



A-FORM

BHARAT HEAVY ELECTRICALS LIMITED - BHOPAL

MM DEPARTMENT

ESTIMATE SHEET FOR ISSUE OF MATERIAL/COMPONENTS FROM BHEL

FORM NO BP-0021

CHECKLIST

A-FORM NO : A211B41
REV NO : 0
A-FORM DATE : 03-FEB-22
DATE : 03-FEB-22
PAGE : 1 / 1

DEPARTMENT : 211

PROJECT

: NPCL GHAVP PO NO : A211B41

END PRODUCT : DRILLED TUBE SHEET

INDENT NO : 221110071

WORK ORDER NO : 18083W04701

PO DATE :

DELV REQD : 04052022

MATERIAL ISSUE DIV : 211

SUPP CODE :

SUPP NAME :

DETAILS OF FINISHED GOODS

A-SL NO PO IT NO PI IT NO QUANTITY REQUIRED

UNIT SHOP NO DEST CD COST CD H.CELL

DESCRIPTION OF SUB-ASSEMBLY/ITEM & WEIGHT/VOLUME/AREA

FREE ISSUE MATERIAL PER UNIT OF FINISHED GOODS

MATL CODE	QTY PSL UNIT	PSL UNIT	RATE PSL UNIT	TOTAL MATL TO BE ISSUED	ISSUE PSL/ UNIT WIP	SMIV/ PPMIV NO	MATERIAL VALUE	TARIFF HEAD	MATL ISSUE QTY
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DESCRIPTION OF FREE ISSUE MATERIAL AND WEIGHT /VOLUME/AREA

1 0 1 4.000 NO 211 211

DRILLED TUBE SHEET AS PER DRG NO-11650340824 R-04

SA 182 316L 1.0000 NO 5613500.000 4.00 NO WIP 22454000.000 1.0000

DRILLED TUBE SHEET AS PER DRG NO-11650340824 REV-04 VAR-00 MATERIAL SIZE-2189 O/D X 260 TK R.WT-4650 KG EACH, F.WT-3410 KG EACH APPROX.

REMARKS LABOUR BASIS

TOTAL NO OF CANCEL ITEM 0

AFORM TOTAL 22454000.000

1.MATERIAL TO BE ISSUED ON :-	FREE ISSUE BASIS	SIGNATURE OF INDENTOR	SIGNATURE OF ASC EXECUTIVE
2.TRANSPORT TO BE PROVIDED BY :-	SUPPLIER	NAME	NAME
3.EXCISE DUTY ON ISSUE MATL TO BE BORNE BY :-	SUPPLIER	DESIGNATION	DESIGNATION
4.SCRAP TO BE RETURNED :-	NO	TELEPHONE	TELEPHONE
5.INVARIABLY ISSUE WT. TO BE RECORDED ON SMIV/PMIV			

DPT 101



QUALITY ASSURANCE PLAN

ITEMS: MODERATER HEAT EXCHANGER FOR 700 MW GHAVP UNIT 1&2

CUSTOMER: M/S NUCLEAR POWER CORPORATION

QA PLAN NO. QAX/TH/1479
Date 29-10-2020
Rev. 04
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Sr.No.	Component & Operation	Characteristic	Class	Type of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record	Inspection Agency/				Remarks
									P	W	R	H	

2.1.7	Machining of Stopper & Trunion.	OD, length and WEP	Major	Visual and Measurements	100%	As per App Drawing	As per Approved drawing	Inspection report	2	2	1	-	
		LPE Machined surface & WEP	Major	LPE	100%	Approved LPE procedure	Approved LPE procedure	Inspection report	2	2	1	-	
2.1.8	Release of welding consumables	Batch qualification & Approved brand of welding consumables.	Major	Co-relation of Test certificates & verification of Batch no.	100%	Tender Spec/ App. TPS	Tender Spec/ App. TPS	Inspection report	2	2	1	-	
2.1.9	Assembly of Stopper & Trunion with Tube Sheet.	Fit up Dimension, WPS & PQR	Major	Root gap Orientation Procedure qualification verification	100%	Appd. Drawing App WPS	Appd. Drawing Specification/ PQR	Inspection Report PQR/Weld data sheet	2	2	1	-	
		Welding parameter	Major	verification	100%	Approved specification/procedure/WPS	Approved specification/procedure/WPS	Weld data report	2	2	1	-	
2.1.10	Welding of Stopper & Trunion with Tube Sheet	Root Run LPE	major	visual, NDE	100%	Approved LPE procedure	Approved LPE procedure	Inspection reports	2	2	1	-	
		Final weld LPE	major	visual, NDE	100%	Approved LPE procedure	Approved LPE procedure	Inspection reports	2	2	1	-	
		Final weld UT	major	visual, NDE	100%	Approved UT procedure, App Drawing,	Approved UT procedure App Drawing,	Inspection reports	2	2	1	-	
2.1.11	Machining of Stopper & Trunion	Dimension measurement.	Major	visual/ measurement	100%	Approved LPE procedure	Approved LPE procedure	Inspection report	2	2	1	-	
		LPE of machined surface	Major	LPE	100%	Approved LPE procedure	Approved LPE procedure	Inspection report	2	2	1	-	
2.1.12	Cleaning & Preservations	Surface Protection	Major	Visual	100%	Approved Procedures	Approved Procedures	Inspection Report	2	2	1	-	
2.2	Drilling Procedure Qualification on DQB	Alignment of Block on machine. Tube layout and Reference hole identification	Major	Measurements / Visual	100%	Approved drawing, Approved Drilling Procedure	AS per Approved drawing, Drilling Procedure	Inspection Report	2	2	1	-	

BHEL

NPCIL

S.B. Dhanraonikar



QUALITY ASSURANCE PLAN
ITEMS: MODERATOR HEAT EXCHANGER FOR 700 MW GHAVP UNIT 1&2
CUSTOMER: M/S NUCLEAR POWER CORPORATION

QA PLAN NO.	QA/TH/1479
Date	29-10-2020
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Sr.No	Component & Operation	Characteristic	Class	Type of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record	Inspection Agency				Remarks
									P	W	R	H	

		Hole dia, drift, surface finish, positional accuracy, pitch, ligament check	Major	Measurement by optical tooling, Borescope and Visual	100%	As per Approved drawing & Drilling Procedure	As per Approved drawing & Drilling Procedure	Inspection Report	2	2.	1		
		Drilling machine parameters and tool life											

2.3	Drilling of Tube sheet													
2.3.1	Tube sheet drilling with Production Quality Control Block (PQC block), (Equivalent names PQC Block=Mock Up Block=Test Block)	Tube sheet Setting on deep hole drilling machine. Orientation, flatness, Tube layout, Hole dia, drift, surface finish, positional accuracy	Major	Set up on machine, Measurement / Visual, Line layout	1) 2% of Tube sheet holes, 2) All PQC holes 3)	Approved drawing, Drilling Procedure	Approved drawing, Drilling Procedure	Inspection Report	2	2.1	-	1	1 All control holes (2% of Tube sheet holes) shall be witnessed by NPCIL.	
		Ligaments check , Hole dia.	Major	Go-No go gauging, Visual	100%									
2.3.2	Tie rod holes drilling on shell side drilling.	Set up verification Axis matching	Major	Visual & Dimensional	100%	Approved drawing	Approved drawing	Inspection Report	2	2.1				
2.3.3	Tapping of Tie rod holes on Shell side of T/S	Threads	Major	Gauge Check	100%	Approved drawing	Approved drawing	Inspection Report	2	2.1		1		
2.3.4	Radius machining of Tube holes on Shell side & de burring	Radius	Major	Dimensions & visual	100%	Approved Drawing/ procedure	Approved Drawing / procedure	Inspection report	2	2.1	-	1	2%holes random by NPCIL QS	
2.3.5	Tube sheet final machining	channel side & shell side WEP of tube sheet and Trunnion &	Major	Dimensions & visual	100%	Approved Drawing/ procedure	Approved Drawing / procedure	Inspection report	2	2	1	1		

SHEL

13-11-2020

NPCIL

S.B.Dhamadhikari



QUALITY ASSURANCE PLAN
ITEMS: MODERATER HEAT EXCHANGER FOR 700 MW GHAVP UNIT 1&2
CUSTOMER: M/S NUCLEAR POWER CORPORATION

QA PLAN NO. QAX/TH/1479
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Sr.No.	Component & Operation	Characteristic	Class	Type of check	Quantum of check	Reference Document	Acceptance Norms	Format of Record	Inspection Agency				Remarks
									P	W	R	H	

2.3.6	Cleaning and Preservation	LPE of WEP Cleaning and capping of holes from both side	Major	LPE Visual and Measurements	100%	Approved LPE procedure App Drawing / Approved procedure	Approved LPE procedure App Drawing / Approved procedure	Inspection report Inspection Report	2	2.	-	1	
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2.4 BAFFLES

2.4.1	Material Inspection & Identification of baffle and mock-up (PQC)	Chemical Composition	Major	Co-relation & verification of MTC / Lab TC, all stage-wise records	100%	ASME Sec. II / III, Approved NPCIL specification (TPS) & approved material inspection and testing plan	ASME Sec. II / III, Approved NPCIL specification (TPS) & approved material inspection and testing plan	Inspection Report	2	-	1	1	Identification on item should cover heat no./Lot no./PO no./Material grade /Monogram/ QS stamp Witness for only visual and co-Relation Refer Note 1
		Heat Treatment, IGC, Grain size, Forging ratio Mechanical Properties											

2.4.2	Cleaning and Preservation after sizing	Dimensional check, surface quality	Major	Visual and Measurements	100%	App Drawing / Spec	As per Approved drawing	Inspection Report	-	2.	1	1	
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2.4.3	Procedure qualification of baffle drilling	Material block thick, flatness, parallelism, hole dia, ligament, hole position, corner radius	Major	Set up on m/c, parallelism measurement t bar gauge	100%	Approved drawing, Drilling procedure	Approved drawing, Drilling procedure	Inspection Report	2	2.	-	1	
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2.4.4	Baffle drilling with production quality control/Mock up block.	Hole dia, ligament, Visual check, Sliding rod hole position, Tube hole layout.	Major	1) Holes Measurement 2) Ligament check 3) Go-No go gauging 4) Bar gauge	1) 3% holes Ref. 2) 3% ligament 3) 100% baffle	Approved drawing / Drilling procedure	Approved drawing / Drilling procedure	Inspection Report	2	2.	-	1	Visual check 100% holes
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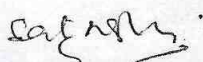
	2 x 700 MW GORAKHPUR HARYANA ANUVIDYUT PARIYOJANA -1&2	Document No. BHEL/NPCIL/30447/SC/MHX/TSD
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SPECIFICATION FOR SUB-CONTRACTING FOR TUBESHEET DRILLING- MODERATOR HEAT EXCHANGER		

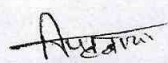
1.0 GENERAL:


- 1.1. This specification gives requirements for Sub-Contracting of Tube Sheet Drilling of 4 Nos Moderator Heat Exchanger on CNC Deep Hole Drilling Machine.
- 1.2. Deep hole Drilling on Qualification block, Test Block and Actual Job as per Drawing. Quality drilling of Tube sheets meeting specification / approved drawing requirements with respect to drift, positional accuracy, ligament, hole size, surface finish within specified tolerances are very important.
- 1.3. Setting Jobs will be done in single setting. Approval required for setting by BHEL QA before proceeding any deep hole drilling.
- 1.4. Machine calibration Report & all related measuring instrument calibration report need to be approved from BHEL QA before start of process.
- 1.5. The drilling of the Tube Sheet shall be done as per qualified Procedure and also by the same machine used for Procedure qualification.
- 1.6. All measurements, readings and derived values shall be recorded in proper format.
- 1.7. Sub-Contracting to Sub-vendor for drilling is not allowed. Only vendors having in house facility for deep hole drilling as per enclosed drawing and Drilling Specifications can submit offer.

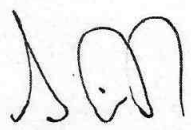
2.0 SCOPE OF WORK:


- 2.1. Establishment of Drilling Parameters & Tool Life.
- 2.2. Drilling of Qualification block (drilling procedure qualification) prior to start of Tube Sheet Drilling with Minimum 50 Holes per spindle.
- 2.3. One hole shall be drilled on the Test Block set along with the Tube Sheet before/after the shift and during the event of any change in conditions (i.e. change of drill, change found during in process checks on hole diameter, finish, ligaments by visual examination and go-no-go gauges) and only after ensuring acceptable hole quality, drilling on the production job shall be taken up.
- 2.4. Production drilling as per layout shall be taken up only after successful completion of Procedure qualification on Drilling Qualification Block(DQB) and duly accepted by BHEL QA & NPCIL QA.
- 2.5. BTA/BTS tool required for Tube Sheet Drilling.
- 2.6. Radius of Tube Holes in Shell Side as per Drawing requirement.
- 2.7. Measuring instruments like Go-NOGO plug Gauges, Ligament Gauges, Dial Bore Gauge, Surface finish testing instrument & borescope for visual Inspection etc.
- 2.8. Required Skilled manpower for execution of Job.


(SAYASHRI)


(VINOD PATNAIK)


(RAJESH SINGH)


(G.S. MADAVI)

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SPECIFICATION FOR SUB-CONTRACTING FOR TUBESHEET DRILLING- MODERATOR HEAT EXCHANGER		

- 2.9. Fixture required for Mounting of Optical instrument i.e. Alignment Telescope.
- 2.10. Drilling & Tapping of Tie Rod Holes.
- 2.11. Internal Inspection (Namely Hole Diameter, Ligament, hole Position, Drift, Visual Inspection & Surface finish.
- 2.12. Joint Inspection of BHEL & NPCIL during drilling and final inspection.

3.0 REFERENCE DOCUMENTS


- 3.1 NPCIL Drilling Specification PC-P-192.
- 3.2 TUBE SHEET DRILLING PLAN No -11650340824.

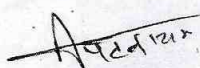
4.0 PRE-REQUISITES:

- 4.1 CNC deep hole drilling M/c BTA/BTS Type.
- 4.2 Fixture for Mounting Alignment Telescope
- 4.3 Internal micrometer for hole size measurement/Dial Gauge.
- 4.4 Go- No-Go gauge.
- 4.5 Ligament gauge.
- 4.6 Borescope.
- 4.7 Surface finish tester.

5. JOB DETAILS:


S. No.	Identification	Unit	Moderator Heat Exchanger Tube Sheet Requirement
1	Tube plate thickness	mm	150 mm
2	Outer Tube Limit	mm	2037.8
3	No of tube holes	No	8272
4	Tube hole size	mm	12.76 ^{+0.05/-0.0}
5	Drift	mm	0.1 mm
6	No of Tie Rod holes		32
7	Tie Rod hole size	mm	M12X25 Deep
8	Tube pitch	mm	19 mm triangular as per Detail N of Drg.
9	Hole finish	microns	1.6
10	Shell side holes Radius making on Tube Sheet as per drawing		As per Drawing.


(CARYACHURI)


(VINOD PATNAIK)


(RAJESH SINGH)


(G.S. MADAVI)

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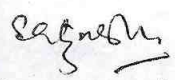
11	Channel side holes Chamfering/Beveling 0.6 X 45 degree		BHEL SCOPE
12	Quantity of Production Block	Nos	4 (Four)
13	Tentative Weight of Each Tube sheet	Kg	3407
14	Qualification Block Dimension & Qty-1 Nos		800 MM (+2.0/-0.0) MM X 300 MM X (+2.0/-0.0) X 150 MM (+2/-0.0) (WT.= 288 KG EACH)
15	Test Block & Qty.- 4 Nos	Kg	800 MM (+2.0/-0.0) MM X 300 MM X (+2.0/-0.0) X 150 MM (+2/-0.0) (WT.= 288 KG EACH)


6. NOTES: -


- 6.1 Ensure availability of all types of Tooling & Fixture at your end and confirm.
- 6.2 BHEL QA presence for witness, customer witness will be ensured by BHEL after your feedback for loading schedule.
- 6.3 You need to carry out inspection of our raw material supplied at your end for visual, dimensional and machining allowance before starting the process. If any defect or non-conformity found, inform BHEL QA immediately and hold the job. Acceptance will be subjected to BHEL QA Approval.
- 6.4 In case of rejection and Tube Plugging all the material cost & all processing cost (Decided by BHEL) till date will be recovered from you.

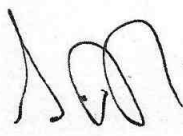
7. GENERAL TERMS FOR INSPECTION OF COMPONENT:


- 7.1 After drilling & inspection, tube sheet holes shall be cleaned & protected from both sides by Plastic caps.
- 7.2 After completion of Job in all respect as per the scope of purchase order inspection shall be carried out at your end to confirm conformity of the component.
- 7.3 Following are Guidelines to fill up the inspection report.
 - a) Component ID no must be filled in the inspection report.
 - b) Dimensions must be reported in one more decimal than tolerance decimal.
 - c) All deviations must be marked by * Marks.
 - d) Ensure proper packing to avoid any damage during transit.


(SANJAY SURI)


(VINOD PATNAIK)


(RAJESH CHINGRA)


(GS MADAVI)

 Bharat Heavy Electricals Limited	2 x 700 MW GORAKHPUR HARYANA ANUVIDYUT PARIYOJANA -1&2	Document No. BHEL/NPCIL/30447/SC/MHX/TSD
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		SPECIFICATION FOR SUB-CONTRACTING FOR TUBESHEET DRILLING- MODERATOR HEAT EXCHANGER

7.4 Drilling Qualification Requirement:


Item	Requirement	Acceptance Standard
Hole Diameter	All holes at 3mm from the front face, 3 mm from the rear face and 3 locations at equal intervals on remaining length in two perpendicular directions by bore dial.	12.76 +0.05/-0.00
	Go gauge check for full length & NO GO gauge check for all holes from both ends. If all the reference holes are within specified limits then remaining holes of tube sheet shall be checked with GO gauge for full length) & NOGO gauge from both ends.	Go gauge should enter and No go gauge should not enter the hole. Go Gauge size 12.76+0.03 and No Go gauge size- 12.81+0.03 here
Ligament	100 % ligaments shall be measured at front and rear face side.	Front max= 6.69 mm & min = 5.9 mm. Rear Max=6.64 mm & 5.79 mm
Hole Position	100 % holes shall be measured at front face.	0.2 mm
Drill Drift	100 % holes by optical tooling at rear w.r.t Front Side.	0.1mm max
Visual Examination	100 % Holes By Visual/borescope examination.	Hole surface shall be free from scratch, tool mark etc.
Surface finish measurement	100% holes by Surface finish tester/Replica method at front and rear ends of holes.	1.6 Ra

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(SAGREN)

Vinod Patnaik
(VINOD PATNAIK)

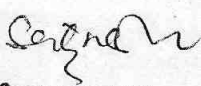
Rajesh Singh
(RAJESH SINGH)


S. S. Mahavi
(S. S. MAHAVI)


	2 x 700 MW GORAKHPUR HARYANA ANUVIDYUT PARIYOJANA -1&2	Document No.
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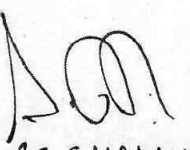
7.5 Actual Job Inspection Requirement:


Item	Requirement	Acceptance Standard
Hole Diameter	2% of total holes referred as "Reference Holes", selected at random by NPCIL (QA). At 3mm from the front face, 3mm from the rear face and 3 locations at equal intervals on remaining length in two perpendicular directions by dial bore gauge.	12.76 +0.05/-0.00
	If all the reference holes are within specified limits then remaining holes of Tube sheet shall be checked with GO gauge for full length & NOGO gauge from both ends.	Go gauge should enter and No go gauge should not enter the hole. Go Gauge size 12.76+0.03 and No Go gauge size- 12.81+0.03 here
Ligament	100 % ligaments shall be measured at front and rear face side.	Front max= 6.69 mm & min = 5.9 mm. Rear Max=6.64 mm & 5.79 mm
Hole Position(Layout)	All reference holes and all non-conformance holes shall be measured at front face	0.2 mm
Drill Drift	All reference holes by optical tooling and all non-conformance holes at rear w.r.t front side.	0.1mm max
Visual Examination	100 % Holes By Visual/borescope examination.	Hole surface shall be free from scratch, tool mark etc.
Surface finish measurement	All reference holes and all nonconformance holes by Surface finish tester/Replica method and at front & rear ends of holes.	1.6 Ra


(CA VACM)


(VINOD PATNAIK)


(RAJESH SINGH)


(S. S. MADAVI)

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SPECIFICATION FOR SUB-CONTRACTING FOR TUBESHEET DRILLING- MODERATOR HEAT EXCHANGER		

8. GENERAL INSTRUCTIONS:

- 8.1 There should be no scratch mark on the surface of the items.
- 8.2 All the material given for processing should be stored separately and should not come in contact with any other material like MS during storage.
- 8.3 Our QA stamp & NPCIL QA stamp and numbers should be visible for all the time during processing and in case the stamp is getting removed during drilling, vendor shall inform in advance for stamp transfer on another location.
- 8.4 All machined components should be free from Dirt, Dust, Oil, Grease or any other foreign particles.
- 8.5 BHEL will issue the tube sheet welded with Trunnion, Stopper and lugs required to clamp the job vertically on T- Slotted Angle plate. Vendor to submit their holding/ clamping arrangement drawing requirement according BHEL will fitted the lugs before issuing of Tube sheet.
- 8.6 Drift shall be measure by optical instrument.
- 8.7 Since tube sheet is having collar projection on both the side, hence vendor is requested to understand the drawing very carefully so that outer tube limit of the hole would not get any obstruction/ foul of drilling head.
- 8.8 Contact of Tube Sheets with carbon steel shall be avoided to prevent contamination. All clamping and packing arrangement used will be of stainless steel.
- 8.9 Dimension report dully sealed & signed by BHEL QC along with customer shall be submitted before dispatch of Tube sheet.
- 8.10 Shipping release note/ document endorsed by BHEL customer i.e. NPCIL that job is made as per drg. and ready to use at BHEL works.
- 8.11 Lug will be removed at BHEL works, hence under BHEL scope.
- 8.12 Tube sheet, drilling qualification Block & Production quality control block used shall be properly protected, covered & packed in wooden box before dispatch.
- 8.13 Vendor has to submit the following document for BHEL
 - I. Drilling procedure,
 - II. Sample format dimension report.
- 8.14 Vendor must confirm machine shall be available & run 24 x 7 dedicatedly on receipt of order for drilling of 4 Nos of Moderator Heat Exchanger.
- 8.15 Vendor to submit drilling offer inclusive of inspection charges. Vendor to read drawing & NPCIL specification before submitting offer on fixed amount basis for drilling, chamfering (Making Radius on Shell Side) & inspection of job in the machine during drilling and after Unloading.

(Signature)
(KATYASHRI)

(Signature)
(VINOD PATNAIK)

(Signature)
(RAJESH CHINHAL)

(Signature)
(S. MADAVI)

NUCLEAR POWER CORPORATION OF INDIA LIMITED	
Kakrapar Atomic Power Project-3&4	Page No. : 1 of 12
Procedure for Tube Sheet & Baffle Drilling of Heavy Water Heat Exchangers	Revision No. : 1

1.0 GENERAL

- 1.1 This procedure establishes the requirements for the Procedure qualification & Production drilling of Tube sheet and Baffles.
- 1.2 Production drilling shall be taken up only after successful completion of procedure qualification, duly accepted by NPCIL (QA).
- 1.3 Tube sheet drilling shall be done on a CNC deep hole drilling machine while baffle drilling can be done on CNC drilling machine
- 1.4 All measurements shall be recorded in proper formats.

2.0 PROCEDURE QUALIFICATION OF TUBE SHEET DRILLING

2.1. Qualification Block

Following are the requirements for the qualification Block

Item	Requirement
Material	Same as tube sheet material including cladding (if any), heat treatment condition, NDE examinations.
Thickness	Equal to Tube sheet Thickness
Surface Flatness	Shall be within 0.2 mm
Surface Finish	Same as Tube sheet

2.2. Drilling Machine Setting

- 2.2.1 Channel side (front face) shall face the M/C tool (drill) side, so as to start drilling from the Channel side surface.
- 2.2.2 Parallelism of entire block face shall be set using precision dial gauges. It shall be within 0.10 mm and actual measurements shall be recorded and verified periodically.

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Procedure for Tube Sheet & Baffle Drilling of Heavy Water Heat Exchangers	Revision No. : 1

2.3 Drilling

2.3.1 Drilling shall be done as per approved sequence and machine shall be programmed accordingly.

2.3.2 Drawing of test block with holes layout, holes identified with respect to machine, spindles, and spindle combinations, in case of multi spindle machine, shall be prepared prior to drilling and shall be submitted to purchaser for information.

2.4 Nos. of Holes

Minimum 50 holes shall be drilled per spindle as per approved tube lay out by using parameters established during trial drilling. Drilling parameters shall be recorded. Limit of maximum numbers of holes per drill bit to be established during the procedure qualification.

2.5 Examination

Following examinations shall be carried out:

Item	Requirement	Acceptance Standard
Hole Diameter	100% holes at 3mm from the front face, 3mm from the rear face and 3 locations at equal intervals on remaining length in two perpendicular directions by bore dial.	Approved drawing
	Go gauge check for full length & NOGO gauge check for all holes from both ends.	Go gauge should enter and No go gauge should not enter the hole

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Ligament	100% ligaments shall be measured at front and rear face sides	Approved drawing
Hole position	100% holes shall be measured at front face.	Approved drawing
Drift	100% holes by optical tooling at rear w.r.t. front side.	Approved drawing
Visual examination	100% holes by Visual and Boroscope examination	Hole surface shall be free from scratch, tool mark etc.
Surface finish measurement	100% holes by Surface finish tester/Replica method at front and rear ends of holes.	Approved drawing

3.0 TUBE-SHEET DRILLING

3.1 Tube Sheet Condition

Just prior to drilling stage, Tube sheet condition shall be as per approved manufacturing procedure / QAP.

3.2 Drilling

3.2.1 Drilling shall be carried out on qualified machine by qualified operators.

3.2.2 Tube sheet shall be set in a position as shown in approved drawing with respect to axis marking and set position shall be recorded and verified.

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- 3.2.3 Suitable measures shall be taken to ensure that Tube sheet setting is not disturbed during drilling.
- 3.2.4 Drilling sequence and machine setting parameters shall be as per drilling program established during procedure qualification. CNC machine drilling program/sequence shall be checked/verified for hole depth and hole layout before drilling on the job.
- 3.2.5 One hole shall be drilled on the test block set along with the tube sheet before/after the shift and during the event of any change in conditions (i.e change of drill, change found during in process checks on hole diameter, finish, ligaments by visual examination and go-no-go gauges) and only after ensuring acceptable hole quality, drilling on the production job shall be taken up.
- 3.2.6 The first hole on the job at the beginning of the shift shall be examined for acceptable quality.
- 3.2.7 As drilling proceeds, each of the drilled holes shall be checked before drilling the next hole by operator by visual means and using go- nogo gauges at drill entry and exit for hole diameter & ligaments. Records for 100 % tube hole inspection shall be kept by the manufacturer.
- 3.2.8 In addition, at regular intervals during drilling operation, hole shall be inspected and measurements recorded.
- 3.2.9 Drill bit shall be replaced as per established holes limit during procedure qualification or as and when limits for hole dimensions are reached during in process inspection, whichever falls earlier. Whenever a drill is replaced, the first hole shall be checked for compliance. Reground tools can also be used. Record

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shall be kept on the status of each drill (i.e. new, first grinding, second grinding etc.) along with identification of holes drilled, sequence on each spindle.

3.3 Examination

Following examinations shall be carried out on drilled Tube sheet:

Item	Requirement	Acceptance Standard
Hole Diameter	10% of total holes referred as “Reference Holes”, selected at random by NPCIL (QA). At 3mm from the front face, 3mm from the rear face and 3 locations at equal intervals on remaining length in two perpendicular directions by dial bore gauge.	Approved drawing
	If all the reference holes are within specified limits then remaining holes of Tube sheet shall be checked with GO gauge for full length) & NOGO gauge from both ends.	Go gauge should enter and No go gauge should not enter the hole
Ligament	100% ligaments shall be measured at front and rear face sides	Approved drawing
Hole position	All reference holes at random and all non-conformance holes shall be measured at front face.	Approved drawing

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Drift	All reference holes and all non-conformance holes at rear w.r.t front side.	Approved drawing
Visual examination	100% holes by Visual and Boroscope Examination.	Hole surface shall be free from scratch, tool mark etc.
Surface finish measurement	All reference holes and all non-conformance holes by Surface finish tester/Replica method and at front & rear ends of holes.	Approved drawing

Note: “Reference holes” to be selected by NPCIL (QA) randomly, but in a manner representing total tube sheet drilling.

3.4 Special Occurrence

If abnormalities like vibration, loosening of clamping, drill breakage etc. are noticed, drilling shall be stopped and the affected hole(s) shall be evaluated. Drilling shall proceed only after a satisfactory drilling of a hole on the test block and NPCIL (QA) clearance.

4.0 PROCEDURE QUALIFICATION OF BAFFLE DRILLING

4.1 Qualification Block

Following are the requirements for the qualification Block:

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Item	Requirement
Material	Same as Baffle material including heat treatment condition, NDE examinations, etc.
Thickness	The number of plates, in a stack, used in procedure qualification, shall be the maximum permitted during production drilling
Surface Flatness	Shall be within 0.2 mm
Surface Finish	Same as baffle

The drilling of extra portion of first production baffle set itself may be used for baffle drilling procedure qualification.

4.2 Drilling Machine Setting

- 4.2.1 Setting of baffle plates on machine and clamping arrangements shall be done suitably to prevent buckling of the baffle plate before/during drilling. Adequacy of clamping and parallelism of baffle plate surface towards the drill side shall be checked by precision dial gauges traversing the entire surface.
- 4.2.2 Each of the plates in such a stack shall be punch marked suitably with respect to drill side face and plate sequence number in drilling direction, stack identification number so that baffles, from the same stack can be installed in the same sequence and facing, in the heat exchangers such that tubes can be smoothly inserted in the drilling direction. The setting/clamping and marking of plates shall be shown in a sketch.

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4.2.3 Parallelism of entire baffle stack face shall be set using precision dial gauges. It shall be within 0.10 mm and actual measurements shall be recorded and verified periodically.

4.3 Drilling

Drilling shall be done as per approved sequence and machine shall be programmed accordingly.

4.4 No of holes

Minimum 50 holes shall be drilled per spindle as per approved tube lay out by using parameters established during trial drilling. Drilling parameters shall be recorded. Limit of maximum numbers of holes per drill bit to be established during the procedure qualification.

4.5 Examination

Following examinations shall be carried out:

Item	Requirement	Acceptance Standard
Hole Diameter	100% holes	Approved drawing
	Go gauge check for full length & NOGO gauge check for all holes from both ends.	Go gauge should enter and No go gauge should not enter the hole
Ligament	100% ligaments shall be measured at front and rear face sides	Approved drawing

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Item	Requirement	Acceptance Standard
Hole position	100% holes shall be measured preferably by optical tooling at front face.	Approved drawing
Visual examination	100% holes	Hole surface shall be free from scratch, tool mark etc.
Surface finish	All holes shall be visually examined	Scratch Free uniform surface finish.
Bar Gauge Check	The stack shall be clamped and locked with locking pins for a bar gauge of diameter specified by purchaser. Check all holes	Bar Gauge shall pass through all the holes in the stack smoothly.

5.0 BAFFLE DRILLING

5.1 Condition

Just prior to drilling stage, Baffle condition shall be as per approved manufacturing procedure /QAP.

5.2 Drilling

5.2.1 Drilling shall be carried out on a qualified machine by qualified operators.

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- 5.2.2 Baffle Stack or individual baffle shall be set in a position as shown on approved drawing with respect to axis marking and set position shall be recorded and verified.
- 5.2.3 Dial gauge shall be suitably fixed on periphery of Baffle Stack/Baffle to ensure setting is not disturbed during drilling.
- 5.2.4 Drilling sequence and machine setting parameters shall be as per drilling program established during procedures qualification. CNC machine drilling program/sequence shall be checked/verified for hole depth and hole layout before drilling on the job.
- 5.2.5 One hole shall be drilled on the test block set along with the Baffle Stack/Baffle before/after the shift and during the event of any change in conditions (i.e change of drill, change found during in process checks on hole diameter, finish, ligaments by visual examination and go-nogo gauges) and only after ensuring acceptable hole quality, drilling on the production job shall be taken up.
- 5.2.6 The first hole on the job at the beginning of the shift shall be examined for acceptable quality.
- 5.2.7 As drilling proceeds each of the drilled holes shall be checked before drilling the next hole by operator by visual means and using go-nogo gauges at drill entry and exit for hole diameter & ligaments.
- 5.2.8 In addition, at regular intervals during drilling operation, hole shall be inspected and measurements recorded.

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5.2.9 Drill bit shall be replaced as per established holes limit during procedure qualification for baffle drilling or as and when limits for hole dimensions are reached during in process inspection, whichever falls earlier. Whenever a drill is replaced, the first hole shall be checked for compliance. Reground tools can also be used. Record shall be kept on the status of each drill (i.e. new, first grinding, second grinding etc.) along with identification of holes drilled, sequence on each spindle.

5.3 Examination

Following examinations shall be carried out on drilled Baffles:

Item	Requirement	Acceptance Standard
Hole Diameter	Diameters of at least 3% of total holes (but not less than 5 holes /baffle) referred as “ Reference holes ” shall be measured and recorded.	Approved drawing
	If all the reference holes are within specified limits then remaining holes shall be checked with GO gauge & NOGO gauge.	Go gauge should enter and No go gauge should not enter the hole
Ligament	At least 3% of total ligaments (per baffle) shall be measured. 100% holes by GO gauge & NOGO gauge.	Approved drawing

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Visual examination	100% holes	Hole surface shall be free from scratch, tool mark etc.
Bar Gauge Check	<p>The stack shall be clamped and locked with locking pins for a bar gauge of diameter specified by purchaser.</p> <p>check all holes.</p> <p>After successful bar gauge check, the baffle sequence number and set number shall be marked so that baffles of the same set could be subsequently assembled in the same sequence in the heat exchanger for smooth tube insertion in the drilling direction.</p>	Bar Gauge shall pass through the all the holes in the stack smoothly.
Surface finish	All holes shall be visually examined	Scratch free uniform surface finish.

Note: “Reference Holes” to be selected by NPCIL (QA) randomly, but in a manner-representing total Baffle drilling.

5.4 Special occurrence

If abnormalities like vibration, loosening of clamping, drill breakage etc. are noticed, drilling shall be stopped and the affected holes shall be evaluated and reported for clearance. Drilling shall proceed only after a satisfactory drilling of a hole on test block and purchaser or his authorized agency's clearance.

Procedure for Online submission of Tender Fee is given below:-

- (i) Please enter the following link in your internet address browser or click on the following link <https://www.onlinesbi.com/prelogin/icollecthome.htm>. Please click on “proceed” after clicking “Check Box” to proceed for payment.
- (ii) Now the SBI’s SB-Collect site gets opened. Please select state of Corporation as “Madhya Pradesh” and type of Corporation as “Industry” and then click on “GO” appearing on the screen.
- (iii) Now select “Bharat Heavy Electricals, Bhopal” from the dropdown table appearing against “Select Industry” and click submit.
- (iv) Now select “Deposit of Tender Cost” category from the dropdown table appearing against “select category” and click submit.

Instructions related to fill formats are mentioned:-

IP*	Please Select “TCOST”
Name of the depositor *	Name of your firm, on whose name tender are submitting.
Enquiry or Tender ref No.*	Enquiry No. or Notice of Tender Reference No. (i.e“E7073069 ” for this Tender)
Enquiry or Tender Ref No. Date *	Enquiry date or Notice of tender Reference No Date.
Tender Issuing Dept*	Department Name who Invites tender(i.e. “CMM-Copper” for this Tender)
Amount Deposited *	Amount of Tender Fees
Remarks	Additional information required to be mention , if any



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ANNEXURE-I

For Labour Basis Jobs (Machining) for 28/68 Buying group and General terms & conditions are also applicable as per BP -200102 for indigenous vendor already available at B-2-B website of BHEL Bhopal internet webpage .

Techno commercial annexures for labour basis/Job work job/Mixed basis

Section – A

1. Scope of Work:

- a. Scope of work shall include completion of all the works / operations as per BHEL drawings, inspection of the material and delivery of the goods to BHEL stores in accordance with the drawings specifications, technical scope, QA plan, annexure & other relevant documents etc .
- b. Technical scope is only for guidance and not exhaustive. Supplier has to take all necessary care and deliver the item to satisfy relevant quality standard applicable for such product.
- c. All required materials and / or components to be issued as free by BHEL under rule-55(1)-(B),(C) and (D) of central goods and service (CGST) rules 2017 against valid Bank Guarantee.
- d. **Before start of manufacturing vendor to confirm latest revisions of Drawings, painting specification & QA plan (if any) in writing from Indenting deptt. or Concerned Engineering deptt .**

2. Bank Guarantee (BG) clause for labour basis/mixed basis jobs :

The raw material /components/sub assemblies listed in enclosed free-issue material statement ("A" form) for the item(s) described in enquiry, shall be issued as Free Issue Material (FIM) by BHEL under rule-55(1)-(B),(C) and (D) of central goods and service (CGST) rules 2017 against valid Bank Guarantee, to be furnished covering cost of material proposed to be issued. Cost of any other inputs shall be borne by the supplier and are deemed to be included in the scope of supply/quotation. In case issual of material gets delayed because of non-submission of BG, BHEL reserves the right to cancel the order.pls refer b 2 b site for full details for new BG system 2016. A declaration to be submitted for balance value of free issue items & solvency certificate to be submitted.

In case of order, the vendor would be required to furnish Bank Guarantee (BG) as follows, if not stated otherwise in the main Enquiry.

Note: - The BG is to be furnished in prescribed Performa and from BHEL approved Banks only (available with ASC division & hosted in B-2-B website of BHEL Bhopal).

Note: - The BG is to be furnished in prescribed Performa and from BHEL approved Banks only (available with ASC division & hosted in B-2-B website of BHEL Bhopal).

a) Bank Guarantee for free issue material to sub-contractor. (as per sample form no BP 205514 – Annexure XIV)

The free issue material are classified into 3 categories as follows for BG purposes:

Category A : Normal material of MS ,SS , HSS , CRGO & CRNGO etc. for machining, fabrication and lamination purpose and copper sheets for welding to transformer tank.

Category B: High value item e.g. Thermal blades, Turbine runner, Liners and Labyrinth for HVOF coating etc.

Category C: Very high value items like copper for moldings of conductors, silver for soldering etc.

Bank Guarantee Valuation



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For category 'A' items as per above, Bank Guarantee to be taken for 10% of the highest balance of MWF value (taking into account both PMIV & SMIV held by fabricators). Highest balance shall be reckoned as the MWF value appearing at the end of each month starting from January to December of the previous calendar year.

For Category 'B' items as per above. Bank guarantee to be taken for 10% of the highest below of MWF (taking into account both PMIV & SMIV held by fabricators) and based on the highest balance of MWF value, appearing of the end each month starting for January & December of the previous calendar year, or value of material to be issued, whichever is more.

For Category 'C' items as per above, Bank Guarantee shall be taken for 100% value of material.

The minimum Bank Guarantee shall be for Rs. 1.0 lakh only.

For First time vendors under Category "A" and "B", where development enquires are issued, the Bank Guarantee shall be 30% value of free issue material subject a maximum BG of Rs. 30 lakhs.

Under Category "A" and "B", when enquires are issued simultaneously to new & established vendors, a uniform BG 10% value of free issue material shall be insisted upon.

- a) All vendors have to necessarily submit "Undertaking for Free Issue Materials", as per sample form no. BP205515 (annexure XV)
- b) All vendors have to necessarily submit "form for solvency certificate" as per sample form no. BP205516 (annexure XVI)

Kindly refer B-2-B vendor portal website of BHEL Bhopal for further details of GTC, BG and solvency certificate.

3. Rates:

- a. Rates should be quoted in the unit mentioned in the enquiry, exclusive of taxes & duties but inclusive of desired/specified packing and to & fro transportation charges for delivering the completed job to BHEL Bhopal. Payment of all taxes if any for transportation of free issue material from Bhopal to the works of the supplier is to be borne by the supplier.
- b. All applicable Duties & Taxes, which BHEL is required to pay should be clearly declared.
- c. **Rates shall remain firm** basis and not subject to any variation / escalation during the period of contract on any account. The quoted rates should not be linked with quantity to facilitate part orders.
- d. Rates should be valid for ordering for 90 days from the date of tender opening. Offers received with validity period less than 90 days shall not be considered.

4. Scrap /Swarf clause: Scrap to be retain by vendor on chargeable basis. Cost of scrap and GST on scrap shall be recovered from vendors bills hence it is requested to pls. keep note while submitting your quotations. Scrap generated during the machining operations shall be retained by the vendor (treated as deemed sales). BHEL, however, would recover the cost of scrap and GST extra as applicable on scrap and other applicable tax from the vendors in lieu of scrap retained by them. For this purpose, scrap selling rate shall be taken as Rs 74.8/- PER KG. The difference between the raw material weight (R/W) and finished weight (F/W) would be taken for determining the quantum of scrap generation.

5. GST as applicable on labour basis job.

6. Free-Issue-Material (FIM) will be issued by BHEL under rule-55(1) - (B),(C) and (D) of central goods and service (CGST) rules 2017 and the vendor will have to return the Duplicate/



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Transporter/Green copy of excise challan to BHEL after value addition along with supplies along with supply/ the stipulated period as per GST rules. Failing which, the cost of material including GST paid by BHEL may be recovered from the vendor at the applicable rate. Moreover, overhead charges may also be deducted

- 7. No rejection allowance is permissible.**
- 8.** Supplier should indicate the supply capacity per month and delivery schedule, in No. of days/weeks/months (as the case may be) meeting enquiry requirement.
- 9.** Dimensional report TC, GC etc. as the case may be, to be furnished along with the supply. Machined items must be protected properly to avoid dent or damage during handling/transportation. TRP to be applied in each item.
- 10.** Quotation should be valid for minimum 90 days from the date of opening of tender.
- 11.** Purchase order can be issued for part quantity / item / item wise L1 basis, if not specified otherwise in the enquiry.
- 12.** The vendor shall produce the free-issue-material supplied to them to BHEL officials visiting vendor's unit for verifications/ inspection purposes at any time. If vendor fails to produce or properly account for the material so issued, BHEL will take further action as deemed fit including the recovery of the value of material as per BHEL norms from vendor bills & BG.
- 13. Splitting of order quantity :** BHEL reserves the right to split the ordering of tendered quantity. We need **2** supplier in the ratio of L1:L2::3:1 as mentioned in the Enquiry NIT for execution of this work. Hence your offer should be valid for part quantity also. L1 rates shall be counter offered to L2 and so on vendors if no other vendor accepts counteroffer total qty. shall be given to L1 vendor.

The merit rank would be based on their standing position in RA or price bids (THIS CASE RA SHALL BE DONE). Above percentages are approximate figure. All quantities will be rounded off to nearest whole number. Other than L1 vendor shall be counter offered at L1 accepted rates and on acceptance of same by them, order shall be split as above. In case of non-acceptance of counter-offer by vendor as above, counter-offer process shall be repeated with other vendors in the order of their merit in the comparative statement of prices obtained through Part-II or RA. If we do not get sufficient vendors in final bidding of RA, then ranking of vendors will be picked from initial / dynamic bidding in order of their merit for counter offer purpose. Following are to be noted herein:

- a) No supplier must refuse the less quantity allocated.
- b) Additionally BHEL also reserves the right to revise the tendered quantity downward with or without split ordering as above
- c) In case any of vendors L2 do not accept the counter offer of L1 rates, then the counter offer shall be made to other remaining vendors sequentially as per their comparative statement of prices obtained through Part-II (price bids) or ranking in RA followed by their ranking in sealed bids. At the end, however, if it is observed that less than the vendors required (excluding L1 vendor) has agreed to L1 rates, then the order shall be finalized with only those vendors who



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accepts L1 rates. The quantity distribution then shall be then proportionally revised as declared in enquiry details /enquiry remarks / enquiry main copy .

- d) **In case, if less number of vendor accepts our counter offer then the quantity shall be redistributed as per split ratio shown above.**
- e) In case of capacity constraint /monthly capacity of vendors the additional quantity over & above of their shares will be distributed on other vendors suitably.

14. Basis of evaluation of quotations:

- a) Only offers received before due date and time and meeting the terms and conditions of the enquiry will be considered.
- b) In case of Two bid system, all the bidders should read "instructions to bidders for submission of two bid system". Whenever two bid system of enquiry is mentioned "BHEL reserves the right to go in for Reverse Auction instead of opening the submitted sealed bid, which will be decided after technical evaluation". All the bidders should also read additional instructions to bidders for Reverse Auction (Ref. Annexure-IV).
- c) **All the offers for each items shall be compared for landed cost to BHEL at BHEL stores.**
- d) In cases where more than one offer is at L1 price, L1 will be decided
"In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

In case more than one bidder happens to occupy the L-1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss / draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s).

Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding."
- e) Offers received on any other basis other than the unit specified in tender shall be compared on the basis of design weight indicated in drawing.
- f) L-1 /lowest rank will be decided on basis of HESG cost/total landed cost to BHEL Bhopal.
- g) Offers having deviations to the terms and conditions will be suitably loaded as per standard/suitable loading factors of BHEL to derive total landed cost to BHEL at BHEL stores.
- h) GST as applicable on the date of enquiry shall be taken wherever it is not indicated in the offer for arriving the price to BHEL Bhopal.
- i) Decision of BHEL in this regard will be final and binding without any further correspondence with the supplier.
- j) During bid evaluation, No loading of price with regard to preferential payment of within 45 days will be made on vendor falling under MSMED ACT – OCT.06.

15. Acceptance & Rejection of bids



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- a) In case of two bid system, firms whose bids have been evaluated but found not meeting the qualification criteria would be intimated and un-opened price bid shall be returned to them.
- b) Bids not in line with the terms and conditions of the tender enquiry, or unsatisfactory past performance, or not meeting the required delivery schedule/ long delivery or not conforming to normally accepted practices are likely to be rejected.
- c) Suppliers are requested to quote in two parts for 2 bid enquiries. However, for quotations submitted in single bid against our requirement of two bid will be considered only if the bid is techno-commercially accepted without seeking any clarifications from the vendor. Otherwise, the bid is liable to be rejected.
- d) If any new vendor to whom enquiry is issued & who is not registered in BHEL, their price bid shall be considered only after, they will get registered with BHEL.
- e) BHEL reserves the right in respect of acceptance & rejection of bids, which will be final and binding without any further correspondence.
- f) In case of any deviation submitted for vendors BHEL will preferably asked the vendors to withdraw their deviation as per BHEL NIT terms.

6. Drawings/Documents

- A) It is advised that technical scope, tender terms and conditions, drawings and other related documents are thoroughly studied and the weight and other required details are ascertained before submitting the offer/bid in their own interest.
- b) In case of any discrepancies, it should be immediately informed in writing to the tender issuing authority clearly indicating the discrepancies at least one day before submitting the offers.
- c) Before start of manufacturing vendor to confirm latest revisions of Drawings , painting specification & QA plan (if any) in writing from Indenting deptt or Concerned Engineering deptt .

7. Delivery Period:

BHEL prefers : As given in enquiry remarks (item wise basis)

Delivery mentioned in the purchase order can be pre-poned / postponed as per the project schedule. Supplier will be required to meet the revised delivery schedule accordingly. In case of labour basis jobs / mixed basis jobs normally the vendors are expected to lift material in time without any reminders from BHEL and the delivery is computed as per the agreed manufacturing cycle mentioned in the enquiry / offer. However, at times, BHEL will remind the vendors through emails to lift material. In such cases, the delivery will be computed from the last date of issue of material .

8. Taxes & duties :-

- a) Applicable Duties & Taxes, which BHEL is required to pay, should be clearly declared considering the offer validity and quoted delivery period. Otherwise BHEL will not be responsible for payment of any kind of duties & taxes.
- b) Taxes and duties will be paid extra as applicable on the date/dates of contractual delivery or actual delivery whichever is lower.
- c) Parties shall declare: GSTIN details , GSTIN no . SAC code, Excise duty, sales Tax, IT PAN and SSI registration details and also communicate subsequent changes wherever not submitted earlier at the time of registration.



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- d) All the formalities relating with existing taxes and duties as well as such taxes and duties which will be introduced in future, will be discharged by the vendor and there shall be nothing which will fall on BHEL.
- e) **Form 88** – BHEL being Public Sector Undertaking of Gov. of India is exempted vide notification no. FA329/2004/1/V(54) DT 26/10/2005 by order of Addl. Secy. Gov. of M.P., in respect of goods sent from a place outside the state of Madhya Pradesh.
- f) **Vendor to follow strictly adhere to the government E -way bill rules for transportation.**

9. Payment –

- a) Payment shall be made in 90 days from date of receipt and against accepted SRV for the supplies complete in all aspects as per the technical scope. If the payment is less than 90 days vendor will be suitably loaded to arrive at BHEL landed cost. However for supplier registered with us against MSMED act will be paid within 45 days. No loading shall be done on MSME vendor this payment term.

"MSE suppliers can avail the intended benefits only if they submit along with the offer, attested copies of either EM II certificate having deemed validity (five years from the date of issue of acknowledgement in EM II) or valid NSIC certificate or EM II certificate along with attested copy of a CA certificate (Format enclosed at Annexure -1 where deemed validity of EM II certificate of five years has expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining the deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of their bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiency in the above required documents are not submitted before price bid opening. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal. Documents should be notarized or attested by a Gazetted officer. "

10. Confidentially agreement: Without prior permission of BHEL, NIT related documents shall not be used for any other purpose .

Section –B (Additional terms for labour basis jobs) 1) Order

execution:

Materials should be lifted immediately on receipt of intimation of readiness. Delivery period shall be reckoned after 2 days from the date of intimation. If any delay is due to non lifting of material shall not be considered for delivery amendment. Stock Verification

- 1. BHEL reserves the right of verification of material lying with the subcontractor /supplier at any time.
- 2. BHEL material should be stocked at one place with identification with tags on them and should not be mixed with other materials.
- 3. Proper stock record of material held with them shall be maintained and the same shall be provided to BHEL on demand. If the Subcontractor fails to produce or properly account the materials so issued, BHEL will have the right to recovery of the value of the materials along with the respective administration charges and statutory levies from the running bills of the Subcontractor.
- 4. Any of the materials of BHEL under no circumstance be sold / hypothecated to any bank or to any lending institution or to any party whomsoever. It should not also be shown as the Subcontractor's assets in any of statements of the Subcontractor to any party.
- 5. Subcontractor should take all necessary precautions to ensure safety of BHEL material against damage or loss in any form.
- 6. Further subcontracting of work without prior written permission of BHEL is not permitted. Also, Shifting of items / materials issued by BHEL to any place other than the Subcontractor's works is prohibited.



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- 2) Issue and accountal of free issue material from BHEL**
- a) Material /components will be issued free of cost under GST ACT 2017 only. Material accountal statement will be submitted by the supplier along with each bill. **Free-Issue-material (FIM)** will be issued by BHEL under GST rule For movement of inputs of partially processed goods under Rule 55(1)- (b), (c) & (d) of Central Goods & Service Tax (CGST) Rules, 2017 of Invoice GST rule from one factory to another factory for processing / operation and subsequent
 - b) Material shall be issued in form of raw material & components as mentioned in the technical scope with adequate allowance as per prevailing engineering practice.
 - c) It shall be the responsibility of Subcontractor to check the raw materials received by them for quality & quantity and ensure its correctness before removing it from BHEL premises.
 - d) Any wrong material collected should be immediately communicated for remedy. Excess material collected should be immediately returned in the usable form.
 - e) Any wrong material collected should be immediately informed to us for correction. Excess material collected should be immediately returned in the usable form against not for payment challan through SRV, & only cutbits/offcuts i.e end pieces shall be returned through SCRN.
 - f) Material issued for job work shall be taken back only in exceptional circumstances and upon written request of vendor with due justification.
 - g) In cases wherever availability of material becomes critical for certain work order, BHEL has the right to either take back or transfer the balance, material available with the Subcontractor to other, with due material accountal.



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- h) Free issue Material accountal shall be submitted by the vendor along with each supply. In case vendor fails to liquidate material accountal within stipulated period as per the GST rules from the date of issue of material, then BHEL may recover the cost of material.
- i) In case of rejection of BHEL issued material, vendor must repair and return/ replace, as the case may be, within 60 days from the date of rejection failing which such rejection shall be treated as "BHEL material damaged" and BHEL may recover the cost of material as per BHEL rules.

3) Q.A. Plan , Testing , Inspection, Quality certification & correlation

- a) Q.A. plan (if any) is to be strictly followed without any deviation and skilled worker will be employed as per job requirement & QA plan.
- b) Testing:-All types of testing & NDT would be in the scope of supplier and will be carried out through BHEL approved agencies unless specified otherwise in technical specification subject to review of NDT reports by BHEL. Testing of sample if done in BHEL TSD department will be on chargeable basis as per prevailing rates.

c) Inspection and traceability of free issue Material

- 1. All the material and components taken from BHEL should have got inspected and should be used only for the purpose for which it is issued by QC of BHEL otherwise job is likely to be rejected.
- 2. **It shall be the responsibility of subcontractors to check the raw materials received by them for quality & quantity as mentioned in the order.**
- 3. **Subcontractors shall ensure transfer of materials identity and traceability at all stages and also maintains proper records.**
- 4) Inspection of completed jobs
 - a) Inspection shall be done by customer, third party and/or BHEL's quality control department as mentioned in the QA plan /annexure.
 - b) In case of inspection by customer or his authorized agency, intimation of readiness of job for calling the party should be given at least one week in advance.
 - c) After inspection at supplier's works the goods will be cleared for dispatch on provisional basis. Any defects noticed during assembly, testing or use is to be attended by the subcontractor, including replacement.
 - d) **The cost of rework or rejection, and any cost of freight incidental to such work will be to the Subcontractor's account.**
 - e) Subcontractors shall provide all reasonable facilities to BHEL personnel to have access to the records of the issued material and items under manufacture at all stages of processing and inspection.
- 5) **Calibration :**
 - 1. Subcontractor shall use only relevant measuring instruments, templates; gauges- calibrated at, either BHEL or at any Govt., approved labs – traceable to national standards or BHEL approved agencies for the purpose.
 - 2. Relevant Test Certificates are to be produced to BHEL inspection staff for verification and demand.
- 6) **LATE DELIVERY (LD CALUSE) :** In case of late delivery a penalty @0.5% of the total order value per week of delay or part thereof subject to a maximum of 10% of total order value would be levied.
- 7) **Order Cancellation**



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- a) BHEL shall have the right to cancel any order either wholly or in part on account due to cancellation of order or any curtailments or stoppage of BHEL's business or any other reason which justifies cancellation with recovery of full material cost.
- b) In the event of delay in lifting the free issue material or/and delay in completion of work , BHEL shall be free to cancel the order in part or full and divert it to alternate subcontractor as per BHEL policy.
- 8) Confidentiality Agreement**
- a. All successful vendors are under obligation to maintain complete confidentiality of the documents, process etc . Acceptance of terms and conditions of the tender implies and binds the vendor to this agreement and no separate agreement need not be entered.
- b. BHEL drawings shall not be used other than BHEL's requirements which after manufacture of items shall be returned along with delivery of materials.
- 9) Guarantee**
- The subcontractor shall warrant that the goods fully complies with the drawings and other technical conditions. If the finished goods are found defective owing to faulty workmanship / incomplete work within a period of 24 months from the date of dispatch the subcontractor shall make good of it / replace the same free of cost. Alternatively, the rework/replacement will be done by BHEL at the cost and risk of the subcontractor.
- 10) Insurance- Submission of documents by the vendors :** Material issued to vendors are covered under BHEL corporate insurance policy. In case of any loss, to facilitate processing of claim, the vendor needs to furnish all required documents in time. The vendor is liable to pay the loss if the claim is not enforceable due to nonsubmission of documents by the vendors.
- 11) General**
- a) Any change in the constitution of the subcontractor's unit during the operation of the contract will have to be made only after getting the specific written approval from BHEL. Non - compliance to this may entail cancellation of registration.
- b) The Subcontractor shall comply with all statutory obligations such as ESI. PF, labour laws, Factories Act. BHEL shall not be responsible for any of the penalties/ fines etc on this account.
- c) Further to the above , other instructions for packing, liquidated damages, arbitration & jurisdiction, indemnity , rejection etc., shall be as per the terms & conditions of indigenous enquiry **BP -200102** and purchase order MM 5527 as issued by material management department . (copy of documents mentioned above are already available with the vendors & hosted in B2B site of BHEL Bhopal <http://www.bhelbpl.co.in/mm/>).
- d) Progress report – Progress report will be required to be sent every week without fail by e-mail to skbaranawal@bhel.in indicating the status of each purchase order and hold up points. Please indicate your e-mail address in your offer without fail.
- e) In case of mismatch or any typographical mistake , computer generated enquiry copy shall be valid for enquiry.
- f) Pls visits B-2-B site for all information <http://www.bhelbpl.co.in/mm/>
- g) Acceptance of all the above Enquiry terms & conditions & annexures are required in your offer. The same is to be signed by the vendors and submitted along with Part-1 offer. Offers/Bids/Quotations may be rejected without submission of same.
- 12) REGARDING TOOLS/Jigs , Fixtures , checking templates :**
- "In cases where tools are issued **VENDORS ARE REQUESTED TO RETURN THE TOOLS IMMEDIATELY ON COMPLETION OF JOBS. IN CASE THE TOOLS ARE NOT RETURNED WITHIN 3 MONTHS OF ISSUE OF THE SAME, THE BILLS OF THE VENDORS MAY BE KEPT UNDER HOLD TILL RETURN OF THE TOOLS**"



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13) BHEL RESERVES RIGHT TO CANCEL

- i. Our requirement part or full at any stage of the tender finalization (or) even after finalization of tender. **PO can be short close or mutually extended at any point depending upon order BHEL book position and BHEL shop loading capacity etc.**
 - ii. Or forfeit the chance in tender, if any vendor(s) found to be "unsatisfactory" during our assessment processes/noncompliance of statutory requirements etc. as required for "vendor registration" during/after the processes of finalization of contract.
 - iii. The order(s), if any vendor (s) found to be "unsatisfactory" during our periodical assessment processes / review of assessment processes/ non-compliance of statutory requirements etc. as required for "vendor registration" during the execution of order(s).
 - iv. **Divert order(s) allocation quantity, in case of non-submission/ delay in submission/delay in lifting the material/delay in completing the work/delay in supply or failure to meet order delivery schedule / in-sufficient amount of bank guarantee/non-execution of orders by vendor(s) as per BHEL rules/current practice.**
 - v. In case L-1 supplier or any supplier after finalization of rate contract is not maintaining supply within stipulated contractual delivery, the balance quantity will be distributed in order of merit.
 - vi. The contract or forfeit the chance in tender, if any vendor (s) disposed off units/found to be sick/ running under unrest/ declared insolvency /nonrenewal lease deed during/ after finalization process/ during the validity of the contract without assigning any reasons thereafter.
 - vii. The offers of the vendor who are in banned list and offers of those firm who engaged with the services of banned firm the offers shall be summarily rejected .If the vendor is found in banned list of BHEL at later stage the PO shall be cancelled. The list of all banned firm is available in BHEL internet site at www.bhel.com.
 - viii. Any deviation to any points of this annexure or enquiry should be clearly mentioned in offer. Otherwise, it will be presumed that supplier agrees to these conditions.
Any deviation to BHEL NIT conditions and BHEL std practice will be suitably loaded as per BHEL current loading factors to arrive at total cost to BHEL to decide Total Landed cost to BHEL to arrive at L-1 status
- 14)** Apart from the above, general terms & conditions of indigenous enquiry and purchase order issued by material management department vide BP -200102 , MM 5527 respectively will also be applicable (already available with the suppliers and hosted in B-2-B site <http://www.bhelbpl.co.in/mm/>).

15) Acceptance of all the above Enquiry terms & conditions & annexures are required in your offer. The same is to be signed by the vendors and submitted along with Part-1 offer. Offers/Bids/Quotations may be rejected without submission of same. Deviation to be clearly mentioned in your offer else we assume that you have accepted all terms of BHEL. In case of e procurement enquiries as tender is submitted by verified DSC of vendor hence it will presumed that all terms and conditions of tender and annexures are accepted in TOTO unless if any deviation is submitted or written in your online quotations .

16) Part 2 price bid sha be opened to confirm L1 vendor.



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Annexure II

NEW BANK GUARANTEE SYSTEM 2016 FOR ALL LABOUR BASIS & MIXED BASIS POS

Pls refer B-2-B site in bhel Bhopal website and contact our BG section in ASX deptt for complete details in Office hrs.

a) In case of order, the vendor would be required to furnish Bank Guarantee (BG) as follows, if not stated otherwise in the main Enquiry :

1. First order:-Bank guarantee for vendors executing first order of ancillary & sub-contracting division shall be for 30% cost of free issue material subject to maximum BG of Rs 30 lakhs for first order.



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2. Subsequent orders: - Bank guarantee shall be for 10% cost of free issue material subject to maximum BG of Rs 30 lakhs for subsequent orders.
3. 10% BG of highest balance of MWF value (taking into account both PMIV & SMIV held by the fabricators), for A category i.e. for normal material of MS, SS, HSS, CRGO & CRNGO etc. for machining, Fabrication and lamination purpose and copper sheets for welding to transformer tank (based on highest balance of MWF value appearing at the end of each month starting from January to December of the previous calendar year)
4. 10% BG of highest balance of MWF value (taking into account both PMIV & SMIV held by the fabricators & based on highest balance of MWF value appearing at the end of each month starting from January to December of the previous calendar year) or value of material to be issued whichever is more for B category i.e. for high value item e.g. , thermal blades, turbine runner, liners and labyrinth for HVOF coating etc.
5. 100% BG of value of material to be issued for C category i.e. for very high value item like copper for moulding of conductors, silver for soldering etc.
6. Subject to minimum BG of Rs. 1,00,000 (Rupees one lakh only)
7. "UNDERTAKING FOR FREE ISSUE MATERIAL" on plain paper / letter head from vendors to be submitted (where 10% BG is proposed) which will be a part of every enquiry **In case of e procurement enquiry your digital signature is enough for acceptance & digitally signed by you is considered as your acceptance unless you specifically submit a deviation in this regard**
8. Solvency certificate of equivalent amount of free issue material.

Note: - The BG is to be furnished in prescribed Performa and from BHEL approved Banks only (available in B2B site).

- a. Discontinue the practice of taking IB on Stamp paper and Net worth Certificate.
- b. "UNDERTAKING FOR FREE ISSUE MATERIAL" ON PLAIN PAPER (unstamped) from vendors will be obtained (where 10% BG is proposed) which will be a part of every enquiry . In case of e procurement enquiry your digital signature is enough for acceptance & digitally signed by you is considered as your acceptance.
- c. To continue to obtain solvency certificate of equivalent amount free issue material.

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."

Annexure III



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UNDERTAKING FOR FREE ISSUE MATERIALS

**M/s Bharat Heavy Electrical Limited,
Piplani, Bhopal-462022 (M.P.)**

Whereas M/s Bharat Heavy Electrical Limited (hereinafter referred to as 'The Customer' which expression shall unless repugnant to the context includes their legal representatives, successors and assigns having their office at Piplani, Bhopal 462 022, MP has entered in to a contract with M/s..... (hereinafter referred to as 'The Contractor' which expression shall unless repugnant to the context includes their legal representatives, successors and assigns for supply for free issue material on the terms and conditions as set out inter-alia, in the above said Purchase order/various purchase orders and various documents forming part thereof hereinafter collectively referred to as the 'Said Contract' which expression shall include all amendments, modifications and / or variation thereto. This will also include other future fabrication and machining orders placed by BHEL during below mentioned period.

AND WHEREAS the customer has agreed to supply to the contractor major portion of raw materials / components etc. for the purpose of execution of the said contract by the contractor (the raw materials/ components etc.) to be supplied by the customer to the contractor hereinafter for the sake of brevity referred to as the "Said Materials" shall be under the custody and charge of the contractor and shall be kept, stored, altered, worked upon, machined/fabricated at the sole risk and expense of the Contractor.

Now Therefore in consideration of the pre-condition to the supply of the said materials by the Customer to the contractor, the Contractor hereby irrevocably and unconditionally undertake to compensate and keep compensated the customer from and against all loss, damage and destruction (inclusive but not limited) to any or all loss or damage and destruction to or of the said materials or any item or part thereof by theft, pilferage, fire, flood, storm, tempest, lightning, explosion storage, chemical or physical action or reaction, bending, warping, exposure, resting, faulty workmanship, fabrication or faulty method or technique of fabrication, strike, riot, civil connection or other act or omission or commission whatsoever within or beyond the control of the Contractor, misuse and misappropriation (Inclusive but not limit to misuse or misappropriation by the contractor and the contractor's servant and or agents) Whatsoever to or of in the said materials or any part of item thereof from the date that the same or relative part of item thereof was supplied to the Contractor up to until the date of return to the Purchaser of the said material or relative part of item thereof or completed construction works incorporating the said material and undertake to pay to the customer forthwith on demand in writing without protest or demur the value as specified by the Customer of the said material or item or part thereof lost , damaged, destroyed, misused and / or misappropriated, as the case may be , together with the Customers costs and expenses (inclusive of but not limited to handling, transportation, cartage, insurance freight, packing and inspection costs/ or expenses) upto and aggregate limit of **Rs. _____/- (Rupees _____ only)** and/or additional value of material, if supplied to contractor.

1. The Undertaking shall be a continuing/ Undertaking and shall remain valid and irrevocable for all claims of the purchaser arising hereunder upto and until the midnight of However, if the Contract for which this Undertaking is given is not completed by this date Contractor hereby agrees to extend the Undertaking till such time as is required to fulfill the Contract.
2. This Undertaking shall not be determined on change of constitution or insolvency of the Contractor but shall be in all respects and for all purpose be binding and operative until payment of all moneys payable to the Customer in terms hereof.
3. The mere statement or allegation made by or on behalf of the customer in any notice or demand or other writing addressed to the contractor as to any of the said material or item or part thereof having been lost, damaged, destroyed, misused or misappropriated while in the custody of the contractor and / or prior to completion of the completed fabrication/ machining works and handing over the completed job thereof incorporating the said materials shall be conclusive of the factor of the said material or item or part thereof having been supplied to the Contractor and / or the loss, damage, destruction, misuse or misappropriation thereof, as the case may be , while in the custody of the Contractor and / or prior to the completion of the fabrication/ machining/processing works and handing over the completed job thereof incorporating the



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said materials without necessity on the part of the customer to produce any documentary proof or other evidence whatsoever in support of this.

4. The amount stated in any notice of demand addressed by the customer to the Contractor as to the value of such said materials lost, damage, destroyed, misused or misappropriated, inclusive relative to the costs and expenses incurred by the Customer in connection therewith shall be conclusive of the Value of such said materials and the said cost and expenses as also of the amount liable to be paid to the customer without producing any voucher, bill or other documentation or evidence whatsoever in support thereof.

The undersigned has full power to execute this undertaking on behalf of the Contractor under the capacity as Chairman & Managing Director/ owner/partner of the Company.

Place :



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Date:

Witnesses

For (Co. name) _____

1. Signature

Signature.....

Name

(Name, sign & seal of Co.)

Address.....

2. Signature

Name

Address.....

: