

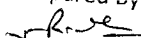
**Annexure – I**

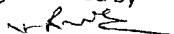
PR No.: 30026420, Dated: 20.09.2017

Item No.- 1 : EVA (Front), Qty. : 5,12,000 SQM.

Item No.- 2 : EVA (Back), Qty. : 5,12,000 SQM.

|                                                                                                                                                                                                                                                                    | <b>A. PRE-QUALIFICATION CRITERIA</b>                                                                                                                                                                                                                                 | <b>Bidder's Confirmation</b><br>(Please indicate deviations, if any)                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.                                                                                                                                                                                                                                                                 | The offer shall be quoted only by the original EVA Manufacturers. However OEMs can also quote through their authorized channel partners/ dealers / representatives with a valid authorization certificate.                                                           | Manufacturing Plant Location:<br>(Complete Address & Contact Details)                                                                                                                                                                          |
| 2.                                                                                                                                                                                                                                                                 | Vendors should have a minimum of 2,000,000 (two million) SQM per annum production capacity for EVA.                                                                                                                                                                  | Annual in-house manufacturing capacity for EVA:.....SQM<br><br>Vendors should provide Documentary evidence for demonstrating their plant capacity published by the way of published annual reports, licenses, third party certification etc... |
| 3.                                                                                                                                                                                                                                                                 | Vendors should have supplied EVA of minimum 660,000 (six hundred sixty thousand) SQM equivalent per annum to reputed SPV Module manufacturers. The reputed module manufacturer should have manufactured module of rating 250 Wp or above and shall be IEC certified. | Vendors should provide copies of purchase order/ contracts/ delivery documents, performance certificate from their customer's etc., PV module manufacturers for supply of EVA.                                                                 |
| <b>BHEL RESERVES THE RIGHT FOR INDEPENDENT VERIFICATION OF THE CLAIMS MADE FOR CONFORMANCE TO THE PRE-QUALIFICATION CRITERION. BIDDERS TO ENSURE PROVIDING AUTHENTIC CERTIFICATES / DOCUMENTATION AND CREDENTIALS IN ORDER TO QUALIFY FOR BHEL TENDER PROCESS.</b> |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                |
|                                                                                                                                                                                                                                                                    | <b>B. TECHNICAL</b>                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                |
| 1.                                                                                                                                                                                                                                                                 | EVA (Front) offered shall comply with BHEL Technical Specification No. PS-901-02-0010, Rev. 00. & EVA (Back) offered shall comply with BHEL Technical Specification No. PS-901-02-0011, Rev. 00.                                                                     | Acceptable/Not Acceptable                                                                                                                                                                                                                      |
| 2.                                                                                                                                                                                                                                                                 | Certificate of conformance to the specification shall be provided with each lot mentioning BHEL Purchase Order number and quantity supplied.                                                                                                                         | Acceptable/Not Acceptable                                                                                                                                                                                                                      |
| 3.                                                                                                                                                                                                                                                                 | Supplier has to replace defective item found during opening of the package at the time of actual use at BHEL.                                                                                                                                                        | Acceptable/Not Acceptable                                                                                                                                                                                                                      |
| <b>C. Price Basis</b>                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                |
| 1.                                                                                                                                                                                                                                                                 | The price is to be quoted on per Metre Square basis.                                                                                                                                                                                                                 | Acceptable/Not Acceptable                                                                                                                                                                                                                      |

  
R K Pradhan

Checked By  
  
Ananda Rao N.

Approved By  
  
Purushotham C.N.



**ELECTROPORCELAINS DIVISION  
BENGALURU – 560012, INDIA  
Purchase Specification  
Group: Photovoltaic Module**

SPEC. NO: PS-901-02-0010

REV. 00 JOB NO.-STD.

PAGE 01 OF 02

**EVA – ETHYLENE VINYL ACETATE SHEET (FRONT)**

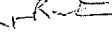
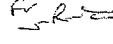
**1.0 PHYSICAL CHARACTERISTICS.**

|      |                                                       |                                                                                                        |
|------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1.1  | Material                                              | : Ethylene Vinyl Acetate                                                                               |
| 1.2  | Dimensions                                            | : Width – 985 ± 2 mm<br>Thickness – 0.45 to 0.50 mm<br>Length – in roll form of 100 linear meters each |
| 1.3  | Surface Type                                          | : Inside – Matt; Outside – Polished / Embossed                                                         |
| 1.4  | Tensile Strength                                      | : 18 ± 3 Mpa min.                                                                                      |
| 1.5  | Water absorption                                      | : < 0.1 %                                                                                              |
| 1.6  | Thermal Conductivity                                  | : 0.27 W / m.K                                                                                         |
| 1.7  | Specific Heat                                         | : 2.8 J / g.K                                                                                          |
| 1.8  | Thermal Shrinkage                                     | : < 1 %                                                                                                |
| 1.9  | Adhesion to Glass                                     | : > 70 N / cm                                                                                          |
| 1.10 | Optical Transmittance for wave length (280-359.99 nm) | : > 80 %                                                                                               |
| 1.11 | Optical Transmittance for wave length (360-1100 nm)   | : > 91 %                                                                                               |
| 1.12 | UV Cut Off wave length                                | -                                                                                                      |
| 1.13 | Refractive Index                                      | : 1.48                                                                                                 |
| 1.14 | Dielectric Strength                                   | : > 25 kV / mm                                                                                         |
| 1.15 | Volume Resistivity                                    | : 1 x 10 <sup>15</sup> min.                                                                            |
| 1.16 | Gel Content                                           | : > 80 %                                                                                               |
| 1.17 | Color                                                 | : Transparent                                                                                          |
| 1.18 | Haze                                                  | : < 7%                                                                                                 |
| 1.19 | Vinyl Acetate Content                                 | : 26 - 33 %                                                                                            |
| 1.20 | Ethylene Vinyl Acetate should be                      | : PID Resistance<br>: Good Adhesive<br>: Excellence Weather ability                                    |

COPY RIGHT AND CONFIDENTIAL

The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.

| Revision (00):        | Issued By | Prepared By | Checked By | Approved By | Date     |
|-----------------------|-----------|-------------|------------|-------------|----------|
| 1 <sup>st</sup> Issue | SPV Eng.  | RKP         | NAR        | CNP         | 20.09.17 |

|                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                  |           |                                                                                         |                                                                                          |                                                                                           |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------|
|                                                                                                                                                                                                                            | <br>BHEL-EPD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ELECTROPORCELAINS DIVISION<br>BENGALURU – 560012, INDIA<br>Purchase Specification<br>Group : Photovoltaic Module |           |                                                                                         |                                                                                          | SPEC. NO: PS-901-02-0010                                                                  |              |
|                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                  |           |                                                                                         |                                                                                          | REV. 00                                                                                   | JOB NO.-STD. |
|                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                  |           |                                                                                         |                                                                                          | PAGE 02 OF 02                                                                             |              |
| COPY RIGHT AND CONFIDENTIAL<br><br>the information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company. | <b>2.0 VISUAL CHARACTERISTICS:</b><br>2.1 Appearance: Smooth surface, uniform thickness and shall have no discoloration.<br>2.2 Shall be non-sticky at room temperature<br>2.3 Shall have not any bubble and peeling                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                  |           |                                                                                         |                                                                                          |                                                                                           |              |
|                                                                                                                                                                                                                            | <b>3.0 PACKING CONDITIONS</b><br><br>3.1 EVA roll shall be packed in air-tight Aluminium foil / foam sheet to avoid possible material degradation.<br><br>3.2 Each roll shall have manufacturers label containing <ol style="list-style-type: none"> <li>1) Manufacturers Name</li> <li>2) Lot No</li> <li>3) Specification No. - BHEL / PS-901-02-0010</li> <li>4) Date of Manufacture</li> <li>5) Date of Expiry</li> <li>6) Dimensions</li> <li>7) Width</li> <li>8) Quantity</li> <li>9) Weight</li> </ol><br>3.3 Final packing box shall have a label containing BHEL Purchase Order No. and Date.<br><br>3.4 Each lot must be accompanied with Test Certificate. |                                                                                                                  |           |                                                                                         |                                                                                          |                                                                                           |              |
|                                                                                                                                                                                                                            | <b>4.0 INSPECTION AT BHEL</b><br><br>4.1 Visual Inspection, Dimensional & Properties evaluation.<br><br>4.2 Vis Single Sampling Plan as per IS:10673-1983, Special Inspection Level S-4, AQL 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                  |           |                                                                                         |                                                                                          |                                                                                           |              |
|                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                  |           |                                                                                         |                                                                                          |                                                                                           |              |
|                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Revision (00):                                                                                                   | Issued By | Prepared By                                                                             | Checked By                                                                               | Approved By                                                                               | Date         |
|                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 <sup>st</sup> Issue                                                                                            | SPV Eng.  | RKP  | NAR  | CNP  | 20.09.17     |



BHEL-EPD

ELECTROPORCELAINS DIVISION  
BENGALURU – 560012, INDIAPurchase Specification  
Group: Photovoltaic Module

SPEC. NO: PS-901-02-0011

REV. 00 JOB NO.-STD.

PAGE 01 OF 02

## EVA – ETHYLENE VINYL ACETATE SHEET (BACK)

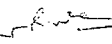
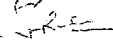
## 1.0 PHYSICAL CHARACTERISTICS

|      |                                                       |                                                                                                            |
|------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1.1  | Material                                              | : Ethylene Vinyl Acetate                                                                                   |
| 1.2  | Dimensions                                            | : Width – $985 \pm 2$ mm<br>Thickness – 0.45 to 0.50 mm<br>Length – in roll form of 100 linear meters each |
| 1.3  | Surface Type                                          | : Inside – Matt; Outside – Polished / Embossed                                                             |
| 1.4  | Tensile Strength                                      | : $18 \pm 3$ Mpa min.                                                                                      |
| 1.5  | Water absorption                                      | : $< 0.1$ %                                                                                                |
| 1.6  | Thermal Conductivity                                  | : 0.27 W / m.K                                                                                             |
| 1.7  | Specific Heat                                         | : 2.8 J / g.K                                                                                              |
| 1.8  | Thermal Shrinkage                                     | : $< 1$ %                                                                                                  |
| 1.9  | Adhesion to Glass                                     | : $> 70$ N / cm                                                                                            |
| 1.10 | Optical Transmittance for wave length (280-359.99 nm) | : $< 10$ %                                                                                                 |
| 1.11 | Optical Transmittance for wave length (360-1100 nm)   | : $> 91$ %                                                                                                 |
| 1.12 | UV Cut Off wave length                                | : 360 nm                                                                                                   |
| 1.13 | Refractive Index                                      | : 1.48                                                                                                     |
| 1.14 | Dielectric Strength                                   | : $> 25$ kV / mm                                                                                           |
| 1.15 | Volume Resistivity                                    | : $1 \times 10^{15}$ min.                                                                                  |
| 1.16 | Gel Content                                           | : $> 80$ %                                                                                                 |
| 1.17 | Color                                                 | : Transparent                                                                                              |
| 1.18 | Haze                                                  | : $< 7$ %                                                                                                  |
| 1.19 | Vinyl Acetate Content                                 | : 26 - 33 %                                                                                                |
| 1.20 | Ethylene Vinyl Acetate should be                      | : PID Resistance<br>: Good Adhesive<br>: Excellence Weather ability                                        |

COPY RIGHT AND CONFIDENTIAL

The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company.

| Revision (00):        | Issued By | Prepared By | Checked By | Approved By | Date     |
|-----------------------|-----------|-------------|------------|-------------|----------|
| 1 <sup>st</sup> Issue | SPV Eng.  | RKP         | NAR        | CNP         | 20.09.17 |

|                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                  |           |                                                                                         |                                                                                          |                                                                                           |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------|
|                                                                                                                                                                                                                           | <br>BHEL-EPD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ELECTROPORCELAINS DIVISION<br>BENGALURU – 560012, INDIA<br><b>Purchase Specification</b><br><b>Group : Photovoltaic Module</b>                                                                   |           | SPEC. NO: PS-901-02-0011                                                                |                                                                                          |                                                                                           |          |
|                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                  |           | REV. 00                                                                                 | JOB NO.-STD.                                                                             |                                                                                           |          |
|                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                  |           | PAGE 02 OF 02                                                                           |                                                                                          |                                                                                           |          |
| COPY RIGHT AND CONFIDENTIAL<br><br>The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest of the company. | <b>2.0 VISUAL CHARACTERISTICS:</b><br>2.1 Appearance: Smooth surface, uniform thickness and shall have no discoloration.<br>2.2 Shall be non-sticky at room temperature<br>2.3 Shall have not any bubble and peeling                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                  |           |                                                                                         |                                                                                          |                                                                                           |          |
|                                                                                                                                                                                                                           | <b>3.0 PACKING CONDITIONS</b><br><br>3.1 EVA roll shall be packed in air-tight Aluminium foil / foam sheet to avoid possible material degradation.<br><br>3.2 Each roll shall have manufacturers label containing <ol style="list-style-type: none"> <li>1) Manufacturers Name</li> <li>2) Lot No</li> <li>3) Specification No. - BHEL / PS-901-02-0011</li> <li>4) Date of Manufacture</li> <li>5) Date of Expiry</li> <li>6) Dimensions</li> <li>7) Width</li> <li>8) Quantity</li> <li>9) Weight</li> </ol><br>3.3 Final packing box shall have a label containing BHEL Purchase Order No. and Date.<br><br>3.4 Each lot must be accompanied with Test Certificate. |                                                                                                                                                                                                  |           |                                                                                         |                                                                                          |                                                                                           |          |
|                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>4.0 INSPECTION AT BHEL</b><br><br>4.1 Visual Inspection, Dimensional & Properties evaluation.<br><br>4.2 Vis Single Sampling Plan as per IS:10673-1983, Special Inspection Level S-4, AQL 1.0 |           |                                                                                         |                                                                                          |                                                                                           |          |
|                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Revision (00):                                                                                                                                                                                   | Issued By | Prepared By                                                                             | Checked By                                                                               | Approved By                                                                               | Date     |
|                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1 <sup>st</sup> Issue                                                                                                                                                                            | SPV Eng.  | RKP  | NAR  | CNP  | 20.09.17 |