

SECTION - C

TECHNICAL SPECIFICATIONS OF STORES AND DRAWINGS.

Technical Specifications for Supply of Cryogenic Vacuum Jacketed Control Valves

Specifications of Cryogenic vacuum jacketed valves

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Introduction to SST-1 NBI:

Institute for Plasma Research (IPR) is involved in research and development activities related to the plasma science and fusion technology. The Steady State Superconducting Tokamak (SST-1) is an important project aimed at producing high temperature plasma. The Neutral Beam Injector (NBI) is a system required for the purpose of heating the plasma of SST-1 tokamak. NBI system generates a beam of energetic hydrogen atoms and then inserts them into the SST-1 plasma.

The NBI system comprises of a huge vacuum vessel (20 m³) with an Ion source and gate valve mounted on it. The vacuum vessel contains the following major 'internal components' such as the neutralizer, electromagnet, magnet liner, calorimeter, Ion dump and the cryo-condensation pumps. It also contains headers and distribution systems for liquid nitrogen, liquid helium and cooling water. The components outside the vacuum vessel are known as the 'external components'. They are the external vacuum pumping system, external cryogenic distribution system, external cooling water distribution system, HV deck, and the snubber deck.

Presently, the external cryogenic system of NBI is under up-gradation. As a part of this, cryogenic vacuum jacketed flow control and manual valves are required. The present document explains the technical requirements of these valves along with other terms and conditions.

Cryogenic valves: Scope of Supply

The vendor has to supply the valves as per the specifications given below. The vendor has to fill the columns on the right side and supply necessary information as a part of compliance during the quotation process.

Specifications:

Flow control and manual vacuum jacketed cryogenic valves for 80 K Liquid Nitrogen (LN2)/ GaseousN2 application:

Valve	Size	Quantity	Operating conditions (300 K to 80 K)	Fluid	Type	Flow characteristic	Heat leak (Max.)	Vendor specification* * <i>(Please quote for a standard valve fits into the flow range and please specify the Cv)</i>
FCV-3	DN25	1	Normally close Max flow – 110 g/s (100 g/s liquid + 10 g/s vapour) Min flow- 10 g/s (5 g/s liquid + 5 g/s vapour) Pressure inlet- 1.8 bar abs Pressure drop- 0.1 bar	Two phase	Control valve, Globe valve, straight pattern, with Vacuum Jacket	Equal percentage	5 W	
FCV-7	DN25	1	Normally open Max flow – 100 g/s vapour Min flow- 10 g/s vapour Pressure inlet- 1.8 bar abs Pressure drop- 0.4 bar	GN2	Control valve, Globe valve, straight pattern, with Vacuum Jacket	Equal percentage	5 W	
FCV-6	DN15	1	Normally close Max flow – 8 g/s vapour Min flow- 1 g/s vapour Pressure inlet- 1.5 bar abs Pressure drop- 0.2 bar	GN2	Control valve, Globe valve, straight pattern, with Vacuum Jacket	Equal percentage	5 W	
FCV-8	DN40 (1 1/2)	1	Normally open Max flow – 80 g/s vapour	GN2	Control valve, Globe valve,	Equal percentage	5 W	

	inch)		Min flow- 10 g/s vapour Pressure inlet- 1.3 bar abs Pressure drop- 0.1 bar		straight pattern, with Vacuum Jacket			
MV-1	DN25	1	Max flow – 110 g/s (100 g/s liquid + 10 g/s vapour) For Isolation purpose	LN2	Manual valve, Globe valve, straight pattern, with Vacuum Jacket	Equal percent-tage	5 W	

**** Please fill this column with valve size, valve Cv and other technical details. Please attach separate sheets wherever it is necessary.**

Note: g/s means gram/sec

General Specifications & terms and conditions:

IPR specification	Vendor specification/Confirmation	Vendor remarks, if any
<ul style="list-style-type: none"> Valve Body; SS 304 L or better grade 		
<ul style="list-style-type: none"> Valve sealing: Bellowed sealed type desirable (please mention in the quotation valve is bellow sealed or not. Vendor can quote for both options. Selection will be based on lowest priced valves) 		
<ul style="list-style-type: none"> Vendor shall give the details of positioner for control valves along with the quotation. 		
<ul style="list-style-type: none"> Vendor shall supply the valve with position or travel indicator scale. 		
<ul style="list-style-type: none"> Maximum operating pressure 2.5 bar abs Design pressure – 5 bar (please specify pressure rating of the valve along with the quotation) 		
<ul style="list-style-type: none"> Individual leakage across valve seats; (at design pressure and room temperature) 10^{-4} mbar l/s 		
<ul style="list-style-type: none"> Leakage from valves and Instrumentation to atmosphere better than 10^{-7} mbar l/s. 		
<ul style="list-style-type: none"> All Leak tightness details shall be given by contractor for approval 		
<ul style="list-style-type: none"> Valves fabrication and testing as per standard codes (please specify this with quotation) 		

<ul style="list-style-type: none">• Relevant drawings, Material and test certificates including valve calibration certificate shall be supplied before delivery for Institute for Plasma Research (IPR) for approval.		
Terms and conditions:		
<ul style="list-style-type: none">• Please give a separate price for tools and spares, if any, in the price-bid.		
<ul style="list-style-type: none">• Delivery: 18 weeks from the date of Purchase order		

Authorised Signatory

Official Seal

Date :-