



CORPORATE PURCHASING SPECIFICATION

AA 103 01

Rev. No. 05

PREFACE SHEET

COLD DRAWN SPRING STEEL WIRE - ZINC COATED

FOR INTERNAL USE ONLY
REMOVE THIS PREFACE SHEET BEFORE ISSUE TO SUPPLIERS

Comparable Standards:

1. INDIAN : IS : 4454, Part 1 – 2001, Gr: SM
Finish : Zinc Coated

Suggested/Probable Suppliers And Grades:

Refer plant vendors list.

User Plant References:

1. BHOPAL : PS 103 01.
2. HEER, HARDWAR : 0550. 000

Revisions :

Cl. 26.6.22 of MOM of MRC-S&GPS

APPROVED :

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE-MRC (S&GPS)

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COLD DRAWN SPRING STEEL WIRE - ZINC COATED

1.0 GENERAL:

This specification governs the quality of requirements of Zinc coated cold drawn carbon steel wire.

2.0 APPLICATION:

Suitable for the manufacture of cold formed helical springs, spring-rings and wire forms subjected to moderate load cycles-statically stressed.

3.0 CONDITION OF DELIVERY:

Wire shall be supplied in the form of coils in Zinc Coated, Cold drawn condition.

4.0 COMPLIANCE WITH NATIONAL STANDARDS:

The material shall comply, in general, with requirements of the following National standards and also meet the requirements of this specification.

IS: 4454, Part 1- 2001, Gr.: SM : Steel wires for mechanical springs.

5.0 DIMENSIONS AND TOLERANCES :

5.1 Sizes:

The material shall be supplied to the dimensions specified on BHEL order.

Wires above 0.30 mm and upto and including 20.0 mm in diameter only shall be ordered to this specification.

5.2 Tolerances:

5.2.1 The tolerances of the wire shall comply with Table-4 of IS: 4454, Part-1.

5.2.2 The cross-section of the round wire shall be circular to within half the tolerance of the permitted diameter tolerance, specified above.

Revisions:

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6.0 MANUFACTURE:

Steel for springs shall be manufactured by the open heath, electric, basic oxygen or a combination of these processes. If any other process is employed, prior approval of BHEL shall be obtained.

Material shall be manufactured form killed steel.

The wire shall be drawn in the galvanised condition.

7.0 FREEDOM FROM DEFECTS:

The surface of the wire shall be smooth and free from defects such as grooves, seams, pits, die marks, tears, rust, scale, scratches and any harmful defects which may have a noticeable adverse effects on application of the wire.

8.0 SAMPLING:

Unless otherwise agreed to method of drawing representative sample of material and criteria for conformity shall be as per Annex. C of IS:4454, Part 1.

9.0 CHEMICAL COMPOSITION:

The melt analysis of steel and the permissible variation in the composition of the finished product form the melt analysis shall be as follows:

Element	Melt analysis,		Permissible variation percent
	%min.	%max.	
Carbon	0.35	1.0	± 0.02
Silicon	0.10	0.30	± 0.03
Manganese	0.30	1.20	+ 0.05
Sulphur	-	0.030	+ 0.005
Phosphorus	-	0.030	+ 0.005
Copper	-	0.20	-

NOTE: i) P + S = 0.055% , max.

ii) Cu + Ni + Cr = 0.35%, max

10.0 ZINC COATING:

Zinc Coating Process (Hot dip galvanising) shall be as per IS:2629.

The final weight of zinc coating shall not be less than 60 gm/m² on any size of wire when tested as per IS:6745..

**11.0 WRAPPING TEST:**

The wire shall be bent or wrapped round a mandrel of appropriate diameter given below without cracking of the base wire, or cracking or flaking of the coating to such an extent that any zinc can be removed by rubbing with bare fingers.

Diameter of wire mm	Minimum complete turns of wrap	Mandrel diameter
3.80 and under	6	4 D*
Over 3.80 upto and incl. 7.5	6	5 D
Over 7.5	1/4 (one 90° bend)	5 D

* Diameter of wire = D

12.0 MECHANICAL PROPERTIES:**12.1 Tensile:**

The tensile test shall be carried out in accordance with IS: 1608.

The tensile strength and percentage reduction of area obtained from the test pieces shall comply with those given in Table 5 of IS: 4454, Part 1.

12.2 Wrapping:

The wrapping test shall be applicable to wires with nominal diameter less than 3mm. Wrapping test when carried out in accordance with IS:1755 shall not show on visual examination any sign of fracture upon closely coiled for atleast four turn around a mandrel of diameter equal to diameter of wire.


12.3 Torsion:

For wires of diameter 0.5 mm and upto and incld. 10.0 mm.

The sample piece of length equal to 100 times the wire diameter, but not exceeding 500mm shall be twisted in accordance with IS: 1717. The test piece shall withstand, without failure, the minimum number of turns given in Table 6 of IS: 4454, Part I. The fracture shall be perpendicular to the wire axis and surface shall not split. Any secondary helical fracture shall be ignored.

12.4 Cast of Wire:

As per IS:4454.

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13.0 INSPECTION AT SUPPLIER ' WORKS:

When ever specified tests and inspection are to be conducted in the presence of BHEL's representative.

The supplier shall offer BHEL's representative all reasonable facilities, without charge to satisfy the latter that the material is being furnished in accordance with this specification. The supplier shall prepare and provide necessary test specimens for testing to be carried out at his premises. If facilities are not available at his works, the supplier shall make necessary arrangements for carrying out the prescribed test elsewhere. The supplier shall notify BHEL in advance about the readiness of the material for inspection and testing.

BHEL reserves the right to test the material at BHEL's works and the final acceptance of the material shall be based on these test results.

14.0 TEST CERTIFICATES :

Three copies of test certificates shall be supplied, unless otherwise stated on the order In addition, to the above, the supplier shall ensure to enclose one copy of the test certificate along with their despatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information:

AA 103 01: Rev. No. 05: Cold drawn spring steel wire - Zinc coated

BHEL order No,

Supplier's Reference :

Name

Identification No.

Cast No./Lot No.

Results of Tests :

Results of chemical mechanical and Zinc coating tests.

15.0 PACKING AND MARKING :

The wires shall be supplied in coils having a maximum weight of 50kg. The wires shall be coiled in such a way that the coils remain flat when the ties are cut. The coils shall be suitably packed to prevent corrosion and damage during transit.

A metal label shall be securely attached to each bundle and shall bear the following information:

AA 10301: Cold drawn spring steel wire - Zinc coated

BHEL Order No.

Consignment/Identification No.

Size and Weight.

Supplier's Name

16.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1) IS:1608	2) IS:1717	3) IS:1755	4) IS: 2629
5) IS:4454, Part1	6) IS:6745		