

**BUREAU OF INDIAN STANDARDS**  
**(Central Marks Department - III)**

**Our Ref : CMD-III/16: 7098 (Pt.1)**

**3 May, 2007**

**Subject : Implementation of Amendment No.1 , April 1994 and Amendment No.2 , February 2007 to IS 7098 (Pt.1):1988 - Cross-Linked Polyethylene Insulated Thermoplastic Sheathed Cables.**

Amendment No.1 , April 1994 and Amendment No. 2, February 2007 to IS 7098 (Pt.1):1988 - for Cross-Linked Polyethylene Insulated Thermoplastic Sheathed Cables have been published (copy enclosed) In view of above, the STI has been revised as Doc:STI/ 7098(Pt.1)/3, May 2007 (copy enclosed).

It has been decided to implement the above amendment as per the following guidelines:-

ROs /BOs to inform the licensees under their jurisdiction about the implementation of Amendment No 1&2 to IS 7098(Pt.1):1988 with immediate effect.

Licensees as per IS 7098(Pt.1):1988 , who intend to cover cables with improved fire performance in their licence, may get the variety included as per prevailing guidelines

Put up for consideration and approval please.

(Rajeev Sharma)  
Sc D( CMD-III)

Encl: As above.

**D&H (CMD-III)**

**DDGM**

**All ROs/BOs/ BIS Labs**

**c.c. CMD-1**

**ETD for arranging gazette notification**

**SCHEME OF TESTING AND INSPECTION  
FOR CERTIFICATION OF  
CROSSLINKED POLYTHYLENE INSULATED THERMOPLASTIC SHEATHED  
CABLES FOR WORKING VOLTAGES UPTO AND INCLUDING 1100 VOLTS  
ACCORDING TO IS 7098(Part 1):1988  
(Including Amendment No.1&2)**

1. **LABORATORY** – A laboratory shall be maintained which shall be suitably equipped and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 All testing apparatus shall be periodically checked and calibrated records of such checks/calibration shall be maintained.

2. **TEST RECORDS** - All records of tests and inspection shall be kept in suitable forms approved by the Bureau.

2.1 Copies of any records and other connected papers that may be required by the Bureau shall be made available at any time on request.

3. **QUALITY CONTROL** – It is recommended that, as far as possible, Statistical Quality Control (SQC.) methods may be used for controlling the quality of the product during production as envisaged in this Scheme [See IS 397(Part 1):2003 to IS 397 (Part 4):2003].

3.1 In addition, effort should be made to gradually to introduce Quality Management system in accordance with IS/ISO 9001: 2000

4. **STANDARD MARK** – The Standard Mark, as given in Column (1) of the First Schedule of the licence, shall be stenciled on the drum along with other information about the cable; provided always that each length of the cable wound on the drum conforms to every requirement of the specification.

4.1 **MARKING** - In addition the drum shall carry the information according to clause 18.2 of IS 7098(Part 1):1998 and also the identification in code or otherwise to enable the date and lot manufacture to be traced back to factory records shall be either stenciled on the drum or contained in a label attached to it.

4.2 The Standard Mark and the information given in 4 shall also be given on a label or a tag. The label or the tag shall be attached to the end of the cable in such a manner, that it is destroyed as soon as the cable is unwound from the drum. The cut ends of the cable shall be sealed by means of non-hygroscopic sealing materials.

5. **LEVELS OF CONTROL** - The tests, as indicated in Table 1 attached and at the levels of control specified therein, shall be carried out on the whole production of the factory which is covered by this scheme and appropriate records and charts maintained in accordance with paragraph 2.0 above. All the production which conforms to the Indian Standards and covered by the licence shall be marked with certification mark of the Bureau.

5.1 On the basis of test and inspection results, the decision regarding conformity or otherwise of the cables to the requirements of the specification shall be taken as given remarks column of Table 1.

5.2 In respect of all other clauses of the specification the factory will maintain appropriate control and checks to ensure that their product conforms to the various requirements of this specification.

**6. REJECTIONS** - A separate record shall be maintained giving information relating to the rejection of the production not conforming to the requirements of the specification and the method of its disposal. Such material shall in no circumstances be stored together with those conforming to the specification .

**7. SAMPLES** - The licensee shall supply, free of charge, the samples required in accordance with the Bureau of Indian Standards (Certification) Regulations, 1988, as subsequently amended, from the factory or godowns. The Bureau shall pay for the samples taken by it from the open market.

**8. REPLACEMENT**- whenever a complaint is received soon after the goods with Standard marks have been purchased and used, and if there is adequate evidence that the goods have not been misused, defective goods are replaced free of cost by the licensee in case the complaint is proved to be genuine and the warranty period (where applicable) has not expired. The final authority to judge the conformity of the product to the Indian Standard shall be with the Bureau. The firm shall have own complaint investigation system as per IS/ISO 10002.

8.1 In the event of any damages caused by the goods bearing the standard Marks, or claim being filed by the consumers against BIS Standard mark and not “ conforming to” the relevant Indian Standard, entire liability arising out of such non conforming product shall be of licensee and BIS shall not in any way be responsible in such cases.

9. **STOP MARKING** - The marking of the product shall be stopped under intimation to the Bureau if, at any time, there is some difficulty in maintaining the conformity of their product to the specification, or the testing equipment goes out of order. The marking may be resumed as soon as the defects are removed under intimation to Bureau.

9.1 The marking of the product shall be stopped immediately if directed to do so by Bureau for any reason. The marking may then be resumed only after permission by the Bureau. The information regarding resumption of marking shall also be sent to the Bureau.

10. **PRODUCTION DATA** -The licensee shall send to BIS as per the enclosed proforma- 1 to be authenticated by a Chartered Accountant a statement of quantity produced, marked and exported by him and the trade value thereof at the end of each operative year of the licence.

Table 1.....

**IS 7098 (Part 1):1988**  
**CROSSLINKED POLYTHYLENE INSULATED THERMOPLASTIC SHEATHED CABLES**  
**FOR WORKING VOLTAGES UPTO AND INCLUDING 1100 VOLTS**  
**TABLE 1 LEVELS OF CONTROL**  
**(Para 5 of the Scheme of Testing and Inspection)**

TEST DETAILS					LEVELS OF CONTROL		
Cl.	Requirement	Test Methods			No. of samples	Lot Size/ Frequency	Remarks
		Clause	Reference	Part no. of IS 10810			
<b>15.1 (a)</b>	<b>Test on Conductor</b>						<b>1. These are in addition to production line checks at wire drawing stage. 2.Until requirements after stranding are specified annealing test may be confined to one sample out of ten units or part there of received before stranding.</b>
(i)	Annealing test (For copper)	6.1.2	IS 8130	1	One	Each length of finished cable	
(ii)	Tensile test (for aluminum)	6.2.1	-do-	2			
(iii)	Wrapping Test(for Aluminium)	6.2.2	-do-	3			
(iv)	Resistance test	6.3	-do-	5			
<b>15.1(b)</b>	<b>Armouring wire &amp; strips</b>	<b>6&amp; Table 6</b>	<b>IS 3975</b>	<b>36-42</b>	One	Each consignment of armoring wires/formed wires should be inspected as per sampling plan contained in IS 3975. In case of BIS certified armour, no further testing is necessary. For cable meant for use in mines the resistance of Armour shall not exceed that of conductor by more than 33%	
<b>13.3</b>	<b>Dimensions</b>	<b>Table 6</b>	<b>IS 7098 (Pt.1)</b>	<b>36</b>			
<b>13.5</b>	<b>Resistance of armour</b>	<b>Table 7</b>	<b>IS 7098 (Pt.1)</b>	<b>42</b>			

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TEST DETAILS					LEVELS OF CONTROL		
Cl.	Requirement	Test Methods			No. of samples	Lot Size/ Frequency	Remarks
		Clause	Reference	Part No. of IS 10810			
8	Construction of conductors	8	IS 7098 (Pt.1)	Visual examination	One	Each length of conductors	
9.4	Application of insulation	9.4	-do-				
10	Core identification	10	-do-				
11	Laying up of cores	11	-do-				
12	Inner sheath	12					
13	Armouring	13.1, 13.2, 13.3 & 13.4	-do-				
15.1 (c)	Thickness of insulation	9	IS 7098 (Pt.1)	6	Two	Each length of finished cable	
	Thickness of sheath	12 & 14	-do-	6			
15.1 (d) (i)	Physical test on insulation Tensile Strength and elongation at break	Table 1	-do-	7	One	Cable of each size and type manufactured in a day.	Whenever there is change in formulation of XLPE compound, additional sample shall be tested.
(ii)	Ageing in Air oven	-do-	-do-	11	One	Cable of each size & type manufactured in a fortnight or 25 delivery length of same size & type, which ever is less	
(iii)	Hot set test	-do-	-do-	30			
(iv)	Shrinkage test	-do-	-do-	12			
(v)	Water absorption (gravimetric)	-do-	-do-	33			

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**TABLE 1 LEVELS OF CONTROL**  
**(Para 5 of the Scheme of Testing and Inspection)**

TEST DETAILS					LEVELS OF CONTROL		
Cl.	Requirement	Test Methods			No. of samples	Lot Size/ Frequency	Remarks
		Clause	Reference	Part no. of IS 10810			
15.1 (e)	Physical test on outer sheath	-do-	IS 5831	7	One	Cable of each size & type manufactured in a day cable of each size & type manufactured in a fortnight or 25 delivery night or 25 delivery length of same size and type which ever is less	Whenever there is a change in formulation of XLPE compound additional sample shall be tested.
(i)	Tensile strength and elongation at break						
ii)	Ageing in air oven						
(iii)	Loss of mass in air oven						
(iv)	Shrinkage test						
(v)	Hot deformation						
(vi)	Heat shock test						
(vii)	Thermal stability						
15.1 (f)	Insulation resistance (volume resistivity)	Table 1	IS 7098(Pt.1)	43	One	Each length of finished cable	
15.1 (g)	High voltages test	16.2	-do-	45			
15.1(h)	Flammability	16.3	-do-	53	One	All cable of same size and type manufactured in a month or 25 delivery length of same size and type of cable which ever is less	
15.4 (a)	* Cold bend test for outer sheath	Table 2	IS 5831	20	One		
15.4 (b)	* Cold impact test for outer sheath	-do-	-do-	21	One		

\* Note : Optional tests to be carried out when required by agreement between purchaser or suppliers.

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**TABLE 1 LEVELS OF CONTROL**  
**(Para 5 of the Scheme of Testing and Inspection)**

TEST DETAILS					LEVELS OF CONTROL			
Cl.	Requirement	Clause	Reference	Test Methods		No. of Samples	Frequency	Remarks
				Part	Reference			
<b>Additional type tests for cables with Improved Fire Performance</b>								
15.1.1 and Appendix A	Oxygen Index Test	16.9	7098(Pt.1)	58	IS 10810	One	Every month for each size and type from one consignment of PVC compound.	For Category C1 and C2 Sample to be taken from outer sheath, as applicable, and prepared in the manner given in the relevant test method.
	Flame Retardance Test on single cable	16.10	-do-	61	IS 10810			For category C1 and C2
	Flame Retardance Test on bunched cable	16.11	-do-	62	IS 10810			For category C1 and C2
	Test for specific optical density of smoke	16.12		-	IS 10810			Under consideration
	Temperature Index	16.14	-do-	64	IS 10810			For Category C1 and C2 Sample to be taken from outer sheath, as applicable, and prepared in the manner given in the relevant test method.
	Smoke Density	16.15	-do-	63	IS 10810			For Category C2 Sample to be taken from outer sheath, as applicable, and prepared in the manner given in the relevant test method.
	Test for Halogen acid gas evolution	16.13	-do-	59	IS 10810			For Category C2 Sample to be taken from outer sheath, as applicable, and prepared in the manner given in the relevant test method.

## PERFORMA - 1

### PROFORMA FOR OBTAINING PRODUCTION DETAILS

**Period covered**

**Name of Licensee**

**CM/L No.**

**Name of Articles (s)**

**IS No.**

**Grade/Type/Size/Variety/Class/Rating**

**1.1 Brand/Trade/Name(s) of BIS Certification Marked Products**

**2.0 Total production of the articles(s)  
licensed for certification marking**

**2.1 Total production of the article(s)  
conforming to Indian Standard**

**3.0 Production covered with BIS  
Certification Mark and its  
value**

**a) Quantity**

**b) Value (Rs.)**

**3.1 Brand Name used on production covered under BIS Certification Mark**

**3.2 Calculation of marking fee on unit-rate basis; Marking Fee per unit**

**a) Unit**

**b) Quantity covered with BIS Certification Mark**

**c) Marking fee rounded off in whole rupees as obtained by applying unit rates given  
in (a) on quantity given in (b)**

**Note : In case a clause is not applicable, suitable remarks may be given against it.**

**4.0 Quantity not covered with BIS Certification Mark. If any, and the reasons for  
such non-coverage**

**4.1 Brand Name under which non certified goods were sold**

**5.0 Quantity Exported with BIS Standard Mark and its value**

**5.1 Brand Name under which BIS Certified goods are exported**

**6.0 Authentication by Chartered Accountant**

**Signature of Authorized Signatory  
Name  
Date**

**AMENDMENT NO. 2 FEBRUARY 2007  
TO  
IS 7098 (PART 1) : 1988 SPECIFICATION FOR  
CROSSLINKED POLYETHYLENE INSULATED  
PVC SHEATHED CABLES**

**PART 1 FOR WORKING VOLTAGES UP TO AND  
INCLUDING 1 100 V**

*( First Revision )*

*[Page 7, clause 15.1.1, col 4 (see also Amendment No. 1)] — Delete 'under preparation' for category C1 and Test (a) under For Test Method Refer Part No. of IS 10810.*

*[Page 7, clause 15.1.1, col 4 (see also Amendment No. 1)] — Substitute '64' for 'Under consideration' for category C1 and Test (d) under For Test Method Refer Part No. of IS 10810.*

*[Page 7, clause 15.1.1, col 4 (see also Amendment No. 1)] — Delete 'Under preparation' for category C2 and Test (a) under For Test Method Refer Part No. of IS 10810.*

*[Page 7, clause 15.1.1, col 4 (see also Amendment No. 1)] — Substitute '64' for 'Under consideration' for category C2 and Test (g) under For Test Method Refer Part No. of IS 10810.*

(ET 9)

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Reprography Unit, BIS, New Delhi, India