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SCHEME OF TESTING AND INSPECTION FOR CERTIFICATION OF CROSSLINKED POLYETHYLENE INSULATED PVC SHEATHED CABLES FOR WORKING VOLTAGES FROM 3.3kV UPTO AND INCLUDING 33kV ACCORDING TO IS 7098(Part 2):1985 (Including Amendment Nos.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) to IS 397 (Part 4)].

3.1 In addition, effort should be made to gradually 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 The Standard Mark shall be applied on the label or a tag, in such a manner, that as far as possible, it gets destroyed when the drums are opened for using the cable, as other wise it may be fraudulently used by any person so as to deceive the consumers.

4.2 **IDENTIFICATION** - *The manufacturer's identification and cable identification shall be done as per clause 20.1 and 20.2 of IS 7098(Part 2).*

4.3 **OTHER MARKINGS** - In addition the cable shall carry the information according to clause 21.2 of IS 7098(Part 2) either stenciled on the drum or contained in a label attached to it which include the following:

a) Manufacturer's name, brand name or trade-mark;
b) Type of cable and voltage grade;
c) Number of cores;
d) Nominal cross-sectional area of conductor;
e) Cable code;
f) Length of cable on the drum;
g) Number of lengths on the drum (if more than one);
h) Direction of rotation of drum (by means of arrow);
i) Approximate gross mass;
j) Country of manufacture;
k) Year of manufacture;
l) Licence number (CM/L……..)
m) The word "MINING" or "suitable for low temperature use" wherever applicable; and
n) Identification in code or otherwise to enable the date and control unit of manufacture to be traced back to factory records

4.4 The ends of the cable shall be sealed by means of non-hygroscopic sealing material.

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 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.

5.2 **CONTROL UNIT** - For the purpose of this scheme, Cable of each size and type manufacturied in a day shall constitute a control unit.

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

6. **MATERIALS** - *The Various raw material used in the manufacturer of cables shall conform to the various requirements as given in section 2 of IS 7098(Pt.2).*

7. **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.

8. **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.

9. **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.

9.1 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.

10. **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.

10.1 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.

11. **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.

IS 7098 (Part 2):1985
CROSSLINKED POLYETHYLENE INSULATED PVC SHEATHED CABLES FOR WORKING VOLTAGES FROM 3.3kV UPTO AND INCLUDING 33kV
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**			
	Tests on Conductor						1. These are in addition of 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 thereof received before stranding.
18.1 (a) (i)	Annealing test (For copper)	6.1.2	IS 8130	1	One	Each length of finished cable	
18.1 (a) (ii)	Tensile test (for aluminum)	6.2.1	IS 8130	2			
18.1 (a) (iii)	Wrapping Test (for aluminum)	6.2.2	IS 8130	3			
18.1 (a) (iv) & 18.3(a)	Resistance test	6.3	IS 8130	5			
18.1(b)	*Tests for round steel wire/formed steel wire (strip) armour*	*16.3, 16.6 (a to g)*	7098(Pt.2)	36-42	One	*Each length of finished cable of each size & type manufactured from the same consignment of armour/formed wires.*	*No testing of armouring wires/ formed wires is required if it is received with 'ISI' mark, records to this effect to be maintained.*
18.3(d)	Resistance test for armour (for mining cables)	16.5	-do-	42	One	Each length of finished cable	

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		Clause	**Reference**	**Part No. of IS 10810**			
3 to8	***Materials***	3 to 8	IS 7098 (Pt.2)	-	One	Each length of conductors/*finished cable*	
9	Construction of conductor	9					
10	Conductor screening	10					
11.4	Application of insulation	11.4					
12	Insulation screening	12					
13	Core identification	13					
14	Laying up of cores	14					
15	Inner sheath	15					
16	Armouring	16					
17	Outer sheath	17					
18.1(c)	Thickness of insulation & sheath	11,15 &17	IS 7098 (Pt.2)	6	One	Each length of finished cable	
18.1(d)	Physical tests for insulation						Whenever there is change in formulation of XLPE compound, additional sample shall be tested.
(i)	Tensile Strength and elongation at break	Table 1	-do-	7	One	Each Control Unit	
(ii)	Ageing in Air oven	-do-	-do-	11	One	Cable of each size & type manufactured in a fortnight or 25 delivery lengths 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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TEST DETAILS					LEVELS OF CONTROL		
Cl.	Requirement	Test Methods			No. of samples	Lot Size/ Frequency	Remarks
		Clause	Reference	Part no. of IS 10810			
18.1 (e)	Physical test for outer sheath						Whenever there is a change in formulation of *outer sheath compound* additional sample shall be tested.
(i)	Tensile strength and elongation at break	Table 2	IS 5831	7	One	Each Control Unit	
(ii)	Ageing in air oven	-do-	IS 5831	11	One	Cable of each size & type manufactured in a fortnight or 25 delivery lengths of same size & type, which ever is less	
(iii)	Loss of mass in air oven		IS 5831	10			
(iv)	Shrinkage test		IS 5831	12			
(v)	Hot deformation		IS 5831	15			
(vi)	Heat shock test		IS 5831	14			
(vii)	Thermal stability		IS 5831	60			
18.3(b)	Partial discharge test	19.2	IS 7098(Pt.2)	46	One	Each length of finished cable	
18.3(c)	High voltage test	19.7.2	IS 7098(Pt.2)	45			
18.1(h)	Bending test	19.3	IS 7098(Pt.2)	50	One	Cable of each size & type manufactured in a month or 25 delivery lengths of same size & type, which ever is less.	
18.1(j)	Dielectric power factor test i) as a function of voltage ii) as a function of temperature	19.4	IS 7098(Pt.2)	48			
18.1 (k)	Insulation resistance test	Table 1	IS 7098(Pt.2)	43			
18.1(m)	Heating cycle test	19.5	IS 7098(Pt.2)	49			
18.1(n)	Impulse withstand test	19.6	IS 7098(Pt.2)	47			
18.1(p)	High voltage (type) test	19.7.1	IS 7098(Pt.2)	45			
18.1(q)	Flammability test	19.8	IS 7098(Pt.2)	53			
18.4	Cold impact test for outer sheath (optional test)	Table 2	IS 5831	21			

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: Incase 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 with 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