

**GOVERNMENT OF INDIA
DEPARTMENT OF SPACE
ISRO PROPULSION COMPLEX (IPRC)
MAHENDRAGIRI**

Tender for Supply of Manual and EP valves

Bids to be submitted online

Tender No.: IPRC/PURGP1/IP202100029001 dated 01-09-2021

A. Tender Details

Tender No :	IPRC/PURGP1/IP202100029001
Tender Date :	01-09-2021
Tender Classification:	GOODS
Purchase Entity :	PURGP1
Centre :	ISRO PROPULSION COMPLEX (IPRC)

Procurement of Supply of Manual and EP valves

This is a two-part bid. Price details shall NOT be mentioned in technical Bid/attachments, failing which the offer will be considered as invalid.

This is a TWO-PART tender i.e. Techno-Commercial Bid (Part-I) and Price Bid (Part-II) shall be submitted separately. All technical and commercial terms and conditions shall be furnished in the Techno Commercial Bid while price shall be indicated only in the Price Bid.

1.Foreign vendors are not permitted to quote.

2.Only Class-I and Class-II Local suppliers as per Make in India Policy are eligible to participate in the bid.

a. The percentage of local content should be specifically mentioned in the offer, without which it will be summarily rejected.

b. Preference will be given to Class-I Local Supplier and in their absence, Class-II Local Supplier will be considered.

3.Last minute clarification on tenders will not be entertained.

4.This is an E Tender. Hence Postal/Fax/Email tenders will not be accepted.

5.Acceptance of Guarantee / Warranty, PBG, SD, LD are mandatory. Quotations not accepting these conditions will not be considered.

A.1 Tender Schedule

Bid Submission Start Date : 01-09-2021 17:00

Bid Clarification Due Date : 13-09-2021 10:00

Bid Submission Due Date : 30-09-2021 10:00

Bid Opening Date : 30-09-2021 10:01

Price Bid Opening Date : 01-10-2021 10:01

B. Tender Attachments

Technical Write-up/Drawings

Document : Specifications-Manual valves

Document : specifications-EP Valves

Document : Terms & Conditions

Document : Pre-Qualification criteria

Instructions To Vendors

5. STANDARD TERMS AND CONDITIONS (DOS PM:19)

1. TERMS AND CONDITIONS OF TENDER:

Price quoted should be on the basis of FOR IPRC, Mahendragiri or delivery at site. The Purchaser will not pay separately for transit insurance, and the risk and cost during transit shall be exclusively the responsibility of the Contractor and the purchaser shall pay only for such stores as are actually received in good condition in accordance with the Contract.

2. Quotation should be valid for at least 60 days from the date of opening of the tender.

3. The time for and the date of delivery of the stores stipulated in the Purchase Order shall be deemed to be the essence of the Contract and delivery must be completed not later than the date specified therein, and failure to do so, without adequate justification, may involve cancellation of the Contract at the discretion of the Purchaser.

4.

a. Prices are required to be quoted according to the units indicated in the annexed tender form.

When quotations are given in terms of units other than those specified in the tender form, relationship between the two systems of unit must be furnished.

5. b. Corrections, if any, in the quotation must be attested. All amounts shall be indicated both in words as well as in figures. When there is difference between the amount quoted in words and figures, the amount quoted in words shall prevail.

6. The Purchaser reserves the right to accept or reject any quotation fully or partly without assigning any reason therefore.

7. Payment terms are full payment within 30 days from the date of receipt and acceptance of material ordered. Our Bankers are State Bank of India, Mahendragiri.

8. Late Tenders will not be considered

9. Where counter terms and conditions/printed or cyclostyled conditions of sale have been offered by the tenders, the same shall not be deemed to have been accepted by the Purchaser unless the Purchaser's specific written acceptance thereof is obtained

10. Specifications: Stores offered should strictly conform to Purchasers specifications. Deviations, if any, shall be clearly indicated by the tenderer in his quotation. The tenderer should also indicate the Make/Type number of the stores offered and provide catalogues, technical literature and samples, wherever necessary, along with the quotation. Test certificate, wherever necessary, should be forwarded along with supplies. Wherever options are called for in our specifications, the tenderer should address all such options, wherever specifically mentioned by us, and the tenderer could suggest changes to specifications with appropriate response for the same. Even in such case, the tenderer should state why he cannot meet our specifications and why he is suggesting the change.

11. Sales Tax and/or other duties/levies, where legally leviable and intended to be claimed, should be distinctly shown separately in the tender.

12. Guarantee: The stores offered should be guaranteed for a minimum period of twelve months against defective stores design, operation or manufacture. For defects noticed during the guarantee period, replacement/repair should be arranged free of cost within a reasonable period of such notification. In cases where our specifications call for a guarantee period more than 12 months specifically, then such a period shall apply

13. The Contractor shall at all times indemnify the Purchaser against all claims which may be in respect of the stores for infringement of any right protected by Patent, Registration or design or Trade Mark and shall take all risks of accidents or damage which may cause a failure of the supply

from whatever causes arising and the entire responsibility for the sufficiency of all means used by him for the fulfilment of the Contract

14. Arbitration in the event of any dispute or difference arising under these terms & conditions or any condition contained in the Purchase Order or in connection with this Contract. (except as to any matter the decision of which is specially provided for by these conditions), the same shall be referred to the sole arbitration of the Head of the Purchase Office or of some other person appointed by him, and the dispute further processed in terms of the Arbitration & Conciliation Act, 1996. There will be no objection that the arbitrator is a Government Servant that he had to deal with matter which the Contract relates to or that in the course of his duties as Government Servant has expressed views on all or any of the matters in dispute or difference. The award of the arbitrator shall be final and binding on the parties of this Contract.

15. If the arbitrator is the Head of the Purchase Office :

(i) In the event of his being transferred or vacating his office by resignation or otherwise, it shall be lawful for his successor in office either to proceed with the reference himself for to appoint another person as arbitrator, or In the event of his being unwilling or unable to act for any reason, it shall be lawful for the Head of the Purchase Office to appoint another person as arbitrator

16. If the arbitrator is a person appointed by the Head of the Purchase Office, In the event of his denying or neglecting or refusing to act, or resigning or being unable to act, for any reason, shall be lawful for the Head of the Purchase Office either to proceed with the reference himself or to appoint another person as arbitrator in place of the outgoing arbitrator subject, as aforesaid, to the Arbitration and Conciliation Act, 1996, and the rules thereunder and any statutory modifications thereof for the time being in force shall be deemed to apply to the arbitration proceeding under the clause. The Arbitrator shall have the power to extend with the consent of the Purchaser and the Contractor the time for making and publishing the award. The venue of arbitration shall be the place as the Purchaser in his absolute discretion may determine. Work under the Contract shall, if reasonably possible, continue during Arbitration Proceedings.

17. Successful tenderer will have to furnish in the form of a Bank Guarantee or in any other form as called for by the Purchaser towards adequate security for the materials/property provided by the purchaser for the due execution for the Contract.

18. Packing and Forwarding: The Contractor will be held responsible for the stores being sufficiently and properly packed for transport by rail, road, sea or air, to withstand transit hazards and ensure safe arrival at the destination. The packing and marking of packages shall be done by and at the expense to the Contractor.

6. Conditions for BIDDER FROM A COUNTRY WHICH SHARES LAND BORDER WITH INDIA

1. As per the Rule 144(xi) of General Financial Rule, 2017, any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the competent authority ie., Department for Promotion of Industry and Internal Trade (DPIIT).

2. Hence, Vendors or Agents of a Vendor (Indian or others) from a country sharing border with India shall submit copy of valid registration made with Department for Promotion of Industry and Internal Trade (DPIIT), Government of India along with the tender mandatorily, without which the offer will be treated as invalid.

3. Validity of Registration: Registration should be valid at the time of submission of bids and should be valid at the time of placement of order.

4. Any false declaration and non-compliance of the above would be a ground for immediate rejection of offer or termination of the contract and further legal action in accordance with the laws.

5. Model Certificate for Tenders

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that this bidder is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that this bidder fulfils all requirements in this regard and is eligible to be considered

7. GENERAL TERMS AND CONDITIONS

1. IPRC shall not be responsible for failure of vendors in submitting bids online caused due to technical reasons at vendor end such as network or power failures, computer failure, internet-browser, mistakes / errors in filling the bids on line by vendor etc.

2. The offer should be valid for a minimum period of 120 days from the date of opening of the bids (Technical bid in case of 2-part tender).

3. Offers sent through post, telegram, fax, e-mail, courier will not be considered. Partially completed / incomplete tenders shall not be considered.

4. The goods or material offered should be strictly as per our specifications. Change(s) in specifications, if any, should be clearly indicated by the supplier in his quotation. The supplier should also indicate make/type No. of the materials or equipment offered. Vague terms such as Best Indian, Best Indigenous and Imported make should not be used.

5. Only authorized dealers/agents or their accredited representatives for original manufacturers have to submit the quotation with documentary evidence.
6. Indian Agents while quoting on behalf of their principals shall attach necessary authorization letter from their Principals along with the bid.
7. In a tender, either the Indian Agent on behalf of the Principal/OEM or Principal/ OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender.
8. If an Indian agent submits bid on behalf of the Principal/OEM, the same Indian agent shall not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product
9. a) Facility of after sales service to be confirmed with details.
b) Permanent Account Number (PAN) allotted by Income-Tax authorities shall be furnished with documentary proof. Otherwise, documentary proof for having applied for PAN should be provided. Also PAN should be in the name of Company/Firm, if quoted by the Company/Firm and in the name of Individual, if quoted by individual.
c) GST No.
d) PAN No.
e) Local office in Tirunelveli / Nagercoil is preferable.
Note: (b) to (e) are applicable for Indian Companies only.
10. In case of imported items (stores), Ex-Works/FOB/FCA prices should be indicated. In case of indigenous stores the quotation should be on FOR-Destination / Door delivery basis.
11. ISRO PROPULSION COMPLEX (IPRC) is exempted from payment of Customs Duty under Notification No. 50/2017-Customs dated 30.06.2017 and as amended by Notification No.5/18 Customs dt:25/1/18. For imported items IPRC will provide Customs Duty Exemption Certificate for availing Concessional CD and IGST.
12. Guarantee / Warranty period as applicable shall be indicated, along with the quote. Guarantee/Warranty shall commence from the date of installation and acceptance of the complete equipment supplied under the contract/purchase order.
13. IPRC reserves the right to accept or reject any quotation in full or part thereof by recording the reasons.
14. In case the vendor falls in the category of Small Scale Industries(SSIs), who are registered with NSI, Public Sector Undertakings (PSUs) and Micro & Small Enterprises (MSMEs) the same shall be mentioned in their quote for evaluation.

15. PAYMENT: 100% through RTGS within 30 days from the date of receipt and acceptance of items at our site is the normal payment for Indigenous supply. In the case of direct Import, normal terms of payment are by Sight Draft / Wire Transfer after receipt of items. However, other terms of payment like establishment of Letter of Credit may be considered by the Purchaser on such terms and conditions as may be agreed upon.

16. SECURITY DEPOSIT : Security Deposit @ 3% of order value shall be submitted in the form of DD/FDR duly endorsed in favour of Accounts Officer, IPRC or by way of Bank Guarantee (in the prescribed format) within 20 days after receipt of order and valid up to the successful execution of the order.

17. PERFORMANCE BANK GUARANTEE :

The Supplier shall guarantee the successful and satisfactory performance/commissioning of equipment/machinery under the conditions specified in the Purchase Order. As a performance security, the SUPPLIER shall furnish a performance bank guarantee (format enclosed) from Nationalized Bank/Scheduled Bank for an amount equal to the sum of 3% of the order value ensuring the due performance of equipment/machinery in accordance with all the specifications and terms specified in the Purchase Order herein valid for the warranty period. On due performance, the performance bank guarantee shall be automatically cancelled and returned to the Supplier within 30 days after expiry of the Warranty period. The performance bank guarantee shall have claim period of six months.

18. LIQUIDATED DAMAGES: Delivery is the essence of the contract. Items shall be delivered within stipulated period. If delivery is delayed beyond the stipulated delivery period mentioned in the purchase order or any extension thereof, an amount equal to 0.5% per week shall be recovered, subject to a maximum of 10% of the order value shall be deducted from your bills due.

19. GST where legally leviable and intended to be claimed should be distinctly shown separately in the tender. As per Notification No.45/2017 Central Tax(Rate) or Notification No. 47/17 Integrated TAX(Rate) of 14/11/17, We are eligible for availing Concessional GST@5% against certificate issued by an officer not below the rank of Dy. Secretary to Govt. of India

20. The purchaser shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portions of the quantity offered and the tenderer shall supply the same at the rates quoted.

21. Wherever the tenderer is asked to submit sample for evaluation of tenders, the same shall be submitted along with your quote.

22. All amounts shall be indicated both in words as well as in figures. Where there is difference between amounts quoted in words and figures, amount quoted in words shall prevail.

23. Last minute request for the extension of the due date w.r.t. any technical issue at Vendors/Suppliers side will not be considered. You may submit your quotation online well in advance instead of waiting till the last date to ensure that Internet problem and network condition does not cause problem

C. Bid Templates

C.1 Technical Bid - Supply of Manual and EP valves

1. Manual Globe Valve(Gland sealed),Size:DN 15,Pr rating:44 MPa

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		
8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat:For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		

13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		
17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing. Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		

21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		
32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		

34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		
37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		

38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/ outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

2. Manual Globe Valve(Gland sealed),Size:DN15,Pr rating:1500#

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		

8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat: For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/ 36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		

17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		

32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		
34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		
38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/ outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

3. Manual Globe Valve(Bellow sealed),Size:DN 15,Pr rating:44 MPa,Service medium:GH2

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		

8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat: For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/ 36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		

17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		

32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		
34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		
38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

4. Manual Globe Valve(Gland sealed),Size:DN 25,Pr rating:44 MPa

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		

8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat: For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/ 36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		

17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		

32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		
34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		
38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

5. Manual Globe Valve(Gland sealed),Size:DN 15,Pr rating:900#

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		

8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat: For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/ 36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		

17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		

32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		
34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		
38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

6. Manual Globe Valve(Gland sealed),Size:DN 15,Pr rating:600#

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		

8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat: For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/ 36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		

17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		

32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		
34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		
38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/ outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

7. Manual Globe Valve(Gland sealed),Size:DN 100,Pr rating:600#

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		

8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat:For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/ 36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		

17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		

32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		
34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		
38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/ outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

8. Manual Globe Valve(Bellow sealed),Size:DN 100,Pr rating:600#

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		

8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat: For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/ 36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		

17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		

32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		
34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		
38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/ outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

9. Manual Globe Valve(Bellow sealed),Size:DN 15,Pr rating:44 MPa,Service medium:GHe

Item specifications for Manual Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Quantity	As given in Table 1A	Yes / No / Explain		
2	Tag number	As given in Table 1A	Yes / No / Explain		
3	Pattern	Globe	Yes / No / Explain		
4	Actuation	Hand-operated by wheel (manual)	Yes / No / Explain		
5	Fluid medium	As given in Table 1A	Yes / No / Explain		
6	Working temperature range	273 - 350 K	Yes / No / Explain		
7	Nominal size	As given in Table 1A	Yes / No / Explain		

8	Pressure rating class	As given in Table 1A	Yes / No / Explain		
9	Permissible leakage rate across body: For BSG & GSG valves	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
10	Permissible leakage rate across seat: For bellow sealed valves	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
11	Permissible leakage rate across seat: For Gland sealed valves	Bubble-tight	Yes / No / Explain		
12	Guaranteed cycles of operation	3,000	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B16.9/16.25 with pipe stubs as per ASME B 36.19/ 36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe size and schedule number as given in Table 1A	Yes / No / Explain		
14	Body (Style of construction)	With full port (standard bore)	Yes / No / Explain		
15	Bonnet (Style of construction)	Bolted or screwed to body with suitable seals (bonnet shall be top of stem extension). Collar shall be welded on top of the stem extension (bellow bonnet flange)	Yes / No / Explain		
16	Stem(Style of construction)	Non rotating rising stem. The stem operation for high pressure valves may be assisted by requisite bearing for easy operation of valve stem with/without load.	Yes / No / Explain		

17	For bellow sealed valves(Style of construction)	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	For Gland sealed valves(Style of construction)	With gland packing.	Yes / No / Explain		
19	Plug(Style of construction)	Renewable (replaceable) from stem with insert.	Yes / No / Explain		
20	Seat(Style of construction)	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
21	Flow direction(Style of construction)	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Body and bonnet(Material of construction)	ASTM A 182 F 304L/ 316L/ 321 for nominal size DN40 & ASTM A351 CF3/3M for nominal size DN50	Yes / No / Explain		
23	Stem, plug, seat, seat insert(Material of construction)	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
24	Bellows(Material of construction)	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
25	Gland packing(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
26	Plug insert/ trim(Material of construction)	PTFE/ Glass-filled PTFE/ PEEK	Yes / No / Explain		
27	Pipe stub (Material of construction)	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts(Material of construction)	ASTM A 193 Gr. B.8	Yes / No / Explain		
29	Nuts (Material of construction)	ASTM A 194 Gr.8	Yes / No / Explain		
30	Design code	BS 5352/ BS 1873/ API 6-D/ ASME B16.34	Yes / No / Explain		
31	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34	Yes / No / Explain		

32	Test (Material certificates)	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided.	Yes / No / Explain		
33	Test(Dimensional inspection)	All valves have to be subjected to dimensional inspection as per the approved drawings	Yes / No / Explain		
34	Test(Welding joint test wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
35	Test(Bellows cyclic test)	Three sample bellows drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Pre-assembly Hydraulic shell pressure test	The valve shell, prior to assembly in fully open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.5 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

37	Final Hydraulic Shell pressure test	The valve, upon final assembly in partially open position, shall be subjected to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class.	Yes / No / Explain		
38	Hydraulic seat pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	MSLD Shell leakage test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/ outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

40	MSLD Seat leakage test(For Hydrogen & Helium service)	The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
41	Pneumatic seat pressure test (for Nitrogen service):	The leakage rate across seat shall be tested with dry air or gaseous Nitrogen at 0.7 MPa (g) by water displacement (bubble) method.	Yes / No / Explain		
42	Leak test for reverse flow shut off (For BSG & GSG valves)	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
43	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
44	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs	Yes / No / Explain		

45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation.	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves	Yes / No / Explain		
47	Quality Assurance Plan	As given in Table 1B.	Yes / No / Explain		

10. Pneumatically Actuated Bellows Globe Valve, Size: DN 15, Pr rating: 44 MPa

Item specifications for Pneumatically Actuated Bellows Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Valve(Type)	Pneumatically-actuated valve bellow sealed globe valve	Yes / No / Explain		
2	Quantity	As given in Table-2A	Yes / No / Explain		
3	Tag number	As given in Table-2A	Yes / No / Explain		
4	Pattern	Globe	Yes / No / Explain		
5	Application	on-off	Yes / No / Explain		
6	Actuation	By pneumatic actuator	Yes / No / Explain		

7	Fluid medium	Gaseous Hydrogen	Yes / No / Explain		
8	Working temperature range	273 – 350 K	Yes / No / Explain		
9	Nominal size	15 NB	Yes / No / Explain		
10	Pressure rating class	As given in Table-2A	Yes / No / Explain		
11	Permissible leakage rate across body	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
12	Permissible leakage rate across seat:	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		
13	End connection	BW : Butt welding ends as per ASME B 16.9/16.25 with pipe stubs as per ASME B 36.19/36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe of schedule number as given in Table 2A.	Yes / No / Explain		
14	Body	With full port (standard bore)	Yes / No / Explain		
15	Bonnet	Bolted or screwed to body with suitable seals(bonnet shall be top of stem extension)Collar shall be welded on top of the stem extension (bellow bonnet flange) for ESG valves to facilitate welding of vacuum jacket by Purchaser.	Yes / No / Explain		
16	Stem	Non-rotating, rising stem	Yes / No / Explain		

17	Stem (dynamic) seal	By bellows with redundant gland packing. Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	Plug	Renewable (replaceable) from stem with insert	Yes / No / Explain		
19	Seat	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
20	Shut off mode	Bi-directional shut off	Yes / No / Explain		
21	Flow direction	Flow-to-open (Flow-under-plug)	Yes / No / Explain		
22	Material of construction:		-		
23	Body and bonnet	ASTM A 182 F 304L/ 316L/ 321	Yes / No / Explain		
24	Stem, plug, seat, seat insert	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
25	Bellows	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
26	Plug insert/ trim	PCTFE/polycarbonate	Yes / No / Explain		
27	Pipe stub	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts	ASTM A 320 Gr.B8	Yes / No / Explain		
29	Nuts	ASTM A 194 Gr.8	Yes / No / Explain		
30	The valves shall be either inherently anti-static or provided with anti-static features.		-		
31	Design code	BS 5352/ BS 1873/API 6-D/ BS 6364/ ASME B16.34	Yes / No / Explain		
32	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34/ BS 6364	Yes / No / Explain		

33	Material certificates	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided	Yes / No / Explain		
34	Dimensional inspection	All valves have to be subjected to dimensional inspection as per the approved drawings.	Yes / No / Explain		
35	Bellows cyclic life test	one sample bellow drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Welding joint test (wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
37	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs.	Yes / No / Explain		

38	Pre-assembly hydraulic shell pressure test	The valve shell, prior to assembly in partially open position, shall be subject to pressure test with water (with suitable corrosion inhibitor) at 1.5 times the nominal maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	Final hydraulic shell pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		
40	Hydraulic seat pressure test	The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		

41	MSLD shell leakage test	<p>18.2 The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.</p>	Yes / No / Explain		
42	MSLD seat leakage test	<p>18.2 The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.</p>	Yes / No / Explain		

43	Leak test for reverse flow shut off	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
44	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation	Yes / No / Explain		
46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves and its response time.	Yes / No / Explain		
47	Actuator(Type)	Linear actuator, piston/ diaphragm type, single acting, spring return, fail-safe	Yes / No / Explain		
48	Actuator(Normal position)	Normally closed	Yes / No / Explain		
49	Actuator(Command gas)	Gaseous Nitrogen at 0.55± 0.01 MPa(g)	Yes / No / Explain		
50	Actuator(Failure position)	Close	Yes / No / Explain		

51	Actuator(Response time for both opening and closing strokes)	<2s,If required, flow (volume) booster and quick exhaust valve shall be incorporated to achieve the specified response time.If the given response time is not able to meet, the actuator shall be designed for considering the command pressure of 5.0 MPa (g).	Yes / No / Explain		
52	Actuator(End connection for command gas)	DN 8 (¼”) NPT (F) to ASME B 1.10.1.	Yes / No / Explain		
53	Actuator(Material)	Carbon steel (enamel-painted)	Yes / No / Explain		
54	Actuator(Test alongwith valve assembly)	The response time taken for opening and closing of the valve shall be evaluated	Yes / No / Explain		
55	Status switches	The valve shall be provided with a pair of non-contact type proximity status switches to indicate the “opened/ closed” status of the valve. The status switches shall be mounted on the valve with such proper arrangement that does not require any adjustment/ alignment for the specified cycles of operation of the valve.	Yes / No / Explain		
56	Status switch(Type)	Cylindrical Inductive Type Proximity Sensor (switch) in accordance with NAMUR	Yes / No / Explain		
57	Sensing Distance	1.5, 2, 4, 5 mm (The sensing distance shall be suitably selected by the valve manufacturer according to the valve stroke length)	Yes / No / Explain		
58	Electrical configuration	DC, 2 wire	Yes / No / Explain		
59	Nominal voltage	8 V	Yes / No / Explain		

60	Operating voltage	5 – 24V	Yes / No / Explain		
61	Switching frequency	> 500 Hz	Yes / No / Explain		
62	Reverse polarity	Shall be Protected against reverse polarity	Yes / No / Explain		
63	Short circuit protection	Shall be Protected for short circuit	Yes / No / Explain		
64	Indication of switching state	`LED	Yes / No / Explain		
65	Connection Type	2 m long PVC cable	Yes / No / Explain		
66	Ambient Temperature	-240 C to 800 C	Yes / No / Explain		
67	Housing material	Stainless steel	Yes / No / Explain		
68	Protection Degree	IP 67	Yes / No / Explain		
69	Current consumption	Sensing : 1mA & Non sensing : 3mA	Yes / No / Explain		
70	Hazardous area certification	The switches shall be intrinsically safe for Hydrogen environment in conformance with Ex ia IIC T6, Zone 1 of IEC/ ATEX. The certificate of conformance to this effect from the accredited agency shall be provided.	Yes / No / Explain		
71	Make and model	To be specified by the bidder in the quotation	Yes / No / Explain		
72	Suggested make	a. IFM electronic, b. Omron, USA c. Pepperl + Fuchs, Germany d. Rockwell Automation – USA e. LongVale ltd – UK f. Cario Gavazzi g. Euroswitch – UK	Yes / No / Explain		

73	Command solenoid valve	Solenoid valve for the command purpose is not under the scope of the supplier. Hence the solenoid valve need not be supplied along with the Pneumatic valve. It will be provided by IPRC.	Yes / No / Explain		
74	Quality assurance plan	As given in Table - 2B.	Yes / No / Explain		

11. Pneumatically Actuated Bellows Globe Valve,Size:DN 15,Pr rating:2500#

Item specifications for Pneumatically Actuated Bellows Globe Valve

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Valve(Type)	Pneumatically-actuated valve bellow sealed globe valve	Yes / No / Explain		
2	Quantity	As given in Table-2A	Yes / No / Explain		
3	Tag number	As given in Table-2A	Yes / No / Explain		
4	Pattern	Globe	Yes / No / Explain		
5	Application	on-off	Yes / No / Explain		
6	Actuation	By pneumatic actuator	Yes / No / Explain		
7	Fluid medium	Gaseous Hydrogen	Yes / No / Explain		
8	Working temperature range	273 – 350 K	Yes / No / Explain		
9	Nominal size	15 NB	Yes / No / Explain		
10	Pressure rating class	As given in Table-2A	Yes / No / Explain		
11	Permissible leakage rate across body	1 X 10 ⁻⁶ mbar-lit/sec of GHe	Yes / No / Explain		
12	Permissible leakage rate across seat:	1 X 10 ⁻⁵ mbar-lit/sec of GHe	Yes / No / Explain		

13	End connection	BW : Butt welding ends as per ASME B 16.9/16.25 with pipe stubs as per ASME B 36.19/36.10 of 100 mm length each shall be butt-welded to the body on either side, the ends of which shall be prepared for butt welding. The butt welding ends shall be suitable to mate with the interfacing pipe of schedule number as given in Table 2A.	Yes / No / Explain		
14	Body	With full port (standard bore)	Yes / No / Explain		
15	Bonnet	Bolted or screwed to body with suitable seals(bonnet shall be top of stem extension)Collar shall be welded on top of the stem extension (bellow bonnet flange) for ESG valves to facilitate welding of vacuum jacket by Purchaser.	Yes / No / Explain		
16	Stem	Non-rotating, rising stem	Yes / No / Explain		
17	Stem (dynamic) seal	By bellows with redundant gland packing.Between bellows seal and the redundant gland packing, a tell-tale indicator pressure gauge port with suitable plug shall be provided.	Yes / No / Explain		
18	Plug	Renewable (replaceable) from stem with insert	Yes / No / Explain		
19	Seat	Seat shall be integral with body of material harder than the plug insert.	Yes / No / Explain		
20	Shut off mode	Bi-directional shut off	Yes / No / Explain		
21	Flow direction	Flow-to-open (Flow-under-plug)	Yes / No / Explain		

22	Material of construction:		-		
23	Body and bonnet	ASTM A 182 F 304L/ 316L/ 321	Yes / No / Explain		
24	Stem, plug, seat, seat insert	ASTM A 479 304L/ 316L/ 321	Yes / No / Explain		
25	Bellows	Stainless steel 316Ti/ 321/Hastealloy C276/Inconel 600/ 625	Yes / No / Explain		
26	Plug insert/ trim	PCTFE/polycarbonate	Yes / No / Explain		
27	Pipe stub	ASTM A 312 TP Grade same as that of the body	Yes / No / Explain		
28	Bolts	ASTM A 320 Gr.B8	Yes / No / Explain		
29	Nuts	ASTM A 194 Gr.8	Yes / No / Explain		
30	The valves shall be either inherently anti-static or provided with anti-static features.		-		
31	Design code	BS 5352/ BS 1873/API 6-D/ BS 6364/ ASME B16.34	Yes / No / Explain		
32	Test code	BS 6755 Part 1/ API 598/ ANSI B 16.34/ BS 6364	Yes / No / Explain		
33	Material certificates	The material certificates, detailing the physical and chemical properties, of the principal pressure-bearing parts shall be provided	Yes / No / Explain		
34	Dimensional inspection	All valves have to be subjected to dimensional inspection as per the approved drawings.	Yes / No / Explain		

35	Bellows cyclic life test	one sample bellow drawn from each batch of the same size and type shall be subject to (destructive) cyclic life (proto-type) test as per BS 5352 or equivalent. If the manufacturer of the bellows has already performed such test, copy of the certificate may be produced and this test need not be performed.	Yes / No / Explain		
36	Welding joint test (wherever applicable)	All butt welding joints in the valve (including the joints between the body and the pipe stubs) shall be subject to radio-graphic test with X-rays or gamma rays to 2-2T sensitivity as per Section IX, ASME. All the socket welding joints shall be subject to dye-penetrant test.	Yes / No / Explain		
37	Ultrasonic test	100% ultrasonic test shall be conducted for the pipe stubs.	Yes / No / Explain		
38	Pre-assembly hydraulic shell pressure test	The valve shell, prior to assembly in partially open position, shall be subject to pressure test with water (with suitable corrosion inhibitor) at 1.5 times the nominal maximum rated working pressure of the particular pressure rating class of the valve.	Yes / No / Explain		
39	Final hydraulic shell pressure test	The valve, in closed position, shall be subject to pressure test with Water (with suitable corrosion inhibitor) at 1.1 times the maximum rated working pressure of the particular pressure rating class of the valve	Yes / No / Explain		

40	Hydraulic seat pressure test	<p>The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.</p>	Yes / No / Explain		
41	MSLD shell leakage test	<p>18.2 The global leakage rate across body shall be measured with gaseous Helium Mass Spectrometer Leakage Detector (MSLD) to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by shrouding the entire outside surface of the valve with a plastic bag to hold gaseous Helium at a positive pressure and by evacuating and connecting the inlet/outlet port to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.</p>	Yes / No / Explain		

42	MSLD seat leakage test	18.2 The global leakage rate across seat shall be measured with gaseous Helium MSLD to establish the permissible leakage rate values specified above by hood technique as per Article 10, Section V, ASME. The leakage test shall be performed by pressurizing the inlet with gaseous Helium and by evacuating and connecting the outlet to MSLD. Leakage test by detector probe or tracer probe technique is not acceptable.	Yes / No / Explain		
43	Leak test for reverse flow shut off	Each valve has to be subjected to reverse flow shut off test by pressurizing the downstream side to the pressure at 0.7 MPa (g) and bubble tightness is to be ensured.	Yes / No / Explain		
44	Functional test	Each valve has to be subjected to functional test for verification of free operation of valves to the full stroke length	Yes / No / Explain		
45	Cleanliness	All the interior flow surfaces of the valve shall be degreased and cleaned to Oxygen service standards as per CGA G-4.1 or ASTM G 93. The valves shall be dispatched with end connection sealed by suitable plastic plugs to avoid contamination during transportation	Yes / No / Explain		

46	Marking	All the valves are assigned tag numbers for the sake of identification. The tag number for each valve, as indicated above, besides size, pressure rating class, material of construction, etc, shall be legibly and indelibly engraved on the body of the valves and its response time.	Yes / No / Explain		
47	Actuator(Type)	Linear actuator, piston/ diaphragm type, single acting, spring return, fail-safe	Yes / No / Explain		
48	Actuator(Normal position)	Normally closed	Yes / No / Explain		
49	Actuator(Command gas)	Gaseous Nitrogen at 0.55± 0.01 MPa(g)	Yes / No / Explain		
50	Actuator(Failure position)	Close	Yes / No / Explain		
51	Actuator(Response time for both opening and closing strokes)	<2s,If required, flow (volume) booster and quick exhaust valve shall be incorporated to achieve the specified response time.If the given response time is not able to meet, the actuator shall be designed for considering the command pressure of 5.0 MPa (g).	Yes / No / Explain		
52	Actuator(End connection for command gas)	DN 8 (¼") NPT (F) to ASME B 1.10.1.	Yes / No / Explain		
53	Actuator(Material)	Carbon steel (enamel-painted)	Yes / No / Explain		
54	Actuator(Test alongwith valve assembly)	The response time taken for opening and closing of the valve shall be evaluated	Yes / No / Explain		

55	Status switches	The valve shall be provided with a pair of non-contact type proximity status switches to indicate the "opened/ closed" status of the valve. The status switches shall be mounted on the valve with such proper arrangement that does not require any adjustment/ alignment for the specified cycles of operation of the valve.	Yes / No / Explain		
56	Status switch(Type)	Cylindrical Inductive Type Proximity Sensor (switch) in accordance with NAMUR	Yes / No / Explain		
57	Sensing Distance	1.5, 2, 4, 5 mm (The sensing distance shall be suitably selected by the valve manufacturer according to the valve stroke length)	Yes / No / Explain		
58	Electrical configuration	DC, 2 wire	Yes / No / Explain		
59	Nominal voltage	8 V	Yes / No / Explain		
60	Operating voltage	5 – 24V	Yes / No / Explain		
61	Switching frequency	> 500 Hz	Yes / No / Explain		
62	Reverse polarity	Shall be Protected against reverse polarity	Yes / No / Explain		
63	Short circuit protection	Shall be Protected for short circuit	Yes / No / Explain		
64	Indication of switching state	`LED	Yes / No / Explain		
65	Connection Type	2 m long PVC cable	Yes / No / Explain		
66	Ambient Temperature	-240 C to 800 C	Yes / No / Explain		
67	Housing material	Stainless steel	Yes / No / Explain		

68	Protection Degree	IP 67	Yes / No / Explain		
69	Current consumption	Sensing : 1mA & Non sensing : 3mA	Yes / No / Explain		
70	Hazardous area certification	The switches shall be intrinsically safe for Hydrogen environment in conformance with Ex ia IIC T6, Zone 1 of IEC/ ATEX. The certificate of conformance to this effect from the accredited agency shall be provided.	Yes / No / Explain		
71	Make and model	To be specified by the bidder in the quotation	Yes / No / Explain		
72	Suggested make	a. IFM electronic, b. Omron, USA c. Pepperl + Fuchs, Germany d. Rockwell Automation – USA e. LongVale ltd – UK f. Cario Gavazzi g. Euroswitch – UK	Yes / No / Explain		
73	Command solenoid valve	Solenoid valve for the command purpose is not under the scope of the supplier. Hence the solenoid valve need not be supplied along with the Pneumatic valve. It will be provided by IPRC.	Yes / No / Explain		
74	Quality assurance plan	As given in Table - 2B.	Yes / No / Explain		

12. SPARES(Manual Valve)

Item specifications for SPARES

SI No	Specification	Value	Compliance	Offered Specification	Remark
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1	Spares	Necessary spare parts for operation & maintenance of the valves given in Annexure-1 & 2 for a period of two years shall be specified by the bidder and shall be quoted separately for Manual & EP valves with break-up list of spares. The required spares will be selected from the list by the purchaser.	Yes / No / Explain		
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13. PNEUMATIC SPARES

Item specifications for PNEUMATIC SPARES

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Spares	Necessary spare parts for operation & maintenance of the valves given in Annexure-1 & 2 for a period of two years shall be specified by the bidder and shall be quoted separately for Manual & EP valves with break-up list of spares. The required spares will be selected from the list by the purchaser.	Yes / No / Explain		

Common Specifications (Applicable for all items)

SI No	Specification	Value	Compliance	Offered Specification	Remark
1	Delivery period	Due to schedule criticality, minimum delivery period shall be quoted for entire supply of this offer	Yes / No / Explain		
2	Design	The design and testing shall be done in accordance with codes specified in the technical specification	Yes / No / Explain		

3	Spares	Necessary spare parts for operation & maintenance of the valves given in Annexure-1 & 2 for a period of two years shall be specified by the bidder and shall be quoted separately for Manual & EP valves with break-up list of spares. The required spares will be selected from the list by the purchaser	Yes / No / Explain		
4	Guarantee	The valves shall be guaranteed for satisfactory performance over a period of 18 months from the date of dispatch from the Supplier's works or 12 months from the date of commissioning at the Purchaser's site, whichever happens to be earlier.	Yes / No / Explain		

5	Scope of inspection	<p>The test requirements given in Annexure -1 & 2 of the specification shall be conducted in the presence of reputed Third Party Inspection (TPI) agency. It is the responsibility of the supplier to arrange for Third Party Inspection. The choice of TPI agency should have the concurrence of Purchaser (IPRC). The TPI charges shall be quoted separately in the offer.</p> <p>Review of material test certificate for physical (mechanical) and chemical properties for the principal pressure bearing components of the valve and Ultrasonic test reports of pipe stubs.</p> <p>Review of bellows cyclic life test certificates.</p> <p>Review of Certificate of conformity of electrical and electronic components for explosion proof as per specification.</p> <p>Witness of soundness test, pre assembly shell pressure test, Final hydraulic shell pressure test, MSLD shell & seat leakage test, MSLD jacket leakage test, pneumatic seat pressure test, reverse flow shut off test and functional test.</p> <p>Review of DP test and radiography test reports.</p> <p>Witness of cleanliness condition.</p> <p>Visual and dimensional check report</p>	Yes / No / Explain		
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6	Documentation (alongwith quotation)	<p>The following documents shall be provided for our study & assessment.</p> <ul style="list-style-type: none"> • The complete detailed catalogue with full range of products • Overall dimension of the offered valve clearly indicating length of stem, actuator diameter, height, weight, end connection & orifice diameter etc., of valves • Deviations if any from the tender specifications shall be specified separately 	Yes / No / Explain		
7	Documentation (after placement of order)	<p>The following documents shall be provided</p> <p>An assembly drawing of the valves indicating overall dimensions & Cv.</p> <ul style="list-style-type: none"> • Cross sectional drawing of the valves indicating dimensional details and material of construction of each part. <p>The above documents (drawings) are subjected to correction by the purchaser with reference to ordered specification and only after getting approval of the same by the Purchaser, the supplier shall go ahead with the fabrication.</p>	Yes / No / Explain		

8	Documentation (after completion of inspection)	<p>The following documents (2 Copies) shall be sent to IPRC soon after the valves are fabricated, tested and inspected. Certificates of tests given in the specification, duly approved (stamped & signed) by the Bidder & TPIA. Certificate of cleanliness as per specification, duly approved (stamped & signed) by the Bidder & TPIA. Certificate of conformity of the electrical & electronic components for explosion proof as per specification, duly approved (stamped & signed) by the Bidder & TPIA. Valve functional and performance test certificate duly approved (stamped & signed) by Bidder & TPIA. Final Inspection and release note given by the Bidder & TPIA. Guarantee certificate. Instruction manual for operation, trouble shooting and maintenance of Valves.</p> <p>On receiving and scrutinizing these documents, IPRC shall issue a "DESPATCH CLEARANCE" note. Only upon receipt of despatch clearance, the supplier shall go-ahead with despatch of consignment.</p>	Yes / No / Explain		
9	Documentation (alongwith items)	<p>Test certificates / quality book - 1 copy Final as built drawings - 1 copy Operation & Maintenance manuals - 1 copy</p>	Yes / No / Explain		

10	Part order	The Bidder shall confirm their willingness to accept part order irrespective of price or quantity out of the quantity enquired.	Yes / No / Explain		
11	Charges towards testing & inspection etc.	The Bidder shall confirm that the charges (if quoted separately) towards testing, inspection, packing & forwarding, taxes or levies, documentation or any other head are quoted as percentage of the basic price in the Price bid.	Yes / No / Explain		

Supporting Documents required from Vendor

1. Annexure-1

2. Annexure-2

3. The Bidder must be manufacturer or authorized agent / stockist / distributor of the manufacturer. Manufacturer shall submit a self-declaration to that effect. Agent / stockist / distributor / shall submit Authorization letter from the manufacturer

5 additional documents can be uploaded by the vendor

C.2 Commercial Terms / Bid

Sl. No.	Description	Compliance	Vendor Terms
1	The Bidder shall confirm that there is no mention or indication of any element of price whatsoever, as sum or percentage, in the Techno-commercial bid. Such information is to be given in the Price bid only.	Yes / No / Explain	
2	VALIDITY OF OFFER (specify):	Yes / No / Explain	
3	DELIVERY PERIOD (specify):	Yes / No / Explain	
4	DELIVERY TERM : Normal delivery terms - FOR Destination (for Indigenous cases) & FOB/ FCA or Ex Works (Import cases). Specify your Offered delivery terms.	Yes / No / Explain	
5	PAYMENT TERM:: 100% within 30 days after receipt and acceptance of item for indigenous /Sight Draft for import cases (No advance payment is acceptable)	Yes / No / Explain	
6	SECURITY DEPOSIT :Security Deposit: Successful Tenderer shall submit Security Deposit equivalent to 3% of the order value valid for a period of 60 days beyond the date for completion of the Purchase Order. This security deposit is collected towards the performance of the Contract. The said Security Deposit shall be submitted either in the form of Bank Guarantee or Fixed Deposit receipts from Nationalised/Scheduled Banks. No exemption is applicable for MSE vendors from submission of Security Deposit.	Yes / No / Explain	
7	Confirm point No. 5 of Conditions for BIDDER FROM A COUNTRY WHICH SHARES LAND BORDER WITH INDIA	Yes / No / Explain	
8	LIQUIDATED DAMAGE : Item shall be delivered with in the stipulated period. If delivery is delayed beyond the stipulated delivery period mentioned in the order or any extension thereof an amount equal to 0.5% subject to maximum 10% of the order value shall be deducted from your bills. Please confirm.	Yes / No / Explain	

9	PRINCIPAL Name, address (specify):	Yes / No / Explain	
10	Details of Indian Agent with Name, Address, Contact No, E-mail id	Yes / No / Explain	
11	Currency quoted (specify)	Yes / No / Explain	
12	WARRANTY PERIOD: (specify)	Yes / No / Explain	
13	Taxes and other costs, if any IPRC is eligible for reduced rate of IGST as per Notification No. 47/2017 - Integrated Tax (Rate) dtd. 14/11/2017 & Notification NO. 45/2017- Central Tax (Rate) dt 14.11.2017. Rate of IGST applicable is 5%].	Yes / No / Explain	
14	PERFORMANCE BANK GUARANTEE :PBG @ 3% of the order value obtained from a scheduled bank in Rs.100/- non judicial stamp paper with validity 2 months beyond the warranty period shall be submitted. Please confirm .	Yes / No / Explain	

C.3 Price Bid

Sl. No.	Item	Quantity	Unit Price	Currency	Total Price	Third Party Inspection Charges (If any)	Testing Charges (If any)	Packing and forwarding	Freight Charges	Remark
1	Manual Globe Valve(G land sealed), Size:DN 15,Pr rating:4 4 MPa	8.00 Nos.		-						
2	Manual Globe Valve(G land sealed), Size:DN 15,Pr rating:1 500#	6.00 Nos.		-						

3	Manual Globe Valve(Bellow sealed), Size:DN 15,Pr rating:44 MPa,Service medium :GH2	5.00 Nos.								
4	Manual Globe Valve(Gland sealed), Size:DN 25,Pr rating:44 MPa	4.00 Nos.								
5	Manual Globe Valve(Gland sealed), Size:DN 15,Pr rating:900#	4.00 Nos.								
6	Manual Globe Valve(Gland sealed), Size:DN 15,Pr rating:600#	7.00 Nos.								
7	Manual Globe Valve(Gland sealed), Size:DN 100,Pr rating:600#	2.00 Nos.								
8	Manual Globe Valve(Bellow sealed), Size:DN 100,Pr rating:600#	2.00 Nos.								

9	Manual Globe Valve(Bellow sealed), Size:DN 15,Pr rating:44 MPa,Service medium :GHe	2.00 Nos.								
10	Pneumatically Actuated Bellows Globe Valve,Size:DN 15,Pr rating:44 MPa	3.00 Nos.								
11	Pneumatically Actuated Bellows Globe Valve,Size:DN 15,Pr rating:2500#	2.00 Nos.								
12	SPARE S(Manual Valve)	1.00 Lot								
13	PNEUMATIC SPARE S	1.00 Lot								