



INDIAN RAILWAY
STANDARD SPECIFICATION

FOR

CABLE TERMINATION BOXES (INDOOR) FOR RAILWAY
ELECTRIFIED AREAS

Specification No.TC 18-75

TELECOM DIRECTORATE
RESEARCH DESIGNS & STANDARD ORGANISATION
LUCKNOW- 226011

0.0 FOREWORD

0.1 This specification is issued under the fixed serial No. TC-18, followed by the year of original adoption as standard or in the event of revision, the year of last revision.

Adopted - 1975

0.2 This specification requires reference to the following Indian Railway standard (IRS) and Indian Standard (IS), specifications:

IRS: S 23 Electrical Signalling & Interlocking Equipment.

IS: 104 Ready mixed paint, brushing, zinc chrome, priming.

IS: 319 Free cutting brass rods and sections.

IS: 617- 1994 Aluminium and Aluminium alloy ingots and costing for general engineering purposes.

IS: 2339 Aluminium paint for general purposes in dual container.

IS: 5666 Etch (Pretreatment) Primer.

0.3 Wherever, a reference to any specification appears in this specification, it shall be taken as a reference to the latest issue of that specification, except where a particular issue has specifically been referred to by indicating this year of issue.

0.4 The cable termination boxes are of sizes 10 pairs, 20 pairs, 30 pairs and 50 pairs.

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

1.0 SCOPE

1.1 This specification lays down the technical requirements and provisions on sampling and tests for cable termination boxes (indoor) used for termination of underground derivation cable for providing tappings from underground main cable for Railways' telecommunication and block circuits.

1.2 This specification does not cover the requirements of cable termination boxes used for termination of cables – other than derivation cables.

2. TERMINOLOGY:

- 2.1 For the purpose of this specification, the terminology given in IRS : S-23* shall be applicable.
- 2.2 The Terms referred to in this specification but not covered in IRS:S-23* are defined below:
- 2.2.1 **Lot** - A lot is constituted by the Cable Termination Boxes of the same type manufactured in same factory during the same period using the same process and material.

3.0 GENERAL REQUIREMENTS:

- 3.1 The cable termination box is meant for indoor installations and is wall mounting type used in locations like signal cabins, station master's offices etc. It shall, therefore, be provided with a dust proof cover.
- 3.2 The general requirements of workmanship, limits and fits and rejection shall be in accordance with IRS: S-23* to the extent applicable.

* Electrical Signalling and Interlocking Equipment.

4. Construction:

- 4.1 The cable termination box shall consist of the following components:
- a) Case
 - b) Front cover
 - c) Back Plate
 - d) Terminal plate
 - e) Terminal block
 - f) Terminal stud
 - g) Sleeve
 - h) Hinge pin
- 4.2 The case front cover and back plate shall be made from alloy aluminium casting conforming to IS: 617 **.
- 4.3 Brass used for terminals shall conform to IS: 319***
- 4.4 The terminal block shall be on one face of the C.T. Box. It shall have requisite pairs of brass terminals so that the connections of the underground cable can be so soldered on the inner side of the block and external wires can be connected with nuts on the outer side.
- 4.5 The cable termination box shall be manufactured in thoroughly workman-like manner, in accordance with best engineering practice. The front cover and the back plate shall fit flush with the case and all screws shall be flush.
- 4.6 The cable termination box shall be manufactured as per approved drawing supplied by the purchaser.

- 4.7 The bulk manufacturer shall be undertaken only after the type approval has been communicated by the purchaser or his nominee.

** Aluminium and aluminium alloy ingots and castings for general engineering purposes.

*** Free cutting brass rods and sections.

5.0 FINISH:

- 5.1 The casting shall be sound, clean and free from blow holes, distortion, surface defects and defects of any other kind. The top cover and the end pieces shall fit flush with the main body. The bolts shall fit properly in the places specified in the approved drawings supplied by the purchaser.
- 5.2 While the casting shall be painted all over with one coat of etch (pretreatment) primer to IS : 5668*** followed by two coats of zinc chrome to IS : 104* and a finishing coat of aluminium paint to IS : 2339** the ebonite parts shall be buff finished and phenolic resin-bonded cotton fabric sheet parts finished fine all over.

6 TESTS:

6.1 Type Tests: The following shall constitute the type tests:

- (a) Visual Inspection (Clause 14.2 of IRS: S 23[®])
- (b) Conformity of the raw materials used to the specified grade. If agreed to by the purchaser or his nominee the manufacturer can furnish the test certificates from an approved test laboratory giving result of chemical analysis etc. of material used to prove their conformity with the requirements of this specification.
- (c) Dimensional check as per approved drawing.
- (d) Dielectric test (Clause 6.4).
- (e) Insulation test (Clause 6.5).
- (f) Dry heat test (Clause 6.6).

6.2 Routine Tests: The following shall constitute routine tests which shall be carried out by manufacturer on each individual cable termination box.

- (a) Visual Inspection (Clause 14.2 of IRS: S 23[®])
- (b) Dimensional check as per approved drawing.
- (c) Dielectric test (Clause 6 .4).
- (d) Insulation test (Clause 6 .5).
- (e) Dry heat test (Clause 6 .6).
- (f) Any other test to ensure that cable terminal boxes are in conformity with the requirements of the specification.

- * Ready mixed paint, brushing, zinc chrome, priming.
- ** Aluminium paint for general purposes in dual containers.
- *** Etch (Pretreatment) primer.
- @ Electrical Signalling and Interlocking Equipment.

6.3 Acceptance Tests: The following shall constitute the acceptance tests:

- (a) Visual Inspection (Clause 14.2 of IRS: S 23[@])
- (b) Dimensional check as per approved drawing.
- (c) Dielectric test (Clause 6 .4).
- (d) Insulation test (Clause 6 .5).
- (e) Dry heat test (Clause 6 .6).
- (f) Any other test to ensure that cable terminal boxes are in conformity with the requirements of the specification.

6.3.1 SAMPLING PLAN: Unless otherwise agreed to by the purchaser and the manufacturer, the double sample plan given in Table-1 below shall be adopted:

TABLE - 1

Lot consisting of CT Boxes	1 st sample size (N1)	2 nd sample size (N2)	Combined sample size (N1 + N2)	Acceptance Number (C1)	Rejection Number (C2)
1.	2.	3.	4.	5.	6.
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
3201 to 8000	100	200	300	6	17
8001 & above	150	300	450	9	24

@ Electrical Signalling and Interlocking Equipment.

The number of C.T. Boxes (N1) as given in Column (2) shall be first selected and subjected to the acceptance tests. If in the first sample, the number of defective C.T. Boxes, i.e. those failing in one or more acceptance tests, is less than or equal to the corresponding number (C1) given in Column (5), the lot shall be considered as conforming to the requirements of the acceptance tests. If the number of defective C.T. Boxes in the first sample is greater than or equal to the rejection number (C2) given in

Column (6), the lot shall be considered as not conforming to the requirements of the acceptance tests. If the number of defective C.T. Boxes in the first sample lies between (C1) and (C2), a second sample of size (N2) as given in Column (3) shall be selected and subjected to acceptance tests. If in the combined sample, the number of defective C.T. Boxes is less than (C2), the lot shall be considered as conforming to the requirements of acceptance tests, otherwise not.

The C.T. Boxes for acceptance tests shall be selected at random from at least 10 percent of the packages. For random selection of packages, all the packages in the lot shall be arranged in serial order and every alternate package shall be selected until the requisite number of packages is obtained.

6.4 Dielectric Test – The C.T. Box shall withstand an ac voltage of 2000 V (r.m.s.) when applied for one minute between

- i) Any two terminals and
- ii) Any terminal and the body.

6.5 Insulation Test – The insulation resistance between line terminals of each pair or between any two terminals or between any line terminal and body of the cable termination box shall not be less than 500 mega Ohms when measured at ambient temperature and a relative humidity of 70%, and shall not be less than 200 mega Ohms at ambient temperature and relative humidity of 95%. The test shall be conducted with a 500 volts insulation tester. The insulation test shall be taken on each and every cable termination box.

6.6 Dry Heat Test – The C.T. Box shall be placed in a chamber maintained at a temperature of $120^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for a period of not less than 8 hours. It shall then be taken out of the chamber and allowed to cool under ambient conditions and visually inspected to see whether any defect or deformation has occurred in the terminal box. The insulation of the terminal shall then be checked according to Clause 6.5-and the values stated therein shall be satisfied.

7. MARKING AND IDENTIFICATION:

7.1 The terminals on the terminal plate shall be marked by engraved numbers. The numbers shall be neat and distinct and as shown on the drawing.

7.2 Manufacturer's code and year of manufacture shall be indelibly marked on the back plate of cable termination box.

8. PACKING:

8.1 The material shall be suitably packed so as to avoid any damage or loss during transit and storage.

9. INFORMATION TO BE SUPPLIED BY PURCHASER:

- 9.1 The purchaser shall supply the following information at the time of tender enquiry or placement of order.
- a) Quantity and size required.
 - b) Approved drawing.