



**PRODUCT MANUAL FOR
WIRE ROPES AND STRANDS FOR SUSPENSION BRIDGES
ACCORDING TO IS 9282:2002**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification license/certificate.

| | | | |
|----|---|---|--|
| 1. | Product | : | IS 9282:2002 |
| | Title | : | Wire Ropes and Strands for Suspension Bridges |
| | No. of Amendments | : | One |
| 2. | Sampling Guidelines: | | |
| a) | Raw material | : | As per Cl.4 of IS 9282: 2002 |
| b) | Grouping guidelines | : | Please refer ANNEX – A |
| c) | Sample Size | : | Mechanical Tests: 4 meter Chemical Tests: 5 pieces of 5cm x 5cm |
| 3. | List of Test Equipment | : | Please refer ANNEX – B |
| 4. | Scheme of Inspection and Testing | : | Please refer ANNEX –C |
| 5. | Possible tests in a day: | | i) Requirements of wire (Cl. 4.2, 4.3, 4.4, 4.5) ii) General requirements (Cl. 5) iii) Joints (Cl. 5) iv) Direction of Lay (Cl. 7) v) Length of lay (Cl. 8) vi) Lubrication (Cl. 9) |
| 6. | Scope of the Licence: | | Please refer ANNEX –D |

ANNEX -A**GROUPING GUIDELINES**

1. IS 9282: 2002 covers Wire Ropes and Strands for Suspension Bridges which are classified into different varieties based on the following:
 - a) Type- Round Strand/Spiral Strand/Half and Full locked Coil Wire Rope
 - b) Construction (as per Cl. 1)
 - c) Rope Grade –1370/1420/1470/1570
 - d) Size (Nominal Diameter)
2. Considering the above, the following grouping guidelines shall be followed for GoL/CSoL:
 - i) Samples of Wire Rope of any Type, Construction and Size (Nominal Diameter), preferably the largest size, shall be drawn and tested for all the requirements.
 - ii) However, the following relaxation may be given when a particular variety is tested for all the requirements:

| Variety Tested | Additional Variety that may be covered | Remarks |
|-----------------------|---|--|
| Rope Grade – 1570 | Rope Grade – 1420 | For Round Strand and Spiral Strand Types |
| Rope Grade – 1470 | Rope Grade – 1370 | For Half and Full Locked Coil Wire Rope |

3. The Firm shall declare the varieties they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
4. During the operation of license, it shall be ensured that all varieties covered in the license are tested in rotation, to the extent possible.

ANNEX--B**List of Test Equipment***Major test equipment required to test as per the Indian Standard*

| Sr No | Tests used in with clause reference | Test equipment |
|--------------|--|---|
| 1 | Rope size, Cl. 1, Table 1 to 11 Dimensional limits and tolerances Cl. 4, | Vernier caliper, Micrometer |
| 2 | Minimum breaking force, Cl. 1, 10, Table 1 to 11 Tensile test, Cl. 4.2 Elongation test, Cl. 4.3 Proof stress test, Cl. 4.4 | Tensile testing machine / Breaking Load Testing Machine |
| 3 | Measurement of mass - Table 1 to 11 | Weighing balance |
| 4 | Length of rope - Cl. 6 of IS 6594 | Measuring tape / Length Counter meter |
| 5 | Shape and dimensions | Snap gauge / Profile projector |
| 6 | Tests for Galvanizing, Cl. 4.5.1 (Cl. 11 of IS 1835) | Weighing balance, Chemicals |
| 7 | Wrap test, Cl. 4.5.2 | Suitable fixture and mandrels. |

The above list is indicative only and may not be treated as exhaustive.

ANNEX C

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING – As per requirements of IS 9282: 2002.

4. LEVELS OF CONTROL - The tests as indicated in column 1 of [Table 1](#) and the levels of control in column 3 of [Table 1](#), shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

4.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark

5. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1

| (1) | | | | (2) | (3) | | |
|--------------|--|--------------|-------------------------------|--|-------------------|-------------|----------------------------------|
| Test Details | | | | | Levels of Control | | |
| Clause | Requirement | Test Methods | | Test equipment requirement Required (R) or Sub-contracting permitted (S) | No. of Sample | Frequency | Remarks |
| | | Clause | Reference | | | | |
| 4 | Material | 4.1 | IS 9282 IS 1835 | S | One | Each heat | The material shall be ISI Marked |
| 1, 4 | Size and Tolerance | 1, 4.2.1 | IS 9282 IS 1835 | R | Each Rope | -- | - |
| 4 | Tests on individual wires before manufacturing rope | | | | | | |
| 4.2.2 | Tensile test | 4.2.2 | IS 9282 IS 1608 IS 6594 | R | One | Each bobbin | - |
| 4.3 | Elongation | 4.3 | IS 9282 | R | One | Each bobbin | - |
| 4.4 | Proof stress | 4.4 | IS 9282 | R | One | Each bobbin | - |
| 4.5.1 | Galvanizing | 4.5.1 | IS 9282 IS 1835 | R | One | Each bobbin | - |
| 4.5.2 | Wrap test | 4.5.2 | IS 9282 | R | One | Each bobbin | - |

| 4 | | | | | | | |
|--|------------------|-------------------------------|-------------------------------|---|-------------|--------------------|---|
| Tests on wires from completed ropes | | | | | | | |
| 4.2.2 | Tensile test | 4.2.2 | IS 9282 IS 1608 IS 6594 | R | One | Each Reel/ Coil | - |
| 4.3 | Elongation | 4.3 | IS 9282 | R | One | | - |
| 4.4 | Proof stress | 4.4 | IS 9282 | R | One | | - |
| 4.5.1 | Galvanizing | 4.5.1 | IS 9282 IS 1835 | R | One | | - |
| 4.5.2 | Wrap test | 4.5.2 | IS 9282 | R | One | | - |
| 5 | | | | | | | |
| General Requirements | | | | | | | |
| - | Length | 6.4 | IS 6594 | R | Each length | | - |
| - | Approximate Mass | Table 1 to Table 11 6.5 | IS 9282 IS 6594 | R | Each length | | - |
| 7 | Lay of rope | 7.1 to 7.3 | IS 9282 | R | Two | Each Reel/ Coil | - |
| 6 | Joints | 6.1, 6.2 | IS 9282 | R | Two | | - |
| 8 | Length of lay | 8 | IS 9282 | R | Each rope | | - |
| 9 | Lubrication | 9 | IS 9282 | R | Each rope | | - |

| | | | | | | | |
|----|------------------------|-------------------------|---------|---|-----|---|--------------------------------|
| 10 | Minimum breaking force | 10, Table 1 to Table 11 | IS 9282 | R | One | Every loading length subject to max 5 t | For each construction and size |
| | | | | | Two | Above 5 t | |

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

ANNEX D

Scope of Licence

“Licence is granted to use Standard Mark as per IS 9282:2002 with the following scope:

| | |
|---------------------|---|
| Name of the product | Wire Ropes and Strands for Suspension Bridges |
| Type | |
| Size | |
| Construction | |
| Rope Grade | |