



भारत सरकार

रेल मन्त्रालय

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

इनडोर उपयोग के लिये दूरसंचार केबल टर्मिनेशन बॉक्स
अधात्विक

**TELECOM CABLE TERMINATION BOXES FOR INDOOR USE
(NON METALLIC)**

स्पेसिफिकेशन संख्या आरडीएसओ /एसपीएन/टीसी/97/2012
Specification No. RDSO/ SPN/ TC/97/2012

दूरसंचार निदेशालय

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Title of Document TELECOM CABLE TERMINATION BOXES FOR INDOOR USE (NON METALLIC)	
Author_ Director/ Telecom-I/ RDSO	
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Abstract This document lays down specification of Telecom Cable termination boxes for indoor use (Non Metallic)	

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DOCUMENT CONTROL SHEET:

NAME	ORGANIZATION	FUNCTION	LEVEL
N.K.VARMA Director/Telecom/ I	RDSO	Member	Prepare
D.K.SINGH Executive Director/ Telecom	RDSO	Approving Authority	Approve

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I. SUMMARY:

This specification covers the general, technical, performance and test requirements of “Telecom Cable Termination Box for indoor use (Non Metallic)” for use in Indian Railways.

II. SOURCE

Draft specification RDSO/SPN/TC/97/2012 - has been prepared by RDSO, Lucknow as per recommendation of 7th MSG.

III. Research Designs and Standards Organization (RDSO) is an attached office of Ministry of Railways, engaged in design and standardization of equipment for use on Indian Railways.

RDSO/SPN/TC/97/2012 Rev.1 specification is issued as draft specification. This specification is circulated to customers/Railways and field inspection units for comments. In the absence of IRS specification, procurement may be made as per RDSO/SPN/TC/97/2012 Rev.1 specification.

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1. SCOPE

This specification lays down the requirements of Cable Termination Box (CT Box) for termination of telecom cables, Power Cables, SPD's, Fuse etc. for indoor use. This specification covers the constructional details of CT box and other details.

2. REFERENCE

Whenever a reference to any specification is made, it shall be taken as a reference to the latest issue of that specification, except where a particular issue has specifically been referred by indicating the year of issue.

3. TERMINOLOGY

3.1 For purpose of this specification, the terminology given in IRS: S-23 shall be applicable.

3.2 The terms appearing in this document but not covered in IRS: S-23 are defined below.

3.2.1 Lot- A lot is constituted by the cable termination boxes of the same type manufactured in the same factory during the same period using the same process and same material.

4. GENERAL REQUIREMENTS OF CT BOX

4.1 The CT box is meant for indoor applications and to be used in places such as cabins, station master's office, premises of various users, sheds etc.

4.2 It shall be wall mounting type.

4.3 It shall have smooth and good finish.

4.4 The material color of CT Box should preferably be Industrial grey (RAL 7035).

4.5 The CT box shall have locking and sealing arrangement.

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4.6 Two number DIN rail of length 330±1 mm to be fixed inside CT Box

4.7 One Hylam Sheet (Insulated Plate) of size (346mm×212 mm×4mm) ±1 mm(L×W×H) to be fixed inside CT Box.

5. CONSTRUCTION AND OTHER REQUIREMENTS

5.1 The thickness of the top cover and various walls of the CT box shall be such that it shall be able to meet various requirements of this specification. However, the minimum thickness shall be 3 mm and maximum thickness shall be 4 mm.

5.2 The box shall have total eight entries for incoming / outgoing cables. These will have provision of cable glands which shall be provided with sealing inserts.

5.3 The size of the box is as per drawing as to accommodate a reasonable extra length of copper conductors and provide adequate space for cable entry, cable termination work.

5.4 The finished CT box shall have following properties.

Clause	Parameter	Value	Test Method
a.	IP class	IP 54(this is to be tested with cable glands sealed with sealing inserts)	As per IEC-60529
b.	Temperature Range Celsius(Short Term)	- 20 ⁰ C to 80 ⁰ C	As per clause 7.6
c.	Temperature Range Celsius(continuous)	- 10 ⁰ C to 60 ⁰ C	As per clause 7.6
d.	Impact Resistance	IK 07	As per IEC 62262

5.5 The material of body & cover of CT box shall be non-metallic & is made up of ABS thermoplastic material with following properties:

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Clause	Parameter	Value	Test Method	Clause
a.	VICAT Softening point	96 ⁰ C (min)	ASTM D-1525	Finished product
b.	Density	1.02 to 1.06 gm/cc	ASTM D-792	Finished product
c.	Tensile strength at break	25 Mpa Min	ASTM D- 638	Raw material
d.	Flexural Strength	45 MPa Min	ASTM D 790	Finished product
e.	Elongation at break	Min 10%	ASTM D-638	Raw material
f.	IZOD impact strength Notched	390 J/m Minimum	ASTM D-256	Raw material
g.	Rockwell hardness	Min R 95	ASTM D - 785A	Finished product
h.	Enclosure flammability rating	UL-94HB	UL	Raw material
i.	Water absorption	0.5% Max	ASTM D- 570	Finished product
j.	Volume Resistivity	Min 10 ¹² Ω.m	D 257	Raw material

5.6 The cover of the CT box shall be completely removable. The cover of CT Box shall be tightly closed by four Mild Steel Screw (as per drawing)

5.7 The cover of the CT box shall be provided with gasket for ingress protection.

5.8 The gasket shall be made up of TPU (Thermoplastic Polyurethane) with following properties.

Clause	Property	Value	Test method	To be done on
a.	Density	1.18 to 1.26 gm/cc	ASTM D -792	Finished product
b.	Tensile Strength	20 MPa	ASTM D-412	Raw material
c.	Elongation at break	Min 200%	ASTM D- 412	Raw material
d.	Compression set	Max 12% at Room temperature for 24 Hrs.	ASTM D- 395 Method B	Raw material
e.	Hardness	50-75 Shore A	ASTM D-2240	Raw material

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5.9 M.S. SCREWS:

- 5.9.1 The cover of the CT box shall have M.S. (Mild Steel) based screws of as per drawing.
- 5.9.2 In order to effectively cover the CT box, inserts M- 6 thread of depth 20 ± 1 mm shall be provided in the body of CT box corresponding to the screws in the cover.

5.10 CABLE GLANDS:

- 5.10.1 The CT Boxes shall have cable glands for the cable entry inside the box. These shall have seal insert and sealing ring.

- 5.10.2 The cable gland shall be made of Polyamide based material with Properties as mentioned below.

Clause	Properties	Values	Test Method	To be done on
a.	Density	1.10 to 1.16 gm./cc	ASTM D-792	Finished product
b.	Water absorption	5% Max	ASTM D-570	Finished product
c.	Flammability to UL 94	HB	UL	Raw material
d.	Tensile Strength	Min 70 MPa	ASTM D-638	Raw material
e.	Flexural Strength	Min 95 MPa	ASTM D-790	Raw material
f.	Hardness (Rockwell R)	Minimum 110	ASTM D-785	Raw material

- 5.10.3 The colour of gland shall be generally as per color scheme of CT box.

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5.11 MOUNTING ARRANGEMENT

5.11.1 The holes if any, for the mounting of the box shall not allow ingress of water.

6 MARKING & IDENTIFICATION:

- 6.1 The marking on the CT box shall be wipe resistant.
- 6.2 The following should be marked on the front cover of CT box and on the base (inside) of CT box.
- a) **Indian Railway Property**
 - b) **Telecom Cable Termination Box**
 - c) **RDSO Spec No. RDSO/SPN/97/2012 Rev. 1**
 - d) **Year & Month**
 - e) **Name of Manufacturer**

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7 TYPE APPROVAL

- 7.1 Proto type sample of CT Box shall be made and submitted as per the following-
- For base of the CT Box Drawing No. 4340(ADV) with Alt. 1
 - For cover of the CT Box Drawing No. 4341(ADV) with Alt. 1
- 7.2 Two complete samples of CT Box for which type approval is sought shall be manufactured and checked/ tested against clauses 4 to 6 and 8.1 to 8.4 of the specification.
- 7.3 Manufacturer will submit the following documents during type test
- 7.3.1 Statement of raw material used along with results of raw material tests to demonstrate that various parameters indicated in specifications are met with.
 - 7.3.2 Routine test results.
- 7.4 The test standards for various parameters are mentioned against relevant clauses of this specification. In case testing is proposed to be done as per any other equivalent test standard, prior approval of RDSO shall be obtained.
- 7.5 In case manufacturer wants to change source of raw material/ materials/ components other than mentioned in Type Approval Certificate (TAC), manufacturer shall have to obtain prior permission from RDSO, Lucknow. All those tests related to that particular raw material/ materials/ components of changed source and required tests on C T Box shall be carried out by inspecting authority of RDSO on one C T Box and necessary corrigendum to Type Approval Certificate (TAC) shall be issued.
- 7.6 Test method for clause 5.4.2 and 5.4.3

The test shall be conducted at two temperatures, -20°C and 80°C for short term test. CT box or a test piece of suitable size prepared from the CT box shall be immersed in the liquid heat transfer medium separately at -20°C and 80°C for 30 minutes. For continuous test, the test shall be conducted separately at -10°C and 60°C for 24 hours. The test shall be carried out as per procedure given below.

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High and low temperature deformation/ bitterness test:

CT box or a test piece of suitable size prepared from the CT box shall be immersed in the liquid heat transfer medium that remains fluid at the test temperature and will not appreciably affect the material tested. The heat transfer medium is brought to the required temperature and the test piece is immersed. Suitable means (automatic or manual) shall be provided for controlling the temperature of the heat transfer medium to within $\pm 0.5^{\circ}\text{C}$ of the desired value. Powdered solid carbon dioxide (dry ice) and liquid nitrogen are recommended for lowering the temperature and an electric immersion heater for raising the temperature. The heat transfer medium shall be kept in a suitable tank provided with stirrer for through circulation of the heat transfer medium. After immersion for the specified time at the test temperature, examine each specimen to determine whether or not it has failed. Failure is defined as the development of any crack or any surface deformation in the specimen which is visible to the unaided eye.

- 7.7 The vendor shall be required to sign an undertaking on “**Infringement of patent rights**”. The undertaking shall be as under.

“Indian Railways shall not be responsible for infringement of patent rights arising due to similarity in design, manufacturing process, use of similar components in the design and development of this item and any other factor not mentioned herein which may cause such dispute. The entire responsibility to settle any such dispute/ matters lies with us (the manufacturer/ supplier).

Details /design/ documents given by us are not infringing any IPR and we are responsible in absolute and full measure instead of Railways for any such violations. Data, specifications and any other IP as generated out of interaction with Railways shall not be unilaterally used without the consent of RDSO and right of Railways/ RDSO on such IP is acceptable to us”.

- 7.8 After successful completion of type test, the product shall be subject to field trial for a minimum quantity and duration. During the field trial performance of the product shall be monitored closely. On successful completion of field trial, the firm shall be placed in ‘VENDORS FOR DEVELOPMENTAL ORDERS’ of the list of approved vendors.

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8 ACCEPTANCE TESTS

8.1 Visual inspection for the workmanship, dimensions (as per approved drawing) bill of material, flaws/ defects etc. as per clause nos. 4.3, 4.4, 4.5, 4.6, 4.7, 5.1 (Only thickness), 5.2, 5.6, 5.7, 5.9, 5.10.1, 5.10.3, 5.11 and 6.

8.2 Tightness of all cable glands shall be ensured by inserting dummies made of plastic material of minimum and maximum diameter. The CT Box shall not slide on inserted dummy when it is hanged through dummy.

8.3 The sample of complete CT Box shall be dropped thrice on hard cement concrete flooring. The sample shall be allowed to fall on three mutually perpendicular sides each time to complete the test. The sample when dropped from:

8.3.1 Two meters height shall not fail by permanent deformation or break or Crack .

8.3.2 One meter height shall not fail by chipping or flaking.

8.4 Density of ABS and polyamide as per clauses 5.5 (b), 5.8 (a), 5.9 and 5.10.2 (a) and flexural strength of finished product as per clause 5.5 (d)

8.5 Sampling plan for acceptance test shall be as per table below.

Lot Size	For clause 8.1	For Clauses 8.2, 8.3 and No. of samples to be tested	For Clause 8.4, No. of samples to be tested
	No of samples to be tested		
Up to 100	2	2	1
101-200	3	2	1
201-300	5	3	1
301-500	8	3	1
501 and above	10	3	1

Note: No failure is permitted for testing under clauses 8.1 8.2, 8.3 and 8.4.

9 ROUTINE TESTS

Routine test shall constitute all tests covered under acceptance test as per sampling plan of acceptance test. In addition, parameter of clauses 5.5 (a) to 5.5(h) and any other test conducted by the manufacturer shall constitute routine test for a lot.

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10 INFORMATION TO BE FURNISHED BY THE PURCHASER

- A) Type of cable along with conductor diameter. for which the CT box is being procured.

11 PACKING

The CT box, the accessories and the fixtures shall be packed as to permit convenient handling and to protect against loss or damage during transit and storage. Each CT box shall carry a brief technical detail along with the instruction sheet for its use and installation and use of accessories along with bill of material.

- 12** “All the provisions contained in RDSO’s ISO procedure laid down in document No. QO-D-7.1-11 dated 19.07.2016(titled “Vendor-Changes in approved status”) and subsequent versions/amendments thereof, shall be binding and applicable on the successful Vendor/Vendors in the contracts floated by Railways to maintain quality of products supplied to Railways.”