Date: 30.04.2026

To,
All Prospective Bidders,

It is requested to submit the Budgetary offers for supply of HT Cables, Copper Conductor, 3C x 33 KV x 240 Sq.mm (8.0 KM) as per technical details placed below. Offer shall be submitted on or before 07.05.2026 @ 17.00 hrs. with GTP and Technical Data sheet

Offer shall be made to following Email ID

Mail Id : agwadatkar@jnport.gov.in , ssgangurde@jnport.gov.in, dattatraysurvase@jnport.gov.in

TECHNICAL SPECIFICATION FOR 3 Core X 33 KV XLPE CABLE, Unearth, Copper Conductor, XLPE, Armoured Round Wire

A. SCOPE:

The Contractor Shall Design, Manufacture, test, supply after factory inspection, transport up to JNPA site, including Loading/unloading, carry out laying, test and charge HT power cables as per tender technical data sheet and as specified below. The above cables shall conform to IS 7098- with latest revision.

B. LOCATION:

1 The Cables shall be laid and covered under round RCC pipes buried directly in ground at a depth of minimum 1.1 meter.

2 The Cable shall also be laid within covered cable trenches, RCC pipes, RCC duct, in cable racks or open air ladder trays etc. for certain portions of lengths.

C. SYSTEM DETAILS:

1	*Voltage grade (KV) of cable:*	*33/33 KV*
2	*Service Voltage:*	*33 KV*
3	*Highest Voltage:*	*36 KV*
4	*Earthing System:*	*Earthed system*
5	*B.I.L. For Cable:*	*170 KV for 33 KV Grade*
6	*Fault Level (Max.):*	*31 KA*
7	*Frequency:*	*50 C./S*

D. STANDARDS:

The Cable shall conform to the following standards

1) IS: 7098 (Part-II): Specification for cross-linked polyethylene Insulated PVC Sheathed (Latest) Cables for working Voltages from 3.3 KV up to and including 33 KV.

2) IS:8130-1984 : Specification for Conductors for insulated electric cables and flexible cords

3) IS:5831-1984 : PVC insulation & sheath of electric cables

4) 3975-1999: Armour for cables (for 3 Core)

5) IS:10810-1984 : Methods of test for Cables.

6) IS:10418-1982 : Cable Drums for Electric Cables.

The cable joints, indoor termination and their accessories and fittings may conform to other Indian and/or equivalent Standards or important publications to improve upon their performance, but shall not fall short of the requirement of this specification. The tenderer shall clearly indicate such standards in their offers.

E. ELECTRICAL CHARACTERISTICS & PERFORMANCE:

The specifications of cable shall generally conform to MSEDCL **SPECIFICATION NO. TECHNICAL SPECIFICATION NO. CE/T & QC/MSC-I/11/22/33 KV XLPE POWER CABLE/ T-LTM 10/1221 dt. 21.02.2022 however below mentioned specifications shall supersede the above.**

Description of Cable: 33/33 KV Grade cable.

Standard, compacted, circular, [Copper Conductor (for 33 KV) shielded with black extruded semi-conducting compound, XLPE insulated, core shielded with black extruded semi-conducting compound, black semi-conducting tape and a copper tape, coloured strips having Red, Yellow & Blue for core identification, shielded cores laid up with PP fillers, binder taped and Black extruded PVC (Type ST-2) inner sheath, single layer of round galvanised steel wire/ strip armoured and black extruded PVC FRLSH (Type ST-2), overall sheathed, conforming generally to IS:7098(Part-II)

a) Voltage Grade : 33/33KV
b) Size of Cable : 33 KV grade X 3 Core X 240 sqmm
c) Service Voltage : 33 KV
d) Max. Conductor temp. : 90 o C at max. continuous current.
e) Short Ckt. Current - 3 Phase Short Ckt : As per relevant IS
f) Maximum Permissible emergency overload temp. at 25% overload to 100 hrs. per year or 500 hrs. in life of Cable: 130-degree C for one hour
g) Max. Permissible short circuit Temperature : 250-degree C for one second
h) Conductor Material: Material conforming to IS: 8130, Electrolytic grade Copper Conductor stranded compacted circular
i) Conductor screening: Extruded, cross linked, semi-conducting compound of 0.5 mm. thickness
j) Insulation: XLPE of thickness as per IS 7098-Part-II
k) Insulation Screening : Black extruded semi-conducting compound as the non-metallic part and annealed copper 0.09 mm (minimum) thick tape lapping as metallic part to suit the Single phase to Earth Short Ckt Current as describe above.
l) Inner Sheathing : Black extruded PVC Type ST-2 compound
m) Armouring : Single layer of round galvanized steel round wire armoured.
n) Overall Sheathing: Red coloured, Extruded PVC sheath ST-2 as per IS: 5831/1984, with FRLSLH PVC compound anti-rodent and anti-termite.
o) Approx. length of Cable in a Drum & Over all Tolerance: 450 meters with a tolerance of +/- 5% but overall Tolerance of Item wise PO Quantity shall be +/-1% .
p) End Sealing: H.S. Caps (Heat Shrinkable)
q) Max. tan-delta at room temp., at nominal Phase to Neutral Voltage (Uo) : 0.004
r) Max. Increment of tan delta between 0.5 Uo to 2 Uo at room temp :.002
s) Partial Discharge Value : 10 Pc (Max.) at 1.73 Uo
t) Impulse Tests : 170 KV for 33 KV

u) H.V. Tests between Conductors & Screen/Armour : 48 KV (rms) for 33 KV for 5 minutes
v) Maximum D.C Resistance per KM: As per relevant I.S.S

F. 33 KV and 11 KV CABLE CONSTRUCTION:

i XLPE Underground Cable is to be manufactured in continuous catenary process at controlled elevated temperature and pressure in inert atmosphere with use of suitable materials for XLPE main insulation and XLPE semi-conducting Insulation & XLPE screen (Extrusion in Dry Curing-Nitrogen). The inner and outer semiconducting sheaths and main polyethylene insulation between the sheaths are to be simultaneously extruded during the Triple Extrusion Process of manufacturing and main insulation of the Cable is to be extruded unfilled. The short circuit rating of the cable will depend on the conductivity and continuity of the strands of the armour wires which shall be ensured by guarding against corrosion.

ii **CONDUCTOR SCREEING** :

A semi-conducting cross-linked polyethylene (XLPE) screening shall be extruded over the conductor to act as an electrical shield which together with the elimination of the so called “Strand Effect” prevents to a great extent air ionisation on the surface of the conductor.

iii **INSULATION** :

The main insulation of the Cable shall be extruded unfilled, chemically cross-linked polyethylene (XLPE) inert gas cured satisfying the requirement of ISS: 7098(Part-II).

iv **INSULATING SCREEN** :

The metal screen eliminates tangential stress of rotating electrostatic field surrounding the conductor and uniform electrical stress in the insulation. The semi-conducting polyethylene (XLPE) screen shall be extruded over the main polyethylene insulating wall to prevent partial discharge at the surface of the insulation. The copper tape shall be wrapped over the semi conducting compound layer. The metal screen so formed around the cores shall be in contact with one another as the cores are laid up at triangular configuration. Conductor screening, insulation and insulation screening shall be extruded in triple extrusion processes so as to obtain continuously smooth interfaces.

v The mechanical and chemical properties of the materials for semi conducting screens are much more important than their electrical properties, but for obtaining the high overall degree of electrical properties of an H.V. cable, the inner and outer semi conducting screens and the main polyethylene insulation between the screens shall be simultaneously extruded during the manufacturing process known as “triple extrusion”. The advantages are: -

i) The partial discharge level at the surface of the insulation is brought to a minimum.
ii) There will be no displacement of the semi conducting screen and insulation during expansion and contraction due to load cycles and bending.
iii) The semi conducting screens are easily removable during jointing and termination operations.
iv) LAYING UP: PP Fillers shall be used. The phase identification of the cores shall be either by colour or numerals as per I.S.S.

vii **INNER SHEATH:**

The cable core shall be supplied with bedding of PVC (inner sheath) in the form of extruded PVC sheath.

viii ARMOUR:

The cable shall be Single layer GI round wire armoured to ensure an adequate return path for the flow of fault current and also to provide suitable mechanical protection. The Steel Wires of required size in requisite number as per IS-7098-Part-2 shall be laid closely in the spiral formation to protect the circumference of the cable fully and to provide adequate cross sectional area for flow of maximum fault current within limits of specified temperature rise and duration of fault. The direction of the lay of the armour shall be opposite to that of the cable cores

ix OUTER SEATH:

A reliable serving shall be necessary for maintaining conductivity of the armour particularly under corrosive condition in the form of jacket. The cable shall therefore be finished with an extruded PVC-FRLSH-ST2 over armour of thickness as per IS-7098-Part-2. The quality of PVC over sheath (Jacket) shall be ensured for service reliability against moisture intrusion and shall conform to type ST-2 of IS:5831.

The colour of the outer sheath shall be as follows: For 33 KV Cable: RED or as confirmed before placing order. The sheaths shall be protected against white ants, vermin and termites by suitable, reliable and durable measures. Cable shall be provided with non-conducting water swellable tape of thickness approx. 0.3 mm. applied over armour.

x CABLE IDENTIFICATION:

The following shall be embossed on the outer sheath for the identification.

a) Manufacturer's Name or Trade Mark.
b) Voltage Grade.
c) Nominal section & Material of conductor and number of crores.
d) Year of manufacture.
e) Inscription for length of cables at 1.0-meter interval.
f) Name of the purchaser: JNPA
g) Type of insulation i.e. XLPE.

xi SEALING OF CABLE ENDS: The cable ends of cable in the metal drum for delivery shall be sealed with heat shrinkable caps.

G. METAL DRUMS:

The Cable shall be packed in non-returnable METAL drums.

The following information shall be marked on each drum.

a) Drum identification No.
b) Manufacturer's Name, Trade Name/Trade Mark, if any.
c) Nominal sectional area of the conductor of the cable.
d) No. of Cores.
e) Type of Cable and Voltage Grade with Cable Code.
f) Length of the Cable in Cable Drum.

g) Direction of rotation of Drum (by means of an arrow)
h) Approximate Weight: Tare: Gross
i) Year and Country of Manufacture.
j) Purchase Order No.
k) Date of Delivery.
l) Name of the Purchaser:

H. Tests to be performed as per IS: 7098 (Part-II)

i. Type Test: All the tests mentioned below are to be performed as per details given in IS:10810

a) Tests on conductor. i) Tensile Test (for aluminum) ii) Wrapping Test (for aluminum) iii) Resistance Test.
b) Tests for armoring Wires strips.
c) Test for thickness of insulation and sheath

d) Physical test for insulation.
i) Tensile strength and elongation at break.
ii) Ageing in air oven.
iii) Hot test.
iv) Shrinkage test
v) Water absorption (Gravimetric)

e) Physical tests for outer sheath
i) Tensile strength and elongation at break.
ii) Ageing in air oven.
iii) Shrinkage test.
iv) Hot deformation.
v) Heat shock.
vi) Loss of mass in air oven.
vii) Thermal stability.

f) Partial discharge test.
g) Bending test.
h) Dielectric power factor test.
i) As a function voltage.
j) As a function of temperature.
i) Insulation resistance (Volume resistivity) Test.
j) Heating cycle test.
k) Impulse with stand test.
l) High voltage test.
m) Flammability test.

ii. The following tests on screened cable shall be performed successively on the same test sample of completed cable, not less than 10m. in length between the test accessories.

a) P.D. Test.
b) Bending Test followed by P.D. Test.
c) Dielectric power factor as a function of voltage.
d) Dielectric power factor as a function of temperature.
e) Heating cycle test followed by dielectric power factor as a function of voltage and P.D. tests.
f) Impulse withstand test and
g) High voltage test.

If a sample fails in test (g) one more sample shall be taken for this test, preceded by tests (b) & (e).

iii. Acceptance Test: The following shall constitute Acceptance Tests:

a) Tensile test (for aluminium) - [Not applicable as per IS:8130-1984.]
b) Wrapping test (for aluminium) - [Not applicable as per IS:8130-1984.]
c) Conductor resistance test.
d) Test for thickness of insulation and sheath.
e) Hot set test for insulation.
f) Tensile strength and elongation at break test for insulation and outer sheath.
g) P. D. Test (for screened cables) only on full drum length.
h) High Voltage test, and
i) Insulation resistance (VOLUME RESISTIVITY) Test.

iv. ROUTINE TESTS:

The routine test shall be carried out on cable manufactured in accordance with this specification. The following routine tests shall be made on cable length as specified in the ISS.

a) Conductor resistance test.
b) Partial discharge test on full drum length.
c) High voltage test as per para 7.21

v. TEST WITNESS:

1. All Tests shall be performed in presence of JNPA representative.
2. The contractor, shall give at least fifteen (15) days advance notice for witnessing such tests.

vi. TEST CERTIFICATE:

a. Certified copies of all routine tests carried out at Works shall be furnished in Three (3) copies for approval of the purchaser.
b. The cables shall be dispatched from Works only after receipt of Purchaser's written approval of shop test reports.
c. Type Test Certificates of the Cable offered shall be furnished along with Bid.

vii. DESCRIPTIVE LITERATURES, TEST RESULTS ETC.:

The following details for the cable shall be submitted with bid for approval of employer.

a) Manufacturer's Catalogue giving cable construction details and characteristics.

b) Manufacturing process in detail for cables highlighting the steps to control.
   i) Contamination.
   ii) Formation of water trees.
   iii) Effects of by-products of cross-linking.
   iv) Stress control etc.
c) Cross section drawing of the cable.
d) Cable current ratings for different types of installation inclusive of all de rating factors due to ambient temperature, grouping etc.
e) Over-Load characteristics of the cable without endangering the normal life and electrical quality of the insulation.
f) Complete technical data of the cables.
g) List of Customers to whom the Cable of similar rating have been supplied.

h) Type Test Report conducted on similar type of Cable from NABL/ Central Govt. approved Accredited Testing Laboratory within 5 years from the due date of opening of Tender is to be submitted.

i) Valid Calibration Certificate of instruments/equipment used for Testing purpose conducted by NABL accredited Laboratory provided the certificate bears an accreditation body logo. For testing equipment where NABL accreditation is not available, calibration certificate from educational institutions like IIT's, NIT's only can be accepted provided they demonstrate traceability.

j) Documents to be submitted at the time of physical delivery at consignee stores.

viii. The following documents are to be submitted at the time of dispatch to site by the vendors:

i. Copy of Purchase Order
ii. Copy of dispatch instruction
iii. Inspection Test certificate
iv. Guarantee certificate
v. Proforma Invoice
vi. Calculation Sheet for price variation on the basis of IEEMA as applicable
vii. Seal list and packing list
viii. Challan in triplicate
ix. Way bill, if applicable