



**CONTROLS & INSTRUMENTATION (FB)
PRE-QUALIFICATION REQUIREMENT (PQR)**

**CI:PE:PQR: OPA
Rev. No: 00
Dt. : 21-09-2021**

Orifice Plate Assembly

Sl. No.	Description	Bid Requirements	Vendor compliance
1	Vendor Capability	Vendor shall be the Original Equipment Manufacturer (OEM) of Orifice Plate Assembly.	
2	Past experience /Reference Projects	<ul style="list-style-type: none">• Vendor to submit signed copy of the reference list of projects, where the offered Orifice Plate Assembly, was supplied earlier in the past five years. The reference list should contain the following details, Name of the projects, Customer, Capacity of the plant, location, Orifice Plate size, application, year of commissioning and contact details along with relevant PO copies.• Vendor shall submit the performance Certificates from End User/ Principal Contractor (if the supplies were through agencies other than BHEL).	

BHARAT HEAVY ELECTRICALS LIMITED

HIGH PRESSURE BOILER PLANT, TIRUCHIRAPALLI – 620 014

TECHNICAL DELIVERY CONDITIONS FOR SUB - DELIVERY COMPONENTS OF CONTROLS AND INSTRUMENTATION



TCI:8100-SCR/ORIFICE



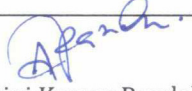
PAGE 1 OF 4

ORIFICE PLATE ASSEMBLY

for

Project: NALCO Damanjodi, 1 x 18.5 MW CPP, SCR Package
Customer Nos.: 8100

REVISION HISTORY

REV. No.	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
00	01-11-2021	Initial Release	 (N.Rakesh)	 (N.Rakesh)	 (Aswini Kumar Panda)

**1.0 TECHNICAL SPECIFICATION**

Sl. No.	Characteristics	Requirements
1.0	Site Condition	
1.1	Altitude above mean sea level	910 m above MSL
1.2	Ambient temperature	13 - 41 °C
1.4	Relative humidity	50 - 89%
2.0	Type of Flow Element	Concentric Square Edge Orifice plate with Flanges
2.1	Reference Standard	ASME PTC-19.5 (Part-II), ISO 5167, ISO/TR 15377
3.0	Flange Details	
3.1	Type of Flange	Weld Neck Raised Face (WNRF) Flange
3.2	Flange Tapping Details	Three pairs of tapping (120° apart) having end connection 1/2" NPT(F)
3.3	Flange Dimensions	Suitable to butt weld with the pipe as per pipe size indicated in the data sheet reference.
3.4	Flange Rating	300 LBS
3.5	Flange Material	A105
4.0	Orifice Plate Details	
4.1	Orifice Material	SS316
4.2	Orifice Plate Thickness	3 mm
4.3	Vent & Drain	Vent & Drain Holes are to be provided as per standard.
5.0	Performance Parameters	
5.1	Beta (β) ratio	Between 0.3 to 0.7 (0.5 can be preferred)
5.2	Max. Pr. loss allowed	40 - 60 % of Max. Diff. Pressure.
5.3	Accuracy	± 1.0 % of full scale
5.4	Uncertainty in flow measurement	As per standard ISO 5167 & same to be proved in calibration.
6.0	Design Aspects	<ol style="list-style-type: none">1. Flange bore diameter shall be the same as pipe's internal diameter.2. Orifice to be designed for operating flow at normal operating pressure and temperature.3. All the orifice plates shall be fabricated with a collar, which shall extend outside the mounting flange.

Sl. No.	Characteristics	Requirements
7.0	Mounting Accessories	1. Accessories like gaskets, flanges, flange bolts, nuts, jack screws etc. to be provided. 2. Flanges & Fasteners shall be with red oxide primer paint
8.0	Engraving	Tag no., orifice plate bore diameter, upstream (+) and downstream (-) side marking and plate material shall be engraved on the handle of the orifice plate.
9.0	Documents	
9.1	To be submitted along with offer	Sub Delivery Enquiry Deviation indicating the Description, Specification, Quality Plan, Packing Procedure reference.
9.2	To be submitted after placement of Purchase Order for approval	1. Orifice Plate Design Calculation Sheet. 2. DP Vs Flow Curve in mmWC & Kg/Hr. 3. Orifice Plate with Flange Assembly GA drawing
9.3	To be submitted during Inspection	1. Calibration test report from NABL approved lab for one Orifice plate per each service. 2. Material certificates for all items.
10.0	Quality Plan	QA:CI:STD:QP:16/06
11.0	Packing Procedure	QA:CI:STD:PR:04/03

Note:

1. Vendor to duly sign and stamp for compliance/confirmation for the BHEL's specification.
2. In case of any deviation it shall be mentioned only in BHEL's Sub-Delivery Enquiry Deviation Format.
3. The entire system and accessories should not contain any asbestos material.

**2.0 DATA SHEET REF: DS/1727-SCR/ORIFICE**




1		Application		Sonic Horn for SCR Reactor - Air Flow	
2	Medium	Air			
3	Instrument Tag no	0605FE3301			
4	Quantity per Boiler	No.	1		
5	Maximum Pressure	Kg/cm ²	7		
6	Maximum Temperature	°C	35		
7	Maximum Flow	Nm ³ /Hr	25		
8	Pipe size (OD X T)	mm	NB25 (33.4 x 3.38 mm)		
9	Flow Range	Nm ³ /Hr	0 - 30		
10	Recommended DP at Max Flow	mmWC	100		



CONTROLS AND INSTRUMENTATION/QA/FB

STANDARD QUALITY PLAN FOR

ORIFICE PLATE ASSEMBLY

REV	DATE	PREPARED	REVIEWED	APPROVED	REVISION HISTORY
00	----	Sd/-	Sd/-	Sd/-	Initial release.
01	13/10/1993	Sd/-	Sd/-	Sd/-	Converted to 9 column QP
02	16/06/1997	Sd/-	Sd/-	Sd/-	Format revised
03	21/03/2002	Sd/-	Sd/-	Sd/-	Dept. name changed. CTQ requirements added & General revision.
04	07/12/2007	Sd/-	Sd/-	Sd/-	Revised to include the comments/feedback of Internal discussion / vendors meet.
05	17/01/2009	Sd/-	Sd/-	Sd/-	Revised based on feedback from Inspection agencies and customer. Format Revised.
06	20/05/2013	RM.VAIRAVAN 	N.SRIDHAR 	K.PALANIVEL 	QP revised for P91 material.



Sl. No	Component & Operation	Characteristics	Class	Type of Check	Quantum of check		Ref Doc. & Acceptance STD	Format of record	AGENCY			REMARKS
					M	B/C			M	B	C	
A	RAW MATERIAL & BOUGHT OUT ITEMS INSPECTION											
01	Plates, pipes and forging	a. Material	Major	CHEM	1 sample plate for each lot	--	Spec. Appd Drg	TC	P	-	-	
		b. Log Sheet Verification	Major	VISU	100%	100%	Specification	Log Sheet	P	V	-	Applicable in case of P91
		c. Forging for flow elements	Major	UT	100%	--	ASTM A388 - 203.2	LGB	P	-	-	
02	Valves	a. Type & Make	Major	PHYS	100%	--	Spec. IBR Certificate	TC	P	-	-	
		b. Bore size	Major	MEAS	100%	--	Spec. Drg	LGB	P	-	-	
		c. End connection	Major	PHYS	100%	--	-Do-	LGB	P	-	-	
		d. Hydraulic Test	Major	PHYS	100%	--	At rated pressure for 5 min.	LGB	P	-	-	There shall be no leak
03	Flanges	a. Type & make	Major	PHYS	100%	--	Spec. IBR Certificate	TC	P	-	-	
		b. Bore size	Major	MEAS	100%	--	Spec. Drg	LGB	P	-	-	
		c. End connection	Major	PHYS	100%	--	-Do-	LGB	P	-	-	
04	Fasteners & Gaskets	a. Material, Dimension	Major	PHYS	100%	--	-Do-	LGB	P	-	-	
B	IN PROCESS INSPECTION											
01	Welding Procedure Specification	Correctness	Critical	PHYS	100%	100%	ASME IX	Format of IS / ASME	P	V	-	Refer Note.8
02	Procedure & Welder Qualification	Correctness	Critical	Welding Test	Each welder	Each welder	ASME IX	IIR	P	V	-	Refer Note.9
03	Machining	a. Dimensions	Major	MEAS	100%	--	Spec. Drg	LGB	P	-	-	
		b. Verticality	Major	PHYS	100%	--	-Do-	LGB	P	-	-	
		c. Concentricity	Major	PHYS	100%	--	-Do-	LGB	P	-	-	
		d. Surface finish	Major	PHYS	100%	--	-Do-	LGB	P	-	-	
04	Welding	a. Weld ends	Major	LPI	100%	--	-Do-	LGB	P	-	-	

M- MANUFACTURER/ SUB-VENDOR; **B** - BHEL / TPI ; **C** - CUSTOMER / TPI
P - PERFORM ; **W** - WITNESS **V** - VERIFICATION ;



Sl. No	Component & Operation	Characteristics	Class	Type of Check	Quantum of check		Ref Doc. & Acceptance STD	Format of record	AGENCY			REMARKS
					M	B/C			M	B	C	
		b. Weld profile and surface finish	Major	VISU	100%	--	-Do-	LGB	P	-	-	
		c.Hardness on Butt Joint & Heat Affected Zone(HAZ) *Eco-Tip Method	Major	MEAS	100%	10%	ASTM E 10	IIR	P	V	-	Hardness Report * Applicable in case of P91
05	Heat treatments	Heat Treatment (HT)- *Induction Heat (Pre & Post Welding)	Major	VISU	100%	10%	ASTM E-165 / ASME Sec VIII Div I / IS: 3658	HT Chart	P	V	-	*Applicable in case of P91
C	FINAL INSPECTION											
01	Routine tests	a. Hydraulic test (Not applicable for flanged type)	Critical	Major	100%	100%	1.5 times rated pressure	TC	P	V		IBR Form III C (wherever applicable)
		b. Physical and dimensional check	Major	MEAS	100%	100%	Spec. Drg	TR	P	W		
		c. Finish, alignment and tapping orientation	Major	MEAS VISU	100%	100%	Spec. Drg	TR	P	W		
		d. marking of flow direction	Major	PHYS	100%	100%	Spec. Drg	TR	P	W		
		e. Edge preparation	Major	PHYS	100%	100%	Spec. Drg	TR	P	W		
		f. Pressure taps	Major	PHYS	100%	100%	Spec. Drg	TR	P	W		
		g. Meter run pipes weld seams	Critical	RT	100%	100%	There shall be no flaw	TC	P	V		
02	Type test	Accuracy (Wet Calibration)	Major	MECH	1 No./ Size	1 No./ Size	Spec. ISO 5167	TC	P	V		Refer Note.10

D.NOTES:

1.LEGENDS:

THER	:	Thermal	MEAS	:	Measurement
MECH	:	Mechanical	LGB	:	Log Book
CHEM	:	Chemical	TC	:	Test certificate
VISU	:	Visual	TR	:	Test Report
UT	:	Ultrasonic Test	RT	:	Radiographic Test

2. The vendor at their works shall arrange all testing facilities. Tests for which facilities are not available are to be carried out at recognized National Test Houses like ETDC/CIL/NPL/ERTL etc., at vendor cost.

- Vendor to give tentative inspection program in advance and confirm exact date two weeks in advance for arranging BHEL's inspection.
- Packing shall be as per the "PACKING PROCEDURE" indicated in the specification.
- WPS subject to approval of BHEL prior to start of manufacturing of Flow Nozzle. In case WPS is already approved by BHEL in earlier project (similar type), it need not to be approved again. Same shall be reviewed.
- In case welder already approved and continuously doing welding, Earlier record can be reviewed and need not be qualified again.
- Type test certificate shall not be earlier than 5 years from the date of Purchase enquiry conducted for same Beta ratio and line size. If Type test

M- MANUFACTURER/ SUB-VENDOR; **B** - BHEL / TPI ; **C** - CUSTOMER / TPI
P - PERFORM ; **W** - WITNESS **V** - VERIFICATION ;



3. Through Log Book / any other documents available at the vendor's works, it shall be possible to correlate the finished products with raw material and in process stage checks / inspection carried out.
4. All Measuring and Testing Instruments shall be periodically calibrated from recognized test houses & certificates made available during inspection for verification.
5. Test certificates for routine type tests are to be furnished by the vendor.

Certificate validity is expired (or) such type test certificates not available, Vendor has to conduct Fresh Type test at Govt./ NABL Accredited Lab.

E. REFERENCE STANDARDS:

(For Indicated Standards Refer the Latest Version)

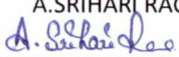

ISO 5167 : Measurement of fluid flow in pipes

SQP16R6.doc

**BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPPALLI**

**CONTROLS AND INSTRUMENTATION / FB
QUALITY ASSURANCE**

**STANDARD PACKING PROCEDURE
FOR
ALL INSTRUMENTS AND MISCELLEANEOUS ITEMS
(ELECTRICAL, ELECTRONIC AND PNEUMATIC)**

Rev	Date	Prepared	Checked	Approved	Revision History
00	01.01.96	Sd/-	Sd/-	Sd/-	Initial History
01	28.03.02	Sd/-	Sd/-	Sd/-	Department name changed
02	26.02.07	Sd/-	Sd/-	Sd/-	Revised after discussion with Shipping Dept.
03	17.12.16	A.SRIHARI RAO 	RM.VAIRAVAN 	S.DAKSHINAMOORTHY 	Revised to suit all type of instruments.

1. Scope

This procedure gives minimum guidelines to be complied with for packing of Electrical, Electronic and pneumatic Instruments. This packing shall be suitable for different handling operations and for the adverse conditions during transportation and during indoor / outdoor storage for period more than one year.

2. Material for packing

The individual instrument shall be packed in carton box (specifically made for particular instrument) and grouped together inside a box made of wood or plywood as per National / International standard.

3. Packing

- Items shall be inspected for cleanliness immediately before packaging. Dirt, oil, residue, metal chips or other forms of contamination shall be removed.
- Adequate protection shall be provided against mechanical damage and atmospheric corrosion in transit and, for equipment suitable for outside storage, for prolonged storage at the site prior to installation.
- Water proof barrier material – high density polythene shall be used as a resistant to grease and water; it shall protect items from airborne and windblown soils.
- Desiccants like silica gel to be used inside the carton box. Silica gel shall conform to IS 3401. The gel is to be packed in sachets placed at different positions inside the components for absorbing moisture. The quantity of silica gel shall be adequate for storage period of one year.
- All tapped openings in equipment shall be plugged with plastic plugs to protect internal / external threads.
- Use a sturdy cardboard shipping carton, large enough for at least 3 inch foam padding around the instrument.
- Do not use loose plastic foam pieces, which can shift during transport.
- Secure the box flaps with packaging tape or box staples.

3.1) Marking & Labelling:

- Components and their containers shall be identified by marking. Shipping marks shall be on all sides of package. The shipping marks shall be at least 3 inches high where space permits. Markings are to be in black paint or ink depending on shade of the package surface.
- Cautionary symbols to be stenciled in red waterproof paint or ink.

QA:CI:STD:PR:04 / Rev 03

- The gap between job and the box shall be filled with suitable material like jute, coir, thermo coal, etc.
- For export packing additional care shall be taken as per contract requirements if applicable. Otherwise, suitable box made of seasoned wood and / or plywood sheets of required thickness shall be used with suitable sea worthy packing protection.

4. Marking

- After completing the packing, Stencil marking, as per dispatch instructions and symbol marking as per Annexure – I shall be made. Please ensure the box is stenciled with “FRAGILE ITEM”, “HANDLE WITH CARE”.

5. Packing Slip

- A copy of the packing slip, kept in a polythene cover shall be kept inside the box. Another copy of the packing slip, kept in a polythene cover shall be kept outside the box and firmly fixed to the case.

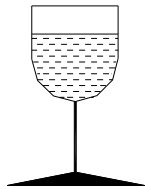
6. Caution

- Do not pack any other Mechanical items with this case.

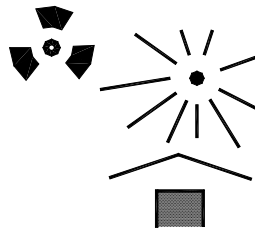
7. General

- These packing procedures are the minimum requirements in addition to the standard instructions mentioned in the Purchase Order and Specification.
- Deviation to meet the packing procedure requirements / non-clarity in packing approach in any quotation will be liable for rejection of offer.

ANNEXURE - 1



FRAGILE, HANDLE WITH CARE



PROTECT FROM HEAT AND RADIOACTIVE SOURCES



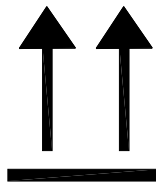
USE NO HOOKS

NOTE: The design of heavy goods packages cannot always resist top lifting by grabhooks.



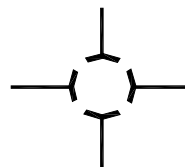
KEEP DRY

NOTE: Not all cases have waterproof internal liners; plywood used in the construction may not have a waterproof glue-line.



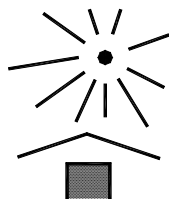
THIS WAY UP

NOTE: Certain designs of small cases make it difficult to distinguish top from bottom.



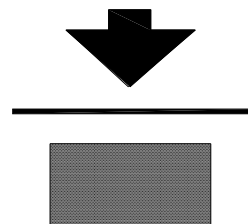
CENTRE OF GRAVITY

NOTE: This should be stencilled as a minimum on the two longest case sides (this information will normally be supplied by the manufacturer of the item(s) packed).



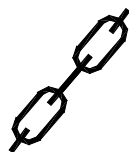
KEEP AWAY FROM HEAT

... kg max



STACKING LIMITATION

NOTE: The maximum load in kilograms should be marked above the arrow.



INTERNATIONAL "SLING HERE" SYMBOL

/ On Bidder's office letter pad /

Self-Declaration

GEM bid Enquiry No.	GEM/2021/B/1663165
Enquiry Date	10.11.2021

In line with Government public procurement order Number P-45021/2/2017-B.E-II dated 15.06.2017, and further modified order dt.04.06.2020 issued by DPIIT,

I / We hereby declare that I / We are a “Local Supplier” meeting the requirement of minimum local content (.....%) defined in the above government notification for the goods against above mentioned enquiry Number.

Details of location at which local value addition will be made is as follows:

Door No.	
Street / Address 1	
Street / Address 2	
District	
State	
Country	
PIN Code	

We also understand that the false declarations will be considered as breach of Integrity and liable for action.

For Company Name:

Seal:

Signature:

Date:

Place:

(Please fill all the yellow color field)

GEM/2021/B/1663165

**MATERIALS MANAGEMENT / BOI****SUB-DELIVERY ENQUIRY DEVIATION FORMAT**

Page : of

Schedule of deviation to
Sub-delivery Enquiry No. : **GEM/2021/B/1663165 dt 10.11.2021**Description : **Sonic Horn Orifice Plate Assembly**Documents : **Specification: TCI:8100-SCR/ORIFICE Rev.00**

Drawing No. : -

Quality Plan : **QA:CI:STD:QP:16 Rev.06**Packing Procedure : **QA:CI:STD:PR:04 Rev.03**

Document reference	BHEL called for	Firm's alternative offer

Certified that other than the above deviations, we are accepting all the other specifications and requirements in full to your Enquiry.

Station :

Date :

Signature of firm's representative

Firm seal

Note : 1. Deviations should be taken only in the extreme case
2. If necessary, use additional sheets with page control number

GEM/2021/B/1663165 Dated: 10.11.2021

GEM/2021/B/1663165 Dated: 10.11.2021			
Sl. No.	TERMS	CONDITINS	VENDOR CONFIRMATION
1	Delivery term	Vendor shall quote unit price on FOR / Project site basis inclusive of Packing & Forwarding, Freight , calibration charges & GST. Insurance will be on BHEL scope.	Quoted / Not quoted
2	Delivery days	70 days from document approval. Delivery period shall inclusive of all the activities like manufacturing, inspection, Packing & Forwarding and dispatch.	Accepted
3	Payment term	100% payment within 60 days of issue of consignee receipt-cum- acceptance certificate (CRAC)” MSE vendor payment will be made as per MSME act 2006 Any deviation in the above Payment Terms, any other conditions in payment terms or any other payment term will not be accepted and offers are liable to be commercially rejected	Accepted
4	LD clause	As per present GeM Terms & Conditions	Accepted
5	Guarantee period	18 months from the date of supply or 12 months from the date of actual put in use, whichever is earlier.	Accepted
6	HSN CODE	Indicate HSN code for quoted items	
7	GST	PI Mention in GST % for quoted items	%
DOCUMENT SUBMISSION ALONG WITH BID			
8	Attachments 1	Whether vendor belongs to MSE & Have you submitted Udyam Registration Certificate (To validate MSE status)	Yes / No
9	Attachments 2	Have you submitted Filled, signed & sealed “ NIL Deviation Format ” .	Yes / No
10	Attachments 3	Have you submitted signed, sealed in the all pages of tender documents like “Technical Specification, Drawing/datasheet, testing procedure, Quality Plan & packing procedure” with respect to this tender along with offer. (If applicable)	Yes / No
11	Attachments 4	Have you Filled local content %, signed, sealed & submitted “ Self declaration format for MII clause” as per BHEL format in your company letter head.	Yes / No
Note: vendor consents that the terms & conditions accepted, in GEM alone, shall be binding between BHEL and the Vendor; and no other terms mentioned, elsewhere in the un priced offer / Quotation will be considered / accepted by BHEL.			
VENDOR DETAILS			
1	Vendor Name		
2	Office Address		
3	Contact Person Name		
4	Mobile No.		
5	E mail Id		
6	GSTN		

Vendor to fill & submit this Annexure with sign & seal along with offer .