Buyers Specific Additional Terms & Conditions (ATC) in addition to GTC
Item Name: Oil Throttle Valve
Projects: 200 MW UKAI-3&5 R&M

A. SCOPE OF ENQUIRY:

E-bids on GeM portal are invited from bidders for the supply of Refrigeration Gas Drier with SS Heat Exchanger for Udangudi, Patratu and Sagardighi Project as per requirement mentioned below:

Sl. No.	Project	Material Code & Item Description	Total Qty.	LOT Quantity	Delivery Requirement
1	200 MW UKAI-3&5 R&M	Mat. Code: W90311923275, DRG: 411923D8000 REV:00, OIL THROTTLE VALVE AS PER DOCUMENTS AND DRGS. MENTIONED IN DOCUMENT NO. 4-11923-D8000	2 ST	Lot-1 Qty. 1 ST Lot-2 Qty. 1 ST	06/02/2024 06/02/2024

B. Project Details:

Project Name	Consignee Address
200 MW UKAI-3&5 R&M	200 MW UKAI-3&5 R&M CHIEF ENGINEER (Gen.) GUJRAT STATE ELECTRICITY CORPORATION LIMITED UKAI R&M STORE, THERMAL POWER STATION, UKAI DIST-TAPI P.O. UKAI DAM, TAL-FORT-SONGADH PIN-394680 (GUJRAT)

Sl. No.	Terms	Description	Confirmation of Vendors
1.	**Compliance of GTC on GeM**	General Terms and Conditions on GeM 4.0 (Version 1.12). Please submit signed & stamped copy of the same.	
2.	**Public Procurement (Preference to Make in India)**	"For this procurement, the local content to categorize a supplier as a Class-I Local Supplier / Class-II Local Supplier/ Non-Local Supplier and purchase preference to Class-I Local Supplier, is as defined in Public Procurement (Preference to Make in India), Order-2017 Ref. No. P-45021/2/2017-PP (BE-II) dtd. 04/06/2020 issued by DPIIT. In case of subsequent orders issued, by the nodal ministry, changing the definition of local content for the items of this NIT, but before opening of Part-II bids against this NIT."	
3.	**Compliance of Rule 144 (xi) of GFR 2017**	Compliance of Restrictions under Rule 144 (xi) of GFR 2017 shall be as General terms and conditions on GeM.	
4.	**Confirmation to General Instructions and standard terms & conditions**	Please submit signed and stamped copy of Confirmation to General Instructions and standard terms & conditions (enclosed) as your acceptance to these terms and conditions. Deviation to "General Instructions and standard terms & conditions", if any, shall be submitted along with offer in separate documents. Please note that in case no- deviation sheet of "General Instructions and standard terms & conditions", is received along with offer, it will be presumed that all terms and conditions mentioned in "General Instructions and standard terms & conditions" shall be acceptable to you and your offer will be processed accordingly.	
5.	**Compliance of 144 (xi) of GFRs-2017**	Terms & conditions for PPP-MII Order No. P-45021/ 2/ 2017-PP (BE-ll) dtd. 04/06/2020 AND RULE No. 144 (xi) of GFRs-2017, shall be as per enclosed Annexure-A1.	

6.	**Evaluation criteria**	Evaluation will be done on the basis of total all-inclusive landed cost to BHEL, with cost involved for delivery up to BHEL project site (considering material cost, taxes & duties and Freight charges up to BHEL Project site). Please confirm.	
7.	**Basis of Quotation**	Please quote your prices on Ex-Works, freight prepaid basis up to BHEL Project site including freight, Packing & forwarding charges (if any) and GST. Please Confirm.	
8.	**Transit Insurance**	Transit insurance for shall be arranging by BHEL. Please do not include in the basic price. Please confirm.	
9.	**Currency of quotation**		
10.	**Validity**	Confirm that the validity of the offer shall be 160 days from the due date of opening of Techno-Commercial offers.	
		Please note that BHEL reserves the right to ignore the offers quoting validity less than 160 days from EOD (Enquiry Opening Date).	
11.	**Engineering Document/ Document approval**	Drawings/Data sheets/documents as called for in the specifications (if any) shall be submitted for approval to BHEL for BHEL/customer approval within 30 days of purchase order. Any delay in delivery on account of late submission of drawings shall be to vendors account. BHEL will arrange the approval of the drawings/data sheets/ documents within 30 days of their receipt. In case of delay on account of BHEL, delivery shall be re-scheduled accordingly.	
12.	**Payment Terms**	The payment term shall be done after issue of consignee receipt-cum acceptance certificate (CRAC) and receipted copy of GR as per the below details: Type of Bidder Payment Terms (Number of Days) Micro & Small Enterprises (MSEs) 45 days Medium Enterprises 60 days Non MSME 90 days Subject to submission of non-discrepant documents.	
		In case of deviation in payment terms w.r.t. tender conditions, offer shall be evaluated after loading on account of deviation in payment terms as per extended rules of BHEL.	
13.	**Liquidated Damages (LD) for late delivery**	liquidated Damages (LD) for Late Deliveries shall be applicable @0.5% per week or part thereof subject to maximum of 10% of the total value of each lot (Lot wise/Project wise/ Unit wise). Purchase Order value for this purpose shall be the Total Gross Value payable to the vendor (Before LD) excluding taxes and duties for (Lot wise/Project wise/Unit wise).	
		In case of any deviation to the above penalty clause, BHEL reserves the right to load the offers to the extent to which it is not agreed by vendors (at offered value).	
		Date of LR/GR/RR shall be considered as date of delivery for LD Purpose/ All purpose.	
14.	**Quality requirements & third-party inspection**	INSPECTION SHALL BE DONE BY BHEL NOMINATED INSPECTION AGENCY M/S INTERTEK & CUSTOMER AS PER FINAL END BHEL/CUSTOMER APPROVED QUALITY PLAN. PLEASE CONFIRM.	
		INSPECTION CHARGES BY THIRD PARTY INSPECTION AGENCY SHALL BE TO BHEL'S ACCOUNT. BHEL SHALL PAY DIRECTLY TO TPI. HOWEVER, ALL COORDINATION WITH TPI FOR ARRANGING INSPECTION SHALL BE DONE BY SUPPLIER. PLEASE CONFIRM.	
15.	**Customer approval Condition**	Please note that procurement shall be done only from the vendors approved by end customer. Bidders are required to submit following documents along with their offer. BHEL will propose name of PQR qualified bidder (Along with the documents submitted by the bidders) to end customer for their approval. a. Complete Supply Experience Including Experience with BHEL (if available) b. Details of Manufacturing and testing facilities.	

		c. ISO Certificate like ISO 9001:2015 etc. if available. d. Company Profile e. Audited Balance Sheet for last three Financial Years f. Any other supporting document to Bidder's presentation against customer. BHEL will propose name of PQR qualified vendors along with credentials to end customer for their approval, however, approval of vendors is sole discretion of end customer. Offer of only those bidders shall be considered for opening of price bid (part-II) whose customer approval will be available at the time of price bid opening.	
16.	**MDCC clause**	Please note that, material shall be dispatched only after issue of Material dispatch clearance certificate (MDCC) end customer. For issue of MDCC, vendors are required to submit all test certificates (TC) and inspection report of third party (IR) to BHEL. After review & acceptance of the quality document, BHEL will forward the same to end customer for issuance of MDCC. After receipt of complete quality documents / TCs, minimum 7 days would be required by BHEL for issuance of MDCC. Material shall be dispatched within 7 days from the date of issuance of MDCC.	
17.	**Delivery**	Please note that material is required as per the delivery mentioned in lot date of enquiry. Please quote your deliveries accordingly in no. of weeks/months from the date of PO including the time required for approval of documents.	
		If the delivery quoted by you does not meet BHEL's delivery requirement / revised delivery requirement as per site progress, you will be given a chance for reviewing your quoted delivery and inform revised delivery to BHEL. After this, if your delivery does not meet BHEL's required delivery / revised delivery as per site progress, BHEL reserve the right to reject your offer.	
18.	**Guarantee**	The supplier shall Guarantee trouble free and satisfactory operation of the equipment for a period of 12 months from the date of installation and commissioning or 18 months from the date of dispatch from supplier works whichever is later. Please confirm.	
		If, during erection/commissioning and operation at site, any defect in any component is detected, purchaser's/owner's site representative shall prepare the assessment report and ca copy of the same shall be forwarded to the supplier. The supplier shall replace/rectify the concerned items free of charge. The supplier, of he so desired, may depute their representative to site at his own cost otherwise the report of purchaser's/owner's site representative shall be binding of supplier. Please confirm.	
19.	**Reverse Auction**	BHEL SHALL BE RESORTING TO REVERSE AUCTION (RA) (GUIDELINES AS AVAILABLE ON www.bhel.com) FOR THIS TENDER. RA SHALL BE CONDUCTED AMONG ALL THE TECHNO-COMMERCIALLY QUALIFIED BIDDERS. PRICE BIDS OF ALL TECHNO-COMMERCIALLY QUALIFIED BIDDERS SHALL BE OPENED AND SAME SHALL BE CONSIDERED AS INITIAL BIDS OF BIDDERS IN RA. IN CASE ANY BIDDER(S) DO (ES) NOT PARTICIPATE IN ONLINE REVERSE AUCTION, THEIR SEALED ENVELOPE PRICE BID ALONG WITH APPLICABLE LOADING, IF ANY, SHALL BE CONSIDERED FOR RANKING.	
20.	**Packing Instruction / Details**	VALVE ENDS, MACHINED AND UN MACHINED SURFACES ETC. SHALL BE PROTESTED AGAINST RUSTING AND CORROSION AND VALVE SHALL BE PACKED ACCORDING TO MODE OF TRANSPORT AND STORAGE IN TOP SHADE STORE GANTRY IN TROPIC CLIMATIC CONDITIONS FOR A PERIOD OF 8 TO 12 MONTHS. VALVE SHALL BE SUPPLIED WITH ALL ENDS OF VALVE BODY PROPERLY AND SUITABLY SEALED.PLEASE CONFIRM.	

		VENDOR SHALL KEEP 2 COPIES OF O&M MANUAL AND CHARACTERISTIC CURVE INSIDE DISPATCH BOX AND ALSO MENTION IT IN VENDOR'S SHIPPING LIST. PLEASE CONFIRM.	
21.	**Operation & Maintenance Manual**	GUARANTEE CERTIFICATE REQUIRED. TEST CERTIFICATE REQUIRED. OPERATION AND MAINTENANCE MANUAL REQUIRED. WARRANTEE CERTIFICATE REQUIRED.	
22.	**Risk Purchase:**	In case of abnormal delays (beyond the maximum late delivery period as per LD clause) in supplies / defective supplies or non-fulfilment of any other terms and conditions given in Purchase Order, BHEL may cancel the Purchase Order in full or part thereof, and may also make the purchase of such material from elsewhere / alternative source at the risk and cost of the supplier. BHEL will take all reasonable steps to get the material from alternate source at optimum cost. If bidder does not agree to the above Risk Purchase Clause, BHEL reserves the right to reject the offer. In case for compelling reasons BHEL accepts the offer without acceptance of this clause by the bidder and in the eventuality of Risk Purchase, appropriate action will be taken as per BHEL extant rules. This will be without prejudice to any other right of BHEL under the contract or under General Law.	
23.	**Action against Bidders / vendor / supplier / contractor in case of default:**	In order to protect the commercial interests of BHEL, BHEL shall act against supplies / contractors by way of suspension of business dealings, who either fail to perform or are in default without any reasonable cause, cause loss of business/ money/ reputation, indulge in malpractices, cheating, bribery, fraud or any other misconduct or formation of cartels so as to influence the bidding process or influence the price etc. Suspension of Business Dealings could be in the form of “Hold” or “Banning” a supplier/ contractor or a bidder and shall be as per “Guidelines for Suspension of Business Dealings with Suppliers/ Contractors” available at BHEL’s website “https://www.bhel.com/guidelines-suspension-business-dealings-supplierscontractors”	
24.	**Arbitration/settlement of disputes clause**	In case of any dispute arising out of as in connection with this contract, the same shall be referred to arbitration under Arbitration & Conciliation Act 1996 of a sole arbitrator who shall be appointed by mutual consent of the parties. The seat & venue of arbitration shall be Haridwar. The proceedings shall be conducted in English. The Governing law of contract shall be the substitutive law of India.	

Pre-Qualification Requirements (PQR) ~~to be met by New Vendors applying for registration for supply of Oil Throttle valves to~~ Bharat Heavy Electricals Limited, Haridwar	Doc. No.: 4-11923-V8800 Rev00

A. For description of Oil Throttle Valves vendor shall refer document no. 4-11939-V8801.

B. ACCEPTANCE CRITERION FOR VENDOR for Oil Throttle Valve

1. Vendor should have experience of manufacturing, testing and supply of Oil Throttle valve, along with its flushing operation components, to **atleast three units** of power-plants[$] in a period of 7 years prior to applying in BHEL (i.e. Purchase Order shall be on or after 01.01.2015). For the said experience, the valves should have been used to perform the function of regulating lube oil flow to individual bearings of turbine-generator set and where all three units of power-plant have been commissioned/achieved-full-load as on date of issue of enquiry.

   [$] a power plant is defined as a steam/gas/nuclear power plant of rating ≥ 200MW

2. Vendor shall furnish its experience in Table-2 which satisfies the requirement in clause-1 above. However, for any two POs mentioned in Table-2 by vendor, vendor shall furnish following documents:-
   a. Customer/end-customer approved GA drawing/documents of Oil Throttle Valves along with docs of flushing operation components and characteristic curve.
   b. unpriced purchase orders.
   c. Dimensional check report.
   d. Acceptance certificate/ despatch documents

TABLE-2 (Vendor to fill this table and submit alongwith application)

Sl. No.	Item	Minimum acceptance Criteria	Data for 1st unit/ project	Data for 2nd unit/ project	Data for 3rd unit/ project
1	Whether the Oil Throttle Valve type is Globe type as per doc. 4-11939-V8801	YES			
2	Project Name with Rating in MW	≥ 200MW			
3	End customer Name				
4	Whether valve was manufactured at vendor's works	YES			
5	Whether valve was tested at vendor's works	YES			
6	Whether valve was supplied by vendor directly	YES			
7	Whether the Flushing Operation Components of Oil Throttle Valve is as per doc. 4-11939-V8801	YES			
8	PO No. and PO Date	PO date on or after 01.01.2015			
9	Whether the application of valve is regulating lube oil flow to turbine-generator bearings	YES			
10	Fluid	Oil			
11	Date of Commissioning/achieving full load of power-plant	On or before date of issuing of enquiry by BHEL			
12	Range of Flow in throttle valve in l/s				

13	Telephone numbers & Email IDs of End user/Customer				

NOTE:-

1. BHEL reserves the right to verify the information submitted by vendor. Submission of false/incorrect information shall lead to rejection of offer and shall be taken seriously by BHEL.
2. BHEL reserves the right to ask for more pertinent information /documents / clarifications. Vendor shall provide this information to BHEL in a timely manner so that project schedule doesnot hamper.
3. All the documents furnished to BHEL shall be in English language only. If the documents are not in English, then they must be accompanied with duly certified English translations of the same.
4. BHEL may visit the factory premises of the vendor for verification and other purposes, cost of which shall be borne by BHEL.
5. In case the vendor meets the acceptance criterion mentioned in this document, other technical details of these valves shall be furnished to them after signing of Non-Disclosure Agreement (NDA) or similar document between vendor and BHEL.
6. The responsibility for correct supply of item (as per BHEL spec) and correct functioning of item at BHEL site rests with item supplier. For this it is supplier's responsibility to understand BHEL's technical requirements completely.

25/4/22
Hardeep Singh Dogra
Mgr (STE-TL)

25/4/22
Sr. Manager (STE-TL)
Sh. Dhruv. Garg

25/4/22
SDGM (STE-TL)
Sh. Anuj Jain

A. SCOPE OF THE DOCUMENT:

1. This document states the size and flow requirement of Oil Throttle Valve. For other requirements please refer the document General Specification of Oil Throttle Valve doc. no. 4-11923-S5100.

B. REQUIREMENTS

1. Size of Valves shall be as follows:-

Sl. No. (Brg No.)	Valve KKS TAG No.	Valve Size	Quantity (number)	Flow rate passing thru the valve (liter per second)
1	MAV42AA251	NB40	1	2.26
2	MAV42AA253	NB100	1	17.81
3	MAV42AA255	NB50	1	3.78
4	MAV42AA257	NB65	1	6.18
5	MAV42AA259	NB65	1	6.17
6	MAV44AA251	NB65	1	6.33
7	MAV44AA253	NB50	1	5.00

2. It may be noted that the valve of size NB100 above is not mentioned in document 4-11923-S5100 as it is a new size requirement. Vendor to offer this valve and its performance curves.

GENERAL SPECIFICATION

OIL THROTTLE VALVE

PMD CATEGORY: BI 157

DOCUMENT NO.: 4-11923-S5100

00	10.06.19	HS DOGRA	First Revision release.
Rev No.	Date of Issue	Issued By	Description of revision

A. SCOPE OF THE DOCUMENT:

1. This document states general technical/ contractual requirements of Bharat Heavy Electricals Limited (hereafter referred to as BHEL) for the vendors to adhere to. For project specific data, refer document Project Specific Specification (PSS) 4-11923-XX000. This document must be read in addition to PSS.

B. ABOUT THE VALVE

1. Oil Throttle Valves are used to throttle/modify flow of lube oil entering into turbine-generator bearings.
2. Flushing Device: The throttle valves shall also be supplied alongwith flushing device mentioned further in the document.

C. REQUIREMENTS

1. Technical Parameters

Sl. No.	Description	Value
1	Working Pressure	4 bar
2	Design pressure	8 bar
3	End Connection	Butt weld with pipe schedule 10S ASME B16.25-2003 Weld fig. 4
4	Working Fluid	Turbine Oil ISO VG46
5	Working temperature	50deg C
6	Max. Temperature	80deg C
7	Material of Construction (All parts in contact with oil)	SS Gr. 316L or 321 or equivalent
8	Mat. Of Construction (Gaskets/Orings etc)	Viton

2. Each Throttle valve shall have a hole of min. dia inside its throttle so that even if the valve is closed, oil starvation does not happen in turbine bearings. The size of this hole is shown in drgs. below for each valve size.

3. Rating: Valve rating shall be selected by supplier based on working parameters and material mentioned above. Rating shall be as per ANSI B16.34.

4. Each valve shall be marked with an arrow on the body showing direction of flow. On the hand-wheel also there shall be direction indication for opening and closing.

5. Latest issue and amendments of all applicable international standards shall apply.

6. **Characteristic Curve:**

Valve supplier shall furnish characteristic curve where piston travel is plotted on x-axis and flow on y-axis.
Δp can vary from 0.25bar to 3.0bar.

Supplier shall furnish Curves for Δp = 0.25bar, 0.5bar, 1bar, 1.5bar, 2bar, 2.5bar and 3bar across the valve. These curves shall be furnished for each valve.

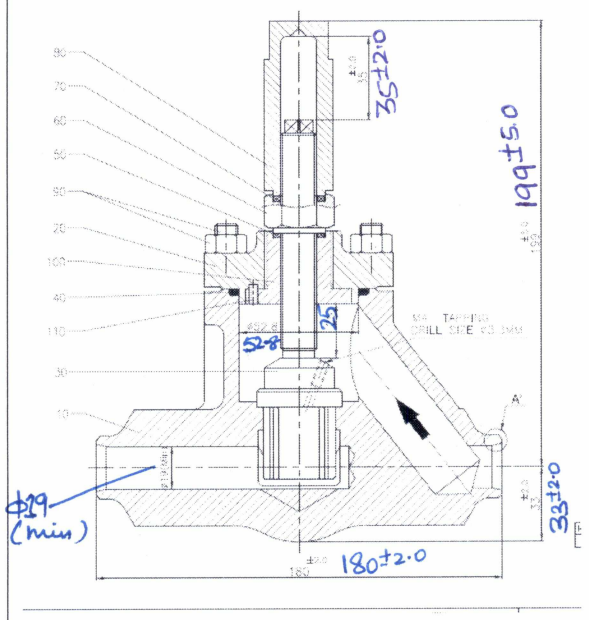
Range of piston travel is as per following table-1.

TABLE-1 (RANGE OF PISTON TRAVEL)		
Sl. No.	Valve Size	Range of Piston Travel (mm)
1	NB20	0 to 25
2	NB25	0 to 25
3	NB40	0 to 32
4	NB50	0 to 45
5	NB65	0 to 48
6	NB80	0 to 54

It may be noted that characteristic curves are an important document for BHEL site to adjust opening of oil throttle valve to adjust flow.

D. DRAWING OF OIL THROTTLE VALVE

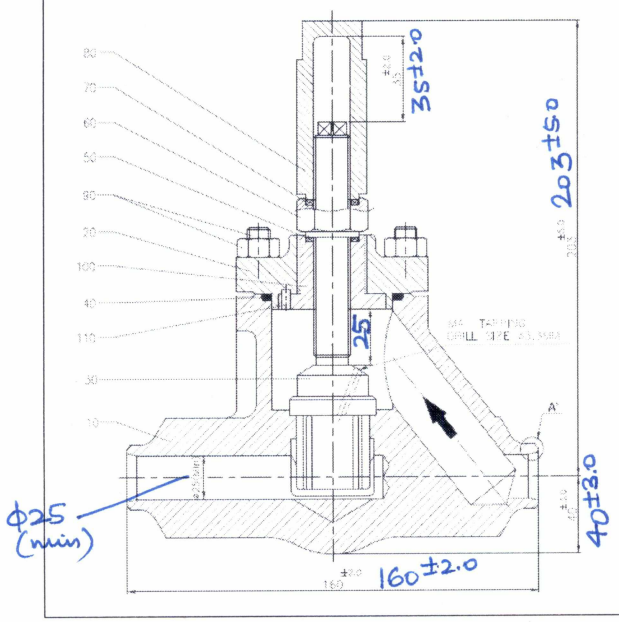
Fig. 1: THROTTLE VALVE NB20



Item No.:	Description
10:	Body
20:	Cover
30:	Throttle
40:	Cover Oring/gasket
50:	Gasket
60:	Nut
70:	Gasket
80:	Capped Nut
90:	Cover stud & Nut
100:	Cover Bush
110:	Grub Screw

Min. hole size to prevent oil starvation = ϕ 3.3mm

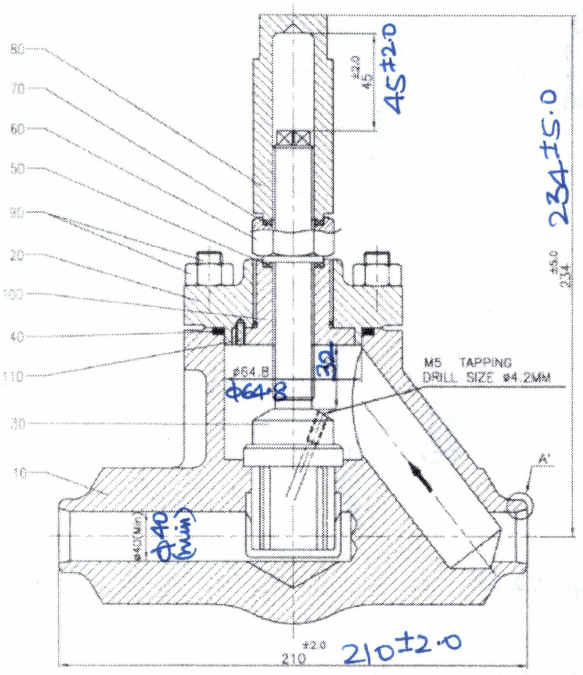
Fig. 2: THROTTLE VALVE NB25



Item No.:	Description
10:	Body
20:	Cover
30:	Throttle
40:	Cover Oring/gasket
50:	Gasket
60:	Nut
70:	Gasket
80:	Capped Nut
90:	Cover stud & Nut
100:	Cover Bush
110:	Grub Screw

Min. hole size to prevent oil starvation = ϕ 3.3mm

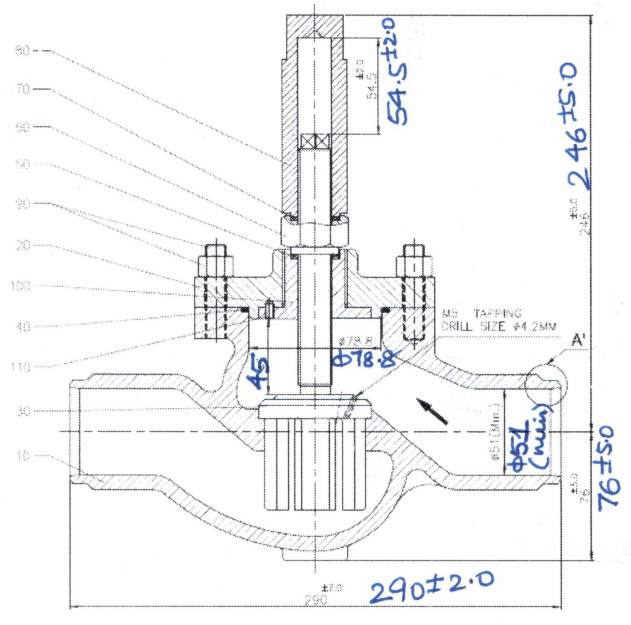
Fig. 3: THROTTLE VALVE NB40



Item No.: Description
10: Body
20: Cover
30: Throttle
40: Cover Oring/gasket
50: Gasket
60: Nut
70: Gasket
80: Capped Nut
90: Cover stud & Nut
100: Cover Bush
110: Grub Screw

Min. hole size to prevent oil starvation = ϕ 4.2mm

Fig. 4: THROTTLE VALVE NB50

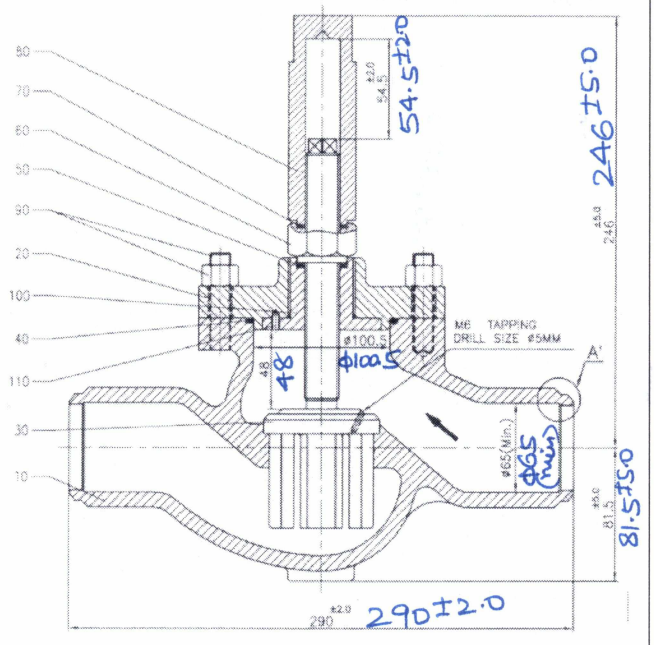


Item No.: Description
10: Body
20: Cover
30: Throttle
40: Cover Oring/gasket
50: Gasket
60: Nut
70: Gasket
80: Capped Nut
90: Cover stud & Nut
100: Cover Bush
110: Grub Screw

Min. hole size to prevent oil starvation = ϕ 4.2mm

Worked & Checked by	HS DOGRA (Dy. Mgr. STE-TL)	13/6/19
Approved by	A JAIN (Dy. Gen. Mgr. STE-TL)	
Agreed By	Sanjeev Bhardwaj (Sr. Engr. QAX-BOI)	13.06.19
	Name Signature	

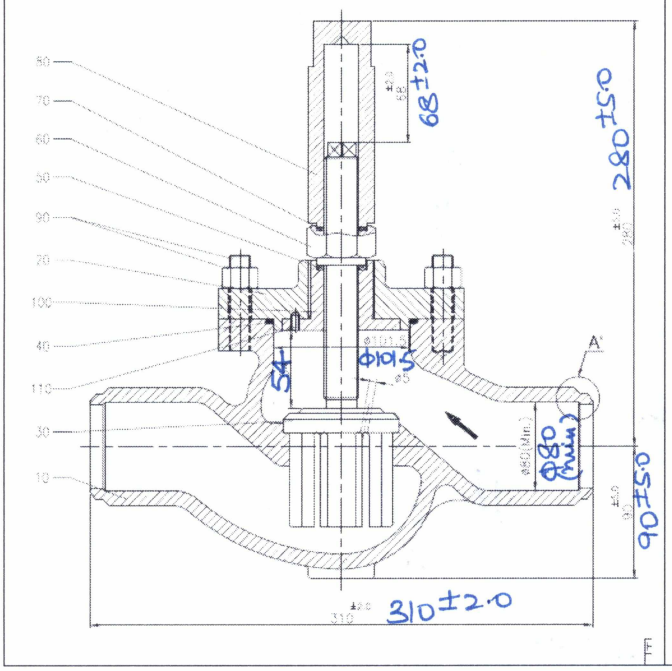
Fig. 5: THROTTLE VALVE NB65



Item No.: Description
10: Body
20: Cover
30: Throttle
40: Cover Oring/gasket
50: Gasket
60: Nut
70: Gasket
80: Capped Nut
90: Cover stud & Nut
100: Cover Bush
110: Grub Screw

Min. hole size to prevent oil starvation = ϕ 5.0mm

Fig. 6: THROTTLE VALVE NB80



Item No.: Description
10: Body
20: Cover
30: Throttle
40: Cover Oring/gasket
50: Gasket
60: Nut
70: Gasket
80: Capped Nut
90: Cover stud & Nut
100: Cover Bush
110: Grub Screw

Min. hole size to prevent oil starvation = ϕ 5.0mm

Worked & Checked by	HS DOGRA (Dy. Mgr. STE-TL)	13/6/19
Approved by	A JAIN (Dy. Gen. Mgr. STE-TL)	
Agreed By	Sanjeev Bhardwaj (Sr. Engr. QAX-BOI)	13.06.19
	Name Signature	

E. FLUSHING DEVICE

1. Flushing device is a name given to the following items as shown in Fig. 7:-
   a. Flange
   b. Gasket
   c. Pin extractor
   d. Flushing strainer
   e. A rod to remove flushing strainer (having threads at one end, refer Clause E.2.b below)

The above items shall be supplied alongwith throttle valve which shall be fitted by BHEL's site inside the valve body for oil flushing operation.
Item nos. 1 to 4 shall be supplied for each oil throttle valve.
Item no. 5 shall be supplied for each nut size (refer Clause E.2.b below).

2. Following points are noteworthy:-
   a. Flushing Strainer is a basket type of strainer having a lining of a mesh of size 185 microns. The mesh shall be sandwiched between two perforated sheets of thickness 1mm. This strainer shall be fitted on valve seat and pin extractor ensures that this flushing strainer doesnot get lifted up from its seat when oil flows.
   b. Refer the item marked as "nut" in Fig. 7. This nut shall be welded at bottom of flushing strainer. A rod shall be supplied by valve supplier which shall have threads at one end so that when the flushing strainer is to be removed, the threaded end of the rod shall be tightened in the nut and the flushing strainer is taken out.

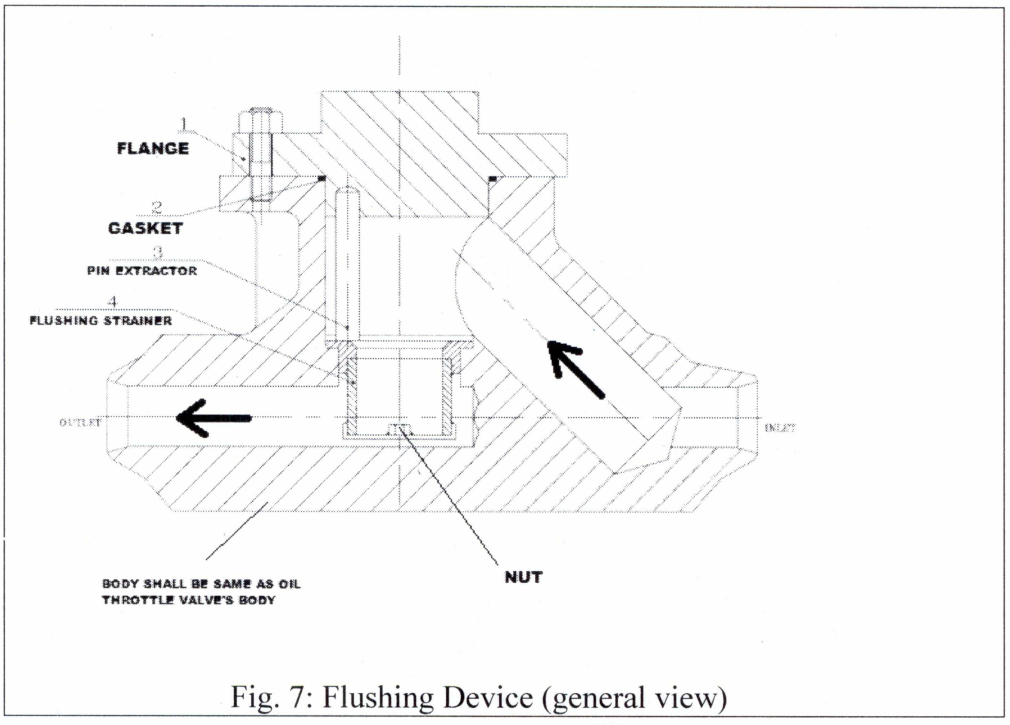


Fig. 7: Flushing Device (general view)

F. DOCUMENTS TO BE SUBMITTED BY SUPPLIER

1. During Technical Scrutiny along with offer
   a. One set, in hard copy, of GA drgs. of each valve-size and flushing device for each size offered

2. After placement of Purchase order
   a. One set, in soft copy, of GA drgs. of each valve, flushing device and characteristic curves for each size offered.

G. INSPECTION AND TESTING

1. The manufacturer shall conduct all tests required to ensure that all the components of the valve offered
   a. Conform to the requirements of the specification.
   b. Conform to requirements of application.
   c. And are in compliance with the requirements of applicable codes and standards.

2. The bidder shall submit quality plan along with offer.

3. The particulars of the proposed shop tests and procedure for the test shall be submitted to BHEL/its customer for approval along with quality plan.

4. The equipment shall be dispatched only after inspection and clearance of material by BHEL/its customer and approval of test certificated by BHEL/its customer.

5. Tests

The minimum test/check to be carried out on the valve, as envisaged by BHEL, are given below. This is, however, not intended to form a comprehensive testing programme as it is supplier's responsibility to prepare a detailed quality plan which shall also include tests, checks carried out by supplier as a part of their normal practice. This quality plan is subject to approval of BHEL/its customer. BHEL/its customer reserves the right to ask for any more check at the time of quality plan finalization.

The following tests shall be carried out during various stages of manufacturing at manufacturer's works on each of the complete valve and its flushing device:-

a. **NDT:** DPT on valve body, cover, stem, seat, flushing part and all welded joints to check for surface defects.

b. Welding of screen with perforated sheet shall be tested as per supplier standard practice.

c. **Dimensional Check:** Check for dimensional measurement shall be done.

d. **Function Test:** Smooth opening and closing of valve shall be ensured by functional test.

e. For any new valve, where characteristic curve is not available with the supplier, supplier shall prepare a test setup and produce characteristic curve thru actual testing.

f. **Material Testing:** The material of each component shall be tested as per relevant specification for its chemical composition and mechanical properties viz Yield Strength, impact, percent elongation etc. Material certificates shall be submitted as part of Quality documentation

g. **Hydrostatic Test:** Hydraulic Test shall be carried out on each valve. After hydraulic test all internal shall be wiped, cleaned and dried. Body shall be tested hydraulically in accordance with test P10 according to EN 12266 Part 1. Valve body shall be subjected to hydro test at 10bar for 15 mins. Test certificates mentioning about test pressure and duration of test alongwith following information shall be furnish to purchaser:-
   a. Valve KKS Tag
   b. Type of Valve
   c. Valve Size
   d. Name of manufacturer
   e. Project Name
   f. Date of testing

h. Color matching of valve seat and plug in case of metal to metal contact.

H. CLEANING AND SURFACE PROTECTION

Unmachined surfaces shall be blast cleaned to remove any rust/ dust.

I. PACKING

Valve ends, machined and unmachined surfaces etc. shall be protested against rusting and corrosion and valve shall be packed according to mode of transport and storage in top shade store gantry in tropic climatic conditions for a period of 8-12 months. Valve shall be supplied with all ends of valve body properly and suitably sealed.

J. GUARANTEE

The supplier shall guarantee trouble free and satisfactory operation of the equipment for a period of 12 months after installation and commissioning or 18 monthts from the date of dispatch from supplier's works.

If, during erection/commissioning, and operation at site, any defect in any component is detected, purchaser's/owner's site representative shall prepare the assessment report and a copy of the same shall be forwarded to the supplier. The supplier shall replace /rectify the concerned items free of charge. The supplier, of he so desired, may depute his representative to site at his own cost otherwise the report of purchaser's/owner's site representative shall be binding of supplier.

K. MISCELLANEOUS REQUIREMENTS

1. The following shall be printed/painted on the valve for easy identification:
   a. KKS TAG
   b. Valve size
   c. PO Number

Description of Oil Throttle Valve:-

Oil throttle valves are installed in lube oil supply line to turbine-generator bearings for regulating the flow of oil to each bearing of Steam Turbine & Generators.

Type of Valve: Globe Type. The plug of Oil Throttle valve is cylindrical is shape with openings cut into it across the length. The regulation of oil flow is achieved by rotating its stem. The stem has threads (counter-threads are in valve cover). When the stem is rotated, it moves up and down. Due to this up and down movement of stem and hence plug, the flow area available to fluid changes which allows for flow regulation.

Characteristic curves of the Valves are also to be supplied by valve supplier to BHEL. These curves are at different differential-pressures (ΔP) wherein valve opening (also known as piston travel) is shown in X-axis and flow is shown in Y-axis. These are also called as flow-lift characteristics. Characteristic curves are required for ΔP varying between 0.50bar to 3 bar. These curves are obtained by actual testing of the valve prototype. For illustration, refer Fig. 3.

Table 1: Technical Parameters

Sl. No.	Description	Value
1	Working Pressure	4 bar
2	Design pressure	8 bar
3	End Connection	Butt weld with pipe schedule 10S ASME B16.25-2003 Weld fig. 4
4	Working Fluid	Turbine Oil ISO VG46
5	Working temperature	50deg C
6	Max. Temperature	80deg C
7	Material of Construction (All parts in contact with oil)	SS Gr. 316L or 321 or equivalent
8	Mat. Of Construction (Gaskets/Orings etc)	Viton

For the purpose of this category in Gem Portal, the enquiry above mentioned valve type and description is meant/defined and is to be understood/supplied by vendor. Other types of Oil Throttles like butterfly valves, disc valves, needle valves etc are not meant and not to be understood. Refer Figure 1 for Oil Throttle Valve.

The "flushing operation" is also supplied along with the valve for declaration of flushing in each individual line going to Turbine and Generator bearings. These are components which are used in flushing of the lube oil. Parts of flushing operation include flushing strainer, pin extractor, gaskets, flange, etc. Refer Figure 2 for Flushing Operation.

Some of the technical details of the valves required by BHEL are mentioned below:-

1. Range of flow, range of travel and range of differential pressure are mentioned in Table-1. Each throttle valve of a particular size shall work for the full range of differential pressure, flow & travel indicated in Table-1 against it. Eg. Nb50 valve shall work for range of oil flow from 0-80 m3/hr with range of travel from 0 -45 mm at different differential pressures ranging from 0.50-3.0 bar
2. The flushing operation as indicated in Figure -2 must be of basket type lined mesh stainless steel screen. Mesh size is 185 microns. The screen of strainer should be sandwiched between two perforated sheets.

Table-1: Overview of range of flow and range of piston travel of Oil Throttle Valve

	Valve size(Nb20)	Valve size(Nb25)	Valve size(Nb50)	Valve size(Nb65)	Valve size(Nb80)
Range of Oil flow (m3/hr).	0-18	0-18	0 - 80	0 - 100	0 - 150
Range of Travel of piston (mm)	0-25	0-25	0 - 45	0 - 48	0 - 62
Range of differential pressure across Oil Throttle Valve (bar)	0.50 – 3.0				

Note: This data gives only a general overview. This is not project specific data. For actual project specific value, refer project specific specification.

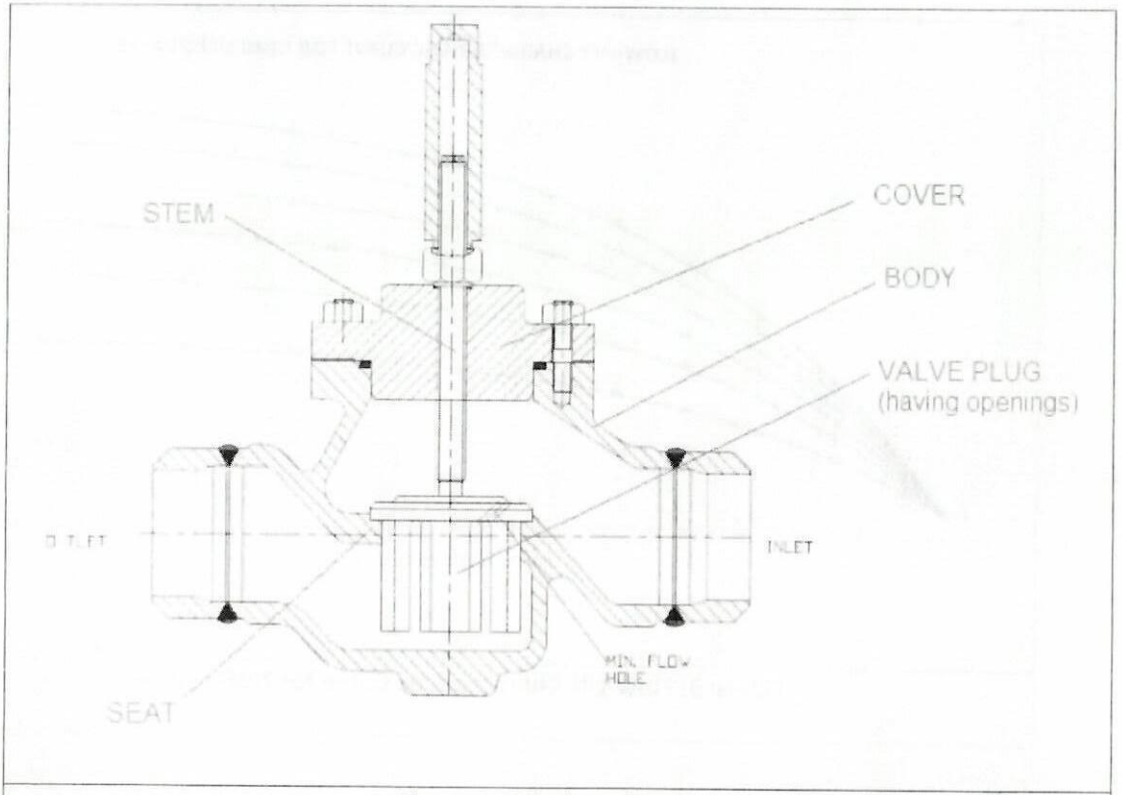


Figure 1: Oil Throttle Valve

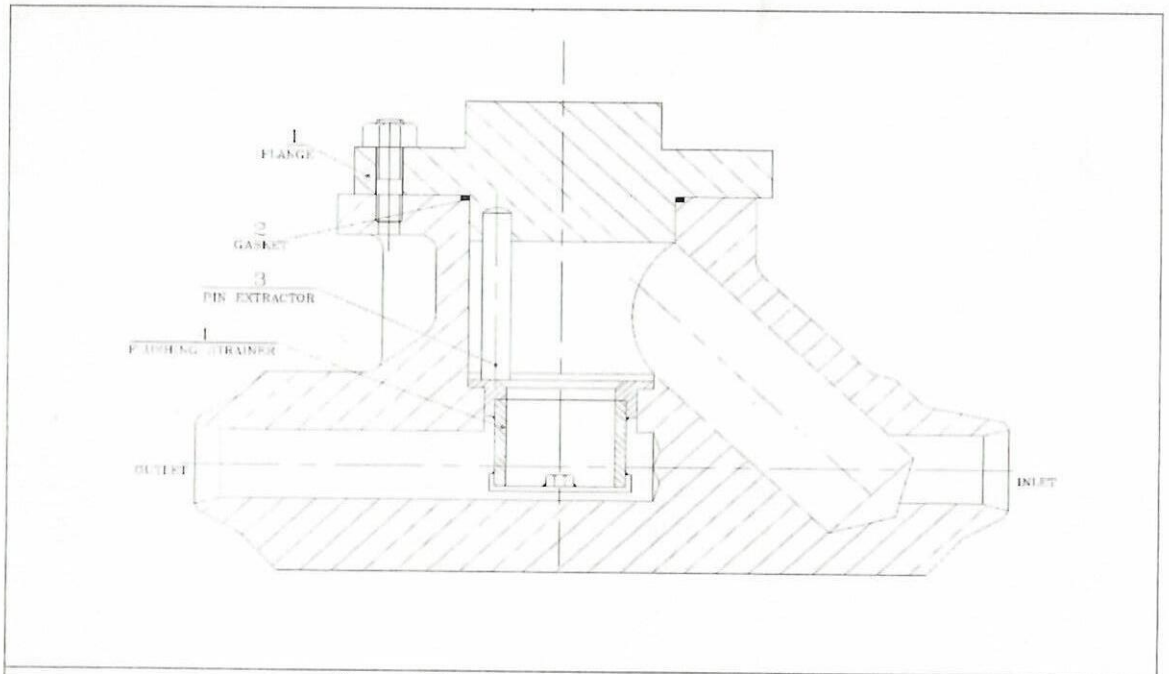


Figure 2: Flushing Operation Components

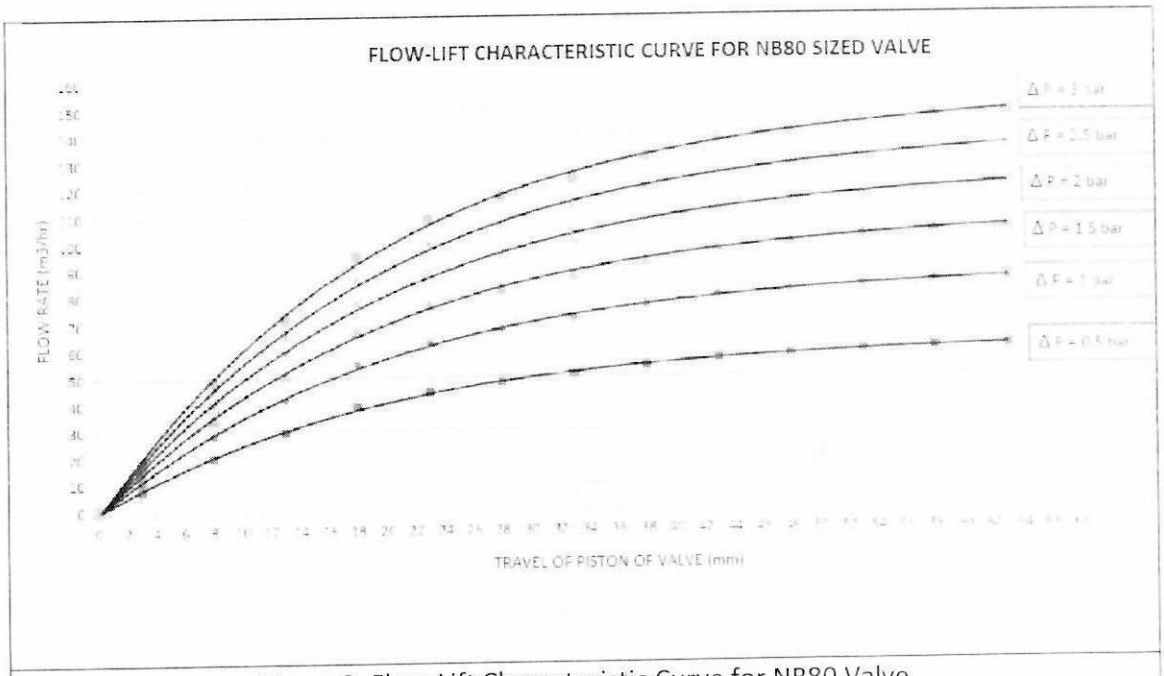


Figure 3: Flow-Lift Characteristic Curve for NB80 Valve