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| Plant MRPL Mangalore | Client MRPL | Contract Code WSS for PFCC Flue Gas | Document ID 6723-JEX-G00-EC-0001-A213 | Contract No. 66-6723 |
|  | | Indicative Inspection and Test Plan(IITP) for Plug Valves Soft (Resilient Seated) | | |
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The tests indicated are general minimum requirements of tkIS India. All Tests, as applicable, have to be performed as specified in the Order, Order Attachments, Codes, tkIS India Specifications, Licensor's Specifications and Standards. In case of discrepancies between the Indicative Inspection Test Plan and the workshop documents Approved / Reviewed by LSTK Contractor, the latter shall apply. The Manufacturer shall be responsible for the required Tests to be performed and for the Inspector to be invited in due time to witness the Tests. The Manufacturer shall try to perform as many individual Tests as possible on same day, provided that the fabrication process permits such a procedure

| Sr. No. | Component / Operation | Stage Description | Characteristics | Reference Std. | Acceptance Std. | Format of Record | Inspection | | | | |
|--------------|-----------------------|--|--|--|--|---------------------------------|------------|-----------------|------|-------------|----|
| | | | | | | | Vendor | LSTK Contractor | TPIA | PMC / Owner | |
| QAP Approval | | | | | | | | | | | |
| 1 | Raw material | Forging, Castings for Body, Plug & Cover | Visual | MSS-SP-55, ASME B16.34, Material Specification | MSS-SP-55, ASME B16.34, Material Specification | Inspection report | H | -- | -- | A | |
| | | | Dimensions | Drawing | Drawing | Inspection report | H | -- | -- | -- | -- |
| | | | Steel making process, heat treatment, Chemical, mechanical properties, NDE (RT, DP, MT, bend test, Hardness as applicable etc. IGC – B (for casting) /E with micro test for SS material. | Order Specification, Relevant ASTM Std. & Approved drawing | Order Specification, Relevant ASTM Std. & Approved drawing | Foundry test certificate | R | R | R | -- | -- |
| 2 | In process | Fasteners | Heat treatment, Chemical, mechanical properties, etc. | Order Specification, Relevant ASTM Std. | Order Specification, Relevant ASTM Std. | Manufacturer's test certificate | R | R | R | -- | |
| | | | Chemical, mechanical properties, etc. | Order Specification, Relevant ASTM Std. & Approved drawing | Order Specification, Relevant ASTM Std. & Approved drawing | Manufacturer's test certificate | R | R | R | -- | |
| | | | Visual & dimensions | Drawing & MSS-SP-55 | Drawing & MSS-SP-55 | Inspection report | W | -- | -- | -- | |

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| | | | | | | | Vendor | LSTK Contractor | TPIA | PMC/ Owner |
| 3 | Final inspection | Strip test (1% of offered qty.) | Visual | Drawing, order specification | Drawing, order specification | Inspection report | H | H | H | -- |
| | | Visual | Workmanship / Finish | MSS-SP-55, ASME B16.34, Material Specification | MSS-SP-55, ASME B16.34, Material Specification | Inspection report | H | 100% H | 100% H | -- |
| | | Dimensions | Measurement | Approved drwg. & MSS-SP-55 | Approved drwg. & MSS-SP-55 | Inspection report | H | H* | H* | -- |
| | | Pressure test (shell, high pressure closure & low pressure closure tests) & Functional Test | Leak tightness, Water Cl2 content <20 ppm for SS and Portable water for others | Applicable testing std./approved drwg. | Applicable testing std./approved drwg. | Inspection report | H | H* | H* | -- |
| | | D.P. test on butt weld & socket weld ends/ Ends | Visual | ASTM E 165 | ASTM E 165 | Inspection report | H | H* | H* | -- |
| | | Radiography test (if applicable) | Defects | ASME B 16.34, ASTM E 446 | ASME B 16.34, Appendix I, ASTM E 446 | Radiography report | R | R (Review of RT films) | R (Review of RT films) | -- |
| | | Radiography of Butt weld for end connections (if applicable) | weld Defects | ASME Sec V, ASME VIII Div1 | ASME Sec V, ASME VIII Div. 1, UW51. | Radiography report | R | R (Review of films) | R (Review of films) | -- |
| | | PMI test, as applicable | Conformance to requirements for materials and welds | Drawing, order specification | Drawing, order specification | Test report | H | H- 10%(per tag , per size, per visit) | H- 10%(per tag , per size, per visit) | -- |
| Marking details | Visual | Approved drwg. | Approved drwg. | Inspection report | H | 100% H | 100% H | -- | | |
| | Helium and cryogenic test as applicable | Conformance to requirements | Drawing, order specification | Drawing, order specification | Test report | H | H - 100% | H - 100% | -- | |

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| | | | | | | | Vendor | LSTK Contractor | TPIA | PMC/ Owner |
| 4 | Inspection before despatch | Surface preparation & painting | Paint DFT, shade, etc. | Applicable std., Order specification | Applicable std., Order specification | Inspection report | H | H | H | -- |
| | | Pickling passivation for SS valves. | Visual | Applicable std., Order specification | Applicable std., Order specification | Inspection report | H | H | H | -- |
| | | 100% Stamping by LSTK Contractor & TPIA and Issue of Inspection Release Note | Review of Documents including Fire Safe Design, if applicable. | Drawings, order specification, API 607/API6FA std. | Drawings, order specification, API 607/API6FA std. | Inspection report & test certificates | H | H | H | - |
| 5 | Inspection documentation & Issue of IRN | Packing | Visual | Order specification, manufacturer's std. | Order specification, manufacturer's std. | Internal records, packing slip | H | W | R | -- |
| | | Valve Test reports, Material Test Certificate | Review of Documents | 100% | As per Applicable Material & Order Specifications, drawings | Conformance to Codes & Order Specification, drawings | H | H | H | R |
| 5 | Final documentation & Despatch Clearance | Compilation of final documents | Verification for completeness | Purchase Order, specification | Purchase Order, specification | Dossier | R | H | -- | H |

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| | | | | | | | Vendor | LSTK Contractor | TPIA |

Notes

- LSTK contractor to prepare final QAP based on this IITP, Applicable specifications, standards and codes and submit to PMC for final approval
- Testing/acceptance standard shall be as per Order Specification, approved drawing, testing standards, viz. EN 12266 part 1 or 2, API 598, etc.
- For C.S. valves with butt weld or socket weld ends, C.E. shall not be greater than that specified in Order specification.
- Vendor shall weld end nipples at both the ends before assembly. WPS/PQR shall be submitted for LSTK Contractor, TPIA review for all welds including Bypass welds. Bypass valve shall be tested as per the requirements of main valve.
- *Quantity of check shall be 100% by Vendor & 10%(per Tag, per size, per visit) by LSTK Contractor & TPIA
- Helium test for valves shall be in line with EDB-0006.
- Seat tests are to be carried out from both directions (Exception-unidirectional valves).
- Fire safe valves shall be as per Process requirement.
- Statutory requirement and inspection by Statutory Authority, if applicable, the same shall be met.
- LSTK Contractor may increase percentage of inspection upto 100% if any rejection or non-conformity is observed during sampling inspection or based on past experience with the vendor.
- In addition to the requirements of IITP, all requirements of Purchase order, material specification, Order specification and Order Technical requirements (Document ID: EDB-0006) for raw material and final product shall be fulfilled. In addition, Material in Hydrogen Service shall comply with the requirements of Annexure F of document EDB-0006. Material in Sour service shall comply with the requirements of NACE MR0103 & MR0175 & EDB-0006.
- Statutory requirement and inspection by Statutory Authority, if applicable, the same shall be met. IBR requirements for EDB-0006 shall be met. Original IBR Forms shall be submitted
- Hydro test Water quality shall be as potable for CS and LAS. For SS material Chloride shall be 20 ppm max

Legends: W - Witness, R - Review, H – Hold A – Approval

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|-----------------|----------------------------|---------------|-----------|
| Devesh Sharma | Thomas Abhi / Sundar T. V. | Syam S. | Syam N.S. |
| Prepared by: LE | Checked by: SSP / DQAR | Neeliparambil | HDP |

