



**PRODUCT MANUAL FOR  
WINDING WIRES FOR SUBMERSIBLE MOTORS  
SPECIFICATION FOR INDIVIDUAL WIRES - HR PVC  
INSULATED WIRES ACCORDING TO IS 8783 (Part 4/Sec 1):1995**

*This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.*

1.	<b>Product</b>	:	IS 8783 (Part 4/Sec 1):1995
	<b>Title</b>	:	Winding Wires for Submersible Motors – HR PVC Insulated Wires
	<b>No. of Amendments</b>	:	1
2.	<b>Sampling Guidelines:</b>		
a)	<b>Raw material</b>	:	High conductivity annealed copper conductor (Round solid/ Stranded ) - IS 8783 (Part 1):1995
b)	<b>Grouping guidelines</b>	:	Please refer <a href="#">ANNEX – A</a>
c)	<b>Sample Size</b>	:	25 meters of wire
3.	<b>List of Test Equipment</b>	:	Please refer <a href="#">ANNEX – B</a>
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer <a href="#">ANNEX – C</a>
5.	<b>Possible tests in a day:</b> Please refer <a href="#">ANNEX – D</a>		
6.	<b>Scope of the Licence:</b>		
	“Licence is granted to use Standard Mark as per IS 8783 (Part 4/Sec 1):1995 with the following scope:		
	HR PVC Insulated Winding Wires for Submersible motors, with round solid and/or stranded copper conductor for sizes upto and including ---- mm <sup>2</sup> (Nominal cross-sectional area of conductor)		

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**ANNEX A**

**Grouping Guidelines**

1. IS 8783 (Part 4/Sec 1):1995 covers the requirements and tests for HR PVC Insulated winding wires for Submersible Motors with round solid and stranded copper conductor.
2. For considering GoL/CSoL, winding wires with the lowest and highest nominal cross-sectional area of conductor for each type of conductor (round solid/ stranded) shall be tested to cover the entire range of nominal cross-sectional area of that type of conductor.
3. The Firm shall declare the varieties and sizes of winding wire they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
4. During the operation of the Licence, BO shall ensure that all the varieties covered in the Licence are tested in rotation, to the extent possible.

**ANNEX B****List Of Test Equipment***Major test equipment required to test as per the Indian Standard*

<b>Sl. No</b>	<b>Test Equipment</b>	<b>Tests Used in with Clause reference of IS 8783 (Part 3):1995</b>
1	Digital Vernier Caliper	Annex A
2	Steel Scale, Micrometer	Cl. 8.1
3	Travelling microscope with magnifying glass 10X	Cl. 4.3 (5)
4	Hot air oven with digital temperature controller, Air flow arrangement	Cl. 4.2(4), Cl. 4.3(4), Cl. 4.3(5)
5	Tensile testing machine, Ageing oven with thermostatic controller, air flow meter & Hour meter	Cl. 4.2 (3), Cl. 5.2 (e)
6	Mega ohm meter	Cl. 4.3 (3)
7	Heat Shock Mandrels	Cl. 4.2(4)
8	Hot deformation Apparatus with weight	Cl. 4.3(5)
9	Vacuum oven with pump, desiccator	Cl. 4.3(6)
10	Kelvin Double Bridge with galvanometer, D.C source & Conductivity attachment	Cl. 5.2(b)

*The above list is indicative only and may not be treated as exhaustive.*

**ANNEX C**

**Scheme Of Inspection And Testing**

**1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

**1.1** The manufacturer shall prepare a calibration plan for the test equipment.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.

**3. LABELLING AND MARKING** – As per the requirements of IS 8783 (Part 4/Sec 1):1995.

**4. LEVELS OF CONTROL** - The tests as indicated in column 1 of [Table 1](#) and the levels of control in column 3 of [Table 1](#), shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

**4.1** All the production which conforms to the Indian Standard and covered by the licence should be marked with Standard Mark.

**5. CONTROL UNIT** – Winding wires of continuous length manufactured under similar conditions of production for one nominal cross-sectional area of conductor shall constitute a control unit.

**6. REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

**TABLE 1**

<b>(1)</b>				<b>(2)</b>	<b>(3)</b>		
<b>Test Details</b>				<b>Test equipment requirement R: required (or) S: Sub-contracting permitted</b>	<b>Levels of Control</b>		
<b>Cl.</b>	<b>Requirement</b>	<b>Test Methods</b>			<b>No. of Sample</b>	<b>Frequency</b>	<b>Remarks</b>
		<b>Clause</b>	<b>Reference</b>				
3	Conductor Resistance	3.1	IS 8783 (Part 4/Sec 1)	R	Each coil/spool/reel		
		5.3 (a)	IS 8783 (Part 3)				
	High Voltage Test (Water Immersion Test) at room temperature	4.6	IS 8783 (Part 4/Sec 1)	R	Each Control Unit		
		5.3 (b)	IS 8783 (Part 3)				
	Insulation Resistance (Volume Resistivity) at 27° C	3.2	IS 8783 (Part 4/Sec 1)	R			
5.2 (j)		IS 8783 (Part 3)					
Overall Diameter	4.4	IS 8783 (Part 4/Sec 1)	R				
	5.3 (c)	IS 8783 (Part 3)					
3	Conductor Diameter	3.1	IS 8783 (Part 4/Sec 1)	R	Each Control Unit		
		5.3 (d)	IS 8783 (Part 3)				
	Annealing Test	3.1	IS 8783 (Part 4/Sec 1)	R			
		5.2 (c)	IS 8783 (Part 3)				
	Thickness of Insulation	4.1	IS 8783 (Part 4/Sec 1)	R			
5.2 (d)		IS 8783 (Part 3)					
Insulation Resistance (Volume Resistivity at test temperature 85 ° C)	3.2	IS 8783 (Part 4/Sec 1)	R	Winding wires of each size and type manufactured in a month from one consignment of PVC compound			
	4.3 (3)	IS 8783 (Part 3)					
Tensile Strength & Elongation at break (before ageing)	3.2	IS 8783 (Part 4/Sec 1)	R				
	5.2 (e)	IS 8783 (Part 3)					

3	Thermal Ageing in Air Oven	3.2	IS 8783 (Part 4/Sec 1)	R	Winding wires manufactured in a month from one consignment of PVC compound
		4.2 (3)	IS 8783 (Part 3)		
	Heat Shock	3.2	IS 8783 (Part 4/Sec 1)	R	
		4.2 (4)	IS 8783 (Part 3)		
	Shrinkage	3.2	IS 8783 (Part 4/Sec 1)	R	
		4.3 (4)	IS 8783 (Part 3)		
	Hot Deformation	3.2	IS 8783 (Part 4/Sec 1)	R	
		4.3 (5)	IS 8783 (Part 3)		
Water absorption	3.2	IS 8783 (Part 4/Sec 1)	S		
	4.3 (6)	IS 8783 (Part 3)			

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

**ANNEX - D**

**Possible Tests in a day**

1. Overall Dimension
2. Annealing Test
3. Conductor Resistance
4. Insulation Resistance Test (Volume Resistivity at 27° C and test temperature 85° C)
5. High Voltage Test (Water Immersion Test) at room temperature
6. Conductor Diameter
7. Thickness of Insulation
8. Heat Shock test
9. Shrinkage test
10. Tensile test before ageing