

RATE CONTRACT

TECHNICAL SPECIFICATION FOR LT PVC CONTROL CABLE

SPECIFICATION No. PE-TS-999-507-E003
ISSUE NO. 01
REV NO. 01



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



TECHNICAL SPECIFICATION
LT PVC CONTROL CABLE
(RATE CONTRACT)

PE-TS-999-507-E003

Issue No: 01

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Date :20.09.2025

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SCOPE

SCOPE OF THIS PACKAGE COVERS THE FOLLOWING:

SL.NO	PARAMETERS	REQUIREMENT
1	Supply Including Design, Engineering, Manufacturing of LT PVC Control 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

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	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 equipment confirms in all respects to high standards of design, engineering and workmanship.
2	Bidder shall also ensure that the offered equipment 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.
7	Bidder shall furnish Type Test Certificate of specified Type Test as per quality plan which has been conducted within period of 10 years i.e. from 14.11.2024 up to 15.11.2014 . These reports should be for the tests conducted on the LT PVC Control 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.
8	Bidder shall confirm compliance with the Quality Plan attached with the specification without any deviations. At contract stage, the Quality Plan as enclosed in the technical specification is to be appended with cover sheet bearing document number and description. The signed and stamped copy of the same shall be submitted to BHEL without making any changes in the contents of the document. There shall be no commercial implication to BHEL on account of minor changes in QP during contract stage.
9	Equipment must be safe, reliable and easy to maintain at all operating condition

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TECHNICAL DATA - PART - A			
SL.NO	DESCRIPTION	UOM	DETAIL
1.0	DESIGN CODES & STANDARDS		
1.1	Standard applicable in general (Latest amendment to be referred if any)		IS:1554 (Part-1)
1.2	Current rating of cables		As per IS:3961 (P-2)
1.3	Short circuit rating		IEC 60949
1.4	Conductor		IS: 8130
1.5	PVC Insulation		IS 1554 (Part-1)
1.6	Inner sheath		IS 1554 (Part-1)
1.7	Outer sheath		IS 1554 (Part-1)
1.8	Core Identification (Upto 5 core)		Colour coding as per IS 1554 (Part-1)
1.9	Core Identification (Above 5 core)		By numbering as per IS 1554 (Part-1). Insulation to have black colour.
1.10	Armour		Galvanised Steel Round Wire/ Galvanised Steel Formed Wire Conforming to : (i) Type 'b' as per Table-5 of IS 1554-I and (ii) IS 3975; as per project requirements.
2.0	DESIGN /SYSTEM PARAMETERS		
2.1	Type of Cable		Flame Retardant-Low Smoke (FR-LSH) LT CABLE
2.2	Voltage Grade		1.1 kV
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		Annealed Bare Copper (ABC)
3.1.2	Grade		Annealed high conductivity
3.1.3	Class		Class 2 (Stranded)
3.1.4	Shape		Circular

3.1.5	Compaction		Compacted
3.1.6	Cable Size	sq.mm	As per unpriced 'price schedule'
3.2	PVC INSULATION		
3.2.1	Nominal thickness of insulation	mm	As per IS: 1554 (Part-1) Table-2
3.2.2	Material		Extruded PVC Type-A
3.2.3.1	Continuous withstand temperature	deg. C	70
3.2.3.2	Short-circuit withstand temperature	deg. C	160
3.2.4	Volume Resistivity	ohm cm	1X10 ¹³ ohm cm at 27 deg C 1X10 ¹⁰ ohm cm at 70 deg C
3.3	Extrusion		Sleeve extrusion not permitted.
3.3.1	Method of extrusion		Pressure Extruded / Vacuum Extruded
3.4	CORE IDENTIFICATION		As per IS
3.5	INNERSHEATH		
3.5.1	Thickness of inner sheath		As per IS 1554 (Part-1) Table-4
3.5.2	Material		Extruded PVC Type ST-1
3.5.3	Colour		Black
3.5.4	Whether FR-LSH		NO
3.5.5	Material of fillers (for multicore cables)		Same as inner sheath
3.5.6	Method of application		Extrusion
3.5.6.1	Multi-core cables:		Pressure extruded / Vacuum extruded
3.6	Armour (Applicability per BOQ mentioned in Unpriced 'Price Schedule')		
3.6.1	Dimension		As per IS: 1554 Part-1 and tolerance as per IS:3975
3.6.2	Material		
3.6.2.2	Multi core		Galvanised steel round wire / Galvanised steel formed wire
3.6.3	Gap between armour wire		Not more than one armour wire space (No cross over / No over riding)
3.6.4	Paint on joint		Zinc rich paint shall be applied on armour joint surface of G.S.wire / formed wire
	Minimum Coverage		90%
3.6.5	Breaking load of Joint		95% of normal armour

3.7	OUTERSHEATH		
3.7.1	Thickness of outer sheath		As per Table-7 of IS: 1554 (Part-1)
3.7.2	Material		Extruded PVC Type ST1 as per IS: 5831.
3.7.3	Colour		Black/ Grey (Project specific requirement shall be informed during detailed engineering)
3.7.4	Whether FR-LSH		YES
3.7.5	Method of application		Extruded
3.7.6	Marking/ Embossing on Outer sheath		
3.7.6.1	At every 5 Meters		(i) Owner's Name (project specific) (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-UNIT NAME' (Shall be informed during detailed engineering) (vii) 'FRLS'/ FRLSH
3.7.6.2	At every 1 Meters by embossing/ printing		Progressive Sequential length.Drum no. shall also be embossed/ printed.
3.8	FR-LSH CHARACTERISTICS		
3.8.1	Oxygen index		Minimum 29 as per ASTM D 2863
3.8.2	Temperature index		Minimum 250° C as per ASTM D 2863
3.8.3	Acid gas generation		Maximum 20% by weight as per IEC 60754-1
3.8.4	Smoke density rating		Maximum 60% as per ASTM D 2863
3.8.5	Flame retardance test for single cable (for cable OD ≤ 35mm)		As per IS 10810 Part 61
3.8.6	Flame retardance test for bunched cables		As per IS 10810 Part 62/ IEC-332 Part-3 (Category -B)
3.9	DIAMETERS		
3.9.1	Tolerance on overall diameter	mm	(±) 2 mm over the declared value

3.10	CABLE DRUM DETAILS		
3.10.1	Type		Steel
3.10.2	Standard drum length		AS per BOQ cum Un-priced schedule
3.10.3	Tolerance on drum length		(±) 5%
3.10.4	Details of marking on Drum		a) Manufacturer's name or trade make, address & contract no. 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) Approx. gross mass.(on both sides of drum) j) Drum no. k) 'BHEL-UNIT NAME' (Shall be informed during detailed engineering)
4.0	INSPECTION/TESTING		
4.1	Type test conduction required	No* (* : Refer Sl. No. 4.2 below)	
4.2	Validity of type test report	As per Quality Plan vendor to furnish Type Test Certificate of specified Type Test which has been conducted within period of 10 years i.e. from 14.11.2024 up to 15.11.2014 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.	
4.3	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 DATA - PART - B
(SUPPLIER DATA TO BE FURNISHED AFTER AWARD OF CONTRACT)

S NO.	PARTICULARS	
1	Name of manufacturer	
2	Place of manufacture	
3	No of cores X Nominal area of conductor (mm ²)	
4	Cable Type	
5	CONDUCTOR	
	a) Material type & grade	
	b) Shape	
	c) No. of Strands/Diameter of each strand (No. / mm)	
6	HRPVC INSULATION	
	a) Material	
	b) Dielectric strength kv/mm	
	c) Nominal thickness (mm)	
	d) Volume resistivity at 27° C (ohm-cm)	
	e) Volume resistivity at 70° C (ohm-cm)	
	f) Insulation resistance constant at 27° C (M ohm km)	
	g) Insulation resistance constant at 70° C (M ohm km)	
	h) Min. Tensile strength (N/mm ²)	
	i) Min. Elongation at break (%)	
	j) Negative tolerance on thickness (mm)	
	k) Fictitious dia over insulation (mm)	
7	FILLERS	
	a) Material	
8	INNERSHEATH	
	a) Material	
	b) Whether FRLS	
	c) Minimum thickness (mm)	
	d) Colour of inner sheath	
	e) Fictitious dia over inner sheath (mm)	
9	ARMOUR	

NAME OF VENDOR			SEAL	REV.	
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	a) Material	
	b) Type of armouring	
	c) Nominal size of armour (mm)	
	d) Minimum coverage	
	e) Method of jointing	
	f) Breaking load of joint	
	g) Minimum no. of wires (No.)	
	h) Armour resistance at 20 deg.C (Ohm/km) max	
	i) Max. Resistivity of GS wire (Ohm-cm) max.	
	j) Fictitious dia over Armouring (mm)	
10	OUTERSHEATH	
	a) Material	
	b) Whether FRLS	
	c) Thickness (mm) (Nominal)	
	d) Min. Tensile strength (N/mm ²)	
	e) Min. Elongation at break (%)	
	f) Colour of Outer sheath	
	g) Tolerance on thickness in mm	
11	Permissible Voltage Variation	
12	Permissible Frequency Variation	
13	Combined Voltage & Frequency Variation	
14	Max. rated Conductor temperature	
15	Max. allowable conductor temperature during short circuit	
16	a. Continuous current carrying capacities	
	b. In Ground 30 deg.C (A)	
	c. In Duct 30 deg.C (A)	
	d. In Air 50 deg.C (A)	
	e. Depth of laying	
	f. Thermal resistivity of soil	
17	FRLS PROPERTIES	
	a. Oxygen Index (ASTMD 2863)	
	b. Temperature Index (ASTMD 2863-77)	
	c. Smoke density rating (ASTMD 2843)	
	d. HCL (ACID) Gas Generation (IEC 754-1)	
	e. Flammability tests	

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18	CABLE DRUMS	
	a. Type & construction	
	b. Stranded drum length with tolerance on drum length	
19	Max. D.C. resistance of conductor at 20° C- Main (ohm/km)	
20	Max. A.C. resistance of conductor at 70° C- Main (ohm/km)	
21	Calculated star reactance (ohm/km)	
22	Approx. Cable Capacitance (micro F/km)	
23	Charging current at 415 V (A/km)	
24	Loss tangent (for reference only)	
25	DIAMETERS	
	a. Approx. dia over insulation (mm)	
	b. Approx. dia over inner sheath (mm)	
	c. Fictitious. dia under outer sheath (mm)	
	d. Approx. overall dia of cable (mm)	
	e. Tolerance on overall dia in mm	
26	Minimum bending radius	
27	safe pulling force when pulled by pulling eye N	
28	Approximate weight of cable (kg/km)	
29	Marking at every 5 meter on Outer Sheath by Embossing	
30	Marking at every 1 meter on Outer Sheath by Printing	

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NAME	SIGNATURE	DATE			

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QUALITY PLAN

NTPC		STANDARD QUALITY PLAN स्टैंडर्ड क्वालिटी प्लान					TO BE FILLED IN BY NTPC						
Item (material, class, grade, rating, range, size etc.) / मद (सामग्री, वर्ग, ग्रेड, रेंज, आकार आदि): 1.1 PVC Insulated FRLS Control cables		CONFORMING TO CODE/ कोड के अनुरूप: IS 1554 PART 1 & NTPC TECHNICAL SPECIFICATION)					QP. NO. 0000-999- QOE- S-040 क्यूपी सं.: 0000-999-क्यूओई-एस-040 REV/ संशोधित सं.: 01 DATE / तिथि: 27.08.2021 Page/ पृष्ठ 1 OF/ से 12 VALID UPTO: 26.08.2024		REVIEWED BY AMAN PANDEY AMAN DUBEY S K LAL SUNIL KUMAR LAL NISHITH AGARWAL NISHITH AGRAWAL		APPROVED BY 		
SL. NO क्र.सं	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class /वर्ग	Type of check/जांच के प्रकार	Quantum of check		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी			Remarks/ टिप्पणियां
					M/ एम	C/N सी/एन				M/ एम	C/ सी	N/ एन	
1	2	3	4	5	6		7	8	9	D*	**	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 cable drum.
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.

A	Raw material/ Bought out Items												
1.01	Copper	1.Make	MA	Verify	100%	--	NTPC ACCEPTED SOURCES	NTPC ACCEPTED SOURCES	QCR		V	--	--
		2. Resistivity	MA	Elect	As per cable mnfr std.	--	IS 613	IS 613	-do--		P	--	--
1.02	PVC compound for insulation	1. Make	MA	Verify	--do--	100%	MANUFACTURER APPROVED SOURCES	MANUFACTURE R APPROVED SOURCES	--do--		V	V	V
		2. Type/ Grade	MA	Verify	100%	100%	NTPC ADS	NTPC ADS	-do--		V	V	V
		3. All acceptance test as per manufacturer norms	MA	Verify	As per manufacturer norms	As per manufacturer norms	--do--	--do--	--do--		V	V	V
													Refer note 1
1.03	PVC Compound for Inner sheath	1. Make	MA	Verify	--do--	--do--	MANUFACTURER APPROVED SOURCES	MANUFACTURE R APPROVED SOURCES	--do--		V	V	V
		2. Type/ Grade	MA	Verify	--do--	--do--	NTPC ADS	NTPC ADS	--do--		V	V	V
1.04	Steel wire / Formed Wire (As applicable)	1. Make	MA	Verify	--do--	--do--	MANUFACTURER APPROVED SOURCES	MANUFACTURE R APPROVED SOURCES	--do--		V	V	V
		2. Dimension	MA	Meas	1 sample from each	--	NTPC APPROVED DATA SHEET & IS 3975	NTPC APPROVED	--do--		P	--	--

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LEGEND/ संकेतिका: * RECORDS, IDENTIFIED WITH "TICK" (Ø) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION/ * "टिक" (.) के साथ प्रमाणित रिकॉर्ड, क्यूए दस्तावेजीकरण में आपूर्तिकर्ता द्वारा अनिवार्य रूप से शामिल किया जाएगा।
** M: MANUFACTURER/SUB-SUPPLIER/निर्माता / उप-आपूर्तिकर्ता C: MAIN CONTRACTOR/मुख्य संविदाकार, N: NTPC/एनटीपीसी P: PERFORM/निष्पादन W: WITNESS/गवाह AND V: VERIFICATION. AS APPROPRIATE/सत्यापन (जैसा उपयुक्त हो), CHP/सीएचपी: NTPC SHALL IDENTIFY IN COLUM "N" AS "W": एनटीपीसी खंड "N" में "W" के रूप में करेगा ।

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प्रारूप सं.

Engg. Div./QA&I

अभि. प्रभाग/क्यूए व आई

			STANDARD QUALITY PLAN स्टैंडर्ड क्वालिटी प्लान			TO BE FILLED IN BY NTPC							
Item (material, class, grade, rating, range, size etc.) / मद (सामग्री, वर्ग, ग्रेड, रैंकिंग, रेंज, आकार आदि): 1.1 PVC Insulated FRLS Control cables			CONFORMING TO CODE/ कोड के अनुरूप: IS 1554 PART 1 & NTPC TECHNICAL SPECIFICATION			QP. NO. 0000-999- QOE- S- 040 क्यूपी सं.: 0000-999-क्यूओई -एस-040 REV/ संशोधित सं.: 01 DATE / तिथि: 27.08.2021 Page/ पृष्ठ 2 OF/ से 12 VALID UPTO: 26.08.2024		REVIEWED BY AMAN PANDEY AMAN DUBEY SUNIL K LAL KUMAR LAL NISHITH AGARWAL NISHITH AGRAWAL		APPROVED BY 			
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					M/ एम	C/N सी/एन				M/ ए म	C/ सी	N/ एन	
1	2	3	4	5	6		7	8	9	D*	**	10	11

					size / lot			DATA SHEET & IS 3975					
		3. All acceptance tests as per IS 3975	MA	Verify	As per IS 3975	--	IS 3975	IS 3975	Supplier TC		V	V	--
1.05	PVC compound for Sheath	1. Make	MA	Verify	As per manufacturer norms	100%	MANUFACTURER APPROVED SOURCES	MANUFACTURER APPROVED SOURCES	QCR		V	V	V
		2. Type / Grade	MA	Verify	100%	100%	NTPC ADS	NTPC ADS	--do--		V	V	V
		3. All acceptance test as per manufacturer norms	MA	Verify	As per manufacturer norms	As per manufacturer norms	--do--	--do--	--do--		V	V	V
		4. Thermal Stability	MA	Chem	One sample / Batch	--	NTPC ADS	NTPC ADS	QCR		P	--	--
		5. Oxygen Index	MA	Chem	--do--	--	NTPC ADS/ IS 10810 Part 58	NTPC ADS/ IS 10810 Part 58	--do--		P	--	--
		6. Acid Gas Emission	MA	Chem	--do--	--	NTPC ADS / IEC60754	NTPC ADS / IEC60754	--do--		P	--	--
1.06	Wooden Drum	1. Dimension	MI	Meas	Manuf. Std.	--	IS 10418	IS10418	QCR		P	--	--
		2. Anti termite treatment	MI	Chem	Cable manuf. std	--	CABLE MANUF. STD.	CABLE MANUF. STD.	COC		V	V	V
1.07	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	--	SHOULD BE SMOOTH &	SHOULD BE	QCR		P	--	--

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LEGEND/ संकेतिका: * RECORDS, IDENTIFIED WITH "TICK" (✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION, / * "टिक" (✓) के साथ प्रमाणित रिकॉर्ड, क्यूए दस्तावेजीकरण में आपूर्तिकर्ता द्वारा अनिवार्य रूप से शामिल किया जाएगा।

** M: MANUFACTURER/ SUB-SUPPLIER/ निर्माता / उप-आपूर्तिकर्ता C: MAIN CONTRACTOR/ मुख्य संविदाकार, N: NTPC/ एनटीपीसी P: PERFORM/ निष्पादन W: WITNESS/ गवाह AND V: VERIFICATION. AS APPROPRIATE/ सत्यापन (जैसा उपयुक्त हो), CHP/ सीएचपी: NTPC SHALL IDENTIFY IN COLUMN "N" AS "W": एनटीपीसी खंड "N" में "W" के रूप में करेगा।

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प्रारूप सं.

अभि. प्रभाग/क्यूए व आई

NTPC		STANDARD QUALITY PLAN स्टैंडर्ड क्वालिटी प्लान				TO BE FILLED IN BY NTPC							
Item (material, class, grade, rating, range, size etc.) / मद (सामग्री, वर्ग, ग्रेड, रेंजिंग, रेंज, आकार आदि): 1.1 PVC Insulated FRLS Control cables		CONFORMING TO CODE/ कोड के अनुरूप: IS 1554 PART 1 & NTPC TECHNICAL SPECIFICATION)				QP. NO. 0000-999- QOE- S-040 क्यूपी सं.: 0000-999-क्यूओई-एस-040 REV/ संशोधित सं.: 01 DATE / तिथि: 27.08.2021 Page/ पृष्ठ 3 OF/ से 12 VALID UPTO: 26.08.2024		REVIEWED BY AMAN PANDEY AMAN DUBEY SUNIL S K LAL KUMAR LAL NISHITH AGARWAL NISHITH AGRAWAL		APPROVED BY  अनुमोदित Approved B C Roy			
SL. NO क्र.सं	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class /वर्ग	Type of check/जांच के प्रकार	Quantum of check		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी			Remarks/ टिप्पणियां
					M/ एम	C/N सी/एन				M/ एम	C/ सी	N/ एन	
1	2	3	4	5	6		7	8	9	D*	**	10	11

					sample/Settin g of each size		FREE FROM SCRATCHES	SMOOTH & FREE FROM SCRATCHES					
		2. Wire Diameter	MA	Meas	--do--	--	NTPC ADS	NTPC ADS	--do--		P	--	--
		3. Annealing Test	CR	Mech	--do--	Same as 6M	IS8130/NTPC ADS	IS8130/NTPC ADS	--do--		P	V	V
													Refer Sl. No. 3.03(iii).
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 ADS	--do--		P	--	--
2.03	Insulation extrusion	1. Surface finish	MA	Visual	--do--	-	NTPC spec	SHOULD BE SMOOTH. NO POROSITY IS PERMITTED.	--do--		P	--	--
		2.Colour of cores	MA	Visual	--do--	-	NTPC ADS	NTPC ADS	--do--		P	--	--
													PVC compound shall be preferably loaded in to extruder by suction method.

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** M: MANUFACTURER/SUB-SUPPLIER/निर्माता / उप-आपूर्तिकर्ता C: MAIN CONTRACTOR/मुख्य संविदाकार, N: NTPC/एनटीपीसी P: PERFORM/निष्पादन W: WITNESS/गवाह AND V: VERIFICATION. AS APPROPRIATE/सत्यापन (जैसा उपयुक्त हो), CHP/सीएचपी: NTPC SHALL IDENTIFY IN COLUM "N" AS "W": एनटीपीसी खंड "N" में "W" के रूप में करेगा।

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SL. NO क्र.सं	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class वर्ग	Type of check/जांच के प्रकार	Quantum of check		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी			Remarks/ टिप्पणियां
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1	2	3	4	5	6		7	8	9	D*	**	10	11

		3.Core identification	MA	Visual	One sample/Settin g of each size	--	NTPC ADS	NTPC ADS	QCR		P	--	---	Core printing shall be legible & indelible
		4.Thickness	CR	Meas	--do--	--	--do--	--do--	--do--		P	--	--	
		5.Spark Test	CR	Elect	100%	100%	CABLE MANUF. STD.	No FAILURE	QCR		P	V	V	1.Spark test failure record is to be verified. 2.Core repairing not permitted
2.04	Laying up	1. Core sequence	MA	Visual	One sample/Settin g of each size	--	IS 1554 (Part I)	IS 1554 (Part I)	--do--		P	--	--	
		2. Direction of lay	MA	Visual	--do--	--	--do--	--do--	--do--		P	--	--	
		3. Dia over laid up core	MA	Meas	--do--	--	NTPC ADS	NTPC ADS	--do--		P	--	--	
2.05	Inner Sheath	1.Colour	MA	Visual	--do--	-	--do--	--do--	--do--		P	--	---	
		2. Surface Finish	MA	Visual	100%	-	NTPC SPECIFICATION	FISH EYE, BLOW HOLE NOT PERMITTED	--do--		P	--	-	
		3.Thickness	MA	Meas	One sample/Settin g of each size	-	NTPC ADS	NTPC ADS	--do--		P	--	--	
		4.Dia over inner sheath	MI	Meas	--do--	-	--do--	--do--	--do--		P	--	--	

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SL. NO क्र.सं	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class /वर्ग	Type of check/जांच के प्रकार	Quantum of check		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी			Remarks/ टिप्पणियां
					M/ एम	C/ N सी/एन				M/ एम	C/ सी	N/ एन	
1	2	3	4	5	6		7	8	9	D*	**	10	11

2.06	Armouring (As Applicable)	1.Dimension	MA	Meas	--do--	-	--do--	--do--	--do--		P	--	--	
		2.No. of wires / strip	MA	Meas.	--do--	-	--do--	--do--	--do--		P	--	--	
		3. Direction of lay	MA	Visual	One sample/Settin g of each size	--	IS 1554 (Part 1)	IS 1554 (Part 1)	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)	--do--			P	--	--	
		5 Dia over armouring	MA	Meas.	One sample/Settin g of each size	--	NTPC ADS	NTPC ADS	--do--		P	--	--	
2.07	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)	QCR			P	--	--	PVC FRLS compound shall be preferably loaded in to extruder by suction method.

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SL. NO क्र.सं	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class /वर्ग	Type of check/जांच के प्रकार	Quantum of check		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी			Remarks/ टिप्पणियां
					M/ एम	C/N सी/एन				M/ ए म	C/ सी	N/ एन	
1	2	3	4	5	6		7	8	9	D*	**	10	11

		2.Colour of sheath	MA	Visual	One sample/Setting of each size	--	NTPC ADS	NTPC ADS	QCR		P	--	--	
		3. Dia over outer sheath	MA	Meas	--do--	--	--do--	--do--	--do--		P	--	--	
		4.Thickness of outer sheath	CR	Meas	--do--	-	--do--	--do--	--do--		P	--	--	
		5. Embossing quality	MA	Visual	100%	-	Drum No. IS 1554(Part 1) Cable size, Voltage grade & Words "FRLS" at every 5 meter is to be embossed. Embossing shall be automatic, in line & marking shall be legible & indelible. (As per NTPC specification)	--do--	--do--		P	--	--	Drum No. on Cable may be embossed/printed
		6. Sequential marking	MA	Visual	Full length	--	Sequential marking of length of cable in meter at every one meter is to be embossed / printed. Embossing / printing shall be progressive, automatic in line & marking shall be legible & indelible. (As per NTPC specification) In addition, Drum No. is also to be embossed/printed on full cable length	--do--	--do--		P	--	--	
C	Finished Cables													
3.01	Type test reports clearance from NTPC Engineering	All type tests as per NTPC specification	CR	Doc.	100%	100%	NTPC SPECIFICATION / NTPC ADS / IS 1554 (Part I)	NTPC SPECIFICATION / NTPC ADS / IS 1554 (Part I)	QCR	✓	P	V	V	
3.02	Routine Tests	1.High Voltage test	CR	Elect	100%	100%	NTPC ADS / IS 1554 (Part I)	NTPC ADS / IS	Test	✓	P	W	V	Refer note 2

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1	2	3	4	5	6	7	8	9	D*	**	10	11	

		at room temperature						1554 (Part I)	certificat c					
		2. Conductor Resistance	CR	Elect	100%	100%	NTPC ADS / IS 1554 (Part I)	NTPC ADS / IS 1554 (Part I)	--do--	✓	P	W	V	
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 1554 (Part I)		NTPC ADS	NTPC ADS	--do--	✓	P	W	W	
		2. Laying of core	CR	Visual	--do--		NTPC ADS / IS 1554 (Part I)	NTPC ADS / IS 1554 (Part I)	Test certific c	✓	P	W	W	
		3. Core Identification	CR	Visual	--do--		--do--	--do--	--do--	✓	P	W	W	Core printing shall be legible & indelible
		4. Colour of outer sheath	MA	Visual	--do--		NTPC ADS	NTPC ADS	--do--	✓	P	W	W	
		5. Inner sheath thickness	CR	Meas	- do -		--do--	--do--	--do--	✓	P	W	W	
		6. Inner sheath colour	MA	Visual	- do -		- do -	- do -	--do--	✓	P	W	W	
3.03 (ii)	Armour wires/ Formed wires (if applicable)	1. Dimensions	CR	Meas	Each type & size of cables as per sampling plan of IS 1554 (Part I)		NTPC ADS / IS1554(Part I)/IS3975	NTPC ADS / IS1554(Part I)/IS3975	--do--	✓	P	V	V	
		2. No. of wires/ formed wire	CR	Mech	- do -		--do--	--do--	--do--	✓	P	V	V	

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SL. NO क्र.सं.	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class /वर्ग	Type of check/जांच के प्रकार	Quantum of check		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी			Remarks/ टिप्पणियां
					M/ एम	C/ N सी/एन				M/ एम	C/ सी	N/ एन	
1	2	3	4	5	6	7	8	9	D*	**	10	11	

		3. Tensile test	CR	Mech	--do--	--do--	--do--	--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 (iii)	Conductor	1. Annealing Test	CR	Mech	--do--	NTPC ADS/ IS 8130	NTPC ADS/ IS 8130	--do--	✓	P	V	V	Refer Sl. No. 2.01
		2. Resistance Test	CR	Elect	--do--	--do--	--do--	--do--	✓	P	W	W	
3.03 (iv)	PVC Insulation & PVC Sheath	1. Thickness of insulation & sheath	CR	Meas.	--do--	NTPC ADS/ IS 1554(Part I)	NTPC ADS/ IS 1554(Part I)	--do--	✓	P	W	W	
		2. Tensile strength & elongation at break of insulation & outer sheath	CR	Mech	--do--	--do--	NTPC ADS/ IS 1554(Part I)	--do--	✓	P	W	W	
		3. Tensile strength & elongation of PVC at break of insulation & outer	CR	Mech	One sample per batch of offered lot (Finished Cable) irrespective of sizes	NTPC ADS/ IS 1554(Part I)	NTPC ADS/ IS 1554(Part I)	Test certificate	✓	P	V	V	MTR of the offered lot shall be verified

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STANDARD QUALITY PLAN स्टैंडर्ड क्वालिटी प्लान		TO BE FILLED IN BY NTPC											
Item (material, class, grade, rating, range, size etc.) / मद (सामग्री, वर्ग, ग्रेड, रैंटिंग, रेंज, आकार आदि): 1.1 PVC Insulated FRLS Control cables		CONFORMING TO CODE/ कोड के अनुरूप: IS 1554 PART 1 & NTPC TECHNICAL SPECIFICATION)		QP. NO. 0000-999- QOE- S- 040 क्यूपी सं.: 0000-999-क्यूओई-एस-040 REV/ संशोधित सं.:01 DATE :/तिथि: 27.08.2021 Page/ पृष्ठ 9 OF/ से 12 VALID UPTO: 26.08.2024		REVIEWED BY AMAN PANDEY AMAN DUBEY S K LAL SUNIL KUMAR LAL NISHITH AGARWAL NISHITH AGRAWAL		APPROVED BY 					
SL. NO क्र.सं	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class /वर्ग	Type of check/जांच के प्रकार	Quantum of check M/ एम C/ N सी/एन		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी M/ ए म C/ सी N/ एन			Remarks/ टिप्पणियां
1	2	3	4	5	6	7	8	9	D*	**	10	11	

		sheath (Ageing Test)											
		4. Insulation resistance (Volume resistivity method)	CR	Elect	Each type & size of cables as per sampling plan of IS 1554 (Part 1)		--do--	NTPC ADS/ IS 1554(PartI)	--do--	✓	P	W	W
		5.High voltage test at room temperature	CR	Elect	--do--		--do--	--do--	--do--	✓	P	W	W
		6.Thermal stability on PVC Insulation and outer sheath	CR	Chem	One sample of each offered lot of all offered sizes		--do--	--do--	--do--	✓	P	W	W
		7.Oxygen index Test on outer sheath	CR	Chem	--do--		NTPC ADS / IS10810 Part 58	NTPC A.D.S	Test certificate	✓	P	W	W
		8.Smoke density rating test on outer sheath	CR	Chem	--do--		NTPC ADS & ASTM D2843	NTPC ADS	--do--	✓	P	W	W
		9.Acid gas generation test on outer sheath	CR	Chem	--do--		NTPC ADS & IEC 60754-1	NTPC ADS	--do--	✓	P	W	W
		10.Flammability test on completed cable	CR	Chem	Refer Note 4	Refer Note 4	NTPC ADS & IEC 60332 Part-3 (Category-B)	NTPC ADS	--do--	✓	P	W	W

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NTPC		STANDARD QUALITY PLAN स्टैंडर्ड क्वालिटी प्लान				TO BE FILLED IN BY NTPC							
Item (material, class, grade, rating, range, size etc.) / मद (सामग्री, वर्ग, ग्रेड, रैंज, साइज आदि): 1.1 PVC Insulated FRLS Control cables		CONFORMING TO CODE/ कोड के अनुरूप: IS 1554 PART 1 & NTPC TECHNICAL SPECIFICATION)				QP. NO. 0000-999- QOE- S-040 क्यूपी सं.: 0000-999-क्यूओई-एस-040 REV/ संशोधित सं.: 01 DATE : तिथि: 27.08.2021 Page/ पृष्ठ 10 OF/ से 12 VALID UPTO: 26.08.2024		REVIEWED BY AMAN PANDEY AMAN DUBEY SUNIL KUMAR LAL NISHITH AGARWAL NISHITH AGRAWAL					
SL. NO क्र.सं	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class /वर्ग	Type of check/जांच के प्रकार	Quantum of check		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी			Remarks/ टिप्पणियां
					M/ एम	C/N सी/एन				M/ एम	C/ सी	N/ एन	
1	2	3	4	5	6		7	8	9	D*	**	10	11

		11.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 50 drums of all sizes	(1)IS1554Part-I (2)Cable size, Voltage grade & Words " FRLS" 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 in meter at every one meter is to be embossed / printed. Embossing / printing shall be progressive, automatic, in line & marking shall be legible & indelible (4) drum / Batch number marking on outer sheath	--do--	✓	P	W	W	Pimple, Fish Eye, Burnt particles, Blow Hole etc. not permitted. Repairing on outer sheath not permitted.	
		12. 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. Zn rich paint shall be applied on armour joint surface of G.S. Wire /formed wire	--do--	✓	P	W	W		
4	Packing	1. Sealing	MA	Visual	100%	100%	(1)IS 1554(Part-I) (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	Sealing shall be visible	--do--	✓	P	V	V	

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STANDARD QUALITY PLAN स्टैंडर्ड क्वालिटी प्लान			TO BE FILLED IN BY NTPC										
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SL. NO क्र.सं	COMPONENT & OPERATIONS अवयव व संचालन	Characteristics/ विशेषताएं	Class /वर्ग	Type of check/जांच के प्रकार	Quantum of check		Reference Document/ संदर्भ दस्तावेज#	Acceptance Norms/ स्वीकृत मानदंड	Record Format/ रिकॉर्ड का प्रारूप	Agency / एजेंसी			Remarks/ टिप्पणियां
					M/ एम	C/ N सी/एन				M/ ए म	C/ सी	N/ एन	
1	2	3	4	5	6		7	8	9	D*	**	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 is to carry out ageing test & test report is to be reviewed (quantum of ageing test sample shall be one sample /batch)
2)	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 at the time of final inspection. 2(b) In case of manufacturers / supplier WHO HAVE NOT SUPPLIED cables in the past through Corporate Centre:- Routine Test are to be witnessed by Main Contractor on 100% basis. This is in addition to manufacturer internal test report to be verified by NTPC at the time of final inspection. Same is to be verified by NTPC
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.

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NTPC		STANDARD QUALITY PLAN स्टैंडर्ड क्वालिटी प्लान				TO BE FILLED IN BY NTPC							
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					M/ एम	C/ N सी/एन				M/ ए म	C/ सी	N/ एन	
1	2	3	4	5	6		7	8	9	D*	**	10	11

	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.
4)	This test will be carried out using composite sampling i.e. irrespective of size; cables of one particular type (i.e. armoured, unarmoured) will be bunched together, as per calculations in line with the IEC. All sizes of armoured & unarmoured cables shall be covered.
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

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	ANNEXURE-A TO QP	CUSTOMER:	PROJECT TITLE	SPECIFICATION NUMBER:
		BIDDER/VENDOR:	QUALITY PLAN NUMBER: PE-QP-999-507-E003	SPECIFICATION TITLE:
	SHEET 1 OF 3	SYSTEM: CABLE	ITEM: 1. LT PVC CONTROL CABLE	DOC. NO.

TYPE/ ACCEPTANCE/ ROUTINE TEST REQUIREMENTS

A. Type Test Conduction (For applicability, please refer clause no. 4.2 of Technical Data Part-A):

- Tests for which "T" is indicated in the 'Test Conduction Required As' column below shall be conducted as Type Test.
- Sampling:
 - Type test to be conducted on one size for each type (Al/Cu conductor) of cable.
 - FRLS & Flammability Test to be conducted only on one sample.
- Repeat type test(s) are not required, in case the requirements of note no. 2, clause no. 2.2 of IS 1554-1 (as per amendment no. 5 of 2012) are met.

B. Acceptance Test Conduction:

- Tests for which "A" is indicated in the 'Test Conduction Required As' column below shall be conducted as Acceptance tests.
- Sampling:
Sampling for acceptance tests shall be as per Appendix-B of IS: 1554 Part-I.
- Flammability Test to be conducted only on one sample.

C. Routine Test Conduction:

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

D. Tests listed in S. No-7.0 & 8.0 shall be conducted only on one sample.

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 to inspector at the time of inspection
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	
2.0	Tests for Armour Wires/Strips				

	ANNEXURE-A TO QP	CUSTOMER:	PROJECT TITLE	SPECIFICATION NUMBER:
		BIDDER/VENDOR:	QUALITY PLAN NUMBER: PE-QP-999-507-E003	SPECIFICATION TITLE:
	SHEET 2 OF 3	SYSTEM: CABLE	ITEM: 1. LT PVC CONTROL CABLE	DOC. NO.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
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 / Adhesion 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	Applicable for Aluminium wire & GS wire	A	IS 10810 Pt 3	
3.0	<u>Physical Tests for PVC Insulation & PVC sheath</u>				
I.	Test for thickness	Applicable for PVC insulation, PVC inner sheath & PVC outer sheath	T, A	IS 10810 Pt 6	
II.	Tensile strength and elongation test at break	Applicable for PVC insulation & PVC outer sheath			
(a)	Before ageing		T, A	IS 10810 Pt 7	
(b)	After ageing		T, A	IS 10810 Pt 7	
III.	Ageing in air oven	Applicable for PVC insulation & PVC outer sheath	T	IS 10810 Pt 11	
IV.	Loss of mass in air oven test	For PVC outer sheath only	T	IS 10810 Pt 10	
V.	Hot deformation test	For PVC outer sheath only	T, A	IS 10810 Pt 15	
VI.	Heat shock test	For PVC outer sheath only	T	IS 10810 Pt 14	
VII.	Shrinkage test	For PVC insulation & PVC outer sheath only	T	IS 10810 Pt 12	
VIII.	Thermal stability test	For PVC insulation & PVC outer sheath only	T, A	IS 10810 Pt 60	
4.0	<u>Improved Fire performance (FR-LSH) Tests</u>				
I.	Oxygen index test	<i>For outer sheath only</i>	T, A	IS 10810 Pt 58 / ASTM D 2863/	
II.	Smoke density test	<i>For outer sheath only</i>	T, A	IS 10810 Pt 63 / ASTM D 2843	
III.	Acid gas generation test	<i>For outer sheath only</i>	T, A	IS 10810 Pt 59 / IEC-754-1	
IV.	Temperature Index Test	<i>For outer sheath only</i>	T	IS 10810 Pt 64 / ASTM D 2863	

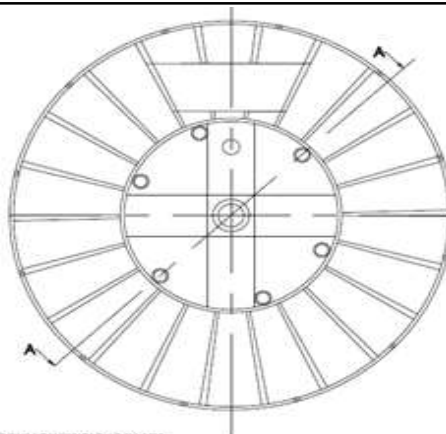
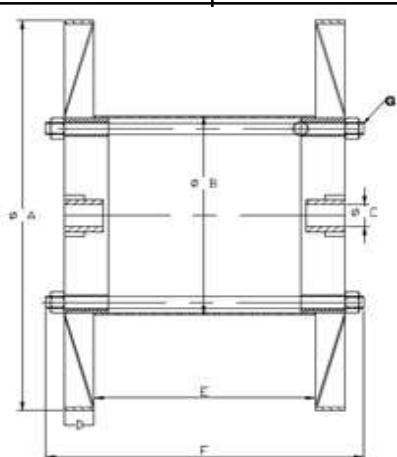
	ANNEXURE-A TO QP	CUSTOMER:	PROJECT TITLE	SPECIFICATION NUMBER:
		BIDDER/VENDOR:	QUALITY PLAN NUMBER: PE-QP-999-507-E003	SPECIFICATION TITLE:
	SHEET 3 OF 3	SYSTEM: CABLE	ITEM: 1. LT PVC CONTROL CABLE	DOC. NO.

<u>S. No.</u>	<u>TEST</u>	<u>APPLICABLE FOR</u>	<u>TEST CONDUCTION REQUIRED AS</u>	<u>REFERENCE STANDARD</u>	<u>REMARKS</u>
5.0	<u>Flammability Tests</u>				
I.	Flammability test for bunched cables	For complete cable	T, A	IS 10810 Pt 62/ IEC-60332 (Part-3-23-Cat-B)	
II.	Flammability test for single cable	For complete cable	T, A	IS: 10810 Pt 61 / 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	
6.0	<u>Electrical Tests</u>				
I.	High Voltage Test (Water immersion test)	On cores	T, A, R	IS 10810 Pt 45	
II.	High Voltage Test at room temperature	For complete cable	T, A, R	IS 10810 Pt 45	
III.	Insulation Resistance Test (Volume resistivity method)	For complete cable	T, A	IS 10810 Pt 43	

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PACKING REQUIREMENT

Sl.no	DESCRIPTION
	Steel Drums:
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

• Dwg. not to scale.
 • ALL DIMENSIONS ARE IN MM.

2	Packing slip & holder:
2.1	Packing slip kept in polyethylene bag shall be placed inside the cable drum at appropriate place.
2.2	One copy of packing slip wrapped in polyethylene bag covered in galvanized iron tin sheet/ aluminium packing slip holder shall be fixed on the external surface the cable drum.

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TECHNICAL SPECIFICATION
LT PVC CONTROL CABLE
(RATE CONTRACT)

PE-TS-999-507-E003

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COMPLIANCE CERTIFICATE

1	It is hereby confirm that the technical specification (sheet 1 to) 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