

**Mandatory Pre-Qualification requirements for Vortex flow meter W96415002767  
as per TG60665**

**Description:** - The vortex flow meter is used to measure volume flow of De-mineralized water at outlet of bushing in Turbo generators. The vortex flow meters shall be suitable for mounting in horizontal/vertical direction of flow with flanged connections.

**Mandatory Pre-Qualification requirements**

- 1.0** The vendor should be a regular manufacturer of Vortex flow meter with following technical requirements-

SI No.	Parameter	Value
(i)	Application fluid	DM Water
(ii)	Flow rate	≤ 25 m <sup>3</sup> /hr.
(iii)	Size	≤ 1 inch (NB25)
(iv)	Working Pressure	1.5 bar (minimum)
(v)	Measuring accuracy	±0.75% or better
(vi)	Electrical output	4-20 mA, 2 wire output HART Protocol

- 2.0** In support of above, vendor shall furnish technical details in below mentioned format for at least five (5) nos. of vortex flow meter for the P.O. executed in past 10 years (from date of enquiry) along with P.O. copies meeting requirements as per point no. 1 above.

S. No.	Brief technical details	Data	P.O. Ref. No.	Name & address of customer	Date of supply
	- Application fluid	DM Water			
	- Working pressure				
	-Working Temperature				
	- Flow rate				
	- Material of body/flanges/inside parts				
	-Measuring accuracy				

- 3.0** Vendor to furnish the test certificate for calibration and hydraulic test of vortex flow meter for any one of the P.O. submitted against clause 2. Vendor to also furnish the NABL accreditation details of calibration facility.
- 4.0** Acceptance certificate from one of the vendor's end user of Vortex flow meter to be provided for any one of the P.O. submitted as per clause 2.0. Acceptance certificate should contain information like item details and its application.

**Mandatory Pre-Qualification requirements for Vortex flow meter  
W96415002910(dual sensor) & W96415002902(single sensor) as per TG60665**

**Description:** - The vortex flow meter is used to measure volume flow of De-mineralized water at outlet of stator winding in Turbo generators. The vortex flow meters shall be suitable for mounting in horizontal/vertical direction of flow with flanged connections.

**Mandatory Pre-Qualification requirements**

- 1.0 The vendor should be a regular manufacturer of Vortex flow meter with following technical requirements-

SI No.	Parameter	Value
(i)	Application fluid	DM Water
(ii)	Flow rate	≥50 m <sup>3</sup> /hr.
(iii)	Working Pressure	1.5 bar (minimum)
(iv)	Measuring accuracy	±0.75% or better
(v)	Electrical output	4-20 mA, 2 wire output HART protocol
(vi)	No. of sensor	Single/ Dual

- 2.0 In support of above, vendor shall furnish technical details in below mentioned format for at least five (5) nos. of vortex flow meter for the P.O. executed in past 10 years (from date of enquiry) along with P.O. copies meeting requirements as per point no. 1 above.

S. No.	Brief technical details	Data	P.O. No.	Ref.	Name & address of customer	Date of supply
	- Application fluid	DM Water				
	- Working pressure					
	-Working Temperature					
	- Flow rate					
	- Material of body/flanges/inside parts					
	-Measuring accuracy					
	-No. of sensors for flow measurement.					

- 3.0 Vendor to furnish the test certificate of Vortex flow meter for any one of the P.O. submitted against clause 2. Vendor to also furnish the NABL accreditation details of calibration facility.
- 4.0 Acceptance certificate from one of the vendor's end user of vortex flow meter to be provided for any one of the P.O. submitted as per clause 2.0. Acceptance certificate should contain information like item details and its application.

MANUFACTURER'S NAME AND ADDRESS		STANDARD QUALITY PLAN					TO BE FILLED BY BHEL			TO BE FILLED BY BHEL			
 BHEL	VENDOR'S NAME	ITEM	<b>FLOW METER</b>			QP NO.	QA/BE/QP/925						
			<b>(Vortex Type)</b>			REV.	00	Date: 07.03.2022					
		Drg. No.	As per PO										
		Spec.	TG60665										
		Spec. Rev.	As per PO			Page 1 of 1							
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY			REMARKS
										M	B	N	
1	2	3	4	5	6	7	8	9	D	10			11

<b>1.0 RAW MATERIALS</b>													
1.1	Flange, body, sensor, bluff body and all water contact parts	Chemical composition	Major	Measurement	1 sample/lot	Ord. Drg./Spec.	Ord. Drg./Spec.	MTC	√	P	V	-	
1.2	Electronic housing	Chemical composition	Major	Measurement	1 sample/lot	Ord. Drg./Spec.	Ord. Drg./Spec.	MTC	√	P	V	-	
<b>2.0 FINAL TESTING</b>													
2.1	Visual & Dimensional check	--	Major	Measurement	100%	Ord. Drg./Spec.	Ord. Drg./Spec.	IR	√	P	W	-	
2.2	Hydraulic test	--	Major	Physical	100%	Ord. Drg./Spec.	No leakage	IR	√	P	W	-	
2.3	Calibration test	--	Major	Physical	100%	Ord. Drg./Spec.	Ord. Drg./Spec.	IR	√	P	W	-	
2.4	Electrical output check	--	Major	Electrical	100%	Ord. Drg./Spec.	Ord. Drg./Spec.	IR	√	P	W	-	
2.5	Compliance to technical specification	--	Major	Review	100%	Ord. Drg./Spec.	Ord. Drg./Spec.	COC	√	P	V	-	
2.6	Marking	--	Major	Review	100%	Ord. Drg./Spec.	Ord. Drg./Spec.	-	-	P	V	-	
2.7	Packing	--	Major	Review	100%	Ord. Drg./Spec.	Ord. Drg./Spec.	-	-	P	V	-	

Note: 1. Witness by inspection agency to be random 10% of each material code (minimum 1 pieces per material code) from each lot. However, vendor to carry out 100% tests internally and tests report shall be reviewed by inspection engineer during inspection at Vendor's works. 2. Manufacturer to maintain calibrated instrument having better accuracy than the item under the test. Inspection engineer shall check the same.

Digitally signed  
by Sachin Jain  
Date:  
2023.09.22  
14:43:03 +05'30'

MANUFACTURER/ SUBCONTRACTOR	LEGEND: ORD.: PURCHASE ORDERING, DRG: BHEL APPROVED DRAWING, SPEC: BHEL SPECIFICATION, MTC: MATERIAL TEST CERTIFICATE, T.C.: TEST CERTIFICATE, I.R.: INSPECTION REPORTS, COC: CERTIFICATE OF CONFORMANCE, M: MANUFACTURER / SUBCONTRACTOR B: BHEL / NOMINATED INSPECTION AGENCY, N: CUSTOMER, 'P': PERFORM, 'W': WITNESS, 'V': VERIFICATION, "√" RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHP' OF CUSTOMER	FOR CUSTOMER USE	APPROVED BY
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