

**SECTION 'C'**  
**TECHNICAL SPECIFICATIONS OF**  
**STORES AND DRAWINGS**

## SECTION-C

### Institute for Plasma Research

(An Aided Institute of Dept. of Atomic Energy)

Bhat, Gandhinagar

#### Eligibility Criteria (Annexure-A)

ITEM DESCRIPTION	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.

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3	<p>The bidder shall have:</p> <p>a) In-house facilities for design, fabrication, inspection and testing of Gate Valve or</p> <p>b) Outsourced vendors/sub-vendors for design, fabrication, inspection and testing of Gate Valve.</p>	<p>Bidder should submit:</p> <p>a) Self-certificate certifying the details of in-house facilities available for design, fabrication, inspection and testing of Gate Valve or</p> <p>b) Copy of agreement with the vendors/sub-vendors or self-certificate by the vendor/sub-vendor certifying the details of facilities with them.</p>
	<b>Note:</b>	
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	
c	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  $\leq 60^{\circ}\text{C}$  from application purpose. There are also a provision for nitrogen gas flow at 300 lpm inside the waste feeder lines.
- Biomedical waste packets of  $\sim 08$  to 12 kg weight and approx.  $0.1 \text{ m}^3$  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).

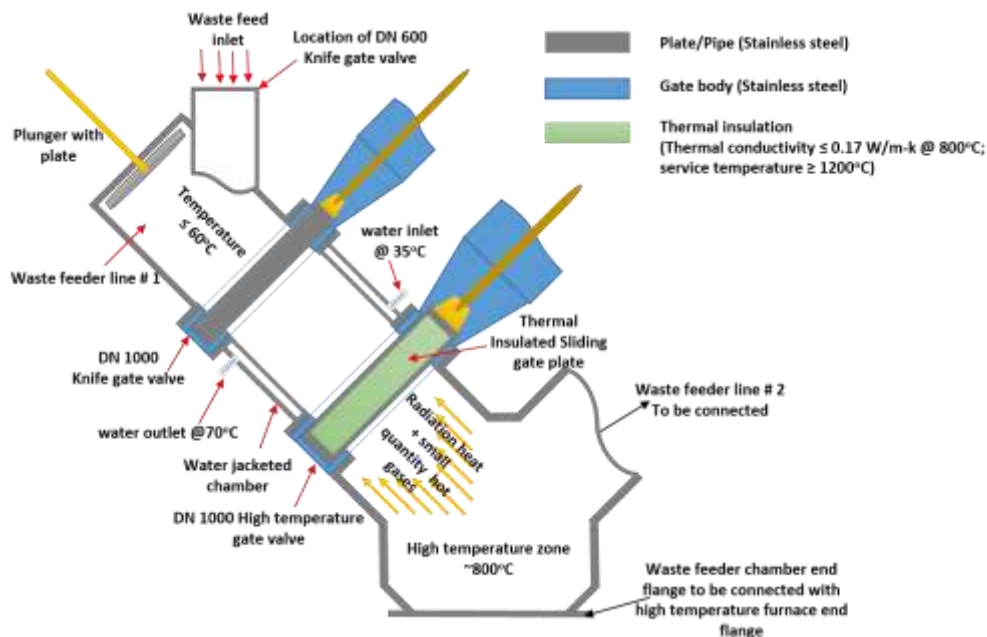


Fig. 01(a) Location of DN 600 and DN 1000 knife gate valves on waste feeder line # 1.

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.

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- This gate valve has to be maintained at temperature  $\leq 60^{\circ}\text{C}$  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  $\sim 08$  to  $12$  kg weight and approx.  $0.1\text{ m}^3$  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).

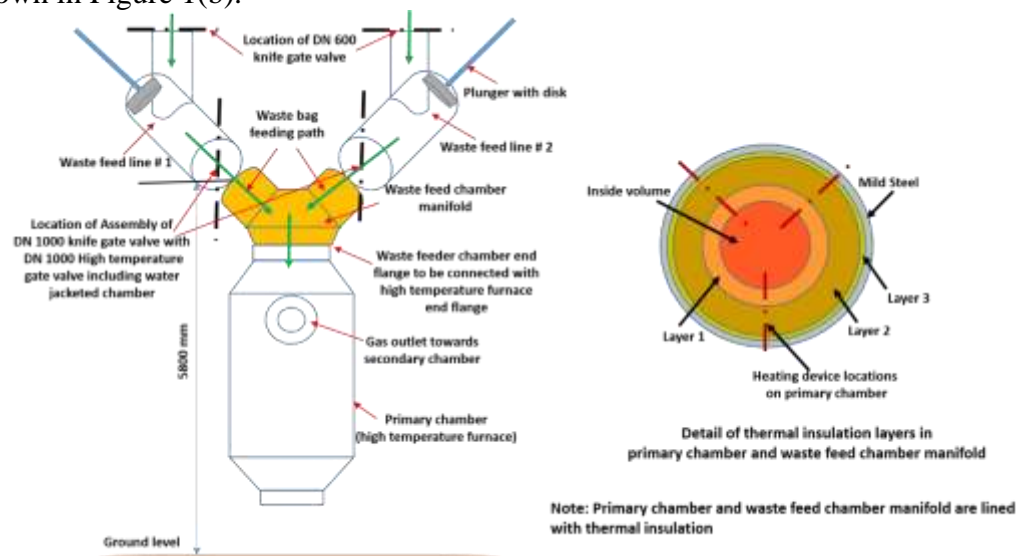


Figure 1(b): Schematic of Waste feeder lines and high temperature furnace (Primary chamber) assembly

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

Sr. no.	Description	IPR Specifications
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 $150^{\circ}\text{C}$ .
05	Valve clear bore on opening	$600 \pm 5$ mm.
06	Sliding Gate plate thickness	$\leq 20$ 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.

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		[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	<b>Sliding gate plate material</b>	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	<b>Seal material</b>	For Body and Gland packing -Metal/graphite/compliant and/or For Gate seat - Metal/ceramic/compliant.
10	<b>End Flange Dimensions</b>	Outside diameter, Pitch Circle diameter, No. of holes and holes diameter, etc. are in line with dimensions as given for NPS 600 mm in ASME B16.50 Cl 150 except thickness which would be selected as per gate valve manufacturer's standard practice.
11	<b>Mounting</b>	Gate valve should work in any mounting position from 0 to 90 degree.w.r.t. Horizontal Position.
12	<b>Allowable Leak Rate</b>	≤ 06 lpm at room temperature [After soaking for 02 hours at ~ 150°C followed by cooling down from ~ 150°C to RT]..
13	<b>Shell leakage test and seat closure test standard</b>	Shell leakage test and Seat closure test shall be performed followed by procedure as described in MSS-SP 151 except leak rate which is as mentioned under point # 12 above.
14	<b>Gate valve fully Opening time</b>	Maximum 25 seconds for fully opening from fully closed position (Noiseless, Smooth operation).
15	<b>Gate valve fully Closing time</b>	Maximum 25 seconds for fully closing from fully opened position (Noiseless, Smooth operation).
16	<b>Actuator</b>	Double Acting Hydraulic Actuator (Electro-Hydraulic actuation). In addition, manual rescue feature shall be incorporated which can bring sliding gate plate to fully close position in case of failure of electro-hydraulic actuation.
17	<b>Valve position indicator</b>	The mounting of Electrical sensor at the appropriate locations with an indication of valve fully opened and fully closed position shall be provided and these proximity sensors 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	<b>Total no. of cycle/day</b>	Minimum 240 cycles/day operation of the gate valve (Typically 03 minute per cycle).
19	<b>Seal replacement</b>	Seal replacement shall be carried out only after completion of typically 15000 cycles.
20	<b>Weight</b>	≤ 1800 kg.
21	<b>Essential Spares</b>	Please quote separately for a) Seal set for gate valve (08 sets) and b) Hydraulic solenoid valves (02 sets).
22	<b>Fabrication/ Manufacturing Drawing</b>	2D drawings and 3D CAD model of the valve including all relevant details shall be provided by manufacturer [Soft copy (1 no.) and hard 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:-

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<b>23</b>	<b>Acceptance test at Vendor Site (FAT)</b>	<p>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.</p> <p>b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.</p> <p>c) Minimum 240 cycle's operation of gate valve to be demonstrated.</p> <p>d) Electrical sensors indication for valve opened and closed position shall be checked.</p> <p>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.</p>
<b>24</b>	<b>Acceptance test at FCIPT, Gandhinagar site (SAT)</b>	<p>Following operational and functional tests are to be carried out by the vendor in the presence of IPR representatives:-</p> <p>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. (<b>Note:</b> Heating element along with the power supply shall be provided by IPR for SAT. However, vendor shall submit the requirement).</p> <p>b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.</p> <p>c) Electrical sensors indication for valve opened and closed position shall be checked.</p> <p>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.</p>
<b>25</b>	<b>Test certificate</b>	<p>The following test certificates, where applicable, for the body, seal and sliding gate plate shall be submitted by vendor.</p> <p>(1) Chemical Analysis of materials from NABL accredited lab.</p> <p>(2) Mechanical properties of materials from NABL accredited lab.</p> <p>(3) Certificate for life cycle of seal and moving components (Stem, gate, etc.) to be operated without failure up to 15000 cycles.</p> <p>(4) Non-Destructive examination [LPT/MPD/UT/RT where applicable as per relevant ASME/ASTM standard].</p> <p>(5) Shell leakage test as per MSS-SP 151 &amp; in compliance of point # 12.</p> <p>(6) Seat closure test as per MSS-SP 151 &amp; in compliance with point # 12.</p>
<b>26</b>	<b>Warranty</b>	<p>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.</p>
<b>27</b>	<b>Post Warranty Support</b>	<p>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.</p>
<b>28</b>	<b>Packing</b>	<p>a) The valves shall be dried and cleaned thoroughly after testing.</p>

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		<p>b) The valves shall be shipped in closed condition, glands fully packed and all openings properly closed.</p> <p>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.</p> <p>d) All machined and threaded parts shall be suitably protected with approved rust preventive.</p> <p>e) The individual valve shall be wrapped in polythene &amp; packed in individual box with inner lining of bubbled packing.</p> <p>f) The packed box/s shall be shipped in wooden crates.</p>
29	<p><b>Disassembly of gate valves at FCIPT, Gandhinagar site and packing, safe transportation &amp; re-installation of gate valves at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city.</b></p>	<p>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.</p> <p>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.</p> <p>c) However, the cost for above activities is "<b>Not To Be Included</b>" in the quotation against the present tender.</p>

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

Sr. no.	Description	IPR Specifications
01	<b>Quantity</b>	Gate valve DN 1000 along with pair of blanked flanges - 02 sets.
02	<b>Valve design standard</b>	MSS SP-81 [Valve shall be designed and fabricated for the desired frequency cycles (min. 15000 cycles)]. <b>Note</b> -To ensure the life of the moving components necessary low friction and high wear resistance material must be selected.
03	<b>Pressure</b>	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	<b>Temperature compatibility for the valve body, seals, sliding gate plate and mechanism</b>	Up to 200°C.
05	<b>Valve clear bore on opening</b>	1000 ± 5 mm.
06	<b>Sliding Gate plate thickness</b>	≤ 25 mm
07	<b>Valve body material</b>	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.



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		[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	<b>Sliding gate plate material</b>	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	<b>Seal material</b>	For Body and Gland packing -Metal/graphite/compliant and/or For Gate seat - Metal/ceramic/compliant.
10	<b>End Flange Dimensions</b>	Outside diameter, Pitch Circle diameter, No. of holes, holes diameter, etc. are in line with dimensions as given for NPS 1000 mm in ASME B16.47C1 150 Series B (API 605) except thickness which would be selected as per gate valve manufacturer's standard practice.
11	<b>Mounting</b>	Gate valve should work in any mounting position from 45 to 90 degree w.r.t horizontal position.
12	<b>Allowable Leak</b>	≤ 06 lpm at room temperature. [After soaking for 02 hours at ~ 200°C followed by cooling down from ~ 200°C to RT]
13	<b>Shell leakage test and seat closure test standard</b>	Shell leakage test and Seat closure test shall be performed followed by procedure as described in MSS-SP 151 except leak rate which is as mentioned under point # 12 above.
14	<b>Gate valve fully Opening time</b>	Maximum 25 seconds for fully opening from fully closed position (Noiseless, Smooth operation).
15	<b>Gate valve fully Closing time</b>	Maximum 25 seconds fully closing from fully opened position (Noiseless, Smooth operation).
16	<b>Actuator</b>	Double Acting Hydraulic Actuator (Electro-Hydraulic actuation). In addition, manual rescue feature shall be incorporated which can bring sliding gate plate to fully close position in case of failure of electro-hydraulic actuation.
17	<b>Valve position indicator</b>	The mounting of Electrical sensor at the appropriate locations with an indication of valve fully opened and fully closed position shall be provided and these proximity sensors 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	<b>Total no. of cycle/day</b>	Minimum 240 cycles/day operation of the gate valve (Typically 03 minute per cycle).
19	<b>Seal replacement</b>	Seal replacement shall be carried out only after completion of typically 15000 cycles.
20	<b>Weight</b>	≤ 2800 kg.
21	<b>Essential Spares</b>	Please quote separately for a) Seal set for gate valve (08 sets) and b) Hydraulic solenoid valves (02 sets).
22	<b>Fabrication/ Manufacturing Drawing</b>	2D drawings and 3D CAD model of the valve including all relevant details shall be provided by manufacturer [Soft copy (1 no.) and hard copy (2 nos.)] within 30 days from the date of purchase order.
23	<b>Acceptance test at Vendor Site (FAT)</b>	Following operational and functional tests are to be carried out by the vendor in the presence of IPR representatives:-

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		<ul style="list-style-type: none"> <li>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 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 opening and closing 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	<b>Acceptance test at FCIPT, Gandhinagar site (SAT)</b>	<p>Following operational and functional tests are to be carried out by the vendor in the presence of IPR representatives:-</p> <ul style="list-style-type: none"> <li>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 Temperature. This test to be performed with blank flanges on both the ends.</li> </ul> <p><b>(Note:</b> Heating element along with the power supply shall be provided by IPR for SAT. However, vendor shall submit the requirement).</p> <ul style="list-style-type: none"> <li>b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.</li> <li>c) Electrical sensors indication for valve opening and closing position shall be checked.</li> <li>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.</li> </ul>
25	<b>Test certificate</b>	<p>The following test certificate, where applicable, for the body, seal and sliding gate shall be submitted by vendor.</p> <ul style="list-style-type: none"> <li>1) Chemical Analysis of materials from NABL accredited lab.</li> <li>2) Mechanical properties materials from NABL accredited lab.</li> <li>3) Certificate for life cycle of seal and moving components (Stem, gate, etc.) to be operated without failure up to 15000 cycles.</li> <li>4) Non-Destructive examination [LPT/MPD/UT/RT where applicable as per relevant ASME/ASTM standard].</li> <li>5) Shell leakage test as per MSS-SP 151 &amp; in compliance with point # 12.</li> <li>6) Seat closure test as per MSS-SP 151 &amp; in compliance with point # 12.</li> </ul>
26	<b>Warranty</b>	<p>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.</p>
27	<b>Post Warranty Support</b>	<p>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.</p>
28		<ul style="list-style-type: none"> <li>a) The valves shall be dried and cleaned thoroughly after testing.</li> </ul>

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	<p><b>Packing</b></p>	<p>b) The valves shall be shipped in closed condition, glands fully packed and all openings properly closed.</p> <p>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.</p> <p>d) All machined and threaded parts shall be suitably protected with approved rust preventive.</p> <p>e) The individual valve shall be wrapped in polythene &amp; packed in individual box with inner lining of bubbled packing.</p> <p>f) The packed box/s shall be shipped in wooden crates.</p>
<p style="text-align: center;"><b>29</b></p>	<p><b>Disassembly of gate valves at FCIPT, Gandhinagar site and packing, safe transportation &amp; re-installation of gate valves at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city.</b></p>	<p>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.</p> <p>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.</p> <p>c) However, the cost for above activities is "<b>Not To Be Included</b>" in the quotation against the present tender.</p>

**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. no.	Description	IPR Specifications	Vendor response
01	<b>Quantity</b>	Gate valve DN 600 along with pair of blanked flanges - 02 sets.	
02	<b>Valve design standard</b>	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	<b>Pressure</b>	Atmospheric pressure (1.0 bar absolute)	
04	<b>Temperature compatibility for the valve body, seals, sliding gate plate and mechanism</b>	Up to 150°C.	
05	<b>Valve clear bore on opening</b>	600 ± 5 mm.	
06	<b>Sliding Gate plate thickness</b>	≤ 20 mm	
07	<b>Valve body material</b>	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].	
08	<b>Sliding gate plate material</b>	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	<b>Seal material</b>	For Body and Gland packing - Metal/graphite/compliant and/or For Gate seat - Metal/ceramic/compliant.	
10	<b>End Flange Dimensions</b>	Outside diameter, Pitch Circle diameter, No. of holes and holes diameter, etc. are in line with dimensions as given for NPS 600 mm in ASME B16.50 Cl 150 except thickness which would be selected as per gate valve manufacturer's standard practice.	

11	<b>Mounting</b>	Gate valve should work in any mounting position from 0 to 90 degree.w.r.t. Horizontal Position.	
12	<b>Allowable Leak Rate</b>	≤ 06 lpm at room temperature [After soaking for 02 hours at ~ 150°C followed by cooling down from ~ 150°C to RT]..	
13	<b>Shell leakage test and seat closure test standard</b>	Shell leakage test and Seat closure test shall be performed followed by procedure as described in MSS-SP 151 except leak rate which is as mentioned under point # 12 above.	
14	<b>Gate valve fully Opening time</b>	Maximum 25 seconds for fully opening from fully closed position (Noiseless, Smooth operation).	
15	<b>Gate valve fully Closing time</b>	Maximum 25 seconds for fully closing from fully opened position (Noiseless, Smooth operation).	
16	<b>Actuator</b>	Double Acting Hydraulic Actuator (Electro-Hydraulic actuation). In addition, manual rescue feature shall be incorporated which can bring sliding gate plate to fully close position in case of failure of electro-hydraulic actuation.	
17	<b>Valve position indicator</b>	The mounting of Electrical sensor at the appropriate locations with an indication of valve fully opened and fully closed position shall be provided and these proximity sensors 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	<b>Total no. of cycle/day</b>	Minimum 240 cycles/day operation of the gate valve (Typically 03 minute per cycle).	
19	<b>Seal replacement</b>	Seal replacement shall be carried out only after completion of typically 15000 cycles.	
20	<b>Weight</b>	≤ 1800 kg.	
21	<b>Essential Spares</b>	Please quote separately for a) Seal set for gate valve (08 sets) and b) Hydraulic solenoid valves (02 sets).	
22	<b>Fabrication/ Manufacturing Drawing</b>	2D drawings and 3D CAD model of the valve including all relevant details shall be provided by manufacturer [Soft copy (1 no.) and hard copy (2 nos.)] within 30 days from the date of purchase order.	
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		<p>Temperature. This test to be performed with blank flanges on both the ends.</p> <p>b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.</p> <p>c) Minimum 240 cycle's operation of gate valve to be demonstrated.</p> <p>d) Electrical sensors indication for valve opened and closed position shall be checked.</p> <p>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.</p>	
24	<b>Acceptance test at FCIPT, Gandhinagar site (SAT)</b>	<p>Following operational and functional tests are to be carried out by the vendor in the presence of IPR representatives:-</p> <p>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).</p> <p>b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.</p> <p>c) Electrical sensors indication for valve opened and closed position shall be checked.</p> <p>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.</p>	
25	<b>Test certificate</b>	<p>The following test certificates, where applicable, for the body, seal and sliding gate plate shall be submitted by vendor.</p> <p>(1) Chemical Analysis of materials from NABL accredited lab.</p> <p>(2) Mechanical properties of materials from NABL accredited lab.</p> <p>(3) Certificate for life cycle of seal and moving components (Stem, gate, etc.) to be operated without failure up to 15000 cycles.</p> <p>(4) Non-Destructive examination [LPT/MPD/UT/RT where applicable as per relevant ASME/ASTM standard].</p> <p>(5) Shell leakage test as per MSS-SP 151 &amp; in compliance of point # 12.</p> <p>(6) Seat closure test as per MSS-SP 151 &amp; in compliance with point # 12.</p>	
26	<b>Warranty</b>	<p>One year warranty from the date of acceptance against all sorts of manufacturing defects, faulty</p>	

		materials and poor workmanship for gate valve and actuator components.	
27	<b>Post Warranty Support</b>	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	<b>Packing</b>	<ul style="list-style-type: none"> <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	<b>Disassembly of gate valves at FCIPT, Gandhinagar site and packing, safe transportation &amp; re-installation of gate valves at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city.</b>	<ul style="list-style-type: none"> <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 "<b>Not To Be Included</b>" 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. no.	Description	IPR Specifications	Vendor response
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)]. <b>Note</b> -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 ± 5 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].	
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 B16.47C1 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.	



12	<b>Allowable Leak</b>	≤ 06 lpm at room temperature. [After soaking for 02 hours at ~ 200°C followed by cooling down from ~ 200°C to RT]	
13	<b>Shell leakage test and seat closure test standard</b>	Shell leakage test and Seat closure test shall be performed followed by procedure as described in MSS-SP 151 except leak rate which is as mentioned under point # 12 above.	
14	<b>Gate valve fully Opening time</b>	Maximum 25 seconds for fully opening from fully closed position (Noiseless, Smooth operation).	
15	<b>Gate valve fully Closing time</b>	Maximum 25 seconds fully closing from fully opened position (Noiseless, Smooth operation).	
16	<b>Actuator</b>	Double Acting Hydraulic Actuator (Electro-Hydraulic actuation). In addition, manual rescue feature shall be incorporated which can bring sliding gate plate to fully close position in case of failure of electro-hydraulic actuation.	
17	<b>Valve position indicator</b>	The mounting of Electrical sensor at the appropriate locations with an indication of valve fully opened and fully closed position shall be provided and these proximity sensors 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	<b>Total no. of cycle/day</b>	Minimum 240 cycles/day operation of the gate valve (Typically 03 minute per cycle).	
19	<b>Seal replacement</b>	Seal replacement shall be carried out only after completion of typically 15000 cycles.	
20	<b>Weight</b>	≤ 2800 kg.	
21	<b>Essential Spares</b>	Please quote separately for a) Seal set for gate valve (08 sets) and b) Hydraulic solenoid valves (02 sets).	
22	<b>Fabrication/ Manufacturing Drawing</b>	2D drawings and 3D CAD model of the valve including all relevant details shall be provided by manufacturer [Soft copy (1 no.) and hard copy (2 nos.)] within 30 days from the date of purchase order.	
23	<b>Acceptance test at Vendor Site (FAT)</b>	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 Temperature. This test to be performed with blank flanges on both the ends.	

		<ul style="list-style-type: none"> <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 opening and closing 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	<b>Acceptance test at FCIPT, Gandhinagar site (SAT)</b>	<p>Following operational and functional tests are to be carried out by the vendor in the presence of IPR representatives:-</p> <ul style="list-style-type: none"> <li>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 Temperature. This test to be performed with blank flanges on both the ends. (<b>Note:</b> Heating element along with the power supply shall be provided by IPR for SAT. However, vendor shall submit the requirement).</li> <li>b) Valve Opening and Closing time shall be demonstrated to be maximum 25 seconds.</li> <li>c) Electrical sensors indication for valve opening and closing position shall be checked.</li> <li>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.</li> </ul>	
25	<b>Test certificate</b>	<p>The following test certificate, where applicable, for the body, seal and sliding gate shall be submitted by vendor.</p> <ul style="list-style-type: none"> <li>1) Chemical Analysis of materials from NABL accredited lab.</li> <li>2) Mechanical properties materials from NABL accredited lab.</li> <li>3) Certificate for life cycle of seal and moving components (Stem, gate, etc.) to be operated without failure up to 15000 cycles.</li> <li>4) Non-Destructive examination [LPT/MPD/UT/RT where applicable as per relevant ASME/ASTM standard].</li> <li>5) Shell leakage test as per MSS-SP 151 &amp; in compliance with point # 12.</li> <li>6) Seat closure test as per MSS-SP 151 &amp; in compliance with point # 12.</li> </ul>	
26	<b>Warranty</b>	<p>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.</p>	

27	<b>Post Warranty Support</b>	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	<b>Packing</b>	<ul style="list-style-type: none"> <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 linding 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	<b>Disassembly of gate valves at FCIPT, Gandhinagar site and packing, safe transportation &amp; re-installation of gate valves at site recommended by Homi Bhabha Cancer Hospital (HBCH) in Varanasi city.</b>	<ul style="list-style-type: none"> <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 "<b>Not To Be Included</b>" in the quotation against the present tender.</li> </ul>	