wire

- Uses on dams to stop stones.
- For making mesh for segregation of stones.



D.P. WIRES LIMITED

An IS/ISO 9001:2015 Company



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