# SECTION 'C' TECHNICAL SPECIFICATIONS OF STORES AND DRAWINGS

## **Institute for Plasma Research**

(An Aided Institute of Dept. of Atomic Energy)
Bhat, Gandhinagar

#### Eligibility Criteria (Annexure-A)

Design, fabrication, inspection, testing, supply and installation of DN 1000 and DN 600 knife Gate Valves including essential spares at FCIPT, Gandhinagar as per the detailed specifications mentioned in the tender documents.

Sr. No.	Criteria	Documents required to submit / upload
1	The bidder shall be the Original Equipment Manufacturer (OEM) of Valves.	Bidder should provide copy of valve manufacturer certificate/Self-declaration. (In case of self-declaration, bidder should fill the detail as asked in self-declaration format attached as Annexure-VI)
2	The bidder should have supplied gate valves of size above 500 mm clear bore on opening in last five years from date of publication of the tender.	Bidder should provide details of orders executed for similar size items in last five years from date of publication of tender. The detail of orders should include copies of P.O. with technical specification, name of client (with name, email-id & contact no. of concerned engineer/officer of the client for reference), and documentary proof of acceptance/installation/performance certificate from end user.

3	The bidder shall have:  a) In-house facilities for design, fabrication, inspection and testing of Gate Valve or  b) Outsourced vendors/subvendors for design, fabrication, inspection and testing of Gate Valve.	of in-house facilities available for design, fabrication, inspection and testing of Gate Valve or b) Copy of agreement with the vendors/sub-vendors or self-
	Note:	
a	The response to tender without submission of proof of above points will summarily be rejected without further communication	
b	The bidder shall not be under a declaration of ineligibility for corrupt or fraudulent practices or blacklisted with any of the Government agencies	
С	Original documents shall be produced for verifications, if required	

Design, fabrication, inspection, testing, supply and installation of DN 600 and DN 1000 knife Gate Valves including essential spares.

#### **Introduction:**

#### 1. DN 600 knife gate valve:

- These gate valves will be used to ingress waste packets inside the waste feeder line # 1 & line # 2 respectively from the conveyor system during each cycle.
- The inside diameter of cylindrical chamber (part of waste feeder lines) with which these gate valves are to be connected is 600 mm with 15 mm plate thickness. The structural material of waste feeder line is SA-516 Grade 70 material.
- These gate valves are to be maintained at temperature  $\leq 60^{\circ}$ C from application purpose. There are also a provision for nitrogen gas flow at 300 lpm inside the waste feeder lines.
- Biomedical waste packets of ~ 08 to 12 kg weight and approx. 0.1 m³ volume will be fed in every 03 minutes cycle during which gate valves are to be opened/closed.
- The location where DN 600 knife gate valves are to be connected is shown in Fig. 01(a).

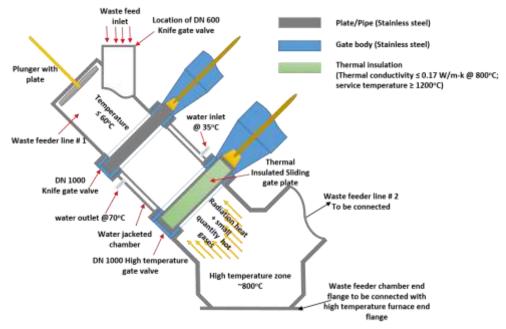


Fig. 01(a) Location of DN 600 and DN 1000 knife gate valves on waste feeder line # 1. Note: waste feeder line # 2 is not shown here which is at 90 degree from waste feeder line # 1.

#### 2. DN 1000 knife gate valve:

- These gate valves will be used to hold the waste packets ingress inside the waste feeder line # 1 & line # 2 respectively during opening of DN 600 knife gate valves. The waste packets shall be sucked/pushed inside the high temperature furnace as DN 1000 knife gate valves will be opened.
- The inside diameter of respective waste feeder line and water jacketed chamber between which these gate valves are to be connected is 1000 mm. The thickness of waste feeder line structural material is 15 mm. The structural material of waste feeder lines and water jacketed chamber is SA-516 Gr. 70.

- This gate valve has to be maintained at temperature ≤ 60°C from the application purpose with use of water jacketed chamber. There is a provision for nitrogen gas flow at 300 lpm inside each waste feeder line.
- Biomedical waste packets of ~ 08 to 12 kg weight and approx. 0.1 m<sup>3</sup> volume will be fed in every 03 minutes cycle during which gate valves are to be opened/closed.
- 1. The location where DN 1000 knife gate valves are to be connected is shown in Fig. 01(a). The approximate height at which these gate valves are to be assembled with water jacketed chamber is shown in Figure 1(b).

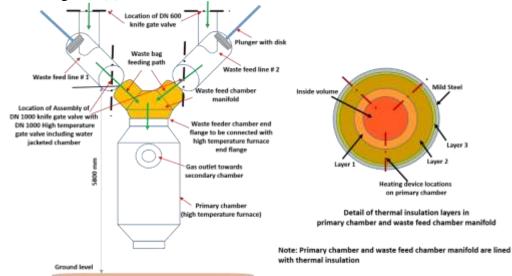


Figure 1(b): Schematic of Waste feeder lines and high temperature furnace (Primary chamber) assembly

I. Technical Specifications for DN 600 Knife gate valve

Sr.	Description	IPR Specifications	
no.			
01	Quantity	Gate valve DN 600 along with pair of blanked flanges - 02 sets.	
02	Valve design standard	MSS SP-81 [Valve shall be designed and fabricated for the desired frequency cycles (min. 15000 cycles)].  Note -To ensure the life of the moving components necessary low friction and high wear resistance material must be selected.	
03	Pressure	Atmospheric pressure (1.0 bar absolute)	
04	Temperature compatibility for the valve body, seals, sliding gate plate and mechanism	Up to 150°C.	
05	Valve clear bore on opening	$600 \pm 5 \text{ mm}.$	
06	Sliding Gate plate thickness	≤ 20 mm	
		Option-1: manufactured using fabrication/welding process: ASTM A516 Gr. 70 or equivalent. <b>or</b> Option-2: manufactured using casting process: ASTM A216 Gr. WCB or	
07	Valve body material	equivalent.	

		[Note: Chemical composition and Mechanical properties (Ultimate tensile		
and Yield strength) should be equal of		and Yield strength) should be equal or better than specified materials		
		under option-1 & option-2 respectively for equivalent material].		
		ASTM A240 Gr. 304H/304 or equivalent.		
08	Sliding gate plate	[Note: Chemical composition and Mechanical properties (Ultimate tensile		
Vo	material	and Yield strength) should be equal or better than specified materials for		
		equivalent material].		
09	Seal material	For Body and Gland packing -Metal/graphite/compliant and/or		
0,5	Seal Illatellal	For Gate seat - Metal/ceramic/compliant.		
		Outside diameter, Pitch Circle diameter, No. of holes and holes diameter,		
10	End Flange	etc. are in line with dimensions as given for NPS 600 mm in ASME		
10	Dimensions	B16.50 Cl 150 except thickness which would be selected as per gate valve		
		manufacturer's standard practice.		
11	Mounting	Gate valve should work in any mounting position from 0 to 90		
	Widness	degree.w.r.t. Horizontal Position.		
12	Allowable Leak Rate	$\leq$ 06 lpm at room temperature [After soaking for 02 hours at ~ 150°C		
		followed by cooling down from ~ 150°C to RT]		
	Shell leakage test and	Shell leakage test and Seat closure test shall be performed followed by		
13	seat closure test	procedure as described in MSS-SP 151 except leak rate which is as		
	standard	mentioned under point # 12 above.		
14	Gate valve fully	Maximum 25 seconds for fully opening from fully closed position		
	Opening time	(Noiseless, Smooth operation).		
15	Gate valve fully	Maximum 25 seconds for fully closing from fully opened position		
	Closing time	(Noiseless, Smooth operation).		
		Double Acting Hydraulic Actuator (Electro-Hydraulic actuation). In addition, manual rescue feature shall be incorporated which can bring		
16	Actuator	sliding gate plate to fully close position in case of failure of electro-		
		hydraulic actuation.		
		The mounting of Electrical sensor at the appropriate locations with an		
		indication of valve fully opened and fully closed position shall be		
	Valve position indicator	provided and these proximity sensors should be compatible for 24V		
17		supply. Also, provision for interlock signal (24V to be connected to		
		control panel) at fully opened and fully closed position to be provided by		
		vendor.		
10	TD / 1 0 1 / 1	Minimum 240 cycles/day operation of the gate valve (Typically 03 minute		
18	Total no. of cycle/day	per cycle).		
10	G 1 1 4	Seal replacement shall be carried out only after completion of typically		
19	Seal replacement	15000 cycles.		
20	Weight	$\leq 1800 \text{ kg}.$		
		Please quote separately for		
21 Essential Spares a) Seal set for gate valve (08 sets) and		a) Seal set for gate valve (08 sets) and		
		b) Hydraulic solenoid valves (02 sets).		
	Fabrication/	2D drawings and 3D CAD model of the valve including all relevant details		
22	22 Manufacturing shall be provided by manufacturer [Soft copy (1 no.) and har			
	Drawing	nos.)] within 30 days from the date of purchase order.		
		Following operational and functional tests are to be carried out by the		
		vendor in the presence of IPR representatives:-		

23	Acceptance test at Vendor Site (FAT)	<ul> <li>a) Shell leakage test at 0 or 90 degree and seat closure test at various mounting position (0, 45 and 90 degree) respectively at Room Temperature (RT) [After soaking for 02 hours at ~ 150°C followed by cooling down from ~ 150°C to RT] as per MSS-SP 151. Leakage rate not to exceed 6 lpm at Room Temperature. This test to be performed with blank flanges on both the ends.</li> <li>b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.</li> <li>c) Minimum 240 cycle's operation of gate valve to be demonstrated.</li> <li>d) Electrical sensors indication for valve opened and closed position shall be checked.</li> <li>e) Gate valve clear bore on opening and End Flange dimensions shall be verified from drawing provided by vendor in respect of this technical specification.</li> </ul>	
24	Acceptance test at FCIPT, Gandhinagar site (SAT)	Following operational and functional tests are to be carried out by the vendor in the presence of IPR representatives:-  a) Shell leakage test at 0 or 90 degree and seat closure test at various mounting position (0, 45 and 90 degree) respectively at Room Temperature (RT) [After soaking for 02 hours at ~ 150°C followed by cooling down from ~ 150°C to RT] as per MSS-SP 151. Leakage rate not to exceed 6 lpm at Room Temperature. This test to be performed with blank flanges on both the ends.  (Note: Heating element along with the power supply shall be provided by IPR for SAT. However, vendor shall submit the requirement).  b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.  c) Electrical sensors indication for valve opened and closed position shall be checked.  d) Gate valve clear bore on opening and End Flange dimensions shall be verified from drawing provided by vendor in respect of this technical	
25	Test certificate  Warranty	The following test certificates, where applicable, for the body, seal and sliding gate plate shall be submitted by vendor.  (1) Chemical Analysis of materials from NABL accredited lab.  (2) Mechanical properties of materials from NABL accredited lab.  (3) Certificate for life cycle of seal and moving components (Stem, gate, etc.) to be operated without failure up to 15000 cycles.  (4) Non-Destructive examination [LPT/MPD/UT/RT where applicable as per relevant ASME/ASTM standard].  (5) Shell leakage test as per MSS-SP 151 & in compliance of point # 12.  (6) Seat closure test as per MSS-SP 151 & in compliance with point # 12.  One year warranty from the date of acceptance against all sorts of manufacturing defects, faulty materials and poor workmanship for gate valve and actuator components.  The vendor shall confirm that they will provide the post-warranty support	
27	Post Warranty Support Packing	for additional five (05) years after expiry of the warranty period at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi City. However, the cost for such post warranty support is "Not To Be Included" in the quotation against the present tender.	
28	1 ucming	a) The valves shall be dried and cleaned thoroughly after testing.	

		b) The values shall be skinned in algorid and it on algorida for the model of	
		b) The valves shall be shipped in closed condition, glands fully packed	
		and all openings properly closed.	
		End flanges and/or welding ends shall be blanked over entire surface.	
		End protector to be attached to the valve end by suitable friction	
		lending devices.	
		d) All machined and threaded parts shall be suitably protected with	
		approved rust preventive.	
		e) The individual valve shall be wrapped in polythene & packed in	
		individual box with inner lining of bubbled packing.	
		f) The packed box/s shall be shipped in wooden crates.	
	Disassembly of gate		
	valves at FCIPT,		
	Gandhinagar site and	a) Vendor shall give assurance for the technical support during	
	packing, safe	disassembly of gate valves at FCIPT, Gandhinagar site as and when	
	transportation & re-	informed by IPR representative after successful demonstration of	
	installation of gate	waste disposal system.	
29		b) Vendor shall give assurance for the technical support during re-	
	valves at site	installation of gate valves at site recommended by Homi Bhabha	
	recommended by Homi	Cancer Hospital (HBCH) in Varanasi city.	
	Bhabha Cancer	c) However, the cost for above activities is "Not To Be Included" in the	
	Hospital (HBCH) in	quotation against the present tender.	
	Varanasi city.		

II. Technical Specifications for DN 1000 Knife gate valve

Sr. no.	Description	IPR Specifications	
01	Quantity	Gate valve DN 1000 along with pair of blanked flanges - 02 sets.	
02	Valve design standard	MSS SP-81 [Valve shall be designed and fabricated for the desired frequency cycles (min. 15000 cycles)].  Note -To ensure the life of the moving components necessary low friction and high wear resistance material must be selected.	
03	Pressure	At one side of gate valve pressure is ~20mm negative water column i.e. nearly atmospheric pressure (750 mmHg) while at another side it faces atmospheric pressure.	
04	Temperature compatibility for the valve body, seals, sliding gate plate and mechanism	Up to 200°C.	
05	Valve clear bore on opening	$1000 \pm 5 \text{ mm}.$	
06	Sliding Gate plate thickness	≤ 25 mm	
07	Valve body material	Option-1: manufactured using fabrication/welding process: ASTM A516 Gr. 70 or equivalent. <b>or</b> Option-2: manufactured using casting process: ASTM A216 Gr. WCB or equivalent.	

		[Note: Chemical composition and Mechanical properties (Ultimate tensile		
		and Yield strength) should be equal or better than specified materials		
		under option-1 & option-2 respectively for equivalent material].		
		ASTM A240 Gr. 304H/304 or equivalent.		
NO.	Sliding gate plate	[Note: Chemical composition and Mechanical properties (Ultimate tensile		
08	material	and Yield strength) should be equal or better than specified materials for		
		equivalent material].		
00	G 1 4 1 1	For Body and Gland packing -Metal/graphite/compliant and/or		
09	Seal material  For Gate seat - Metal/ceramic/compliant.			
		Outside diameter, Pitch Circle diameter, No. of holes, holes diameter, etc.		
10	End Flange	are in line with dimensions as given for NPS 1000 mm in ASME		
10	Dimensions	B16.47Cl 150 Series B (API 605) except thickness which would be		
		selected as per gate valve manufacturer's standard practice.		
11	Manutina	Gate valve should work in any mounting position from 45 to 90 degree		
11	Mounting	w.r.t horizontal position.		
12	Allowable Leak	≤ 06 lpm at room temperature. [After soaking for 02 hours at ~ 200°C		
12	Allowable Leak	followed by cooling down from ~ 200°C to RT]		
	Shell leakage test and	Shell leakage test and Seat closure test shall be performed followed by		
13	seat closure test	procedure as described in MSS-SP 151 except leak rate which is as		
	standard	mentioned under point # 12 above.		
14	Gate valve fully	Maximum 25 seconds for fully opening from fully closed position		
14	Opening time	(Noiseless, Smooth operation).		
15	Gate valve fully	Maximum 25 seconds fully closing from fully opened position (Noiseless,		
15	Closing time	Smooth operation).		
		Double Acting Hydraulic Actuator (Electro-Hydraulic actuation). In		
16	Actuator	addition, manual rescue feature shall be incorporated which can bring		
10		sliding gate plate to fully close position in case of failure of electro-		
		hydraulic actuation.		
		The mounting of Electrical sensor at the appropriate locations with an		
		indication of valve fully opened and fully closed position shall be		
17	Valve position	provided and these proximity sensors should be compatible for 24V		
17	indicator	supply. Also, provision for interlock signal (24V to be connected to		
		control panel) at fully opened and fully closed position to be provided by		
		vendor.		
18	Total no. of cycle/day	Minimum 240 cycles/day operation of the gate valve (Typically 03 minute		
	1 out not of egotoraa	per cycle).		
19	Seal replacement	Seal replacement shall be carried out only after completion of typically		
20	Waiah4	15000 cycles.		
20	Weight	≤ 2800 kg.		
21	Eggantial Craws	Please quote separately for		
21	<b>Essential Spares</b>	a) Seal set for gate valve (08 sets) and		
	b) Hydraulic solenoid valves (02 sets).			
22	Fabrication/	2D drawings and 3D CAD model of the valve including all relevant details		
22	Manufacturing	shall be provided by manufacturer [Soft copy (1 no.) and hard copy (2		
	Drawing Assert of	nos.)] within 30 days from the date of purchase order.		
23	Acceptance test at	Following operational and functional tests are to be carried out by the		
	Vendor Site (FAT)	vendor in the presence of IPR representatives:-		

		followed by cooling down from ~ 200°C to RT] as per MSS-SP 151. Leakage rate not to exceed 6 lpm at Room Temperature. This test to be performed with blank flanges on both the ends.  b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.  c) Minimum 240 cycle's operation of gate valve to be demonstrated.  d) Electrical sensors indication for valve opening and closing position shall be checked.  e) Gate valve clear bore on opening and End Flange dimensions shall be verified from drawing provided by vendor in respect of this technical specification.  Following operational and functional tests are to be carried out by the vendor in the presence of IPR representatives:-  a) Shell leakage test at 0 or 90 degree and seat closure test at various mounting position (45, 60 and 90 degree) respectively at Room mounting position (45, 60 and 90 degree) respectively at Room	
24	Acceptance test at FCIPT, Gandhinagar site (SAT)	mounting position (45, 60 and 90 degree) respectively at Room Temperature (RT) [After soaking for 02 hours at ~ 200°C followed by cooling down from ~ 200°C to RT] as per MSS-SP 151. Leakage rate not to exceed 6 lpm at Room Temperature. This test to be performed with blank flanges on both the ends.  (Note: Heating element along with the power supply shall be provided by IPR for SAT. However, vendor shall submit the requirement).  b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.  c) Electrical sensors indication for valve opening and closing position shall be checked.  d) Gate valve clear bore on opening and End Flange dimensions shall be verified from drawing provided by vendor in respect of this technical specification.	
25	Test certificate	<ol> <li>The following test certificate, where applicable, for the body, seal and sliding gate shall be submitted by vendor.</li> <li>Chemical Analysis of materials from NABL accredited lab.</li> <li>Mechanical properties materials from NABL accredited lab.</li> <li>Certificate for life cycle of seal and moving components (Stem, gate, etc.) to be operated without failure up to 15000 cycles.</li> <li>Non-Destructive examination [LPT/MPD/UT/RT where applicable as per relevant ASME/ASTM standard].</li> <li>Shell leakage test as per MSS-SP 151 &amp; in compliance with point # 12.</li> <li>Seat closure test as per MSS-SP 151 &amp; in compliance with point # 12.</li> </ol>	
26	Warranty	One year warranty from the date of acceptance against all sorts of manufacturing defects, faulty materials and poor workmanship for gate valve and actuator components.	
27	Post Warranty Support	The vendor shall confirm that they will provide the post-warranty support for additional five (05) years after expiry of the warranty period at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city. However, the cost for such post warranty support is "Not To Be Included" in the quotation against the present tender.	
28		a) The valves shall be dried and cleaned thoroughly after testing.	

	Packing b) The valves shall be shipped in closed condition, glands fully page	
		and all openings properly closed.
		c) End flanges and/or welding ends shall be blanked over entire surface.
		End protector to be attached to the valve end by suitable friction
		lending devices.
		d) All machined and threaded parts shall be suitably protected with
		approved rust preventive.
		e) The individual valve shall be wrapped in polythene & packed in
		individual box with inner lining of bubbled packing.
		f) The packed box/s shall be shipped in wooden crates.
	Disassembly of gate	
	valves at FCIPT,	
	Gandhinagar site and	a) Vendor shall give assurance for the technical support during
	packing, safe	disassembly of gate valves at FCIPT, Gandhinagar site as and when
	transportation & re-	informed by IPR representative after successful demonstration of
20	installation of gate	waste disposal system.
29	valves at site	b) Vendor shall give assurance for the technical support during re-
	recommended by	installation of gate valves at site recommended by Homi Bhabha
	Homi Bhabha Cancer	Cancer Hospital (HBCH) in Varanasi city. c) However, the cost for above activities is "Not To Be Included" in the
		quotation against the present tender.
	Hospital (HBCH) in	quotation against the present tender.
	Varanasi city.	

**Delivery period:** Within Eight (8) months from the date of approval of drawings by IPR.

## Vendor compliance sheet

Design, fabrication, inspection, testing, supply and installation of DN 600 and DN 1000 knife Gate Valves including essential spares.

#### I. Technical Specifications for DN 600 Knife gate valve

Note: Please provide confirmation or clarification against each point including any deviation as remark.

We understand that vendor has carefully read introduction part before filling compliance sheet.

Sr.	Description	IPR Specifications	Vendor response
no.		-	· · · · · · · · · · · · · · · · · · ·
01	Quantity	Gate valve DN 600 along with pair of blanked	
	· ·	flanges - 02 sets.	
		MSS SP-81 [Valve shall be designed and fabricated for the desired frequency cycles	
02	Valve design	(min. 15000 cycles)].	
UZ	standard	Note -To ensure the life of the moving	
		components necessary low friction and high	
02	n	wear resistance material must be selected.	
03	Pressure	Atmospheric pressure (1.0 bar absolute)	
	Temperature		
04	compatibility for the	Up to 150°C.	
04	valve body, seals,		
	sliding gate plate and mechanism		
	Valve clear bore on		
05	opening	$600 \pm 5$ mm.	
	Sliding Gate plate		
06	thickness	≤ 20 mm	
	tilickliess	Option-1: manufactured using	
		fabrication/welding process: ASTM A516 Gr.	
		70 or equivalent. <b>or</b>	
		Option-2: manufactured using casting process:	
		ASTM A216 Gr. WCB or equivalent.	
		[Note: Chemical composition and Mechanical	
07	Valve body material	properties (Ultimate tensile and Yield strength)	
0.	, war vo 2002 and war and	should be equal or better than specified	
		materials under option-1 & option-2	
		respectively for equivalent material].	
		ASTM A240 Gr. 304H/304 or equivalent.	
		[Note: Chemical composition and Mechanical	
08	Sliding gate plate	properties (Ultimate tensile and Yield strength)	
	material	should be equal or better than specified	
		materials for equivalent material].	
		For Body and Gland packing -	
09	Seal material	Metal/graphite/compliant and/or	
		For Gate seat - Metal/ceramic/compliant.	
		Outside diameter, Pitch Circle diameter, No. of	
		holes and holes diameter, etc. are in line with	
10	End Flange	dimensions as given for NPS 600 mm in ASME	
10	Dimensions	B16.50 Cl 150 except thickness which would be	
		selected as per gate valve manufacturer's	
		standard practice.	

		Gate valve should work in any mounting	
11	Mounting	position from 0 to 90 degree.w.r.t. Horizontal	
11	Mounting	Position.	
10		≤ 06 lpm at room temperature [After soaking for	
12	Allowable Leak Rate	02 hours at ~ 150°C followed by cooling down	
		from ~ 150°C to RT]	
	Shell leakage test and	Shell leakage test and Seat closure test shall be	
13	seat closure test	performed followed by procedure as described	
	standard	in MSS-SP 151 except leak rate which is as	
	Stanuaru	mentioned under point # 12 above.	
	Cata realiza fuller	Maximum 25 seconds for fully opening from	
14	Gate valve fully	fully closed position (Noiseless, Smooth	
	Opening time	operation).	
		Maximum 25 seconds for fully closing from	
15	Gate valve fully	fully opened position (Noiseless, Smooth	
	Closing time	operation).	
		Double Acting Hydraulic Actuator (Electro-	
		Hydraulic actuation). In addition, manual	
16	Actuator	rescue feature shall be incorporated which can	
10	retuator	bring sliding gate plate to fully close position in	
		case of failure of electro-hydraulic actuation.	
		The mounting of Electrical sensor at the	
		appropriate locations with an indication of	
	<b>T</b> 7 1 '4'	valve fully opened and fully closed position	
17	Valve position	shall be provided and these proximity sensors	
	indicator	should be compatible for 24V supply. Also,	
		provision for interlock signal (24V to be	
		connected to control panel) at fully opened and	
		fully closed position to be provided by vendor.	
18	Total no. of cycle/day	Minimum 240 cycles/day operation of the gate	
		valve (Typically 03 minute per cycle).	
19	Seal replacement	Seal replacement shall be carried out only after	
	-	completion of typically 15000 cycles.	
20	Weight	$\leq 1800 \text{ kg}.$	
		Please quote separately for	
21	<b>Essential Spares</b>	a) Seal set for gate valve (08 sets) and	
		b) Hydraulic solenoid valves (02 sets).	
		2D drawings and 3D CAD model of the valve	
	Fabrication/	including all relevant details shall be provided	
22	Manufacturing	by manufacturer [Soft copy (1 no.) and hard	
	Drawing	copy (2 nos.)] within 30 days from the date of	
		purchase order.	
		Following operational and functional tests are	
		to be carried out by the vendor in the presence	
		of IPR representatives:-	
		a) Shell leakage test at 0 or 90 degree and seat	
		closure test at various mounting position (0,	
	Acceptance test	45 and 90 degree) respectively at Room	
23	at Vendor Site	Temperature (RT) [After soaking for 02	
23	(FAT)	hours at ~ 150°C followed by cooling down	
		from ~ 150°C to RT] as per MSS-SP 151.	
		Leakage rate not to exceed 6 lpm at Room	

		Temperature. This test to be performed with blank flanges on both the ends. b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds. c) Minimum 240 cycle's operation of gate valve to be demonstrated. d) Electrical sensors indication for valve opened and closed position shall be checked. e) Gate valve clear bore on opening and End Flange dimensions shall be verified from drawing provided by vendor in respect of this technical specification.	
24	Acceptance test at FCIPT, Gandhinagar site (SAT)	Following operational and functional tests are to be carried out by the vendor in the presence of IPR representatives:-  a) Shell leakage test at 0 or 90 degree and seat closure test at various mounting position (0, 45 and 90 degree) respectively at Room Temperature (RT) [After soaking for 02 hours at ~ 150°C followed by cooling down from ~ 150°C to RT] as per MSS-SP 151. Leakage rate not to exceed 6 lpm at Room Temperature. This test to be performed with blank flanges on both the ends.  (Note: Heating element along with the power supply shall be provided by IPR for SAT. However, vendor shall submit the requirement).  b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.  c) Electrical sensors indication for valve opened and closed position shall be checked.  d) Gate valve clear bore on opening and End Flange dimensions shall be verified from drawing provided by vendor in respect of this technical specification.	
25	Test certificate	The following test certificates, where applicable, for the body, seal and sliding gate plate shall be submitted by vendor.  (1) Chemical Analysis of materials from NABL accredited lab.  (2) Mechanical properties of materials from NABL accredited lab.  (3) Certificate for life cycle of seal and moving components (Stem, gate, etc.) to be operated without failure up to 15000 cycles.  (4) Non-Destructive examination [LPT/MPD/UT/RT where applicable as per relevant ASME/ASTM standard].  (5) Shell leakage test as per MSS-SP 151 & in compliance of point # 12.  (6) Seat closure test as per MSS-SP 151 & in compliance with point # 12.	
26	Warranty	One year warranty from the date of acceptance against all sorts of manufacturing defects, faulty	

		materials and poor workmanship for gate valve	
		and actuator components.	
27	Post Warranty Support	The vendor shall confirm that they will provide the post-warranty support for additional five (05) years after expiry of the warranty period at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi City. However, the cost for such post warranty support is "Not To Be Included" in the quotation against the present tender.	
28	Packing	<ul> <li>a) The valves shall be dried and cleaned thoroughly after testing.</li> <li>b) The valves shall be shipped in closed condition, glands fully packed and all openings properly closed.</li> <li>c) End flanges and/or welding ends shall be blanked over entire surface. End protector to be attached to the valve end by suitable friction lending devices.</li> <li>d) All machined and threaded parts shall be suitably protected with approved rust preventive.</li> <li>e) The individual valve shall be wrapped in polythene &amp; packed in individual box with inner lining of bubbled packing.</li> <li>f) The packed box/s shall be shipped in wooden crates.</li> </ul>	
29	Disassembly of gate valves at FCIPT, Gandhinagar site and packing, safe transportation & reinstallation of gate valves at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city.	<ul> <li>a) Vendor shall give assurance for the technical support during disassembly of gate valves at FCIPT, Gandhinagar site as and when informed by IPR representative after successful demonstration of waste disposal system.</li> <li>b) Vendor shall give assurance for the technical support during re-installation of gate valves at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city.</li> <li>c) However, the cost for above activities is "Not To Be Included" in the quotation against the present tender.</li> </ul>	

#### II. Technical Specifications for DN 1000 Knife gate valve

Note: Please provide confirmation or clarification against each point including any deviation as remark.

We understand that vendor has carefully read introduction part before filling compliance sheet.

Sr.	Description	IPR Specifications	Vendor response
no.	-		
01	Quantity	Gate valve DN 1000 along with pair of blanked flanges - 02 sets.	
02	Valve design standard	MSS SP-81 [Valve shall be designed and fabricated for the desired frequency cycles (min. 15000 cycles)].  Note -To ensure the life of the moving components necessary low friction and high wear resistance material must be selected.	
03	Pressure	At one side of gate valve pressure is ~20mm negative water column i.e. nearly atmospheric pressure (750 mmHg) while at another side it faces atmospheric pressure.	
04	Temperature compatibility for the valve body, seals, sliding gate plate and mechanism	Up to 200°C.	
05	Valve clear bore on opening	$1000 \pm 5 \text{ mm}.$	
06	Sliding Gate plate	≤ 25 mm	
00	thickness		
07	Valve body material	Option-1: manufactured using fabrication/welding process: ASTM A516 Gr. 70 or equivalent. or Option-2: manufactured using casting process: ASTM A216 Gr. WCB or equivalent. [Note: Chemical composition and Mechanical properties (Ultimate tensile and Yield strength) should be equal or better than specified materials under option-1 & option-2 respectively for equivalent material].	
08	Sliding gate plate material	ASTM A240 Gr. 304H/304 or equivalent. [Note: Chemical composition and Mechanical properties (Ultimate tensile and Yield strength) should be equal or better than specified materials for equivalent material].	
09	Seal material	For Body and Gland packing - Metal/graphite/compliant and/or For Gate seat - Metal/ceramic/compliant.	
10	End Flange Dimensions	Outside diameter, Pitch Circle diameter, No. of holes, holes diameter, etc. are in line with dimensions as given for NPS 1000 mm in ASME B16.47Cl 150 Series B (API 605) except thickness which would be selected as per gate valve manufacturer's standard practice.	
11	Mounting	Gate valve should work in any mounting position from 45 to 90 degree w.r.t horizontal position.	

		$\leq$ 06 lpm at room temperature. [After soaking for	
12	Allowable Leak	02 hours at ~ 200°C followed by cooling down	
		from ~ 200°C to RT]	
		Shell leakage test and Seat closure test shall be	
	Shell leakage test and	performed followed by procedure as described in	
13	seat closure test	MSS-SP 151 except leak rate which is as	
	standard	mentioned under point # 12 above.	
		Maximum 25 seconds for fully opening from	
14	Gate valve fully	fully closed position (Noiseless, Smooth	
	Opening time	operation).	
	Gate valve fully	Maximum 25 seconds fully closing from fully	
15	Closing time	opened position (Noiseless, Smooth operation).	
	2 2 2 2	Double Acting Hydraulic Actuator (Electro-	
		Hydraulic actuation). In addition, manual rescue	
16	Actuator	feature shall be incorporated which can bring	
		sliding gate plate to fully close position in case of	
		failure of electro-hydraulic actuation.	
		The mounting of Electrical sensor at the	
		appropriate locations with an indication of valve	
		fully opened and fully closed position shall be	
4-	Valve position	provided and these proximity sensors should be	
17	indicator	compatible for 24V supply. Also, provision for	
		interlock signal (24V to be connected to control	
		panel) at fully opened and fully closed position to	
		be provided by vendor.	
10	Total no of avaladou	Minimum 240 cycles/day operation of the gate	
18	Total no. of cycle/day	valve (Typically 03 minute per cycle).	
19	Seal replacement	Seal replacement shall be carried out only after	
	-	completion of typically 15000 cycles.	
20	Weight	≤ 2800 kg.	
		Please quote separately for	
21	<b>Essential Spares</b>	a) Seal set for gate valve (08 sets) and	
		b) Hydraulic solenoid valves (02 sets).	
		2D drawings and 3D CAD model of the valve	
	Fabrication/	including all relevant details shall be provided by	
22	Manufacturing	manufacturer [Soft copy (1 no.) and hard copy (2	
	Drawing	nos.)] within 30 days from the date of purchase	
		order.	
		Following operational and functional tests are to	
		be carried out by the vendor in the presence of	
		IPR representatives:-	
		a) Shell leakage test at 0 or 90 degree and seat closure test at various mounting	
	Acceptance test at	position (45, 60 and 90 degree)	
23	Vendor Site (FAT)	respectively at Room Temperature (RT)	
		[After soaking for 02 hours at ~ 200°C	
		followed by cooling down from ~ 200°C	
		to RT] as per MSS-SP 151. Leakage rate	
		not to exceed 6 lpm at Room Temperature. This test to be performed	
		with blank flanges on both the ends.	
	1	0	

		b) Valve Opening and Closing time shall be	
		demonstrated to be maximum 25	
		seconds.	
		c) Minimum 240 cycle's operation of gate	
		valve to be demonstrated.	
		d) Electrical sensors indication for valve	
		opening and closing position shall be	
		checked.	
		e) Gate valve clear bore on opening and End	
		Flange dimensions shall be verified from	
		drawing provided by vendor in respect of	
		this technical specification.	
		Following operational and functional tests are to	
		be carried out by the vendor in the presence of	
		IPR representatives:-	
		a) Shell leakage test at 0 or 90 degree and seat	
		closure test at various mounting position (45,	
		60 and 90 degree) respectively at Room	
		Temperature (RT) [After soaking for 02 hours	
		at ~ 200°C followed by cooling down from ~ 200°C to RT] as per MSS-SP 151. Leakage	
		rate not to exceed 6 lpm at Room	
	Acceptance test at	Temperature. This test to be performed with	
24	FCIPT, Gandhinagar	blank flanges on both the ends.	
27	site (SAT)	(Note: Heating element along with the power	
		supply shall be provided by IPR for SAT.	
		However, vendor shall submit the	
		requirement).	
		b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.	
		c) Electrical sensors indication for valve opening and closing position shall be checked.	
		d) Gate valve clear bore on opening and End	
		Flange dimensions shall be verified from	
		drawing provided by vendor in respect of this	
		technical specification.	
		The following test certificate, where applicable,	
		for the body, seal and sliding gate shall be	
		submitted by vendor.	
		1) Chemical Analysis of materials from NABL	
		accredited lab.  2) Mechanical properties materials from NABL	
		accredited lab.	
		3) Certificate for life cycle of seal and moving	
25	Test certificate	components (Stem, gate, etc.) to be operated	
		without failure up to 15000 cycles.	
		4) Non-Destructive examination	
		[LPT/MPD/UT/RT where applicable as per	
		relevant ASME/ASTM standard].	
		5) Shell leakage test as per MSS-SP 151 & in	
		compliance with point # 12.	
		6) Seat closure test as per MSS-SP 151 & in	
		compliance with point # 12.	
	Wannant	One year warranty from the date of acceptance against all sorts of manufacturing defects, faulty	
26	Warranty	materials and poor workmanship for gate valve	
		and actuator components.	
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27	Post Warranty Support	The vendor shall confirm that they will provide the post-warranty support for additional five (05) years after expiry of the warranty period at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city. However, the cost for such post warranty support is "Not To Be Included" in the quotation against the present tender.	
28	Packing	<ul> <li>a) The valves shall be dried and cleaned thoroughly after testing.</li> <li>b) The valves shall be shipped in closed condition, glands fully packed and all openings properly closed.</li> <li>c) End flanges and/or welding ends shall be blanked over entire surface. End protector to be attached to the valve end by suitable friction lending devices.</li> <li>d) All machined and threaded parts shall be suitably protected with approved rust preventive.</li> <li>e) The individual valve shall be wrapped in polythene &amp; packed in individual box with inner lining of bubbled packing.</li> <li>f) The packed box/s shall be shipped in wooden crates.</li> </ul>	
29	Disassembly of gate valves at FCIPT, Gandhinagar site and packing, safe transportation & reinstallation of gate	<ul> <li>a) Vendor shall give assurance for the technical support during disassembly of gate valves at FCIPT, Gandhinagar site as and when informed by IPR representative after successful demonstration of waste disposal system.</li> <li>b) Vendor shall give assurance for the technical</li> </ul>	
	valves at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city.	support during re-installation of gate valves at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city. c) However, the cost for above activities is "Not To Be Included" in the quotation against the present tender.	