SCHEME OF TESTING AND INSPECTION
FOR CERTIFICATION OF
PVC INSULATED CABLES FOR WORKING VOLTAGES UPTO
AND INCLUDING 1100 VOLTS
ACCORDING TO IS 694:1990
(Including amendment No.1, 2,3 & 4)

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/measuring instruments shall be periodically checked and calibrated and records of such checks/calibration shall be maintained.

2. **TEST RECORDS** - All records of tests, inspection and calibration 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 I) : 2003 to IS 397(Part IV):2003].

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

4. **STANDARD MARK** – The Standard Mark, as given in Column (1) of the First Schedule of the licence, shall be either stenciled on the reel/drum on which cable is wound or contained in a label attached to the packed coil, provided always that the cable to which the Mark is thus applied conforms to every requirement of the specification . In addition to this, ISI mark & CM/L No. shall be printed or embossed on the cable insulation/sheath on every meter. In case of smaller size of cable IS 694 may be embossed or printed on one side of logo instead of on the top.

4.1 OTHERMARKING - In addition, the information as per 17.1and 18.2 of IS 694:1990 as also the identification in code or otherwise to enable the date and control unit of manufacture to be traced back to factory records shall be either stencilled on reel/drum, packages of individual or contained in the label attached to the coil. The following special cables shall be identified by indenting, embossing or printing on any consecutive prints not more than one meter length throughout the cable as under.

FR for Improved fire performance (Category C1)
FR-LSH for Improved fire performance (Category C2)

4.2 The Standard Mark shall be applied in such a manner that, as far as possible, the empty reels do not retain the Standard Mark intact, as otherwise these might be fraudulently used by any person so as to deceive that this product coiled on the reels carries the Standard Mark and thus conforms to the specification.

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 Standard and covered by the licence shall be marked with BIS Standard mark.

5.1 **Control uni**t- For the purpose of this scheme , the cable of continuous length manufactured/ extruded under similar conditions of production for one nominal cross sectional area and class of conductor shall constitute a control unit.

5.2 On the basis of tests and inspection, the decision regarding conformity or otherwise of the control unit to a given requirement shall be made.

5.3 All the samples taken for test shall satisfy the requirements of the specification for acceptance of the lot.

5.4 In respect of all other clauses of the specification not covered above /Table 1 of STI 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 that 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 mark 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 Mark, 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 permitted by the Bureau. The information regarding resumption of markings 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 694:1990
PVC INSULATED CABLES (For working voltages up to and including 1100V)
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 Part**	**Reference**	**No. of Samples**	**Frequency**	**Remarks**
4.	Conductor					1		
	a) Resistance	6.3	IS 8130	5	IS 10810		Each Coil/bobbin of finished wire drawn or received	
	b) Tensile strength/annealing	6.2.1/6.2.3	-do-	2/1	-do-			
	c) Wrapping	6.2.2	-do-	3	-do-			
	d) Diameter	6.1.2.1	-do-					
	e) Purity test (for copper)	Table 1 Table 1	IS 191 (Pt.5) IS 191 (Pt.6)			1	Each lot/ consignment	In case of non-availability of in-house testing facilities, sample to be tested from NABL/BIS approved Lab.
15.3	a) Conductor resistance	6.3	IS 8130	5	-do-	Each coil		If so desired these routine test may be conducted on the entire length of the control unit before cutting in individual coils.
	b) High voltage	16.3.1	IS 694:90	45	-do-	-do-		
	or						Entire length of core after extrusion of insulation	
	Spark Test (as applicable)	16.4	-do-	45	-do-	-do-		
4 to 14 & 17	Material, construction and identification.		IS 694:90			Each control unit		Visual Examination
Table 8 (b)	Thickness of insulation, sheath and overall dimension	10,13,14 & Tables 2 to 6 (as applicable)	IS 694:90	6	IS 10810	2	Each control unit of 10000 m or less	

TEST DETAILS						LEVELS OF CONTROL		
Cl.	**Requirement**	**Clause**	**Reference**	**Test Methods Part**	**Reference**	**No. of Samples**	**Frequency**	**Remarks**
Table 8 (a)	Conductor i) Annealing test (for copper)	6.1.2 & 6.2.3	IS 8130:84	1	-do-	2	Each control unit of 10000 m or less	Annealing test after stranding under consideration
	ii) Tensile test (for aluminium)	6.2.1	-do-	2	-do-			
	iii) Wrapping Test (for aluminium)	6.2.2		3	-do-			
Table 8 (c)	Physical tests for insulation and sheath	Table 1 & Table 2	IS 5831	7	-do-	1	Quantity (length) of cable of each size and type manufactured in a week from a batch of PVC compound	In case of failure, sample from every day production of this type and size shall be tested & marking done only if the sample meets the requirements of test. After 5 consecutive samples have passed the original frequency shall be resumed.
	i) Tensile strength and elongation at break			7	-do-			
	ii) Shrinkage test	-do-	-do-	12	-do-			
	iii) Heat shock test	-do-	-do-	14	-do-			
	iv) Hot deformation test	-do-	-do-	15	-do-			
Table 8 (d)	Insulation resistance & volume resistivity	Table 1	-do-	43	-do-			
Table 8 15.1 (e)	High voltage test/water immersion test	16.2	IS 694:90	45	IS 10810	1	Every month for each size and type from one consignment of PVC compound.	
15.1 (c) & Table 8	i) Loss of mass test	Table 1 & Table 2	IS 5831	10	-do-			
	ii)Thermal ageing in air.	-do-	-do-	11	-do-			
Table 9 15.4	a) Cold bend (when applicable)	Table 1 & Table 2	-do-	20	-do-			
	b) Cold Impact (when applicable)	-do-	-do-	21	-do-			
	c) Additional ageing Test (when applicable)	16.6	IS 694:90	16.6	IS 694:90			
	d) Flexing Test (under consideration)	16.7	-do-	16.7	-do-			
Table 8	(f) Flammability Test	16.5	-do-	53	IS 10810	1	Cables manufactured from a consignment of PVC compound.	

TEST DETAILS					LEVELS OF CONTROL		
	Requirement	**Clause Reference**	**Test Methods**		**No. of**	**Frequency**	**Remarks**
	Additional type tests for cables with Improved Fire Performance						
	Oxygen Index Test	16.8 -do-	58	IS 10810	1	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
	Temperature Index	16.13 -do-	64	IS 10810			For Category C1 and C2 Sample to be taken from outer sheath, as applicable, and
	Smoke Density	16.14 -do-	63	IS 10810			For Category C2 Sample to be taken from outer sheath, as applicable, and prepared in the
	Test for Halogen acid gas evolution	16.12 -do-	59	IS 10810			For Category C2 Sample to be taken from outer sheath, as applicable, and prepared in the manner given

NOTE : 1 Whenever testing of 2 samples has been stipulated in the scheme, they shall be taken from the beginning and the end parts of a control unit.