


GEM PARAMETERS**1.0 PRODUCT SPECIFICATIONS**

- a) Category of cable : FR
 b) Type Of Insulation (Shall Conforming To IS:5831:1984 Latest) : TYPE D
 c) Nominal Cross Sectional Area Of Conductor (In Sq.Mm) : 2.5, 4.0, 6.0
 d) Conductor Material As Per Cl.4.1 Of IS:694:2010
 (Complying With IS:8130:1984 Latest) : Plain Copper

ADDITIONAL PARAMETERS

| S.No. | Specification Parameter Name | Bid Requirement (Allowed Values) |
|-------|---|---|
| 1 | CONDUCTOR CLASS | Class-2 as per IS: 8130 |
| 2 | MIN. NO. OF STRANDS & MAX. RESISTANCE OF CONDUCTOR | As per IS 8130 table-2 |
| 3 | STANDARD BUNDLE LENGTH | 90-100 meters |
| 4 | THE COLOUR WISE QUANTITY (MTR) OF PVC WIRES SHALL BE: | <p>For 2.5 sq mm: BLACK: 96000 RED: 32000 YELLOW: 32000 BLUE: 32000 GREY: 2000 WHITE: 2000</p> <p>For 4.0 sq mm: BLACK: 40500 RED: 13500 YELLOW: 13500 BLUE: 13500</p> <p>For 6 sq mm: BLACK: 96000 RED: 32000 YELLOW: 32000 BLUE: 32000 GREY: 2000 WHITE: 2000</p> |

| | | | | | | | | | | |
|--|--|--|-----------------------|--|---------------------------------|--|---------------------------------|--|------------------|--|
|  | MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS | | STANDARD QUALITY PLAN | | | | SPEC. NO : | | DATE: | |
| | | | CUSTOMER : | | | | QP NO.: PE-QP-999-558-E003, R01 | | DATE: 10.07.2020 | |
| | | | PROJECT: | | | | PO NO.: | | DATE: | |
| | | | ITEM: PVC Wires | | SYSTEM: STATION LIGHTING SYSTEM | | SECTION: II | | SHEET 1 OF 4 | |


| 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 | |

1.0 RAW MATERIAL/BOUGHT OUT ITEMS

| | | | | | | | | | | | | | | |
|-----|-----------------------------|------------------------|----|------------------|---------------|---|---------|---------|----------------------------|---|-----|---|---|--|
| 1.1 | CONDUCTOR (COPPER) | 1. Physical properties | MA | Physical Tests | Sample/ Batch | - | IS:8130 | IS:8130 | Certificate of conformance | ✓ | P/V | V | - | |
| | | 2. Elec. Properties | MA | Electrical Tests | Sample/ Batch | - | -do- | -do- | -do- | ✓ | P/V | V | - | |
| 1.2 | PVC Compound for insulation | 1. Material Properties | MA | Physical Tests | Sample/ Batch | - | IS 5831 | IS 5831 | Certificate of conformance | ✓ | P | V | - | |


2.0 ROUTINE/ ACCEPTANCE/ TYPE TEST

| | | | | | | | | | | | | | | |
|-----|-----------|----------------------|----|---------------------|----------------|---------------|--|--|-----------------------------------|---|-----|---|---|--|
| 2.1 | PVC Wires | SURFACE DEFECTS | MA | Visual | IS 694 Annex A | - | IS:694 | IS:694 | Insp. And test report from manuf. | ✓ | P/V | V | - | BIS APPROVED MAKE |
| 2.2 | | CONSTRUCTION OF WIRE | MA | Visual/ Measurement | -DO- | - | IS-694 (table-3) IS-8130 (table-2) Appd DS | IS-694 (table-3) IS-8130 (table-2) Appd DS | -DO- | ✓ | P/V | V | - | |
| 2.3 | | TYPE TESTS | CR | Tests | One sample | One sample of | IS:694 (TABLE-1) | IS:694 (TABLE-1) | Test cert. | ✓ | P | W | | 1) Type test shall be conducted on first |

| BHEL | | | | | |
|--------------|---|---|--------------|--|---------------|
| ENGINEERING | | | QUALITY | | |
| | Sign & Date | Name | | Sign & Date | Name |
| Prepared by: | MUDIT CHOPRA MEET SAGAR SINGH RAJPAL | MUDIT CHOPRA MEET SAGAR SINGH RAJPAL | Checked by: |  Digitally signed by Kunal Gandhi Date: 2020.07.20 19:24:56 +05'30' | KUNAL GANDHI |
| Reviewed by: | PRAVEEN DUTTA | PRAVEEN DUTTA | Reviewed by: | Digitally signed by Ritesh Kumar Jaiswal Date: 2020.07.30 13:36:25 +05'30' | R. K. JAISWAL |


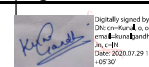

| BIDDER/ SUPPLIER | |
|------------------|--|
| Sign & Date | |
| Seal | |

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

| | | | | | | | | | | |
|--|--|--|-----------------------|--|---------------------------------|--|---------------------------------|--|------------------|--|
|  | MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS | | STANDARD QUALITY PLAN | | | | SPEC. NO : | | DATE: | |
| | | | CUSTOMER : | | | | QP NO.: PE-QP-999-558-E003, R01 | | DATE: 10.07.2020 | |
| | | | PROJECT: | | | | PO NO.: | | DATE: | |
| | | | ITEM: PVC Wires | | SYSTEM: STATION LIGHTING SYSTEM | | SECTION: II | | SHEET 2 OF 4 | |


| 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 | |

| | | | | | | | | | | | | | | |
|-----|--|--|----|----|--------------------------|-----------------------|-----------------|----------|-------------|---|---|---|--|---|
| | | | | | of each wire type & size | each wire type & size | | | | | | | | project Order supply from rate Contract. 2) Refer note 1 & 2 |
| 2.4 | | ACCEPTANCE TESTS a) Annealing test b) Conductor Resistance test c) Thickness of Insulation d) Tensile strength and elongation at break of insulation e) IR test f) HR Test g) Flammability test h) Oxygen index test i) Temperature index j) Halogen acid | MA | CR | IS 694 Annex A | IS 694 Annex A | IS 694/ IS 8130 | IS 10810 | Test Report | √ | P | W | | Refer note-1 |

| BHEL | | | | | |
|--------------|--|---|--------------|--|---------------|
| ENGINEERING | | | QUALITY | | |
| | Sign & Date | Name | | Sign & Date | Name |
| Prepared by: |  MUDIT CHOPRA MEET SAGAR SINGH RAJPAL | MUDIT CHOPRA MEET SAGAR SINGH RAJPAL | Checked by: |  RITESH KUMAR JAISWAL Date: 2020/07/30 13:37:13 | KUNAL GANDHI |
| Reviewed by: |  PRAVEEN DUTTA | PRAVEEN DUTTA | Reviewed by: | | 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 : | | DATE: | |
| | | | CUSTOMER : | | | | QP NO.: PE-QP-999-558-E003, R01 | | DATE: 10.07.2020 | |
| | | | PROJECT: | | | | PO NO.: | | DATE: | |
| | | | ITEM: PVC Wires | | SYSTEM: STATION LIGHTING SYSTEM | | SECTION: II | | SHEET 3 OF 4 | |

| 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 | |


| | | | | | | | | | | | | | | |
|-----|--|----------------------|----|--------|----------------|----------------|---------|---------|--------------|---|-----|---|--|--|
| | | gas k) Smoke density | | | | | | | | | | | | |
| 2.5 | | ROUTINE TESTS | MA | -DO- | 100% | - | -DO- | -DO- | -DO- | √ | P/V | V | | |
| 2.6 | | MARKING | MA | VISUAL | IS 694 Annex A | IS 694 Annex A | APPD DS | APPD DS | INSP. REPORT | √ | P/V | W | | |

3.0 PACKING

| | | | | | | | | | | | | | | |
|--|---------|---|-------|--------|------|------|------------------------|------------------------|-------------------|---|---|---|---|--|
| | PACKING | Soundness of Packing against transit damage | Major | Visual | 100% | 100% | BHEL approved document | BHEL approved document | Inspection report | √ | P | W | - | |
|--|---------|---|-------|--------|------|------|------------------------|------------------------|-------------------|---|---|---|---|--|

NOTES:


- In case of FR type wires, FR properties test (Oxygen Index & Temp. Index) are also applicable.
- Type test report of successfully conducted test on First project of rate contract shall be referred for subsequent purchase orders & further conduction of type test is not required.
- Project specific QP shall be based on customer requirement. In case, any changes in QP commented by customer at contract stage shall be carried out by bidder without any implication to BHEL/ Customer.
- For export jobs, BHEL technical specification for seaworthy packing for export jobs is to be followed.
- Packing shall be suitable for storage at site in tropical climatic conditions. **Refer Annexure-I for packing specification.**
- Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc.) Indicated in QP shall be referred.
- BHEL reserves the right for conducting repeat test if required.
- After packing and prior to issue MDCC, photographs of items to be dispatched shall be sent to BHEL purchase group for review.

| BHEL | | | | | |
|--------------|---|---|--------------|--|---------------|
| ENGINEERING | | | QUALITY | | |
| | Sign & Date | Name | | Sign & Date | Name |
| Prepared by: | MUDIT CHOPRA MEET SAGAR SINGH RAJPAL | MUDIT CHOPRA MEET SAGAR SINGH RAJPAL | Checked by: |  R. K. Jaiswal Date: 2020.07.30 | KUNAL GANDHI |
| Reviewed by: | PRAVEEN DUTTA | PRAVEEN DUTTA | Reviewed by: | Digitally signed by RITESH KUMAR JAISWAL Date: 2020.07.30 | R. K. JAISWAL |

13:37:53 +05'30'

| 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 : | | DATE: | | | | |
| | | | CUSTOMER : | | | | QP NO.: PE-QP-999-558-E003, R01 | | DATE: 10.07.2020 | | | | |
| | | | PROJECT: | | | | PO NO.: | | DATE: | | | | |
| | | | ITEM: PVC Wires | | SYSTEM: STATION LIGHTING SYSTEM | | 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 | |
| 1 | 2 | 3 | 4 | 5 | 6 | | 7 | 8 | 9 | * D | ** | | |
| | | | | | M | C/ N | | | | | M | C | |


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

| BHEL | | | | | |
|--------------|--|--|--------------|---|----------------------|
| ENGINEERING | | | QUALITY | | |
| | Sign & Date | Name | | Sign & Date | Name |
| Prepared by: | MUDIT CHOPRA MEET SAGAR SINGH RAJPAL | MUDIT CHOPRA MEET SAGAR SINGH RAJPAL | Checked by: |  | KUNAL GANDHI |
| Reviewed by: | PRAVEEN DUTTA | PRAVEEN DUTTA | Reviewed by: | RITESH KUMAR JAISWAL | RITESH KUMAR JAISWAL |

| BIDDER/ SUPPLIER | |
|------------------|--|
| Sign & Date | |
| Seal | |

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

4. 
 Ritesh Kumar Jaiswal
 Date: 2020/07/30 13:38:39 +05'30'

ANNEXURE-I TO QUALITY PLAN
PACKING SPECIFICATIONS- PVC WIRES PACKAGE

PACKING

1. The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling.
2. The wire shall be clean and dry prior to packaging.
3. The wire shall be supplied in packed coils. The tapes used for packing shall not bleed, leave residue, or damage the item when removed.
4. The inside coil diameters shall not be smaller than the minimum safe allowable bending diameter for wires.
5. The coil shall be placed in a corrugated paperboard/ fibreboard container/ mono carton.
6. The mono cartons shall be wrapped or bagged or tied in place in master cartons. The master carton shall be taped and then wrapped with cushioning material.
7. The dimensions of cartons shall be as per manufacturer's recommendations.