

| ANNEXURE-3 MASTER DOCUMENT FORMAT |                                              |             |                 |     |                        |            |                            |                                |                                     |     |          |                 |         |
|-----------------------------------|----------------------------------------------|-------------|-----------------|-----|------------------------|------------|----------------------------|--------------------------------|-------------------------------------|-----|----------|-----------------|---------|
| 1                                 | LIST OF SUPERCEDED DRAWINGS / DOCUMENTS      |             |                 |     |                        | S          | TO INDEX PAGE              |                                | NO COMMENTS                         |     |          |                 | 1       |
| 2                                 | LIST OF ACTIVE DRAWINGS / DOCUMENTS          |             |                 |     |                        | A          | TODAY'S DATE               |                                | COMMENTS AS MARKED CLEARED FOR MANU |     |          |                 | 2       |
| 3                                 | LIST OF DRAWINGS/DOCUMENTS UNDER PREPARATION |             |                 |     |                        | UP         |                            |                                | COMMENTS AS MARKED                  |     |          |                 | 3       |
| 4                                 | LIST OF BHEL APPROVED DRAWINGS               |             |                 |     |                        | ADS        |                            |                                | RETAINED FOR INFORMATION            |     |          |                 | 4       |
| S. NO                             | DRAWING/ DOCUMENTS                           | BHEL DRG NO | BIDDER DWG. NO. | REV | SCHEDULE OF SUBMISSION | APPR (A/I) | SENT BY BIDDER (SOFT COPY) | HARD COPY RECEIVED FROM BIDDER | COMMENTS SEND TO BIDDER             | STS | PEND     | BHEL APP STATUS | REMARKS |
| 1                                 | Drawings & Documents Pending with BIDDER     |             |                 |     |                        |            |                            |                                |                                     | A   | P-BIDDER | 1               |         |
| 2                                 | Drawings & Documents Pending with BHEL       |             |                 |     |                        |            |                            |                                |                                     | A   | P-BHEL   | 2               |         |
| 3                                 | Drawings & Documents Approved by BHEL        |             |                 |     |                        |            |                            |                                |                                     | A   | ADS      | 3               |         |
| 4                                 | Superceded Drawings                          |             |                 |     |                        |            |                            |                                |                                     | S   | S        | 4               |         |

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| TD-201<br>Rev No. 00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Form No. |  | <b>PRODUCT STANDARD</b><br>PROJECT ENGINEERING & SYSTEMS DIVISION<br>HYDERABAD | ANNEXURE 5<br>to <b>PY 51263</b> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                                                                                   |                                                                                | Rev No. 00                       |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                                                                                   |                                                                                | Page 1 of 3                      |
| <div><div><div><b>COPYRIGHT AND CONFIDENTIAL</b><br/>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED,<br/>It must not be used directly or indirectly in any way detrimental to the interest of the company.</div></div><div><div>ANNEXURE-5</div><div>QAP GUIDELINES &amp; FORMAT</div><div>( ANNEXURE - TO PY 51263)</div><div>The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement.</div><div>Note :</div><div><div>1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval.</div><div>2. No deviation to reference document is acceptable.</div></div></div></div> |          |                                                                                   |                                                                                |                                  |

|                                                                                                                                                                                                                                  |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |
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| Form No.                                                                                                                                                                                                                         | <br>HYDERABAD | <b>PRODUCT STANDARD</b><br>PROJECT ENGINEERING & SYSTEMS DIVISION<br>HYDERABAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ANNEXURE- 2<br>to PY 51246 |
|                                                                                                                                                                                                                                  |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Rev No. 00                 |
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| <b>COPYRIGHT AND CONFIDENTIAL</b><br>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED .<br>It must not be used directly or indirectly in any way detrimental to the interest of the company. |                                                                                               | <p align="center"><b><u>GUIDELINES TO VENDORS FOR<br/>PREPARATION OF QUALITY ASSURANCE PLAN</u></b></p> <ol style="list-style-type: none"> <li>QAP shall be made in landscape mode on A4 size paper as per the format enclosed.<br/>Font size shall be minimum 10.</li> <li>Each page of QAP shall contain the following information.           <ol style="list-style-type: none"> <li>Vendor's name &amp; address.</li> <li>Customer: BHEL, Hyderabad.</li> <li>Project.</li> <li>BHEL Product Standard Number/revision number as referred in P.O.</li> <li>BHEL Purchase Order Number &amp; Date.</li> <li>Product as per P.O. description.</li> <li>QAP Number (unique and shall not repeat)/revision number/date.</li> <li>Page number and number of pages</li> </ol> </li> <li>QAP shall contain four parts / stages as follows.           <ol style="list-style-type: none"> <li>Raw materials and bought out items.</li> <li>In process Control / Inspection.</li> <li>Final assembly, Inspection &amp; Testing.</li> <li>Painting, preservation &amp; packing.</li> </ol> </li> <li>Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc).</li> <li>Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT,DP etc.), hydrostatic test, calibration check etc.)</li> <li>Under 'Class', indicate minor, major or critical depending on the importance of characteristic.</li> <li>Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.)</li> <li>Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.)</li> <li>Under 'Reference document' and 'Acceptance norms', appropriate National &amp; International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review &amp; approval by our Engineering dept.</li> <li>Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc.</li> </ol> |                            |
|                                                                                                                                                                                                                                  |                                                                                               | 11. Please refer 'Agency' in QAP format.<br>Under P: Perform, W: Witness, V: Verify<br>Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR<br>2: (Vendor / Sub vendor)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |
| Ref. Doc                                                                                                                                                                                                                         |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                            |

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| Form No.                                                                                                                                                                                    | <br>HYDERABAD | <b>PRODUCT STANDARD</b><br>PROJECT ENGINEERING & SYSTEMS DIVISION<br>HYDERABAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ANNEXURE- 2<br>to PY 51246 |
|                                                                                                                                                                                             |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Rev No. 00                 |
|                                                                                                                                                                                             |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Page 3 of 3                |
| The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED .<br>It must not be used directly or indirectly in any way detrimental to the interest of the company. |                                                                                               | Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, under Witness (W) column use 1. Under 'Verify' column, use code 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            |
|                                                                                                                                                                                             |                                                                                               | 12. Under 'D' please put ( Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification.<br><br>13. Vendor's signature & stamp should be available on each page of QAP.<br><br>14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification & Approved Drawings.<br><br>15. The following operations/characteristics/check points may be included (AS APPROPRIATE)<br>a) Visual check<br>b) Dimensional check<br>c) Mechanical and Chemical properties.<br>d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.)<br>e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc.<br>f) Check for correctness for all components mounted as per General arrangement Drawing, Bill Of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc.<br>g) Verification of test certificate for protection class for the enclosures.<br>h) Mechanical functioning of switches.<br>i) Continuity of earthing and provision of earth points.<br>j) Colour coding of wiring, size, tightness & dressing of wiring.<br>k) Review of test certificates of assembled items, raw materials, internal test reports etc.<br>l) Witness of functional checks, which may include mechanical run & electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc.<br>m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc.<br>n) Material identification ( for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.)<br>o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non Destructive Tests.<br>p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating)<br>q) All tests as per BHEL Product Standard & approved drawings including Type tests and Routine tests on individual items and on System as a whole.<br>r) Packing and Preservation.<br>16. <b>QAP Format enclosed.</b><br>17. <b>Typical Manufacturing QAP is attached.</b> |                            |
| Ref. Doc                                                                                                                                                                                    |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                            |

| VENDOR'S NAME & ADDRESS: |                                  |                 | MANUFACTURING QUALITY PLAN                              |               |                  |                                          |                  |                  | QP. NO.: |                 |             |  |         |
|--------------------------|----------------------------------|-----------------|---------------------------------------------------------|---------------|------------------|------------------------------------------|------------------|------------------|----------|-----------------|-------------|--|---------|
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  | REV NO:  |                 | DATE:       |  |         |
|                          |                                  |                 | CUSTOMER: BHEL, HYDERABAD – 32.<br>PROJECT:<br>PRODUCT: |               |                  | BHEL P.O.NO.:<br>P.O.DATE:<br>BHEL SPEC: |                  |                  | REV:     |                 | PAGE 1 OF 1 |  |         |
| SL NO                    | COMPONENTS                       | CHARACTERISTICS | CLASS                                                   | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                       | ACCEPTANCE NORMS | FORMAT OF RECORD | * D      | AGENCY<br>P W V |             |  | REMARKS |
| 1.0                      | RAW MATERIALS & BOUGHT OUT ITEMS |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
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|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
| 2.0                      | INPROCESS INSPECTION             |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
| 3.0                      | FINAL INSPECTION & TESTING       |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
| 4.0                      | PRESERVATION & PACKING           |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |
|                          |                                  |                 |                                                         |               |                  |                                          |                  |                  |          |                 |             |  |         |

**VENDOR TO NOTE:** THIS FORMAT IS IN MICROSOFT WORD. HEADER & FOOTER SHALL BE AVAILABLE IN EACH PAGE OF QP. QP SHALL BE IN LANDSCAPE & A4 SIZE ONLY. FONT SIZE SHALL BE MIN 10. VENDOR SHALL SIGN & STAMP IN EACH PAGE OF QP. LOI REF. & DATE ARE NOT ACCEPTABLE. P.O.NO. & DATE SHALL BE INDICATED. QP NO. SHOULD BE UNIQUE AND SHALL NOT REPEAT. ALL THE TESTS / CHECKS INDICATED IN THE BHEL SPEC. SHALL BE INDICATED IN THE QP.

|                                                                                                                                                                                                                                                                                                                             |                            |                           |                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------|------------------------------|
| LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL CQS (OR BHEL NOMINATED INSPECTION AGENCY) & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS. | PREPARED BY                | APPROVED BY               | APPROVED BY                  |
|                                                                                                                                                                                                                                                                                                                             | VENDOR'S SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP |

## ANNEXURE-6

|  |                                                     | <b>TYPICAL MANUFACTURING QUALITY PLAN</b>                               |       |                             |                          |                                   |                                   |                  | MQP. NO.:   |        |       |   |         |
|----------------------------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------|-------|-----------------------------|--------------------------|-----------------------------------|-----------------------------------|------------------|-------------|--------|-------|---|---------|
|                                                                                  |                                                     |                                                                         |       |                             |                          |                                   |                                   |                  | REV NO:     |        | DATE: |   |         |
|                                                                                  |                                                     | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |                             |                          | PRODUCT: DELUGE VALVE             |                                   |                  | PAGE 1 OF 2 |        |       |   |         |
| SL NO                                                                            | COMPONENTS                                          | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK               | QUANTUM OF CHECK         | REFERENCE DOCUMENT                | ACCEPTANCE NORMS                  | FORMAT OF RECORD | * D         | AGENCY |       |   | REMARKS |
|                                                                                  |                                                     |                                                                         |       |                             |                          |                                   |                                   |                  |             | P      | W     | V |         |
| <b>1.0</b>                                                                       | <b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b>         |                                                                         |       |                             |                          |                                   |                                   |                  |             |        |       |   |         |
| 1.1                                                                              | BODY & COVER (C.I. CASTINGS)                        | i) Mechanical                                                           | Major | Tensile                     | One (1) Per Heat         | App TDS/Drg./ Spec.               | App TDS/Drg./ Spec.               | Lab/Mfg. TC      | √           | 2      | --    | 1 |         |
|                                                                                  |                                                     | ii) Dimension                                                           | Major | Measurement                 | At random (Two) Per Heat | App TDS/Drg./ Spec.               | App TDS/Drg./ Spec.               | IR               |             | 2      | 2     | 1 |         |
|                                                                                  |                                                     | iii) Physical Obsvn.                                                    | Major | Visual                      | 100%                     | Surface free from harmful defects | Surface free from harmful defects | IR               |             | 2      | 2     | 1 |         |
| 1.2                                                                              | CLAPPER, SEAT & CLAMPS (GM CASTINGS)                | i) Mechanical Test & Chemical Test                                      | Major | Tensile & Chemical Analysis | One (1) Per Heat         | App TDS/Drg./ Spec.               | App TDS/Drg./ Spec.               | Lab/Mfg. TC      | √           | 2      | --    | 1 |         |
|                                                                                  |                                                     | ii) Dimension                                                           | Major | Measurement                 | At random (Two) Per Heat | App TDS/Drg./ Spec.               | App TDS/Drg./ Spec.               | IR               |             | 2      | 2     | 1 |         |
|                                                                                  |                                                     | iii) Physical Obsvn.                                                    | Major | Visual                      | 100%                     | Surface free from harmful defects | Surface free from harmful defects | IR               |             | 2      | 2     | 1 |         |
| 1.3                                                                              | SEAT, RUBBER & DIAPHRAGM                            | i) Mechanical                                                           | Major | UTS                         | One (1) Per Heat         | App TDS/Drg./ Spec.               | App TDS/Drg./ Spec.               | Lab/Mfg. TC      | √           | 2      | --    | 1 |         |
|                                                                                  |                                                     | ii) Polymer Test                                                        | Major | Chemical Test & FTIR Graph  | One (1) Per Heat         | Neoprene Rubber                   | Neoprene Rubber                   | Lab/Mfg. TC      | √           | 2      | --    | 1 |         |
| <b>2.0</b>                                                                       | <b>INPROCESS INSPECTION</b>                         |                                                                         |       |                             |                          |                                   |                                   |                  |             |        |       |   |         |
| 2.1                                                                              | Body, Cover Clapper Clamps, Seat (During machining) | i) Physical Obsvn. Dimn. Check                                          | Major | Visual & Measurement        | 100%                     | App TDS/Drg./ Spec.               | App TDS/Drg./ Spec.               | IR               |             | 2      | 2     | 1 |         |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|  |                                                                   | TYPICAL MANUFACTURING QUALITY PLAN                                      |          |                                                       |                           |                              |                              |                   | MQP. NO.:   |        |       |   |         |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------|----------|-------------------------------------------------------|---------------------------|------------------------------|------------------------------|-------------------|-------------|--------|-------|---|---------|
|                                                                                  |                                                                   | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                                                       | PRODUCT: DELUGE VALVE     |                              |                              |                   | REV NO:     |        | DATE: |   |         |
|                                                                                  |                                                                   |                                                                         |          |                                                       |                           |                              |                              |                   | PAGE 2 OF 2 |        |       |   |         |
| SL NO                                                                            | COMPONENTS                                                        | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK                                         | QUANTUM OF CHECK          | REFERENCE DOCUMENT           | ACCEPTANCE NORMS             | FORMAT OF RECORD  | * D         | AGENCY |       |   | REMARKS |
|                                                                                  |                                                                   |                                                                         |          |                                                       |                           |                              |                              |                   |             | P      | W     | V |         |
| 2.2                                                                              | Body, Cover<br>Clapper Clamps,<br>Seat (After final<br>machining) | i) Physical Obsvn.<br>Dimn. Check                                       | Major    | Visual &<br>Measure<br>ment                           | 100%                      | App TDS/Drg./<br>Spec.       | App TDS/Drg./<br>Spec.       | IR                |             | 2      | 2     | 1 |         |
| 2.3                                                                              | Body & Cover                                                      | i) Hydro Test                                                           | Major    | Leak<br>proof test                                    | 100%                      | 25 kg/cm2 for 5<br>Mins.     | No Leakage                   | IR                |             | 2      | 2     | 1 |         |
| 2.4                                                                              | Body & Cover                                                      | i) Surface Cleaning                                                     | Major    | Pressure<br>Test,<br>Dressing/<br>Grinding/<br>Filing | 100%                      | Free from<br>surface defects | Free from<br>surface defects | IR                |             | 2      | 2     | 1 |         |
| 3.0                                                                              | FINAL INSPECTION & TESTING                                        |                                                                         |          |                                                       |                           |                              |                              |                   |             |        |       |   |         |
| 3.1                                                                              | DELUGE<br>VALVE<br>( Complete<br>Assembly)                        | i) Physical Obsvn.<br>Dimn. Check                                       | Major    | Visual &<br>Measure<br>ment                           | 100% for 2<br>& 10% for 1 | App TDS/Drg./<br>Spec.       | App TDS/Drg./<br>Spec.       | IR                | √           | 2      | 1     | - |         |
|                                                                                  |                                                                   | ii) Seat Leak Test                                                      | Major    | Hydro<br>test<br>(seat)                               | 100% for 2<br>& 10% for 1 | App TDS/Drg./<br>Spec.       | No Leakage                   | IR                | √           | 2      | 1     | - |         |
|                                                                                  |                                                                   | iii) Performance cum<br>functional check                                | Critical | Performa<br>nce Test                                  | 100% for 2<br>& 10% for 1 | App TDS/Drg./<br>Spec.       | App TDS/Drg./<br>Spec.       | IR                | √           | 2      | 1     | - |         |
|                                                                                  |                                                                   | iv) Painting &<br>Marking                                               | Major    | Visual                                                | 100%                      | App TDS/Drg./<br>Spec.       | App TDS/Drg./<br>Spec.       | IR                | √           | 2      | 2     | 1 |         |
| 4.0                                                                              | PRESERVATION & PACKING                                            |                                                                         |          |                                                       |                           |                              |                              |                   |             |        |       |   |         |
| 4.1                                                                              | DV. Assy.<br>(Painted)                                            | Properly packing with<br>necessary marking                              | Major    | Visual                                                | 100%                      | App TDS/Drg./<br>Spec.       | App TDS/Drg./<br>Spec.       | Packing<br>Report | √           | 2      |       | 1 |         |
| 4.2                                                                              |                                                                   | Preservation must be<br>maintained at proper<br>place                   | Major    | Visual                                                | 100%                      | App TDS/Drg./<br>Spec.       | App TDS/Drg./<br>Spec.       | Packing<br>Report | √           | 2      |       | 1 |         |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                                                  |            |                                                                         |       |                  |                     |                       |                     |                     |              |                     |       |  |         |
|----------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|-------|------------------|---------------------|-----------------------|---------------------|---------------------|--------------|---------------------|-------|--|---------|
|  |            | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |                  |                     |                       |                     |                     | QP. NO.:     |                     |       |  |         |
|                                                                                  |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |                  |                     | PRODUCT: INSTRUMENT   |                     |                     | REV NO:      |                     | DATE: |  |         |
|                                                                                  |            |                                                                         |       |                  |                     |                       |                     |                     | PAGE 1 OF 12 |                     |       |  |         |
| SL<br>NO                                                                         | COMPONENTS | CHARACTERISTICS                                                         | CLASS | TYPE OF<br>CHECK | QUANTUM<br>OF CHECK | REFERENCE<br>DOCUMENT | ACCEPTANCE<br>NORMS | FORMAT OF<br>RECORD | *<br>D       | AGENCY<br>P   W   V |       |  | REMARKS |

## DIFFERENTIAL PRESSURE SWITCH

|            |                                             |                                       |       |                     |                                     |                                                         |                                                         |                                 |   |   |    |   |  |
|------------|---------------------------------------------|---------------------------------------|-------|---------------------|-------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------|---|---|----|---|--|
| <b>1.0</b> | <b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b> |                                       |       |                     |                                     |                                                         |                                                         |                                 |   |   |    |   |  |
| 1.1        | DIFFERENTIAL PRESSURE SWITCH                | MATERIAL OF CONSTRUCTION              | MAJOR | MATERIAL CONFIRMITY | 100%                                | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | MATERIAL COMPLIANCE CERTIFICATE | √ | 2 | -- | 1 |  |
| <b>2.0</b> | <b>FINAL INSPECTION &amp; TESTING</b>       |                                       |       |                     |                                     |                                                         |                                                         |                                 |   |   |    |   |  |
| 2.1        | DIFFERENTIAL PRESSURE SWITCH                | PHYSICAL VERIFICATION & MARKING CHECK | MAJOR | VISUAL              | 100%                                | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | INSPECTION REPORT               | √ | 2 | 1  |   |  |
| 2.2        |                                             | DIMENSIONAL VERIFICATION              | MAJOR | MEASUREMENT         | 100%                                | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | DIMENSION REPORT                | √ | 2 | 1  |   |  |
| 2.3        |                                             | CALIBRATION                           | MAJOR | REVIEW              | 100%                                | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | CALIBRATION TEST CERTIFICATE    | √ | 2 | -- | 1 |  |
| 2.4        |                                             | WEATHER PROOF                         | MAJOR | VERIFICATION        | FOR ONE SAMPLE OF APPLICABLE DESIGN | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | IP CERTIFICATE                  | √ | 2 | -- | 1 |  |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.



|  |                   | <b>TYPICAL MANUFACTURING QUALITY PLAN</b>                               |       |               |                  |                                                         |                                                      | QP. NO.:              |     |              |    |   |         |
|----------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------|-------|---------------|------------------|---------------------------------------------------------|------------------------------------------------------|-----------------------|-----|--------------|----|---|---------|
|                                                                                  |                   |                                                                         |       |               |                  |                                                         |                                                      | REV NO:               |     | DATE:        |    |   |         |
|                                                                                  |                   | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  |                                                         |                                                      | PRODUCT: INSTRUMENT   |     | PAGE 2 OF 12 |    |   |         |
| SL NO                                                                            | COMPONENTS        | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                                      | ACCEPTANCE NORMS                                     | FORMAT OF RECORD      | * D | AGENCY       |    |   | REMARKS |
|                                                                                  |                   |                                                                         |       |               |                  |                                                         |                                                      |                       |     | P            | W  | V |         |
| 2.5                                                                              |                   | GUARANTEE PERFORMANCE                                                   | MAJOR | REVIEW        | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | GUARANTEE CERTIFICATE | √   | 2            | -- | 1 |         |
| <b>3.0 PRESERVATION &amp; PACKING</b>                                            |                   |                                                                         |       |               |                  |                                                         |                                                      |                       |     |              |    |   |         |
| 3.1                                                                              | COMPLETE ASSEMBLY | PACKING & PRESERVATION                                                  | MAJOR | PACKING       | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | PACKING LIST          | √   | 2            | -- | 1 |         |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                                                  |            |                                                                         |       |               |                  |                    |                     |                  |              |        |       |   |         |
|----------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|-------|---------------|------------------|--------------------|---------------------|------------------|--------------|--------|-------|---|---------|
|  |            | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |               |                  |                    |                     |                  | QP. NO.:     |        |       |   |         |
|                                                                                  |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  |                    | PRODUCT: INSTRUMENT |                  | REV NO:      |        | DATE: |   |         |
|                                                                                  |            |                                                                         |       |               |                  |                    |                     |                  | PAGE 3 OF 12 |        |       |   |         |
| SL NO                                                                            | COMPONENTS | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS    | FORMAT OF RECORD | * D          | AGENCY |       |   | REMARKS |
|                                                                                  |            |                                                                         |       |               |                  |                    |                     |                  |              | P      | W     | V |         |

## PRESSURE SWITCH

|            |                                             |                                            |       |                     |                                     |                                                         |                                                         |                                 |   |   |    |   |  |
|------------|---------------------------------------------|--------------------------------------------|-------|---------------------|-------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------|---|---|----|---|--|
| <b>1.0</b> | <b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b> |                                            |       |                     |                                     |                                                         |                                                         |                                 |   |   |    |   |  |
| 1.1        | PRESSURE SWITCH                             | MATERIAL OF CONSTRUCTION                   | MAJOR | MATERIAL CONFIRMITY | 100%                                | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | MATERIAL COMPLIANCE CERTIFICATE | √ | 2 | -- | 1 |  |
| <b>2.0</b> | <b>FINAL INSPECTION &amp; TESTING</b>       |                                            |       |                     |                                     |                                                         |                                                         |                                 |   |   |    |   |  |
| 2.1        | PRESSURE SWITCH                             | PHYSICAL VERIFICATION & MARKING CHECK      | MAJOR | VISUAL              | 100%                                | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | INSPECTION REPORT               | √ | 2 | 1  |   |  |
| 2.2        |                                             | DIMENSIONAL VERIFICATION                   | MAJOR | VISUAL              | 100%                                | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | DIMENSION REPORT                | √ | 2 | 1  |   |  |
| 2.3        |                                             | CALIBRATION                                | MAJOR | REVIEW              | 100%                                | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | CALIBRATION TEST CERTIFICATE    | √ | 2 | -- | 1 |  |
| 2.4        |                                             | WEATHER PROOF & HAZARDOUS AREA CERTIFICATE | MAJOR | VERIFICATION        | FOR ONE SAMPLE OF APPLICABLE DESIGN | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | IP CERTIFICATE                  | √ | 2 | -- | 1 |  |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                                                  |                        |                                                                         |       |               |                  |                                                         |                                                      |                       |     |        |    |   |         |
|----------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------|-------|---------------|------------------|---------------------------------------------------------|------------------------------------------------------|-----------------------|-----|--------|----|---|---------|
|  |                        | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |               |                  |                                                         |                                                      | QP. NO.:              |     |        |    |   |         |
|                                                                                  |                        | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  | PRODUCT: INSTRUMENT                                     |                                                      | REV NO:               |     | DATE:  |    |   |         |
|                                                                                  |                        |                                                                         |       |               |                  |                                                         |                                                      | PAGE 4 OF 12          |     |        |    |   |         |
| SL NO                                                                            | COMPONENTS             | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                                      | ACCEPTANCE NORMS                                     | FORMAT OF RECORD      | * D | AGENCY |    |   | REMARKS |
|                                                                                  |                        |                                                                         |       |               |                  |                                                         |                                                      |                       |     | P      | W  | V |         |
| 2.5                                                                              |                        | GUARANTEE PERFORMANCE                                                   | MAJOR | REVIEW        | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | GUARANTEE CERTIFICATE | √   | 2      | -- | 1 |         |
| 3.0                                                                              | PRESERVATION & PACKING |                                                                         |       |               |                  |                                                         |                                                      |                       |     |        |    |   |         |
| 3.1                                                                              | COMPLETE ASSEMBLY      | PACKING & PRESERVATION                                                  | MAJOR | PACKING       | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | PACKING LIST          | √   | 2      | -- | 1 |         |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

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|----------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|-------|---------------|------------------|--------------------|---------------------|------------------|--------------|--------|-------|---|---------|
|  |            | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |               |                  |                    |                     |                  | QP. NO.:     |        |       |   |         |
|                                                                                  |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  |                    | PRODUCT: INSTRUMENT |                  | REV NO:      |        | DATE: |   |         |
|                                                                                  |            |                                                                         |       |               |                  |                    |                     |                  | PAGE 5 OF 12 |        |       |   |         |
| SL NO                                                                            | COMPONENTS | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS    | FORMAT OF RECORD | * D          | AGENCY |       |   | REMARKS |
|                                                                                  |            |                                                                         |       |               |                  |                    |                     |                  |              | P      | W     | V |         |

## LEVEL SWITCH

|            |                                             |                                       |       |                     |                                           |                                                         |                                                         |                                 |   |   |    |   |  |
|------------|---------------------------------------------|---------------------------------------|-------|---------------------|-------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------|---|---|----|---|--|
| <b>1.0</b> | <b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b> |                                       |       |                     |                                           |                                                         |                                                         |                                 |   |   |    |   |  |
| 1.1        | LEVEL SWITCH                                | MATERIAL OF CONSTRUCTION              | MAJOR | MATERIAL CONFIRMITY | 100%                                      | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | MATERIAL COMPLIANCE CERTIFICATE | √ | 2 | -- | 1 |  |
| <b>2.0</b> | <b>FINAL INSPECTION &amp; TESTING</b>       |                                       |       |                     |                                           |                                                         |                                                         |                                 |   |   |    |   |  |
| 2.1        | LEVEL SWITCH                                | PHYSICAL VERIFICATION & MARKING CHECK | MAJOR | VISUAL              | 100%                                      | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | INSPECTION REPORT               | √ | 2 | 1  |   |  |
| 2.2        |                                             | DIMENSIONAL VERIFICATION              | MAJOR | VISUAL              | 100%                                      | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | DIMENSION REPORT                | √ | 2 | 1  |   |  |
| 2.3        |                                             | HIGH VOLTAGE TEST AT 2KV              | MAJOR | TEST                | 100%                                      | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | TEST REPORT                     | √ | 2 | -- | 1 |  |
| 2.4        |                                             | WEATHER PROOF                         | MAJOR | VERIFICATION        | ON ONE SAMPLE OF APPLICABLE DESIGN/ MODEL | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | IP CERTIFICATE                  | √ | 2 | -- | 1 |  |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

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|----------------------------------------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|-------|---------------|------------------|---------------------------------------------------------|------------------------------------------------------|-----------------------|----------|--------|----|---|----------------|
|  |                                                  | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |               |                  |                                                         |                                                      |                       | QP. NO.: |        |    |   |                |
|                                                                                  |                                                  | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  | PRODUCT: INSTRUMENT                                     |                                                      | REV NO:               |          | DATE:  |    |   |                |
|                                                                                  |                                                  |                                                                         |       |               |                  |                                                         |                                                      | PAGE 6 OF 12          |          |        |    |   |                |
| SL NO                                                                            | COMPONENTS                                       | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                                      | ACCEPTANCE NORMS                                     | FORMAT OF RECORD      | * D      | AGENCY |    |   | REMARKS        |
|                                                                                  |                                                  |                                                                         |       |               |                  |                                                         |                                                      |                       |          | P      | W  | V |                |
| 2.5                                                                              |                                                  | GUARANTEE PERFORMANCE                                                   | MAJOR | REVIEW        | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | GUARANTEE CERTIFICATE | √        | 2      | -- | 1 |                |
| 2.6                                                                              | EXTERNAL CHAMBER, FLOAT AND OTHER PRESSURE PARTS | IBR CERTIFICATE*                                                        | MAJOR | REVIEW        | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | IBR FORM-III C        | √        | 2      | -- | 1 | *if applicable |
| 3.0                                                                              | PRESERVATION & PACKING                           |                                                                         |       |               |                  |                                                         |                                                      |                       |          |        |    |   |                |
| 3.1                                                                              | COMPLETE ASSEMBLY                                | PACKING & PRESERVATION                                                  | MAJOR | PACKING       | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | PACKING LIST          | √        | 2      | -- | 1 |                |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|  |            | <b>TYPICAL MANUFACTURING QUALITY PLAN</b>                               |       |               |                  |                    |                  | QP. NO.:            |     |              |   |   |         |
|----------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|-------|---------------|------------------|--------------------|------------------|---------------------|-----|--------------|---|---|---------|
|                                                                                  |            |                                                                         |       |               |                  |                    |                  | REV NO:             |     | DATE:        |   |   |         |
|                                                                                  |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  |                    |                  | PRODUCT: INSTRUMENT |     | PAGE 7 OF 12 |   |   |         |
| SL NO                                                                            | COMPONENTS | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD    | * D | AGENCY       |   |   | REMARKS |
|                                                                                  |            |                                                                         |       |               |                  |                    |                  |                     |     | P            | W | V |         |

## PRESSURE GAUGE

|                                                 |                |                          |       |                     |                                           |                                                         |                                                         |                                 |   |   |    |   |  |
|-------------------------------------------------|----------------|--------------------------|-------|---------------------|-------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------|---|---|----|---|--|
| <b>1.0 RAW MATERIALS &amp; BOUGHT OUT ITEMS</b> |                |                          |       |                     |                                           |                                                         |                                                         |                                 |   |   |    |   |  |
| 1.1                                             | PRESSURE GAUGE | MATERIAL OF CONSTRUCTION | MAJOR | MATERIAL CONFIRMITY | 100%                                      | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | MATERIAL COMPLIANCE CERTIFICATE | √ | 2 | -- | 1 |  |
| <b>2.0 FINAL INSPECTION &amp; TESTING</b>       |                |                          |       |                     |                                           |                                                         |                                                         |                                 |   |   |    |   |  |
| 2.1                                             | PRESSURE GAUGE | VISUAL & MARKING CHECK   | MAJOR | VISUAL              | 100%                                      | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | INSPECTION REPORT               | √ | 2 | 1  |   |  |
| 2.2                                             |                | CALIBRATION              | MAJOR | REVIEW              | 100%                                      | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | CALIBRATION TEST CERTIFICATE    | √ | 2 | -- | 1 |  |
| 2.3                                             |                | WEATHER-PROOFNESS        | MAJOR | TYPE TEST           | ON ONE SAMPLE OF APPLICABLE DESIGN/ MODEL | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | IP CERTIFICATE                  | √ | 2 | -- | 1 |  |
| 2.4                                             |                | GUARANTEE PERFORMANCE    | MAJOR | REVIEW              | 100%                                      | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | GUARANTEE CERTIFICATE           | √ | 2 | -- | 1 |  |
| <b>3.0 PRESERVATION &amp; PACKING</b>           |                |                          |       |                     |                                           |                                                         |                                                         |                                 |   |   |    |   |  |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                 |                   |                                                                         |       |               |                  |                                                         |                                                      |                  |     |        |    |   |         |
|-------------------------------------------------|-------------------|-------------------------------------------------------------------------|-------|---------------|------------------|---------------------------------------------------------|------------------------------------------------------|------------------|-----|--------|----|---|---------|
| <div><div>बी एच ई एल</div><div>BHEL</div></div> |                   | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |               |                  |                                                         |                                                      | QP. NO.:         |     |        |    |   |         |
|                                                 |                   | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  | PRODUCT: INSTRUMENT                                     |                                                      | REV NO:          |     | DATE:  |    |   |         |
|                                                 |                   |                                                                         |       |               |                  |                                                         |                                                      | PAGE 8 OF 12     |     |        |    |   |         |
| SL NO                                           | COMPONENTS        | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                                      | ACCEPTANCE NORMS                                     | FORMAT OF RECORD | * D | AGENCY |    |   | REMARKS |
|                                                 |                   |                                                                         |       |               |                  |                                                         |                                                      |                  |     | P      | W  | V |         |
| 3.1                                             | COMPLETE ASSEMBLY | PACKING & PRESERVATION                                                  | MAJOR | PACKING       | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | PACKING LIST     | √   | 2      | -- | 1 |         |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                                                  |            |                                                                         |       |               |                  |                     |                  |                  |              |        |       |   |         |
|----------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|-------|---------------|------------------|---------------------|------------------|------------------|--------------|--------|-------|---|---------|
|  |            | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |               |                  |                     |                  |                  | QP. NO.:     |        |       |   |         |
|                                                                                  |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  | PRODUCT: INSTRUMENT |                  |                  | REV NO:      |        | DATE: |   |         |
|                                                                                  |            |                                                                         |       |               |                  |                     |                  |                  | PAGE 9 OF 12 |        |       |   |         |
| SL NO                                                                            | COMPONENTS | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT  | ACCEPTANCE NORMS | FORMAT OF RECORD | * D          | AGENCY |       |   | REMARKS |
|                                                                                  |            |                                                                         |       |               |                  |                     |                  |                  |              | P      | W     | V |         |

## DIFFERENTIAL PRESSURE GAUGE

|            |                                                                |                                       |       |                     |                                           |                                                   |                                                   |                                 |   |   |    |   |  |
|------------|----------------------------------------------------------------|---------------------------------------|-------|---------------------|-------------------------------------------|---------------------------------------------------|---------------------------------------------------|---------------------------------|---|---|----|---|--|
| <b>1.0</b> | <b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b>                    |                                       |       |                     |                                           |                                                   |                                                   |                                 |   |   |    |   |  |
| 1.1        | DIFFERENTIAL PRESSURE GAUGE – SENSOR & CASE OF INSTRUMENT etc. | MATERIAL OF CONSTRUCTION              | MAJOR | MATERIAL CONFIRMITY | 100%                                      | Approved Datasheet/ Approved Drawing/ Tech. spec. | Approved Datasheet/ Approved Drawing/ Tech. spec. | MATERIAL COMPLIANCE CERTIFICATE | √ | 2 | -- | 1 |  |
| <b>2.0</b> | <b>FINAL INSPECTION &amp; TESTING</b>                          |                                       |       |                     |                                           |                                                   |                                                   |                                 |   |   |    |   |  |
| 2.1        | DIFFERENTIAL PRESSURE GAUGE                                    | PHYSICAL VERIFICATION & MARKING CHECK | MAJOR | VISUAL              | 100%                                      | Approved Datasheet/ Approved Drawing/ Tech. spec. | Approved Datasheet/ Approved Drawing/ Tech. spec. | INSPECTION REPORT               | √ | 2 | 1  |   |  |
| 2.2        |                                                                | CALIBRATION                           | MAJOR | REVIEW              | 100%                                      |                                                   |                                                   | CALIBRATION TEST CERTIFICATE    | √ | 2 | -- | 1 |  |
| 2.3        |                                                                | WEATHER PROOF                         | MAJOR | TYPE TEST           | ON ONE SAMPLE OF APPLICABLE DESIGN/ MODEL |                                                   |                                                   | IP CERTIFICATE                  | √ | 2 | -- | 1 |  |
| 2.4        |                                                                | ACCURACY TEST                         | MAJOR | TYPE TEST           | ON ONE SAMPLE OF APPLICABLE DESIGN/ MODEL |                                                   |                                                   | TEST CERTIFICATE                | √ | 2 | -- | 1 |  |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.



|                                                                                  |                        |                                                                         |       |               |                                           |                                                   |                                                   |                       |               |        |       |   |         |
|----------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------|-------|---------------|-------------------------------------------|---------------------------------------------------|---------------------------------------------------|-----------------------|---------------|--------|-------|---|---------|
|  |                        | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |               |                                           |                                                   |                                                   |                       | QP. NO.:      |        |       |   |         |
|                                                                                  |                        | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                                           | PRODUCT: INSTRUMENT                               |                                                   |                       | REV NO:       |        | DATE: |   |         |
|                                                                                  |                        |                                                                         |       |               |                                           |                                                   |                                                   |                       | PAGE 10 OF 12 |        |       |   |         |
| SL NO                                                                            | COMPONENTS             | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK                          | REFERENCE DOCUMENT                                | ACCEPTANCE NORMS                                  | FORMAT OF RECORD      | * D           | AGENCY |       |   | REMARKS |
|                                                                                  |                        |                                                                         |       |               |                                           |                                                   |                                                   |                       |               | P      | W     | V |         |
| 2.5                                                                              |                        | MAXIMUM WORKING PRESSURE WITHSTAND ABILITY                              | MAJOR | TYPE TEST     | ON ONE SAMPLE OF APPLICABLE DESIGN/ MODEL | Approved Datasheet/ Approved Drawing/ Tech. spec. | Approved Datasheet/ Approved Drawing/ Tech. spec. | TEST CERTIFICATE      | √             | 2      | --    | 1 |         |
| 2.6                                                                              |                        | GUARANTEE PERFORMANCE                                                   | MAJOR | REVIEW        | 100%                                      |                                                   |                                                   | GUARANTEE CERTIFICATE | √             | 2      | --    | 1 |         |
| 3.0                                                                              | PRESERVATION & PACKING |                                                                         |       |               |                                           |                                                   |                                                   |                       |               |        |       |   |         |
| 3.1                                                                              | COMPLETE ASSEMBLY      | PACKING & PRESERVATION                                                  | MAJOR | PACKING       | 100%                                      | Approved Datasheet/ Approved Drawing/ Tech. spec. | Approved Datasheet/ Approved Drawing/ Tech. spec. | PACKING LIST          | √             | 2      | --    | 1 |         |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|  |            | <b>TYPICAL MANUFACTURING QUALITY PLAN</b>                               |       |               |                  |                    |                  | QP. NO.:            |     |               |   |   |         |
|----------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|-------|---------------|------------------|--------------------|------------------|---------------------|-----|---------------|---|---|---------|
|                                                                                  |            |                                                                         |       |               |                  |                    |                  | REV NO:             |     | DATE:         |   |   |         |
|                                                                                  |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  |                    |                  | PRODUCT: INSTRUMENT |     | PAGE 11 OF 12 |   |   |         |
| SL NO                                                                            | COMPONENTS | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD    | * D | AGENCY        |   |   | REMARKS |
|                                                                                  |            |                                                                         |       |               |                  |                    |                  |                     |     | P             | W | V |         |

### LEVEL GAUGE

|                                                 |             |                                       |       |                     |      |                                                         |                                                         |                                 |   |   |    |   |  |
|-------------------------------------------------|-------------|---------------------------------------|-------|---------------------|------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------|---|---|----|---|--|
| <b>1.0 RAW MATERIALS &amp; BOUGHT OUT ITEMS</b> |             |                                       |       |                     |      |                                                         |                                                         |                                 |   |   |    |   |  |
| 1.1                                             | LEVEL GAUGE | MATERIAL OF CONSTRUCTION              | MAJOR | MATERIAL CONFIRMITY | 100% | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | MATERIAL COMPLIANCE CERTIFICATE | √ | 2 | -- | 1 |  |
| <b>2.0 FINAL INSPECTION &amp; TESTING</b>       |             |                                       |       |                     |      |                                                         |                                                         |                                 |   |   |    |   |  |
| 2.1                                             | LEVEL GAUGE | PHYSICAL VERIFICATION & MARKING CHECK | MAJOR | VISUAL              | 100% | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | INSPECTION REPORT               | √ | 2 | 1  |   |  |
| 2.2                                             |             | COROSSION TEST                        | MAJOR | TEST                | 100% | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | TEST CERTIFICATE                | √ | 2 | -- | 1 |  |
| 2.3                                             |             | THERMAL SHOCK TEST                    | MAJOR | TEST                | 100% | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | TEST CERTIFICATE                | √ | 2 | -- | 1 |  |
| 2.4                                             |             | HYDRAULIC TEST                        | MAJOR | TEST                | 100% | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | TEST CERTIFICATE                | √ | 2 | -- | 1 |  |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                                                  |                        |                                                                         |       |               |                  |                                                         |                                                      |                       |               |        |       |   |                |
|----------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------|-------|---------------|------------------|---------------------------------------------------------|------------------------------------------------------|-----------------------|---------------|--------|-------|---|----------------|
|  |                        | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |               |                  |                                                         |                                                      |                       | QP. NO.:      |        |       |   |                |
|                                                                                  |                        | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  | PRODUCT: INSTRUMENT                                     |                                                      |                       | REV NO:       |        | DATE: |   |                |
|                                                                                  |                        |                                                                         |       |               |                  |                                                         |                                                      |                       | PAGE 12 OF 12 |        |       |   |                |
| SL NO                                                                            | COMPONENTS             | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                                      | ACCEPTANCE NORMS                                     | FORMAT OF RECORD      | * D           | AGENCY |       |   | REMARKS        |
|                                                                                  |                        |                                                                         |       |               |                  |                                                         |                                                      |                       |               | P      | W     | V |                |
| 2.5                                                                              |                        | IBR CERTIFICATE*                                                        | MAJOR | REVIEW        | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | IBR FORM - III C      | √             | 2      | --    | 1 | *if applicable |
| 2.6                                                                              |                        | GUARANTEE PERFORMANCE                                                   | MAJOR | REVIEW        | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | GUARANTEE CERTIFICATE | √             | 2      | --    | 1 |                |
| 3.0                                                                              | PRESERVATION & PACKING |                                                                         |       |               |                  |                                                         |                                                      |                       |               |        |       |   |                |
| 3.1                                                                              | COMPLETE ASSEMBLY      | PACKING & PRESERVATION                                                  | MAJOR | PACKING       | 100%             | Approved Datasheet/<br>Approved Drawing/<br>Tech. spec. | Approved Datasheet/<br>Approved Drawing/ Tech. spec. | PACKING LIST          | √             | 2      | --    | 1 |                |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                 |                                                   |                                                                         |          |                                |                                         |                               |                               |                           |                              |        |                  |   |         |
|-------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------|----------|--------------------------------|-----------------------------------------|-------------------------------|-------------------------------|---------------------------|------------------------------|--------|------------------|---|---------|
| <div><div>बी एच ई एल</div><div>BHEL</div></div> |                                                   | MANUFACTURING QUALITY PLAN                                              |          |                                |                                         |                               |                               |                           | MQP. NO.: SMQP/FPS/02/092013 |        |                  |   |         |
|                                                 |                                                   | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                                | PRODUCT: FLAME PROOF CONTROL<br>STATION |                               |                               |                           | REV NO: 00                   |        | DATE: 01/09/2013 |   |         |
|                                                 |                                                   |                                                                         |          |                                |                                         |                               |                               |                           | PAGE 1 OF 3                  |        |                  |   |         |
| SL NO                                           | COMPONENTS                                        | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK                  | QUANTUM OF CHECK                        | REFERENCE DOCUMENT            | ACCEPTANCE NORMS              | FORMAT OF RECORD          | *                            | AGENCY |                  |   | REMARKS |
|                                                 |                                                   |                                                                         |          |                                |                                         |                               |                               |                           | D                            | P      | W                | V |         |
| 1.0                                             | RAW MATERIALS & BOUGHT OUT ITEMS                  |                                                                         |          |                                |                                         |                               |                               |                           |                              |        |                  |   |         |
|                                                 | CASTING                                           | PHYSICAL & CHEMICAL PROPERTIES                                          | MAJOR    | PHYSICAL & CHEMICAL PROPERTIES | SAMPLE                                  | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE/LOG BOOK | √                            | 2      |                  | 1 |         |
|                                                 | WIRE, TERMINAL, GLASS, AMMETER, VOLT METER, e.t.c | TYPE, MAKE, SIZE, RATING, FUNCTIONAL                                    | MAJOR    | PHYSICAL                       | SAMPLE/BATCH                            | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE/LOG BOOK | √                            | 2      |                  | 1 |         |
|                                                 | FLAMEPROOF ENCLOSURE WITHOUT COMPONENTS           | ROUTINE PRESSURE TEST                                                   | MAJOR    | PHYSICAL                       | SAMPLE/BATCH                            | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE/LOG BOOK | √                            | 2      |                  | 1 |         |
| 2.0                                             | INPROCESS INSPECTION                              |                                                                         |          |                                |                                         |                               |                               |                           |                              |        |                  |   |         |
|                                                 | ASSEMBLY                                          | WIRING, FERRULING, LEVELLING, EARTHING                                  | MAJOR    | VISUAL                         | 100%                                    | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE/LOG BOOK | √                            | 2      |                  | 1 |         |
|                                                 | GENERAL ARRANGEMENT                               | COMPONENT MOUNTING                                                      | MAJOR    | VISUAL                         | 100%                                    | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE/LOG BOOK | √                            | 2      |                  | 1 |         |
| 3.0                                             | FINAL INSPECTION & TESTING                        |                                                                         |          |                                |                                         |                               |                               |                           |                              |        |                  |   |         |
|                                                 |                                                   | DIMENSION                                                               | CRITICAL | MEASUREMENT                    | 100%                                    | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE          | √                            | 2      | 1                |   |         |

|                                                                                                                                                                                                                                                                                                                                                                    |                           |                           |                                              |
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| LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS. | PREPARED BY               | APPROVED BY               | APPROVED BY                                  |
|                                                                                                                                                                                                                                                                                                                                                                    | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

| <div><div>बी एच ई एल</div><div></div></div> |            | MANUFACTURING QUALITY PLAN                                                                        |          |               |                                         |                               |                               | MQP. NO.: SMQP/FPS/02/092013 |     |                  |   |   |         |
|------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------|----------|---------------|-----------------------------------------|-------------------------------|-------------------------------|------------------------------|-----|------------------|---|---|---------|
|                                                                                                                              |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032                           |          |               | PRODUCT: FLAME PROOF CONTROL<br>STATION |                               |                               | REV NO: 00                   |     | DATE: 01/09/2013 |   |   |         |
|                                                                                                                              |            |                                                                                                   |          |               |                                         |                               |                               | PAGE 2 OF 3                  |     |                  |   |   |         |
| SL NO                                                                                                                        | COMPONENTS | CHARACTERISTICS                                                                                   | CLASS    | TYPE OF CHECK | QUANTUM OF CHECK                        | REFERENCE DOCUMENT            | ACCEPTANCE NORMS              | FORMAT OF RECORD             | * D | AGENCY           |   |   | REMARKS |
|                                                                                                                              |            |                                                                                                   |          |               |                                         |                               |                               |                              |     | P                | W | V |         |
|                                                                                                                              |            | VISUAL                                                                                            | CRITICAL | VISUAL        | 100%                                    | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                | 1 |   |         |
|                                                                                                                              |            | ELECTRICAL OPERATION TEST                                                                         | CRITICAL | ELECTRICAL    | 100%                                    | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                | 1 |   |         |
|                                                                                                                              |            | PERFORMANCE TEST                                                                                  | CRITICAL | ELECTRICAL    | 100%                                    | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                | 1 |   |         |
|                                                                                                                              |            | HV-IR TEST BEFORE & AFTER HIGH VOITAGE                                                            | CRITICAL | ELECTRICAL    | 100%                                    | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                | 1 |   |         |
|                                                                                                                              |            | CERTIFICATE OF STATUTORY APPROVAL AUTHORITY LIKE CCOE/PESO FOR USE IN ELECTRICALLY HAZARDOUS AREA | CRITICAL | ELECTRICAL    | ONE                                     | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                |   | 1 |         |
|                                                                                                                              |            | IP-TEST                                                                                           | CRITICAL | ELECTRICAL    | ONE                                     | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                |   | 1 |         |

|                                                                                                                                                                                                                                                                                                                                                                    |                           |                           |                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------------------------------|
| LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS. | PREPARED BY               | APPROVED BY               | APPROVED BY                                  |
|                                                                                                                                                                                                                                                                                                                                                                    | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|                                                  |                        |                                                                         |          |               |                                         |                                |                                |                              |   |                  |   |   |         |
|--------------------------------------------------|------------------------|-------------------------------------------------------------------------|----------|---------------|-----------------------------------------|--------------------------------|--------------------------------|------------------------------|---|------------------|---|---|---------|
| <div><div>बी एच डी एल</div><div>BHEL</div></div> |                        | MANUFACTURING QUALITY PLAN                                              |          |               |                                         |                                |                                | MQP. NO.: SMQP/FPS/02/092013 |   |                  |   |   |         |
|                                                  |                        | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |               | PRODUCT: FLAME PROOF CONTROL<br>STATION |                                |                                | REV NO: 00                   |   | DATE: 01/09/2013 |   |   |         |
|                                                  |                        |                                                                         |          |               |                                         |                                |                                | PAGE 3 OF 3                  |   |                  |   |   |         |
| SL NO                                            | COMPONENTS             | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK | QUANTUM OF CHECK                        | REFERENCE DOCUMENT             | ACCEPTANCE NORMS               | FORMAT OF RECORD             | * | AGENCY           |   |   | REMARKS |
|                                                  |                        |                                                                         |          |               |                                         |                                |                                |                              | D | P                | W | V |         |
|                                                  |                        | INTERNAL TEST REPORTS FOR ALL ITEMS                                     | CRITICAL | ELECTRICAL    | ONE                                     | BHEL SPECIFICATION/DATA SHEET  | BHEL SPECIFICATION/DATA SHEET  | TEST CERTIFICATE             | √ | 2                |   | 1 |         |
|                                                  |                        | BOM CHECK                                                               | CRITICAL | VISUAL        | 100%                                    | BHEL SPECIFICATION/DATA SHEET  | BHEL SPECIFICATION/DATA SHEET  | TEST CERTIFICATE             | √ | 2                | 1 |   |         |
|                                                  |                        | PAINT SHADE & THICKNESS                                                 | CRITICAL | VISUAL        | 100%                                    | BHEL SPECIFICATION/DATA SHEET  | BHEL SPECIFICATION/DATA SHEET  | TEST CERTIFICATE             | √ | 2                | 1 |   |         |
| 4.0                                              | PRESERVATION & PACKING |                                                                         |          |               |                                         |                                |                                |                              |   |                  |   |   |         |
|                                                  | PACKING                | FINISH                                                                  | MAJOR    | VISUAL        | 100%                                    | BHEL specification/D ata Sheet | BHEL specification/D ata Sheet | TEST CERTIFICATE/LOG BOOK    |   | 2                |   | 1 |         |

|                                                                                                                                                                                                                                                                                                                                                                    |                           |                           |                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|-------------------------------------------------|
| LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS. | PREPARED BY               | APPROVED BY               | APPROVED BY                                     |
|                                                                                                                                                                                                                                                                                                                                                                    | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP<br>(IF APPLICABLE) |

|  |                                             | <b>TYPICAL MANUFACTURING QUALITY PLAN</b>                               |       |                         |                  |                                             |                                        | MQP. NO.:               |     |        |   |   |         |
|----------------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------|-------|-------------------------|------------------|---------------------------------------------|----------------------------------------|-------------------------|-----|--------|---|---|---------|
|                                                                                  |                                             |                                                                         |       |                         |                  |                                             |                                        | REV NO:                 |     | DATE:  |   |   |         |
|                                                                                  |                                             | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |                         |                  | PRODUCT: Forged, Seamless & Welded Fittings |                                        | PAGE 1 OF 2             |     |        |   |   |         |
| SL NO                                                                            | COMPONENTS                                  | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK           | QUANTUM OF CHECK | REFERENCE DOCUMENT                          | ACCEPTANCE NORMS                       | FORMAT OF RECORD        | * D | AGENCY |   |   | REMARKS |
|                                                                                  |                                             |                                                                         |       |                         |                  |                                             |                                        |                         |     | P      | W | V |         |
| <b>1.0</b>                                                                       | <b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b> |                                                                         |       |                         |                  |                                             |                                        |                         |     |        |   |   |         |
|                                                                                  | Billets, Rounds, Pipes, Coil, Plate s, etc. | Chemical, Physical                                                      | Major | Analysis Test           | One/Lot          | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | Lab. /Supp. Certificate | √   | 2      | 2 | 1 |         |
| <b>2.0</b>                                                                       | <b>INPROCESS INSPECTION</b>                 |                                                                         |       |                         |                  |                                             |                                        |                         |     |        |   |   |         |
|                                                                                  | Cleaning & Finishing                        | Blast Cleaning                                                          | Major | Cleaning                | 100%             | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | IIR                     | √   | 2      | 2 | 1 |         |
|                                                                                  | Finishing                                   | Galvanizing                                                             | Major | Chemical                | 100%             | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | IIR                     | √   | 2      | 2 | 1 |         |
| <b>3.0</b>                                                                       | <b>FINAL INSPECTION &amp; TESTING</b>       |                                                                         |       |                         |                  |                                             |                                        |                         |     |        |   |   |         |
|                                                                                  |                                             | NDT                                                                     | Major | NDT                     | 10%              | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | IR                      | √   | 2      | 1 | - |         |
|                                                                                  |                                             | Size, Thickness, Dimension                                              | Major | Visual                  | 10%              | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | IR                      | √   | 2      | 1 | - |         |
|                                                                                  |                                             | Surface Quality, Marking, Color coding, etc                             | Major | Visual                  | 10%              | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | IR                      | √   | 2      | 1 | - |         |
|                                                                                  |                                             | PMI(Final inspected Fittings)                                           | Major | PMI                     | One/Lot          | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | IR                      | √   | 2      | 1 | - |         |
| <b>4.0</b>                                                                       | <b>PRESERVATION &amp; PACKING</b>           |                                                                         |       |                         |                  |                                             |                                        |                         |     |        |   |   |         |
|                                                                                  | Identification                              | Marking & Stamping                                                      | Major | Verification & Stamping | 100%             | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | IR                      | √   | 2      |   | 1 |         |
|                                                                                  | Painting                                    | Final finish & Paint DFT                                                | Major | Visual & Measurement    | 100%             | Approved BHEL Spec./Drawing/ datasheet      | Approved BHEL Spec./Drawing/ datasheet | Painting Report         | √   | 2      |   | 1 |         |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|  |            | <b>TYPICAL MANUFACTURING QUALITY PLAN</b>                               |       |               |                                             |                                       |                                       | MQP. NO.:        |     |        |   |   |         |
|----------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|-------|---------------|---------------------------------------------|---------------------------------------|---------------------------------------|------------------|-----|--------|---|---|---------|
|                                                                                  |            |                                                                         |       |               |                                             |                                       |                                       | REV NO:          |     | DATE:  |   |   |         |
|                                                                                  |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               | PRODUCT: Forged, Seamless & Welded Fittings |                                       |                                       | PAGE 2 OF 2      |     |        |   |   |         |
| SL NO                                                                            | COMPONENTS | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK                            | REFERENCE DOCUMENT                    | ACCEPTANCE NORMS                      | FORMAT OF RECORD | * D | AGENCY |   |   | REMARKS |
|                                                                                  |            |                                                                         |       |               |                                             |                                       |                                       |                  |     | P      | W | V |         |
|                                                                                  | Packing    | Soundness of packing                                                    | Major | Verification  | 100%                                        | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | ✓   | 2      |   | 1 |         |

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|                                                 |                                  |                                                                         |       |                            |                            |                                 |                                |                  |                                |        |                  |   |         |
|-------------------------------------------------|----------------------------------|-------------------------------------------------------------------------|-------|----------------------------|----------------------------|---------------------------------|--------------------------------|------------------|--------------------------------|--------|------------------|---|---------|
| <div><div>बी एच ई एल</div><div>BHEL</div></div> |                                  | MANUFACTURING QUALITY PLAN                                              |       |                            |                            |                                 |                                |                  | MQP. NO.: SMQP/FPS/10/A/092013 |        |                  |   |         |
|                                                 |                                  | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |                            | PRODUCT: HVWS NOZZLE SPARY |                                 |                                |                  | REV NO: 00                     |        | DATE: 01/09/2013 |   |         |
|                                                 |                                  |                                                                         |       |                            |                            |                                 |                                |                  | PAGE 1 OF 2                    |        |                  |   |         |
| SL NO                                           | COMPONENTS                       | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK              | QUANTUM OF CHECK           | REFERENCE DOCUMENT              | ACCEPTANCE NORMS               | FORMAT OF RECORD | *                              | AGENCY |                  |   | REMARKS |
|                                                 |                                  |                                                                         |       |                            |                            |                                 |                                |                  | D                              | P      | W                | V |         |
| 1.0                                             | RAW MATERIALS & BOUGHT OUT ITEMS |                                                                         |       |                            |                            |                                 |                                |                  |                                |        |                  |   |         |
|                                                 | HOUSING (BRASS)                  | CHEMICAL                                                                | MAJOR | CHEM. ANALYSIS             | ONE PER HEAT OR BATCH      | As per approved drg/TDS//Spec . | As per approved drg/TDS//Spec. | Lab./Mfg. TC     | √                              | 2      | -                | 1 |         |
|                                                 |                                  | DIMENSION                                                               | MAJOR | MEASURE MENT               | ONE PER HEAT OR BATCH      | As per approved drg/TDS//Spec . | As per approved drg/TDS//Spec. | IR               | -                              | 2      | 2                | 1 |         |
|                                                 | SCROLL (BRASS)                   | MECH. & CHEMICAL                                                        | MAJOR | MECH & CHEM. ANALYSIS      | ONE PER HEAT OR BATCH      | As per approved drg/TDS//Spec . | As per approved drg/TDS//Spec. | Lab./Mfg. TC     | -                              | 2      | -                | 1 |         |
| 2.0                                             | INPROCESS INSPECTION             |                                                                         |       |                            |                            |                                 |                                |                  |                                |        |                  |   |         |
|                                                 | HOUSING                          | MECH. & DIMENSION CHECK                                                 | MAJOR | MEASURE MENT & GAUGE CHECK | 100%                       | AS per approved drg.            | AS per approved drg.           | IR               | -                              | 2      | 2                | 1 |         |
|                                                 | SCROLL                           | DIMENSTION CHECK                                                        | MAJOR | MEASURE MENT & GAUGE CHECK | 100%                       | AS per approved drg.            | AS per approved drg.           | IR               | -                              | 2      | 2                | 1 |         |
|                                                 | ASSY                             | Fitment & Assembly Check                                                | MAJOR | VISUAL                     | 100%                       | AS per approved drg.            | AS per approved drg.           | IR               | -                              | 2      | 2                | 1 |         |
|                                                 |                                  | Cleaning & Flow Testing                                                 | MAJOR | FLOW TEST                  | 100%                       | AS per approved drg.            | AS per approved drg.           | IR               | -                              | 2      | 2                | 1 |         |
| 3.0                                             | FINAL INSPECTION & TESTING       |                                                                         |       |                            |                            |                                 |                                |                  |                                |        |                  |   |         |

|                                                                                                                                                                                                                                                                                                                                                                   |                           |                           |                                              |
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|                                                                                                                                                                                                                                                                                                                                                                   | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|                                                                                   |                             |                                                                         |           |                       |                            |                                 |                                |                                |     |                     |      |   |         |
|-----------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------|-----------|-----------------------|----------------------------|---------------------------------|--------------------------------|--------------------------------|-----|---------------------|------|---|---------|
|  |                             | MANUFACTURING QUALITY PLAN                                              |           |                       |                            |                                 |                                | MQP. NO.: SMQP/FPS/10/A/092013 |     |                     |      |   |         |
|                                                                                   |                             | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |           |                       | PRODUCT: HVWS NOZZLE SPARY |                                 |                                | REV NO: 00                     |     | DATE: 01/09/2013    |      |   |         |
|                                                                                   |                             |                                                                         |           |                       |                            |                                 |                                | PAGE 2 OF 2                    |     |                     |      |   |         |
| SL NO                                                                             | COMPONENTS                  | CHARACTERISTICS                                                         | CLASS     | TYPE OF CHECK         | QUANTUM OF CHECK           | REFERENCE DOCUMENT              | ACCEPTANCE NORMS               | FORMAT OF RECORD               | * D | AGENCY<br>P   W   V |      |   | REMARKS |
|                                                                                   | HVWS NOZZLE (Complete Assy) | PHYSICAL OBSERVATION & DIMN. CHECK                                      | MAJOR     | VISUAL & MEASURE MENT | 100% for 2, 10% for 1      | As per approved drg/TDS//Spec . | As per approved drg/TDS//Spec. | IR                             | √   | 2                   | 2, 1 | - |         |
|                                                                                   |                             | PERFORMANCE (FLOW,SPRAY ANGLE,SPRAY PATTERN TEST)                       | CRITIC AL | FLOW TEST             | 100% for 2, 10% for 1      | As per approved drg/TDS//Spec . | As per approved drg/TDS//Spec. | IR / TC                        | √   | 2                   | 2, 1 | - |         |
|                                                                                   |                             | MARKING & FINISH                                                        | MAJOR     | VISUAL                | 100% for 2, 10% for 1      | As per approved drg/TDS//Spec . | As per approved drg/TDS//Spec. | IR                             | √   | 2                   | 2, 1 | - |         |
| 4.0                                                                               | PRESERVATION & PACKING      |                                                                         |           |                       |                            |                                 |                                |                                |     |                     |      |   |         |
|                                                                                   | HVWS NOZZLE ASSY            | PROPERLY PACKING WITH NECESSARY MARKING                                 | MAJOR     | VISUAL                | 100%                       | As per approved drg/TDS//Spec . | As per approved drg/TDS//Spec. | PACKING NOTE                   | -   | 2                   | 2    | - |         |
|                                                                                   |                             | PRESERVATION MUST BE MAINTAINED IN PROPER PLACE                         | MAJOR     | VISUAL                | 100%                       | As per approved drg/TDS//Spec . | As per approved drg/TDS//Spec. | PACKING NOTE                   | -   | 2                   | 2    | - |         |

|                                                                                                                                                                                                                                                                                                                                                                   |                           |                           |                                              |
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|                                                                                                                                                                                                                                                                                                                                                                   | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|                                                 |                                                  |                                                                         |          |               |                  |                                           |                                           |                   |                              |        |                  |   |         |
|-------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|----------|---------------|------------------|-------------------------------------------|-------------------------------------------|-------------------|------------------------------|--------|------------------|---|---------|
| <div><div>बी एच ई एल</div><div>BHEL</div></div> |                                                  | MANUFACTURING QUALITY PLAN                                              |          |               |                  |                                           |                                           |                   | MQP. NO.: SMQP/FPS/04/092013 |        |                  |   |         |
|                                                 |                                                  | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |               |                  | PRODUCT: JUNCTION BOX                     |                                           |                   | REV NO: 00                   |        | DATE: 01/09/2013 |   |         |
|                                                 |                                                  |                                                                         |          |               |                  |                                           |                                           |                   | PAGE 1 OF 4                  |        |                  |   |         |
| SL NO                                           | COMPONENTS                                       | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                        | ACCEPTANCE NORMS                          | FORMAT OF RECORD  | * D                          | AGENCY |                  |   | REMARKS |
|                                                 |                                                  |                                                                         |          |               |                  |                                           |                                           |                   |                              | P      | W                | V |         |
| 1.0                                             | RAW MATERIALS & BOUGHT OUT ITEMS                 |                                                                         |          |               |                  |                                           |                                           |                   |                              |        |                  |   |         |
|                                                 | ENCLOSURE CASTING                                | MATERIAL OF CONSTRUCTION                                                | MAJOR    | CHEMICAL      | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      |                  | 1 |         |
|                                                 |                                                  | DIMENSIONS                                                              |          | MEASURE MENT  |                  |                                           |                                           |                   |                              |        |                  |   |         |
|                                                 | READYMADE PARTS & COMPONENTS LIKE TERMINALS Etc. | MAKE & RATING                                                           | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      |                  | 1 |         |
|                                                 |                                                  | FUNCTIONAL TEST                                                         |          | ELECTRIC ALC  |                  |                                           |                                           |                   |                              |        |                  |   |         |
|                                                 |                                                  | HIGH VOLTAGE TEST                                                       |          | ELECTRIC ALC  |                  |                                           |                                           |                   |                              |        |                  |   |         |
|                                                 |                                                  | INSULATION RESISTANCE TEST                                              |          | ELECTRIC ALC  |                  |                                           |                                           |                   |                              |        |                  |   |         |
|                                                 | CABLE GLAND/PLUGS                                | EXPLOSION PROOF                                                         | MAJOR    | VERIFICAT ION | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      |                  | 1 |         |
|                                                 | GASKET & HARDWARE                                | DIMENSIONS                                                              | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      |                  | 1 |         |
|                                                 |                                                  | MECHANICAL PROPERTIES                                                   |          | MECHANIC AL   |                  |                                           |                                           |                   |                              |        |                  |   |         |
| 2.0                                             | INPROCESS INSPECTION                             |                                                                         |          |               |                  |                                           |                                           |                   |                              |        |                  |   |         |
|                                                 | MACHINING                                        | DIMENTION                                                               | MAJOR    | MEASURE MENT  | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2      |                  | 1 |         |
|                                                 |                                                  | CABLE ENTRY                                                             |          | MEASURE MENT  |                  |                                           |                                           |                   |                              |        |                  |   |         |
|                                                 | PRESSURE TEST                                    | TESTING                                                                 | CRITICAL | MECHANIC AL   | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2      |                  | 1 |         |
|                                                 | WIRING                                           | CONTINUITY                                                              | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2      |                  | 1 |         |

|                                                                                                                                                                                                                                                                                                                                                                    |                           |                           |                                              |
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|                                                                                                                                                                                                                                                                                                                                                                    | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|  |                            | MANUFACTURING QUALITY PLAN                                              |          |               |                  |                                           |                                           |                   | MQP. NO.: SMQP/FPS/04/092013 |        |                  |   |         |
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|                                                                                   |                            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |               |                  | PRODUCT: JUNCTION BOX                     |                                           |                   | REV NO: 00                   |        | DATE: 01/09/2013 |   |         |
|                                                                                   |                            |                                                                         |          |               |                  |                                           |                                           |                   | PAGE 2 OF 4                  |        |                  |   |         |
| SL NO                                                                             | COMPONENTS                 | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                        | ACCEPTANCE NORMS                          | FORMAT OF RECORD  | * D                          | AGENCY |                  |   | REMARKS |
|                                                                                   |                            |                                                                         |          |               |                  |                                           |                                           |                   |                              | P      | W                | V |         |
|                                                                                   | PAINTING                   | SURFACE PREPARATION                                                     | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2      |                  | 1 |         |
|                                                                                   |                            | SHADE                                                                   | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2      |                  | 1 |         |
|                                                                                   |                            | SURFACE FINISH                                                          | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2      |                  | 1 |         |
|                                                                                   | ASSEMBLY                   | LOCATION OF COMPONENTS                                                  | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2      |                  | 1 |         |
|                                                                                   |                            | CLEARANCE                                                               |          | VISUAL        |                  |                                           |                                           |                   |                              |        |                  |   |         |
| 3.0                                                                               | FINAL INSPECTION & TESTING |                                                                         |          |               |                  |                                           |                                           |                   |                              |        |                  |   |         |
|                                                                                   | ROUTINE CHECKS             | OVERALL DIMENTIONS                                                      | MAJOR    | MEASURE MENT  | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      | 1                |   |         |
|                                                                                   |                            | COMPLETENESS CHECK                                                      | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      | 1                |   |         |
|                                                                                   |                            | CABLE ENTRIES                                                           | MAJOR    | MEASURE MENT  | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      | 1                |   |         |
|                                                                                   |                            | JOINT,SURFACE & GAP/CLEARANCE                                           | CRITICAL | MEASURE MENT  | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      | 1                |   |         |
|                                                                                   |                            | TERMINAL ARRANGEMENT                                                    | MAJOR    | VISUAL        | 100%             | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2      | 1                |   |         |

|                                                                                                                                                                                                                                                                                                                                                                   |                           |                           |                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------------------------------|
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|                                                                                                                                                                                                                                                                                                                                                                   | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|                                                 |                         |                                                                         |          |               |                   |                                           |                                           |                   |                              |                 |                  |   |               |
|-------------------------------------------------|-------------------------|-------------------------------------------------------------------------|----------|---------------|-------------------|-------------------------------------------|-------------------------------------------|-------------------|------------------------------|-----------------|------------------|---|---------------|
| <div><div>बी एच ई एल</div><div>BHEL</div></div> |                         | MANUFACTURING QUALITY PLAN                                              |          |               |                   |                                           |                                           |                   | MQP. NO.: SMQP/FPS/04/092013 |                 |                  |   |               |
|                                                 |                         | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |               |                   | PRODUCT: JUNCTION BOX                     |                                           |                   | REV NO: 00                   |                 | DATE: 01/09/2013 |   |               |
|                                                 |                         |                                                                         |          |               |                   |                                           |                                           |                   | PAGE 3 OF 4                  |                 |                  |   |               |
| SL NO                                           | COMPONENTS              | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK | QUANTUM OF CHECK  | REFERENCE DOCUMENT                        | ACCEPTANCE NORMS                          | FORMAT OF RECORD  | * D                          | AGENCY<br>P W V |                  |   | REMARKS       |
|                                                 |                         | PAINT SHADE & FINISH                                                    | MAJOR    | VISUAL        | 100%              | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2               | 1                |   |               |
|                                                 |                         | HIGH VOLTAGE TEST                                                       | CRITICAL | ELECTRIC ALC  | 100%              | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2               | 1                |   |               |
|                                                 |                         | INSULATION RESISTANCE TEST                                              | CRITICAL | ELECTRIC ALC  | 100%              | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2               | 1                |   |               |
|                                                 | TYPE TEST               | DEGREE OF PROTECTION OF ENCLOSURE                                       | MAJOR    | MECHANICAL    | 1 No. EACH DESIGN | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2               |                  | 1 | IF APPLICABLE |
|                                                 |                         | FLAME PROTECTION OF ENCLOSURE                                           | MAJOR    | MECHANICAL    | 1 No. EACH DESIGN | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2               |                  | 1 | IF APPLICABLE |
|                                                 |                         | WEATHER PROOF                                                           | MAJOR    | MECHANICAL    | 1 No. EACH DESIGN | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | TEST CERTIFICATE  | √                            | 2               |                  | 1 | IF APPLICABLE |
| 4.0                                             | PRESERVATION & PACKING  |                                                                         |          |               |                   |                                           |                                           |                   |                              |                 |                  |   |               |
|                                                 | MARKING                 | TAGGING & IDENTIFICATION                                                | MAJOR    | VISUAL        | 100%              | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2               |                  | 1 |               |
|                                                 | PACKING OF THE MATERIAL | PACKING PROCEDURE                                                       | MAJOR    | VISUAL        | 100%              | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2               |                  | 1 |               |
|                                                 |                         | PACKING LIST                                                            | MAJOR    | VISUAL        | 100%              | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | AS PER APPD DRG/APPD DATASHEET/BHEL SPEC. | INSPECTION REPORT | √                            | 2               |                  | 1 |               |

|                                                                                                                                                                                                                                                                                                                                                                    |                           |                           |                                              |
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| LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS. | PREPARED BY               | APPROVED BY               | APPROVED BY                                  |
|                                                                                                                                                                                                                                                                                                                                                                    | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|                                                                                   |            |                                                                         |       |               |                       |                    |                  |                              |     |                     |  |  |         |
|-----------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------|-------|---------------|-----------------------|--------------------|------------------|------------------------------|-----|---------------------|--|--|---------|
|  |            | <b>MANUFACTURING QUALITY PLAN</b>                                       |       |               |                       |                    |                  | MQP. NO.: SMQP/FPS/04/092013 |     |                     |  |  |         |
|                                                                                   |            |                                                                         |       |               |                       |                    |                  | REV NO: 00                   |     | DATE: 01/09/2013    |  |  |         |
|                                                                                   |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               | PRODUCT: JUNCTION BOX |                    |                  | PAGE 4 OF 4                  |     |                     |  |  |         |
| SL NO                                                                             | COMPONENTS | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK      | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD             | * D | AGENCY<br>P   W   V |  |  | REMARKS |

**NOTE:-**

- 1) This MQP should be read along with specification, approved drawings & approved data sheet.
- 2) Latest revisions of specifications/drawings as per P.O., approved drawings & bill of materials are applicable.
- 3) All test certificates/reports reviewed and certified by TPI/BHEL shall be submitted to BHEL as documentation package.
- 4) Drawing/data sheet shall prevail over quality plan for contradiction if any between quality plan and drawing/specification.
- 5) Any project/customer specific requirement which shall be notified have to be fulfilled by the vendor at the time of execution of order.

|                                                                                                                                                                                                                                                                                                                                                                   |                           |                           |                                              |
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|                                                                                                                                                                                                                                                                                                                                                                   | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|                                                                                                                                                                                                                                                                                   |                                                                           | <b>MANUFACTURING QUALITY PLAN</b>                                       |       |                                |                                              |                               |                                              | MQP. NO.: SMQP/FPS/05/092013 |                                                                 |                  |   |   |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|-------------------------------------------------------------------------|-------|--------------------------------|----------------------------------------------|-------------------------------|----------------------------------------------|------------------------------|-----------------------------------------------------------------|------------------|---|---|---------|
|                                                                                                                                                                                                                                                                                                                                                                    |                                                                           |                                                                         |       |                                |                                              |                               |                                              | REV NO: 00                   |                                                                 | DATE: 01/09/2013 |   |   |         |
|                                                                                                                                                                                                                                                                                                                                                                    |                                                                           | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |                                |                                              | PRODUCT: LOCAL CONTROL PANEL  |                                              |                              |                                                                 | PAGE 1 OF 3      |   |   |         |
| SL NO                                                                                                                                                                                                                                                                                                                                                              | COMPONENTS                                                                | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK                  | QUANTUM OF CHECK                             | REFERENCE DOCUMENT            | ACCEPTANCE NORMS                             | FORMAT OF RECORD             | *                                                               | AGENCY           |   |   | REMARKS |
|                                                                                                                                                                                                                                                                                                                                                                    |                                                                           |                                                                         |       |                                |                                              |                               |                                              |                              | D                                                               | P                | W | V |         |
| <b>1.0</b>                                                                                                                                                                                                                                                                                                                                                         | <b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b>                               |                                                                         |       |                                |                                              |                               |                                              |                              |                                                                 |                  |   |   |         |
|                                                                                                                                                                                                                                                                                                                                                                    | STEEL SHEET                                                               | PHYSICAL & CHEMICAL PROPERTIES                                          | MAJOR | PHYSICAL & CHEMICAL PROPERTIES | SAMPLE                                       | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET                | TEST CERTIFICATE/LOG BOOK    | ✓                                                               | 2                |   | 1 |         |
|                                                                                                                                                                                                                                                                                                                                                                    | WIRE, TERMINAL, MCCB, MCB, CONTACTOR, INDICATION LAMP, PUSH BUTTON, e.t.c | TYPE, MAKE, SIZE, RATING, FUNCTIONAL                                    | MAJOR | PHYSICAL                       | SAMPLE/BATCH                                 | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET                | TEST CERTIFICATE/LOG BOOK    | ✓                                                               | 2                |   | 1 |         |
| <b>2.0</b>                                                                                                                                                                                                                                                                                                                                                         | <b>INPROCESS INSPECTION</b>                                               |                                                                         |       |                                |                                              |                               |                                              |                              |                                                                 |                  |   |   |         |
|                                                                                                                                                                                                                                                                                                                                                                    | FABRICATION                                                               | DIMENSION, WELDING, LIFTING FACILITY                                    | MAJOR | VISUAL                         | 100%                                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET                | TEST CERTIFICATE/LOG BOOK    | ✓                                                               | 2                |   | 1 |         |
|                                                                                                                                                                                                                                                                                                                                                                    | PRETREATMENT                                                              | DEGREASING, DERUSTING, PHOSPHATISING                                    | MAJOR | VISUAL                         | 100%                                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET                | TEST CERTIFICATE/LOG BOOK    | ✓                                                               | 2                |   | 1 |         |
|                                                                                                                                                                                                                                                                                                                                                                    | ASSEMBLY                                                                  | WIRING, FERRULING, LEVELLING, EARTHING                                  | MAJOR | VISUAL                         | 100%                                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET                | TEST CERTIFICATE/LOG BOOK    | ✓                                                               | 2                |   | 1 |         |
|                                                                                                                                                                                                                                                                                                                                                                    | GENERAL ARRANGEMENT                                                       | COMPONENT MOUNTING                                                      | MAJOR | VISUAL                         | 100%                                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET                | TEST CERTIFICATE/LOG BOOK    | ✓                                                               | 2                |   | 1 |         |
| <b>3.0</b>                                                                                                                                                                                                                                                                                                                                                         | <b>FINAL INSPECTION &amp; TESTING</b>                                     |                                                                         |       |                                |                                              |                               |                                              |                              |                                                                 |                  |   |   |         |
| LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS. |                                                                           |                                                                         |       |                                | PREPARED BY<br><br>BHEL QA SIGNATURE & STAMP |                               | APPROVED BY<br><br>BHEL QA SIGNATURE & STAMP |                              | APPROVED BY<br><br>CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |                  |   |   |         |

|                                                                                                                              |            |                                                                                                   |          |               |                              |                               |                               |                              |     |                  |   |   |         |
|------------------------------------------------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------------------|----------|---------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-----|------------------|---|---|---------|
| <div><div>बी एच ई एल</div><div></div></div> |            | MANUFACTURING QUALITY PLAN                                                                        |          |               |                              |                               |                               | MQP. NO.: SMQP/FPS/05/092013 |     |                  |   |   |         |
|                                                                                                                              |            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032                           |          |               | PRODUCT: LOCAL CONTROL PANEL |                               |                               | REV NO: 00                   |     | DATE: 01/09/2013 |   |   |         |
|                                                                                                                              |            |                                                                                                   |          |               |                              |                               |                               | PAGE 2 OF 3                  |     |                  |   |   |         |
| SL NO                                                                                                                        | COMPONENTS | CHARACTERISTICS                                                                                   | CLASS    | TYPE OF CHECK | QUANTUM OF CHECK             | REFERENCE DOCUMENT            | ACCEPTANCE NORMS              | FORMAT OF RECORD             | * D | AGENCY           |   |   | REMARKS |
|                                                                                                                              |            |                                                                                                   |          |               |                              |                               |                               |                              |     | P                | W | V |         |
|                                                                                                                              |            | DIMENSION                                                                                         | CRITICAL | MEASUREMENT   | 100%                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                | 1 |   |         |
|                                                                                                                              |            | HV-IR TEST                                                                                        | CRITICAL | ELECTRICAL    | 100%                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                | 1 |   |         |
|                                                                                                                              |            | CALIBRATION TEST                                                                                  | CRITICAL | MEASUREMENT   | 100%                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                |   | 1 |         |
|                                                                                                                              |            | PERFORMANCE TEST                                                                                  | CRITICAL | ELECTRICAL    | 100%                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                | 1 |   |         |
|                                                                                                                              |            | LEAK TEST(FOR PNEUMATIC PANEL)                                                                    | CRITICAL | MEASUREMENT   | 100%                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                |   | 1 |         |
|                                                                                                                              |            | CERTIFICATE OF STATUTORY APPROVAL AUTHORITY LIKE CCOE/PESO FOR USE IN ELECTRICALLY HAZARDOUS AREA | CRITICAL | ELECTRICAL    | ONE                          | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √   | 2                |   | 1 |         |

|                                                                                                                                                                                                                                                                                                                                                                    |                           |                           |                                              |
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|                                                                                                                                                                                                                                                                                                                                                                    | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |



|                                                 |                        |                                                                         |          |               |                              |                               |                               |                              |   |                  |   |   |         |
|-------------------------------------------------|------------------------|-------------------------------------------------------------------------|----------|---------------|------------------------------|-------------------------------|-------------------------------|------------------------------|---|------------------|---|---|---------|
| <div><div>बी एच ई एल</div><div>BHEL</div></div> |                        | MANUFACTURING QUALITY PLAN                                              |          |               |                              |                               |                               | MQP. NO.: SMQP/FPS/05/092013 |   |                  |   |   |         |
|                                                 |                        | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |               | PRODUCT: LOCAL CONTROL PANEL |                               |                               | REV NO: 00                   |   | DATE: 01/09/2013 |   |   |         |
|                                                 |                        |                                                                         |          |               |                              |                               |                               | PAGE 3 OF 3                  |   |                  |   |   |         |
| SL NO                                           | COMPONENTS             | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK | QUANTUM OF CHECK             | REFERENCE DOCUMENT            | ACCEPTANCE NORMS              | FORMAT OF RECORD             | * | AGENCY           |   |   | REMARKS |
|                                                 |                        |                                                                         |          |               |                              |                               |                               |                              | D | P                | W | V |         |
|                                                 |                        | IP-TEST                                                                 | CRITICAL | ELECTRICAL    | ONE                          | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √ | 2                |   | 1 |         |
|                                                 |                        | BOM CHECK                                                               | CRITICAL | VISUAL        | 100%                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √ | 2                | 1 |   |         |
|                                                 |                        | PAINT SHADE & THICKNESS                                                 | CRITICAL | VISUAL        | 100%                         | BHEL SPECIFICATION/DATA SHEET | BHEL SPECIFICATION/DATA SHEET | TEST CERTIFICATE             | √ | 2                |   | 1 |         |
| 4.0                                             | PRESERVATION & PACKING |                                                                         |          |               |                              |                               |                               |                              |   |                  |   |   |         |
|                                                 | PACKING                | FINISH                                                                  | MAJOR    | VISUAL        | 100%                         | BHEL specification/Data Sheet | BHEL specification/Data Sheet | TEST CERTIFICATE/LOG BOOK    |   | 2                |   | 1 |         |

|                                                                                                                                                                                                                                                                                                                                                                    |                           |                           |                                              |
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| LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICATE REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS. | PREPARED BY               | APPROVED BY               | APPROVED BY                                  |
|                                                                                                                                                                                                                                                                                                                                                                    | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

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|----------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------|-------|----------------------------|----------------------------|--------------------------------|--------------------------------|------------------|-----|--------|---|---|---------|
|  |                                  | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |                            |                            |                                |                                | MQP. NO.:        |     |        |   |   |         |
|                                                                                  |                                  | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |                            | PRODUCT: MVWS NOZZLE SPARY |                                |                                | REV NO:          |     | DATE:  |   |   |         |
|                                                                                  |                                  |                                                                         |       |                            |                            |                                |                                | PAGE 1 OF 2      |     |        |   |   |         |
| SL NO                                                                            | COMPONENTS                       | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK              | QUANTUM OF CHECK           | REFERENCE DOCUMENT             | ACCEPTANCE NORMS               | FORMAT OF RECORD | * D | AGENCY |   |   | REMARKS |
|                                                                                  |                                  |                                                                         |       |                            |                            |                                |                                |                  |     | P      | W | V |         |
| 1.0                                                                              | RAW MATERIALS & BOUGHT OUT ITEMS |                                                                         |       |                            |                            |                                |                                |                  |     |        |   |   |         |
|                                                                                  | HOUSING (BRASS)                  | CHEMICAL                                                                | MAJOR | CHEM. ANALYSIS             | ONE PER HEAT OR BATCH      | As per approved drg/TDS//Spec. | As per approved drg/TDS//Spec. | Lab./Mfg. TC     | √   | 2      | - | 1 |         |
|                                                                                  |                                  | DIMENSION                                                               | MAJOR | MEASURE MENT               | ONE PER HEAT OR BATCH      | As per approved drg/TDS//Spec. | As per approved drg/TDS//Spec. | IR               | -   | 2      | 2 | 1 |         |
|                                                                                  |                                  | SURFACE DEFECTS                                                         | MINOR | VISUAL                     | 100%                       | SURFACE FREE FROM DEFECTS      | SURFACE FREE FROM DEFECTS      | IR               | -   | 2      | 2 | 1 |         |
|                                                                                  | DEFLECTOR                        | MECH. & CHEMICAL                                                        | MAJOR | MECH & CHEM. ANALYSIS      | ONE PER HEAT OR BATCH      | As per approved drg/TDS//Spec. | As per approved drg/TDS//Spec. | Lab./Mfg. TC     | √   | 2      | - | 1 |         |
|                                                                                  | DEFLECTOR PIN                    | MECH. & CHEMICAL                                                        | MAJOR | MECH & CHEM. ANALYSIS      | ONE PER HEAT OR BATCH      | As per approved drg/TDS//Spec. | As per approved drg/TDS//Spec. | Lab./Mfg. TC     | √   | 2      | - | 1 |         |
| 2.0                                                                              | INPROCESS INSPECTION             |                                                                         |       |                            |                            |                                |                                |                  |     |        |   |   |         |
|                                                                                  | HOUSING                          | MECH. & DIMENSION CHECK                                                 | MAJOR | MEASURE MENT & GAUGE CHECK | 100%                       | As per approved drg.           | As per approved drg.           | IR               | -   | 2      | 2 | 1 |         |
|                                                                                  | DEFLECTOR & DEFLECTOR PIN        | DIMENSTION CHECK                                                        | MAJOR | MEASURE MENT & GAUGE CHECK | 100%                       | AsS per approved drg.          | As per approved drg.           | IR               | -   | 2      | 2 | 1 |         |
|                                                                                  | ASSY                             | Fitment & Assembly Check                                                | MAJOR | VISUAL                     | 100%                       | As per approved drg.           | As per approved drg.           | IR               | -   | 2      | 2 | 1 |         |

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|                                                                                  |                             |                                                                         |           |                       |                            |                               |                                |                  |     |        |   |   |         |
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|  |                             | TYPICAL MANUFACTURING QUALITY PLAN                                      |           |                       |                            |                               |                                | MQP. NO.:        |     |        |   |   |         |
|                                                                                  |                             | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |           |                       | PRODUCT: MVWS NOZZLE SPARY |                               |                                | REV NO:          |     | DATE:  |   |   |         |
|                                                                                  |                             |                                                                         |           |                       |                            |                               |                                | PAGE 2 OF 2      |     |        |   |   |         |
| SL NO                                                                            | COMPONENTS                  | CHARACTERISTICS                                                         | CLASS     | TYPE OF CHECK         | QUANTUM OF CHECK           | REFERENCE DOCUMENT            | ACCEPTANCE NORMS               | FORMAT OF RECORD | * D | AGENCY |   |   | REMARKS |
|                                                                                  |                             | Cleaning & Flow Testing                                                 | MAJOR     | FLOW TEST             | 100%                       | As per approved drg.          | As per approved drg.           | IR               | -   | 2      | 2 | 1 |         |
| 3.0                                                                              | FINAL INSPECTION & TESTING  |                                                                         |           |                       |                            |                               |                                |                  |     |        |   |   |         |
|                                                                                  | MVWS NOZZLE (Complete Assy) | PHYSICAL OBSERVATION & DIMN. CHECK                                      | MAJOR     | VISUAL & MEASURE MENT | 100% for 2, 10% for 1      | As per approved drg/TDS//Spec | As per approved drg/TDS//Spec. | IR               | √   | 2      | 1 | - |         |
|                                                                                  |                             | PERFORMANCE (FLOW,SPRAY ANGLE,SPRAY PATTERN TEST)                       | CRITIC AL | FLOW TEST             | 100% for 2, 10% for 1      | As per approved drg/TDS//Spec | As per approved drg/TDS//Spec. | IR / TC          | √   | 2      | 1 | - |         |
|                                                                                  |                             | MARKING & FINISH                                                        | MAJOR     | VISUAL                | 100% for 2, 10% for 1      | As per approved drg/TDS//Spec | As per approved drg/TDS//Spec. | IR               | √   | 2      | 1 | - |         |
| 4.0                                                                              | PRESERVATION & PACKING      |                                                                         |           |                       |                            |                               |                                |                  |     |        |   |   |         |
|                                                                                  | MVWS NOZZLE ASSY            | PROPERLY PACKING WITH NECESSARY MARKING                                 | MAJOR     | VISUAL                | 100%                       | As per approved drg/TDS//Spec | As per approved drg/TDS//Spec. | PACKING NOTE     | -   | 2      | 2 | - |         |
|                                                                                  |                             | PRESERVATION MUST BE MAINTAINED IN PROPER PLACE                         | MAJOR     | VISUAL                | 100%                       | As per approved drg/TDS//Spec | As per approved drg/TDS//Spec. | PACKING NOTE     | -   | 2      | 2 | - |         |

LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICAT REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                                                   |                                                      |                                                                         |       |                                |                            |                          |                          |                  |                              |                  |   |   |                                         |
|-----------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------|-------|--------------------------------|----------------------------|--------------------------|--------------------------|------------------|------------------------------|------------------|---|---|-----------------------------------------|
|  |                                                      | MANUFACTURING QUALITY PLAN                                              |       |                                |                            |                          |                          |                  | MQP. NO.: SMQP/FPS/11/092013 |                  |   |   |                                         |
|                                                                                   |                                                      | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |                                | PRODUCT: FLOW ORIFICE ASSY |                          |                          | REV NO: 00       |                              | DATE: 01/09/2013 |   |   |                                         |
|                                                                                   |                                                      |                                                                         |       |                                |                            |                          |                          | PAGE 1 OF 3      |                              |                  |   |   |                                         |
| SL NO                                                                             | COMPONENTS                                           | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK                  | QUANTUM OF CHECK           | REFERENCE DOCUMENT       | ACCEPTANCE NORMS         | FORMAT OF RECORD | *                            | AGENCY           |   |   | REMARKS                                 |
|                                                                                   |                                                      |                                                                         |       |                                |                            |                          |                          |                  | D                            | P                | W | V |                                         |
| 1.0                                                                               | RAW MATERIALS & BOUGHT OUT ITEMS                     |                                                                         |       |                                |                            |                          |                          |                  |                              |                  |   |   |                                         |
| 1.1                                                                               | ORIFICE PLATE                                        | CHEMICAL & MECHANICAL PROPERTIES                                        | MAJOR | CHEMICAL & MECHANICAL ANALYSIS | 100%                       | BHEL SPEC./ APPD DRAWING | BHEL SPEC./ APPD DRAWING | MTC              | √                            | 2                |   | 1 |                                         |
| 1.2                                                                               | FLANGES                                              | CHEMICAL & MECHANICAL PROPERTIES                                        | MAJOR | CHEMICAL & MECHANICAL ANALYSIS | 100%                       | BHEL SPEC./ APPD DRAWING | BHEL SPEC./ APPD DRAWING | MTC              | √                            | 2                |   | 1 |                                         |
| 1.2                                                                               | NIPPLES                                              | CHEMICAL & MECHANICAL PROPERTIES                                        | MAJOR | CHEMICAL & MECHANICAL ANALYSIS | 100%                       | BHEL SPEC/ APPD. DRAWING | BHEL SPEC/ APPD. DRAWING | MTC              | √                            | 2                |   | 1 |                                         |
| 1.3                                                                               | GASKET, STUDS & NUTS                                 | CHEMICAL & MECHANICAL PROPERTIES                                        | MAJOR | CHEMICAL &MECHANICAL ANALYSIS  | 100%                       | BHEL SPEC/ APPD DRAWING  | BHEL SPEC/ APPD DRAWING  | MTC              | √                            | 2                |   | 1 |                                         |
| 1.4                                                                               | BRANCH PIPE*                                         | CHEMICAL & MECHANICAL PROPERTIES                                        | MAJOR | CHEMICAL &MECHANICAL ANALYSIS  | 100%                       | BHEL SPEC/ APPD DRAWING  | BHEL SPEC/ APPD DRAWING  | MTC              | √                            | 2                |   | 1 | *for Flow orifice with Branch pipe type |
| 1.4                                                                               | ROOT VALVES (Body, Bonnet, Stem, Gland packing etc.) | CHEMICAL & MECHANICAL PROPERTIES.                                       | MAJOR | CHEMICAL &MECHANICAL ANALYSIS, | 100%                       | BHEL SPEC/ APPD DRAWING  | BHEL SPEC/ APPD DRAWING  | MTC              | √                            | 2                |   | 1 |                                         |

|                                                                                                                                                                                                                                                                                                                                                                   |                           |                           |                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------------------------------|
| LEGEND: P: PERFORM, W: WITNESS, V: TEST CERTIFICAT REVIEW. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS. | PREPARED BY               | APPROVED BY               | APPROVED BY                                  |
|                                                                                                                                                                                                                                                                                                                                                                   | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|                                                                                                                                                                                                                                                                                  |                                                              | <b>MANUFACTURING QUALITY PLAN</b>                                       |          |                        |                                              |                          |                                              | MQP. NO.: SMQP/FPS/11/092013 |                                                                 |                  |   |   |                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------|----------|------------------------|----------------------------------------------|--------------------------|----------------------------------------------|------------------------------|-----------------------------------------------------------------|------------------|---|---|----------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                   |                                                              |                                                                         |          |                        |                                              |                          |                                              | REV NO: 00                   |                                                                 | DATE: 01/09/2013 |   |   |                                                          |
|                                                                                                                                                                                                                                                                                                                                                                   |                                                              | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                        | PRODUCT: FLOW ORIFICE ASSY                   |                          |                                              | PAGE 2 OF 3                  |                                                                 |                  |   |   |                                                          |
| SL NO                                                                                                                                                                                                                                                                                                                                                             | COMPONENTS                                                   | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK          | QUANTUM OF CHECK                             | REFERENCE DOCUMENT       | ACCEPTANCE NORMS                             | FORMAT OF RECORD             | * D                                                             | AGENCY           |   |   | REMARKS                                                  |
|                                                                                                                                                                                                                                                                                                                                                                   |                                                              |                                                                         |          |                        |                                              |                          |                                              |                              |                                                                 | P                | W | V |                                                          |
|                                                                                                                                                                                                                                                                                                                                                                   |                                                              | HYDRO TEST LEAKAGE CLASS                                                | MAJOR    | HYDRO TEST             | 100%                                         | BHEL SPEC./ APPD DRAWING | BHEL SPEC/ APPD DRAWING                      | TC                           | √                                                               | 2                |   | 1 |                                                          |
| 1.6                                                                                                                                                                                                                                                                                                                                                               | Accessories like PLUG, JACK BOLT WITH NUT, CARRIER RING etc. | MATERIAL CHECK                                                          | MAJOR    | CHEMICAL ANALYSIS      | 100%                                         | BHEL SPEC./ APPD DRAWING | BHEL SPEC./ APPD DRAWING                     | MTC                          | √                                                               | 2                |   | 1 |                                                          |
| <b>2.0</b>                                                                                                                                                                                                                                                                                                                                                        | <b>INPROCESS INSPECTION</b>                                  |                                                                         |          |                        |                                              |                          |                                              |                              |                                                                 |                  |   |   |                                                          |
| 2.1                                                                                                                                                                                                                                                                                                                                                               | FLOW ORIFICE ASSEMBLY                                        | HYDRO TEST*                                                             | CRITICAL | HYDRO TEST             | 100%                                         | BHEL SPEC/ APPD. DRAWING | BHEL SPEC/ APPD. DRAWING                     | TC                           | √                                                               | 2                | 2 | 1 | *Hydro test applicable for FLOW ORIFICE with branch pipe |
|                                                                                                                                                                                                                                                                                                                                                                   | WELDING                                                      | WPS, PQR*                                                               | CRITICAL | REVIEW                 | 100%                                         | ASME Sec. IX             | ASME Sec. IX                                 | WPS, PQR                     | √                                                               | 2                |   | 1 | *if applicable                                           |
|                                                                                                                                                                                                                                                                                                                                                                   | BUTT WELD JOINTS                                             | RADIOGRAPHY*                                                            | CRITICAL | RT                     | 100%                                         | BHEL SPEC./ ANSI B 16.34 | ANSI B 16.34 ANNEXURE B                      | NDE REPORT                   | √                                                               | 2                | 2 | 1 | *if applicable                                           |
|                                                                                                                                                                                                                                                                                                                                                                   | FILLET WELD JOINTS, WELD NECK JOINTS                         | LIQUID PENETRANT TEST*                                                  | CRITICAL | LPT                    | 100%                                         | BHEL SPEC/ APPD. DRAWING | BHEL SPEC/ APPD. DRAWING                     | NDE REPORT                   | √                                                               | 2                | 2 | 1 | *if applicable                                           |
| <b>3.0</b>                                                                                                                                                                                                                                                                                                                                                        | <b>FINAL INSPECTION &amp; TESTING</b>                        |                                                                         |          |                        |                                              |                          |                                              |                              |                                                                 |                  |   |   |                                                          |
| 3.1                                                                                                                                                                                                                                                                                                                                                               | FLOW ORIFICE ASSEMBLY                                        | WORKMANSHIP, DIMENSIONS, MARKING, FINISH, COMPLETENESS (BOM CHECK)      | CRITICAL | VISUAL & MEASURE MENTS | 100%                                         | BHEL SPEC/ APPD. DRAWING | BHEL SPEC/ APPD. DRAWING                     | TC                           | √                                                               | 2                | 1 |   |                                                          |
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|                                                                                   |                        |                                                                         |          |                          |                            |                          |                          |                              |   |                  |   |   |                                                                     |
|-----------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------|----------|--------------------------|----------------------------|--------------------------|--------------------------|------------------------------|---|------------------|---|---|---------------------------------------------------------------------|
|  |                        | MANUFACTURING QUALITY PLAN                                              |          |                          |                            |                          |                          | MQP. NO.: SMQP/FPS/11/092013 |   |                  |   |   |                                                                     |
|                                                                                   |                        | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                          | PRODUCT: FLOW ORIFICE ASSY |                          |                          | REV NO: 00                   |   | DATE: 01/09/2013 |   |   |                                                                     |
|                                                                                   |                        |                                                                         |          |                          |                            |                          |                          | PAGE 3 OF 3                  |   |                  |   |   |                                                                     |
| SL NO                                                                             | COMPONENTS             | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK            | QUANTUM OF CHECK           | REFERENCE DOCUMENT       | ACCEPTANCE NORMS         | FORMAT OF RECORD             | * | AGENCY           |   |   | REMARKS                                                             |
|                                                                                   |                        |                                                                         |          |                          |                            |                          |                          |                              | D | P                | W | V |                                                                     |
|                                                                                   |                        | PMI*                                                                    | CRITICAL | PMI CHECK                | 100%                       | BHEL SPEC/ APPD. DRAWING | BHEL SPEC/ APPD. DRAWING | TC                           | √ | 2                |   | 1 | * PMI for AS & SS MATERIAL                                          |
|                                                                                   |                        | WET CALIBRATION at IIT/FCRI*                                            | CRITICAL | CALIBRATION CHECK        | 100%                       | BHEL SPEC/ APPD. DRAWING | BHEL SPEC/ APPD. DRAWING | CALIBRATION REPORT           | √ | 2                |   | 1 | *as applicable                                                      |
| 4.0                                                                               | PRESERVATION & PACKING |                                                                         |          |                          |                            |                          |                          |                              |   |                  |   |   |                                                                     |
|                                                                                   | FLOW ORIFICE ASSEMBLY  | SURFACE PREPARATION, PAINTING(DFT)                                      | MAJOR    | VISUAL & DFT MEASUREMENT | 100%                       | BHEL SPEC/ APPD. DRAWING | BHEL SPEC/ APPD. DRAWING | PAINTING REPORT              | √ | 2                | 1 |   |                                                                     |
|                                                                                   |                        | PACKING* (Soundness)                                                    | MAJOR    | VISUAL                   | 100%                       | BHEL SPEC                | BHEL SPEC                | REPORT/ PACKING LIST         | √ | 2                |   | 1 | *In case of exporting/ importing, packing shall be as per HY0490573 |

**Notes:-**

1. This MQP should be read along with specification, approved drawings & approved datasheet. (Latest revisions to be considered as per PO).
2. Drawing/datasheet shall prevail over quality plan for contradiction if any.
3. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

**Abbreviations:-**

|                                        |                       |
|----------------------------------------|-----------------------|
| MTC – Material Test certificate        | AS – Alloy Steel      |
| IBR – Indian Boiler Regulations        | SS – Stainless Steel  |
| DFT – Dry Film Thickness               | TC – Test Certificate |
| PMI – Positive Material Identification | IS – Indian Standards |

|                                                                                                                                                                                                                                                                                                                                                                    |                           |                           |                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|----------------------------------------------|
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|                                                                                                                                                                                                                                                                                                                                                                    | BHEL QA SIGNATURE & STAMP | BHEL QA SIGNATURE & STAMP | CUSTOMER'S SIGNATURE & STAMP (IF APPLICABLE) |

|                                                                                                                              |                                            |                                                                               |          |                       |                         |                    |                  |                  |             |        |       |   |                                 |
|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------|----------|-----------------------|-------------------------|--------------------|------------------|------------------|-------------|--------|-------|---|---------------------------------|
| <div><div>बी एच ई एल</div><div></div></div> |                                            | TYPICAL MANUFACTURING QUALITY PLAN                                            |          |                       |                         |                    |                  |                  | MQP. NO.:   |        |       |   |                                 |
|                                                                                                                              |                                            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032       |          |                       |                         | PRODUCT:PIPES      |                  |                  | REV NO:     |        | DATE: |   |                                 |
|                                                                                                                              |                                            |                                                                               |          |                       |                         |                    |                  |                  | PAGE 1 OF 2 |        |       |   |                                 |
| SL NO                                                                                                                        | COMPONENTS                                 | CHARACTERISTICS                                                               | CLASS    | TYPE OF CHECK         | QUANTUM OF CHECK        | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | * D         | AGENCY |       |   | REMARKS                         |
|                                                                                                                              |                                            |                                                                               |          |                       |                         |                    |                  |                  |             | P      | W     | V |                                 |
| 1.0                                                                                                                          | RAW MATERIALS & BOUGHT OUT ITEMS           |                                                                               |          |                       |                         |                    |                  |                  |             |        |       |   |                                 |
|                                                                                                                              | Raw Material (Mother Hollow, Billets etc.) | Mechanical & Chemical Properties                                              | Major    | Mech., Chem. Analysis | One per Lot/Batch /Heat | BHEL Spec          | BHEL Spec        | MTC              | √           | 2      |       | 1 |                                 |
| 2.0                                                                                                                          | INPROCESS INSPECTION                       |                                                                               |          |                       |                         |                    |                  |                  |             |        |       |   |                                 |
|                                                                                                                              |                                            | Heat Treatment                                                                | Major    | TC Review             | One per Lot/Batch /Heat | BHEL Spec          | BHEL Spec        | TC, HT Chart     | √           | 2      | 2     | 1 | *If applicable                  |
|                                                                                                                              |                                            | WPS, PQR, WPQ*                                                                | Major    | Doc. Review           | 100%                    | BHEL Spec          | BHEL Spec        | WPS,PQR, WPQ     | --          | 2      |       | 1 | *for Welded pipes               |
|                                                                                                                              |                                            | NDE*                                                                          | Critical | RT/UT /LP             | As per BHEL Spec        | BHEL Spec          | BHEL Spec        | NDE Reports      | √           | 2      |       | 1 | *as applicable                  |
| 3.0                                                                                                                          | FINAL INSPECTION & TESTING                 |                                                                               |          |                       |                         |                    |                  |                  |             |        |       |   |                                 |
|                                                                                                                              | PIPES                                      | Mechanical Analysis (UTS, YS, EL, BEND/Flattening)                            | Major    | Mech. Analysis        | One per Lot/Batch /Heat | BHEL Spec          | BHEL Spec        | MTC              | √           | 2      |       | 1 |                                 |
|                                                                                                                              |                                            | Chemical Analysis                                                             | Major    | Chem. Analysis        | One per Lot/Batch /Heat | BHEL Spec          | BHEL Spec        | MTC              | √           | 2      |       | 1 |                                 |
|                                                                                                                              |                                            | Dimensional (OD, ID, Length, Thickness, Edge preparation, Straightness, etc.) | Critical | Measure ment          | 100%                    | BHEL Spec          | BHEL Spec        | TC               | √           | 2      | 1     |   | 10% Witness by BHEL/BHEL's TPIA |
|                                                                                                                              |                                            | Hydrostatic Test/ Eddy Current test/ Ultrasonic test                          | Critical | Hydro Test ET/UT      | 100%                    | BHEL Spec          | BHEL Spec        | TC               | √           | 2      | 1     |   | 10% Witness by BHEL/BHEL's TPIA |
|                                                                                                                              |                                            | IBR Certificate*                                                              | Critical | TC Review             | 100%                    | BHEL Spec          | BHEL Spec        | TC               | √           | 2      |       | 1 | *If applicable                  |
|                                                                                                                              |                                            | PMI*                                                                          | Critical | PMI test              | Random                  | BHEL Spec          | BHEL Spec        | TC               | √           | 2      | 1     |   | *If applicable                  |

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|                                                 |                        |                                                                         |          |                                                  |                  |                    |                  |                  |             |        |       |   |                |
|-------------------------------------------------|------------------------|-------------------------------------------------------------------------|----------|--------------------------------------------------|------------------|--------------------|------------------|------------------|-------------|--------|-------|---|----------------|
| <div><div>बी एच ई एल</div><div>BHEL</div></div> |                        | TYPICAL MANUFACTURING QUALITY PLAN                                      |          |                                                  |                  |                    |                  |                  | MQP. NO.:   |        |       |   |                |
|                                                 |                        | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                                                  |                  | PRODUCT:PIPES      |                  |                  | REV NO:     |        | DATE: |   |                |
|                                                 |                        |                                                                         |          |                                                  |                  |                    |                  |                  | PAGE 2 OF 2 |        |       |   |                |
| SL NO                                           | COMPONENTS             | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK                                    | QUANTUM OF CHECK | REFERENCE DOCUMENT | ACCEPTANCE NORMS | FORMAT OF RECORD | * D         | AGENCY |       |   | REMARKS        |
|                                                 |                        |                                                                         |          |                                                  |                  |                    |                  |                  |             | P      | W     | V |                |
|                                                 |                        | Galvanizing<br>(Coating weight, uniformity, Adherence)                  | Critical | Strip test, Preece test, Bend/ Pivot hammer test | Random           | BHEL Spec          | BHEL Spec        | TC               | √           | 2      | 1     |   | *for G.I Pipe  |
| 4.0                                             | PRESERVATION & PACKING |                                                                         |          |                                                  |                  |                    |                  |                  |             |        |       |   |                |
|                                                 |                        | Painting*,<br>(Shade, DFT Check)<br>Marking                             | Major    | Visual, Measurement                              | Random           | BHEL Spec          | BHEL Spec        | TC               | √           | 2      | 1     |   | *if applicable |
|                                                 |                        | Packing                                                                 | Major    | Visual                                           | Random           | BHEL Spec          | BHEL Spec        | Packing List     | √           | 2      |       | 1 |                |

**NOTE:-**

1. This standard MQP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Drawing/data sheet shall prevail over quality plan for contradiction if any between quality plan and drawing/specification.
3. All test certificates/reports reviewed and certified by TPI/BHEL shall be submitted to BHEL as documentation package.
4. All type test reports submitted shall not be older than 5 yrs from the date of purchase order.
5. Any project/customer specific requirements which shall be notified have to be fulfilled by the vendor at the time of execution of order.

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|                                                                                  |                                  |                                                                         |          |                                 |                           |                                   |                                   |                  |             |        |       |   |         |
|----------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------|----------|---------------------------------|---------------------------|-----------------------------------|-----------------------------------|------------------|-------------|--------|-------|---|---------|
|  |                                  | TYPICAL MANUFACTURING QUALITY PLAN                                      |          |                                 |                           |                                   |                                   |                  | MQP. NO.:   |        |       |   |         |
|                                                                                  |                                  | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                                 |                           | PRODUCT: QB DETECTOR              |                                   |                  | REV NO:     |        | DATE: |   |         |
|                                                                                  |                                  |                                                                         |          |                                 |                           |                                   |                                   |                  | PAGE 1 OF 2 |        |       |   |         |
| SL NO                                                                            | COMPONENTS                       | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK                   | QUANTUM OF CHECK          | REFERENCE DOCUMENT                | ACCEPTANCE NORMS                  | FORMAT OF RECORD | * D         | AGENCY |       |   | REMARKS |
|                                                                                  |                                  |                                                                         |          |                                 |                           |                                   |                                   |                  |             | P      | W     | V |         |
| 1.0                                                                              | RAW MATERIALS & BOUGHT OUT ITEMS |                                                                         |          |                                 |                           |                                   |                                   |                  |             |        |       |   |         |
| 1.1                                                                              | BODY (BRASS)                     | Chemical                                                                | Major    | Chem. Analysis                  | One (1) Per heat or Batch | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | Lab./Mfg. TC     | √           | 2      | -     | 1 |         |
|                                                                                  |                                  | Dimn. Check                                                             | Major    | Measurements                    | 2 Nos./ Heat or Batch     | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | IR               | -           | 2      | 2     | 1 |         |
|                                                                                  |                                  | Surface Defects                                                         | Major    | Visual                          | 100%                      | Surface free from harmful defects | Surface free from harmful defects | IR               | -           | 2      | 2     | 1 |         |
| 1.2                                                                              | CAP & DEFLECTOR                  | Chemical                                                                | Major    | Chem. Analysis                  | One (1) Per heat or Batch | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | Lab./Mfg. TC     | √           | 2      | -     | 1 |         |
|                                                                                  |                                  | Dimn. Check                                                             | Major    | Measurements                    | 2 Nos./ Heat or Batch     | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | IR               | -           | 2      | 2     | 1 |         |
| 1.3                                                                              | LIQUID FILLED BULB               | Physical observation                                                    | Major    | Visual                          | 100%                      | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | IR               | -           | 2      | 2     | 1 |         |
| 2.0                                                                              | INPROCESS INSPECTION             |                                                                         |          |                                 |                           |                                   |                                   |                  |             |        |       |   |         |
| 2.1                                                                              | BODY                             | Machining & dimn. Check                                                 | Major    | Measurement & gauge check       | 100%                      | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | IR               | -           | 2      | 2     | 1 |         |
| 2.2                                                                              | CAP + DEFLECTOR                  | Machining & dimn. Check                                                 | Major    | Measurement & gauge check       | 100%                      | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | IR               | -           | 2      | 2     | 1 |         |
| 2.3                                                                              | ASSY.                            | Fitment & assembly check                                                | Major    | Visual                          | 100%                      | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | IR               | -           | 2      | 2     | 1 |         |
| 2.4                                                                              |                                  | Hydro test (30 kg/cm2 for 5 min)                                        | Critical | Leak proof test (pressure test) | 100%                      | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | IR               | -           | 2      | 2     | 1 |         |
|                                                                                  |                                  | & Burst test                                                            | Critical | B. P. test                      | 1/Lot                     | App. TDS/Drg./ Spec.              | App. TDS/Drg./ Spec.              | IR               | -           | 2      | 2     | 1 |         |

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|                                                                                  |                            |                                                                         |          |                                                                   |                  |                      |                      |                  |             |        |       |   |         |
|----------------------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------|----------|-------------------------------------------------------------------|------------------|----------------------|----------------------|------------------|-------------|--------|-------|---|---------|
|  |                            | TYPICAL MANUFACTURING QUALITY PLAN                                      |          |                                                                   |                  |                      |                      |                  | MQP. NO.:   |        |       |   |         |
|                                                                                  |                            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                                                                   |                  | PRODUCT: QB DETECTOR |                      |                  | REV NO:     |        | DATE: |   |         |
|                                                                                  |                            |                                                                         |          |                                                                   |                  |                      |                      |                  | PAGE 2 OF 2 |        |       |   |         |
| SL NO                                                                            | COMPONENTS                 | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK                                                     | QUANTUM OF CHECK | REFERENCE DOCUMENT   | ACCEPTANCE NORMS     | FORMAT OF RECORD | * D         | AGENCY |       |   | REMARKS |
|                                                                                  |                            |                                                                         |          |                                                                   |                  |                      |                      |                  |             | P      | W     | V |         |
| 2.5                                                                              | QBD. BULB (WITH LIQUID)    | Leak Test                                                               | Critical | Leakage test                                                      | 100%             | App. TDS/Drg./ Spec. | App. TDS/Drg./ Spec. | IR               | -           | 2      | 2     | 1 |         |
| 3.0                                                                              | FINAL INSPECTION & TESTING |                                                                         |          |                                                                   |                  |                      |                      |                  |             |        |       |   |         |
| 3.1                                                                              | Q.B.D (Complete Assembly)  | Physical observation & dimn. Check                                      | Major    | Visual check surface, make, logo Model, UL mark & Measurement     | 20% at random    | App. TDS/Drg./ Spec. | App. TDS/Drg./ Spec. | IR, Dimn. Check  | √           | 2      | 1     | - |         |
|                                                                                  |                            | Hydro Test                                                              | Major    | Pressure Test ( Leak Proof Test) 30 kg/cm2 for a period of 5 min. | 10% at random    | App. TDS/Drg./ Spec. | App. TDS/Drg./ Spec. | IR /TC           | √           | 2      | 1     | - |         |
| 4.0                                                                              | PRESERVATION & PACKING     |                                                                         |          |                                                                   |                  |                      |                      |                  |             |        |       |   |         |
| 4.1                                                                              | Q. B. D. Assy              | Properly packing with necessary marking                                 | Major    | Visual                                                            | 100%             | App. TDS/Drg./ Spec. | App. TDS/Drg./ Spec. | Packing report   | √           | 2      |       | 1 |         |
|                                                                                  |                            | Preservation must be maintained at proper place                         | Major    | Visual                                                            | 100%             | App. TDS/Drg./ Spec. | App. TDS/Drg./ Spec. | Packing report   | √           | 2      |       | 1 |         |

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|  |                                             | <b>TYPICAL MANUFACTURING QUALITY PLAN</b>                               |       |               |                  |                                       |                                       |                         | MQP. NO.: |             |       |   |         |
|----------------------------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------------|-------|---------------|------------------|---------------------------------------|---------------------------------------|-------------------------|-----------|-------------|-------|---|---------|
|                                                                                  |                                             |                                                                         |       |               |                  |                                       |                                       |                         | REV NO:   |             | DATE: |   |         |
|                                                                                  |                                             | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |               |                  |                                       | PRODUCT:SOLENOID VALVE                |                         |           | PAGE 1 OF 2 |       |   |         |
| SL NO                                                                            | COMPONENTS                                  | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK | QUANTUM OF CHECK | REFERENCE DOCUMENT                    | ACCEPTANCE NORMS                      | FORMAT OF RECORD        | * D       | AGENCY      |       |   | REMARKS |
|                                                                                  |                                             |                                                                         |       |               |                  |                                       |                                       |                         |           | P           | W     | V |         |
| <b>1.0</b>                                                                       | <b>RAW MATERIALS &amp; BOUGHT OUT ITEMS</b> |                                                                         |       |               |                  |                                       |                                       |                         |           |             |       |   |         |
|                                                                                  | Body, Bonnet, Female outlet                 | Chemical, Physical                                                      | Major | Analysis Test | One/Lot          | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | Lab. /Supp. Certificate | √         | 2           | 2     | 1 |         |
|                                                                                  | Spindle                                     | Chemical, Physical                                                      | Major | Analysis Test | One/Lot          | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | Lab. /Supp. Certificate | √         | 2           | 2     | 1 |         |
|                                                                                  | Spring                                      | Chemical                                                                | Major | Analysis Test | One/Lot          | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | Lab. /Supp. Certificate | √         | 2           | 2     | 1 |         |
|                                                                                  | Outer Washer, Seat Washer                   | Hardness                                                                | Minor | Measurement   | 10%              | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | Lab. /Supp. Certificate | √         | 2           | 2     | 1 |         |
| <b>2.0</b>                                                                       | <b>INPROCESS INSPECTION</b>                 |                                                                         |       |               |                  |                                       |                                       |                         |           |             |       |   |         |
|                                                                                  | Water tightness Seat Test                   | Leakage                                                                 | Major | Hydro Test    | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IIR                     | √         | 2           | 2     | 1 |         |
|                                                                                  | Hydrostatic Pressure Test                   | Leakage                                                                 | Major | Hydro Test    | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IIR                     | √         | 2           | 2     | 1 |         |
|                                                                                  | Operation Test                              | Open-close                                                              | Major | Functional    | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IIR                     | √         | 2           | 2     | 1 |         |
|                                                                                  | Flow Test                                   | Flow                                                                    | Major | Flow          | One/Lot          | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IIR                     | √         | 2           | 2     | 1 |         |
| <b>3.0</b>                                                                       | <b>FINAL INSPECTION &amp; TESTING</b>       |                                                                         |       |               |                  |                                       |                                       |                         |           |             |       |   |         |
|                                                                                  |                                             | VISUAL & DIMENSION CHECK                                                | Major | Visual        | 10%              | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR                      | √         | 2           | 1     | - |         |

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|  |                        | TYPICAL MANUFACTURING QUALITY PLAN                                 |       |                         |                  |                                       |                                       |                  | MQP. NO.: |        |       |   |         |
|----------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------|-------|-------------------------|------------------|---------------------------------------|---------------------------------------|------------------|-----------|--------|-------|---|---------|
| PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032          |                        |                                                                    |       |                         |                  | PRODUCT:SOLENOID VALVE                |                                       |                  | REV NO:   |        | DATE: |   |         |
| PAGE 2 OF 2                                                                      |                        |                                                                    |       |                         |                  |                                       |                                       |                  |           |        |       |   |         |
| SL NO                                                                            | COMPONENTS             | CHARACTERISTICS                                                    | CLASS | TYPE OF CHECK           | QUANTUM OF CHECK | REFERENCE DOCUMENT                    | ACCEPTANCE NORMS                      | FORMAT OF RECORD | * D       | AGENCY |       |   | REMARKS |
|                                                                                  |                        |                                                                    |       |                         |                  |                                       |                                       |                  |           | P      | W     | V |         |
|                                                                                  |                        | HV TEST                                                            | Major | Hydro Test              | 10%              | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √         | 2      | 1     | - |         |
|                                                                                  |                        | SEAT LEAKAGE TEST                                                  | Major | Leakage                 | 10%              | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √         | 2      | 1     | - |         |
|                                                                                  |                        | IR TEST                                                            | Major | Electrical              | One/Lot          | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √         | 2      | 1     | - |         |
|                                                                                  |                        | PNEUMATIC TEST                                                     | Major | Pneumatic               | 10%              | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √         | 2      | 1     |   |         |
|                                                                                  |                        | OPERATIONAL TEST INCLUDING VERIFICATION OF PICKUP AND DROP VOLTAGE | Major | Operational test        | 10%              | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √         | 2      | 1     |   |         |
|                                                                                  |                        | BOM CHECK                                                          | Major | Verification            | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √         | 2      | 1     |   |         |
| 4.0                                                                              | PRESERVATION & PACKING |                                                                    |       |                         |                  |                                       |                                       |                  |           |        |       |   |         |
|                                                                                  | Identification         | Marking & Stamping                                                 | Major | Verification & Stamping | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √         | 2      | 2     | 1 |         |
|                                                                                  | Painting               | Final finish & Paint DFT                                           | Major | Visual & Measurement    | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | Painting Report  | √         | 2      | 1     | - |         |
|                                                                                  | Packing                | Soundness of packing                                               | Major | Verification            | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √         | 2      | 2     | 1 |         |

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|                                                 |                                  |                                                                         |          |                             |                  |                                 |                                 |                  |             |        |       |   |         |
|-------------------------------------------------|----------------------------------|-------------------------------------------------------------------------|----------|-----------------------------|------------------|---------------------------------|---------------------------------|------------------|-------------|--------|-------|---|---------|
| <div><div>बी एच ई एल</div><div>BHEL</div></div> |                                  | TYPICAL MANUFACTURING QUALITY PLAN                                      |          |                             |                  |                                 |                                 |                  | MQP. NO.:   |        |       |   |         |
|                                                 |                                  | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                             |                  | PRODUCT:STRAINER                |                                 |                  | REV NO:     |        | DATE: |   |         |
|                                                 |                                  |                                                                         |          |                             |                  |                                 |                                 |                  | PAGE 1 OF 2 |        |       |   |         |
| SL NO                                           | COMPONENTS                       | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK               | QUANTUM OF CHECK | REFERENCE DOCUMENT              | ACCEPTANCE NORMS                | FORMAT OF RECORD | * D         | AGENCY |       |   | REMARKS |
|                                                 |                                  |                                                                         |          |                             |                  |                                 |                                 |                  |             | P      | W     | V |         |
| 1.0                                             | RAW MATERIALS & BOUGHT OUT ITEMS |                                                                         |          |                             |                  |                                 |                                 |                  |             |        |       |   |         |
|                                                 | Body, Cover                      | Mechanical & Chemical Properties                                        | Major    | Mech., Chem. Analysis       | One per lot      | BHEL Spec/Appd. Dwg/ Datasheet  | BHEL Spec/Appd. Dwg/ Datasheet  | MTC              | √           | 2      |       | 1 |         |
|                                                 |                                  | Non Destructive Examination                                             | Major    | NDT Test                    | 100%             | BHEL Spec/Appd. Dwg/ Datasheet  | BHEL Spec/Appd. Dwg/ Datasheet  | TC               | √           | 2      |       | 1 |         |
|                                                 | Screen                           | Chemical Properties, Degree of Filtration                               | Major    | Chem. Analysis, Measurement | One Sample       | BHEL Spec/Appd. Dwg/ Datasheet  | BHEL Spec/Appd. Dwg/ Datasheet  | MTC, TC          | √           | 2      |       | 1 |         |
|                                                 | Gasket, Drain Plug, Fasteners    | Mechanical & Chemical Properties                                        | Major    | Mech., Chem. Analysis       | One per Lot      | BHEL Spec/Appd. Dwg/ Datasheet  | BHEL Spec/Appd. Dwg/ Datasheet  | MTC              | √           | 2      |       | 1 |         |
| 2.0                                             | INPROCESS INSPECTION             |                                                                         |          |                             |                  |                                 |                                 |                  |             |        |       |   |         |
|                                                 |                                  | Manufacturing processes                                                 | Major    | Process Controls            | Each lot         | BHEL Spec/ Vendor's Own process | BHEL Spec/ Vendor's Own process | --               | -           | 2      | 2     |   |         |
|                                                 |                                  |                                                                         |          |                             |                  |                                 |                                 |                  |             |        |       |   |         |
| 3.0                                             | FINAL INSPECTION & TESTING       |                                                                         |          |                             |                  |                                 |                                 |                  |             |        |       |   |         |
|                                                 | Strainer Assy.                   | Dimensional                                                             | Major    | Measurement                 | As per IS:2500   | BHEL Spec/Appd. Dwg/ Datasheet  | BHEL Spec/Appd. Dwg/ Datasheet  | TC               | √           | 2      | 1     |   |         |
|                                                 |                                  | Hydrostatic Test                                                        | Critical | Hydro Test                  | 100%             | BHEL Spec/Appd. Dwg/ Datasheet  | BHEL Spec/Appd. Dwg/ Datasheet  | TC               | √           | 2      | 1     |   |         |

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|                                                                                                                              |                        |                                                                         |          |                      |                  |                                |                                |                  |             |        |       |   |         |
|------------------------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------|----------|----------------------|------------------|--------------------------------|--------------------------------|------------------|-------------|--------|-------|---|---------|
| <div><div>बी एच ई एल</div><div></div></div> |                        | TYPICAL MANUFACTURING QUALITY PLAN                                      |          |                      |                  |                                |                                |                  | MQP. NO.:   |        |       |   |         |
|                                                                                                                              |                        | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |          |                      |                  | PRODUCT:STRAINER               |                                |                  | REV NO:     |        | DATE: |   |         |
|                                                                                                                              |                        |                                                                         |          |                      |                  |                                |                                |                  | PAGE 2 OF 2 |        |       |   |         |
| SL NO                                                                                                                        | COMPONENTS             | CHARACTERISTICS                                                         | CLASS    | TYPE OF CHECK        | QUANTUM OF CHECK | REFERENCE DOCUMENT             | ACCEPTANCE NORMS               | FORMAT OF RECORD | * D         | AGENCY |       |   | REMARKS |
|                                                                                                                              |                        |                                                                         |          |                      |                  |                                |                                |                  |             | P      | W     | V |         |
|                                                                                                                              |                        | PMI Check                                                               | Critical | PMI                  | 10%              | BHEL Spec/Appd. Dwg/ Datasheet | BHEL Spec/Appd. Dwg/ Datasheet | TC               | √           | 2      | 1     |   |         |
|                                                                                                                              |                        | NDT TEST                                                                | Critical | NDT                  | 10%              | BHEL Spec/Appd. Dwg/ Datasheet | BHEL Spec/Appd. Dwg/ Datasheet | TC               | √           | 2      |       | 1 |         |
| 4.0                                                                                                                          | PRESERVATION & PACKING |                                                                         |          |                      |                  |                                |                                |                  |             |        |       |   |         |
|                                                                                                                              |                        | Painting, Marking (Shade, DFT Check)                                    | Major    | Visual, Measure ment | Random           | BHEL Spec/Appd. Dwg/ Datasheet | BHEL Spec/Appd. Dwg/ Datasheet | TC               | √           | 2      |       | 1 |         |
|                                                                                                                              |                        | Packing                                                                 | Major    | Visual               | Random           | BHEL Spec/Appd. Dwg/ Datasheet | BHEL Spec/Appd. Dwg/ Datasheet | Packing List     | √           | 2      |       | 1 |         |

Pressure drop test shall be carried out for Y-type line strainers

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|                                                                                  |                                                                  |                                                                                                                                                                                                         |       |                   |                                     |                                        |                                        |                         |             |        |       |   |  |         |
|----------------------------------------------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------|-------------------------------------|----------------------------------------|----------------------------------------|-------------------------|-------------|--------|-------|---|--|---------|
|  |                                                                  | TYPICAL MANUFACTURING QUALITY PLAN                                                                                                                                                                      |       |                   |                                     |                                        |                                        |                         | MQP. NO.:   |        |       |   |  |         |
|                                                                                  |                                                                  | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032                                                                                                                                 |       |                   |                                     | PRODUCT:VALVES                         |                                        |                         | REV NO:     |        | DATE: |   |  |         |
|                                                                                  |                                                                  |                                                                                                                                                                                                         |       |                   |                                     |                                        |                                        |                         | PAGE 1 OF 4 |        |       |   |  |         |
| SL NO                                                                            | COMPONENTS                                                       | CHARACTERISTICS                                                                                                                                                                                         | CLASS | TYPE OF CHECK     | QUANTUM OF CHECK                    | REFERENCE DOCUMENT                     | ACCEPTANCE NORMS                       | FORMAT OF RECORD        | * D         | AGENCY |       |   |  | REMARKS |
|                                                                                  |                                                                  |                                                                                                                                                                                                         |       |                   |                                     |                                        |                                        |                         |             | P      | W     | V |  |         |
| 1.0                                                                              | RAW MATERIALS & BOUGHT OUT ITEMS                                 |                                                                                                                                                                                                         |       |                   |                                     |                                        |                                        |                         |             |        |       |   |  |         |
|                                                                                  | Casting and forging (Body, Bonnet , Disc, Stem ,Body Rings,)     | Surface Quality MPT for Hydrogen Service. Diamension, Chemical and Mechanical Properties(Not Special Requirements of heat treatment, Hardness, Impact, Bend, Tensile Test etc. for H2 service and NACE) | Major | Analysis Test     | One/Lot                             | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | Lab. /Supp. Certificate | √           | 2      | 2     | 1 |  |         |
|                                                                                  | All Castings Materials                                           | Heat Treatment as per Specs                                                                                                                                                                             | Major | Analysis Test     | One/Lot                             | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | Lab. /Supp. Certificate | √           | 2      | 2     | 1 |  |         |
|                                                                                  | Casting,forgings for Austenitic StainSteel body and bonnet only. | Inter Granular Corrosion (IGC) Test and Stabilisation Heat Treatment                                                                                                                                    | Major | Analysis Test     | Per Heat /Per solution Annealed Lot | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | Lab. /Supp. Certificate | √           | 2      | 2     | 1 |  |         |
|                                                                                  | All Castings                                                     | Radiography Examination                                                                                                                                                                                 | Minor | Analysis Test     | 10%                                 | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | Lab. /Supp. Certificate | √           | 2      | 2     | 1 |  |         |
|                                                                                  | Bars for Trim Materials                                          | Chemical Analysis                                                                                                                                                                                       | Minor | Chemical Analysis | 10%                                 | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | Lab. /Supp. Certificate | √           | 2      | 2     | 1 |  |         |
|                                                                                  | Stems, Gaskets, Gear Unit, Fastener, Gland , Packing etc.        | Surface Defects, Diamension, Physical and chemical properties                                                                                                                                           | Major | Chemical Analysis | 10%                                 | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | Lab. /Supp. Certificate | √           | 2      | 2     | 1 |  |         |
| 2.0                                                                              | INPROCESS INSPECTION                                             |                                                                                                                                                                                                         |       |                   |                                     |                                        |                                        |                         |             |        |       |   |  |         |

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|                                                                                  |                            |                                                                                              |       |                   |                  |                                       |                                       |                  |             |        |       |   |  |         |
|----------------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------------------|-------|-------------------|------------------|---------------------------------------|---------------------------------------|------------------|-------------|--------|-------|---|--|---------|
|  |                            | TYPICAL MANUFACTURING QUALITY PLAN                                                           |       |                   |                  |                                       |                                       |                  | MQP. NO.:   |        |       |   |  |         |
|                                                                                  |                            | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032                      |       |                   |                  | PRODUCT:VALVES                        |                                       |                  | REV NO:     |        | DATE: |   |  |         |
|                                                                                  |                            |                                                                                              |       |                   |                  |                                       |                                       |                  | PAGE 2 OF 4 |        |       |   |  |         |
| SL NO                                                                            | COMPONENTS                 | CHARACTERISTICS                                                                              | CLASS | TYPE OF CHECK     | QUANTUM OF CHECK | REFERENCE DOCUMENT                    | ACCEPTANCE NORMS                      | FORMAT OF RECORD | * D         | AGENCY |       |   |  | REMARKS |
|                                                                                  |                            | WPS/PQR/WPQ                                                                                  | Major | Chemical Analysis | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IIR              | √           | 2      | 2     | 1 |  |         |
| 3.0                                                                              | FINAL INSPECTION & TESTING |                                                                                              |       |                   |                  |                                       |                                       |                  |             |        |       |   |  |         |
|                                                                                  |                            | Shell Test<br>Gate/Globe/Check<br>Back Seat-Gate/Globe<br><br>Seat Test-<br>Gate/Globe/Check | Major | Visual            | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √           | 2      | 1     | - |  |         |
|                                                                                  |                            | Functional/Operational Test (For motor Operated /Actuator Operated)                          | Major | Functional Test   | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √           | 2      | 1     | - |  |         |
|                                                                                  |                            | PMI Check Finished Valve (Body, Bonnet,Stem)                                                 | Major | PMI Check         | 10%              | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √           | 2      | 1     | - |  |         |

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|                                                                                                                              |                                    |                                                                                                                                                                                                           |       |               |                                                                                                                                                            |                                        |                                        |                  |             |        |       |   |  |         |
|------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------|------------------|-------------|--------|-------|---|--|---------|
| <div><div>बी एच ई एल</div><div></div></div> |                                    | TYPICAL MANUFACTURING QUALITY PLAN                                                                                                                                                                        |       |               |                                                                                                                                                            |                                        |                                        |                  | MQP. NO.:   |        |       |   |  |         |
|                                                                                                                              |                                    | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032                                                                                                                                   |       |               |                                                                                                                                                            | PRODUCT:VALVES                         |                                        |                  | REV NO:     |        | DATE: |   |  |         |
|                                                                                                                              |                                    |                                                                                                                                                                                                           |       |               |                                                                                                                                                            |                                        |                                        |                  | PAGE 3 OF 4 |        |       |   |  |         |
| SL NO                                                                                                                        | COMPONENTS                         | CHARACTERISTICS                                                                                                                                                                                           | CLASS | TYPE OF CHECK | QUANTUM OF CHECK                                                                                                                                           | REFERENCE DOCUMENT                     | ACCEPTANCE NORMS                       | FORMAT OF RECORD | * D         | AGENCY |       |   |  | REMARKS |
|                                                                                                                              | Finished Valve (Body, Bonnet,Stem) | Visual (TC Verification,SI no Marking, Flange Finish, Tag no) Bevel, Dimension and Special Requirements in PR, Painting of Carbon and Low alloy Steel and provision of bypass arrangement (if applicable) | Major | Test          | Visual 100% by Supplier and PURCHASE R / END CUSTOMER . Dimension-100% by supplier and at random by PURCHASE R / END CUSTOMER subject to a minimum of 10 % | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | IR               | √           | 2      | 1     | - |  |         |
|                                                                                                                              | Pre-qualification Test             | Fire safe test (soft seated ball,plug, butterfly and lubricated plug valves ) cryogenic test                                                                                                              | Major | Test          | 1 valve per Type/size and order                                                                                                                            | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | IR               | √           | 2      | 1     |   |  |         |
|                                                                                                                              |                                    | BOM CHECK                                                                                                                                                                                                 | Major | Visual        | 100%                                                                                                                                                       | Approved BHEL Spec./Drawing/ datasheet | Approved BHEL Spec./Drawing/ datasheet | IR               | √           | 2      | 1     |   |  |         |
| 4.0                                                                                                                          | PRESERVATION & PACKING             |                                                                                                                                                                                                           |       |               |                                                                                                                                                            |                                        |                                        |                  |             |        |       |   |  |         |

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

|                                                                                  |                |                                                                         |       |                         |                  |                                       |                                       |                  |             |        |       |   |         |
|----------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------|-------|-------------------------|------------------|---------------------------------------|---------------------------------------|------------------|-------------|--------|-------|---|---------|
|  |                | TYPICAL MANUFACTURING QUALITY PLAN                                      |       |                         |                  |                                       |                                       |                  | MQP. NO.:   |        |       |   |         |
|                                                                                  |                | PROJECT ENGINEERING & SYSTEMS<br>DIVISION BHEL,<br>RC PURAM, HYD-502032 |       |                         |                  | PRODUCT:VALVES                        |                                       |                  | REV NO:     |        | DATE: |   |         |
|                                                                                  |                |                                                                         |       |                         |                  |                                       |                                       |                  | PAGE 4 OF 4 |        |       |   |         |
| SL NO                                                                            | COMPONENTS     | CHARACTERISTICS                                                         | CLASS | TYPE OF CHECK           | QUANTUM OF CHECK | REFERENCE DOCUMENT                    | ACCEPTANCE NORMS                      | FORMAT OF RECORD | * D         | AGENCY |       |   | REMARKS |
|                                                                                  |                |                                                                         |       |                         |                  |                                       |                                       |                  |             | P      | W     | V |         |
|                                                                                  | Identification | Marking & Stamping                                                      | Major | Verification & Stamping | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √           | 2      | 2     | 1 |         |
|                                                                                  | Painting       | Final finish & Paint DFT                                                | Major | Visual & Measurement    | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | Painting Report  | √           | 2      | 1     | - |         |
|                                                                                  | Packing        | Soundness of packing                                                    | Major | Verification            | 100%             | Approved BHEL Spec./Drawing/datasheet | Approved BHEL Spec./Drawing/datasheet | IR               | √           | 2      | 2     | 1 |         |

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL / BHEL NOMINATED INSPECTION AGENCY/END USER/END USER'S REPRESENTATIVE & 2 FOR VENDOR/SUB VENDOR AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. \* FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.

## ANNEXURE-7

### CHECKLIST FOR FIRE PROTECTION & DETECTION SYSTEM

**PROJECT: 4X180 MW MANGDECHHU HYDROELECTRIC PROJECT AUTHORITY,- THIMPU BHUTAN**

**SPEC NO: PY 51263**

| Description                                                                                                                                                                                                                                                                                | Enclosed (Yes/ No) |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Bidder to confirm to the scope of supply as per Cl. No. 6.0 , 7.0 & 10.0 as per Specification No. <u>PY 51263 REV 00</u>                                                                                                                                                                   |                    |
| Bidder's confirmation required for furnishing a list of 3 year recommended spares in their offer separately with optional price. (Refer Cl. No. 6.2.1 of Specification No. PY51246Rev R0)                                                                                                  |                    |
| Bidder to furnish a list of Start-up Commissioning Spares (Refer Cl. No. 6.2.2 of Specification No. PY51246 Rev R0)                                                                                                                                                                        |                    |
| Bidder to quote as per BHEL price format only.<br>Price quoted as per the price bid format, clearly indicating all the applicable items are quoted, and not applicable items are clearly highlighted.<br>Un priced copy of the same shall be enclosed to technical bid. [Refer Annexure-1] |                    |
| Confirm that all Inspection & acceptance, type Tests as required for each equipment, as per specification (Refer Cl. No. 13 .0 of Specification No. <u>PY 51263</u> ) and Codes attached.                                                                                                  |                    |

SIGNATURE:  
NAME:  
DESIGNATION:  
COMPANY: \_\_\_\_\_

DATE: \_\_\_\_\_