

**Mandatory Pre-Qualification requirements for Vapour Exhauster****Description**

The Vapour Exhauster is required to handle mixture of turbine oil vapours, air & H<sub>2</sub> and for creating partial vacuum in generator bearing chamber & oil tanks of Tubogenerators. Vapour exhauster shall comprise of Centrifugal fan, Squirrel cage induction motor, base frame for mounting and motor terminal box.

**Mandatory requirement for Pre-Qualification****1.0 Experience Requirement -**

The Vendor should be a regular manufacturer of such Vapour exhauster & should source motor set from regular manufacturer. Vendor should have supplied at least Three (3) nos. of vapour exhauster with motor in last Ten (10) years (from the date of issuance of enquiry) with following technical details -

| Si No. | Parameter              | Value  |
|--------|------------------------|--|
| (i)    | Exhauster & Motor Type | Centrifugal fan with squirrel cage 3 phase induction motor |
| (ii)   | Flow medium            | Mixture of Oil, Gases and Air.                             |
| (iii)  | Material               | Carbon Steel or Stainless steel                            |
| (iv)   | Discharge Pressure     | 96 mmWC & above  |
| (v)    | Discharge Capacity     | 350 M <sup>3</sup> /Hr & above                             |
| (vi)   | Motor Rating           | 0.75 KW & above  |
| (vii)  | Rated Speed            | 2820 RPM (approx)  |
| (viii) | Rated Voltage          | 415V AC  |

In support of above, vendor to furnish information, as per the following format for previous supplied Vapour exhauster meeting the above technical requirement for the past Ten (10) years from the date of issuance of enquiry.

| Si. No. | Purchase order reference no. | Purchase order issue date | QTY. | Motor KW rating | Discharge Pressure (mmWC) | Discharge Capacity (M <sup>3</sup> /Hr) |
|---------|------------------------------|---------------------------|------|-----------------|---------------------------|---|
|         |                              |                           |      |                 |                           |   |
|         |                              |                           |      |                 |                           |   |

Vendor to submit the following documents as an evidence of acceptance of supplied Vapour exhauster, for the above mentioned successfully executed order -




- Vendor to furnish copy of Un-Priced Purchase Orders executed for supply of at least Three (3) nos. of vapour exhauster with motor in last Ten (10) years (from the date of issuance of enquiry).
- Vendor to furnish the test certificate for Exhauster fan & motor set as per relevant standard for any one of the PO submitted. The submitted test certificates should have co-relation with PO.
- Vendor to furnish supporting document for the evidence of final acceptance from End customer/Third Party of supplied vapour exhauster with motor for any one of the submitted PO's. Acceptance certificate should contain information like item details, Quantity accepted and should also have correlation with PO reference no.

**2.0** Vendor shall submit the proof of manufacturer i.e. Factory license, NSIC certificate

**Note -** BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false / incorrect, the offer shall be rejected.

31.07.23  
Kunal Mishra  
(Manager-EME)

31.7.23  
K.C. Panda  
(SDGM-EME)

|   |   |   |  |                      |
|---|---|---|--|----------------------|
| दिनांक एवं दिनांक<br>SIGN & DATE  |     | <p style="text-align: center;"><b>उत्पाद क्रय विनिर्देश</b></p> <p style="text-align: center;"><b>PRODUCT PURCHASE SPECIFICATION</b></p>  |  | <b>TG60432</b>       |
| सामग्री सूची संख्या को<br>अधिकारित करना है  | SUPERSEDES<br>INVENTORY NO  | <p><b><u>VAPOUR EXHAUSTER</u></b></p> <p>केवल आंतरिक प्रयोग हेतु<br/>प्रदायक को देने से पूर्व इस मुख्य पृष्ठ को निकाल दें।<br/><b>FOR INTERNAL USE ONLY</b><br/><b>REMOVE THIS PREFACE BEFORE ISSUE TO SUPPLIERS.</b></p> |  |                      |
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| स्वत्वधिकार एवं गोपनीय<br>इस दस्तावेज में दी गई सूचना भारत भारती एलेक्ट्रिकल्स की सम्पत्ति है इसका प्रयोग एवं प्रकाशन अन्य से किसी भी तरह प्रयोग जो कि कंपनी के हित में हानिकारक हो न किया जाये।                      |   | <p>सुझाए / सम्भावित प्रदायक एवं श्रेणी<br/>SUGGESTED / PROBABLE SUPPLIERS AND GRADES. } PMD-BI025</p>   |  |                      |
| दिनांक एवं दिनांक<br>SIGN & DATE  |  | <p>कोई अन्य जानकारी<br/>ANY OTHER INFORMATIONS } NIL</p>  |  |                      |
| सामग्री सूची संख्या<br>INVENTORY NO   | P-5894  | SUPERSEDES  | स्वीकृति<br>APPROVED :  Asha Gupta (AGM / EME) | Gr. No.<br>8.10      |
| REV.NO.   | 05  | Date  | निर्माण<br>PREPARED : EME  | जारी<br>ISSUED : TSX |
| 14.05.26  |   |   | दिनांक<br>DATE : 09.09.92  |                      |

Based on BHEL's own experience

**VAPOUR EXHAUSTER**

**1.0 SCOPE AND APPLICATION:**  
 This specification intended to cover design, manufacture, assembly testing & delivery of vapour exhauster, complete with motor, coupling, base plate and other accessories. The vapour exhauster is required to handle mixture of turbine oil vapours, air & H<sub>2</sub> and for creating partial vacuum in generator bearing chamber & oil tanks of Turbo-generators.

**2.0 DESIGNATION:**  
 The Vapour exhauster shall be designated as below: -




- 2.1 ON DRAWINGS INDENTS:**
- |                                   |   |                  |
|-----------------------------------|---|------------------|
| (1) Material specification column | : | TG-60432         |
| (2) Description Column            | : | Vapour Exhauster |
| (3) Material Code Column          | : | W96415000578     |


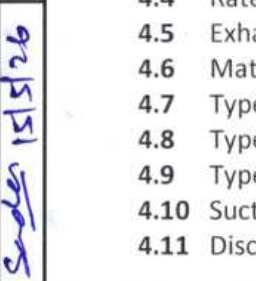


**2.2 ON ENQUIRES AND PURCHASE ORDER:-**  
 In addition to incorporating the above details, a copy of the standard shall be enclosed along with enquiry.





**3.0 TECHNICAL REQUIREMENTS:**




- 3.1 TECHINCAL DATA OF VAPOUR EXHAUSTER:**
- |  |   |                         |
|--|---|-------------------------|
| (1) Continuous discharge capacity at operating point | : | 396 m <sup>3</sup> / hr |
| (2) Normal discharge pressure at operating point     | : | 96 mmWC                 |
| (3) Operating temp. of the medium                    | : | 70°C                    |
| (4) Ambient temp.                                    | : | 50°C                    |
| (5) Speed  | : | 2820rpm                 |




|  |  |   |   |  |
|--|--|---|---|--|
| दिनांक एवं हस्ताक्षर<br>SIGN & DATE                                      | TSX<br>PSC Member<br>QAX<br>सहमत विभाग<br>AGREED DEPTT | नाम<br>NAME<br>दिनांक एवं हस्ताक्षर<br>DATE & SIGNATURE | नाम<br>NAME<br>अनुवादक<br>TRANSLATED BY<br>निर्माणकर्ता<br>WORKED BY<br>जांचकर्ता<br>CHECKED BY<br>पर्यवेक्षणकर्ता<br>SUPERVISED BY | दिनांक एवं हस्ताक्षर<br>SIGNATURE & DATE<br>14/5/26<br>14-05-26<br>14.5.26 |
| सामग्री सूची संख्या<br>INVENTORY NO<br><b>P-5894</b>                     | दिनांक एवं हस्ताक्षर<br>SIGN & DATE<br><b>15/5/26</b>  | स्विकृति<br>APPROVED : <b>ASHA GUPTA (AGM / EME)</b>    | जारीकर्ता<br>ISSUED : <b>TSX</b>  | दिनांक<br>DATE : 09.09.92  |
| SUPERSEDES<br>REV.NO. 05<br>Date. 14.05.26<br>CHANGE ADVICE NO TGE-26-49 |  |   |   |  |





|  |  |   |  |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
|--|--|---|--|------------|---|-------------------------------------|--------------|---|-------------------------------------|----------------|---|-------------------------------------|------------|---|-------|--------------|---|----------|
| SIGN & DATE<br>15/5/26   |   | <b>उत्पाद क्रय विनिर्देश</b><br><b>PRODUCT PURCHASE SPECIFICATION</b> | <b>TG60432</b><br>पृष्ठ 8 का 2<br><b>Page 2 of 8</b>   |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
| SUPERSEDES INVENTORY<br>सामग्री सूची संख्या की अधिकतम संख्या है  | <p><b>3.2 DESIGN AND CONSTRUCTION OF VAPOUR EXHAUSTER</b></p> <p><b>3.2.1</b> The material of the exhauster shall be such as to resist corrosion and shall give long trouble-free service.</p> <p><b>3.2.2</b> The design shall be such as to keep the friction and wear minimum caused by end thrust. Wear in mechanical seals bearings shall be minimum. The rotor of the exhauster shall be dynamically balanced as per ISO 1940, so that vibration of the exhauster is not greater than 25-micron peak to peak as per IEC 60034-14. The noise level shall not be greater than 85dB when measured at a distance of 1 meter from the base of the equipment, measurement should be done as per IEC 60034-9.</p> <p><b>3.2.3</b> Seals must comply with the following: -</p> <p>(a) Easy access for maintenance work.</p> <p>(b) No contamination of the medium from materials abraded from the seals.</p> <p>(c) No seepage of lubricants into the flow medium.</p> <p>(d) No leakage of gases outside in the atmosphere</p> <p>(e) No seepage of oil toward, motor and outside along with the shaft.</p> <p>(f) Shaft shall be sealed with grease lubricated axial seal as shown in the figure.</p> <p><b>3.2.4</b> Exhauster bearing shall be designed so as to ensure 50000 hours of continuous service.</p> <p><b>3.2.5</b> The exhauster shall be provided with a drain plug.</p> <p><b>3.2.6</b> Fan impeller is to be directly mounted onto rotor shaft as shown in the figure at page 8.</p> <p><b>3.2.7</b> The critical speed of the exhauster shall not lie within <math>\pm 30\%</math> of the operating speed (2820 rpm) of the exhauster.</p> <p><b>3.2.8</b> Minimum clearance between impeller &amp; casing shall be 2mm to ensure that there is no rubbing.</p> <p><b>3.2.9</b> The construction, mounting and base frame dimensions shall be generally as per figure at page 8.</p> <p><b>3.2.10 Materials of Construction:-</b></p> <table border="0" style="width: 100%;"> <tr> <td>(1) Casing</td> <td>:</td> <td>Carbon Steel as per IS:2062 E250 BR</td> </tr> <tr> <td>(2) Impeller</td> <td>:</td> <td>Carbon Steel as per IS:2062 E250 BR</td> </tr> <tr> <td>(3) Base Frame</td> <td>:</td> <td>Carbon Steel as per IS:2062 E250 BR</td> </tr> <tr> <td>(4) Sleeve</td> <td>:</td> <td>Brass</td> </tr> <tr> <td>(5) 'O' ring</td> <td>:</td> <td>Neoprene</td> </tr> </table> |   |  | (1) Casing | : | Carbon Steel as per IS:2062 E250 BR | (2) Impeller | : | Carbon Steel as per IS:2062 E250 BR | (3) Base Frame | : | Carbon Steel as per IS:2062 E250 BR | (4) Sleeve | : | Brass | (5) 'O' ring | : | Neoprene |
| (1) Casing   | :  | Carbon Steel as per IS:2062 E250 BR                                   |  |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
| (2) Impeller   | :  | Carbon Steel as per IS:2062 E250 BR                                   |  |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
| (3) Base Frame   | :  | Carbon Steel as per IS:2062 E250 BR                                   |  |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
| (4) Sleeve   | :  | Brass   |  |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
| (5) 'O' ring   | :  | Neoprene  |  |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
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| स्वत्वधिकार एवं गोपनीय<br>इस दस्तावेज में की गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग एवं प्रकाशन के बिना बिना अनुमति के नहीं किया जा सकता है।   |  |   |  |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
| SIGN & DATE<br>15/5/26   | <p><b>3.3 MOTOR SPECIFICATIONS</b></p> <p><b>3.3.1</b> TYPE : TEFC squirrel cage induction motor to IEC 60034-1</p> <p><b>3.3.2</b> KW rating : 0.75kW</p> <p><b>3.3.3</b> Rated voltage : 415 Volts, 3 phase, 50Hz</p> <p><b>3.3.4</b> Type of duty : S1 (Continuous) as per IEC 60034-1</p> <p><b>3.3.5</b> Efficiency class : Refer Variant Table as below</p>  |   |  |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
| INVENTORY NO<br>P-5894   | REV. NO. 05  | निर्माणकर्ता<br>WORKED BY<br><b>Abhishek Kumar</b>                    | <br>14/5/26                           |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |
|  |  | जांचकर्ता<br>CHECKED BY   | <b>Shivangi Gupta</b><br><br>14/05/26 |            |   |                                     |              |   |                                     |                |   |                                     |            |   |       |              |   |          |

| व हस्ताक्षर<br>SIGN & DATE  |   | <b>उत्पाद क्रय विनिर्देश</b><br><br><b>PRODUCT PURCHASE SPECIFICATION</b>   | <b>TG60432</b><br><br>पृष्ठ 8 का 3<br><b>Page 3 of 8</b>  |  |   |  |              |      |     |              |      |     |              |      |     |
|---|--|---|---|--|---|--|--------------|------|-----|--------------|------|-----|--------------|------|-----|
| सामग्री सूची संख्या को<br>INVENTORY   | SUPERSEDES<br>INVENTORY  | <table border="1"> <thead> <tr> <th>MATERIAL CODE OF VAPOUR EXHAUSTER ASSEMBLY</th> <th>EFFICIENCY CLASS OF MOTOR AS PER IEC-60034-30</th> <th>STARTING CURRENT (IN % OF FULL LOAD CURRENT) + 20% (Tolerance as per IEC: 60034-1)</th> </tr> </thead> <tbody> <tr> <td>W96415000578</td> <td>IE-2</td> <td>650</td> </tr> <tr> <td>W96415003127</td> <td>IE-3</td> <td>700</td> </tr> <tr> <td>TG9741500009</td> <td>IE-4</td> <td>700</td> </tr> </tbody> </table> |   | MATERIAL CODE OF VAPOUR EXHAUSTER ASSEMBLY | EFFICIENCY CLASS OF MOTOR AS PER IEC-60034-30 | STARTING CURRENT (IN % OF FULL LOAD CURRENT) + 20% (Tolerance as per IEC: 60034-1) | W96415000578 | IE-2 | 650 | W96415003127 | IE-3 | 700 | TG9741500009 | IE-4 | 700 |
| MATERIAL CODE OF VAPOUR EXHAUSTER ASSEMBLY  | EFFICIENCY CLASS OF MOTOR AS PER IEC-60034-30  | STARTING CURRENT (IN % OF FULL LOAD CURRENT) + 20% (Tolerance as per IEC: 60034-1)  |   |  |   |  |              |      |     |              |      |     |              |      |     |
| W96415000578  | IE-2   | 650   |   |  |   |  |              |      |     |              |      |     |              |      |     |
| W96415003127  | IE-3   | 700   |   |  |   |  |              |      |     |              |      |     |              |      |     |
| TG9741500009  | IE-4   | 700   |   |  |   |  |              |      |     |              |      |     |              |      |     |
| <b>COPYRIGHT AND CONFIDENTIAL</b><br>The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company | <p>3.3.6 Permissible voltage variation : ± 10%</p> <p>3.3.7 Permissible Frequency variation : ± 5%</p> <p>3.3.8 Combined voltage &amp; frequency variation : + 10%</p> <p>3.3.9 Min. voltage required under starting : 85%</p> <p>3.3.10 Conditions to bring driven equipment to rated speed</p> <p>3.3.11 Starting Torque : Min. 1.3 times the rated torque.</p> <p>3.3.12 Breakdown torque : Min. 2 times the rated torque.</p> <p>3.3.13 Starting : DOL</p> <p>3.3.14 Acceleration time with full load connected: 3.5 + 0.5 sec.</p> <p>3.3.15 Starting duty : 3 starts spread over on hour and 2 consecutive starts from hot</p> <p>3.3.16 Condition without injurious heating to the winding.</p> <p>3.3.17 Overload capacity : Motor shall be capable of running at full load with 80% of rated</p> <p>3.3.18 Voltage for 10min. and 70% of rated voltage for 1 min.</p> <p>3.3.19 Class of insulation : 'F' with temperature limited to Class B (70 °C)</p> <p>3.3.20 Ventilation : Totally enclosed &amp; fan cooled</p> <p>3.3.21 Enclosure protection : IP 55 as per IEC 60034-5</p> <p>3.3.22 Explosion proof : Group II T4 as per IEC 60079</p> <p>3.3.23 Bearing : as per suppliers design. Life not less than 50000hrs.</p> <p>3.3.24 Earthing : Suitable arrangement to be provided at 2 places.</p> <p>3.3.25 Terminal box : Terminal box shall be explosion proof as per Group II T4 IEC 60079.</p> <p>3.3.26 Cable gland also to be provided in terminal box for 3 core Aluminium cable.</p> <p>3.3.27 Fault level: 50 KA for 1 sec.</p> |   |   |  |   |  |              |      |     |              |      |     |              |      |     |
| <b>स्वत्वाधिकार एवं गोपनीय</b><br>इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की सम्पत्ति है इसका प्रसारण एवं प्रतिलिपि बनाना बिना लिखित अनुमति के कठिनाई का कारण बन सकता है।   | <p><b>4.0 PUMP DATA SHEET (TO BE FURNISHED ALONGWITH OFFER :</b></p> <p>4.1 Capacity M3 / Sec. :</p> <p>4.2 Head MWC :</p> <p>4.3 Efficiency :</p> <p>4.4 Rated speed :</p> <p>4.5 Exhauster B.H.P. / kw at Rated Capacity :</p> <p>4.6 Material: Casing Impeller base Frame 'o' ring :</p> <p>4.7 Type of bearing used :</p> <p>4.8 Type of coupling :</p> <p>4.9 Type of Sealing :</p> <p>4.10 Suction size :</p> <p>4.11 Discharging size :</p>   |   |   |  |   |  |              |      |     |              |      |     |              |      |     |
| हस्ताक्षर एवं तिथि<br>SIGN & DATE   |   |   |   |  |   |  |              |      |     |              |      |     |              |      |     |
| सामग्री सूची संख्या<br>INVENTORY  | REV. NO. 05  | निर्माणकर्ता<br>WORKED BY   | Abhishek Kumar<br><br>14/5/26  |  |   |  |              |      |     |              |      |     |              |      |     |
| P-5894  |  | जांचकर्ता<br>CHECKED BY   | Shivangi Gupta<br><br>14/05/26 |  |   |  |              |      |     |              |      |     |              |      |     |

|  |  |  |                           |  |   |          |
|--|--|--|---------------------------|--|---|----------|
| व हस्ताक्षर<br>SIGN & DATE   |               | <b>उत्पाद क्रय विनिर्देश</b><br><br><b>PRODUCT PURCHASE SPECIFICATION</b>  |                           | <b>TG60432</b><br><br>पृष्ठ 8 का 4<br><b>Page 4 of 8</b> |   |          |
| SUPERSEDES<br>INVENTORY  | सामग्री सूची संख्या को<br>अपडेटिंग करना है   | 4.12 Wt. of exhauster with motors base frame :<br>4.13 Wt. of exhauster :<br>4.14 General assy. & cross sectionals drawing enclosed with offer :<br>4.15 Capacity Vs discharge pressure curve enclosed :<br>4.16 Power consumption Vs discharge pressure curve enclosed :<br>4.17 Capacity Vs efficiency curve enclosed :  |                           |  |   |          |
| <b>COPYRIGHT AND CONFIDENTIAL.</b><br>The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company |  | <b>5.0 MOTOR DATA SHEET (TO BE FURNISHED ALONG WITH OFFER)</b><br>5.1 Manufacturer :<br>5.2 Type :<br>5.3 Frame size :<br>5.4 Power absorbed by exhauster at duty point (kW) :<br>5.5 Rated power (kW) :<br>5.6 Duty cycle :<br>5.7 Rated voltage :<br>5.8 No. of phase :<br>5.9 Frequency :<br>5.10 Allowable voltage variation :<br>5.11 Allowable frequency variation :<br>5.12 Allowable voltage & frequency variation :<br>5.13 Current :<br>5.14 Rated speed (RPM) :<br>5.15 Full load efficiency :<br>5.16 Full load power factor :<br>5.17 Method of starting :<br>5.18 Max. starting current :<br>5.19 Class of insulation :<br>5.20 Starting torque :<br>5.21 Max. torque :<br>5.22 Safe stall time :<br>a. Under hot condition :<br>b. Under cold condition :<br>5.23 Type of enclosure :<br>5.24 Enclosure protection :<br>5.25 Frequency of starting :<br>5.26 Temp. rise above 500C :<br>5.27 By resistance method :<br>By thermometer method :<br>5.28 Type & no. of terminals brought out :<br>5.29 Type of connection during continuous running :<br>5.30 Type and size of cable for when gland is provided in the terminal box. :<br>5.31 Guaranteed min. voltage read at non terminals :<br>5.32 System of earthing : |                           |  |   |          |
| <b>स्वत्वधिकार एवं गोपनीय</b><br>इस प्रलेख में दी गई सूचना भारत की एलईएच लिमिटेड की संपत्ति है। इसका प्रकाश एवं उपयोग के बिना या इसके बिना किसी भी प्रकार से प्रयोग की बिना कम्पनी के हित में हानिकारक हो न।                 |  |  |                           |  |   |          |
| दिनांक एवं हस्ताक्षर<br>SIGN & DATE  | 15/5/26<br> |  |                           |  |   |          |
| सामग्री सूची संख्या<br>INVENTORY NO.   | REV. NO. 05  |  | निर्माणकर्ता<br>WORKED BY | Abhishek Kumar   |  | 14/5/26  |
| सामग्री सूची संख्या<br>INVENTORY NO.   | P-5894   |  | जांचकर्ता<br>CHECKED BY   | Shivangi Gupta   |  | 14/05/26 |

|   |  |   |   |   |                 |  |
|---|--|---|---|---|-----------------|--|
| दिनांक एवं हस्ताक्षर<br>SIGN & DATE   |   | <h2 style="text-align: center;">उत्पाद क्रय विनिर्देश</h2> <h3 style="text-align: center;">PRODUCT PURCHASE SPECIFICATION</h3>  | <b>TG60432</b>  |   |                 |  |
| सामग्री सूची संख्या को<br>अभिलेखित करना है  | SUPERSEDES<br>INVENTORY  |   | पृष्ठ 8 का 5  | Page 5 of 8   |                 |  |
| COPYRIGHT AND CONFIDENTIAL.<br>The information on this document is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company. | 5.33 Relevant standard :<br>5.34 Motor GD2 Valve :<br>5.35 Type of bearings (DE) :<br>5.36 Type of bearings (NDE) :<br>5.37 Type of lubricant :<br>5.38 Frequency of lubrication :<br>5.39 Wt. of motor :<br>5.40 Insulation class : | <b>6.0 QUALITY ASSURANCE, INSPECTION AND TESTING.</b><br><b>6.1</b> The manufacture shall conduct all tests required to ensure that the exhauster conforms to the requirements of application codes and standards.<br><b>6.2</b> The bidder shall submit the particulars of proposed shop tests along with procedures for information.<br><b>6.3</b> The equipment shall be dispatched only after inspection and clearance by BHEL / owner.<br><b>6.4</b> The min. tests check to be carried out on vapour exhauster, as envisaged by BHEL are given below: -<br><b>6.4.1</b> The material of Casing, Impeller, Base frame, Sleeve & O Ring shall be tested as per relevant standard for the chemical composition and mechanical properties.<br><b>6.4.2 TESTS DURING VARIOUS STAGE OF MANUFACTURING</b><br>1)Check for dimension and finish of the components.<br>2)D.P.T on all welding as per ASME section VIII.<br>3)Dynamic balancing of impeller as per ISO 1940 Gr. 6.3.<br><b>6.4.3 FINAL TESTS:</b> - Following tests shall be carried out: -<br>1)Flow rate of air<br>2)Vibration test as per IEC 60034-14.<br>3)Noise : shall not be greater than 85dB when measured at a distance of 1 meter from the base of the equipment, measurement should be done as per IEC 60034-9<br>4)Speed<br>5)Dimensional check<br>6)Smooth running<br>7)Performance test as per ISO:5801<br><b>6.4.4</b> Type & Routine tests on motor as per IEC:60034-1<br><b>6.4.5</b> Vendor to furnish the test certificates for the following<br>1)Motor Enclosure certificate as per IP 55 as per IEC 60034-5<br>2)Explosion proof certificate for motor for Group II T4 as per IEC60079<br>3)Certificate for enclosure of Terminal box for explosion proof as per Group II T4 IEC 60079.<br>4)Certificate for minimum clearance of 2mm between impeller & casing. |   |   |                 |  |
|   |  |   | स्वत्वाधिकार एवं गोपनीय<br>इस प्रतीक में ही यह सूचना भारत ही है एसेटिडवस्तु की सम्पत्ति है इसका प्रयुक्त एवं अप्रयुक्त रूप में किसी भी तरह प्रयोग जो कि कम्पनी के हित में हानिकारक हो न |   |                 |  |
| दिनांक एवं हस्ताक्षर<br>SIGN & DATE<br><i>15/5/26</i>   | सामग्री सूची संख्या<br>INVENTORY NO<br><i>P-5894</i>   | REV. NO. 05   | निर्माणकर्ता<br>WORKED BY<br>Abhishek Kumar   |  | <i>14/5/26</i>  |  |
|   |  |   | जांचकर्ता<br>CHECKED BY<br>Shivangi Gupta   |  | <i>14/05/26</i> |  |

|   |   |   |                           |   |   |                |
|---|---|---|---------------------------|---|---|----------------|
| दिनांक एवं हस्ताक्षर<br>SIGN & DATE   |    | <b>उत्पाद क्रय विनिर्देश</b><br><b>PRODUCT PURCHASE SPECIFICATION</b> |                           | <b>TG60432</b><br>पृष्ठ 8 का 6<br>Page 6 of 8 |   |                |
| सामग्री सूची संख्या को अधिकारित करता है<br>SUPERSEDES INVENTORY   | <p>6.4.6 After testing the exhauster, all the surface and internal shall be thoroughly cleaned, dried and conserved. All the metallic surface except bright parts exposed to weather shall be given suitable primary coating.</p> <p><b>7.0 DOCUMENTS TO BE FURNISHED AT THE TIME OF OFFER</b></p> <p>7.1 Assembly drawings part list, nozzle size, their coordinates base plate details etc.</p> <p>7.2 Technical data sheet of pump as per clause 4.</p> <p>7.3 Technical data sheet of motor as per clause 5.</p> <p>7.4 Performance curves.</p> <p>7.5 Quality plan in BHEL format, incorporating checks/tests at material stages, in process &amp; final testing.</p> <p>7.6 Clause wise confirmations of specification TG60432.</p> <p><b>8.0 DOCUMENT TO BE SUPPLIED</b></p> <p><b>8.1 AFTER PLACEMENT OF ORDER</b></p> <p>8.1.1 G.A. drawing with parts list &amp; material details.</p> <p>8.1.2 Final quality plan.</p> <p><b>8.2 DOCUMENT FOR FINAL SUBMISSION</b></p> <p>8.2.1 Performance curves.</p> <p>8.2.2 Test certificates for all test checks in clause 6.4 shall be furnished.</p> <p><b>9.0 CLEANING, PAINTING, CONSERVATION AND PACKING</b></p> <p>The surface shall be cleaned and prepared for application of paint by shot blasting. The protective coating should be oil resistant. After testing the exhauster, its internals shall be thoroughly cleaned, dried and conserved before packing. The exhauster packing shall be strong enough to safeguard against any damage during transit. The exhauster shall be packed such that it is safe for at least 2 year of storage in damp atmosphere.</p> <p><b>10.0 GUARANTEE</b></p> <p>10.1 The supplier shall guarantee trouble free and satisfactory operation of the equipment for a period of 12 months after commissioning at site or 18 months from the date of dispatch, whichever is earlier.</p> <p>10.2 The supplier shall guarantee the tested capacity head and capacity of the exhauster.</p> <p>10.3 The supplier shall repair /replace the defective parts at his own cost during the guarantee period.</p> |   |                           |   |   |                |
| COPYRIGHT AND CONFIDENTIAL<br>The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company. |   |   |                           |   |   |                |
| स्वत्वधिकार एवं गोपनीय<br>इस प्रवेश में दी गई सूचना भारत-भारी एलेक्ट्रिकल्स की सम्पत्ति है। इसका प्रयोग एवं अपवाद रूप से किसी भी तरह प्रयोग, जो कि कंपनी के हित में हानिकारक हो सके,                                  |   |   |                           |   |   |                |
| दिनांक एवं हस्ताक्षर<br>SIGN & DATE<br><i>S. Gupta 15/5/26</i>  |   |   |                           |   |   |                |
| सामग्री सूची संख्या<br>INVENTORY NO<br><i>P-5894</i>  | REV. NO. 05   |   | निर्माणकर्ता<br>WORKED BY | Abhishek Kumar                                |  | <i>14/5/26</i> |
|   |   |   | जांचकर्ता<br>CHECKED BY   | Shivangi Gupta                                |  | <i>14/5/26</i> |

|   |   |   |                           |  |   |          |
|---|---|---|---------------------------|--|---|----------|
| व हस्ताक्षर<br>SIGN & DATE  |    | <b>उत्पाद क्रय विनिर्देश</b><br><br><b>PRODUCT PURCHASE SPECIFICATION</b>   |                           | <b>TG60432</b><br>पृष्ठ 8 का 7<br><b>Page 7 of 8</b> |   |          |
| सामग्री सूची संख्या को<br>अपडेट/संशोधित करना है   | SUPERSEDES<br>INVENTORY   | <b>11.0 IDENTIFICATION</b><br>A name plate of stainless steel with following information engraved on it, shall be affixed to the equipment at appropriate location – <ul style="list-style-type: none"> <li>- Item description</li> <li>- Manufacturer's name</li> <li>- Year of manufacturing</li> <li>- Sl. No.</li> <li>- Main technical parameters i.e. Flow rate, Discharge pressure, Speed, Flow Medium, operating temperature, Motor KW Rating.</li> <li>- BHEL specification no.</li> <li>- BHEL material code.</li> <li>- BHEL P.O. No.</li> </ul> |                           |  |   |          |
| <b>COPYRIGHT AND CONFIDENTIAL</b><br>The information on this documents is the property of Bharat Heavy Electrical Limited. It must not be used directly or indirectly in any way detrimental to the interest of the company |   | <b>12.0 GENERAL</b><br>Bidder shall furnish all the documents as per clause 7 of the specification along with offer. Any deviation shall be clearly spelled out. The offer may not be considered if all the technical particulars and information called for in the specification are not submitted along with the offer.   |                           |  |   |          |
| <b>स्वत्वाधिकार एवं गोपनीय</b><br>इस प्रसंग में दी गई सूचना भारत हेवी इलेक्ट्रिकल्स की संपत्ति है इसका प्रयोग अथवा प्रसारण के बिना कम्पनी के हित में इस्तेमाल नहीं किया जा सकता है  |   | <b>13.0 CROSS REFERRED STANDARD</b><br>ISO 1940, ISO 5801<br>IEC 60034-14, IEC 60034-9, IEC 60034-1, IEC 60034-5, IEC 60079<br>IS:2062  |                           |  |   |          |
| दिनांक एवं हस्ताक्षर<br>SIGN & DATE   |  |   |                           |  |   |          |
| सामग्री सूची संख्या<br>INVENTORY  | REV. NO. 05   |   | निर्माणकर्ता<br>WORKED BY | Abhishek Kumar                                       |  | 14/5/26  |
| P-5894  |   |   | जांचकर्ता<br>CHECKED BY   | Shivangi Gupta                                       |  | 14/05/26 |



# उत्पाद क्रय विनिर्देश

## PRODUCT PURCHASE SPECIFICATION

TG60432

पृष्ठ 8 का 8

Page 8 of 8

हस्ताक्षर  
SIGN & DATE

SUPERSEDES  
INVENTORY

सामग्री सूची संख्या को  
अधिकृत करता है

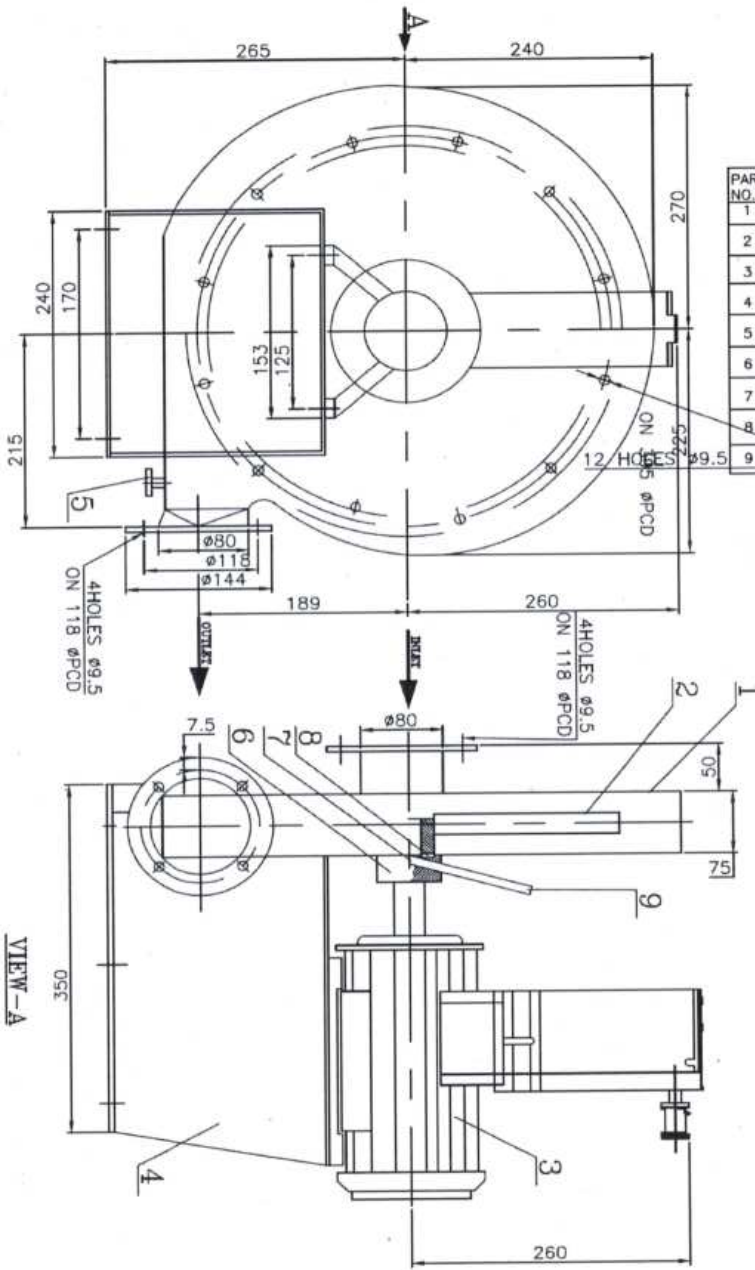
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**स्वत्वाधिकार एवं गोपनीय**  
यस प्रलेख में की गई सूचना भारत की स्वतंत्रता की सुरक्षा के लिए आवश्यक है। इसका प्रयोग एवं अपर्याप्त रूप से किसी भी तरह प्रयोग जो कि कम्पनी के हित में इतिहासिक हो न

हस्ताक्षर एवं तिथि  
SIGN & DATE

सामग्री सूची संख्या  
INVENTORY NO  
P-5894

REV. NO. 05



| PART NO. | DESCRIPTION              |
|----------|--------------------------|
| 1        | CASING                   |
| 2        | IMPELLER                 |
| 3        | MOTOR                    |
| 4        | MOTOR SUPPORTING BRACKET |
| 5        | DRAIN PLUG               |
| 6        | STUFFING BOX             |
| 7        | 'O' RING OIL SEAL        |
| 8        | SLEEVE                   |
| 9        | GREASE NIPPLE            |

|                           |                |                 |          |
|---------------------------|----------------|-----------------|----------|
| निर्माणकर्ता<br>WORKED BY | Abhishek Kumar | <i>AK</i>       | 14/5/20  |
| जांचकर्ता<br>CHECKED BY   | Shivangi Gupta | <i>Shivangi</i> | 14/05/26 |

| MANUFACTURER'S NAME AND ADDRESS |                        | STANDARD QUALITY PLAN |                  |               |                  |                    | TO BE FILLED BY BHEL |                   | TO BE FILLED BY BHEL |    |  |         |  |
|---------------------------------|------------------------|-----------------------|------------------|---------------|------------------|--------------------|----------------------|-------------------|----------------------|----|--|---------|--|
| BHEL                            | VENDOR'S NAME          | ITEM                  | VAPOUR EXHAUSTER | QP NO.        | QA/BE/QP/306     |                    |                      |                   |                      |    |  |         |  |
|                                 |                        |                       |                  | DATED & REV   | 19.03.2025<br>04 |                    |                      |                   |                      |    |  |         |  |
|                                 |                        | DRG. NO.              | AS PER PO        |               |                  |                    |                      |                   |                      |    |  |         |  |
|                                 |                        | SPEC.                 | TG 60432         |               |                  |                    |                      |                   |                      |    |  |         |  |
| REV                             | AS PER PO              |                       | Page 1 of 2      |               |                  |                    |                      |                   |                      |    |  |         |  |
| SL. NO.                         | COMPONENT & OPERATIONS | CHARACTERISTICS       | CLASS            | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS     | FORMAT OF RECORDS | AGENCY               |    |  | REMARKS |  |
| 1                               | 2                      | 3                     | 4                | 5             | 6                | 7                  | 8                    | 9                 | D                    | 10 |  | 11      |  |

|     |   |   |       |                    |      |   |   |     |   |   |   |   |  |
|-----|---|---|-------|--------------------|------|---|---|-----|---|---|---|---|--|
| 1.0 | RAW MATERIAL  |   |       |                    |      |   |   |     |   |   |   |   |  |
| 1.1 | CASING, IMPELLER, BLADES & BASE FRAME/ PLATE, SLEEVE, O-RING              | CHEMICAL, MECHANICAL PROPERTIES & SIZE  | MAJOR | TEST & MEASUREMENT | 100% | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | MTC | ✓ | P | V | V |  |
| 1.2 | NUTS & BOLTS  | TRADE MARK & PRPERTY CLASS  | MAJOR | VISUAL             | 100% | AS PER VENDOR'S PROCEDURE                     | AS PER VENDOR'S PROCEDURE                     | IR  | ✓ | P | V | - |  |
| 1.3 | AC INDUCTION MOTOR (Please specify make, degree of protection and rating) | ROUTINE & TYPE TESTS CERTIFICATE INCLUDING DEGREE OF PROTECTION AND EXPLOSION PROOFNESS | MAJOR | REVIEW             | 100% | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | TC  | ✓ | P | V | V | Also Include Enclosure Certificate as per Spec |
| 2.0 | INPROCESS INSPECTION  |   |       |                    |      |   |   |     |   |   |   |   |  |
| 2.1 | ALL WELDS   | QUALITY OF WELDS  | MAJOR | DPT                | 100% | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | IR  | ✓ | P | V | - | NOTE:1   |
| 2.2 | IMPELLER  | DIMENSIONS  | MAJOR | MEASUREMENT        | 100% | ORDERING DWG                                  | ORDERING DWG                                  | IR  | - | P | - | - |  |
|     |   | DIMENSIONS AFTER MACHINING  | MAJOR | MEASUREMENT        | 100% | ORDERING DWG                                  | ORDERING DWG                                  | IR  | - | P | - | - |  |
|     |   | DYNAMIC BALANCING   | MAJOR | MEASUREMENT        | 100% | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | TC  | ✓ | P | V | V |  |
| 2.3 | ASSEMBLY OF FAN   | INTERNAL CLEARANCE BETWEEN IMPELLER & CASING  | MAJOR | MEASUREMENT        | 100% | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | ORDERING SPEC. / BHEL APPD. DRG. / DATA SHEET | IR  | ✓ | P | V | - |  |
| 3.0 | FINAL INSPECTION ON THE COMPLETE ASSEMBLY                                 |   |       |                    |      |   |   |     |   |   |   |   |  |
| 3.1 |   | OVERALL DIMENSIONS  | MAJOR | MEASUREMENT        | 100% | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET | TC  | ✓ | P | W | V |  |

|                                |  |  |                  |
|--------------------------------|--|--|------------------|
|                                |  | LEGEND:<br>RECORDS IDENTIFIED WITH '✓' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.<br>M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER<br>INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION | FOR CUSTOMER USE |
| MANUFACTURER/<br>SUBCONTRACTOR |  | ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER   | APPROVED BY      |

| MANUFACTURER'S NAME AND ADDRESS |                        | STANDARD QUALITY PLAN |                  |               |                  |                    | TO BE FILLED BY BHEL |                   | TO BE FILLED BY BHEL |   |   |         |    |    |
|---------------------------------|------------------------|-----------------------|------------------|---------------|------------------|--------------------|----------------------|-------------------|----------------------|---|---|---------|----|----|
| BHEL                            | VENDOR'S NAME          | ITEM                  | VAPOUR EXHAUSTER | QP NO.        | QA/BE/QP/306     |                    |                      |                   |                      |   |   |         |    |    |
|                                 |                        |                       |                  | DATED & REV   | 19.03.2025<br>04 |                    |                      |                   |                      |   |   |         |    |    |
|                                 |                        | DRG. NO.              | AS PER PO        |               |                  |                    |                      |                   |                      |   |   |         |    |    |
|                                 |                        | SPEC.                 | TG 60432         |               |                  |                    |                      |                   |                      |   |   |         |    |    |
| REV                             | AS PER PO              |                       |                  |               |                  | Page 2 of 2        |                      |                   |                      |   |   |         |    |    |
| SL. NO.                         | COMPONENT & OPERATIONS | CHARACTERISTICS       | CLASS            | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS     | FORMAT OF RECORDS | AGENCY               |   |   | REMARKS |    |    |
| 1                               | 2                      | 3                     | 4                | 5             | 6                | 7                  | 8                    | 9                 | D                    | M | B | N       | 10 | 11 |

|     |         |  |       |                      |      |  |  |                  |   |   |   |   |                                     |
|-----|---------|--|-------|----------------------|------|--|--|------------------|---|---|---|---|-------------------------------------|
| 3.2 |         | PERFORMANCE (INCLUDING AIR DELIVERY, PRESSURE & POWER CONSUMPTION) | MAJOR | PERFORMANCE          | 100% | IS:4894/ ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET | IS:4894/ ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET | TC               | ✓ | P | W | V |                                     |
| 3.4 |         | FAN SPEED, SMOOTH RUNNING, DIRECTION OF ROTATION                   | MAJOR | VISUAL               | 100% | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | IR               | ✓ | P | W | V |                                     |
| 3.5 |         | NOISE LEVEL  | MAJOR | MEASUREMENT          | 100% | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | IR               | ✓ | P | W | V |                                     |
| 3.6 |         | VIBRATION  | MAJOR | MEASUREMENT          | 100% | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | IR               | ✓ | P | W | V |                                     |
| 3.7 |         | APPEARANCE INCLUDING PAINT THICKNESS (DFT)                         | MAJOR | VISUAL & MEASUREMENT | 100% | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | IR/TC            |   | P | V | V | As per Customer/ BHEL Req. (if any) |
| 3.8 |         | COMPLIANCE OF TECHNICAL REQUIREMENTS                               | MAJOR | --                   | 100% | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | COC              |   | P | V | - |                                     |
| 3.9 |         | COMPLETION OF DOCUMENTS  | MAJOR | PHYSICAL             | 100% | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | DOCUMENTS        | ✓ | P | V | - |                                     |
| 4.0 | PACKING |  |       |                      |      |  |  |                  |   |   |   |   |                                     |
| 4.1 |         | SOUNDNESS OF PACKING AGAINST TRANSIT DAMAGE                        | MAJOR | PHYSICAL             | 100% | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | ORDERING SPEC. / BHEL APPD. DRG. & DATA SHEET          | INTERNAL RECORDS |   | P | - | - |                                     |

NOTE:1 - Welding to be done by qualified welder as per ASME IX WPS and PQR to be checked by inspecting agency.

Note 2: All pages of the inspection documents shall be numbered in chronology with the QAP clauses, duly mentioning the corresponding QAP clause no. at the top of each page.

Note 3: One 'index' page containing the document descriptions, their page no's & QAP cl no. shall be attached upfront the inspection documents.

Note 4: For any spares item, apart from 'visual inspection' the 'interchangeability fitment certificate' or 'material TC' are to be submitted, with specific mentioning of the 'pert no/ item no of the approved GA/ x-sec drg.'.

|                                |  | LEGEND:  | FOR CUSTOMER USE |
|--------------------------------|--|--|------------------|
| MANUFACTURER/<br>SUBCONTRACTOR |  | RECORDS IDENTIFIED WITH '✓' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.                                       | APPROVED BY      |
|                                |  | M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION |                  |
|                                |  | ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER   |                  |