SPECIFICATION FOR DRY GAS SEAL SKIDS

1. Scope

This specification covers the minimum requirements of design, detail engineering, fabrication and supply of completely assembled Gas Seal Control System (with impulse piping, tubing and wiring) for Compressor consisting of (a) Seal Gas Filter Skid & (b) Seal Gas Control Skid compatible with Dry gas seals. The detail of the different operating cases, Gas composition, ambient conditions and design parameters of the different lines, etc. are furnished in the project specific DGS specification which is a part of this enquiry.

2. Seal Gas Filter Skid and Seal Gas Control Skid:

2.1 The Vendors Scope of Supply and Work is as indicated below.

a) Seal Gas P&I Diagram as per API 614 / 692 modules as specified in variant table of this specification.
b) Latest edition of API 614 & API 692. Vendor to submit deviations to API614 & API692 along with offer.
c) List of Instruments, make & model as specified in variant table of this specification.

2.2 The scope of supply shall include the following for each compressor:

a) Seal Gas Filter & Control Skid along with gas conditioning skid, as specified in enquiry. Some projects may require both filter & control skid on a common base frame.
b) Mating flanges with gaskets, bolts and nuts at all terminal points
c) Spare filter cartridges / elements (Each set consists of 01 number of cartridges / element along with O-rings & gaskets required for one Filter Bowl. A duplex filter has two bowls).
d) Loose supplied items like:
   i. Interconnection pipes and fittings between both assemblies.
   ii. Foundation bolts and accessories
   iii. Instruments not mounted on the skids, etc.
   iv. Any other item in Vendor's scope but not assembled on the skids

2.3 The project specific P&I diagram shall be provided after the placement of the order during the detailed engineering. The availability of the gas for startup in primary injection line and barrier seal shall be finalized as per P&I diagram.

2.4 The total design and selection of the equipment of Seal gas filter skid and seal gas control skid is the responsibility of the Vendor. The ranges and set values of the Instruments are to be furnished by Seal Gas Control Skid & Seal gas filter skid Vendor for BHEL/Customer's review during detailed engineering after the placement of the order.

2.5 The primary seal gas line within filter skid shall be steam traced and insulated. All Piping, Valves and fittings forming a part of steam tracing shall be IBR certified. The steam parameters shall be provided during detailed engineering.

2.6 If specified, electrical tracing shall be provided in place of steam tracing. Vendor shall supply all tracing material along with required temperature controllers, terminal junction boxes etc. BHEL will provide single point power connection near the skid.

2.7 Primary vent lines shall be provided with bimetallic Temperature gauges. Thermowell connection shall be 1.5:300/600RF or 2"1500Rj as per skid rating. The primary vent line shall be expanded to 4" for thermowell installation.

2.8 Common filter skid with multiple control valves / filters will be supplied for multiple casing compressor package. The additional Control valve / filter price shall be considered as per unit prices.

3. General arrangement of the skid Assemblies

3.1 Seal Gas System shall be designed generally as two Package Units, i.e. Seal Gas control skid and b) Seal Gas filter skid. Each skid shall be stand-alone type and shall be formed out of suitable structural steel. A common skid shall be supplied in place of individual skids, if required by customer.

3.2 Equipment, Instruments, Regulators, shut off ball valves, control valves, isolating valves, In-line check valves, Piping / Tubing with fittings, etc. shall be mounted and assembled on the respective skid.

3.3 All the materials in contact with primary seal gas inlet and vent shall be of SS316L or equivalent forging / casting materials and shall comply with NACE MR-0103 / 0175 latest editions.

3.4 All the materials in secondary seal inlet and vent lines, barrier seal inlet and vent lines shall be of SS316 or Equivalent forging / casting materials.

3.5 Primary seal leakage to flare header lines along with the instruments shall be designed for the design parameters of seal gas lines.

3.6 If specified, vendor to provide the condensate pot (drain pot) as per design code ASME VIII div I as required along with control system instrumentation for automatic drain on-off valve.

3.7 Whenever, the condensate pot is provided, a guided wave level transmitter shall be provided to control auto drain of liquid / condensate.

3.8 The Vendor shall note that the appearance engineering is one of the most important aspects. The whole Rack shall be very compact and shall give an aesthetically good look as this equipment is mounted on the operating floor of the compressor.

3.9 The Vendor shall take care of good accessibility for operation and maintenance of all parts. The Instruments and Components disposition / location on the rack and Piping/Tubing layout are paramount important aspect.

3.10 External paint shall be with the thickness 80-150 microns and internal paint shall be with the thickness 40-60 microns. The project specific painting specification, if applicable shall be provided during detailed engineering; vendor to carry out the same without any commercial implication.

3.11 The Skids shall be provided with lifting lugs for a 4-point lift.

3.12 Foundation holes shall be oval in shape to help in installation.

3.13 The primary seal gas supply lines along with all inline equipment & instruments shall be min 2". The gas velocity shall be limited to 30 m/s.

3.14 Seal gas booster, if required shall be provided by BHEL. Vendor shall provide isolation valves, NRV & flanged connection at skid edge.

3.15 The skid instruments shall be provided with FRP / SS canopy. Overall canopy is also acceptable.

4. Seal Gas Duplex Filter:

4.1 The seal gas duplex filter shall be as per requirements specified in API614 & 692.

4.2 The primary seal Gas Filter shall be coalescing type.

4.3 The primary seal gas may contain up to 250 ppmv of oil during startup. The primary seal gas filter shall be capable of removal of this oil.

4.4 The collapsible pressure for the cartridge is min. 10 kg/cm2 (g) differential.

4.5 The changeover valve is used for switching over from one filter bowl during operation so that one filter opens to operating gas flow and other closed off for changing filter elements. There shall not be any reduction of flow during switching over operation. Arrows shall be provided on filter assembly to indicate the filter in operation. The changeover valve shall be of Trans flow type. Double stage changeover valve is preferred.

4.6 The filters shall be provided with drain and vent connections with valves.

5. Gas Conditioning:

5.1 Seal Gas pre-filter Filter / Cyclone Separators / Cooler: As per API692.

5.2 Seal Gas Heater: As per API692.

6. Piping:

6.1 The exact pipe size and terminal points shall be finalized as per the project specific P&I diagram provided during detailed Engineering. However, the following line sizing shall be considered.

a) Primary seal gas supply: 2”.
b) Secondary & separation seal gas supply: 2”.
c) Primary & Secondary vent: 1”.
d) Primary vent header: 2” with NRV and isolation valve.
e) Drains: 1”.

6.2 Vendor shall supply the companion flanges, gaskets, O-rings, Stud nuts, etc. for all flanged end connections.

6.3 Pipe schedule, thickness etc. of all piping and other items shall be as per flange / pipe rating of the skid. Vendor shall consider the most stringent pipe thickness / schedule for each skid rating. Project specific pipe schedule shall be provided during detail engineering.

6.4 Vendor shall provide its PMS & VMS for seal gas skid piping, valve and other items.

6.5 PMI to be done for all materials, fittings & weld materials.

6.6 The dimension of all fittings shall be as per ASME/ANSI standard.

6.7 In general, the following type of valves shall be provided.

a) For piping root valves Globe valves shall be used. Some project may require metal seated fire safe ball valve or a mix of gate / globe / ball valve. This shall be provided during detail engineering.
b) For isolation, gate valves shall be used
c) For equalization and bypass, globe valves shall be used
d) For instrument air, Ball valves shall be used
e) For throttling in secondary and barrier seal lines, needle / globe valves shall be used.

6.8 All Butt-welded joints shall be TIG welded and the welds shall be 100% radio graphed.

6.9 Vent / Drain/ Any header shall be bigger in size than the individual lines connected to it.

6.10 Supports shall be provided for all items inclusive of pipelines/ tubing/instruments.

6.11 All lines shall be cleaned in order to remove all dust, rust, slag, and all other foreign particles from internal and external parts.

6.12 All the vent / drain holes, if any shall be plugged with threaded plugs/caps.

6.13 All the instruments shall be provided with individual root isolating valves. The double valves shall be provided for all high-pressure (pressures more than 40 bar) isolation, equalization, vent & drains. Toxic service application like H_2S, Ammonia etc. may require double isolation valves irrespective of skid rating.

6.14 Design pressure & temperature of all piping, valves, fittings, instruments, filters shall be as per skid rating. Hydro test / gas leak test shall be carried out as per API614 & API692.

6.15 The items used for Seal gas inlet & vent upto flare, the following shall be strictly followed:

a) All austenitic stainless steel grades shall be solution annealed after welding.

b) Ferrite No. Test: For all austenitic stainless steels, the weld deposit shall be checked for ferrite content. Ferrite No. (FN) not less than 3% and not more than 10% is required to avoid sigma phase embrittlement during heat treatment. FN shall be determined by Ferrite scope prior to post weld heat treatment.

c) All girth welded joints (longitudinal and circumferential) shall be 100% radiographed in accordance with UW-51 of ASME Section VIII, Div-1 and ASME Section V.

d) VALVES:

i. All valve castings shall be of radiographic quality.

ii. All cast valve flanges & bodies with flange rating of Class 1500 shall be examined in accordance with paragraphs 7.2 through 7.5 of Appendix-7 of ASME SEC-VIII, DIV.1, regardless of casting quality factor.

iii. Body / bonnet / cover joints & stuffing box of all valves shall have low emission and shall be helium leak tested as per ASME Sec.V, Subsection A, Article 10 (Detector Probe Technique), Appendix IV at a minimum of 25% of the allowable (rated) cold working pressure. Sampling for helium leak Test shall be one valve selected at random for each item of the material requisition. The failure of helium leak test shall call for testing of remaining valves of that item at vendor's cost. The valve shall show no leakage. No leakage is defined as a total leakage rate of less than 0.0001 ml/s of helium. Test Duration shall be 12 Minutes

iv. Casting and test bar shall be heat treated together. Valve casting shall be in solution heat treated and pickled condition.

v. Critical body and bonnet casing section typically defined by ASME B16.34 shall be radiographed and shall meet ASTM E446 (upto 2" thick) Category A, B & CA Level 2, Category CB, OC & CD Level 3, Category D, B & F Level 0. For wall thickness 2" to 4.5" comparable plates of ASTM E186 shall be used. ASTM E94 and ASTM E142 shall be used for recommended practice & controlling quality of radiography as guide. The entire surface of all castings shall be dye-penetrant inspected after pickling.

vi. Repair welds shall be 100% radiographed and evaluated in accordance with paragraph 344.5 of ASME B31.3 with a minimum casting quality factor of 0.95. Dye Penetration test shall be as per ASTM E165 Procedure B-2, Interpretation as per Appendix-8 of ASME-VIII Div.1.

vii. The following Fugitive emission requirement for valves shall be complied for all kind of valves:

1. All Gate valves as per API-600 / ISO 10434 and all Gate / Globe valves as per API-602 / ISO 15761 shall comply to fugitive emission requirements of API 624 as per clause 5.9.7 of API 600 and 5.9.4 of API 602.
2. For hydrocarbon service, Gate / Globe / Ball / Plug / needle valves shall comply with Fugitive emission requirement of ISO-15848-1 with Tightness Class-C.

7. Instrumentation

7.1 The detailed technical specifications of Instruments, Filter Regulators, Valves, Junction Boxes and other equipment shall be furnished by the vendor.

7.2 All instruments & junction boxes shall be weather proof to IP-67, approved for use in hazardous area IEC Zone-1, Gas Gr. IIA, B & C, T6.

7.3 All the instruments shall have Proven Track Record of minimum 8000 hours of successful uninterrupted operation.

7.4 Analog 4-20mA SMART instruments shall be HART 7 compatible. Foundation fieldbus instruments shall be suitable for FISCO / entity parameters. FF JB is in BHEL scope.

7.5 Vendor to confirm compliance for the sub-vendors indicated in the Instrument table. For the items not covered in the list or vendors are not indicated, vendor shall procure from their standard sub-vendors, subject to valid PTR.

7.6 The vendor shall furnish the following test certificates for the instruments. The certification shall be inline with EN 10204.

a) Calibration/ test certificates
b) Material test certificates
c) Sub-vendor conformity certificates.
d) Third part statutory certificates
e) PMI & IGC.
f) Material traceability certificate.
g) Pressure Testing certificate.
h) NACE certificate.

7.7 Vendor shall submit necessary statutory body certificates for the instruments & Junction Boxes, cable glands, etc from the following statutory authorities.

a) BIS (Bureau of Indian Standards) for flameproof instruments of India origin.
b) Explosion protection test certificate from approved laboratory like KLPL / CIMFR etc.
c) Approval certificate from PESO for all Explosion protected instruments.

7.8 All the Device Description (DD) and common file format (CFF) files for all HART and FF instruments shall be supplied in USB for configuration.

7.9 The earth connections of all electrical components shall be brought to common bar for further connection to earth pit at site.

7.10 Junction Box shall be die cast aluminum LM-6 body (or SS316 if required), with 12 inlets (0.5") & 02 outlets (1.5"). Cable entries shall be in the bottom only.

7.11 JBs shall be provided with FRP canopy.

7.12 Cable glands shall be of SS316, Ex-d & Ex-e certified. PVC hood shall be provided on instrument and JB end.

7.13 One cable gland of 1.5" shall be provided with each JB. Unused cable entries shall be plugged with SS316, Ex-d plugs.

7.14 Telephone sockets and plugs shall be provided in JB. JB shall have internal & external earth.

7.15 All signal cables shall be 1.5 mm^2 armored type XLPE as primary insulation. Cable specification shall be provided during detail engineering.

7.16 Spur cable between FF instruments and FF JB shall be Type A as per IEC61158 part2.

8. Instrument Installation Standards

8.1 The Pressure & DP Gauges shall be grouped as per operational requirement and mounted on the Gauge Board in the front side of the Skids.

8.2 All the instruments mounted on the skids shall be installed as per hook up diagrams (to be furnished during the detailed engineering). Based on these, Vendor shall develop & submit a tag number wise installation Standard (hook up) directory for all the instruments supplied/ mounted in the skids based on the above diagrams for BHEL / Customer approval.

8.3 The tubing for Control valves (from air filter regulator, I/P converter and control valve) shall be of stainless steel tubing and the same is in vendor's scope.

8.4 Vendor to consider piping hookups with welded joints for all instruments. Tubing (SS316L) may be allowed (subject to customer approval) only for a single run with two double compression fittings (Swagelok / parker make) only (after piping root isolation valve).

8.5 Instead of union; flange to be used in all impulse pipes and tubes irrespective of class.

8.6 2-valve or 3-valve manifold shall be fabricated with gate valve and pipe. Equalization with globe valve. Closed coupled installation shall be considered for high viscous services or hydrocarbons containing water for flow/pressure transmitter. The size (NB) of impulse pipe shall be ¾" for corrosive / congealing and high pressure service.

8.7 Bypass line with isolation valves must be provided for inline instruments like Rotameters, Integral orifice, Control/On-Off valves.

8.8 For impulse line with viscous / congealing services a tee off with blind flange shall be provided for cleaning purpose near to first isolation valve.

8.9 All the transmitters shall have horizontal impulse entry to have easy interchangeability.

8.10 The instruments shall not be mounted directly on its hook-up. The instruments shall first be mounted on gauge board / 2"pipe and then the hook-up shall be connected.

9. Electrical Installation

9.1 Separate Junction box shall be provided for the following signals and grouping of instruments shall be carried out accordingly.

a) Analog Signals for DCS
b) Analog Signals for PLC
c) Field Bus Signals
d) Proximity signals
e) Digital signals
f) Solenoid valves
g) Intrinsic/Explosion proof signals

9.2 Field bus junction boxes (FNICO/ FISCO/HPT) is in BHEL scope. Vendor to consider a maximum of 25 meters for FF spur cable.

9.3 Tag plates shall be provided for all the Equipment, instruments & cables. Cable tags shall be provided for both ends.

9.4 All components (instruments, valves, cable glands, junction box etc.) shall be identified by means of a plate placed on the structure with stainless material tearing rivets. All instruments shall have a second stainless steel plate fixed to the instrument body by means of a steel wire. The junction boxes shall be equipped with a second plate fixed to its cover by means of an oil-proof adhesive (Loctite or similar). ALL THE PLATES SHALL BE MANUFACTURED AND ENGRAVED ACCORDING TO PROJECT SPECIFIC P&ID.

9.5 Identification ferrules and lugs for termination shall be provided at junction box end and instrument end.

9.6 All the Electrical Instruments shall be neatly concealed wired and terminated in a local junction box requiring only connection to purchaser's wiring. The cable connecting the instrument to junction box shall be armoured.

9.7 Stainless Steel perforated Cable Trays shall be used for cable laying. The edges of cable trays shall be covered suitably using rubber sleeve.

9.8 The JB grouping and terminal allocation shall be as per BHEL cable schedule (provided during detailed engineering).

9.9 Junction boxes will be installed on the side plates of the panel; the distance between the bottom of these junction boxes and the ground must be at least 800 mm and 500 mm in case of adjacent boxes.

9.10 Seal gas gauge board shall be equipped with n°2 earthing bosses.

9.11 Inside each panel a SS bar measuring 16 mm^2, rectangular-sectioned shall be included for the connection of ground cables coming from the instruments or other.

10. <u>The supplier shall furnish the following Documents</u>

10.1 Along with offer:

a) API 614 & API692 deviation list.
b) Compliance for BHEL specification and its Annexures.
c) Signed and stamped Filled up check-list.
d) Price Schedule.
e) Proven Track Record.
f) Dew Point Curve.

10.2 Vendor shall submit following documents within 2 weeks of Placement of PO / LOI. Date of submission of last document (except 3D model & QAP) shall be considered as submission date.

a) General Arrangement of seal gas skids.
b) BOM of MAIN & SPARES with make / model no.

c) Instruments Data sheets as per ISA format.
d) Sizing calculation for control /on-off valves, filter etc.
e) DGS system data sheet as per API format.
f) 3D model (STP file).
g) QAP / ITP.

10.3 In case of any comments, vendor shall submit the revised document within 1 week of comments.

10.4 Final Documentation: Vendor shall furnish hard copies & USB for all documents mentioned below).

a) As-built GA drawings.
b) As-built Instrument datasheets including instrument vendor datasheets, GA drawings & sizing calculations.
c) Spares list.
d) Packing list.
e) Material test certificates.
f) Filter degree of filtration test certificate.
g) Explosion protection certificates for all electronic instruments.
h) Terminal wiring details of Junction Box.
i) Skid Photographs.
j) Instruction, Service and Maintenance manual.
k) Guarantee Certificates.
l) Site storage instructions.

11. Inspection and Tests:

All the equipment's shall be subject to inspection and witness tests by BHEL / CUSTOMER / CONSULTANT. The schedule of quality checks shall be furnished by the vendor in the quality plan which is subject to the approval of customer/consultant/ BHEL. The minimum requirements is as indicated below.

11.1 IGC requirements for Piping and Instrumentation.

For all Austenitic Stainless steels, Intergranular Corrosion (IGC) Test shall be conducted as per following:

a) ASTM A262 Practice 'B' with acceptance criteria of 60 mils / year (max.) for casting. OR
b) ASTM A262 Practice 'E' with acceptance criteria of 'No cracks as observed from 20X magnification' & microscopic structure to be observed from 250X magnification" for other than casting.
c) For IGC test, two sets shall be drawn from each solution annealing lot; one set corresponding to highest carbon content and other set corresponding to the highest rating / thickness.

11.2 Material tests for filter and Changeover Valve for Duplex Filter (as a minimum)

Sl. No.	Type of Check and Test	Certificate Designation	Type of Inspection
1	Chemical Analysis	Mills Certificates	Verification of test report / certificates by TPI appointed by Vendor.
2	Mechanical Tests	Certified check by manufacturer	- do -

Sl. No.	Type of Check and Test	Certificate Designation	Type of Inspection
3	Non destructive Tests (as per manuf. std)	- do -	- do -
4	Hydrostatic Test (Filter and valve body)	Witness	TPI appointed by Vendor.
5	Degree of filtration (filter element)	Certificate from manufacturer	Verification of test report / certificates by TPI appointed by Vendor.

11.3Inspection & test / Quality Plan

Sl. No.	Description	Type of check Quantum of check 100%	Ref. Documents	Type of Inspection	Agency
1	Assembly of Skids	- Location of equipment - Correctness of flow Schematics - Overall dimensions	- Approved GA drg. of Skids	Physical check	BHEL / CUSTOMER
2	Welding	Type	Manufacturing drawings.	-Review of Radiograph certificate -Welding efficiency of 1	--Do--
3	Duplex Filter	- Material Certification - Hydrostatic test - Degree of filtration-Type Test	-BHEL/ CUSTOMER Specification - Approved drg.	Verification of test report certificate	--Do--
4	Control Valves	Refer control /on-off valve ITP	--Do--	Verification - Review of Certificates	--Do--
5	Valves (other than Control / On-Off)	- Material Certification - Hydrostatic test -Pneumatic / He test.	--Do--	- Verification - Review of Certificates	--Do--
6	Pressure Gauges, Diff. Pr. Gauges, Diff. Pr. Transmitters, I/P converters, DP Switch, Pr. Switches, Junction Box, Flow meters	- Make, Model - Materials Certification - Calibration certification - Explosion proof/ Intrinsic safe certification	--Do--	--Do--	--Do--
7	Filter regulators, Valves	- Make, Model	--Do--	--Do--	--Do--
8	Piping/Tubing	- Materials Certification	--Do--	- Review of Mills certificates	--Do--
9	Pipe and tube fittings	- Materials Certification	--Do--	-Verification - Review of Certificates	--Do--
10	Instrument Hook-up	- Material Certificate	--Do--	Review of certificates	--Do--
11	Line cleaning	Compliance	--Do--	Verification	--Do--
12	Hydraulic Testing of Piping	- Leakage	--Do--	Witness	--Do--
13	HP test with Helium or Nitrogen as per API 614	- Leakage	--Do--	Witness	--Do--
14	Air Leak test for the Hydraulic tested lines	- Leakage	--Do--	Witness	--Do--

Sl. No.	Description	Type of check Quantum of check 100%	Ref. Documents	Type of Inspection	Agency
15	Name Plates	- Correctness	--Do--	Physical check	--Do--
16	Painting - Pre-Treatment, Chemical Cleaning, Degreasing De-rusting and Phosphating - Two coats of Primer and Two coats of final Paint	- Thoroughness - Thoroughness	No Rust Finish	Physical check Physical check	Supplier BHEL / CUSTOMER
17	Wiring	- Continuity	Wiring diagram	Verification	--Do--
18	Cleanliness Test	No discoloration or hard articles found on 20 mesh screen after module blown for 5 minutes with 7 kg/cm2g dry filtered gas.		Witness	--Do--

NOTE: Refer attached standard ITP for individual instrumentation for detailed inspection requirement.

12. Marking and Shipping:

12.1 Name plates: The Individual components shall be provided with Nameplates giving important details like make, model etc. Each component shall be provided with stainless steel Tag plates duly punching Tag Nos. as applicable on it.

12.2 Preparation for Shipment

a) Equipment shall be suitably prepared for shipment. The preparation shall make the equipment suitable for 6 months of outdoor storage from the date of shipment.
b) Each assembly shall be marked with details like, drawing no, job number, PO No. etc. at a convenient location.
c) Exterior carbon Steel surfaces shall be given at least two coats of Epoxy paint.
d) Flanges openings shall be provided with metal closures.
e) Pipe union openings shall be suitably closed.
f) Lifting Points and lifting lugs shall be clearly identified.
g) All Loose supplied items like interconnection pipe and fittings between both assemblies, loose cable glands, spare filter cartridges, foundation bolts, etc., which are in Vendor's scope shall be listed out separately in the packing list.
h) Adequate amount of silica gel or equivalent shall be provided in the box before despatch for the removal of moisture until installation.
i) All safety instructions for storage and handling shall be indicated on external surface of the box.

13. Services:

Vendor shall provide services of their engineers for commissioning of Gas Seal Systems at site for 7 working days per compressor train

14. Training:

Vendor shall at no extra cost to the purchaser, undertake to train 4 engineers selected by the purchaser for a period of 5 working days at BHEL Hyderabad or Vendors works or site

15. SPECIAL NOTES

15.1 Vendor should bring out in his offer clause wise deviations if any, with respect to proposed supply along with price adder for withdrawing the deviation to comply with specification. Failure to highlight the same will be construed as acceptance on the part of the vendor to meet the requirement of this specification totally.

15.2 Vendor shall provide the relevant technical information and supporting documents whenever asked for by the customer/ consultant.

15.3 Vendor to clearly bring out any additional requirements which are essential for proper functioning of the dry gas seal system. This shall be included in the offer.

16. INSTRUMENT TECHNICAL SPECIFICATION:

SL. No.	Instrument	Minimum Specification	Vendor	Model
1	Differential Pressure Gauge / Indicator	-panel mount -150mm dial -SS316L wetted part -SS316 for other / casing etc. -double diaphragm / bellow design -± 1.6 % accuracy -130% over range protection -External Zero adjustment -Colour band (project specific)	GIC / Wika / Baumer /	VTA
2	Pressure Gauge	-panel mount -150mm dial -SS316L wetted part -SS316 for other / casing etc. -Bourdon tube design -± 1 % accuracy -130% over range protection -External Zero adjustment -Colour band (project specific)	GIC / Wika / Baumer	VTA
3	Temperature gauge	-Direct mount -150mm dial -Bimetallic design -S316L wetted part -SS316 for other / casing etc. -± 1 % accuracy -130% over range protection -External Zero adjustment -Colour band (project specific) -thermowell: Flanged (drilled barstock)	GIC / Wika / Baumer /	VTA
4	Pressure & differential pressure transmitter	-SMART HART / Foundation Fieldbus -± 0.05 % accuracy -Die Cast Al Housing -SS316 body with SS316L diaphragm / wetted part (Gold plated for H2 service. Hastelloy as base material allowed only if approved by Customer). -Standard diagnostic. -Advanced Diagnostics with Impulse line detection.	Emerson / Yokogawa / Honeywell	VTA

SL. No.	Instrument	Minimum Specification	Vendor	Model
		-SIL 2 (for SMART HART). -Ex-ia / FISCO for Foundation Fieldbus. -Ex-ia + Ex-d for SMART HART -In built lightning & surge protection -In built LCD Indicator -dual compartment		
5	Flow Meters -Variable Area type	-SMART HART / Foundation Fieldbus -± 1.6 % accuracy -Die Cast Al Housing -SS316L wetted part. -SIL 2 (for SMART HART). -Ex-ia / FISCO for Foundation Fieldbus. -Ex-ia + Ex-d for SMART HART -In built lightning & surge protection -In built LCD Indicator / Dial Indicator	Krohne / Yokogawa / Eureka	VTA
6	Flow Meters –Integral Orifice type	-same as differential pressure transmitter -with integral orifice & flanged meter run	Emerson / Yokogawa / Honeywell	VTA
7	GWR level transmitter	-same as pressure / differential transmitter except the following -± 3.0mm accuracy -Flanged process connection.	Emerson / E+H / Magnetrol / Vega / Krohne	VTA
8	Control valve with Positioner	-Globe Type with pneumatic actuator, spring return type. -Material of body & Trim: SS316L / stellited. -Stem:17-4PH -Leakage: Class IV. -Noise: <85 dB. -Bellow seal for H2 / toxic service (fugitive emission allowed only if approved by Customer)	Fisher / Flowserve / Dresser / IL / Samson / Severn / KSB MIL	VTA
9	SMART / FF Positioner for control valve	-Ex-ia / FISCO for Foundation Fieldbus. -Ex-ia + Ex-d for SMART HART -Contactless link type	Fisher / Flowserve / Metso / Dresser	VTA
10	On-Off valve for Seal Gas inlet changeover / drain pot	-trunnion mounted, Ball valve with pneumatic, spring return type. -metal seated. -fire safe as per API 607 -Material of body & Trim: SS316L / stellited. -Leakage: Class VI TSO / API598. -Noise: <85 dB. -Actuator safety factor: 2.5 -SIL certification -SOV (2oo2) -Limit Switch (proximity type) for open / close indication	Fisher / Flowserve / Metso / Koso / El-O-matic / Rotex / Samson / Micro-finish	VTA
11	Solenoid valve for On-Off valve	-24VDC Ex-ia (Ex-d if 110V) -Class H -SS316 Body -SIL 3	Asco / Herion	VTA
12	Proximity Limit Switch	-Ex-ia	P+F	VTA

SL. No.	Instrument	Minimum Specification	Vendor	Model
	for On-Off valve	-SIL 2 -mounted in position indicator box		
13	PST Positioner for On-Off valve	-Same as SMART positioner for Control valve except the following: -PST feature	Fisher / Flowserve / Metso / Dresser	VTA
14	Junction Box & Cable Gland	Refer specification	Baliga / FCG / FEPL	VTA
15	Duplex filter for Primary / Secondary / Separation seal gas	Refer specification	VTA	VTA
16	Self-Actuated Pressure control valve	-Same as Control valve except the following: -Self actuated without positioner	Fisher / Samson / Nirmal / Dresser	VTA
17	Piping valves / NRV / Instrument Valves / Manifolds / Tube / Fittings etc.	Refer specification	VTA	VTA
18	Signal Cable	Refer specification	Associated Cable / KEI / Cords Cable Ind. / Belden / Lapp	VTA
19	FF Cable	Refer specification	Belden / Lapp	VTA
20	Heater & heater panel	Refer specification -Thyristor control with Heater Panel -Rittal make, 800 x 800 x 2100 mm -2oo3 Temperature transmitter for protection / heater trip through Customer control system. -closed loop PID controller with TT for temperature control. -Additional PID controller with TT for heater stop. -with Ex-d IIC Local Control Station.	Fati / Watlow / Sandvik / Escorts	VTA
21	Temperature transmitter	-SMART HART -Die Cast Al Housing -SIL 2 (for SMART HART). -Ex-ia + Ex-d for SMART HART -In built lightning & surge protection -In built LCD Indicator -Dual Sensor Type -Thermowell: same as temperature gauge	Emerson / Yokogawa / Honeywell	VTA

17. Seal Gas P&ID: API 614 / API 692 Standard Modules for Seal Gas Skid:

Sl. No.	Requirement	API 614	API 692	Remarks
1	Seal Gas System	B.1 to B.4	B.1 to B.17	To be selected as per DGS type
2	Seal Gas Filter (All type)	B.5 / B.7	Module C	
3	Filter drain pot	B.6	Module B2	
4	Primary Seal Gas Pressure Control	B.8	Module DT with DT1/2/3/4	Remark-1
5	Primary Vent	B.16	B.5	2oo3 PT / DPT for trip.
6	Secondary Seal Gas Pressure	B.18	Module F with	Remark-1

Sl. No.	Requirement	API 614	API 692	Remarks
	Control		F1/2/3	
7	Separation Seal Gas Pressure Control	B.18	Module M with M1/2/3	Remark-1
8	Secondary Vent	---	B.5 / B.13 with J & K	Gas Analyzer not applicable.

Remark-1: Additional Instrument (if required) shall be considered as per Unit prices.

18. Check List: To be included with Technical Offer.

Sl. No.	Description	Vendor's Confirmation (Yes/No)
1	API614 / API692 deviations included	
2	Deviation list for BHEL specification and its Annexure included.	
3	DEW point curve enclosed along with the offer.	
4	Unit prices included for all items.	
5	Price Schedule Included.	
6	PTR included.	

Vendor's Signature

Vendor's Company seal

19. DEVIATION FORMAT:

Sl. No.	Document	Clause No	Deviation	Reason	Deviation category Product-design limitation / Optimization
1	API614				
2	API692				
3	BHEL Specification				

20. SPARES PHILOSOPHY:

Sl. No.	SPARE ITEM DESCRIPTION / SPARE PHILOSOPHY	QTY
1	**Filter Element Spares:** i. Primary seal gas filter element with gaskets / O-rings: One no / set. ii. Secondary / Separation seal gas filter element with gaskets / O-rings: One no / set. **The above items comprise as 01 SET.**	Refer RFQ for Qty.
2	Local Gauges: DP, Pressure, flow, temperature, level etc. (01 no each type, range, model). **The above items comprise as 01 SET.**	Refer RFQ for Qty.
3	Transmitter Spares: DP, Pressure, Level, Flow etc. (01 no each type, range, model) **The above items comprise as 01 SET.**	Refer RFQ for Qty.
4	**Control valve & On-Off Valve spares:** 10 % or minimum 1 no of each type and size (unless specified). iii. Trim consisting of seat, seat ring/ seal ring, plug / ball with stem, cage (wherever applicable), packing material. i. Complete Actuator with Hand Wheel assembly. ii. Actuator Diaphragm. iii. Air filter regulator (02 nos). iv. Bonnet Gaskets/ gland packing's, piston O-rings, bearing & liner. v. Any special accessories provided along with the control valve like boosters, relay etc. **The above items comprise as 01 SET.**	Refer RFQ for Qty.

Sl. No.	SPARE ITEM DESCRIPTION / SPARE PHILOSOPHY	QTY
5	**Pressure Regulating Valve (self-Actuated) spares:** 10 % or minimum 1 no of each type and size (unless specified). i. Repair kit consisting of orifice, plug, spring, gasket, actuator diaphragm, spring, O-ring: 20% or min 1 no for each type ii. Trim set consisting of seat, seat ring/ seal ring, plug / ball with stem, cage (wherever applicable), packing material. iii. Bonnet Gaskets/ gland packing's, piston O-rings. **The above items comprise as 01 SET.**	Refer RFQ for Qty.
6	Solenoid valve	Refer RFQ for Qty.
7	Proximity limit switch	Refer RFQ for Qty.
8	Positioner	Refer RFQ for Qty.
9	**Instrument valves, manifolds & fittings: 10 % or minimum 1 no of each type and size (unless specified).** i. Fittings, lugs, nipples, sockets, blinds, unions: 10% or min. 2 no each type. ii. ½", ¾", 1", 1-½", 2" (etc.) valves (Ball, Globe, Gate, Needle, NRV etc.): 10% or min. 1 no each type. iii. 2 valve & 3 valve manifolds, isolation valves, instrument valves, tube fittings, check valves, filter, regulator, orifice plates etc.: 10% or min. 1 no each type. iv. Tube fitting: 05 nos each type. **The above items comprise as 01 SET.**	Refer RFQ for Qty.
10	**Heater & Heater Panel electrical / electronic item / module as per following list.** i. Rectifier control module (Control card fully assembled): one no. of each type ii. Power supply card: one no. of each type iii. Control Cards: one no. of each type iv. Power Fuses: 2 nos. min. of each rating & type v. Control fuses / MCB: 2 nos. each rating & type vi. Contactor: 10% or one no. (min) of each rating & type vii. Indicating lamps Covers: 2 no. of each colour, rating & type viii. Blocker diode: 2 no. of each rating & type ix. LCS Spares (PB, Lamps, Switches, terminals).): one no. of each type x. Temperature RTD / TC & Temperature Transmitter): one no. of each type **The above items comprise as 01 SET.**	Refer RFQ for Qty.

21. Variant Table: Seal Gas Skid & Instrumentation quantity:

Variant No	01	02	03	04	05	06
Material Code	TC976558301	TC976558302	TC976558303	TC976558304	TC976558305	TC976558306
SAP Description	DGS Filter & Control Skid 300# Single Casing	DGS Filter & Control Skid 600# Single Casing	DGS Filter & Control Skid 1500# Single Casing	DGS Filter & Control Skid 2500# Single Casing	DGS Filter & Control Skid 300# Two Casing	DGS Filter & Control Skid 600# Two Casing
Skid Rating	300	600	1500	2500	300	600
API Std	614	614	614	614	614	614
Diff Press Gauge	8	8	8	8	14	14
Press Gauge	18	18	18	18	30	30
Temp Gauge	3	3	3	3	6	6
PT & PDT	25	25	25	25	40	40
FT-VA / Integ FO type	6	6	6	6	12	12
Control valve with Positioner	1	1	1	1	2	2
JB	5	5	5	5	6	6
Duplex filter for Pri / Sec / Sep SGS	1+1+1	1+1+1	1+1+1	1+1+1	1+2+2	1+2+2
Self Act PCV for Sec / Sep SGS	4	4	4	4	8	8

Variant No	07	08	09	10	11	12
Material Code	TC976558307	TC976558308	TC976558309	TC976558310	TC976558311	TC976558312
SAP Description	DGS Filter & Control Skid 1500# Two Casing	DGS Filter & Control Skid 2500# Two Casing	DGS Filter & Control Skid 300# Three Casing	DGS Filter & Control Skid 600# Three Casing	DGS Filter & Control Skid 1500# Three Casing	DGS Filter & Control Skid 2500# Three Casing
Skid Rating	1500	2500	300	600	1500	2500
API Std	614	614	614	614	614	614
Diff Press Gauge	14	14	20	20	20	20
Press Gauge	30	30	50	50	50	50
Temp Gauge	6	6	6	6	6	6
PT & PDT	40	40	55	55	55	55
FT-VA / Integ FO type	12	12	18	18	18	18
Control valve with Positioner	2	2	3	3	3	3
JB	6	6	8	8	8	8
Duplex filter for Pri / Sec / Sep SGS	1+2+2	1+2+2	1+3+3	1+3+3	1+3+3	1+3+3
Self Act PCV for Sec / Sep SGS	8	8	12	12	12	12

Variant No	21	22	23	24	25	26
Material Code	TC976558321	TC976558322	TC976558323	TC976558324	TC976558325	TC976558326
SAP Description	DGS Filter & Control Skid 300# Single Casing	DGS Filter & Control Skid 600# Single Casing	DGS Filter & Control Skid 1500# Single Casing	DGS Filter & Control Skid 2500# Single Casing	DGS Filter & Control Skid 300# Two Casing	DGS Filter & Control Skid 600# Two Casing
Skid Rating	300	600	1500	2500	300	600
API Std	692	692	692	692	692	692
Diff Press Gauge	8	8	8	8	14	14
Press Gauge	18	18	18	18	30	30
Temp Gauge	4	4	4	4	8	8
PT & PDT	25	25	25	25	40	40
FT-VA / Integ FO type	12	12	12	12	16	16
Control valve with Positioner	1	1	1	1	2	2
JB	5	5	5	5	6	6
Duplex filter for Pri / Sec / Sep SGS	1+1+1	1+1+1	1+1+1	1+1+1	1+2+2	1+2+2
Self Act PCV for Sec / Sep SGS	4	4	4	4	8	8

Variant No	27	28	29	30	31	32
Material Code	TC976558327	TC976558328	TC976558329	TC976558330	TC976558331	TC976558332
SAP Description	DGS Filter & Control Skid 1500# Two Casing	DGS Filter & Control Skid 2500# Two Casing	DGS Filter & Control Skid 300# Three Casing	DGS Filter & Control Skid 600# Three Casing	DGS Filter & Control Skid 1500# Three Casing	DGS Filter & Control Skid 2500# Three Casing
Skid Rating	1500	2500	300	600	1500	2500
API Std	692	692	692	692	692	692
Diff Press Gauge	14	14	20	20	14	14
Press Gauge	30	30	50	50	50	50
Temp Gauge	8	8	8	8	8	8
PT & PDT	40	40	55	55	55	55
FT-VA / Integ FO type	16	16	24	24	24	24
Control valve with Positioner	2	2	3	3	3	3
JB	6	6	8	8	8	8
Duplex filter for Pri / Sec / Sep SGS	1+2+2	1+2+2	1+3+3	1+3+3	1+3+3	1+3+3
Self Act PCV for Sec / Sep SGS	8	8	12	12	12	12

22. Variant Table: Spares and Optional Instrumentation:

Variant No	Material Code	SAP Description	Skid Rating
51	TC976558351	Spare Filter Element for Pri / Sec / Sep SGS	
52	TC976558352	Spare Local Gauges (PG/DPG/TC etc. 10% or 01 no each type)	
53	TC976558353	Spare PT & PDT (10% or 01 no each type)	
54	TC976558354	Spare FT-VA / Integ FO type-300#	300
55	TC976558355	Spare FT-VA / Integ FO type-600#	600
56	TC976558356	Spare FT-VA / Integ FO type-1500#	1500
57	TC976558357	Spare FT-VA / Integ FO type-2500#	2500
58	TC976558358	Spares for Control valve & On-Off Valve-300#	300
59	TC976558359	Spares for Control valve & On-Off Valve-600#	600
60	TC976558360	Spares for Control valve & On-Off Valve-1500#	1500
61	TC976558361	Spares for Control valve & On-Off Valve-2500#	2500
62	TC976558362	Spare SMART / FF Positioner	

Variant No	Material Code	SAP Description	Skid Rating
63	TC976558363	Spares for Self Act PCV for Sec / Sep SGS-#	
64	TC976558364	Spare Instrument valves, manifolds & fittings-300#	300
65	TC976558365	Spare Instrument valves, manifolds & fittings-600#	600
66	TC976558366	Spare Instrument valves, manifolds & fittings-1500#	1500
67	TC976558367	Spare Instrument valves, manifolds & fittings-2500#	2500
68	TC976558368	On-Off valve for Seal Gas inlet changeover-300#	300
69	TC976558369	On-Off valve for Seal Gas inlet changeover-600#	600
70	TC976558370	On-Off valve for Seal Gas inlet changeover-1500#	1500
71	TC976558371	On-Off valve for Seal Gas inlet changeover-2500#	2500
72	TC976558372	drain pot with LT & Valve-300#	300
73	TC976558373	drain pot with LT & Valve-600#	600
74	TC976558374	drain pot with LT & Valve-1500#	1500
75	TC976558375	drain pot with LT & Valve-2500#	2500
76	TC976558376	Spare Solenoid valve	
77	TC976558377	Spare Proximity Limit Switch	
78	TC976558378	Spare GWR level transmitter-300#	300
79	TC976558379	Spare GWR level transmitter-600#	600
80	TC976558380	Spare GWR level transmitter-1500#	1500
81	TC976558381	Spare GWR level transmitter-2500#	2500
82	TC976558382	Prefilter-300#	300
83	TC976558383	Prefilter-600#	600
84	TC976558384	Prefilter-1500#	1500
85	TC976558385	Prefilter-2500#	2500
86	TC976558386	Electrical Tracing	
87	TC976558387	Heater & heater panel with Spares-300#	300
88	TC976558388	Heater & heater panel with Spares-600#	600
89	TC976558389	Heater & heater panel with Spares-1500#	1500
90	TC976558390	Heater & heater panel with Spares-2500#	2500

Rev. No.	Date	Revision Details	Revised	Approved
00	31.12.2021	New Standard	--	PDM

स्वचालित नियंत्रण वाल्वों/रेगुलेटरों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR SELF ACTUATED CONTROL VALVES / REGULATORS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	01.08.16	Revised and Reissued	MM	RS	RKS	RN
3	21.11.13	Revised and Reissued	MJ	RS	SCG	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	10.06.08	Revised and Reissued	SA	SKD	SKP	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations:

AS	:	Alloy Steel	LPT	:	Liquid Penetrate Testing
BIS	:	Bureau of Indian Standards	MRT	:	Mechanical Run Test
CEIL	:	Certification Engineers International Limited	MPT/MT	:	Magnetic Particle Testing
CIMFR	:	Central Institute of Mining & Fuel Research	MTC	:	Material Test Certificates
CE	:	Carbon Equivalent	MOC	:	Material of Construction
DFT	:	Dry Film Thickness	NPSH	:	Net Positive Suction Head
DT	:	Destructive Testing	NDT	:	Non Destructive Testing
DP or DPT	:	Dye Penetrate Testing	NEMA	:	National Electrical Manufacturers Association
ERTL	:	Electronics Regional Test Laboratory	PO	:	Purchase Order
FCRI	:	Fluid Control Research Institute	PESO	:	Petroleum Explosive Safety Organization
FM	:	Factory Mutual	PQR	:	Procedure Qualification Record
FLP	:	Flame Proof	PR	:	Purchase Requisition
HART	:	Highway Addressable Remote Transducer	PMI	:	Positive Material Identification
HV	:	High Voltage	PTB	:	Physikalisch-Technische Bundesanstalt
ITP	:	Inspection and Test Plan	QC	:	Quality Control
IP	:	Ingress Protection	RT	:	Radiography Testing
IC	:	Inspection Certification	SS	:	Stainless Steel
IR	:	Insulation Resistance	TC	:	Test Certificate
IEC	:	International Electro technical Commission	TPI or TPIA	:	Third Party Inspection Agency
JEC	:	Japanese Electro technical Committee	VDR	:	Vendor Data Requirement

Inspection Standards Committee

Convenor : Mr. R.K. Singh

Members:

Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr. Neeraj Mathur	Mr. T Kamalakannan
Mr. Deepak Gupta (Project)	Mr. Mahendra Mittal

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Self Actuated Control Valves / Regulators.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
2.0	**Material Inspection**						
2.1	Incoming materials like Forgings & Castings for Body / Bonnet, Trim material etc.	Mechanical & Chemical properties, heat treatment as applicable,	100%	Material Test Certificates / Test Lab Certificates	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components	Visual, Dimensions	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.1	Final Inspection	• Visual check for all items. • Correctness of model no., Tag plate, Connection size. • Physical verification of required accessories. • Hydro test (body). • Set pressure test & Functional test. • Seat leakage test. • Helium leak test (if specified)	100%	Supplier's Internal Test Records/ Inspection Witness Record	-	H	R/W
4.2	NDT	• NDT (as specified).	100%	NDT Reports	-	H	R
4.3	Submission of certificates/ Document	• Type test Certificate for droop within 10% or as per data sheet of set point for each type/model.	Sample	Type test report	-	H	R
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness	100%	Test Records		H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports & MTCs • IC issuance.	100%	Supplier's Test Records /	-	-	H

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
				Inspection Certificate			
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :-

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

इंस्ट्रूमेंट वाल्वों एवं मैनिफोल्डस के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR INSTRUMENT VALVES AND MANIFOLDS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	21.11.13	Revised and Reissued	MJ	RS	AKC	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	29.11.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations

AS	:	Alloy Steel	MRT	:	Mechanical Run Test
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MPT/MT	:	Magnetic Particle Testing
			MTC	:	Material Test Certificates
BIS	:	Bureau of Indian Standards	MOC	:	Material of Construction
CCE or CCOE	:	Chief Controller of Explosives	NPSH	:	Net Positive Suction Head
CEIL	:	Certification Engineers International Limited	NDT	:	Non Destructive Testing
CIMFR	:	Central Institute of Mining & Fuel Research	NEMA	:	National Electrical Manufacturers Association
CE	:	Carbon Equivalent	PO	:	Purchase Order
DFT	:	Dry Film Thickness	PESO	:	Petroleum Explosive Safety Organization
DT	:	Destructive Testing	PQR	:	Procedure Qualification Record
DP or DPT	:	Dye Penetrate Testing	PR	:	Purchase Requisition
ERTL	:	Electronics Regional Test Laboratory	PMI	:	Positive Material Identification
FCRI	:	Fluid Control Research Institute	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	QC	:	Quality Control
FLP	:	Flame Proof	RT	:	Radiography Testing
HART	:	Highway Addressable Remote Transducer	SS	:	Stainless Steel
HV	:	High Voltage	TC	:	Test Certificate
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	UT	:	Ultrasonic Testing
IC	:	Inspection Certification	UL	:	Under writer Laboratories
IR	:	Insulation Resistance	VDR	:	Vendor Data Requirement
IEC	:	International Electro technical Commission	WPS	:	Welding Procedure Specification
JEC	:	Japanese Electro technical Committee	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing	XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Instrument Valves and Manifolds.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
2.0	**Material Inspection**						
2.1	Incoming Material like Forgings, Bar-stock etc.	Chemical & Mechanical Properties, Heat Treatment as applicable	100%	Material Test Certificates / Test Lab Certificates	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components and assembly	Visual, Dimension.	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual • Dimensional Check • Bill of Material for Mounting Brackets & Accessories • Functional Check.	100%	Supplier's Internal Test Records / Supplier's Inspection	-	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Hydrostatic Test for shell and seat. • Pneumatic test for shell and seat.		Witness Record			
4.2	Submission of certificates/Document	• Type tests for each type of valve and manifold as per MSS-SP-99.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Painting and Packing	• Visual • Suitable protection to prevent entry of foreign material. • Cleaning for oxygen and chlorine services, if applicable. • Proper packing to prevent damage during transportation	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports, MTC • IC issuance.	100%	Supplier's Test Records / Inspection Certificate	-	-	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :-

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

इंस्ट्रूमेंट ट्यूबिगं
के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
INSTRUMENT TUBING

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	21.11.13	Revised and Reissued	MJ	RS	AKC	SC
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	29.11.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations

AS	:	Alloy Steel
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres
BIS	:	Bureau of Indian Standards
CCE or CCOE	:	Chief Controller of Explosives
CEIL	:	Certification Engineers International Limited
CIMFR	:	Central Institute of Mining & Fuel Research
CE	:	Carbon Equivalent
DFT	:	Dry Film Thickness
DT	:	Destructive Testing
DP or DPT	:	Dye Penetrate Testing
ERTL	:	Electronics Regional Test Laboratory
FCRI	:	Fluid Control Research Institute
FM	:	Factory Mutual
FLP	:	Flame Proof
HART	:	Highway Addressable Remote Transducer
HV	:	High Voltage
ITP	:	Inspection and Test Plan
IP	:	Ingress Protection
IC	:	Inspection Certification
IR	:	Insulation Resistance
IEC	:	International Electro technical Commission
JEC	:	Japanese Electro technical Committee
LPT	:	Liquid Penetrate Testing
MRT	:	Mechanical Run Test
MPT/MT	:	Magnetic Particle Testing
MTC	:	Material Test Certificates
MOC	:	Material of Construction
NPSH	:	Net Positive Suction Head
NDT	:	Non Destructive Testing
NEMA	:	National Electrical Manufacturers Association
PO	:	Purchase Order
PESO	:	Petroleum Explosive Safety Organization
PQR	:	Procedure Qualification Record
PR	:	Purchase Requisition
PMI	:	Positive Material Identification
PTB	:	Physikalisch-Technische Bundesanstalt
QC	:	Quality Control
RT	:	Radiography Testing
SS	:	Stainless Steel
TC	:	Test Certificate
TPI or TPIA	:	Third Party Inspection Agency
UT	:	Ultrasonic Testing
UL	:	Under writer Laboratories
VDR	:	Vendor Data Requirement
WPS	:	Welding Procedure Specification
WPQ	:	Welders Performance Qualification
XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh
Mr.Neeraj Mathur
Mr. Mayank Jain
Mr. Rajeev Kumar
Mr. T Kamalakannan
Mr. Himangshu Pal
Mr. Deepak Gupta (Project)

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Instrument Tubing.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
2.0	**Material Inspection**						
2.1	Incoming Material like Mother pipes, Bars / Billets etc.	Chemical & Mechanical Properties, Heat Treatment as applicable	100%	Material Test Certificates / Test Lab Certificates	H	H	R
3.0	**In process Inspection**						
3.1	Cold draw / pilger operations, Heat treatment etc.	Dimensions, Finish, Temperature records	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
		• Visual check • Dimensional test. • Chemical & Mechanical Properties					

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.1	Final Inspection	• Hydrostatic test (for SS & Bare Copper tubes). • Pneumatic test (for PVC coated Cu tubes) • Ball Test (for Copper tubes) • Eddy Current Examination of copper/SS tubes. • Product markings on tubes / label. • Hardness/ Tension test for SS tube.	100%	Supplier's Internal Test Records / Supplier's Inspection Witness Record	-	H	R
5.0	**Painting**						
5.1	Painting and Packing	• Visual • Suitable protection to prevent entry of foreign material. • Proper packing to prevent damage during transportation	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Traceability of records • Review of Internal Test Reports, MTC • IC issuance.	100%	Supplier's Test Records / Inspection Certificate	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :-

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

यान्त्रिक ट्यूब फिटिंग्स
के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
INSTRUMENT TUBE FITTINGS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revosed and Reissued	GS	SA	AKC	DM
1	05.05.08	Revised and Reissued	SA	SKD	SKP	VC
0	30.04.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations

CCE or CCOE	:	Chief Controller of Explosives	MPT	:	Magnetic Particle Testing
CEIL	:	Certification Engineers International Limited	MRT	:	Mechanical Run Test
CIMFR	:	Central Institute of Mining & Fuel Research	NPSH	:	Net Positive Suction Head
DFT	:	Dry Film Thickness	NDT	:	Non Destructive Testing
DT	:	Destructive Testing	PO	:	Purchase Order
ERTL	:	Electronics Regional Test Laboratory	PESO	:	Petroleum Explosive Safety Organization
FCRI	:	Fluid Control Research Institute	PQR	:	Procedure Qualification Record
FR	:	Fire Retardant	PR	:	Purchase Requisition
FAT	:	Factory Acceptance Test	PMI	:	Positive Material Identification
HMI	:	Human Machine Interface	RT	:	Radiography Testing
HT	:	Heat Treatment	TC	:	Test Certificate
HIC	:	Hydrogen Induced Cracking	TPI or TPIA	:	Third Party Inspection Agency
ITP	:	Inspection and Test Plan	VDR	:	Vendor Data Requirements
IP	:	Ingress Protection	WPS	:	Welding Procedure Specification
IC	:	Inspection Certificate	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing			

Inspection Standards Committee

Convenor : Mr. S.C. GUPTA

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE:

This Inspection and Test Plan covers the minimum inspection and testing requirements for Instrument Tube Fittings.

2.0 REFERENCE DOCUMENTS:

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	-	-	-	-	-	-
2.0	**Material Inspection**						
2.1	Incoming materials like bar stock, Forgings & Castings for Body / Bonnet, Trim material etc.	Material Identification, Chemical and Mechanical Properties, Hardness verification on parent material for ferrules.	100%	Material Test Certificates / Test Lab Certificates	H	H	R
3.0	**In process Inspection**						
3.1	Machining of Fittings	Visual, Dimensions.	100%	Test Records	-	H	-
4.0	**Final Inspection**						
4.1	Routine Tests	• Visual • Dimensions	Sampling as per applicable standard	Test Records	-	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Type tests	Performance test and supplementary test as per ASTM • Examination of Specimen • Pneumatic proof test • Hydrostatic proof test • Impulse test • Flexure fatigue test • Tensile test • Burst test • Repeat Assembly • Rotary Flexure test • Mecurous Nitrate test (if applicable) • Thermal Cycling test • Elevated temperature Soak test • Stress Corrosion Test • Torsion Test • Shock test • Fire test • Vibration test	To be carried out once for each Size, Material, Rating	Type test report	-	H	R
5.0	**Painting**						
5.1	Cleaning for special services	• Cleaning for oxygen & chlorine services, if applicable	100%	Test record	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports • IC issuance	100%	Supplier's Test Records / Inspection Certificate	-	-	H
6.2	Final Document submission	Compilation of Inspection reports, drawings, etc as per VDR / PR	100%	Final data folder	-	H	H

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
				/Completeness certificate			

Legends: H- Hold (Do not proceed without approval), Random -10%,R-Review, RW-Random witness, W- Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

जंक्शन बक्सों और केबल ग्लोडों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR JUNCTION BOXES AND CABLE GLANDS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Re-issued	GS	SA	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
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Abbreviations

CCE or CCOE	:	Chief Controller of Explosives	MPT	:	Magnetic Particle Testing
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DFT	:	Dry Film Thickness	NDT	:	Non Destructive Testing
DT	:	Destructive Testing	PO	:	Purchase Order
ERTL	:	Electronics Regional Test Laboratory	PESO	:	Petroleum Explosive Safety Organization
FCRI	:	Fluid Control Research Institute	PQR	:	Procedure Qualification Record
FR	:	Fire Retardant	PR	:	Purchase Requisition
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HT	:	Heat Treatment	TC	:	Test Certificate
HIC	:	Hydrogen Induced Cracking	TPI or TPIA	:	Third Party Inspection Agency
ITP	:	Inspection and Test Plan	VDR	:	Vendor Data Requirements
IP	:	Ingress Protection	WPS	:	Welding Procedure Specification
IC	:	Inspection Certificate	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing			

Inspection Standards Committee

Convenor : Mr. S.C. GUPTA

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Junction Boxes and Cable Glands.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred therein /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	---	---	---	---	---	---
2.0	**Material Inspection**						
2.1	Incoming materials like Castings, Terminals etc.	Material Identification, Visual, Pressure test on castings for hazardous area Junction boxes.	100%	Material Test Certificates / Lab test certificates	H	H	-
3.0	**In process Inspection**						
3.1	Machining of components	Visual, Dimensions	100%	Test Records	-	H	-
4.0	**Final Inspection**						

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.1	Final Inspection	• Visual, dimensional, clearance & Paint shade check for all items. • Verification of Terminal Nos., sizes and no. of entries • Bill of material verification. • Warning plate for junction boxes and marking on cable glands, Adapters, Plugs etc. • Pressure test on casting for flameproof junction boxes. • High Voltage and insulation resistance test. • Air leak test report on pneumatic JBs.	100%	Supplier's Test Records	-	H	R
4.2	Documentation and IC	• Certificate from authority like BASEEFA, FM, PTB, ATEX, UL, CIMFR etc. for use in specified hazardous area. • Statutory approval certificates for instruments from PESO for use in specified hazardous area. • Degree of protection certificate for instrument housing.	Prototype for type tests	Statutory Approval Certificates / Type Test Certificates / Suppliers Internal test records	-	H	R
5.0	**Painting**						
5.1	(Painting of JBs prior to assembly)	Pre treatment, primer, final paint shade, thickness	100%	Suppliers Internal Test Reports	----	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports • IC issuance	100%	Supplier's Test Records / Inspection Certificate	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W-Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

ऑन–ऑफ वाल्वों के लिए निरीक्षण एवं परीक्षण योजना

INSPECTION AND TEST PLAN FOR ON-OFF VALVES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
2	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
1	22.03.2012	Revised and Reissued	MJ	GS	AKC	DM
0	01.12.2008	Issued for implementation	RB	SKD	SKP	VC

Abbreviations

AS	:	Alloy Steel	MRT	:	Mechanical Run Test
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MPT/MT	:	Magnetic Particle Testing
			MTC	:	Material Test Certificates
BIS	:	Bureau of Indian Standards	MOC	:	Material of Construction
CCE or CCOE	:	Chief Controller of Explosives	NPSH	:	Net Positive Suction Head
CEIL	:	Certification Engineers International Limited	NDT	:	Non Destructive Testing
CIMFR	:	Central Institute of Mining & Fuel Research	NEMA	:	National Electrical Manufacturers Association
CE	:	Carbon Equivalent	PO	:	Purchase Order
DFT	:	Dry Film Thickness	PESO	:	Petroleum Explosive Safety Organization
DT	:	Destructive Testing	PQR	:	Procedure Qualification Record
DP or DPT	:	Dye Penetrate Testing	PR	:	Purchase Requisition
ERTL	:	Electronics Regional Test Laboratory	PMI	:	Positive Material Identification
FCRI	:	Fluid Control Research Institute	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	QC	:	Quality Control
FLP	:	Flame Proof	RT	:	Radiography Testing
HART	:	Highway Addressable Remote Transducer	SS	:	Stainless Steel
HV	:	High Voltage	TC	:	Test Certificate
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	UT	:	Ultrasonic Testing
IC	:	Inspection Certification	UL	:	Under writer Laboratories
IR	:	Insulation Resistance	VDR	:	Vendor Data Requirement
IEC	:	International Electro technical Commission	WPS	:	Welding Procedure Specification
JEC	:	Japanese Electro technical Committee	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing	XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for ON-OFF Valves.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds as applicable/Stelliting	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	a). Incoming Material like Valve Body Casting & frogings etc. b) Bought out items like Limit Switches, Air Filter Regulator, Solenoid valves etc.	a. Physical and Chemical Properties, Heat Treatment as applicable b. Make, Model No , functional checks.	100%	Material Test Certificates / Test Lab Certificates/ Manufacturer's TC	H	H	R
3.0	**In process Inspection**						
3.1	Valve assembly	• Visual, Dimensional,	100%	Supplier's Test Records	-	H	-

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.2	Stelliting & Hardening	Check for hardness	100%	Supplier's Test Records		H	R
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual and Dimensional checks. • Hydrostatic test on all valve bodies. • Pneumatic test on actuators. • Valve stroke Test / functional test • Manual Valve test • Partial Stroke Test / Valve signature • Seat leakage test • Open-Close operation time • Cryogenic test if specified • Helium leak test if specified	100%	Supplier's Test Records and Inspection Witness Record		H	RW
4.2	NDT	• NDT as applicable	100 %	NDT reports		H	R
4.3	Submission of certificates / Documents	• Certificate from testing agency like BASEEFA, CSA, FM/UL, PTB, CIMFR etc. for compliance to applicable hazardous areas for electrically operated items. • Statutory approval certificates for instruments from PESO for use in specified hazardous area. • Cryogenic service test certificate as per applicable specification, if specified. • Fire safe test certificates for fire safe valves as per applicable specification, if specified	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
5.0	**Painting**						
5.1	Painting and Packing	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports • IC issuance.	100%	Supplier's Test Records / Inspection Certificate	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type) , W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :-

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

परितालिका वाल्वों के लिए निरीक्षण एवं परीक्षण योजना

INSPECTION AND TEST PLAN FOR SOLENOID VALVES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
2	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
1	22.03.2012	Revised and Reissued	MJ	GS	AKC	DM
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Abbreviations

AS	:	Alloy Steel	MRT	:	Mechanical Run Test
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MPT/MT	:	Magnetic Particle Testing
			MTC	:	Material Test Certificates
BIS	:	Bureau of Indian Standards	MOC	:	Material of Construction
CCE or CCOE	:	Chief Controller of Explosives	NPSH	:	Net Positive Suction Head
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DP or DPT	:	Dye Penetrate Testing	PR	:	Purchase Requisition
ERTL	:	Electronics Regional Test Laboratory	PMI	:	Positive Material Identification
FCRI	:	Fluid Control Research Institute	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	QC	:	Quality Control
FLP	:	Flame Proof	RT	:	Radiography Testing
HART	:	Highway Addressable Remote Transducer	SS	:	Stainless Steel
HV	:	High Voltage	TC	:	Test Certificate
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	UT	:	Ultrasonic Testing
IC	:	Inspection Certification	UL	:	Under writer Laboratories
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IEC	:	International Electro technical Commission	WPS	:	Welding Procedure Specification
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LPT	:	Liquid Penetrate Testing	XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Solenoid valves.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
2.0	**Material Inspection**						
2.1	Incoming Material like body, conductor material etc.	Material identification, Conductor resistance and insulation of conductors	100%	Material test certificates / Test lab certificates	H	H	R
3.0	**In process Inspection**						
3.1	Solenoid valve assembly	Visual, Dimensional	100%	Supplier's test records	-	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual Checks • Dimensional checks • HV Test • Insulation Resistance test • Pneumatic test by Air/Nitrogen. • Seat leakage test by Air /Nitrogen • Operational test including verification of pickup and drop voltage	100%	Supplier's records	-	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Submission of certificates / Documents	• Certificate from agencies like BASEEFA, UL/FM, PTB, CIMFR etc. for suitability in specified hazardous area. • PESO/CCE approval certificates for use in electrically hazardous areas • Degree of protection certificate (IP) housing. • Valid BIS license for indigenous supply.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Painting and Packing	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports, MTC • IC issuance.	100%	Supplier's Test Records / Inspection Certificate	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W- Witness (Give due notice, work may proceed after scheduled date).

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इलेक्ट्रानिक / वायवाय उपकरणों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR ELECTRONIC / PNEUMATIC INSTRUMENTS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
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CE	:	Carbon Equivalent	PO	:	Purchase Order
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HART	:	Highway Addressable Remote Transducer	SS	:	Stainless Steel
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ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
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Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements of following types of Electronic / Pneumatic Instruments.

a) Pressure/ temperature instruments
b) Differential pressure instruments
c) Receiver instruments
d) Controllers

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
2.0	**Material Inspection**						
2.1	Incoming Material like sensors, housings, flanges, body castings, studs/nuts gaskets plugs etc.	Physical/chemical properties , Heat Treatment as applicable	100%	Manufacturer's Test Certificates / Material Test Certificates	H	H	R
3.0	**In process Inspection**						
3.1	Instrument assembly	Dimensions, Insulation resistance, Sensor Characterization, calibration, performance.	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.1	Final Inspection on assembled Instruments	• Visual • Dimension check • Calibration check including accuracy, hysteresis, repeatability. • Power supply and Air supply variation check. • Static pressure test • Over range protection. • Vacuum test for transmitters required for vacuum service. • Load driving capability check • Check for zero and span adjustments(From remote & local) • Diagnostic check for smart transmitter • Check for Hart protocol operations for smart transmitters (if specified) including multi master operation. • Functional checks for hand held portable communicator for smart transmitters including: a) Configuration of transmitters b) Calibration of transmitters c) Display of process variables d) Diagnostics e) Continuous output from transmitter during communication with field communicator. f) Capability of configuring other make of transmitters.	100% by Supplier	Supplier's Test Records / Inspection Witness Record	-	H	RW

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		g) Detection of plugged impulse lines & output configuration (for fieldbus transmitter) h) Display of inbuilt control algorithm (fieldbus transmitter) • PID operation check for controllers. • Transmitter power supply check for receiver instruments. • Response Time check • Protection against short circuit & reverse voltage. • Zero elevation /suppression test for level transmitter • Bump less transfer check for controllers from manual to auto mode and vice-versa. • PID operation check for controllers. • Accessories check including air filter regulators, mounting accessories etc.	100%	Supplier's Test Records / Inspection Witness Record		H	RW
4.2	Submission of certificates / Documents	• Certificate from testing agency like BASSEFA, FM, PTB, CMIFR, etc. for instruments for use in specified hazardous area/ fisco approval for fieldbus transmitter. • BIS approval for instruments manufactured indigenously for use in specified hazardous area. • Statutory approval certificates for instruments from /PESO for use in specified hazardous area. • Degree of protection certificate for	sample	Statutory Approval Certificates / Type Test Reports	-	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		instrument housing. • Interoperability test certificate for field bus transmitter • Certificate for electromagnetic compatibility and transient protection as per IEC 61000-4 • Certified values of failure rates, probability of failure on demand (PFD) and test intervals for safety Integrity level (SIL) analysis.					
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports, MTC • Device Description files • IC issuance.	100%	Supplier's Test Records / Inspection Certificate	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :-

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

कन्ट्रोल वाल्वों के लिए
निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN
FOR
CONTROL VALVES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	20.09.13	Revised and Reissued	MJ	RS	SCG	DM
2	22.03.12	Revised and Reissued	MJ	GS	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations

AS	:	Alloy Steel	MRT	:	Mechanical Run Test
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MPT/MT	:	Magnetic Particle Testing
			MTC	:	Material Test Certificates
BIS	:	Bureau of Indian Standards	MOC	:	Material of Construction
CCE or CCOE	:	Chief Controller of Explosives	NPSH	:	Net Positive Suction Head
CEIL	:	Certification Engineers International Limited	NDT	:	Non Destructive Testing
CIMFR	:	Central Institute of Mining & Fuel Research	NEMA	:	National Electrical Manufacturers Association
CE	:	Carbon Equivalent	PO	:	Purchase Order
DFT	:	Dry Film Thickness	PESO	:	Petroleum Explosive Safety Organization
DT	:	Destructive Testing	PQR	:	Procedure Qualification Record
DP or DPT	:	Dye Penetrate Testing	PR	:	Purchase Requisition
ERTL	:	Electronics Regional Test Laboratory	PMI	:	Positive Material Identification
FCRI	:	Fluid Control Research Institute	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	QC	:	Quality Control
FLP	:	Flame Proof	RT	:	Radiography Testing
HART	:	Highway Addressable Remote Transducer	SS	:	Stainless Steel
HV	:	High Voltage	TC	:	Test Certificate
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	UT	:	Ultrasonic Testing
IC	:	Inspection Certification	UL	:	Under writer Laboratories
IR	:	Insulation Resistance	VDR	:	Vendor Data Requirement
IEC	:	International Electro technical Commission	WPS	:	Welding Procedure Specification
JEC	:	Japanese Electro technical Committee	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing	XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S C Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Control valve.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welds, overlays as applicable	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like Forgings & casting for body/ bonnet, wetted parts like plug, Seat, cage, Stem. Accessories such as Positioners, I/P Converters, Solenoid valves, Limit Switches and Air filter Regulators etc.	Chemical & Mechanical Properties, HT Make, model no, functional check.	100%	Material Test Certificates / Test Lab Certificates	H	H	R
3.0	**In process Inspection**						
3.1	Stellited & Hardened Trim (As specified)	D P Test	100%	Supplier's Test Records		H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.2	NDT , Post Weld Heat Treatment (PWHT) (If specified)	• Radiography for weld joints • Dye Penetration test. • Post Weld Heat Treatment of welds,	100%	NDT reports / PWHT chart	-	H	R
4.1	Final Inspection on assembled Valve	• Visual / Dimensional check • Hydrostatic test. • Helium leak test (if specified). • Check for valve characteristics like stroke, Linearity & Hysteresis, etc. • Functional tests including : i) Seat leakage test, lift characteristics. ii) Test on smart positioners. iii) Control valve dynamic response and response time verification.(If specified) iv) Test on Accessories. • Interoperability test for Field bus positioners. • Pneumatic test on actuator on representative samples. • Type test for valves in cryogenic service.(if specified) • Partial stroke test / valve signature • capability of smart and field bus transmitters to accept multimeters and check for configuration, calibration, diagnostics through Hand Held terminal.	100%	Inspection Witness Record	-	H	RW

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.3	Submission of certificates/document	• Certificate from testing agency like BASEEFA, FM, PTB, CIMFR etc. for accessories like solenoid valves, I/P converters, Limit switches etc. for use in specified hazardous area. • BIS approval for explosion proof construction of above accessories manufactured indigenously. • Statutory approval certificates for instruments from CCOE/PESO for use in specified hazardous area. • Degree of protection certificate (IP) for instrument housing. • Fire Safe Certification as applicable.	Prototype for each model	Statutory Approval Certificates / Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Packing	• Cleaning for oxygen and chlorine services. • Suitable protection to prevent entry of foreign material. • Lubrication for valves, which require external lubrication.	100%	Test Records	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports, MTC • Issuance of Inspection Certificate	100%	/ Supplier Test Records / IC	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval, R- Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :-

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

प्रैशर रिलीफ वाल्वों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR PRESSURE RELIEF VALVES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	22.03.12	Revised and Re-issued	MJ	GS	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations

AS	:	Alloy Steel	MRT	:	Mechanical Run Test
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MPT/MT	:	Magnetic Particle Testing
			MTC	:	Material Test Certificates
BIS	:	Bureau of Indian Standards	MOC	:	Material of Construction
CCE or CCOE	:	Chief Controller of Explosives	NPSH	:	Net Positive Suction Head
CEIL	:	Certification Engineers International Limited	NDT	:	Non Destructive Testing
CIMFR	:	Central Institute of Mining & Fuel Research	NEMA	:	National Electrical Manufacturers Association
CE	:	Carbon Equivalent	PO	:	Purchase Order
DFT	:	Dry Film Thickness	PESO	:	Petroleum Explosive Safety Organization
DT	:	Destructive Testing	PQR	:	Procedure Qualification Record
DP or DPT	:	Dye Penetrate Testing	PR	:	Purchase Requisition
ERTL	:	Electronics Regional Test Laboratory	PMI	:	Positive Material Identification
FCRI	:	Fluid Control Research Institute	PTB	:	Physikalisch-Technische Bundesanstalt
FM	:	Factory Mutual	QC	:	Quality Control
FLP	:	Flame Proof	RT	:	Radiography Testing
HART	:	Highway Addressable Remote Transducer	SS	:	Stainless Steel
HV	:	High Voltage	TC	:	Test Certificate
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	UT	:	Ultrasonic Testing
IC	:	Inspection Certification	UL	:	Under writer Laboratories
IR	:	Insulation Resistance	VDR	:	Vendor Data Requirement
IEC	:	International Electro technical Commission	WPS	:	Welding Procedure Specification
JEC	:	Japanese Electro technical Committee	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing	XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S.C. GUPTA

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Pressure Relief Valves.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
2.0	**Material Inspection**						
2.1	Incoming Material like forgings and castings etc.	• Mechanical & Chemical properties.	100%	Material Test Certificates / Test Lab Certificates	H	H	R
3.0	**In process Inspection**						
3.1	Machining of components and their Assembly.	Visual, Dimensions.	100%	Supplier's Test Records	-	H	-
3.2	Hydrostatic test	Leakage test	100%	Supplier's Test Records	-	H	-
4.0	**Final Inspection**						
4.1	NDT , Post Weld Hea Treatment (PWHT) (If specified)	• Radiography for weld joints • Dye Penetration test. • Post Weld Heat Treatment of welds,	100%	NDT reports / PWHT chart	-	H	R
4.2	Final Inspection	• Visual check • Dimensional check	100%	Supplier's Test Records and	-	H	H

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Cold Bench Set Pressure • Seat Leakage Test • Valve Lift test • Reclosing pressure test • Helium Leak test (if specified) •		Inspection Witness Record			
4.3	Submission of certificates / Documents	• Capacity Test as per ASME • Blow Down	Prototype for each model / Manufacturer's TC	Type Test Certificates	-	H	R
5.0	**Painting**						
5.1	Painting	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness.	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports &MTC • Bought out items/accessories TC • IC issuance.	100%	Supplier's Test Records / Inspection Certificate	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), Random 10% , R-Review, RW-Random witness, W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

तापीय यन्त्रों एवं थर्मोवैल्स के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR TEMPERATURE GAUGES AND THERMO WELLS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Re-issued	GS	SA	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	09.12.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations:

AS	:	Alloy Steel	MPT/MT	:	Magnetic Particle Testing
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MRT	:	Mechanical Run Test
BIS	:	Bureau of Indian Standards	MTC	:	Material Test Certificate
CCE or CCOE	:	Chief Controller of Explosives	MOC	:	Material of Construction
CEIL	:	Certification Engineers International Limited	NPSH	:	Net Positive Suction Head
CIMFR	:	Central Institute of Mining & Fuel Research	NDT	:	Non Destructive Testing
CE	:	Carbon Equivalent	NEMA	:	National Electrical Manufacturers Association
DFT	:	Dry Film Thickness	PO	:	Purchase Order
DT	:	Destructive Testing	PESO	:	Petroleum Explosive Safety Organization
DPT	:	Dye Penetrate Testing	PQR	:	Procedure Qualification Record
ERTL	:	Electronics Regional Test Laboratory	PR	:	Purchase Requisition
FCRI	:	Fluid Control Research Institute	PMI	:	Positive Material Identification
FM	:	Factory Mutual	PVC	:	Poly Vinyl Chloride
FLP	:	Flame Proof	QC	:	Quality Control
HIC	:	Hydrogen Induced Cracking	RT	:	Radiography Testing
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
IP	:	Ingress Protection	TPI or TPIA	:	Third Party Inspection Agency
IC	:	Inspection Certification	UT	:	Ultrasonic Testing
IGC	:	Inter Granular Corrosion	UL	:	Under writer Laboratories
IEC	:	International Electro technical Commission	VDR	:	Vendor Data Requirement
JEC	:	Japanese Electro technical Committee	WPS	:	Welding Procedure Specification
LPT	:	Liquid Penetrate Testing	WPQ	:	Welders Performance Qualification
			XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S.C. GUPTA

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE:

This Inspection and Test Plan covers the minimum inspection and testing requirements for Temperature Gauges and Thermowells.

2.0 REFERENCE DOCUMENTS:

PO/PR & Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification	100%	WPS PQR WPQ	---	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Materials like Flanges, Thermowell Bar stock, Bimetal strip, Capillary, Pipe, etc.	Chemical & Mechanical Properties	100%	Material Test Certificates	H	H (Note 1)	R
3.0	**In process Inspection**						

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.1	Machining of components & Assembly.	Calibration, Overpressure, Hysteresis, Accuracy	100%	Test records	-	H	-
4.0	**Final Inspection**						
4.1	Final Inspection: Thermowells	• Radiography for weld joints • Dye Penetration test. • Post Weld Heat Treatment of welds	100%	NDT reports / PWHT chart	-	H	R
		• Visual • Dimensional check • Dye Penetration test of Weld joints	100%	Supplier's Test Records / Inspection Witness Record	---	H	R
		• Hydrostatic Testing a) Inside Pr. Testing at 100 / 200 Kg/cm2 b) Outside Pr. Testing as per Flange rating • Bore Concentricity Check	100%	Supplier's Test Records / Inspection Witness Record	---	H	R
4.2	Final Inspection Temperature Gauges	• Visual check • Dimensional check • Check for filling liquid (SAMA class) for filled type temperature gauges.	100%	Test Records	---	H	R
		• Calibration checks including accuracy, repeatability, over range, etc.	100%	Test Records	---	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
		• Type test certificate for Hermetic sealing • Case capillary compensation • Dry heat, Liquid immersion tests.	1 sample per model & range	Type Test Certificates	---	H	R
4.3	Assembly	• Confirmation of positive contact between Temperature Gauges and Thermowell Tip.	100%	Test Records	---	H	R
5.0	**Painting**						
5.1	Cleaning for special services, Painting	Special cleaning and packing for oxygen and chlorine services	100%	Test Records	---	H	---
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports • Review of Type test reports • Issuance of Inspection Certificate	100%	Type Test Reports / Supplier Test Records / IC	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval, Random -10, R-Review, RW-Random witness, W- Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

1. All NACE, Hydrogen service, AS, SS flanges to be inspected by TPIA appointed by the Main Supplier. CS flanges up to size 24" – 300 ANSI will be accepted on review of Supplier Test Certificates. Supplier test certificate to be reviewed by TPIA.
2. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
3. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

रिसीवर एवं प्रैशर मानकों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR RECEIVER & PRESSURE GAUGES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	09.01.14	Revised and Re-issud	MJ	RS	SCG	SC
2	15.07.11	Revised and Re issued	GS	SA	AKC	DM
1	02.01.08	Revised and Re-issued	SA	CRM	MVKK	VC
0	30.04.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations

CCE or CCOE	:	Chief Controller of Explosives	MPT	:	Magnetic Particle Testing
CEIL	:	Certification Engineers International Limited	MRT	:	Mechanical Run Test
CIMFR	:	Central Institute of Mining & Fuel Research	NPSH	:	Net Positive Suction Head
DFT	:	Dry Film Thickness	NDT	:	Non Destructive Testing
DT	:	Destructive Testing	PO	:	Purchase Order
ERTL	:	Electronics Regional Test Laboratory	PESO	:	Petroleum Explosive Safety Organization
FCRI	:	Fluid Control Research Institute	PQR	:	Procedure Qualification Record
FR	:	Fire Retardant	PR	:	Purchase Requisition
FAT	:	Factory Acceptance Test	PMI	:	Positive Material Identification
HMI	:	Human Machine Interface	RT	:	Radiography Testing
HT	:	Heat Treatment	TC	:	Test Certificate
HIC	:	Hydrogen Induced Cracking	TPI or TPIA	:	Third Party Inspection Agency
ITP	:	Inspection and Test Plan	VDR	:	Vendor Data Requirements
IP	:	Ingress Protection	WPS	:	Welding Procedure Specification
IC	:	Inspection Certificate	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing			

Inspection Standards Committee

Convenor : Mr. S.C. GUPTA

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements for Industrial Type Pressure Receiver Gauges.

2.0 REFERENCE DOCUMENTS:

PO/PR & Standards referred there in /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**						
2.0	**Material Inspection**						
2.1	Incoming Material like Pressure Element, Cases, Glass, Flanges, gauge savers, snubber, syphon etc.	Chemical and Mechanical Properties	100%	Material Test Certificates / Test records	H	H	R
3.0	**In process Inspection**						
3.1	Assembly and calibration of pressure gauge	Calibration, Overpressure, Hysteresis, Accuracy	100%	Test records	--	H	-
4.0	**Final Inspection**						
4.1	Final Inspection	• Visual • Dimensional • Calibration • Over Pressure • Vacuum test (if applicable) • Hydro test on snubbers/gauges savers(as applicable)	100%	Test records	---	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Type tests on Assembled Pressure Gauges	Type tests: • Test for influence of Temperature • Shock test • Endurance test • Weather Proof Construction of housing	One sample per model & range	Type Test Certificates	---	H	R
5.0	**Painting**	---	---	---	---	---	---
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Reviews of Internal Test Reports • Degree of protection certificate for enclosure • IC issuance	-	Supplier Test Records / Type test certificate / IC	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), Random -10% , R-Review, RW-Random witness, W- Witness (Give due notice, work may proceed after scheduled date).

NOTES (As applicable):

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

अवरोधक ओरिफिस प्लेटों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR RESTRICTION ORIFICE PLATES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3.	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Reissued	GS	SA	AKC	DM
1	09.05.08	Revised and Reissued	RB	SKD	SKP	VC
0	25.11.02	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations

CCE or CCOE	:	Chief Controller of Explosives	MPT	:	Magnetic Particle Testing
CEIL	:	Certification Engineers International Limited	MRT	:	Mechanical Run Test
CIMFR	:	Central Institute of Mining & Fuel Research	NPSH	:	Net Positive Suction Head
DFT	:	Dry Film Thickness	NDT	:	Non Destructive Testing
DT	:	Destructive Testing	PO	:	Purchase Order
ERTL	:	Electronics Regional Test Laboratory	PESO	:	Petroleum Explosive Safety Organization
FCRI	:	Fluid Control Research Institute	PQR	:	Procedure Qualification Record
FR	:	Fire Retardant	PR	:	Purchase Requisition
FAT	:	Factory Acceptance Test	PMI	:	Positive Material Identification
HMI	:	Human Machine Interface	RT	:	Radiography Testing
HT	:	Heat Treatment	TC	:	Test Certificate
HIC	:	Hydrogen Induced Cracking	TPI or TPIA	:	Third Party Inspection Agency
ITP	:	Inspection and Test Plan	VDR	:	Vendor Data Requirements
IP	:	Ingress Protection	WPS	:	Welding Procedure Specification
IC	:	Inspection Certificate	WPQ	:	Welders Performance Qualification
LPT	:	Liquid Penetrate Testing			

Inspection Standards Committee

Convenor : Mr. S.C. GUPTA

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum inspection and testing requirements for Restriction Orifice Plates and Multistage Orifice Assemblies.

2.0 REFERENCE DOCUMENTS

PO/PR / Standards referred therein /Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welding involved in Multistage orifice Assemblies, Meter Runs	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material Plates, Pipes, flanges	Material Identification, Chemical and Mechanical Properties	100%	Material Test Certificates / Lab Test Certificates	H	H/R (Note 1)	R
3.0	**In process Inspection**						

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.1	Machining of Plates	Dimensions, Smoothness verification	100%	Test Records	-	H	-
4.0	**Final Inspection**						
4.1	NDT , Post Weld Heat Treatment (PWHT) (If specified)	• Radiography for weld joints • Dye Penetration test. • Post Weld Heat Treatment of welds,	100%	NDT reports / PWHT chart	-	H	R
4.2	Final Inspection	• Visual Checks • Dimensional checks • Orifice Smoothness verification • Correctness of Punching • Physical Dimensional Verification • Liquid Penetrant check for all welds (Multistage). • Hydro test of complete Multistage Restriction Orifice • Review of Radiographic films (for butt welds)	100%	Test Records	-	H	RW
5.0	**Painting**						
5.1	Cleaning for special services, Painting of Multistage assemblies	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness	100%	Test Records		H	---
6.0	**Documentation and IC**						

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.1	Documentation and IC	• Review of Internal Test Reports • IC issuance	100%	Supplier's Test Records / Inspection Certificate	-	H	H
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), Random -10%, R-Review,RW-Random witness, TC, W- Witness (Give due notice, work may proceed after scheduled date).

NOTES:

1. All NACE, Hydrogen service, AS, SS flanges to be inspected by TPIA appointed by the Main Supplier. CS flanges upto size 24" – 300 ANSI will be accepted on review of Supplier Test Certificates. Supplier test certificate to be reviewed by TPIA.
2. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
3. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

ओरिफिस प्लेटों और फलेन्जों के लिए निरीक्षण व परीक्षण योजना

INSPECTION AND TEST PLAN FOR ORIFICE PLATES AND FLANGES

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
3	09.01.14	Revised and Re-issued	MJ	RS	SCG	SC
2	15.07.11	Revised and Re-issued	GS	SA	AKC	DM
1	02.01.08	Revised and Re-issued	AKG	CRM	MVKK	VC
0	29.11.02	Issued for implementation	RB	AKC	AKB	GRR

Abbreviations:

AS	:	Alloy Steel	MPT/MT	:	Magnetic Particle Testing
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MRT	:	Mechanical Run Test
BIS	:	Bureau of Indian Standards	MTC	:	Material Test Certificate
CCE or CCOE	:	Chief Controller of Explosives	MOC	:	Material of Construction
CEIL	:	Certification Engineers International Limited	NPSH	:	Net Positive Suction Head
CIMFR	:	Central Institute of Mining & Fuel Research	NDT	:	Non Destructive Testing
CE	:	Carbon Equivalent	NEMA	:	National Electrical Manufacturers Association
DFT	:	Dry Film Thickness	PO	:	Purchase Order
DT	:	Destructive Testing	PESO	:	Petroleum Explosive Safety Organization
DPT	:	Dye Penetrate Testing	PQR	:	Procedure Qualification Record
ERTL	:	Electronics Regional Test Laboratory	PR	:	Purchase Requisition
FCRI	:	Fluid Control Research Institute	PMI	:	Positive Material Identification
FM	:	Factory Mutual	PVC	:	Poly Vinyl Chloride
FLP	:	Flame Proof	QC	:	Quality Control
HIC	:	Hydrogen Induced Cracking	RT	:	Radiography Testing
ITP	:	Inspection and Test Plan	TC	:	Test Certificate
IP	:	Ingress Protection	TPI or TPIA	:	Third Party Inspection Agency
IC	:	Inspection Certification	UT	:	Ultrasonic Testing
IGC	:	Inter Granular Corrosion	UL	:	Under writer Laboratories
IEC	:	International Electro technical Commission	VDR	:	Vendor Data Requirement
JEC	:	Japanese Electro technical Committee	WPS	:	Welding Procedure Specification
LPT	:	Liquid Penetrate Testing	WPQ	:	Welders Performance Qualification
			XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S.C. GUPTA

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Orifice plates & Flanges, Meter Run assemblies, Flow Straightner

2.0 REFERENCE DOCUMENTS:

PO/PR / Standards referred there in /Job specifications / Approved documents

3.0 INSPECTION AND TEST REQUIREMENTS:

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**						
1.1	WPS/PQR/WPQ	Welding procedure Qualification for welding involved in Multistage orifice Assemblies, Meter Runs	100%	WPS PQR WPQ	--	H	W (New) R (Existing)
2.0	**Material Inspection**						
2.1	Incoming Material like Flanges, Orifice Plate material, Studs / Nuts, Gaskets, Pipes (for Meter Run assemblies) etc.	Chemical , Mechanical Properties, Heat Treatment.	100%	Material Test Certificates / Lab test Certificates	H	H	R
2.2	Flanges	Chemical , Mechanical Properties, Heat Treatment	100%	Material Test Certificates / Lab test Certificates	H	H (Note 1)	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.2	Visual, Dimensions & Physical checks	• Visual • Physical Dimensional Verification • Orifice Smoothness Verification • Meter run / Flow straightners upstream and downstream pipe smoothness verification • Liquid Penetrant check for all welds • Hydrotest for meter run assemblies and flow straightners • Final Assembly, fitment check	100%	Inspection Witness Record	---	H	RW
4.3	Calibration	Wet Calibration of Meter Run Assembly, if specified	100%	Calibration Report from Flow Lab	-	H	R
5.0	**Painting**						
5.1	Cleaning for special services, Painting of CS flanges, Meter runs	• Special cleaning and packing for oxygen and chlorine services • Pre treatment, primer and final paint, shade, thickness	100%	Test Records		H	---
6.0	**Documentation and IC**						
6.1	Documentation and IC	• Review of Internal Test Reports • IC issuance	100%	Supplier's Test Records / Inspection Certificate	-	-	H

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
3.0	**Inprocess Inspection**						
3.1	Machining of Flanges, Plates and Pipes	Dimensions, Smoothness verification	100%	Test Records	-	H	-
4.0	**Final Inspection**						
4.1	NDT , Post Weld Hea Treatment (PWHT) (If specified)	• Radiography for weld joints • Dye Penetration test. • Post Weld Heat Treatment of welds,	100%	NDT reports / PWHT chart	-	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.2	Final Document submission	Compilation of Inspection reports ,drawings, etc as per VDR / PR	100%	Final data folder /Completeness certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), R-Review, RW-Random witness (As specified or 10 % - Samples must include min 1 No of each type), W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :

1. All NACE, Hydrogen service, AS, SS flanges to be inspected by TPIA appointed by the Main Supplier. CS flanges upto size 24" – 300 ANSI will be accepted on review of Supplier Test Certificates. Supplier test certificate to be reviewed by TPIA.
2. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
3. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents

अग्निरोधक नियंत्रण स्टेशनों के लिए निरीक्षण एवं परीक्षण योजना

INSPECTION AND TEST PLAN FOR FLAMEPROOF CONTROL STATIONS

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
2.	21.11.2013	Revised and Reissued	MJ	RS	SCG	SC
2	29.06.2012	Revised and Reissued	AB	HVJ	AKC	DM
1	28.09.2007	Revised and Re-issued	AKG	PPM	MVKK	VC
0	30.04.2002	Issued for implementation	RG	AKC	AKB	GRR

Abbreviations

AS	:	Alloy Steel	MPT/MT	:	Magnetic Particle Testing
BASEEFA	:	British Approval Service for Electrical Equipment in Flammable Atmospheres	MRT	:	Mechanical Run Test
BIS	:	Bureau of Indian Standard	MTC	:	Material Test Certificate
CCE or CCOE	:	Chief Controller of Explosives	MOC	:	Material of Construction
CEIL	:	Certification Engineers International Limited	NPSH	:	Net Positive Suction Head
CIMFR	:	Central Institute of Mining & Fuel Research	NDT	:	Non Destructive Testing
CE	:	Carbon Equivalent	NEMA	:	National Electrical Manufacturers Association
DFT	:	Dry Film Thickness	PO	:	Purchase Order
DT	:	Destructive Testing	PESO	:	Petroleum Explosive Safety Organization
DPT	:	Dye Penetrate Testing	PQR	:	Procedure Qualification Record
ERTL	:	Electronics Regional Test Laboratory	PR	:	Purchase Requisition
FCRI	:	Fluid Control Research Institute	PMI	:	Positive Material Identification
FM	:	Factory Mutual	PVC	:	Poly Vinyl Chloride
FLP	:	Flame Proof	QC	:	Quality Control
HT	:	Heat Treatment	RT	:	Radiography Testing
HIC	:	Hydrogen Induced Cracking	TC	:	Test Certificate
ITP	:	Inspection and Test Plan	TPI or TPIA	:	Third Party Inspection Agency
IP	:	Ingress Protection	UT	:	Ultrasonic Testing
IC	:	Inspection Certification	UL	:	Under writer Laboratories
IGC	:	Inter Granular Corrosion	VDR	:	Vendor Data Requirement
IEC	:	International Electro technical Commission	WPS	:	Welding Procedure Specification
JEC	:	Japanese Electro technical Committee	WPQ	:	Welders Performance Qualification
			XLPE	:	Cross Linked Poly Ethylene

Inspection Standards Committee

Convenor : Mr. S.C. Gupta

Members:

Mr. R.K. Singh	Mr. Rajeev Kumar	Mr. Himangshu Pal
Mr.Neeraj Mathur	Mr. T Kamalakannan	Mr. Deepak Gupta (Project)
Mr. Mayank Jain		

1.0 SCOPE

This Inspection and Test Plan covers the minimum testing requirements of Flameproof Control Stations.

2.0 REFERENCE DOCUMENTS

PO/PR/ Standards referred there in/Job specifications/Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
1.0	**Procedures**	--	--	--	--	--	--
2.0	**Material Inspection**						
2.1	Incoming material like castings, glass, meters, Fasteners etc	Visual, Dimensional, Operational checks, Review of Manufacturer's Certificates etc. as applicable	100%	TC's/ Inspection & Test records / Lab Test Records	H	H	R
3.0	**In process Inspection**						
3.1	Flameproof enclosure without components	Routine Pressure test	100% by Supplier	Supplier's Test Records	-	H	R

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
4.0	**Final Inspection**						
4.1	Flameproof Control Station (Acceptance tests)	• Visual/Dimensional/BOM Checks • Plan Gap/Path/Clearances • Electrical/Functional Checks • High voltage test • IR test before and after High voltage	100% by Supplier 10% by EIL/TPIA	Test Records / Inspection Witness Record	-	H	H
4.2	Submission of Certificates & Documents	• Certificate of Statutory testing agency for suitability of area classification • Certificate of Statutory approval authority like CCoE/ PESO as applicable. • Valid BIS License as applicable • Degree of protection certificate as applicable	Samples	Certificates from test agencies	-	H	R
5.0	**Painting**						
5.1	Painting and Packing	• Visual • Suitable protection to prevent entry of foreign material. • Proper packing to prevent any damage during transportation and storage.	100%	Packing list / Supplier's Records	-	H	-
6.0	**Documentation and IC**						

SL NO.	STAGE/ ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB SUPPLIER	SUPPLIER	EIL/TPIA
6.1	Documentation and IC	• Review of Internal Test Reports & MTC • IC Issuance	100%	Supplier's Test Records / Inspection Certificate	-	H	H

Legends: H- Hold (Do not proceed without approval), Random 10% , R-Review, RW-Random witness, W- Witness (Give due notice, work may proceed after scheduled date).

NOTES :-

1. This document describes the generic test requirements. Any additional test or inspection scope if specified in contract documents shall also be applicable. (Unless otherwise agreed upon).
2. Acceptance Norms for all the activities shall be as per PO/PR/ Standards referred there in/ Job specifications /Approved documents