



MANUFACTURER/ SUPPLIER NAME & ADDRESS	BIDDER/ STANDARD QUALITY PLAN	SPEC. NO. : PE-RC-999-507-E004	DATE:
CUSTOMER :		Qp NO. : PE-QP-999-507-E003, R-1	DATE:
PROJECT:		PO NO.:	DATE:
ITEM: 1.LT PVC CONTROL CABLE 2.LT HR PVC CONTRL CABLE 3. LT PVC POWER CABLE 4. LTRHPVC POWER CABLE	SYSTEM:	SECTION: II	SHEET 14 OF 17

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCED DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
					M	C/N				*	**	M	C	
1	2	3	4	5	6	7	8	9						

		3. Dia over outer sheath	MA	Measurement	One sample of each size/lot	-	Appd. Data Sheet	Appd. Data Sheet	-do-	✓	P	-	-	
		4. Marking/ Colour / Embossing	MA	Visual	One sample of each size/lot	-	Appd. Data Sheet	Appd. Data Sheet	-do-	✓	P	-	-	
		Final Inspection (Internal)	CR	Electrical Test & measurement	100%	100%	IS 1554-1 & Appd. Datasheet	IS 1554-1 & Appd. Datasheet	Test Report	✓	P	V	✓	#. Refer Annexure-A to QP
		Final Inspection	MA	Visual, Measurement	See Remark	See Remark	IS 1554 Pt-1/ Appd. Data Sheet	Free from Bulging, Burnt particles, lumps, cuts & scratches/ Approved data sheet	Test Report	✓	P	W	W	

977049/2022/PS-PEM-MAX

BHEL			
ENGINEERING		QUALITY	
Prepared by: <i>Devidra SINGH</i>	Checked by: <i>Manish SHUKLA</i>	Sign & Date: <i>28/02/2020</i>	Seal
Reviewed by: <i>Manish SHUKLA</i>	Reviewed by: <i>R.K. JAISWAL</i>	Sign & Date: <i>28/02/2020</i>	Seal
BIDDER SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL	
Doc No:	Sign & Date:	Name:	Seal:
Reviewed by:	Sign & Date:	Name:	Seal:
Approved by:	Sign & Date:	Name:	Seal:



MANUFACTURER/ SUPPLIER NAME & ADDRESS		BIDDER/		STANDARD QUALITY PLAN		SPEC. NO : PE-RC-999-507-E004		DATE:	
CUSTOMER :		PROJECT:		SYSTEM:		SECTION: II		SHEET 15 OF 17	
ITEM: 1.LT PVC CONTROL CABLE 2.LT HR PVC CONTRL CABLE 3. LT PVC POWER CABLE 4. LT HRPVC POWER CABLE		PO NO.:		DATE:		DATE:		DATE:	

SI. No.	COMPONE NTS & OPERATIO NS	CHARACTERSTICS	CLA SSS	TYPE OF CHECK	QUANTUM OF CHECK	REFEREN CE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* **	
					M C/N				M C N	

	2. Length	MA	Visual, Measurment	See Remark	IS 1554 Pt-1/ Appd. Data Sheet	BHEL Spec./ Data Sheet	Test Report	✓	P W W	
	2. Dimensions	MA	Measurment	As per IS	IS 1554 Pt-1/ Appd. Data Sheet	Appd. Data sheet	Test Report	✓	P W W	
	3. Armouring - Coverage No of Wires/Strips	MA	Visual & Meas.	-do-	IS 1554 Pt-1/ Appd. Data Sheet	IS 1554 Pt-1/ Appd. Data Sheet	Test Report	✓	P W W	Refer Annexure-I QP for sampling plan.
	4. Marking/Colour Coding	MA	Visual	-do-	IS 1554 Pt-1/ Appd. Data Sheet	IS 1554 Pt-1/ Appd. Data Sheet	Test Report	✓	P W W	
	6. Acceptance Tests (Refer Note-H)	CR	Phy & Elect. Tests	Sample #	FRLS Test		Test Report	✓	P W W	

977049/2022/PS-PEM-MAX

ENGINEERING		QUALITY	
Prepared by:	Sign & Date	Checked by:	Sign & Date
Reviewed by:	Name	Reviewed by:	Name
	DEVENDRA SINGH		KUNAL GANDHI
	MANISH SHUKLA		R.K. JAISWAL

BIDDER/SUPPLIER	
Sign & Date	Seal

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			



MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN		SPEC. NO : PE-RC-999-507-E004		DATE:	
CUSTOMER :		PROJECT:		QP NO.: PE-QP-999-507-E003, R-1		DATE:	
ITEM: 1.LT PVC CONTROL CABLE 2.LT HR PVC CONTRL CABLE 3. LT PVC POWER CABLE 4. LT HRPVC POWER CABLE		SYSTEM:		PO NO.:		DATE:	
				SECTION: II		SHEET 17 OF 17	


SI. No.	COMPONE NTS & OPERATIO NS	CHARACTERSTICS	CLA SS	TYPE OF CHECK	QUANTUM OF CHECK	REFEREN CE DOCUMEN T	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* M C N **	
(I)	BHEL RESERVES THE RIGHT FOR CONDUCTING REPEAT TEST, IF REQUIRED.									
(J)	AFTER PACKING AND PRIOR TO ISSUE OF MDCC, PHOTOGRAPHS OF COMPLETE CABLE (TO BE DISPATCHED) SHALL BE SENT TO BHEL-PURCHASE GROUP FOR REVIEW.									
(K)	PROJECT SPECIFIC QP SHALL BE DEVELOPED BASED ON CUSTOMER REQUIREMENT.									

LEGENDS:
 *RECORDS, IDENTIFIED WITH "TICK"(✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,
 ** M: SUPPLIER/ MANUFACTURER/ SUB-SUPPLIER, C: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, N: CUSTOMER,
 P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE
 MA: MAJOR, MI: MINOR, CR: CRITICAL, D: DOCUMENTATION

ENGINEERING				QUALITY			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Reviewed by:	Seal
by: <i>Devendra Singh</i>	<i>28/02/2020</i>	DEVENDRA SINGH	by: <i>Manish Shukla</i>	<i>28/02/2020</i>	KUNAL GANDHI		
Reviewed by:		MANISH SHUKLA	Reviewed by:		R.K. JAISWAL		

SIGNATURE & SEAL		SIGNATURE & SEAL	
Sign & Date	Seal	Sign & Date	Seal

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	ANNEXURE-I TO QP	CUSTOMER:	PROJECT TITLE	SPECIFICATION NUMBER: PE-RC-999-507-E004
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E003, R1	SPECIFICATION TITLE:
	SYSTEM	ITEM: 1. LT PVC CONTROL CABLE 2. LT HRPVC CONTROL CABLE 3. LT PVC POWER CABLE 4. LT HRPVC POWER CABLE	DOC. NO.	

TYPE/ ACCEPTANCE/ ROUTINE TEST REQUIREMENTS

A. Type Test Conduction:

- 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 of cable for every lot of cable.
 - FRLS & Flammability Test to be conducted only on one sample/ lot.

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 (control cable).
- Flammability Test to be conducted only on one sample/ lot.

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 / lot.

NOTE

LOT shall be defined as per IS: 1554 Part-I (control cable).

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
1.0	Tests for Conductor				
I.	Annealing test	For copper conductor	T, A	IS 10810 Pt 1	In process records shall be furnished to inspector at the time of inspection.
II.	Resistance test	For copper conductor	T, A, R	IS 10810 Pt 5	
2.0	Tests for Armour Wires/Strips				
I.	Measurement of dimensions	Applicable for GS wire/Strip	T,A	IS 10810 Pt 36	
II.	Tensile test	Applicable for GS wire/Strip	T, A	IS 10810 Pt 37	

BHEL				BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING		QUALITY		Sign & Date		Doc No:			
Sign & Date	Name	Sign & Date	Name	Seal		Sign & Date	Name	Seal	
Prepared by: <i>[Signature]</i>	DEVENDRA SINGH	Checked by: <i>[Signature]</i>	KUNAL GANDHI						
Reviewed by: <i>[Signature]</i>	MANISH SHUKLA	Reviewed by: <i>[Signature]</i>	R.K. JAISWAL						


	ANNEXURE-I TO QP	CUSTOMER:	PROJECT TITLE	SPECIFICATION NUMBER: PE-RC-999-507-E004
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E003, R1	SPECIFICATION TITLE:
	SYSTEM	ITEM: 1. LT PVC CONTROL CABLE 2. LT HRPVC CONTROL CABLE 3. LT PVC POWER CABLE 4. LT HRPVC POWER CABLE	DOC. NO.	

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
5.0	Flammability Tests				
I.	Flammability test for bunched cables	For complete cable	T	IS 10810 Pt 62/ IEC-60332 (Part-3-23-Cat-B)	Test & Category applicable as indicated in Datasheet-A
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	Electrical Tests				
I.	High Voltage Test (Water immersion test)	On cores	T	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	
7.0	Anti-rodent and Termite Repulsion test	For PVC outer sheath only	A	Refer Note	Test applicable if indicated in Datasheet-A
8.0	Anti-Fungal Test	For PVC outer sheath only	A	--	
9.0	Special Tests				
I.	Hydrolytic Stability Test	For complete cable	**	ASTM D 3137:81	Test applicable if indicated in Datasheet-A
II.	Ultraviolet Radiation Test	For complete cable	**	BS EN ISO 4892-2	

**** These tests shall be conducted on one sample for the entire contract and duration of these tests shall be 14 days.**

Note: A few chipping of the PVC compound is slowly ignited on a porcelain dish or cubicle in a muffle furnace at about 60-degree C. The resulting ignited ash is boiled with a little ammonium acetate solution (10%). Place a drop of aqueous sodium sulphide solution on a thick filter paper and allow soaking. Touch the spot with a drop of above extract. A black spot indicates the presence of lead, the anti-termite and rodent compound.

BHEL						BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING			QUALITY			Sign & Date	Seal	Doc No:	Sign & Date	Name	Seal
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name						
	<i>[Signature]</i>	DEVENDRA SINGH		<i>[Signature]</i>	KUNAL GANDHI						
Reviewed by:		MANISH SHUKLA	Reviewed by:		R.K. JAISWAL						

	ANNEXURE-I TO QP	CUSTOMER:	PROJECT TITLE	SPECIFICATION NUMBER: PE-RC-999-507-E004
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E003, R1	SPECIFICATION TITLE:
	SYSTEM	ITEM: 1. LT PVC CONTROL CABLE 2. LT HRPVC CONTROL CABLE 3. LT PVC POWER CABLE 4. LT HRPVC POWER CABLE	DOC. NO.	

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
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 GS wire/Strip	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 G. S. wires/Strip only	A	IS 10810 Pt 3	
3.0	Physical Tests for PVC Insulation & PVC sheath				
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	Applicable for PVC insulation & PVC outer sheath	T	IS 10810 Pt 10	
V.	Hot deformation test	Applicable for PVC insulation & PVC outer sheath	T	IS 10810 Pt 15	
VI.	Heat shock test	Applicable for PVC insulation & PVC outer sheath	T	IS 10810 Pt 14	
VII.	Shrinkage test	Applicable for PVC insulation & PVC outer sheath	T	IS 10810 Pt 12	
VIII.	Thermal stability test	Applicable for PVC insulation & PVC outer sheath	T	IS 10810 Pt 60	
4.0	Improved Fire performance (FR-LSH) Tests				
I.	Oxygen index test	For PVC outer sheath only	T, A	IS 10810 Pt 58 / ASTM D 2863	Applicable for Inner Sheath also, if the same is indicated in Datasheet-A
II.	Smoke density test	For PVC outer sheath only	T, A	IS 10810 Pt 63 / ASTM D 2843	
III.	Acid gas generation test	For PVC outer sheath only	T, A	IS 10810 Pt 59 / IEC-754-1	
IV.	Temperature Index Test	For PVC outer sheath only	T	IS 10810 Pt 64 / ASTM D 2863	

BHEL				
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Reviewed by:			Reviewed by:	R.K.

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
Reviewed by:	Sign & Date	Name	Seal
Approved			





DAMODAR VALLEY CORPORATION (DVC)
PANCHET HYDEL STATION
TECHNICAL SPECIFICATION FOR RM&U OF UNIT # 1



CONTROL CABLES

Handwritten signature
मुख्य अभियंता (सी ईडि और) अभियंतिकी
Chief Engineer (C & I), Engineering Department
दामोदर घाटी निगम/DVC
कोलकाता-54/KOLKATA-54



 <p>DAMODAR VALLEY CORPORATION (DVC) PANCHET HYDEL STATION TECHNICAL SPECIFICATION FOR RM&U OF UNIT # 1 (MECHANICAL & CIVIL)</p>	
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ROUTINE TESTS	Following routine tests shall be carried out on each drum of finished cables for all types (PVC / XLPE insulated) & sizes.
1	Conductor Resistance test
2	High voltage test
ACCEPTANCE TESTS	
Following Acceptance tests shall be carried out on each size of each type (PVC / XLPE insulated) of cables, in the offered lot.	
A) For Conductor (as per sampling plan mentioned in IS: 1554 / 7098)	
1)	Annealing test (Copper)
2)	Tensile Test (Aluminium)
B) For Armour Wires / Formed Wires (If applicable) (as per sampling plan mentioned in IS: 1554 / 7098)	
1.	Measurement of Dimensions
2.	Tensile Tests
3.	Elongation Test
4.	Torsion Test For Round wires only
5.	Wrapping Test
6.	Resistance Test
7.	Mass of Zinc coating test For G S wires / Formed wires only
8.	Uniformity of Zinc coating For G S wires / Formed wires only
9.	Adhesion test For G S wires / Formed wires only
10.	Freedom from surface defects
C) For PVC / XLPE insulation & PVC Sheath (as per sampling plan mentioned in IS: 1554 / 7098)	
1.	Test for thickness
2.	Tensile strength & Elongation before ageing (for tests after ageing see "D")
D)Ageing Test	




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 कोष-09/सी

TS VOL - Section-A

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DAMODAR VALLEY CORPORATION (DVC)
PANCHET HYDEL STATION
TECHNICAL SPECIFICATION FOR RM&U OF UNIT # 1
 (MECHANICAL & CIVIL)




Criteria	Condition	Test Requirements	Remarks
PVC insulation & outer sheath: Samples as per relevant IS, from each size of cables in the offered lot, shall be tested for tensile strength & elongation (Before ageing). Tensile & elongation testing shall preferably be done with a computerized machine. The values will be compared with corresponding values mentioned in the Type Test report accepted by OWNER. These values of Tensile Strength & Elongation (before ageing) should be within +/- 15% of the corresponding values of Type Test report. (Please note that test values should be more than the minimum values indicated in relevant standard).	All sizes which meet the criteria	The size which has maximum negative deviation from type test report values will be put on Accelerated ageing test. The Samples shall be aged in air oven at temperature of 130°C +/- 2°C for 5 hours and tested for TS & elongation. Acceptance norms shall be as per IS.	In case the size does not meet the requirement in accelerated ageing test then all sizes (which had met the criteria) will be put on ageing test as per IS.
XLPE insulation	Sizes which do not meet the criteria	Every size will be put on ageing test as per IS.	
Samples as per relevant IS, from each size of cables in the offered lot, will be put on ageing test as per IS.			
E) Following tests will be carried out on completed cables as per IS on each size of each type (PVC / XLPE insulated)			
1.	Insulation resistance test (Volume resistivity method)		
2.	High voltage test		
F) Following tests shall be carried out on only one size of offered lot (comprising of all sizes & types)			
1.	Thermal stability test on PVC insulation and outer sheath		
2.	Oxygen index test on outer sheath		
3.	Smoke density rating test on outer sheath		
4.	Acid gas generation test on outer sheath		
G) Flammability test as per IEC 60332 - Part-3 (Category- B) on completed cables as per following sampling plan:			
This test will be carried out using composite sampling i.e. irrespective of size; cables of one particular type (i.e. armoured PVC insulated, unarmoured PVC insulated, armoured XLPE insulated, unarmoured XLPE insulated) will be bunched together, as per calculations in line with the IEC. All sizes of PVC & XLPE insulated, armoured & unarmoured cables shall be covered. For one particular type, cables with OD less than or equal to 30 mm shall be clubbed together in touching formation while cables with OD greater than 30 mm shall be clubbed together leaving a gap equal to OD of cable having			



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 चप-09
 Chief Engineer (C & I), Engineering Department
 चप-09
 कोलकाता-56

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN		SPEC. NO.:	DATE:
	CUSTOMER :	PROJECT:	ITEM: SCREENED CONTROL CABLES	SYSTEM:	DATE:
PO NO.:		SECTION: II		DATE:	SHEET OF 11


SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* **	
					M	C/N			D M C N	

INSTRUCTIONS:

- 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 no.
- Cable manufacturer to maintain all quality records identified as per all QP stages enumerated below whether it is identified for BHEL verification or witness or not.


1.0 RAW MATERIAL											
1.1 Copper Rods/ Wires (For Conductor & drain wire)											
GENERAL:		MA	Physical Tests	Sample/Batch	Sample/Batch	IS 613	IS 613	Inspection Report/ Test Cert.	P/ V	V	-
1. Physical properties		MA	Electrical Tests	Sample/Batch	Sample/Batch	-do-	-do-	-do-	P/ V	V	-
SPECIFIC CHECKS:											
a) Make		MA	Verify	100%	100%	Manufacturer approved source IS 613	Manufacturer approved source IS 613	COC/ Test Cert.	P	V	-
b) Grade		MA	-do-	-do-	-do-			-do-	P	V	-

ENGINEERING				QUALITY				BIDDER/SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal	Reviewed by:	Sign & Date	Name	Seal	Doc No:	Reviewed by:	Sign & Date	Name	Seal
Reviewed by:	Manish	MANISH	Reviewed by:	Manish	MANISH		Reviewed by:	Manish	MANISH			Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		QUALITY PLAN		SPEC. NO. :	DATE:
	CUSTOMER :		PROJECT:		PO NO.:	DATE:
ITEM: SCREENED CONTROL CABLES		SYSTEM:		SECTION: II		SHEET 2 OF 11


SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS	
					M	C/N				P	V	N		
1		c) Resistivity	MA	Electrical Tests	Manufacturer std.		IS 613	IS 613	-do-		P	V	-	
1.2	PVC Compound (for insulation)	GENERAL : 1. Physical properties SPECIFIC CHECKS : a) Make b) Type/ Grade c) Shelf life/ Storage condition	MA	Physical Tests	Sample/Batch	Sample/Batch	IS 5831	IS 5831	Inspection Report/ Test Cert.		P	V	-	
1.3	Screen / Tapes/ Binders	1. Make 2. Dimension 3. T. S. & Elongation	MA	Verify Measurment Physical Tests	100% Manufacturer std. -do-	100% Manufacturer std. -do-	Manufacturer approved source Manufacturer datashet/ Approved datashet Manufacturer datashet	Manufacturer approved source Manufacturer datashet/ Approved datashet Approved datashet	TC & IR TC & IR -do-		P	V	-	

ENGINEERING				QUALITY			
Prepared by:	Sign & Date:	Name:	Checked by:	Sign & Date:	Name:	Reviewed by:	Seal:
Reviewed by:	Sign & Date:	Name:	Checked by:	Sign & Date:	Name:	Approved by:	Seal:
BHEL				BIDDER/SUPPLIER			
FOR CUSTOMER REVIEW & APPROVAL				FOR CUSTOMER REVIEW & APPROVAL			

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	CUSTOMER :		PROJECT:		OP NO.: PE-QP-999-507-E004, REV 02.	DATE:
ITEM: SCREENED CONTROL CABLES		SYSTEM:		PO NO.:	SECTION: II	DATE:
SHEET 5 OF 11		SHEET 11 OF 11		SHEET 5 OF 11		

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1		2. Surface finish	MA	Visual	M	Surface shall be smooth	Surface shall be smooth	Inspection Report	P	V
2.0	IN PROCESS									
2.1	Wire Drawing & Annealing.	1. Size 2. Surface finish	MA	Dimensional Visual	Mfr's Plant Std. -do-	Approved datasheet Surface shall be smooth	Approved datasheet Surface shall be smooth	Inspection Report	P	V
2.2	Tinning (Conductor or drain wire)	1. Size	MA	Dimensional	Plant Mfg. Std.	Mfr's Plant Std.	Mfr's Plant Std.	-do-	P	V
2.3	Stranding of wires	1. No. of wires 2. Chemical test for tinning 3. Sequence, lay length & Direction 4. Surface Finish	MA	Counting Chemical Visual, Meas Visual	Mfr's Plant Std. -do- one Sample each size/lot 100%	Approved datasheet -do- Mfr. Std Surface shall be smooth	Approved datasheet -do- Mfr. Std. Surface shall be smooth	-do- -do- -do-	P	V

ENGINEERING				QUALITY			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal	
Reviewed by:			Reviewed by:				
BHEL				BIDDER/SUPPLIER			
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Seal		Seal		Seal		Seal	

	MANUFACTURER/ BIDDER SUPPLIER NAME & ADDRESS		QUALITY PLAN		SPEC. NO.:	DATE:
	CUSTOMER:		PROJECT:		PO NO.:	DATE:
ITEM: SCREENED CONTROL CABLES		SYSTEM:		SECTION: II		SHEET 6 OF 11

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1		5. Dimension	MA	Measurement	one Sample of each size/lot	Appd. Data Sheet	Free from bulging burnt particles lumps, cuts & Scratches.	Inspection Report	P	
2	Core Insulation (No repair permitted)	1. Surface finish	MA	Visual	100%	100%	Free from bulging burnt particles lumps, cuts & Scratches.	Inspection Report	P	
		2. Insulation thickness (Min./Max.)	CR	Measurement	one Sample of each size/lot	Appd. data sheet	Appd. data sheet	-do-	P	
		3. Concentricity #	CR	Measurement	-do-	-do-	Mfr's Std.	Inspection Report	P	
		4. Dia over insulation	MA	Measurement	-do-	-do-	Appd. data sheet	-do-	P	
		5. Core identification	MA	Visual	100%	100%	Appd. data sheet	-do-	P	
		6. TS & % Elongation	MA	Mechanical	100%	100%	IS 1554/IS 5831	-do-	P	
2.4	Core Insulation (No repair permitted)	1. Surface finish	MA	Visual	100%	100%	Free from bulging burnt particles lumps, cuts & Scratches.	Inspection Report	P	

ENGINEERING				QUALITY			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal	
Reviewed by:			Reviewed by:				
BHEL				BIDDER/SUPPLIER			
FOR CUSTOMER REVIEW & APPROVAL				Doc No.:			
Sign & Date				Sign & Date			
Name				Name			
Seal				Seal			




MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		QUALITY PLAN		SPEC. NO.:	DATE:
CUSTOMER :		PROJECT :		QP NO.: PE-QP-999-507-E004, REV 02.	DATE:
ITEM: SCREENED CONTROL CABLES		SYSTEM:		PO NO.:	DATE:
SECTION: II		SHEET: 11			

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* **	
		3. Dia over outer sheath	MA	Measurement	-do-	Appd. Data Sheet	Appd. Data Sheet	-do-	P	-
		4. Marking/ Colour / Embossing	MA	Visual	100%	Appd. Data Sheet	Appd. Data Sheet	-do-	P	-
		5. TS & % Elongation	MA	Mechanical	100%	IS 5631/IS 10810 part 7	IS 5631	-do-	P	-
3.0	Final Inspection (Internal)	Routine Test (Refer Note-H)	CR	Electrical test & Measurement	100%	#	#	-do-	P	V
4.0	Final Inspection on (External)	1. Finish & Length (Cable & cable drum)	MA	Visual Measurement	One drum in each lot	Appd. Data Sheet	Free from Bulging, Burnt particles, lumps, cuts & scratches/ Approved data sheet	Inspection Report	P	W

ENGINEERING		QUALITY		BIDDER/SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL	
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Reviewed by:	Sign & Date
Reviewed by:			Reviewed by:			Approved by:	

BHEL: *[Signature]* *[Date]*
 QUALITY: *[Signature]* *[Date]*
 BIDDER/SUPPLIER: *[Signature]* *[Date]*
 FOR CUSTOMER REVIEW & APPROVAL: *[Signature]* *[Date]*


	MANUFACTURER/ SUPPLIER NAME & ADDRESS	BIDDER/	QUALITY PLAN
CUSTOMER :		SPEC. NO. :	
PROJECT :		QP NO. : PE-QP-999-507-E004, REV 02.	
ITEM: SCREENED CONTROL CABLES		PO NO. :	
SYSTEM:		SECTION: II	
		DATE:	
		DATE:	
		DATE:	
		SHEET OF 11	

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	*	**
		2. Dimensions	MA	Measurement	As per std.	Appd. Data sheet	Appd. Data sheet	Inspection Report	P	W
		3. Armouring - Coverage	MA	Measurement	-do-	-do-	-do-	-do-	P	W
		4. Marking/Colour/ pair identification (Cable & cable drum)	MA	Visual	-do-	-do-	-do-	-do-	P	W
		5. Acceptance Tests (Refer Note-H)	CR	Phy & Elect. Tests	#	#	-do-	-do-	P	W
		6. Type & FRLS Tests (Refer Note-H)	CR	Measurement	#	#	Appd. Data sheet	-do-	P	W

NOTES: -

- (A) JOINTS IN CONDUCTOR AND ARMOUR SHALL BE AS PERMITTED BY IS 8130 & IS 1554-1 RESPECTIVELY.
- (B) NO REPAIR OF CORE INSULATION PERMITTED.
- (C) CABLE ENDS SHALL BE SEALED
- (D) RECORD OF RAW MATERIAL, PROCESS & ALL STAGES SHALL BE CERTIFIED BY VENDORS Q.C. AND ARE LIABLE TO AUDIT CHECK BY PURCHASER.


ENGINEERING				BHEL			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal	
Reviewed by:			Reviewed by:				
QUALITY				BIDDER/SUPPLIER			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal	
Reviewed by:			Reviewed by:				
FOR CUSTOMER REVIEW & APPROVAL				FOR CUSTOMER REVIEW & APPROVAL			
Doc No:	Sign & Date	Name	Reviewed by:	Sign & Date	Name	Seal	
Approved by:			Approved by:				

		MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		QUALITY PLAN		SPEC. NO.:		DATE:	
		CUSTOMER :		PROJECT:		PO NO.:		DATE:	
ITEM: SCREENED CONTROL CABLES		SYSTEM:		SECTION: II		SHEET 10		OF 11	

- (E) FILLERS/DUMMY CORES ETC. SHALL BE AS PER BHEL SPECIFICATION
- (F) WHEREVER EXTENT OF CHECK FOR STAGE IS MENTIONED AS SAMPLES AND NOT DEFINED IN QP, THE SAME SHALL BE AS PER VENDORS SAMPLING PLAN AGREED BY PURCHASER.
- (G) VENDOR SHALL FURNISH COMPLIANCE CERTIFICATE TO THE INSPECTION AGENCY CONFIRMING THE PACKING AS PER BHEL SPECIFICATION.
- (H) FOR LIST OF TYPE TESTS, ROUTINE TESTS & ACCEPTANCE TESTS; REFER ANNEXURE A TO QP.

LEGENDS:
 *RECORDS, IDENTIFIED WITH "TICK"(✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION,
 ** M: SUPPLIER/MANUFACTURER/ SUB-SUPPLIER, B: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, C: CUSTOMER,
 P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE
 MA: MAJOR, MI: MINOR, CR: CRITICAL

BHEL				QUALITY				SIGNATURE	
ENGINEERING		Name		Checked by:		Sign & Date		Name	
Prepared by:		P. Srinivasa		W. Srinivasa		25/1/2020		K. Srinivasa	
Reviewed by:		M. Srinivasa		A. Srinivasa		25/1/2020		R. Srinivasa	
BIDDER/SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL					
Doc No.:		Sign & Date		Name		Seal			
Reviewed by:		Name		Seal					
Approved by:		Name		Seal					

	ANNEXURE - I TO QP	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
	Page 1 of 5	SYSTEM	ITEM: SCREENED CONTROL 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 tests (except for Sl. no. b & c below) to be conducted on one size (2P, 4P etc.) of each type (F or G type)/ lot.
 - b) Electrical & C&I tests to be conducted on each size of each type of cables /lot.
 - c) FRLS & Flammability tests to be conducted only on one sample/ lot, irrespective of size/type.

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 (except for Sl. no. b & c below) for every lot shall be as per Appendix-B (Clause 15.2.2) of IS: 1554 Part-I.
 - b) Electrical & C&I tests to be conducted on each size of each type of cables /lot.
 - c) FRLS & Flammability tests to be conducted only on one sample/ lot, irrespective of size/type.

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 testing shall be conducted in line with the applicable standards and as per the Manufacturing Quality Plan approved for the project for every lot offered for inspection.

D. ADS: Approved datasheet.


NOTE: LOT shall be defined as per IS: 1554 Part-1.

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	<u>In process records shall be furnished to inspector at the time of inspection.</u>

BHEL				
ENGINEERING		QUALITY		
Sign & Date	Name	Sign & Date	Name	
Prepared by: <i>[Signature]</i>	<i>[Name]</i>	Checked by: <i>[Signature]</i>	<i>[Name]</i>	
Reviewed by: <i>[Signature]</i>	<i>[Name]</i>	Reviewed by: <i>[Signature]</i>	<i>[Name]</i>	

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
Sign & Date	Name	Seal	
Reviewed by:			
Approved by:			

	ANNEXURE - I TO QP	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
	Page 2 of 5	SYSTEM	ITEM: SCREENED CONTROL CABLES	DOC. NO.


S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
II.	Tin coating test (for tinned copper)	For copper conductor only	T, A	IS 10810 Pt 4	
III.	Resistance test	For Al/Cu	T, A, R	IS 10810 Pt 5	
IV.	Diameter test	For conductor	T, A	ADS	
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 , IS: 2633	
VIII.	Mass of Zinc coating test	For G. S. wires/Strip only	T, A	IS 10810 Pt 41	
3.0 Physical Tests for PVC Insulation, PVC sheath.					
I.	Test for thickness & Eccentricity	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	T, A	IS 10810 Pt 7	
(a)	Before ageing		T, A	IS 10810 Pt 7	
(b)	After ageing		T, A	IS 10810 Pt 7	
III.	Ageing in air oven	For PVC insulation & PVC outer sheath	T	IS 10810 Pt 11	
IV.	Loss of mass in air oven test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 10	

BHEL					
ENGINEERING			QUALITY		
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name
Reviewed by:	Sign & Date	Name	Reviewed by:	Sign & Date	Name

Prepared by: *[Signature]* / 01.12.22 / *[Signature]*
 Checked by: *[Signature]* / 01.12.22 / KUNAL GANDHI
 Reviewed by: *[Signature]* / 01.12.22 / *[Signature]*
 23/12/22

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
Reviewed by:	Sign & Date	Name	Seal
Approved by:			

	ANNEXURE - I TO QP	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
	Page 3 of 5	SYSTEM	ITEM: SCREENED CONTROL CABLES	DOC. NO.


S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
V.	Hot deformation test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 15	
VI.	Heat shock test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 14	
VII.	Shrinkage test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 12	
VIII.	Thermal stability test	For PVC insulation & PVC outer sheath	T	IS 1554-1	
IX.	Bleeding & Blooming test	Applicable for PVC insulation & PVC outer sheath	T	IS 10810 Pt 19	
X.	Cold bend test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 20	
XI.	Cold impact test	For PVC insulation & PVC outer & Inner sheath	T	IS 10810 Pt 21	
XII.	Colour fastness to water	For PVC insulation & PVC outer sheath	T	IS 10810 Pt 18, Appendix-A of IS: 5831	
4.0 Tests for Al-Mylar Shield					
I.	Continuity test	For Al-Mylar shield	T, A	Plant Standard	
II.	Shield thickness	For Al-Mylar shield	A	ADS	
III	Overlap test	For Al-Mylar shield	A	ADS	
IV	Constructional details, dimensions	For Al-Mylar shield	A	ADS	
V	Visual, surface finish+	For Al-Mylar shield	A	Plant Standard	
VI	Overall coverage	For Al-Mylar shield	A	Plant Standard	
VII	Noise interference test.	For Al-Mylar shield	A	ADS	
5.0 Tests for Drain Wire					
I.	Annealing test	For copper conductor only	T, A	IS 10810 Pt 1	<u>In process records shall be furnished to inspector at the time of inspection.</u>

BHEL					
ENGINEERING			QUALITY		
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name
Reviewed by:			Reviewed by:		

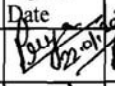
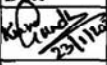
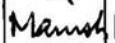
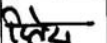
BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
Reviewed by:	Sign & Date	Name	Seal
Approved by:			

23/1/2022

	ANNEXURE - I TO QP	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
		BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
	Page 4 of 5	SYSTEM	ITEM: SCREENED CONTROL CABLES	DOC. NO.


S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
II.	Tin coating test (for tinned copper)	For copper conductor only	T, A	IS 10810 Pt 4	
III.	Resistance test	For Cu Conductor	T, A, R	IS 10810 Pt 5	
IV.	Diameter test	For conductor	T, A	ADS	
6.0 FRLS Tests					
I.	Oxygen index test	For PVC outer sheath & Fillers only	T, A	IS 10810 Pt 58 / ASTMD 2863	Applicable for Inner Sheath if the same is indicated in Datasheet-A
II.	Smoke density test	For PVC outer sheath & Fillers only	T, A	ASTMD 2843	
III.	Acid gas generation test	For PVC outer sheath & Fillers only	T, A	IS 10810 Pt 59 / IEC-754-1	
IV.	Temperature Index Test	For PVC outer sheath only	T	IS 10810 Pt 64 / ASTMD 2863	
7.0 Flammability Tests					
I.	Flammability test for bunched cables	For complete cable	T,A	IS 10810 Pt 62/ IEC-60332 (Part-3-23, CAT B).	Test & Category applicable as indicated in Datasheet-A
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	
8.0 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, R	IS: 10810 Pt 43	
III.	L/R Ratio	For complete cable	A, R	BS:5308 Part II	
IV.	Spark Test	Online Process during Extrusion of Insulation	Online	BS:5308 Part II	

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		<i>Manish</i>	Checked by:		KUNAL GANDHI
Reviewed by:		MANISH	Reviewed by:		RK JAIN

BIDDER/ SUPPLIER	
Sign & Date	
Seal	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

23/1/2020

 ANNEXURE - I TO QP Page 5 of 5	CUSTOMER:	PROJECT TITLE: RATE CONTRACT	SPECIFICATION NUMBER: PE-RC-999-507-E005
	BIDDER/VENDOR:	QUALITY PLAN NUMBER : PE-QP-999-507-E004, R1	SPECIFICATION TITLE:
	SYSTEM	ITEM: SCREENED CONTROL CABLES	DOC. NO.

S. No.	TEST	APPLICABLE FOR	TEST CONDUCTION REQUIRED AS	REFERENCE STANDARD	REMARKS
V.	Thermal ageing test	For complete cable	T	IS-1554 Pt-I	
9.0	C&I Tests				
I.	Cross talk	For complete cable	T, A	ADS	
II.	Attenuation	For complete cable	T, A	ADS	
III.	Characteristic Impedance	For complete cable	T, A	ADS	
IV.	Mutual capacitance	For complete cable	T, A, R	ADS	
V.	Noise interference	For complete cable	T, A	ADS	
10.0	Anti-rodent and Termite Repulsion test	For PVC outer sheath only	A	Refer Note	<u>Test applicable as indicated in Datasheet-A</u>
11.0	Anti-Fungal Test	For PVC outer sheath only	A	<u>Self-certification by vendor for anti-fungal property.</u>	<u>Same shall be applicable as per the project requirement to be furnished later.</u>
12.0	Special Tests				
I.	Hydrolytic Stability	For complete cable	A ^(*)	ASTM D 3137	<u>Test applicable as indicated in Datasheet-A</u>
II.	Ultraviolet Test	For complete cable	A ^(*)	BS EN ISO 4892-2	

**** These tests shall be conducted on one sample for the entire contract and duration of these tests shall be 14 days.**

Note: Few chippings of PVC compound are slowly ignited in a porcelain dish in a muffle furnace at about 600 deg. C. The resulting ignited ash is boiled with a little ammonium acetate solution (10%). A drop of aqueous sodium sulphide solution is placed on a thick filter paper and it is allowed to soak. The spot is touched with a drop of above extract. A black spot indicates the presence of anti-termite & rodent compound (lead).

BHEL					
ENGINEERING			QUALITY		
	Sign & Date	Name		Sign & Date	Name
Prepared by:		Bejankar	Checked by:		KUNAL GANDHI
Reviewed by:		MANISH	Reviewed by:		R K JAIN

BIDDER/SUPPLIER	
Sign & Date	Seal

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			



DAMODAR VALLEY CORPORATION (DVC)
PANCHET HYDEL STATION
TECHNICAL SPECIFICATION FOR RM&U OF UNIT # 1



INSTRUMENTATION CABLES

Signature

मुख्य अभियंता (सी एंड आई), अभियांत्रिकी
Chief Engineer (C & I), Engineering
अभियांत्रिकी विभाग/Engineering Department
दामोदर घाटी निगम/DVC
कोलकाता-54/KOLKATA-54





DAMODAR VALLEY CORPORATION (DVC)
PANCHET HYDEL STATION
TECHNICAL SPECIFICATION FOR RM&U OF UNIT # 1



INSTRUMENTATION CABLE															
ITEMS	Conductor Resistance®(A)	High Voltage®(A)	Insulation Resistance®(A)	Constructional detail, dimensions(A)	Outer-Sheath/ core marking, end sealing(A)	Thermal Stability(A)+	Visual, Surface finish(A) +	Electrical Parameters** (A) +	Persulphate Test (A) +	Overall/Coverage/Continuity(A)	Swidesh chimney Test (SS-4241475) (A)++	FRLS Test * (A) ++	Tensile & Elongation before & after aging(A)++	Vol.Resistivity: a: room & Elevated Temp. (A)++	Spark test report review ®
1. Instrument cable twisted and shielded															
Conductor(IS-8130)	Y			Y			Y								
Insulation(VDE-207)				Y	Y	Y	Y						Y		Y
Pairing/Twisting				Y	Y		Y								
Shielding				Y			Y			Y					
Drain wire	Y			Y			Y		Y	Y					
Inner Sheath				Y	Y	Y	Y					Y	Y		
Outer Sheath				Y	Y	Y	Y					Y	Y		
Overall cable	Y	Y	Y	Y	Y		Y	Y			Y			Y	
Cable Drums(IS-10418)				Y			Y								

Note: High Temp cables shall be subjected to tests as per VDE-207(Part-6) Compensating cables shall be checked for Thermal EMF / Endurance test as per IS 8784.

Note: This is an indicative list of tests/ checks. The manufacture is to furnish a detailed Quality Plan indicating his practice & Procedure along with relevant supporting documents during QP finalization for all items.

Note:®-Routine Test A –Acceptance Test **Y - Test Applicable**

Note: Sampling Plan for Acceptance test shall be as per IS 8784(As applicable)


- * FRLS Tests: Oxygen/Temp Index(ASTMD-2863), Smoke Density Rating(ASTM-D2843), HCL Emission (IEC-754-1)
- **Characteristic Impedance, Attenuation, Mutual Capacitance, Cross Talk(As applicable)

+ Sample size will be One No. of each size /type per lot.

++Sample size will be One No. sample for complete lot offered irrespective of size/type.

मुख्य अभियंता (सी एंड आई), अभियंत्रिकी
 Chief Engineer (C & I), Engineering
 अभियंत्रिकी विभाग/Engineering Department
 दामोदर घाटी निगम/DVC
 कोलकाता-54/KOLKATA-54




MANUFACTURER/ SUPPLIER NAME & ADDRESS	BIDDER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN	
		CUSTOMER : PE-QP-999-507-E005, REV. 03	SPEC. NO. : PE-QP-999-507-E005, REV. 03
PROJECT : CABLE TRAYS & ACCESSORIES		PO NO. :	DATE : 13.02.2020
ITEM: CABLE TRAYS & ACCESSORIES		SYSTEM: CABLING	SECTION: II
DATE :		SHEET 2 OF 7	

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK			REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N	D				M	C	N	
1	2	3	4	5	6	7	8	9	*	**				
	3. SURFACE FINISH		MA	VISUAL	100%	FREE FROM DEFECTS & SLAG	FREE FROM DEFECTS & SLAG	QC RECORD	✓	P	V	-		
2.2	SURFACE PREPARATION	1. CLEANING, PICKLING & RINSING & FLUXING 2. SURFACE FINISH	MA	VISUAL	100%	IS:2629	IS:2629	QC RECORD		P	-	-		
2.3	GALVANISING	1. TEMPERATURE OF ZINC BATH 2. DROSS 3. RATE OF IMMERSION 4. SURFACE FINISH	MA	MEASUREMENT	CONT INUC US	IS-2629	IS-2629	QC RECORD		P	-	-	Galvanization is to be done at galvanisation plant listed in annexure-2 to quality plan.	
			MA	VISUAL	100%	IS 2629	IS 2629	QC RECORD		P/V	-	-		
			MA	VISUAL	100%	FREE FROM BURRS, ROUGHNESS, SLAG FLUX, STAIN ETC.	FREE FROM BURRS, ROUGHNESS, SLAG FLUX, STAIN ETC.	QC RECORD		P	-	-		

ENGINEERING		QUALITY	
Prepared by: <i>Sujit Kumar Sethy</i>	Checked by: <i>Sujit Kumar Sethy</i>	Sign & Date: <i>Sujit Kumar Sethy 13/02/2020</i>	Name: <i>Kundan Prasad</i>
Reviewed by: <i>Manish Shukla</i>	Reviewed by: <i>Manish Shukla</i>	Sign & Date: <i>Manish Shukla 13/02/2020</i>	Name: <i>R K Jaisankar</i>


BIDDER/ SUPPLIER	
Sign & Date	Seal
Doc No:	Seal
Reviewed by:	Name
Approved by:	Seal

FOR CUSTOMER REVIEW & APPROVAL	
Doc No:	Seal
Reviewed by:	Name
Approved by:	Seal

MANUFACTURER/ SUPPLIER NAME & ADDRESS	QUALITY PLAN		SPEC. NO. :	DATE:
	CUSTOMER :		QP NO.: PE-QP-999-507-E005, REV. 03	DATE: 13.02.2022
	PROJECT:		PO NO.:	DATE:
	ITEM: CABLE TRAYS & ACCESSORIES		SECTION: II	
SYSTEM: CABLING		SHEET 3 OF		

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK			REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD				AGENCY	REMARKS
					IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4	IS-2500 (PART 1) LEVEL S-4			M	C	N	D		
1	2	3	4	5	6	7	8	9	*	**					
3.0 FINISHED ITEMS															
3.1	(CABLE TRAY, ACCESSORIES & HARDWARES)	1. DIMENSIONS	MA	MEASUREMENT	IS-2500 (PART 1) LEVEL S-4	APPD.DRG	APPD.DRG	APPD.DRG	INSP.REPORT	INSP.REPORT	INSP.REPORT	P	W	Overall thickness of finished product shall not be less than the thickness of cable tray & accessories defined in technical datasheet.	
		2. SURFACE FINISH	MA	VISUAL	IS-2500 (PART 1) LEVEL S-4	APPD.DRG	APPD.DRG	FREE FROM BURRS, SLAG, ROUGHNESS, F LUX, STAIN ETC.	INSP.REPORT	INSP.REPORT	INSP.REPORT	P	W	Fasteners shall be of good quality as per IS 1363	
		3. MARKING	MA	VISUAL	IS-2500 (PART 1) LEVEL S-4	APPD.DRG	APPD.DRG	APPD.DRG	INSP.REPORT	INSP.REPORT	INSP.REPORT	P	W	Following shall be engraved/ punched on each standard length of cable tray at the center of both sides of runner: 'PEM' (length of letter 90mm & height 30mm).	

BHEL				FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING		QUALITY		BIDDER/SUPPLIER		Doc No:	
Prepared by:	Sign & Date	Name	Sign & Date	Sign & Date	Name	Sign & Date	Seal
Reviewed by:	Manish	SUJIT KUMAR SETHY	13/02/2022				
		MANISH SHUKLA	13/02/2022				

	QUALITY PLAN	SPEC. NO.:	DATE:
MANUFACTURER/ SUPPLIER NAME & ADDRESS	BIDDER/ SUPPLIER NAME & ADDRESS	QP NO.: PE-QP-999-507-E005, REV. 03	DATE: 13.02.2020
PROJECT:	SYSTEM: CABLING	PO NO.:	DATE:
ITEM: CABLE TRAYS & ACCESSORIES	SECTION: II	SHEET 4 OF 4	

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY	REMARKS
					M	C/N			9	* D		
1	2	3	4	5	6	C/N	7	8			**	


3.0 FINISHED ITEMS

4 RIGIDITY (FOR TRAYS)	MA	DEFLECTION TEST	2 No./ LOT/ TYPE	APPD. DRG	APPD. DRG	2 No./ LOT/ TYPE	600MM wide cable tray to be tested. Maximum deflection shall not exceed 7MM on mid span on uniform loading of 100KG/M.
5.MASS OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-6745	IS-4759	IS-4759	INSPECTION REPORT ✓
6. UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS-4759	IS-2633	IS-4759	IS-4759	INSPECTION REPORT ✓

ENGINEERING		QUALITY	
Sign & Date	Name	Sign & Date	Name
<i>[Signature]</i>	SUJIT KUMAR SETHY	<i>[Signature]</i>	Kundan Prasad
Prepared by:	Checked by:	Reviewed by:	Reviewed by:
<i>[Signature]</i>	MANISH SHUKLA	<i>[Signature]</i>	R K Jaiswal

BIDDER/ SUPPLIER	
Sign & Date	Seal

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:	Sign & Date	Name	Seal
Reviewed by:			
Approved by:			

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		QUALITY PLAN		SPEC. NO. :	DATE:
	CUSTOMER :		REFERENCE DOCUMENT		QP NO. : PE-QP-999-507-E005, REV. 03	DATE: 13.02.2000
	PROJECT:		QUANTUM OF CHECK		PO NO.:	DATE:
	ITEM: CABLE TRAYS & ACCESSORIES		SYSTEM: CABLING		SECTION: II	

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	**	
		7. THICKNESS OF ZINC COATING	MA	PHYSICAL TEST	M IS-4759 C/ N	75 MICRONS (MINIMUM), 86 MICRONS (AVERAGE) for 2.0mm thick product. 55 MICRONS (MINIMUM), 65 MICRONS (AVERAGE) for 1.6mm thick product.	75 MICRONS (MINIMUM), 86 MICRONS (AVERAGE) for 2.0mm thick product. 55 MICRONS (MINIMUM), 65 MICRONS (AVERAGE) for 1.6mm thick product.	D INSP.REPORT	M P	
		8. ADHESION	MA	MECH. TEST	IS-4759	IS-2629	IS-2629	INSP.REPORT	P W	

BHEL			
ENGINEERING		QUALITY	
Prepared by:	Sign & Date	Checked by:	Sign & Date
Manish	13/02/2000	SUJIT KUMAR SETHY	13/02/2000
Reviewed by:	Reviewed by:	Reviewed by:	Reviewed by:
Manish	Manish	Manish Shukla	R. K. Jaiswal

BIDDER/ SUPPLIER	
Sign & Date	Seal

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:	Sign & Date	Name	Seal
Reviewed by:	Sign & Date	Name	Seal
Approved by:			


QUALITY PLAN	SPEC. NO.:	DATE:	
CUSTOMER :	QP NO.: PE-QP-999-507-E005, REV. 03	DATE: 13.02.2022	
PROJECT:	PO NO.:	DATE:	
ITEM: CABLE TRAYS & ACCESSORIES	SYSTEM: CABLING	SECTION: II	SHEET 6 OF

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK			REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C	N				M	C	N	
1	2	3	4	5	6		7	8	9	*	**			
	9. COUPLER PLATE		MA	VISUAL	100%	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP. REPORT	✓	P	W	INSPECTOR TO MENTION THE TOTAL NUMBER OF GUNNY BAGS/BUNDLES OF COUPLER PLATES, NUTS, BOLTS & WASHER IN THE INSPECTION REPORT.	
	10. NUT & BOLT		MA	VISUAL	100%	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP. REPORT	✓	P	W	FURTHER MANUFACTURER SHALL ATTACH THE DETAIL OF TOTAL NUMBER OF GUNNY BAGS/BUNDLES OF THE RESPECTIVE ITEMS WITH PACKING LIST.	
	11. WASHER		MA	VISUAL	100%	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP. REPORT	✓	P	W	Refer Note - 2	
	12. PACKING		MA	VISUAL	100%	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP. REPORT	✓	P	V		

ENGINEERING				QUALITY			
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Seal	
Manish	13/02/2022	SUJIT KUMAR SETHY	Kundan Prasad	13/02/2022	Kundan Prasad		
Reviewed by:		MANISH SHUKLA	Reviewed by:		R. K. JAIN		

BIDDER/SUPPLIER			
Doc No.:	Sign & Date	Name	Seal
Reviewed by:	Sign & Date	Name	Seal
Approved by:			

FOR CUSTOMER REVIEW & APPROVAL

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		PROJECT:		QP NO.: PE-QP-999-507-E005, REV. 03	DATE: 13.02.2023
	ITEM: CABLE TRAYS & ACCESSORIES		SYSTEM: CABLING		PO NO.:	DATE:
					SECTION: II	SHEET 7 OF

NOTES:

1. BHEL RESERVES THE RIGHT FOR CONDUCTING REPEAT TEST IF REQUIRED.
2. PHOTOGRAPHS OF COMPLETE CABLE TRAYS AFTER PACKING TO BE SENT TO BHEL PURCHASE GROUP FOR REVIEW BEFORE ISSUING MDCC.

LEGENDS:

*RECORDS, IDENTIFIED WITH "TICK"(✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION, D: DOCUMENTATION
 ** M: SUPPLIER/MANUFACTURER/ SUB-SUPPLIER, C: MAIN SUPPLIER/BHEL/ THIRD PARTY INSPECTION AGENCY, N: CUSTOMER,
 P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE
 MA: MAJOR, MI: MINOR, CR: CRITICAL

BHEL				FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING		QUALITY		BIDDER/SUPPLIER		Doc No:	
Sign & Date	Name	Checked by:	Sign & Date	Name	Sign & Date	Name	Seal
Prepared by: <i>Sujit Kumar Sathy</i> 13/02/2023	SUJIT KUMAR SETHY	Checked by: <i>Kundan Prasad</i> 13/02/2023	Sign & Date Seal	Name Seal	Reviewed by: Approved by:	Name Seal	Seal
Reviewed by: <i>Manish</i>	MANISH SHUKLA	Reviewed by: <i>Rk Jaiswal</i> 13/02/2023					

ANNEXURE-2 to Quality Plan
(LIST OF BHEL- PEM APPROVED GALVANIZERS)


SL. NO.	ITEM	VENDOR NAME	ADDRESS
1	Galvanising	Jenco Industrial Corporation	Chincholi Bunder Khkar Road Near Link Road Devruwadi Malad (W) Mumbai 400064
2	Galvanising	National Galvanizing Company	66, Barrackpore Kamarhatt Trunck Road Calcutta-700058
3	Galvanising	Sigma Galvanising Pvt. Ltd.	Plot No.C-169, TTC, MIDC Ind Area Navin Mumbai-400705
4	Galvanising	B.P. Projects PVT LTD	167A, Vivekananda Road Kolkata-700006
5	Galvanising	Standard Galvanisers	Makardah Road, Kabar Para, Bankra, Howarah -711403
6	Galvanising	Steel Products	National Highway No. 6, Chamrail, Kona, Howrah-711114
7	Galvanising	Unitech Fabricators & Engineers Pvt. Ltd	Village- Ajab Nagar, P.O. -Molla Simlia, P.S. - Singur, Dist - Hoogly, Pin-712223
8	Galvanising	Shivam Engineers & Fabricators	A0-282-284, Industrial Area, South Side of G.T. Road, Ghaziabad, U.P.
9	Galvanising	B.G. Shirke Construction Technology Pvt. Ltd	72-76, Mundhawa, Pune - 401 036
10	Galvanising	Galbro Ispat Galvanizers Pvt. Ltd.	GUT 11 AND 12, OPP. Kudus Steel,Rolling Mill, Wada, Thane , Mumbai
11	Galvanising	Eros Metals	G-97, MIDC, Bhulburi , Nagpur
12	Galvanising	Industrial Perforation (India) Pvt. Ltd.	Ganganagr, Katakhal, Kolkata-700132
13	Galvanising	Indmark Formtech Pvt. Ltd.	Phase - 3, E - 11 / 1, M. I. D. C., Chakan, Pune - 410 501, Maharashtra, India.
14	Galvanising	Namdhari Industrial Traders Pvt. Ltd.	Village Latton Dana, Chandigarh Road, Ludhiana
15	Galvanising	Neha Galvaniser	Jalan Industrial Estate, Gate No-1, 1st Right Choise Lane, Near N.G-6, Jangalpur, PO Domjur Howrah - 700071, West Bengal, India
16	Galvanising	Patny Systems (P) Ltd.	Unit-IV, Sy No. -228/9, Plot No. 6, IP Kuchavaram, Toopran(M) Dist.- Medak, Telegana - 502336
17	Galvanising	Parmar Metal Company	Survey No.207,Veraval (Shapar) Dist. Rajkot, India.
18	Galvanising	Rukmani Electrical & Fabricators Pvt, Ltd.	Urla Industrial Area, Urla Sarora Road, Raipur- 493 221 (Chhattisgarh) Shankharidaha Baniyarah, Jalan Industrial Complex, Gate no.3, Lane no. 4, Domjur, Howrah , W.B. - 71141
19	Galvanising	DMP Projects Pvt.Ltd.	Dulagarh Industrial Park, PS-Sankrail , Howrah -711302
20	Galvanising	Vinfab Engineers India Private Limited	Gut no. 224/1 & 2 Bhiwandi Wada State Highway, Village khupri, Dist. Thane,
21	Galvanising	Saral Projects & Processors	B-1, Industrial Area, Site-II, Amawan Road Rae Bareli
22	Galvanising	Brahampuri Steels Limited	172 (F) Industrial Area, Jhotwara, Jaipur-302013
23	Galvanising	Indiana Gratings PVT. LTD	F-5, MIDC Jejuri, Pune-412 303
24	Galvanising	M/s AVAIDS TECHNOVATORS PVT. LTD.	131, MATSYA INDUSTRIAL AREA, ALWAR RAJASTHAN

NOTES:

1. IT SHALL BE THE RESPONSIBILITY OF THE VENDOR TO GET THE MATERIAL GALVANIZED FROM THE ABOVE LIST WITHOUT ANY COMMERCIAL IMPLICATION TO BHEL

[Signature]
13.02.2020
(Sujit Kumar Sefny)
Etc

[Signature]
13/02/2020


MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN		SPEC. NO. :		DATE:	
		CUSTOMER :		QP NO.: PE-QP-999-507-E006, REV. 03		DATE: 08.07.2024	
		PROJECT:		PO NO.:			
		ITEM: CABLE TRAY SUPPORT SYSTEM- WELDED(GALV)		SYSTEM:CABLING		SECTION: II	

Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	**	
					M	C/N			M	C
									D	

1.0 RAW MATERIAL														
		1. CHEM. & PHY. PROPERTIES	MA	VERIFICATION OF TCS	100%	-	IS -2062	IS -2062	MILL TC	√	P/V	V	V	Refer Note-1
1.1	MILD STEEL SECTIONS (CHANNEL & ANGLES)	2.DIMENSIONS	MA	MEASUREMENT	100%	-	IS - 808	IS - 808	QC RECORD	√	P	-	-	
		3.SURFACE FINISH	MA	VISUAL	100%	-	IS-1079	IS-1079	QC RECORD	√	P	-	-	
1.2	ZINC	CHEM.COMP.	MA	CHEM TEST	EACH HEAT	-	IS-209	IS-209	TC	√	P/V	V	V	

2.0 IN-PROCESS														
		1.DIMENSIONS	MA	MEASUREMENT	100%	-	Refer remarks	Refer remarks	QC RECORD	√	P	V	V	Refer note-2
2.1	CUTTING	2.WELDING QUALITY (IF APPLICABLE)	MA	VISUAL	100%	-	ASME SEC. IX	ASME SEC. IX	QC RECORD	√	P	V	V	Refer Note-3
		3.SURFACE FINISH	MA	VISUAL	100%	-	-	FREE FROM DEFECTS & SLAG	QC RECORD	√	P	V	V	
2.2	SURFACE PREPARATION	1.CLEANING, PICKLING & RINSING & FLUXING	MA	VISUAL	100%	-	IS:2629	IS:2629	QC RECORD	√	P	-	-	
		2. SURFACE FINISH	MA	VISUAL	100%	-	IS:2629	IS:2629	QC RECORD	√	P	-	-	
2.3	GALVANIZING	1. TEMPERATURE OF ZINC BATH	MA	MEASUREMENT	CONTINUOUS	-	IS-2629	IS-2629	QC RECORD	√	P/V	-	-	Refer Note-4
		2.DROSS	MA	VISUAL	PERIODIC	-	IS-2629	IS-2629	QC RECORD	√	P/V	-	-	
		3.RATE OF IMMERSION	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECORD	√	P/V	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS,	QC RECORD	√	P/V	-	-	

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL					
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Sign & Date		Name		Seal	
Prepared by:	MANOJ KUMAR MEENA	Checked by:	KUNAL GANDHI	Sign	Date	Sign	Date	Sign	Date	Name	Name	Seal	Seal
Reviewed by:	MANISH SHUKLA	Reviewed by:	R. K. JAISWAL										

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN		SPEC. NO. :		DATE:	
		CUSTOMER :		QP NO.: PE-QP-999-507-E006, REV. 03		DATE: 08.07.2024	
		PROJECT:		PO NO.:			
		ITEM: CABLE TRAY SUPPORT SYSTEM- WELDED(GALV)		SYSTEM:CABLING		SECTION: II	


Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
					M	C/N				**	M	C	
1	2	3	4	5	6	7	8	9	*	D			

3.0 FINISHED ITEMS													
SLAG FLUX, STAIN ETC.													
3.1	CABLE TRAY SUPPORT SYSTEM- WELDED(GALV)												
	1. DIMENSIONS	MA	MEASUREMENT	IS- 2500 (PART 1) LEVEL LS-4	IS- 2500 (PART 1) LEVEL LS-4	IS - 808	IS - 808	INSP.REPO RT	√	P	W	W	Refer note-2
	2. SURFACE FINISH	MA	VISUAL	IS- 2500 (PART 1) LEVEL S-4	IS- 2500 (PART 1) LEVEL S-4	-	FREE FROM BURRS, SLAG, ROUGHNESS, FLUX, STAIN ETC.	INSP.REPO RT	√	P	W	W	
	3.MASS OF ZINC COATING	MA	CHEM. TEST	IS- 4759	IS- 4759	IS-6745	610 gms/ Sq m	INSP.REPO RT	√	P	W	W	
	4.UNIFORMITY OF ZINC COATING	MA	CHEM. TEST	IS- 4759	IS- 4759	IS-2633	IS-2633	INSP.REPO RT	√	P	W	W	
	5.THICKNESS OF ZINC COATING	MA	PHYSICAL TEST	IS- 4759	IS- 4759	Refer remarks	Refer remarks	INSP.REPO RT	√	P	W	W	Refer note-5
	6.ADHESION	MA	MECH.TEST	IS- 4759	IS- 4759	IS-2629	IS-2629	INSP.REPO RT	√	P	W	W	
7.PACKING	MA	VISUAL	100%	100%	BHEL APPD. DOCUMENT	BHEL APPD. DOCUMENT	INSP.REPO RT	√	P	W	-	Refer Note-6	

NOTES:

- Steel shall be procured from SAIL/ TISCO/ RINL/ BHUSAN/ JINDAL ISPAT/ ESSAR/ LLOYD/ IISCO/ authorised sail re rollers.
- Length of one member of Cable Tray Support System-Welded(Galv) shall be 5.5 mtrs to 6.5 mtrs
- Welding is to be done by qualified welders in accordance with ASME Sec. IX Article III. WPS, PQR & WPQ to be reviewed during inspection.
- Galvanization is to be done at BHEL approved Galvanization Plants listed in Annexure-1 to Quality Plan.
- Thickness of zinc coating shall be 75 microns (minimum) & 86 microns (average).


ENGINEERING				QUALITY				FOR CUSTOMER REVIEW & APPROVAL					
Sign & Date		Name		Sign & Date		Name		Doc No:		Sign & Date		Name	
Prepared by:	MANOJ KUMAR MEENA	Checked by:	KUNAL GANDHI	Sign & Date		Sign & Date		Reviewed by:		Sign & Date		Seal	
Reviewed by:	MANISH SHUKLA	Reviewed by:	R. K. JAISWAL	Sign & Date		Sign & Date		Approved by:		Sign & Date			

MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		STANDARD QUALITY PLAN		SPEC. NO. :		DATE:				
		CUSTOMER :		QP NO.: PE-QP-999-507-E006, REV. 03		DATE: 08.07.2024				
		PROJECT:		PO NO.:						
		ITEM: CABLE TRAY SUPPORT SYSTEM- WELDED(GALV)		SYSTEM: CABLING		SECTION: II		SHEET 3 OF 3		
Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLAS S	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	* D	
					M	C/N		9	** M	
					C/N			D	C	

6. Photographs of complete Cable Tray Support System-Welded (Galv) after packing to be sent to BHEL Purchase Group for review before issuing MDCC.
7. Project specific Quality Plan to be developed based on customer requirement.
8. BHEL reserves the right for conducting repeat test, if required.
9. For export job, BHEL specification for seaworthy packing for export job to be followed.
10. Packing shall be suitable for storage at site in tropical climatic conditions.
11. Latest revision/ year of issue of all the standards (IS/ASME/IEC etc.) indicated in QP shall be referred.

LEGENDS:
 *Records, Identified WITH "Tick"(✓) shall be essentially included by supplier in QA Documentation, **D:** Documentation
 ** **M:** Supplier/ Manufacturer/ Sub-Supplier, **C:** Main Supplier/ BHEL/ Third Party Inspection Agency, **N:** Customer,
P: Perform, **W:** Witness, **V:** Verification, as appropriate
MA: Major, **MI:** Minor, **CR:** Critical


BHEL			
ENGINEERING		QUALITY	
Sign & Date	Name	Sign & Date	Name
Prepared by:	MANOJ KUMAR MEENA	Checked by:	KUNAL GANDHI
Reviewed by:	MANISH SHUKLA	Reviewed by:	R. K. JAISWAL
BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL	
Sign & Date	Seal	Doc No:	Sign & Date
Reviewed by:		Reviewed by:	Name
Approved by:		Approved by:	Seal

		MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS				STANDARD QUALITY PLAN				SPEC. NO :		DATE: 02.11.2020	
		CUSTOMER :				PROJECT :				QP NO.: PE-QP-999-509-E001, R2.		PO NO.:	
ITEM: ABOVE GROUND EARTHING MATERIALS		SYSTEM: EARTHING				SECTION: II		SHEET 1 OF 5					
Sl. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS	
1	2	3	4	5	6	7	8	9	*	D	M	C	N

Sl. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS	
1.0	RAW MATERIAL:												
1.1	MILD STEEL (FLATS & RODS) AS PER SPECIFICATION	1. CHEMICAL & PHYSICAL PROPERTIES 2. DIMENSIONS 3. SURFACE FINISH	MA	VERIFICATION OF TCS MEASUREMENT	100% 100%	IS 2062 IS 1730 IS 1079	IS 2062 IS 1730 IS 1079	MILL TC QC RECORDED QC RECORDED	✓ ✓ ✓	P P P	V - -	- - -	REFER REMARKS AT SL. NO. 3
1.2	ZINC	1. CHEMICAL COMP.	MA	CHEM. TEST	SAMPLE	IS 209	IS 209	QC RECORDED	✓	P	V	-	


Sl. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS	
2.0	IN PROCESS:												
2.1	CUTTING, DRILLING	1. DIMENSIONS 2. SURFACE FINISH	MA	MEASUREMENT VISUAL	100% 100%	APPROVED DATA SHEET / DRAWING -	APPROVED DATA SHEET / DRAWING FREE FROM DEFECTS/ SLAG	QC RECORDED TEST/ INSPN. REPORT	✓ ✓	P P	V V	- -	

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL							
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Doc No:		Sign & Date		Name		Seal	
Prepared by:	Manish Shukla	Name:	Vikas Kumar Singh	Checked by:	Kunal Gandhi	Reviewed by:	Ritesh Kumar	Approved by:	Jaiswal						

		MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS					STANDARD QUALITY PLAN					SPEC. NO : QP NO.: PE-QP-999-509-E001, R2.		DATE: 02.11.2020	
		PROJECT: ITEM: ABOVE GROUND EARTHING MATERIALS					SYSTEM: EARTHING					PO NO.:		SECTION: II	
Sl. No.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS	
					M	C/N				M	C	N	D		
1	2	3	4	5	6	7	8	9	*	**					

2.2	SURFACE PREPARATION	1. CLEANING, PICKLING, RINSING & FLUXING 2. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	IS 2629	QC RECO RD	✓	P	-	-	
2.3	GALVANIZING	1. TEMPERATURE OF BATH 2. DROSS	MA	MEASUREMENT VISUAL	CONTINUOUS PERIODIC	-	IS 2629	IS 2629	QC RECO RD	✓	P	-	-	Galvanization is to be done at galvanization plant listed in annexure-1 to quality plan.
		3. RATE OF IMMERSION	MA	VISUAL / MEASUREMENT	100%	-	IS 2629	IS 2629	QC RECO RD	✓	P	-	-	
		4. SURFACE FINISH	MA	VISUAL	100%	-	IS 2629	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN	QC RECO RD	✓	P	-	-	
3.0	FINISHED ITEMS:													Note: sample for chemical test shall be

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL							
ENGINEERING		QUALITY		SIGN & DATE		SIGN & DATE		SIGN & DATE		SIGN & DATE		SIGN & DATE		SIGN & DATE	
Prepared by:	Manish Singh	Name:	Vikas Kumar Singh	Checked by:	Kunal Gandhi	Reviewed by:	Manish Shukla	Reviewed by:	Ritesh Kumar	Approved by:	Jaiswal	Reviewed by:	Kunal Gandhi	Approved by:	Jaiswal

		MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS					STANDARD QUALITY PLAN					SPEC. NO :		DATE: 02.11.2020		
		CUSTOMER :					PROJECT :					QP NO.:		PE-QP-999-509-E001, R2.		
		ITEM: ABOVE GROUND EARTHING MATERIALS					SYSTEM: EARTHING					PO NO.:		SHEET 3 OF 5		
		SECTION: II														
SI. No.	COMPONENT S & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY				REMARKS	
					M	C/N			*	D	M	C	N			
1	2	3	4	5	6	7	8	9								

3.1	MS FLATS	1. CHEMICAL COMP.	MA	CHEM. TEST	1 No./LOT /SIZE	IS 2026	IS 2026	IS 2026	LAB TC	✓	P	V	-	selected by BHEL & testing shall be done at NABL/ govt. approved Lab.
		2. DIMENSIONS	MA	MEASUREMENT	IS 2500 (PART 1) LEVEL S-4	APPROVED DATA SHEET / DRAWING	APPROVED DATA SHEET / DRAWING	INSPECTION REPORT		✓	P	W	-	Sampling plan for galvanization test: Inspection shall be as per table 2 of IS 4759 and same is mentioned below:-
		3. SURFACE FINISH	MA	VISUAL	IS 2500 (PART 1) LEVEL S-4	-	FREE FROM BURRS, ROUGHNESS, SLAG, FLUX, STAIN ETC.	QC RECORDED		✓	P	W	-	

No. of units in a Lot	No. of units to be selected in a sample	Acceptance No.
(1)	(2)	(3)
Upto 25	3	0
26-100	5	0
101-	8	1
151-	13	1
501-	20	2
1001-	32	3

BHEL			
ENGINEERING		QUALITY	
Sign & Date	Name	Sign & Date	Name
	VIKAS KUMAR SINGH		KUNAL GANDHI
Prepared by:		Checked by:	
Reviewed by:	MANISH SHUKLA	Reviewed by:	RITESH KUMAR JAISWAL

BIDDER/ SUPPLIER			
Sign & Date	Seal	Sign & Date	Seal
Reviewed by:		Reviewed by:	
Approved by:		Approved by:	

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:	Sign & Date	Name	Seal
Reviewed by:		Reviewed by:	
Approved by:		Approved by:	