



TME/2010

**BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL
TRACTION MACHINES ENGINEERING DIVISION**

PRODUCT STANDARD		CONCURRENT SHEET	
GENERAL INFORMATION		DATE : 04.04.2000	
PRODUCT STANDARD NO. : 98255			
DESCRIPTION :		DUAL WALL CROSS LINKED POLYOLEFIN HEAT SHRINKABLE TUBE (3:1 SHRINK RATIO) (Thin walled and Medium walled)	
REVISION NO.	DETAILS OF REVISION		
01	Medium wall tube added as table 2. Tensile strength, Dielectric strength and specific gravity modified. Other clause revised accordingly.		
	NAME	SIGNATURE	DATE
PREPARED BY	S. P. SINGH		04.04.2000
AGREED BY	REMARK DEPTT./SEC.	SIGNATURE	DATE
A. P. Samra	TME / ELECTRICAL		4.4.2000
A. DAMI	TME / ELECTRICAL		4.4.2000



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DUAL WALL CROSS LINKED POLYOLEFIN HEAT SHRINKABLE TUBE
(3:1 SHRINK RATIO)
(Thin walled and Medium walled)

1. GENERAL:

This specification governs the quality of Dual Wall Cross Linked Polyolefin Heat Shrinkable Tube with a meltable adhesive inner liner which flows and seals when heated. The tube can be shrunk uniformly by application of heat at temperature of 120 deg.C and above. The material of the tube should be low density polyethelene or any other suitable material of the same type.

2. APPLICATION:

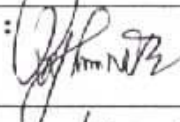
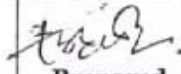
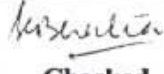
Used for covering exposed portion of flexible lead wires between the cable insulation and terminal as well as covering of connections in traction machines.

3. COMPLIANCE WITH NATIONAL STANDARDS:

There is no Indian Standard covering this material.

4. DIMENSIONS AND TOLERANCES:

Sizes and type of tube shall be as stated on the order/drawing preferably as given in table 1 / table 2 for thin walled and medium walled tube respectively. The length of the tube as supplied can vary from 1 to 1.5 mtr. or as given in order.

Revision : 01 Date : 03.04.2000	Distribution	Qty.	Approved :
	TME TXM TAM	2 2 2	  Prepared
			 Checked



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Table 1 (Thin walled adhesive lined tube)

Item No.	Before Heat Shrinking (As Recd.-Nom) I.D. (mm)	After Heat Shrinking Without Cable		
		I.D. (mm)	Wall Thickness	
			Total (mm)	Meltable (mm)
1.	6.0	2.0	1.0	0.5
2.	9.0	3.0	1.4	0.6
3.	12.0	4.0	1.75	0.7
4.	19.0	6.0	2.25	0.8
5.	24.0	8.0	2.5	0.8
6.	39.0	13.0	2.5	1.0
7.	50.0	16.0	2.6	1.0

Table 2 (Medium walled adhesive lined tube)

Item No.	Before Heat Shrinking (As Recd.-Nom) I.D. (mm)	After Heat Shrinking Without Cable		
		I.D. (mm)	Wall Thickness	
			Total (mm)	Meltable (mm)
1.	12.0	4.0	2.0	0.5
2.	20.0	6.0	2.5	0.6
3.	30.0	8.0	3.0	0.7
4.	34.0	9.0	3.0	0.8
5.	40.0	12.0	3.0	0.8
6.	45.0	13.0	3.0	0.9
7.	50.0	17.0	3.5	1.0

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5. FREEDOM FROM DEFECTS:

The tube shall be smooth and free from porosity, breaks and other visible defects.



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6. IDENTIFICATION:

The material, when identified by infra-red spectrometer or by any other convenient method shall be low density polyethelene.

7. TEST SAMPLE:

5 meter long sample of the tube shall be supplied for testing & approval.

8. PROPERTIES:

8.1 Temperature Rnage:

-55 deg.C to 135 deg.C

8.2 Tensile strength (Test Method : ISO 37 or DIN 53455)

10 Mpa, Min.

8.3 Elongation (Test Method : ISO 37 or DIN 53455)

300%, Min.

8.4 Dielectric Strength (Test Method : IEC 243 or DIN 53481)

12 Kv/mm, Min.

8.5 Longitudinal Change (Test Method : ASTM D2671)

5%, Max.

8.6 Water Absorption (Test Method : ISO 62/ASTM D570/DIN0570)

0.5% Max.

8.7 Flammability (Test Method: ISO 2671/ASTM D876)

Shall not propagate flame and should be generally flame retardant.

8.8 Resistance to Acid & Alkali (Test Method: ISO 1817/ISO 37)

Good to excellent



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8.9 Resistance to Corrosion (Test Method : ASTM D2671)

Non Corrosive

8.10 Specific gravity (By any conventional method)

1.2 +/- 0.1 gm/ cubic-cm.

8.11 Colour : Black

9.0 STORAGE PROPERTIES:

When stored properly under normal storage condition, the material shall not show any sign of deterioration like hair line cracks ,swelling, porosity ,flow lines ,etc. and there should not be any change in dimension of tube.

10. INSPECTION AT SUPPLIER'S WORK:

Whenever specified, tests and inspections 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 later 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 tests elsewhere. The supplier shall notify BHEL in advance about the readiness of the material for inspection and testing.

11. TEST CERTIFICATE:

Unless otherwise stated, three copies of test certificates shall be supplied.

Further the supplier shall ensure that one copy of Test Certificate is enclosed alongwith the dispatch documents to facilitate quick clearance of the material. Test certificate shall bear the following information :-

TM98255: Dual Wall Cross Linked Polyolefin Heat Shrinkable Tube
(3:1 Shrink ratio, Thin walled/Medium walled)

BHEL Order No.

Supplier's Name & Trade Mark, if any.

Date of Manufacture



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12. PACKING AND MARKING:

Material shall be suitably packed to prevent damage from contamination or handling during transit.

Each package shall be legibly marked with the following information.

BHEL Order No.:

Manufacturer's /Supplier's Name & Trade Mark, if any.

TM 98255 : Dual Wall Cross Linked Polyolefin Heat Shrinkable Tube
(3:1 Shrink ratio, Thin walled/Medium walled)

Date of manufacture

Batch No.

Size

Quantity.

13. REJECTION AND REPLACEMENT:

If the material does not comply with the requirements of this specification during receipt inspection at BHEL or if any defect is found during further processing of the material, BHEL reserves the right to reject the whole consignment notwithstanding any previous certification of satisfactory testing and/or inspection. The supplier shall undertake to replace the rejected material at his own cost & the rejected material shall be taken back by the supplier after fulfilling the commercial terms and conditions.