



उत्तर दक्षिण हरियाणा बिजली वितरण निगम
UTTAR DAKSHIN HARYANA BIJLI VITRAN NIGAM



Specification No. CSC-70/R-II/DH/UH/P&D/2020-2021

**TECHNICAL SPECIFICATION FOR
TWIN CORES PVC SHEATHED PVC INSULATED
WEATHER PROOF CABLE FOR WORKING
VOLTAGE UPTO & INCLUDING 1100 V, FOR SERVICE
CONNECTIONS.**

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Common Specification Committee
(DHBVN & UHBVN)



TECHNICAL SPECIFICATION FOR TWIN CORES PVC SHEATHED PVC INSULATED WEATHER PROOF CABLE FOR WORKING VOLTAGE UPTO & INCLUDING 1100 V FOR SERVICE CONNECTIONS.

1. SCOPE

This specification covers design, manufacture inspection, testing, packing and delivery of unarmoured PVC insulated weather proof (for outdoor use Aluminium conductor, twin cores cables for voltage upto 1.1 kV. The cables are intended to be used for service connections in the low-tension distribution system.

2. STANDARD

Flat twin core cables weather proof (for outdoor use) shall be suitable for service voltage upto 1100 V and made from high conductivity Aluminium Conductors with insulation and sheathing of PVC compound. The cables shall be conforming to IS:694-2010 with latest amendments / editions, if any. However, material manufactured as per any other international standard which offers equivalent or material better in quality and workmanship as compared to mentioned standards shall also be acceptable. The Aluminium conductor complying with IS: 8130-1984 shall be used.

3. CLIMATIC CONDITIONS

The cables shall work satisfactorily under the following climate conditions:-

i)	Location	At various locations in the states of Haryana
ii)	Maximum ambient temperature (°C)	60
iii)	Minimum ambient air temperature (°C)	-5
iv)	Maximum average daily ambient temperature (°C)	40
v)	Maximum yearly weighted average ambient temperature (°C)	32
vi)	Maximum altitude above mean sea level (m)	1000
vii)	Minimum Relative Humidity (%)	26
viii)	Maximum Relative Humidity (%)	95
ix)	Average no. of Rainy days/year	120
x)	Average annual rainfall	900 mm
xi)	Maximum wind pressure	195 kg/m ²

The equipment shall be for use in moderately hot and humid tropical climate, conducive to rust and fungus growth.



4. TECHNICAL PARTICULARS

The cable shall be used on single phase, 240 V, 50 Hz AC supply with Neutral solidlygrounded for rated voltage upto& including 1100 Volts.

5. SIZES

The weight of Aluminium in the cable shall be 27 kg/km/phase (minimum). The normal sizes of the cables shall be as per schedule for requirements.

6. TESTS

6.1 TYPE TESTS

The following shall constitute Type tests:-

Sr. No.	Tests	For Requirement Ref. to:-	Method of Test, Ref to Part of IS 10810
a)	Test on Aluminium Conductor: 1. Tensile test 2. Wrapping test 3. Conductor resistance test.	IS:8130 IS:8130 IS:8130	2 3 5
b)	Test for overall dimensions and thickness of insulation and sheath.	As per relevant tables – Tables 3 to 10 of IS 694: 2010	6
c)	Physical tests for insulation and sheath: 1. Tensile strength and elongation at break 2. Loss of mass test. 3. Ageing in air oven. 4. Shrinkage test. 5. Heat shock test. 6. Hot deformation.	IS:5831 IS:5831 IS:5831 IS:5831 IS:5831 IS:5831	7 10 11 12 14 15
d)	Insulation resistance test.	IS:5831	43
e)	High voltage test (water immersion test)	10.2 of IS: 694	45
f)	Flammability test	10.4 of IS:694	53
g)	Additional Ageing Test	10.9 of IS:694	--

6.2 ROUTINE TEST

The following shall constitute routing tests:

- Conductor resistance test.
- High voltage test at room temperature.

All routine Test shall be carried out at manufacture's works by the supplier. Copies of routine test certificates shall be submitted along with the inspection report for approval.



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6.3 ACCEPTANCE TEST

The following shall constitute the acceptance tests which shall be got carried out by the inspecting officer during inspection:

- a) Tensile test
- b) Wrapping test
- c) Conductor Resistance test
- d) Tests for thickness of insulation and sheath
- e) Tensile strength and elongation at break of insulation and sheath
- f) Insulation Resistance test
- g) High voltage test
- h) Flammability test

Inspecting officer shall carry out following type test also during inspection at firm's works on all the lots offered for inspection.

- a) Shrinkage test.
- b) Hot deformation test.

6.4 Additional ageing test

This additional ageing test shall be carried out from any recognized/Govt. test house on the first lot offered for inspection on every size of cable sample drawn by the inspecting officer as per relevant ISS with latest amendments.

7. MANUFACTURER IDENTIFICATION

PROPERTY of DHBVN/UHBVN alongwith brand name, manufacturername, voltage rating, size PO No. & date in English shall be embossed on the outer sheath of cable at regular intervals of approximately 1 to 1.5 meter.

8. INSPECTION AND TEST

An authorized representative of the Nigam shall inspect, examine, and test the equipment/material in respect of quality, size and ratings as per ISS/IEC mentioned above at the manufacturers works during or after the manufacture of goods prior to dispatch on receipt of a clear notice of minimum 10 days in advance to be reckoned from the date of receipt of the same by the purchaser. No material will be allowed to be dispatched without



prior inspection and approval. The inspecting officer of the purchaser may also inspect the material during the course of manufacture. In case, inspection of any consignment is waived off by the purchaser the supplier will be required to furnish the requisite test certificates (for acceptance as well as routine test) for approval. It will be the responsibility of the supplier to make adequate arrangements for testing of material at their works without any additional charge to the purchaser. All testing instruments and appliances will be made available and material destroyed/ consumed during testing will be to the account of the supplier.

The purchaser reserves the right to carry out type tests as per Indian standard specifications with latest version thereof. These tests will be carried out at an independent & recognized test house/agency/laboratory. The purchaser has the right to have the tests carried out at any Govt./Recognized Test agency in case of dispute in quality, size and rating as per relevant ISS.

8.1 SAMPLING OF CABLES

- a) Scale of sampling: - Sample shall be taken and tested from each lot for ascertaining the conformity of the lot to the required specifications.
- b) The number of samples to be selected shall be as per IS:694:2010 as per table given below:

Sr. No. of drums/No. of coils/reels in lot.	No. of drums to be taken as sample	Permissible number of defectives
(i)	(ii)	(iii)
Upto 50	3	0
51 to 100	5	0
101 to 300	8	0
301 to 500	13	1

The inspector shall have the option to take the sample(s) from any point in the length of any drums selected at random for carrying out various tests and total length of that particular drum(s) of such two pieces because of this sampling in such a particular case will be considered as one length.

8.2 CHECK MEASUREMENT OF CABLE LENGTH

The manufacturer will provide necessary arrangement for checking of length at his own cost by the inspecting officer as per sampling plan. Out of the total quantity of coils offered for inspection, in no case less than ten coils shall be selected for verification of length. If any of the coils is found short in length than the length specified, the whole of the lot shall be rejected.



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9. QUALITY ASSURANCE PLAN

The tenderers must supply an attested photocopy of valid ISI License/other International certification mark, if any, alongwith the tender, failing which their tenders are liable to be rejected. List of manufacturing facilities shall be submitted with the tender. List of testing facilities available for final testing of the cables shall be submitted with the tender.

10. PACKING AND MARKING

The cable shall be packed and supplied in non-returnable polythene/ gunny wrapped packing/plywood reels suitable to resist any damage during transit. Coils shall be supplied in standard length of 100 meters. Non-standard length upto maximum of 55 of the ordered quantity (each piece not measuring less than 30 meters) would allowed to be supplied. These non-standard lengths shall be supplied separately. Material offered for inspection should be duly packed and provided with blank lead scales for purpose of sealing by the inspecting officer.

The marking on the drums shall have the following information's-

- a) Trade mark, if any.
- b) Name of the manufacturer.
- c) Nominal cross sectional area of conductor of the cable.
- d) Year of manufacture.
- e) Type of cable and voltage for which it is suitable.

Length of cable on the drum/reel

- a) Approximate gross weight.
- b) Number of crores.
- c) Net weight of the cable.

Drum/reel identification no.

- a) Purchase order No. and Date.
- b) Consignee's name with designation.
- c) ISI mark/IEC mark/
- d) Direction of rotation of drum/reel (By means of an arrow).
- e) Reference to IS: 694: 2010.



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11. TOLERANCE:

A tolerance of $\pm 5\%$ is permissible on the quantity to each consignee with overall tolerance of $\pm 2\%$ on the ordered quantity for completion of order.

12. SCHEDULE OF GUARANTEED AND GUIDING TECHNICAL PARTICULARS:

The tenderers must supply the detailed guaranteed technical particulars as detailed in Appendix-I. For values, use of Dash / Do / Blank or as per ISS/IEC will not be entertained.

Superintending Engineer/PD&C,
Common Specification Committee
DHBVN & UHBVN



APPENDIX-I

SCHEDULE OF TECHNICAL PARTICULARS FOR TWIN CORE FLAT LT PVC CABLES
FOR USL ON 1100 V.

A. GUARANTEED TECHNICAL PARTICULARS

1.	a)	Name of Manufacturer	
	b)	Place of Manufacturer	
	c)	Brand	
2.	Voltage Grade		
3.	Standard Applicable		
	a)	ISI/IEC marked or not.	
	b)	Validity of ISI/IEC license (Enclose complete upto date copy of license)	
4.	Type of cable and conductor material		
5.	Nos./ Nominal area of cores (No./Size in sq.mm)		
6.	Shape of Conductor		
7.	Nos./Nominal diameter of strand in conductor (No./ dia in mm)		
8.	Thickness of insulation		
	a)	Nominal (mm)	
	b)	Minimum (mm)	
9.	Thickness of Sheaths		
	a)	Nominal (mm)	
	b)	Minimum (mm)	
10.	Maximum resistance of conductor at 20°C (Ω /km)		
11.	Minimum volume resistivity at 27°C (Ω /km)		
12.	Standard length in each coil in meters.		
13.	Continuous current carrying capacity of cables		
	a)	In duct (A)	
	b)	In Air (A)	
	c)	In ground (A)	



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B. GUIDING TECHNICAL PARTICULARS

1.	Overall diameter of finished cable with \pm tolerance (in mm)	
2.	Weight of conductor with \pm tolerance per km (in kg)	27 kg (min.) (No negative tolerance allowed)
3.	Weight of insulation with \pm tolerance per km (in kg)	
4.	Weight of sheathing & filler with \pm tolerance per km (in kg)	
5.	Total weight of cable with \pm tolerance per km (in kg)	

C. PROPERTIES OF PVC (INSULATION SHEATH)

1.	Source of PVC compound	
2.	Dielectric constant	
3.	Dielectric strength kg/mm	
4.	Specific gravity	
5.	Tensile strength at break	
6.	Thermal resistivity	