

GOVERNMENT OF INDIA

MINISTRY OF RAILWAYS

(RAILWAY BOARD)



SECTIONAL LIBRARY
S & T DIRECTORATE
R.D.S.O. LUCKNOW

47/74

INDIAN RAILWAY

REFERENCE COPY

STANDARD SPECIFICATION

100

INSULATORS FOR MECHANICAL WIRE TRANSMISSION

Serial No. 47/74

Issued by

RESEARCH DESIGNS AND STANDARDS ORGANISATION

LUCKNOW-226011

PRICE: Re. 1-00

Copies of Indian Railway Standard Specifications are not sold by the RDSO. They are obtainable on payment from :

- i) The Manager of Publications, Government of India, Civil Lines, Delhi-110006,
- ii) The Government of India Book Depot, 8-K. S. Roy Road, Calcutta-700001, and
- iii) Office of the High Commissioner for India, Publication Branch, India House, Aldwych, London, WC.

2. The copies of Indian Standard Specifications are obtainable on prepayment from the Directorate General, Indian Standards Institution, 9-Bahadur Shah Zafar Marg, New Delhi-110001 ; or from their branches at :

- i) 'Sadhna', Nurmohamed Shaikh Marg, Khanpur, Ahmedabad--380001 ;
- ii) F Block, Unity Bldg., Narasimharaja Square, Bangalore--560002 ;
- iii) 534, Sardar Vallabhbhai Patel Road, Bombay-400007 ;
- iv) 5-Chowringhee Approach, Calcutta--700013 ;
- v) Kothi No. 90 Sector 18-A Chandigarh.
- vi) 5-8-56/57 Nampally Station Road, Hyderabad-500001 ;
- vii) 117/418 B, Sarvodaya Nagar, Kanpur--208005 ;
- viii) 54-General Patters Road, Madras--600002 ; and
- ix) BCI Building (3rd Floor), Gandhi Maidan East, Patna--800004.

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(Railway Board)



INDIAN RAILWAY
STANDARD SPECIFICATION

for

INSULATORS FOR MECHANICAL WIRE TRANSMISSION
(Tentative)

Serial No. S 47-74

0. FOREWORD

0.1 This specification is issued under the fixed Serial No. S 47-74, the final number indicating the year of original adoption as standard, or in the event of revision, the year of last revision.

ADOPTED, 1974

0.2 This specification requires reference to the following Indian Railway Standard (IRS) and Indian Standard (IS) Specifications.

IRS : S 23	Electrical Signalling and Interlocking Equipment.
IS : 196-1966	Atmospheric condition for Testing.
IS : 226-1969	Structural Steel (Standard Quality).
IS : 2071-1962	Methods of High Voltage testing.
IS : 5192-1969	Vulcanized Rubber Compounds.

SECTIONAL LIBRARY
S & T DIRECTORATE
RDSO, LUCKNOW

3.3 The rubber shall be compounded and shall conform to grade 6 of Type 'B' of IS : 5192-1969* or similar and shall be capable of withstanding outdoor weather conditions without deterioration in its electrical and mechanical properties.

3.4 The wire insulator shall be of uniform construction and cylindrical shape.

3.5 The rubber surrounding the steel links shall be a compact mass, free from air bubbles.

3.6 The moulding of the insulating rubber shall conform to the best trade practice, and be free from any surface imperfections, blooms, porosity, etc.

3.7 The insulating rubber surface shall have a uniform and smooth finish.

3.8 The mild steel link with eyelet shall have a smooth finish and be free from surface flaws, rough jags or laminations.

4. SIZES AND DIMENSIONS

4.1 The overall size and dimensions of the wire insulator shall not exceed the following:

4.1.1 Length	.. 150 mm.
4.1.2 Width	.. 60 mm. dia.
4.1.3 Weight	.. 560 gms.

4.2 The wire insulator shall conform to drawings approved by the purchase.

5. TESTS AND PERFORMANCE REQUIREMENTS

5.1 General

5.1.1 Tests given in clause 5.2 are Type tests for which 5 samples shall be required and then given in clause 5.3 are routine tests which shall be made on each wire-insulators. Acceptance tests are given in clause 5.4. Sampling procedure for acceptance of lots is mentioned in clause 6.

5.1.2 Unless other under standard is made

5.1.3 At least small quantities conform

5.1.4 Noted at P. 10

* Vulcanized Rubber
** Atmospheric condition

0.3 Wherever a reference to any specification appears in this specification without mentioning the year of issue, it shall be taken as a reference to the latest issue of that specification.

0.4 This specification is intended chiefly to cover the technical provisions relating to the supply of materials and does not include all the necessary provisions of a contract.

1. SCOPE

1.1 This specification covers the requirements, methods of sampling and tests of the wire-insulators for use in mechanical wire transmissions working signals, points, detectors etc., on 25 KV 50 Hz. electrified sections.

1.2 The general requirements of workmanship, inspection, test and warranty shall be in accordance with specification No. IRS : S 23* to the extent applicable.

2. TERMINOLOGY

2.1 For the purpose of this specification, the following definitions shall apply.

2.2 The terminology referred to in this specification is covered by the definitions given in IRS Specification No. S 23*.

2.3 The term 'lot' referred to in this specification but not covered by IRS Specification No. S 23* is defined below:—

2.3.1 Lot.—All wire insulators manufactured by the same factory during the same period using the same process and materials.

3. CONSTRUCTION, MATERIAL & WORKMANSHIP

3.1 Each wire insulator shall comprise of two interlinked steel links embedded in rubber, as per drawings provided by the purchaser. Each steel ring shall have an eyelet at the other end, outside the rubber insulation, for connecting the wire transmission on either end of the insulator.

3.2 The steel link, shall be made of mild steel to IS : 226-1969**.

* Electrical Signalling and Interlocking equipment.
** Structural steel (Standard quality).

5.1.3 Inspections and tests shall be carried out to ensure that all the requirements of this specification and other relevant specifications referred to are complied with.

5.1.4 Inspections and tests may be carried out partly or wholly either at the place of manufacture or in a railway laboratory, or in a national laboratory, or in any other approved laboratory or workshop, wherever suitable facilities may exist as desired by the inspecting authority or the purchaser or his nominee.

5.1.5 The purchaser or his nominee shall have the right to be present during all stages of manufacture and shall be afforded all reasonable/complete facilities to satisfy himself that the wire insulators are being manufactured in accordance with the terms and conditions of this specification. The Purchaser or his nominee shall have the right to reject any material that fails to conform to the specification.

5.2 Type Tests—The following shall constitute Type Tests and shall be performed in the sequence given below :

- a) Visual Inspection .. (clause. 5.5)
- b) Steaming Test .. (clause. 5.6)
- c) Mechanical Strength Test .. (clause. 5.7).
- d) Dielectric Strength Test .. (clause. 5.8).
- e) Insulation Resistance Test.. (clause. 5.9).
- f) Accelerated Ageing Test .. (clause. 5.10).

5.2.1 Type Approval—The Manufacturer or the Supplier shall submit to the testing authority four numbers of sample of the wire insulator for the purpose of Type Approval by the Purchaser or his nominee. Unless otherwise, agreed to, the bulk manufacture should be undertaken only after the Type Approval has been communicated by the Purchaser or his nominee.

5.2.2 Type Approval Certificate—A Type Approval Certificate may be issued to the Manufacturer if the samples pass all the prescribed tests. The Type Approval Certificate once issued shall not be valid if a change in the design, construction, materials used or manufacturing process is made subsequently, unless this change has the prior approval of the Purchaser or his nominee.

5.3 Routine Tests—The following shall constitute Routine Tests and shall be carried out by the Manufacturer on each insulator to be supplied.

- a) Visual Inspection .. (Clause 5.5)
- b) Mechanical Strength Test .. (Clause 5.7)
- c) Dielectric Strength Test .. (Clause 5.8)
- d) Insulation resistance test .. (Clause 5.9)

5.4 Acceptance Tests—The following shall constitute Acceptance Tests and shall be carried out in the sequence given below. —

- a) Visual Inspection .. (Clause 5.5).
- b) Mechanical Strength Test .. (Clause 5.7).
- c) Dielectric Strength Test .. (Clause 5.8).
- d) Insulation Resistance Test.. (Clause 5.9)

5.5 Visual Inspection—Visual inspection shall be carried out in accordance with clause 14.2 of I R S Specification No. S 23* to the extent applicable.

5.6 Steaming Tests—The wire insulator shall be subjected to constant steaming for two hours duration in a chamber. During the test, the temperature shall be maintained at 70 C. There shall not be any deformation or trace of superficial sediment on the insulator during or after the test. Immediately after this test, the insulator shall withstand the mechanical strength test as per clause 5.7.

5.7 Mechanical Strength Tests—The wire insulator must withstand a tensile force of 1250 kg. applied between the two eyelets of the insulator for 60 seconds. The force is to be applied gradually, starting from a value equal to half of the test force and reaching the full value in one minute. The insulator shall not show any sign of deterioration or deformation during or after the test. Immediately after withdrawing the force, the insulator shall satisfy the dielectric strength and insulation resistance tests as per clauses 5.8 and 5.9 respectively.

5.8 Dielectric Strength Tests The wire insulator shall withstand application of an alternating voltage of 5000V R M S applied between the two eyelets for a period of one minute under wet condition as per clauses 3.3 including sub-clauses 3.3.0 to 3.3.1.4 of IS : 2071-1962**. The application of voltage shall conform to sub-clauses 6.6.1 and 6.6.2 of IS : 2071-1962**. There shall not be any contortion or perforation of the insulator during the test. This test should be immediately followed by the insulation resistance test as per clause 5.9

* Electrical Signalling and Interlocking Equipment

** Methods of High Voltage Testing.

5.9 **Insulation Resistance Test**—The insulation resistance between the two eyelets of the insulator shall not be less than 10 megohms when measured with a 500 volt insulation tester.

5.10 **Accelerated Ageing Test**—The accelerated ageing test shall be as per clause 4.5 of IS : 5192-1969*

6 SAMPLING

6.1 The sampling plan for the purpose of acceptance shall be subjected to agreement between the purchaser and the supplier. In the absence of any such specific agreement, the double sample plan given in Table 1 shall be adopted.

TABLE-1

Lot consisting of W. Insulator	First sample size (N1)	Second sample size (N2)	Combined sample size (N1+N2)	Acceptance No.	Rejection No.
Under 25	3	6	9	0	2
25 to 50	7	14	21	0	3
51 to 100	10	20	30	0	3
101 to 200	13	26	39	0	5
201 to 300	20	40	60	1	5
301 to 500	25	50	75	1	6
501 to 800	35	70	105	2	7
801 to 1300	50	100	150	3	10
1301 to 3200	75	150	225	5	12

7. REJECTION

7.1 Any of the wire insulators which do not comply with the requirements of this specification in the opinion of the inspecting authority or the purchaser or his nominee, may be rejected.

8 MARKINGS

8.1 Each insulator shall be marked distinctly the manufacturer's identification on the insulating material with year of manufacture.

9 PACKING

9.1 The insulators shall be so packed as to permit convenient handling and to protect against loss or damage during transit and storage.

* Vulcanised Rubber Compounds.