Item Numb	Item Title	Item Description	Item Quantity	Unit of Me	Consignee ID	Delivery Period (In number of days)
1	6.6 KV 1C-500-AL-ARMOURED	HT XLPE CABLES	1200	Meters	BHILAI_PEM_CON	180
2	11 KV 1C-500-AL-UNARMOURED	HT XLPE CABLES	2250	Meters	RAVI_NABINAGAR	180

2 X 250MW NSPCL BHILAI FGD
3 X 660MW NPGCPL NABINAGAR STPP FGD

TECHNICAL SPECIFICATION
FOR
HT XLPE POWER CABLE

SPECIFICATION No. **PE-TS-XXX-507-E001**
ISSUE NO. 01
REV NO. 00

XXX = 468 for 2 X 250MW NSPCL BHILAI FGD &
= 457 for 3 X 660MW NPGCPL NABINAGAR STPP FGD

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA, INDIA

INDEX

BHEL	**TECHNICAL SPECIFICATION** **HT XLPE POWER CABLE** **2 X 250MW NSPCL BHILAI FGD** **3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

PROJECT INFORMATION

SL.NO	DESCRIPTION	2 X 250MW NSPCL BHILAI FGD	3 X 660MW NPGCPL NABINAGAR STPP FGD
1	**METEOROLOGICAL DATA**		
1.1	MAXIMUM TEMPERATURE	47.7°C	47°C
1.2	MINIMUM TEMPERATURE	3.9°C	-0.6°C
1.3	MAXIMUM RELATIVE HUMIDITY	87	86
1.4	MINIMUM RELATIVE HUMIDITY	23	32
1.5	AVERAGE ANNUAL RAINFALL	107.4mm	89.1mm
1.6	SEISMIC ZONE (AS PER IS 1893)	Zone II	Zone III
1.7	HEIGHT ABOVE MSL	298m	107m
2	**ELECTRICAL DATA**		
2.1	AMBIENT TEMPERATURE FOR DESIGN OF ELECTRICAL EQUIPMENT	50 deg. Centigrade,	50 deg. Centigrade,
2.2	RATED FREQUENCY	50 HZ	50 HZ
2.3	FREQUENCY VARIATION	+3% & -5%	+3% & -5%
2.4	AC VOLTAGE	6.6 kV	11 kV
2.5	AC VOLTAGE VARIATION	6% for 11 kV	6% for 11 kV
2.6	DC VOLTAGE	220V DC	220V DC
2.7	DC VOLTAGE VARIATION	-15% to +10%	-15% to +10%
2.8	FAULT LEVEL (KA/SEC)	a) 6.6 KV systems - 40 kA rms for 1 second,	a)11kV systems - 40 kA rms for 1 second,

बी एच ई एल BHEL	**TECHNICAL SPECIFICATION** **HT XLPE POWER CABLE** **2 X 250MW NSPCL BHILAI FGD** **3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

SCOPE

SCOPE OF THIS PACKAGE COVERS THE FOLLOWING:

SL.NO	PARAMETERS	REQUIREMENT
1	Supply Including Design, Engineering, Manufacturing of HT XLPE Power cable	YES
a)	Main Supply	YES
b)	Commissioning Spares	NO
2	Painting	NO
3	Inspection & Testing	YES
4	Packing	YES
5	Transportation & Delivery To Site	YES
6	Erection & Commissioning	NO
7	Supervision of Erection & Commissioning	NO
8	Mandatory Spares	NO
9	O & M Service	NO
10	O & M Spares	NO

	TECHNICAL SPECIFICATION **HT XLPE POWER CABLE** **2 X 250MW NSPCL BHILAI FGD** **3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

	GENERAL TECHNICAL REQUIREMENT
1	It is not the intent to specify herein all the details of design and manufacturing. Bidder shall ensure that the offered cables confirms in all respects to high standards of design, engineering and workmanship.
2	Bidder shall also ensure that the offered cables shall comply with all applicable statutory and regulatory requirements.
3	In the event of any conflict between the requirements of two clauses of this specification, documents or requirements of different codes and standards specified, the more stringent requirement as per the interpretation of the owner shall apply.
4	Drawing/document submission shall be through web based Document Management System(DMS) of BHEL. Bidder would be provided access to the DMS for drawing/document submission. Bidder to ensure internet connectivity of min speed of 2Mbps at their end.
5	Drawings/ documents submitted by vendor at any stage shall be complete in all respects. Any incomplete drawing submitted shall be treated as non- submission with delays attributable to vendor. For any clarification/ discussion required to complete the drawings, the bidder shall depute his personnel to BHEL / Customer's Office as per the requirement for across the table submission/ finalizations of drawings.
6	Latest codes and standards shall be complied with as on techno-commercial bid opening.
7	Bidder shall submit Quality Plan in the event of order based on the Quality Plan enclosed therein on compliance route. Inspection / testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc.
8	Cables must be safe, reliable and easy to maintain at all operating condition

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	TECHNICAL SPECIFICATION HT XLPE POWER CABLE 2 X 250MW NSPCL BHILAI FGD & 3 x 660MW NPGCPL NABINAGAR FGD	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

TECHNICAL DATA - PART - A (2 x 250MW Bhilai FGD)			
SL.NO	**DESCRIPTION**	**UOM**	**DETAIL**
1.0	**DESIGN CODES & STANDARDS**		
1.1	Standard applicable in general (Latest amendment to be referred if any)		IS:7098 (Part-2)
1.2	Current rating of cables		As per IS:3961 (Part-7)
1.3	Short circuit rating		IEC 60949
1.4	Conductor		IS: 8130
1.5	Innersheath		IS: 5831
1.6	Outersheath		IS: 5831
2.0	**DESIGN /SYSTEM PARAMETERS**		
2.1	Type of Cable		HT XLPE Power Cable
2.2	Voltage Grade		As per BOQ
2.3	INSTALLATION CONDITIONS AT SITE		
2.3.1	Ambient air temperature	deg. C	50
2.3.2	Ground temperature	deg. C	30
3.0	**CONSTRUCTION FEATURES**		
3.1	CONDUCTOR		
3.1.1	Material type		Aluminium
3.1.2	Grade		H2
3.1.3	Class		Class 2 (Stranded)
3.1.4	Shape		Circular
3.1.5	Compaction		Compacted
3.1.6	Cable Size	sq.mm	Refer BOQ
3.2	CONDUCTOR SCREEN		
3.2.1	Material		Extruded layer of Semi Conducting Compound
3.2.2	Minimum thickness	mm	0.3
3.3	XLPE INSULATION		
3.3.1	Nominal thickness of insulation	mm	As per Table-4 of IS: 7098 (Part-2)
3.3.2	Extrusion		Triple Extrusion
3.3.3	Method of extrusion		Pressure Extruded / Vacuum Extruded
3.3.4	Method of curing		
3.3.4.1	6.6 kV/11kV		Dry/Gas/Steam
3.4	INSULATION SCREEN		
3.4.1	Non-Metallic Part		
3.4.1.1	Material		Extruded semiconducting compound
3.4.1.2	Minimum thickness	mm	0.3
3.4.2	Metallic Part		No, Armour shall constitute the metallic part of the screening.
3.4.2.1	SINGLE CORE CABLES		
3.4.2.1.1	Material		N.A.

3.4.2.1.2	Minimum thickness	mm	N.A.
3.4.2.1.3	No. of tapes	Nos.	N.A.
3.4.2.1.4	Minimum overlapping	%	N.A.
3.4.2.1.5	Earth fault current withstand capacity		N.A.
3.4.2.2	MATERIAL FOR MULTI CORE CABLES		N.A.
3.4.3	Extrusion		Refer Clause no. 3.3.3
3.4.3	Method of curing		Refer Clause no. 3.3.4
3.5	CORE IDENTIFICATION		As per IS:7098 (Part-2)
3.6	INNERSHEATH		N.A.
3.6.1	Material		N.A.
3.6.2	Colour		N.A.
3.6.3	Whether FR-LSH		N.A.
3.6.4	Inner sheath applicable for single core cable		N.A.
3.6.5	Material of fillers (for multicore cables)		N.A.
3.6.6	Method of application		N.A.
3.6.6.1	Multi-core cables:		N.A.
3.6.6.2	Single-core cables:		N.A.
3.6.7	Thickness of inner sheath		N.A.
3.7	ARMOUR		
3.7.1	Dimension		As per IS: 7098 (Part-2) Table-6 and tolerance as per IS:3975
3.7.2	Material		
3.7.2.1	Single core		Non-Magnetic hard drawn H4 grade Aluminium Single Round Wire as per IS: 8130
3.7.2.2	Multi core		N.A.
3.7.3	Gap between armour wire		Not more than one armour wire space (No cross over / No over riding)
3.7.4	Breaking load of Joint		95% of normal armour
3.8	OUTERSHEATH		
3.8.1	Material		Extruded PVC Type ST2
3.8.2	Colour		Black
3.8.3	Whether FR-LSH		YES
3.8.4	Method of application		Extruded
3.8.5	Thickness of outer sheath		As per Table-7 of IS: 7098 (Part-2)
3.8.6	Marking/ Embossing on Outersheath		
3.8.6.1	At every 5 Meters by embossing		(i) Owner's Name (NTPC) (ii) Manufacturer’s name and trade mark (iii) Year of manufacture (iv) Type of cable and voltage class (v) Nominal cross section area of conductor and no. of cores (vi) ‘BHEL-PEM’ (vii) 'FRLS'
3.8.6.2	At every 1 Meters by printing		Progressive Sequential length
3.9	FR-LSH CHARACTERISTICS		
3.9.1	Oxygen index		Minimum 29 as per ASTMD 2863
3.9.2	Temperature index		Minimum 250º C as per ASTMD 2863
3.9.3	Acid gas generation		Minimum 20% by weight as per IEC 60754-1
3.9.4	Smoke density rating		Maximum 60% as per ASTMD 2843
3.9.5	Flame retardance test for single cable		As per IS 7098 Part 2 (IS 10810 Part 61/ IEC 60332 PART1)
3.9.6	Flame retardance test for bunched cables		As per IEC 60332 PART-3
3.10	DIAMETERS		
3.10.1	Tolerance on overall diameter	mm	(±) 2 mm over the declared value
3.11	CABLE DRUM DETAILS		
3.11.1	Type		Steel/wooden
3.11.2	Standard drum length		AS per BOQ cum Un-priced schedule

3.11.3	Tolerance on drum length		(±) 5%
3.11.4	Details of marking on Drum (stenciled on both sides of the drum)		a) Manufacturer's name or trade make. b) Type of cable & voltage grade. c) Year of manufacture. d) Type of insulation. e) No. of core and sizes of cables. f) Cable code - FRLS. g) Single length of cable on drum. h) Direction of rotation, by arrow. i) Net Gross weight j) Purchaser's name , address and contact number
4.0	**PERFORMANCE PARAMETERS**		Not Applicable
5.0	**INSPECTION/TESTING**		
	Type test conduction required		Yes, in case the available type test reports are older than 04.12.2008 or are not available. Refer Annexure -A to Quality plan.
	Validity of type test report		Please refer to Annexure -A to Quality Plan (Type test reports to be submitted). Vendor to furnish Type Test Certificate of specified Type Test which has been mentioned and the same shall not be older than 04.12.2008. These reports should be for the tests conducted on the cable identical in all respects to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. In absence of valid Type Test report ,vendor to conduct the same without any commercial & delivery implication to BHEL.
	Acceptance & Routine test		All acceptance and routine tests as per Quality plan shall be carried out. Charges for these shall be deemed to be included in the cable price.

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	TECHNICAL SPECIFICATION HT XLPE POWER CABLE 2 X 250MW NSPCL BHILAI FGD & 3 x 660MW NPGCPL NABINAGAR FGD	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

	TECHNICAL DATA - PART - A (3 x 660MW Nabinagar FGD)		
SL.NO	**DESCRIPTION**	**UOM**	**DETAIL**
1.0	**DESIGN CODES & STANDARDS**		
1.1	Standard applicable in general (Latest amendment to be referred if any)		IS:7098 (Part-2)
1.2	Current rating of cables		As per IS:3961 (Part-7)
1.3	Short circuit rating		IEC 60949
1.4	Conductor		IS: 8130
1.5	Innersheath		IS: 5831
1.6	Outersheath		IS: 5831
2.0	**DESIGN /SYSTEM PARAMETERS**		
2.1	Type of Cable		HT XLPE Power Cable
2.2	Voltage Grade		As per BOQ
2.3	INSTALLATION CONDITIONS AT SITE		
2.3.1	Ambient air temperature	deg. C	50
2.3.2	Ground temperature	deg. C	30
3.0	**CONSTRUCTION FEATURES**		
3.1	CONDUCTOR		
3.1.1	Material type		Aluminium
3.1.2	Grade		H2
3.1.3	Class		Class 2 (Stranded)
3.1.4	Shape		Circular
3.1.5	Compaction		Compacted
3.1.6	Cable Size	sq.mm	Refer BOQ
3.2	CONDUCTOR SCREEN		
3.2.1	Material		Extruded layer of Semi Conducting Compound
3.2.2	Minimum thickness	mm	0.3
3.3	XLPE INSULATION		
3.3.1	Nominal thickness of insulation	mm	As per Table-4 of IS: 7098 (Part-2)
3.3.2	Extrusion		Triple Extrusion
3.3.3	Method of extrusion		Pressure Extruded / Vacuum Extruded
3.3.4	Method of curing		
3.3.4.1	6.6 kV/11kV		Dry/Gas/Steam
3.4	INSULATION SCREEN		
3.4.1	Non-Metallic Part		
3.4.1.1	Material		Extruded semiconducting compound
3.4.1.2	Minimum thickness	mm	0.3
3.4.2	Metallic Part		Yes
3.4.2.1	SINGLE CORE CABLES		
3.4.2.1.1	Material		Copper Tape

3.4.2.1.2	Minimum thickness	mm	0.1mm
3.4.2.1.3	No. of tapes	Nos.	1
3.4.2.1.4	Minimum overlapping	%	20%
3.4.2.1.5	Earth fault current withstand capacity		600A for 2 Seconds
3.4.2.2	MATERIAL FOR MULTI CORE CABLES		N.A.
3.4.3	Extrusion		Refer Clause no. 3.3.3
3.4.3	Method of curing		Refer Clause no. 3.3.4
3.5	CORE IDENTIFICATION		As per IS:7098 (Part-2)
3.6	INNERSHEATH		N.A.
3.6.1	Material		N.A.
3.6.2	Colour		N.A.
3.6.3	Whether FR-LSH		N.A.
3.6.4	Inner sheath applicable for single core cable		N.A.
3.6.5	Material of fillers (for multicore cables)		N.A.
3.6.6	Method of application		N.A.
3.6.6.1	Multi-core cables:		N.A.
3.6.6.2	Single-core cables:		N.A.
3.6.7	Thickness of inner sheath		N.A.
3.7	ARMOUR		
3.7.1	Dimension		N.A.
3.7.2	Material		N.A.
3.7.2.1	Single core		N.A.
3.7.2.2	Multi core		N.A.
3.7.3	Gap between armour wire		N.A.
3.7.4	Breaking load of Joint		N.A.
3.8	OUTERSHEATH		
3.8.1	Material		Extruded PVC Type ST2
3.8.2	Colour		Black
3.8.3	Whether FR-LSH		YES
3.8.4	Method of application		Extruded
3.8.5	Thickness of outer sheath		As per Table-7 of IS: 7098 (Part-2)
3.8.6	Marking/ Embossing on Outersheath		
3.8.6.1	At every 5 Meters by embossing		(i) Owner's Name (NTPC) (ii) Manufacturer's name and trade mark (iii) Year of manufacture (iv) Type of cable and voltage class (v) Nominal cross section area of conductor and no. of cores (vi) 'BHEL-PEM' (vii) 'FRLS'
3.8.6.2	At every 1 Meters by printing		Progressive Sequential length
3.9	FR-LSH CHARACTERISTICS		
3.9.1	Oxygen index		Minimum 29 as per ASTMD 2863
3.9.2	Temperature index		Minimum 250° C as per ASTMD 2863
3.9.3	Acid gas generation		Minimum 20% by weight as per IEC 60754-1
3.9.4	Smoke density rating		Maximum 60% as per ASTMD 2843
3.9.5	Flame retardance test for single cable		As per IS 7098 Part 2 (IS 10810 Part 61/ IEC 60332 PART1)
3.9.6	Flame retardance test for bunched cables		As per IEC 60332 PART-3
3.10	DIAMETERS		
3.10.1	Tolerance on overall diameter	mm	(±) 2 mm over the declared value
3.11	CABLE DRUM DETAILS		

3.11.1	Type		Steel/wooden
3.11.2	Standard drum length		AS per BOQ cum Un-priced schedule
3.11.3	Tolerance on drum length		(±) 5%
3.11.4	Details of marking on Drum (stenciled on both sides of the drum)		a) Manufacturer's name or trade make. b) Type of cable & voltage grade. c) Year of manufacture. d) Type of insulation. e) No. of core and sizes of cables. f) Cable code - FRLS. g) Single length of cable on drum. h) Direction of rotation, by arrow. i) Net Gross weight j) Purchaser's name , address and contact number
4.0	**PERFORMANCE PARAMETERS**		Not Applicable
5.0	**INSPECTION/TESTING**		
	Type test conduction required		Yes, in case the available type test reports are older than 22.12.2007 or are not available. Refer Annexure - A to Quality plan.
	Validity of type test report		Please refer to Annexure- A to Quality Plan (Type test reports to be submitted). Vendor to furnish Type Test Certificate of specified Type Test which has been mentioned and the same shall not be older than 22.12.2007. These reports should be for the tests conducted on the cable identical in all respects to those proposed to be supplied under this contract and test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. In absence of valid Type Test report ,vendor to conduct the same without any commercial & delivery implication to BHEL.
	Acceptance & Routine test		All acceptance and routine tests as per Quality plan shall be carried out. Charges for these shall be deemed to be included in the cable price.

 Please fill separately for both projects

	TECHNICAL SPECIFICATION HT XLPE POWER CABLE 2 X 250MW NSPCL BHILAI FGD 3 X 660MW NPGCPL NABINAGAR STPP FGD	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

TECHNICAL DATA - PART - B (SUPPLIER DATA TO BE FURNISHED AFTER AWARD OF CONTRACT)

SL.NO		UOM	DETAIL
1.1	**Technical Particulars**		
a	metallic items of each cable size	Kgs	
i	Metallic	Kgs/Km	
ii	Non Metallic	Kgs/Km	
b	Rating factors for variation in ambient air temp.		
c	Rating factors for variation depth of laying in ground		
d	Rating factors for variation in thermal resistivity of soil		
e	Grouping factors for cables laid in open air racks		
f	Grouping factors for cables in build up concrete trenches with restricted air circulation		
g	Grouping factors for cables laid in ground		
h	Particulars of cable drums		
i	Grouping factors for cables laid in ducts/pipes		
1.2	**Technical Data**		
	The following technical data shall be submitted by the manufacturer for each type and size of the cable for Employer's approval.		
1.0	Make		
2.0	Country of manufacturer		
3.0	Type designation		
4.0	Applicable standard		
5.0	Cable size (No. of Cores x mm2)		
6.0	Rated Voltage		
7.0	Continuous current rating for maximum conductor temp. when laid in air at ambient of 50 deg. C.		
a	When metallic screen /armour is earthed at one end	Amps	
b	When metallic screen/armour is earthed at both the ends	Amps	
c	For unscreened, unarmoured Cables	Amps	
8.0	Continuous current rating for max. conductor temp. when buried in soil having thermal resistivity of 150 deg. C Cm/N at a depth of 1 mtr. and at ground ambient temp. of 40 deg. C.		
a	When metallic screen / armour is earthed at one end	Amps	
b	When metallic screen/ armour is earthed at both the ends	Amps	

c	For unscreened, unarmoured cables	Amps	
9.0	Short circuit withstand capacity and duration for		
a	Conductor		
b	Metallic screen		
c	Armour		
10.0	Conductor		
a	Material (Copper or Aluminium)		
b	Grade		
c	Nominal cross sectional area	Sq. mm	
d	Number and diameter of wire before compacting of conductor strands		
i	No. of wires (min.)		
ii	Dia of wires	mm	
e	Shape of conductor		
f	Diameter over conductor (mm)		
i	Fictitious (as per IS 10462 (Part-1)-1983)	mm	
ii	Approximate	mm	
g	Direction of lay of stranded layers		
h	Conductor resistance (DC) At 20 deg C in Ohm/Km (max.)		
i	Conductor resistance (AC)		
a	at 20 deg. C (Approx)	ohm/Km	
b	at 90 deg. C (Approx) (for XLPE cables)	ohm/Km	
j	Reactance per phase at 50 Hz	ohm/Km	
k	Capacitance at 50 hz	micro Farads / Km	
l	Conductor screening (wherever applicable)		
a	Material and type		
b	Thickness of extruded layer	mm	
11.0	Insulation		
a	Composition of insulation		
b	Nominal thickness of insulation	mm	
c	Tolerance on thickness of Insulation	mm	
d	Filled or unfilled (for XLPE only)		
e	Type of curing (for XLPE only)		
f	Min. insulation resistance at 20 deg. C	Mega Ohm/Km	
g	Identification of cores		
12.0	Insulation screening (wherever applicable)		
a	Material & type		
b	Thickness of extruded layer	mm	
13.0	Metallic Screen		
a	Material		
b	Size of tape /wire	mm	
c	No. of wires / tapes		
d	Short circuit capacity of metallic screen (Calculation to be furnished)		

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e	Cross sectional area of screen	sq. mm	
f	Dia below metallic screen i.e. below copper tape/wire	mm	
14.0	Inner sheath		
a	Material		
b	Diameter over the laid up cores		
i	Calculated (By fictitius calculations as per IS 10462 (part-1)-1983)	mm	
ii	Approximate	mm	
c	Thickness of sheath (Min)	mm	
d	Colour of sheath		
e	Tolerance in thickness of inner sheath	mm	
15.0	Type of filler material		
16.0	Armour (in case of armoured cables)		
a	Type of material of armour		
b	Formed wire / wire		
c	Diameter of cable over inner sheath (under armour)		
i	Calculated (By Fictitious calculations as per IS 10462 (part-1)-1983)	mm	
ii	Approximate	mm	
d	Dimension of formed wire /wire	mm	
e	No. of armour formed wires /wires		
f	Approx. cross sectional area of armour	Sq. mm	
g	Resistivity of armour wire at 20 deg. C	ohm- cm	
h	Direction of lay of armour		
17.0	Outer Sheath		
a	Material and type		
b	Diameter under the sheath		
i	Calculated (By Fictitious calculations as per IS 10462 (part-1) - 1983)	mm	
ii	Approximate	mm	
c	Thickness of sheath	mm	
d	Tolerance on Nominal thickness of sheath	mm	
e	Colour of sheath		
18.0			
a	Overall diameter of cable	mm	
b	Tolerance on overall diameter	mm	
c	Eccentricity		
d	Ovality		
19.0	Weight per 1000 mtrs	kg	
20.0	Recommended min installation radius	mm	
21.0	Safe pulling force when pulled by pulling eye on the conductor	kg	
22.0	Cable Drums		
a	Type (Wooden/steel)		
b	Dimensions (Approx)		
i	Flange diameter	mm	
ii	Barrel diameter	mm	

 Please fill separately for both projects

iii	Traverse	mm	
c	Weight of cable drum with Cables	kgs	
23.0	Max. / standard length per drum for each size of cable	(mtr.) and tolerance (%)	
24.0	Guaranteed value of min. oxygen index of outer sheath		
25.0	Max. acid gas generation by weight	%	
26.0	Maximum smoke density rating	%	
27.0	Voltage developed in the screen/armour per 100 mt run with screen / armour earthed at one end when cables is carrying (for single core cables only)		
a	Rated current	Volts	
b	Short circuit current		
i	in the screen	Volts	
ii	in the armour	Volts	
28.0	Circulating current developed in the screen/armour for 100 mt. run, with screen/armour earthed at both ends when cable is carrying (for single core cables only)		
a	Rated current	Amps	
b	Short circuit current	Amps	
i	in the screen		
ii	in the armour		

बी एच ई एल BHEL	**TECHNICAL SPECIFICATION** **HT XLPE POWER CABLE** **2 X 250MW NSPCL BHILAI FGD** **3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

QUALITY PLAN

एनटीपीसी NTPC	Item:- HT POWER FRLS CABLE (3.3 KV TO 33 KV)	**STANDARD QUALITY PLAN** (CONFORMING TO CODE:IS 7098 Part-II AND NTPC TECHNICAL SPECIFICATION)	QP. NO. 0000-999- QOE- S-042 REV-02 DATE : 03/12/2018 Page 1 of 9	REVIEWED BY AMAN PANDEY RAJESH SHARMA S K LAL DINESH KUMAR	APPROVED BY K K OJHA	1

Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C	N	
1	2	3	4	5	6		7	8	9	10				11

Instructions: 1) Cable manufacturer to maintain records to show co- relation of raw materials to finished cables i.e. raw material batch/ lot no. should be traceable to the final cable drum number or batch number.
2) Cable manufacturer to maintain all quality control records identified as per all QP stages enumerated below whether it is identified for NTPC verification or witness or not.
3) Sources of raw material shall be submitted at the time of submission of endorsement sheet for approval by NTPC.

A	**Raw material/ Brought out Items**													
1.01	Aluminum rod for conductor	1.Make	MA	Verify	100%	---	MANUFACTURER APPROVED SOURCES	MANUFACTURER APPROVED SOURCES	QCR		V	--	--	
		2. Grade	MA	--do--	--do--	--	NTPCADS	NTPC ADS	--do--		V	--	---	
		3. Resistivity	MA	Elect	As per cable mnfr std.	--	IS 5082	IS 5082	-do--		P	--	--	
1.02	Aluminum rod for Armouring (as applicable)	1. Make	MA	Verify	100%	--	MANUFACTURER APPROVED SOURCES	MANUFACTURER APPROVED SOURCES	Q.C.R		V	--	--	
		2. Grade	MA	Verify	As per mnfr std.	--	NTPC ADS	NTPC ADS	Manuf. TC		V	--	--	
		3. Resistivity	MA	Verify	-do-	-	IS 5082	IS 5082	-do--		P	--	--	
1.03	Copper rod (If applicable)	1. Make	MA	Verify	100%	--	Manufacturer approved vender	Manufacturer approved vender	QCR		V	--	--	
		2. Resistivity	MA	Verify	As per cable mnfr std.	--	IS 613	IS 613	--do--		P			
1.04	XLPE compound for insulation	1. Make	MA	Verify	--do--	100%	MANUFACTURER APPROVED SOURCES	MANUFACTURER APPROVED SOURCES	--do--		V	V	V	
		2. Type/ Grade	MA	Verify	100%	100%	NTPC ADS	NTPC ADS	--do--		V	V	V	
		3. Shelf life/ Storage condition	MA	Verify	100%	100%-	Compound manuf. Std	Compound manuf. Std	QCR		V	V	V	
		4. All acceptance test as per manufacturer norms	MA	Verify	As per manufacturer norms	As per manufacturer norms	NTPC ADS	NTPC ADS	Supplier TC		V	V	V	Refer note 1
1.05	PVC Compound for Inner sheath	1. Make	MA	Verify	As per manufacturer norms	--	MANUFACTURER APPROVED sources	MANUFACTURER APPROVED sources	Supplier TC		V	V	--	
		2. Type/ Grade	MA	Verify	--do--	--	NTPC ADS	NTPC ADS	--do--		V	V	--	

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एनटीपीसी NTPC	Item:- HT POWER FRLS CABLE (3.3 KV TO 33 KV)	STANDARD QUALITY PLAN (CONFORMING TO CODE:IS 7098 Part-II AND NTPC TECHNICAL SPECIFICATION)	QP. NO. 0000-999- QOE- S-042 REV-02 DATE : Page 2 of 9	REVIEWED BY AMAN PANDEY RAJESH SHARMA S K LAL DINESH KUMAR	APPROVED BY K K OJHA	2

Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C	N	
1	2	3	4	5	6		7	8	9	10				11
1.06	Semi Conducting Compound	1.Make	MA	Verify	100%	100%	NTPC Approved sources	NTPC Approved sources	--do--	√	P	V	V	
		2. Resistivity	MA	--do--	100%	100%	NTPCADS	NTPCADS	--do--		P	V	V	
		3. Shelf Life / Storage condition	MA	Verify	100%	100%	Compound manuf. recommendation	Compound manuf. recommendations	--do--		P	V	V	
1.07	Copper tape (Electrolytic High Conductivity Copper Foils)	1. Make	MA	Verify	100%	100%	NTPC Approved sources	NTPC Approved sources	--do--	√	P	V	V	
		2. Dimension	MA	Measu	As per cable mnfr std.	--	NTPC ADS	NTPC ADS	--do--		P	--	--	
		3. Resistivity	MA	Verify	100%	----	IS 613	IS 613	Supplier TC		V	V	V	
		4. Chem.& Phy. properties	MA	Elec & Mech.	As per cable mnfr std.	--	As per cable mnfr std.	As per cable mnfr std.	--do--		V	V	-	
1.08	Polyester Tape (As applicable)	1.Make	MA	Verify	100%	100%	Manufacturer approved vendor	Manufacturer approved vendor	--do--		P	V	V	
		2. Dimension	Phy.	Meas	As per cable mnfr std.	--	Manuf. Data sheet	Manuf. Data sheet	--do--		P	-	-	
		3. T.S & Elongation	Phy.	Phy.	-do--	--	--do--	--do--	--do--		V	--	--	
1.09	Steel wire / Formed Wire (As applicable)	1. Make	MA	Verify	As per cable mnfr std.	100%	MANUFACTURER APPROVED sources	MANUFACTURER APPROVED sources	QCR		V	V	V	BIS licensees only
		2. Dimension	MA	Meas	1 sample from each size / lot	--	NTPC APPROVED DATA SHEET & IS 3975	NTPC APPROVED DATA SHEET & IS 3975	QCR		P	--	--	
		3. All acceptance tests as per IS 3975	MA	Verify	As per IS 3975	--	IS 3975	IS 3975	Supplier TC		V	V	--	
1.10	PVC compound for Sheath	1. Make	MA	Verify	As per manufacturer norms	100%	MANUFACTURER APPROVED sources	MANUFACTURER APPROVED sources	QCR		V	V	V	

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एनटीपीसी NTPC	Item:- HT POWER FRLS CABLE (3.3 KV TO 33 KV)	**STANDARD QUALITY PLAN** (CONFORMING TO CODE:IS 7098 Part-II AND NTPC TECHNICAL SPECIFICATION)	QP. NO. 0000-999- QOE- S-042 REV-02 DATE : Page 3 of 9	REVIEWED BY AMAN PANDEY RAJESH SHARMA S K LAL DINESH KUMAR	APPROVED BY K K OJHA	3

Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C	N	
1	2	3	4	5	6		7	8	9	10				11
		2. Type / Grade	MA	Verify	100%	100%	NTPC ADS	NTPC ADS	QCR		V	V	V	
		3. All acceptance test as per manufacturer norms	MA	Verify	As per manufacturer norms	As per manufacturer norms	Compound Mnfr standard	IS 5831	QCR		V	V	V	Refer note 1
		4. Thermal Stability	MA	Chem	One sample / Batch	--	IS 5831	IS 5831	QCR		P	--	--	
		5. Oxygen Index	MA	Chem	--do--	--	NTPC ADS/ IS 10810 Part 58	NTPC ADS	--do--		P	---	--	
1.11	Filler Material (As applicable	1.Type	MA	Verfy	As per manuf. Std.	----	NTPC ADS	NTPC ADS	QCR	-	P	--	--	
1.12	Wooden Drum	1. Dimension	MI	Meas	Manuf. Std.	--	IS 10418	IS10418	--do--		P	--	--	
		2. Anti termite treatment	MI	Chem	Cable manuf. std	--	CABLE MANUF. STD.	CABLE MANUF. STD.	COC		V	V	V	COC from drum manuf.
1.13	Steel Drum	1. Dimension	MI	Meas	--do--	--	--do--	--do--	QCR		P	--	--	
		2. Surface finish	MI	Meas	--do--	--	--do--	--do--	--do-		P	--	--	
B	**Process & Stage Inspection**													
2.01	Wire Drawing	1.Surface finish	MA	Visual	One sample/Setting of each size	--	SHOULD BE SMOOTH & FREE FROM SCRATCHES	SHOULD BE SMOOTH & FREE FROM SCRATCHES	QCR		P	--	--	
		2. Wire Diameter	MA	Meas	--do--	--	NTPC ADS	NTPC ADS	--do-		P	--	--	
		3. Tensile test	CR	Mech	--do--	One sample / Setting of each size	IS 8130	IS 8130	--do--		P	V	V	Refer Sl. No.3.03(iii)
		4. Wrapping test	CR	Mech	--do--	--do--	--do--	--do--	--do--		P	V	V	--do--
		5. Annealing Test	CR	Mech	--do--	--do--	--do--	--do--	-do--		P	V	V	--do--
2.02	Bunching / stranding	1. No. of wires	MA	Meas	--do--	--	NTPC ADS	NTPC ADS	--do-		P	--	--	
		2.Dia of wire	MA	Meas	-do--	--	--do--	--do--	--do--		P	--	--	
		3. Dimension of Conductor	MA	Meas	--do--	--	--do--	--do--	--do--		P	--	--	
		4.Direction of lay	MA	Visual	--do--	--	--do-	--do--	--do--		P	--	--	
		5.Records of strand breakage / welding during conductor stranding	MA	Verify	--do--	--	IS 8130	IS8130	--do--		P	--	--	
		6.Surface finish	MA	Visual	--do--	--	--do--	--do--	--do--		P	--	--	
		7. DC Resistance	CR	Meas	--do--	--	IS8130/NTPC ADS	IS8130/ NTPC	--do--		P	--	--	

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NTPC	Item:- HT POWER FRLS CABLE (3.3 KV TO 33 KV)	STANDARD QUALITY PLAN (CONFORMING TO CODE:IS 7098 Part-II AND NTPC TECHNICAL SPECIFICATION)	QP. NO. 0000-999- QOE- S-042 REV-02 DATE : Page 4 of 9	REVIEWED BY AMAN PANDEY RAJESH SHARMA S K LAL DINESH KUMAR	APPROVED BY K K OJHA Dt.....	4

Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C.	N	
1	2	3	4	5	6		7	8	9	10				11
								ADS						
2.03	Insulation extrusion (Conductor screen, XLPE Insulation & Insulation screen)	1. Surface finish	MA	Visual	One sample / Setting of each size	--	Extrusion should be by triple extrusion technique Method of curing for cables shall be "dry curing / gas curing/ steam curing" up to 11KV & " dry curing/ gas curing " for 19/33 KV Insulation extrusion area should be preferably clean & dust free. Extrusion Should be smooth. No porosity is permitted	QCR-		P	-	--	
		2.Thickness	CR	Meas	--do--	--	NTPC ADS	NTPC ADS	QCR		P	--	--	
		3. Eccentricity & Ovality	CR	Meas	--do--	--	Eccentricity of core shall not exceed 10% and Ovality not to exceed 2%	Eccentricity of core shall not exceed 10% and Ovality not to exceed 2%	--do--		P	-- -	--	
		3.Hot Set	CR	Mech	One sample/Setting of each size	--	IS 7098- Part II	IS 7098- Part II	--do--		P	--	--	Sample is to be taken from both top & bottom end
2.04	Copper Taping	1. Thickness	CR	Mech	--do--	--	NTPC ADS	NTPCADS	--do-		P	--	--	
		2. No. of tape	CR	Meas	--do--	--	--do--	--do-	--do--		P	--	--	
		3. Tape application overlap	CR	Meas	--do--	--	--do--	---do--	--do--		P	--	--	
		4. Core identification tape	CR	Visual	--do--	--	--do--	---do--	--do--		P	--	--	
2.05	Laying up	1. Core sequence	MA	Visual	--do--	--	IS 7098- Part II	IS 7098- Part II	--do--		P	--	--	
		2. Direction of lay	MA	Visual	--do--	--	-do-	--do--	--do--		P	--	--	
		3. Lay Length	MA	Meas	--do--	--	Manuf. Std.	Manuf. Std	--do-					
		4. Dia over laid up core	MA	Meas	--do--	--	NTPC ADS	NTPC ADS	--do--		P	--	--	
2.06	Inner Sheath	1.Colour	MA	Visual	-do--	-	--do--	--do--	--do--		P	--	--	
		2.Thickness	MA	Meas	One sample/Setting of each size	-	NTPC ADS	NTPC ADS	--do--		P	--	--	
		3.Dia over inner sheath	MI	Meas	--do--.	-	--do--	---do--	--do--		P	--	--	
2.07	Armouring (As Applicable)	1.Dimension	MA	Meas	--do--	-	--do--	--do--	--do--		P	--	--	
		2.No. of wires / strip	MA	Meas.	--do--	-	--do--	--do--	--do--		P	--	--	

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NTPC	Item:- HT POWER FRLS CABLE (3.3 KV TO 33 KV)	STANDARD QUALITY PLAN (CONFORMING TO CODE:IS 7098 Part-II AND NTPC TECHNICAL SPECIFICATION)	QP. NO. 0000-999- QOE- S-042 REV-02 DATE : Page 5 of 9	REVIEWED BY AMAN PANDEY RAJESH SHARMA S K LAL DINESH KUMAR	APPROVED BY K K OJHA Approved Dt.	5

Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C	N	
1	2	3	4	5	6		7	8	9	10				

		3. Direction of lay	MA	Visual	--do--	--	IS 7098- Part II	IS 7098- Part II	QCR		P	--	--	
		4.Coverage & Quality of armouring	MA	Meas.	100%	--	Min. area of coverage of armouring shall be 90%. The gap between amour wires / formed wires shall not exceed one amour wire/ formed wire space & there shall be no cross over/ over riding of amour wire / formed wire. Zn rich paint shall be applied on amour joint surface of G.S. Wire /formed wire. The breaking load of amour wire joint shall not be less than 95% of that amour wire / formed wire. (As per NTPC specification)		QCR		P	--	--	
		5 Dia over armouring	MA	Meas.	One sample/Setting of each size	--	NTPC ADS		--do--		P	--	--	--
2.08	Outer Sheath	1. Surface finish	MA	Visual	100%	--	Pimple, Fish Eye, Burnt particles, Blow Hole not permitted. Repairing on outer sheath not permitted. (As per NTPC specification) PVC FRLS compound shall be preferably loaded in to extruder by suction method.		--do--		P	--	--	
		2.Colour of sheath	MA	Visual	One sample/Setting of each size	--	NTPC ADS	NTPC ADS	--do--		P	--	--	
		3. Dia over outer sheath	MA	Meas	--do--	--	NTPC ADS	NTPC ADS	--do--		P	--	--	
		4.Thickness of outer sheath	CR	Meas	--do--	-	--do--	--do--	--do--		P	--	--	
		5. Embossing quality	MA	Visual	100%	-	Following shall be embossed or printed on outer sheath at every 5 meter length of cable in addition to identification as per IS:(1).Batch number or Drum number (2) IS 1554 –Part-I (3) Cable size, (4) Voltage grade (5) word "FRLS" (marking shall be legible & indelible).		--do--		P	--	--	
		6. Sequencial marking	MA	Visual	Full length	--	Sequential marking of length of cable in meters at every one meter is to be embossed or printed. Embossing or printing shall be progressive, automatic, in line & marking shall be legible & indelible. In addition, Drum No. is also to be embossed/printed on full cable length		--do--		P	--	--	
C	**Finished Cables**													
3.01	Type Test clearance from NTPC Engineering to be verified at the time of final inspection.													
3.02	Routine Tests	1.High Voltage test at room temperature	CR	Elect	100%	100%	NTPC ADS / IS 7098- Part II	NTPC ADS	Test certificate	✓	P	W	W	Refer note 2

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Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C	N	
1	2	3	4	5	6		7	8	9	10				11
		2.Conductor Resistance	CR	Elect	100%	100%	NTPC ADS / IS 7098- Part II	NTPC ADS	--do--	✓	P	W	W	Refer note 2
		3. Partial Discharge Test	CR	Elect.	100%	100%	NTPC ADS / IS 7098- Part II	NTPC ADS	-do--	√	P	W	W	For Screened cable only/ Refer note 2
3.03	**Acceptance Tests**													
3.03 (i)	Construction of finished Cable	1. OD of Cable	MA	Meas.	Each type & size of cables as per sampling plan of IS 7098- Part II		NTPC ADS	NTPC ADS	--do--	✓	P	W	W	
		2. Laying of core	CR	Visual	--do--		NTPC ADS / IS 7098- Part II	NTPC ADS / IS 7098- Part II	--do--	✓	P	W	W	
		3. Core Identification	CR	Visual	--do--		--do--	--do--	--do--	✓	P	W	W	
		4. Colour of outer sheath & Inner sheath	MA	Visual	Each type & size of cables as per sampling plan of IS 7098- Part II		NTPC ADS	NTPC ADS	--do--	✓	P	W	W	
		5. Inner sheath thickness	CR	Meas	- do -		--do--	--do--	--do--	✓	P	W	W	
		6. Copper tape / Wire dimension with overlap (As applicable)	CR	Phy	--do--		NTPC ADS/ Min overlap 20%	NTPC ADS/ Min. overlap 20%	--do--	√	P	W	W	
3.03 (ii)	Armour wires/ Formed wires.	1.Dimensions	CR	Meas	Each type & size of cables as per sampling plan of IS 7098- Part II		NTPC ADS/ IS7098-II	NTPC ADS	Test Certific	✓	P	W	W	Test as applicable for Galvanized wires/ strips / Al wires
		2. No. of wires/ formed wire	CR	Mech	-- do --		--do--	--do--	--do--	✓	P	W	W	
		3. Tensile test	CR	Mech	--do--		IS 3975	IS 3975	--do--	✓	P	V	V	
		4. Elongation test	CR	Mech	--do--		--do--	--do--	--do--	✓	P	V	V	
		5.Torsion test (for round wires only)	CR	Mech	--do--		--do--	--do--	--do--	√	P	V	V	
		6. Wrapping test	CR	Mech	--do--		--do--	--do--	--do--	✓	P	V	V	
		7. Resistance test	CR	Mech	--do--		--do--	--do-	--do-	✓	P	V	V	
		8.Mass of Zinc coating	CR	Meas	--do--		--do--	--do--	--do--	✓	P	V	V	
		9. Uniformity of Zinc Coating	CR	Chem.	--do--		--do--	--do--	--do--	✓	P	V	V	
		10.Adhesion test	CR	Mech	--do--		--do--	--do-	--do--	✓	P	V	V	
		11.Freedom from defects	CR	Visual	--do--		--do--	--do--	--do--	✓	P	V	V	
3.03	Conductor	1.Resistance Test	CR	Elect	--do--		--do--	--do--	--do--	✓	P	W	W	

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Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C	N	
1	2	3	4	5	6		7	8	9	10				11
(iii)		2.Tensile test	CR	Mech	Each type & size of cables as per sampling plan of IS 7098(Part-11		IS 8130	IS 8130	Test Certific ate	✓	P	W	W	Test report of manufacturer to be reviewed as per Sl. No. 2.01 for Tensile test & wrapping test
		3.Wrapping test	CR	Mech	--do--		--do--	--do--	-do--	√	P	P	W	--do—
3.03 (iv)	XLPE Insulation & PVC Sheath	1.Thickness of insulation & sheath	CR	Meas.	--do-		NTPC ADS & IS 7098-Part II	NTPC ADS	--do--	✓	P	W	W	
		2.Tensile strength & elongation at break of insulation & outer sheath (before & after ageing)	CR	Mech	One sample per batch of offered lot irrespective of sizes		IS 7098-Part II	IS 7098-Part II		✓	P	V	V	MTR for Ageing Test of the offered lot shall be verified
		2(A).Tensile strength & elongation at break of insulation & outer sheath	CR	Mech	Each type & size of cables as per sampling plan of IS 7098(Part-11)		IS 7098-Part II	IS 7098-Part II		✓	P	W	W	
		3. Insulation resistance (Volume resistivity method)	CR	Elect	Each type & size of cables as per sampling plan of IS 7098-Part II		--do--	--do--	--do--	✓	P	W	W	
		4. Partial Discharge test	CR	Elect.	--do--		--do--	--do--	--do--	√	P	W	W	For Screened cable only
		5.High voltage test at room temperature	CR	Elect	Each type & size of cables as per sampling plan of IS 7098-Part II		--do--	--do--	--do--	✓	P	W	W	
		6.Thermal stability on outer sheath	CR	Chem	One sample of each offered lot of all offered sizes		-do--	--do--	--do--	✓	P	W	W	
		7. Hot Set Test for insulation	CR	Mech	Each type & size of cables as per sampling plan of IS 7098-Part II		IS 7098-Part I	IS 7098-Part II	--do--	✓	P	W	W	For XLPE insulation only
		8.Smoke density test on outer sheath	CR	Chem	One sample of each offered lot of all offered sizes		NTPC ADS & ASTMD2843	NTPC ADS	-do--	✓	P	W	W	Refer Note 3
		9.Acid gas generation test on	CR	Chem	--do--		NTPC ADS & IEC 60754-1	'NTPC ADS	--do--	✓	P	W	W	Refer Note 3

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एनटीपीसी NTPC	Item:- HT POWER FRLS CABLE (3.3 KV TO 33 KV)	**STANDARD QUALITY PLAN** (CONFORMING TO CODE:IS 7098 Part-II AND NTPC TECHNICAL SPECIFICATION)	QP. NO. 0000-999- QOE- S-042 REV-02 DATE : Page 8 of 9	REVIEWED BY AMAN PANDEY RAJESH SHARMA S K LAL DINESH KUMAR	APPROVED BY K K OJHA	8

Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C	N	
1	2	3	4	5	6		7	8	9	10				11
		outer sheath												
		10. Oxygen Index	CR	Chem	--do--		NTPC ADS/ IS 10810 Part 58	--do--	--do--	√	P	W	W	Refer Note 3
		11.Flammability test on finished cable	CR	Chem	One sample irrespective of sizes		NTPC ADS & IEC 60332 Part-3 (Category-B)	--do--	--do--	✓	P	W	W	
		12.Surface finish & length measurement.	CR	Visual & Meas	100% (COC from Manufacturer to be submitted for surface finish as per specification' s requirement)	one length of each offered lot of 25 drums of all sizes	(1) Drum number / Outer sheath extrusion batch number (2) IS 7098-Part II (3)Cable size, Voltage grade , Words " FRLS" & Screen Fault Current & duration at every 5 meter is to be embossed. Embossing shall be automatic, in line & marking shall be legible & indelible. (3) Sequential marking of length of cable at every meter length is to be embossed / printed. .(4) Manufacturer's identification as per IS . Embossing / printing shall be progressive, automatic, in line & marking shall be legible & indelible.	Test Certific ate	✓	P	W	W	Pimple, Fish Eye, Burnt particles, Blow Hole etc. not permitted. Repairing on outer sheath not permitted.
		13. Sequence of cores armour coverage, gap between two consecutive armour/ formed wire	CR	Visual & Meas	One length of each size	One length of each size	Min. area of coverage of armouring shall be 90%. The gap between armour wires / formed wires shall not exceed one armour wire/ formed wire space & there shall be no cross over/ over riding of armour wire / formed wire.	--do-	√	P	W	W	Zn rich paint shall be applied on armour joint surface of G.S. Wire /formed wire
		14. Measurement of Eccentricity & Ovality	CR	Meas.	--do--	--do--	Eccentricity of core shall not exceed 10% and Ovality not to exceed 2%	-do--	√	P	W	W	
4	Packing	1. Sealing	MA	Visual	100%	100%	(1) IS 7098-Part II (2) The surface of the drum and the outer most cable layer shall be covered with water proof cover. (3) Both the ends of cables shall be properly sealed with heat shrinkable PVC/ rubber caps secured by "U" nails.	QCR	✓	P	--	--		
4.01	Identification	NTPC Sealing	MA	Visual	100%	100%	Sealing shall be visible	QCR	√	P	V	V		

LEGEND:- *RECORDS, IDENTIFIED WITH "TICK" UNDER COLUMN "D" SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.

एनटीपीसी NTPC	Item:- HT POWER FRLS CABLE (3.3 KV TO 33 KV)	**STANDARD QUALITY PLAN** (CONFORMING TO CODE:IS 7098 Part-II AND NTPC TECHNICAL SPECIFICATION)	QP. NO. 0000-999- QOE- S-042 REV-02 DATE : Page 9 of 9	REVIEWED BY AMAN PANDEY RAJESH SHARMA S K LAL DINESH KUMAR	APPROVED BY K K OJHA	9

Sl. No	Component & Operations	Characteristics	Class	Type of check	Quantum of check		Reference Document	Acceptance Norms	Record Format	Agency				Remarks
					M	C/ N				D*	M	C	N	
1	2	3	4	5	6		7	8	9	10				11

Notes:	
1)	If the compound manufacturer is carrying out Ageing test , test report of compound manufacturer is to be reviewed. If the compound manufacturer is not carrying out ageing test, then cable manufacturer will carry out ageing test & the test report will be reviewed by NTPC (quantum of ageing test sample shall be one sample /batch)
2)	(a) In case of manufacturers / supplier who have supplied cables in the past through Corporate Centre:- Routine Test of manufacturer internal test report are to be verified by NTPC and Main Contractor at the time of final inspection. NTPC and Main Contractor will also witness routine tests on cables on 10% sample basis. (b) In case of manufacturers / supplier WHO HAVE NOT SUPPLIED cables in the past through Corporate Centre:- Routine Test of manufacturer internal test report are to be verified by NTPC at the time of final inspection. NTPC will witness routine tests on cables for the first order on 10% sample basis and Main Contractor will witness routine tests on cables for the first order on 100% basis.
3)	1. For Smoke Density rating test: if the test result without conditioning is within (-)10% of the maximum specified value, then, retesting is to be carried out with conditioning of samples as per standard and the test results after conditioning shall be final for acceptance/rejection. 2. For Acid Gas Generation test: if the test result without conditioning is within (-)10% of the maximum specified value, then, retesting is to be carried out with conditioning of samples as per standard and the test results after conditioning shall be final for acceptance/rejection. 3. For Oxygen Index test: if the test result without conditioning is within (+)7% of the minimum specified value, then, retesting is to be carried out with conditioning of samples as per standard and the test results after conditioning shall be final for acceptance/rejection. 4. In case the test results without conditioning do not meet the maximum/minimum specified value, the manufacturer may exercise the option of retesting the samples after conditioning as per standard.
LEGEND:	**NTPC ADS: NTPC approved data sheet, QCR: quality control records of cable manufacturer, CABLE MANUF STD- cable manufacturer's internal plant standard, MI: minor, MA: major, CR: critical, COC- certificate of conformance**

LEGEND:- *RECORDS, IDENTIFIED WITH "TICK" UNDER COLUMN "D" SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.

BHEL	ANNEXURE-A TO QAP	CUSTOMER: NTPC LIMITED	PROJECT TITLE: 2X250MW NSPCL BHILAI FGD & 3X660MW NPGCPL NABINAGAR STPP FGD	SPECIFICATION NUMBER: PE-TS-XXX-507-E001
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : 0000-999-QOE-S-042, R0	SPECIFICATION TITLE: TECH. SPEC. FOR HT XLPE POWER CABLES
		SYSTEM	ITEM: HT XLPE POWER CABLES	DOC. NO.

TYPE/ ACCEPTANCE/ ROUTINE TEST REQUIREMENTS

A. Type Test Conduction:

1. Tests for which "T" is indicated in the 'Test Conduction Required As' column below shall be conducted as Type Test.

2. Sampling:
a) Type test to be conducted on 1 drum for every 10 drums or less of each type and size of cable/ lot.
b) Electrical tests to be conducted on one drum of every size & voltage grade of cables.
c) FRLS test & Flammability Test to be conducted on every size & voltage grade of cables. Sampling quantity as per appendix –D of IS 7098-2, D2.2.

B. **Acceptance Test Conduction:**

1. Tests for which "A" is indicated in the 'Test Conduction Required As' column below shall be conducted as Acceptance tests.

2. Sampling:
a) Acceptance tests shall be as per 1 drum for every 10 drums or less of each type and size of cable/ lot.
b) FRLS test & Flammability Test to be conducted on every size & voltage grade of cables. Sampling quantity as per appendix –D of IS 7098-2, D2.2.

C. Routine Test Conduction:

1. Tests for which "R" is indicated in the 'Test Conduction Required As' column below shall be conducted as Routine tests.

2. Sampling: Routine tests shall be conducted on 100% cable drums.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
1.0	**Tests for Conductor**				
I.	Annealing test	For copper conductor only **T,**	**A**	IS 10810 Pt 1	***Internal in process Test Report to be furnished for acceptance test***
II.	Tensile test	For aluminium conductor only *(Not applicable for compacted circular or shaped conductor)*	**T, A**	IS 10810 Pt 2	
III.	Wrapping test	For aluminium conductor only *(Not applicable for compacted circular or shaped conductor)*	**T, A**	IS 10810 Pt 3	
IV.	Resistance test	For Al/Cu	**T, A, R**	IS 10810 Pt 5	

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S / VENDORS COMPANY SEAL

BHEL	ANNEXURE-A TO QAP	CUSTOMER: NTPC LIMITED	PROJECT TITLE: 2X250MW NSPCL BHILAI FGD & 3X660MW NPGCPL NABINAGAR STPP FGD	SPECIFICATION NUMBER: PE-TS-XXX-507-E001
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : 0000-999-QOE-S-042, R0	SPECIFICATION TITLE: TECH. SPEC. FOR HT XLPE POWER CABLES
		SYSTEM	ITEM: HT XLPE POWER CABLES	DOC. NO.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
2.0	**Tests for Armour Wires/Strips**				
I.	Measurement of dimensions	Applicable for Aluminium wire & GS wire/Strip	**T,A**	IS 10810 Pt 36	
II.	Tensile test	Applicable for Aluminium wire & GS wire/Strip	**T, A**	IS 10810 Pt 37	
III.	Elongation at break test	Applicable for GS wire/Strip only	**T, A**	IS 10810 Pt 37	
IV.	Torsion test	For GS round wire only **T,**	**A**	IS 10810 Pt 38	
V.	Winding test	For GS strip only	**T, A**	IS 10810 Pt 39	
VI.	Resistivity test	Applicable for Aluminium wire & GS wire	***T, A***	IS 10810 Pt 42	
VII.	Uniformity of Zinc coating test	For G. S. wires/Strip only	***T, A***	IS 10810 Pt 40	
VIII.	Mass of Zinc coating test	For G. S. wires/Strip only	***T, A***	IS 10810 Pt 41	
IX.	Wrapping Test	For Aluminium wires only	***T, A***	IS 10810 Pt 3	
3.0	**Physical Tests for XLPE Insulation & PVC sheath**				
I.	Test for thickness & Eccentricity	Applicable for XLPE insulation, HRPVC inner sheath & For *PVC ST2 inner/outer sheath only*	**T, A**	IS 10810 Pt 6	
II.	Tensile strength and elongation test at break	Applicable for XLPE insulation & For *PVC ST2 inner/outer sheath only*			
(a) B	efore ageing		**T, A**	IS 10810 Pt 7	
(b) Aft	er ageing		**T, A**	IS 10810 Pt 7	
III.	Ageing in air oven	Applicable for XLPE insulation & For *PVC ST2 inner/outer sheath only*	**T**	IS 10810 Pt 11	
IV.	Loss of mass in air oven test	For *PVC ST2 inner/outer sheath only*	**T**	IS 10810 Pt 10	
V.	Hot deformation test	For *PVC ST2 inner/outer sheath only*	**T**	IS 10810 Pt 15	
VI.	Heat shock test	For *PVC ST2 inner/outer sheath only*	**T**	IS 10810 Pt 14	
VII.	Shrinkage test	For XLPE insulation & For *PVC ST2 inner/outer sheath only*	**T**	IS 10810 Pt 12	
VIII.	Thermal stability test	For *PVC ST2 inner/outer sheath only*	**T**	IS 10810 Pt 60	
IX.	Hot set test	For XLPE insulation only	**T, A**	IS 10810 Pt 30	
X.	Water ab sorption (gravimetric) test	For XLPE insulation only	**T**	IS 10810 Pt 33	
XI.	Degree of cross-linking	For XLPE insulation only	**T**	IS 7098-II	

BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S / VENDORS COMPANY SEAL

BHEL	ANNEXURE-A TO QAP	CUSTOMER: NTPC LIMITED	PROJECT TITLE: 2X250MW NSPCL BHILAI FGD & 3X660MW NPGCPL NABINAGAR STPP FGD	SPECIFICATION NUMBER: PE-TS-XXX-507-E001
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : 0000-999-QOE-S-042, R0	SPECIFICATION TITLE: TECH. SPEC. FOR HT XLPE POWER CABLES
		SYSTEM	ITEM: HT XLPE POWER CABLES	DOC. NO.

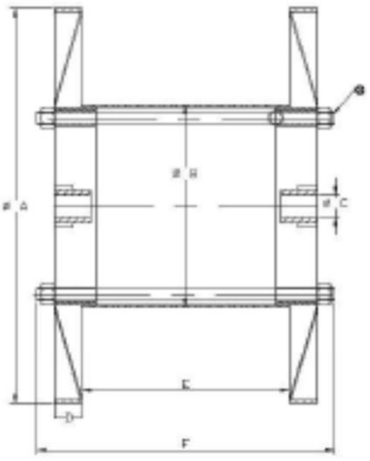
S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
4.0	**Tests On Extruded Semi-conducting Screen**				
I.	Test for Strippability	Applicable for Semi-conducting Strippable screen	**T**	IS 7098-II	Not applicable since it is bonded type
II.	Volume Resistivity	Applicable for Semi-conducting Strippable screen	**T**	IS 7098-II	
III.	Test for cross linking		**A**	IS 7098-II	
5.0	**Improved Fire performance (FR-LSH) Tests**				
I.	Oxygen index test	*For inner/outer sheath only*	**T, A**	IS 10810 Pt 58 / ASTMD 2863	*Sample shall be as per IS 7098,Part 2*
II.	Smoke density test	*For inner/outer sheath only*	**T, A**	ASTMD 2843	
III.	Acid gas generation test	*For inner/outer sheath only*	**T, A**	IS 10810 Pt 59 / IEC-754-1	
IV.	Temperature Index Test	*For inner/outer sheath only*	**T,A**	IS 10810 Pt 64 / ASTMD 2863	
6.0	**Flammability Tests**				
I.	Flammability test for bunched cables	For complete cable	**T,A**	IEC-60332 (Part-3)	
II.	Flammability test for single cable	For complete cable	**T,A**	IEC:60332 Part-1	
III.	Swedish chimney test	For complete cable	**A**	SEN SS 424 1475 (Class F3)	
IV.	Flammability test	For complete cable	**A**	IEEE: 60383	
7.0	**Electrical Tests**				
I.	High Voltage Test	For complete cable	**T, A, R**	IS 10810 Pt 45	
II.	Insulation Resistance Test (Volume resistivity method)	For complete cable	**T, A**	IS 10810 Pt 43	
III.	Partial discharge test (shall be carried out on full drum length)		**T,A,R**	IS 10810 Pt 46	
IV.	Bending Test followed by Partial Discharge test		**T**	IS 10810 Pt 50	
V.	Dielectric Power Factor Test (i) As a function of voltage (ii) As a function of temperature		**T**	IS 10810 Pt 48	
VI.	Heat Cycle Test		**T**	IS 10810 Pt 49	
VII.	Impulse Withstand Test		**T**	IS 10810 Pt 47	
VIII.	Thermal ageing test	For complete cable	**T**	IS 7098-II	
IX.	*Flammability Test*	*For PVC ST2 sheathed cable*	*T*	*IS 10810 Pt 53*	

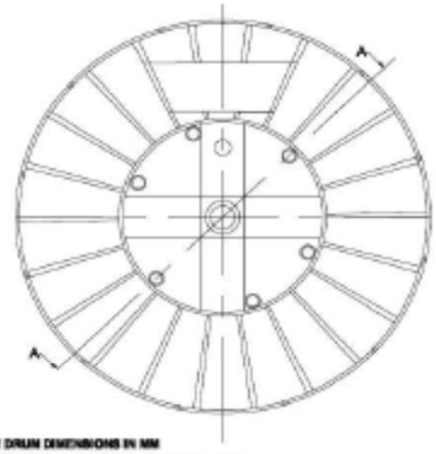
BHEL	PARTICULARS	BIDDER/ VENDOR	
	NAME		
	SIGNATURE		
	DATE		BIDDER'S / VENDORS COMPANY SEAL

BHEL	**TECHNICAL SPECIFICATION HT XLPE POWER CABLE 2 X 250MW NSPCL BHILAI FGD 3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

PACKING REQUIREMENT

Sl.no	DESCRIPTION
1	**Type of Packing (Wood/ Steel): Steel**
1.1	Item shall be fully covered with multi layered cross laminated colourless polyethylene sheet of at least 100 GSM and shall be packed inside steel drum as per below typical drawing.
1.2	Both the end of cables shall be properly sealed with heat shrinkable seal secured by 'U' nails so as to eliminate ingress of water during transportation, storage & erection.
1.3	A tag containing same information shall be attached to the leading end of the cable.





APPROXIMATE DRUM DIMENSIONS IN MM

ALL DIMENSIONS AND VALUES ARE TYPICAL AND ARE DEPENDENT ON CABLE WEIGHT.

A	FLANGE
B	BARREL
C	CENTRAL HOLE
D	FLANGE
E	TRAVERSE
F	GROSS WIDTH
G	STUD SIZE

2	**Quality of wood:**
	As per IS 10418 for wooden drums
3	**Cushioning material and moisture absorber:**
	Not applicable
4	**Packing slip & holder:** NA

BHEL	**TECHNICAL SPECIFICATION HT XLPE POWER CABLE 2 X 250MW NSPCL BHILAI FGD 3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

DOCUMENTATION REQUIREMENT

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY ALL THE BIDDERS ALONG WITH THE BID

Sl. No.		DOCUMENT TITLE
1		PQR CREDENTIALS ALONG WITH FILLED "Sub-Qualifying Requirement of HT Cables" FORM
2		COMPLIANCE SHEET

DRAWINGS & DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER AFTER AWARD OF CONTRACT ALONG WITH SUBMISSION SCHEDULE

Sl. No.	Document No.	Document Title	SUBMISSION SCHEDULE			
			Vendor submission (Days)*	BHEL Comment (Days)	Vendor submission (Days) #	BHEL & Customer comment/ approval (Days)
I		**Primary documents**				
1	PE-V0-XXX-507-E101	Datasheet and Cross Section Drawings for Power Cables (HT)	7	3	2	18
2	PE-V0-XXX-507-E907	QAP for HT Power cables	7	3	2	18
II		**Secondary documents**				
1	-	Type Test Report for Power cable (HT)	7**	3	2	18

NOTES:

a) * 1st submission within indicated days from date of purchase order.

b) # Submission (within indicated days) after incorporating all BHEL comments.

c) Primary documents shall be considered for Delay analysis

d) XXX' in document no. is to be read as 468 (for 2 X 250MW NSPCL BHILAI FGD) & 457 (for 3 X 660MW NPGCPL NABINAGAR STPP FGD)

e) **
1. If Type Test Report is available and Type test conduction is not required as per technical Specification.
2. If Type Test Report is not available as per technical Specification, then within 1 week after conduction of type test for the type tests to be conducted on cable as per Annexture to Quality plan after approval of all other primary documents

DRAWINGS & DOCUMENTS TO BE SUBMITTED AS FINAL/AS-BUILT DOCUMENT

Sl. No.		DOCUMENT TITLE
1		APPROVED DOCUMENTS
2		APPROVED QUALITY PLAN.
3		ALL TEST CERTIFICATES

	TECHNICAL SPECIFICATION HT XLPE POWER CABLE 2 X 250MW NSPCL BHILAI FGD 3 X 660MW NPGCPL NABINAGAR STPP FGD	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

COMPLIANCE CERTIFICATE	
1	It is hereby confirm that the technical specification (sheet 1 to 34) has been read, understood. We confirm compliance to the tender specification including any clarification and amendments without any deviation.
2	It is hereby declared that any technical submittals which was not specifically asked for in NIT shall stand withdrawn.

Signature of authorised Representative

Name and Designation :

Name & Address of the Bidder

Date

बी एच ई एल BHEL	**TECHNICAL SPECIFICATION** **HT XLPE POWER CABLE** **2 X 250MW NSPCL BHILAI FGD** **3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

UNPRICED SCHEDULE

Sr. No.	Item code	Item description	Unit	Order Quantity (metres)	Drum Length (Meters)	Total Quantity (metres)	UNIT PRICE (EX-WORKS) (Rs)	TOTAL PRICE (EX-WORKS)	REMARKS
2 X 250MW NSPCL BHILAI FGD									
1.0		6.6/6.6 KV AL. CONDUCTOR/ XLPE INSULATED/ ARMOURED/ UNEARTHED GRADE POWER CABLE							
1.1	507-27109-A	1C-500	MTR	1,200	600 metre	1,200			2 drums
3 X 660MW NPGCPL NABINAGAR STPP FGD									
2.0		11/11 KV AL. CONDUCTOR/ XLPE INSULATED/ UNARMOURED/ UNEARTHED GRADE POWER CABLE							
2.1	507-27022-A	1C-500	MTR	2,250	750 metre	2,250			3 drums

Notes

1	Tolerance on individual drum length shall be ±5%.
2	Overall tolerance on total dispatched quantity of each size shall be (-) 2% and (+) 0% . Cables consumed for testing and inspection shall be to bidder's account.
3	For each individual cable size, one short length of not less than 20 0m may be accepted only in the final drum length to complete the supply (except where the total ordered quantity is one single drum length). The overall tolerance limits stipulated above shall continue to apply (in case short lengths are accepted).
4	In case of the quantities cleared by BHEL for manufacturing are manufactured and offered for inspection by successful bidder in more than one batch, BHEL reserves the right to witness type testing on all batches without any price implications.
5	Unit price of cables quoted by bidder shall be inclusive of type test charges. No separate charges shall be payable for type tests.
6	For PVC formulae & Indices; please refer "https://ieema.org/wp-content/uploads/2020/07/MV-Cable_PV-Clause_Final_Apr-23-1.pdf" or latest amendment (if any) with upper ceiling limit of 20% & no negative ceiling limit.

	TECHNICAL SPECIFICATION **HT XLPE POWER CABLE** **2 X 250MW NSPCL BHILAI FGD** **3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-TS-XXX-507-E001 Issue No: 01 Rev. No. 00 Date :08.04.2024

PRE QUALIFICATION REQUIREMENT (TECHNICAL)

BHEL	**PRE-QUALIFICATION REQUIRMENTS FOR HT XLPE POWER CABLES** **2X250 MW NSPCL BHILAI FGD PROJECT** **3 X 660MW NPGCPL NABINAGAR STPP FGD**	PE-PQ-468-507-E011 REVISION NO. 00 DATE 10/04/2024 SHEET NO. 1 OF 1

ITEMS: HT XLPE Power Cable **SCOPE:** Supply : YES; Erection & Commissioning : NO;	
1	Vendor should be a manufacturer of HT power cables.
2	Availability of test reports on HT XLPE FRLS power cables to establish in-house capability to carry out all routine, type & acceptance tests as per relevant IS/ International Standards.
3	Capacity of manufacturing 3KM of HT XLPE power cables per month.
4	Manufactured and supplied at least one (1) KM of flame-retardant low smoke cables of any voltage level.
5	Manufactured and supplied HT XLPE power cable sizes of minimum 500 sq. mm for single core cable.
6	Manufactured and supplied at least 3KM 33kV/11kV/6.6 kV /3.3 kV grade XLPE power cables in one single order.
7	Minimum two (2) nos. purchase orders for HT XLPE Power cables shall be submitted which should not be more than five (5) years old from the date of techno-commercial bid for establishing continuity in business.

Notes:

1. Considération of offer shall be subject to customer's approval of bidders, if applicable.
2. Bidder to submit all supporting documents in English. If documents submitted by bidder are in language other than English, a self-attested English translated document should also be submitted.
3. Notwithstanding anything stated above, BHEL reserves the right to assess the capabilities and capacity of the bidder to perform the contract, should the circumstances warrant such assessment in the overall interest of BHEL.
4. After satisfactory fulfillment of all the above criteria/ requirement, offer shall be considered for further evaluation as per NIT and all the other terms of the tender.

PREPARED BY	CHECKED BY	REVIEWED BY	APPROVED BY
NAME: VINEETA/ ALOK VATS DESIGNATION: DY. MGR. (E)/ ENGINEER (E)	NAME: AYAN SAHA DESIGNATION: DGM (E)	NAME: SANDEEP LODH DESIGNATION: AGM (E)	NAME: DEBASISA RATH DESIGNATION: DH (E)

CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन

MAIN CONTRACTOR'S PROPOSAL CUM EVALUATION REPORT

मुख्य संविदाकार प्रस्ताव सह मुल्यांकन रिपोर्ट

Ref No: संदर्भ सं.:			***Date:*** तिथिः		
i.	***Main Contractor*** मुख्य संविदाकार				
ii.	***Project*** परियोजना				
iii.	***Package Name*** पैकेज का नाम		***Package No*** पैकेज सं.		
iv.	***Proposed Item/Scope of Sub-contracting*** उप-संविदा(अनुबंध) का प्रस्तावित मद/ दायरा				
v.	***Item covered under*** *निम्नलिखित के अंतर्गत शामिल मद*	***Schedule-1*** */अनुसूची-* ***1***	☐	***As per contract clause No-*** *अनुबंध के अनुसार खंड सं.--* ***-***	
		Schedule-2 *अनुसूची-* ***-2***	☐		
vi.	***If item is Schedule-1 and proposed sub-vendor is indigenous, Main Contractor to explain how the contractual provisions will be fulfilled*** /यदि मद अनुसूची **-1** है और प्रस्तावित उप-विक्रेता स्वदेशी है, तो मुख्य संविदाकार को स्पष्ट करना होगा कि संविदा/अनुबंध के प्रावधान कैसे पूरे किए जाएंगे				
vii.	***Name and Address of the proposed Sub-vendor's works*** /प्रस्तावित सब-वेंडर का नाम तथा पता				
viii.	***PO placement date/ Start of manufacturing (if self-manufactured) as per L2 network*** **पीओ नियोजन की तिथि / एल-** 2 **नेटवर्क के अनुसार विनिर्माण (यदि स्व-निर्मित है) की शुरुआत**				

ix.	***Item Description (Type/Size/Rating/Scope of Sub-Contracting)*** मद का विवरण (प्रकार / आकार / रेटिंग / उप-अनुबंध का दायरा)	***Total quantity of proposed item envisaged in this package (Nos/ Running Meters/ Kgs/ Tons etc)*** इस पैकेज में परिकल्पित प्रस्तावित मद की कुल मात्रा (संख्या / क्रियाशील मीटर / किलोग्राम / टन आदि)	***Quantity proposed to be procured from proposed sub-vendor (Nos/ Running Meters /Kgs /Tons etc)*** प्रस्तावित उप-विक्रेता (संख्या / क्रियाशील मीटर / किलोग्राम / टन आदि) से खरीदी जाने वाली मात्रा	***Timeline for quantity requirements as per project schedule & whether the proposed Sub-vendor equipped with adequate capacity to supply proposed order quantity in time*** / परियोजना समय सूची के अनुसार मात्रा आवश्यकताओं के लिए समय-सीमा और क्या प्रस्तावित उप-विक्रेता समय पर प्रस्तावित मांग की मात्रा की आपूर्ति करने में पूरी तरह से सक्षम है

x.	***Supply experience of the proposed sub-vendor (including supplies to Main Contractor, if any) for similar item/scope of sub-contracting, for last 3 years (Note:- Only relevant experience details w.r.t. proposed item/scope of subcontracting to be brought out here)*** पिछले **3** वर्षों के लिए उप-अनुबंध के समान मद / दायरे के लिए प्रस्तावित सब-वेंडर (मुख्य संविदाकार हेतु आपूर्ति, यदि कोई हो, सहित) का आपूर्ति अनुभव (नोट: - उप-अनुबंध के प्रस्तावित मद / दायरे के संबंध में केवल प्रासंगिक अनुभव के विवरण का उल्लेख हो

एनटीपीसी NTPC	**CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन** **MAIN CONTRACTOR'S PROPOSAL CUM EVALUATION REPORT** **मुख्य संविदाकार प्रस्ताव सह मुल्यांकन रिपोर्ट**

	Project/Package परियोजना/पैकेज	***Customer Name*** ग्राहक का नाम	***Supplied Item (Type/Rating/Model /Capacity/Size etc)*** आपूर्त्तित मद (प्रकार/रेटिंग /मॉडल /क्षमता/आकार आदि)	***PO ref no/date*** पीओ संदर्भ सं. /तिथि	***Supplied Quantity*** आपूर्ति की मात्रा	***Date of Supply*** आपूर्त्ति की तिथि

We confirm that as per our assessment, the proposed sub-vendor has requisite capabilities & supply experience and is suitable for supplying the proposed item/scope of sub-contracting/हम अपने आकलन के अनुसार इस बात की पुष्टि करते हैं कि, प्रस्तावित उप-विक्रेता के पास अपेक्षित क्षमता और आपूर्ति करने का अनुभव है और उप-अनुबंध के दायरे /प्रस्तावित मद की आपूर्ति के लिए उपयुक्त है।

Name: नाम:		***Desig:*** पद:		***Contact No:*** दूरभाष सं.:		***Sign:*** हस्ताक्षर:		***Date:*** तिथि:	

Company's Seal/Stamp:- कंपनी का मुहर:-

एनटीपीसी NTPC	**CORPORATE QUALITY ASSURANCE/ कॉरपोरेट गुणवत्ता आश्वासन** **SUB-VENDOR QUESTIONNAIRE/ सब-वेंडर प्रश्नावली**

i.	***Item/Scope of Sub-contracting*** **उप-संविदा(अनुबंध) का मद/ दायरा**			
ii.	***Address of the registered office*** पंजीकृत कार्यालय का पता		***Details of Contact Person*** संपर्क व्यक्ति का विवरण ***(Name, Designation, Mobile, Email)*** (नाम, पदनाम, मोबाइल, ईमेल)	
iii.	***Name and Address of the proposed Sub-vendor's works where item is being manufactured*** प्रस्तावित उप-विक्रेता के कार्यों का नाम और पता, जहां मद का निर्माण किया जा रहा है		***Details of Contact Person:*** संपर्क व्यक्ति का विवरण ***(Name, Designation, Mobile, Email)*** (नाम, पदनाम, मोबाइल, ईमेल)	
iv.	***Annual Production Capacity for proposed item/scope of sub-contracting*** **उप-संविदा(अनुबंध)** के प्रस्तावित मद / दायरे के लिए वार्षिक उत्पादन क्षमता			
v.	***Annual production for last 3 years for proposed item/scope of sub-contracting*** **उप-संविदा(अनुबंध)** के प्रस्तावित मद / दायरे के लिए पिछले 3 वर्षों का वार्षिक उत्पादन			
vi.	***Details of proposed works*** **प्रस्तावित कार्यों का विवरण**			
1.	***Year of establishment of present works*** वर्तमान फैक्टरी की स्थापना का वर्ष			
2.	***Year of commencement of manufacturing at above works*** उपरोक्त फैक्टरी में निर्माण कार्य शुरू होने का वर्ष			
3.	***Details of change in Works address in past (if any*** पूर्व में फैक्टरी स्थल में परिवर्तन का विवरण (यदि कोई हो)***)***			
4.	***Total Area*** कुल क्षेत्र			
	Covered Area शामिल क्षेत्र			
5.	***Factory Registration Certificate*** फैक्टरी पंजीकरण प्रमाण पत्र		***Details attached at Annexure – F2.1*** विवरण अनुलग्नक- एफ 2.1 पर संलग्न है	
6.	***Design/ Research & development set-up*** डिजाइन / अनुसंधान और विकास सेटअप ***(No. of manpower, their qualification, machines & tools employed etc.)*** (श्रमिकों की संख्या, उनकी योग्यता, मशीन और उपलब्ध उपकरण आदि)		***Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design)*** ***Details attached at Annexure – F2.2*** ***(if applicable)*** लागू / लागू नहीं, अगर विनिर्माण मुख्य संविदाकार / खरीददार के डिजाइन के अनुसार है) विवरण अनुलग्नक –एफ 2.2 पर संलग्न है। (यदि लागू हो)	
7.	***Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc)*** मैनपावर विवरण के साथ समग्र संगठन का चार्ट(डिजाइन / विनिर्माण / गुणवत्ता आदि)		***Details attached at Annexure – F2.3*** विवरण अनुलग्नक – F2.3 में संलग्न है।	

8.	***After sales service set up in India, in case of foreign sub-vendor(Location, Contact Person, Contact details etc.)*** भारत में बिक्री सेवा की स्थापना के बाद, विदेशी उप-विक्रेता के मामले में(स्थल , संपर्क व्यक्ति, संपर्क विवरण आदि)	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.4*** विवरण अनुलग्नक -2.4 पर संलग्न है।
9.	***Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any*** फ्लोचार्ट सहित विनिर्माण प्रक्रिया निष्पादन योजना , जिसमें आउटसोर्स प्रक्रिया, यदि कोई हो, सहित कच्चे माल से तैयार उत्पाद तक विनिर्माण के विभिन्न चरणों को दर्शाया गया हो,	***Details attached at Annexure – F2.5*** विवरण अनुलग्नक - F2.5में संलग्न है।
10.	***Sources of Raw Material/Major Bought Out Item*** कच्चे माल के स्रोत / खरीदे हुए मुख्य मद	***Details attached at Annexure – F2.6*** विवरण अनुलग्नक - F2.6में संलग्न है।
11.	***Quality Control exercised during receipt of raw material/BOI, in-process , Final Testing, packing*** कच्चे माल / खरीदे हुए मद, प्रक्रियाबद्ध, अंतिम परीक्षण, पैकिंग करते समय गुणवत्ता नियंत्रण	***Details attached at Annexure – F2.7*** विवरण अनुलग्नक - F2.7 पर संलग्न है
12.	***Manufacturing facilities (List of machines, special process facilities, material handling etc.)*** विनिर्माण सुविधा(मशीनों की सूची , विशेष प्रक्रिया सुविधाएं, सामग्री रख-रखाव आदि)	***Details attached at Annexure – F2.8*** विवरण अनुलग्नक - F2.8में संलग्न है।
13.	***Testing facilities (List of testing equipment)*** परीक्षण सुविधाएं(परीक्षण उपकरण की सूची)	***Details attached at Annexure – F2.9*** विवरण अनुलग्नक – F2. 9 में संलग्न है।
14.	***If manufacturing process involves fabrication then-*** यदि निर्माण प्रक्रिया में फेब्रिकेशन की गई है तो-	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.10*** विवरण अनुलग्नक - F2.10में संलग्न है। ***(if applicable)*** लागू / लागू नहीं
	List of qualified Welders पात्र वेल्डर की सूची	
	List of qualified NDT personnel with area of specialization विशेषज्ञता के क्षेत्र सहित पात्र एनडीटी कार्मिकों की सूची	
15.	***List of out-sourced manufacturing processes with Sub-Vendors' names & addresses*** सब-वेंडर द्वारा बाह्य स्रोतों (उनके नाम और पते सहित)से करवाएं गए निर्माण प्रक्रियाओं की सूची	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure. –F2.11*** विवरण अनुलग्नक - F2.10में संलग्न है। ***(if applicable)*** (यदि लागू हो)
16.	***Supply reference list including recent supplies*** नवीनतम आपूर्ति सहित आपूर्ति संदर्भ सूची	***Details attached at Annexure – F2.12*** विवरण अनुलग्नक - F2.12 में संलग्न है। ***(as per format given below)*** (नीचे दिए गए प्रारूप के अनुसार)

Project/ package परियोजना /पैकेज	***Customer Name*** ग्राहक का नाम	***Supplied Item (Type/Rating/Model /Capacity/Size etc)*** आपूर्ति की गई वस्तु (प्रकार / रेटिंग / मॉडल / क्षमता / आकार आदि)	***PO ref no/date*** पीओ संदर्भ सं. / तिथि	***Supplied Quantity*** आपूर्ति की मात्रा	***Date of Supply*** आपूर्ति की तारीख

17.	***Product satisfactory performance feedback letter/certificates/End User Feedback*** उत्पाद के संतोषजनक प्रदर्शन संबंधी फीडबैक पत्र / प्रमाण पत्र / अंतिम उपयोगकर्ता फ़ीडबैक	***Attached at annexure - F2.13*** अनुलग्नक F2. 3पर संलग्न है

18.	***Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product (similar or higher rating)*** प्रस्तावित उत्पाद (एक समान या उच्च रेटिंग वाले) के लिए टाइप टेस्ट रिपोर्ट (टाइप टेस्ट विवरण, रिपोर्ट संख्या, एजेंसी, जांच की तारीख) का सारांश नोट: - रिपोर्ट प्रस्तुत करने की आवश्यकता नहीं है ***Note:- Reports need not to be submitted***	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.14*** विवरण अनुलग्नक - F2.1 4में संलग्न है ***(if applicable)*** (यदि लागू हो)
19.	***Statutory / mandatory certification for the proposed product*** प्रस्तावित उत्पाद के लिए वैधानिक / अनिवार्य प्रमाणीकरण	***Applicable / Not applicable*** लागू / लागू नहीं ***Details attached at Annexure – F2.15 (if applicable)*** (यदि लागू हो)
20.	***Copy of ISO 9001 certificate*** आईएसओ 9001 प्रमाण पत्र की प्रति ***(if available***(यदि उपलब्ध हो)	***Attached at Annexure – F2.16*** अनुलग्नक में संलग्न - F2.1 6 है
21.	***Product technical catalogues for proposed item (if available)*** प्रस्तावित मद के लिए उत्पाद तकनीकी कैटलॉग (यदि उपलब्ध हो)	***Details attached at Annexure – F2.17*** विवरण अनुलग्नक - F2.1 7 में संलग्न है

Name: ***नाम:***		***Desig:*** ***पद:***		***Sign:*** ***हस्ताक्षर:***		***Date:*** ***तिथि:***	

Company's Seal/Stamp:- कंपनी की मुहर / मोहर: -