

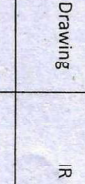


Heat Exchanger Group
BHEL Bhopal

STANDARD QUALITY ASSURANCE PLAN (SQAP)

ITEM
MACHINED AND DRILLED TUBE PLATES
FOR COOLERS


QAP No. QAX/TH/1597
Revision No. 01
Date of Issue 13.06.2022
Page 1 of 2


S. No.	Components & Operations	Characteristics	Category	Type / Method of Check	Quantum of check	Reference Document	Acceptance Norms	Format of Records	Agency			Remarks
									1	2	3	
1	2	3	4	5	6	7	8	9	10			11
1.0	TUBE PLATE (MACHINED & DRILLED)											
1.1	MATERIAL INSPECTION											
a.	Verification of Co-related Mill Test Certificates - MTCs	• Chemical composition (Heat & Product Analysis) • Mechanical Properties	Major	Visual	100%	BHEL Drawing / BHEL Specification	BHEL Drawing / BHEL Specification	MTC	R	R	-	Not Applicable in Case of BHEL supplied plate.
b.	Correlation of MTC & Attestation marks before use.	Marking & transfer of Heat Nos.	---do---	--do--	--do--	---do---	---do---	IR	P	R	-	Identification mark on each part before cutting of plates.
1.2	IN PROCESS INSPECTION											
a.	Machining of Tube Plate	Machining of Outer Periphery (OD/Length & width) & surface as mentioned in the drawing.	Major	I + Visual	100%	BHEL Drawing	BHEL Drawing	IR	P	-	-	
b.	Surface Preparation and primer painting	--	Major	Visual	--do--	BHEL Drawing	BHEL Drawing	--do--	P	W	-	For CS T/P only
c.	Drilling of Tube Plate	Drilling of tube holes, Bolt/stud hole, Lifting holes (if any) etc. and holes surface finish as mentioned in the drawing.	Major	I + Visual	100%	BHEL Drawing	BHEL Drawing	IR	P	-	-	Surface Finish to be ensured using comparator.
1.3	FINAL INSPECTION											
a.	Dimensional check	• Measurement of overall dimensions (e.g. Thickness (TK.), Outside diameter (OD)/Length & Width, Groove depth etc.). • Location & Size of tube holes, Grooves in tube holes, Bolt/Stud hole, lifting holes (if any), drain-vent holes etc.	Critical	I + Visual	100%	BHEL Drawing	BHEL Drawing	IR	P	W	-	• Refer Note-c & d also. • BHEL-1A to ensure the same. • All dimensions to be within tolerance limit.
b.	Surface finish check for tube holes	Surface finish.	Major	I + Visual	100%	BHEL Drawing 	BHEL Drawing	IR	P	W	-	• Comparator to be used. • Tube holes of tube plate should be free from any tool mark, scratches & roughness.

Technical Annexure-01


Scope of work for Machining & Drilling of SS Tube Plate

1. Collection of raw Materials from BHEL Store.(Transportation TO & FRO in your scope)
2. Preparation of Operation process sheet and submission by the vendor.
3. Machining, & drilling to be done as per drawing.
4. All the dimensions shall be maintained as per drawing and surface finish requirement also shall met as per drawing.
5. Inspection by BHEL appointed Third Party TPI/BHEL QC.
6. Packing of Tube Plates individually with proper identification tags.
7. Scrap deduction as per scrap weight. (Note-scrap rate-62.4 Rs /kg)
8. Drilling & machining to be done in house.
 1. Drilling: Drilling process shall be carried out using CNC machine.
 2. Machining: Machining shall be carried out using Boring/Milling machine.
9. Qty may decrease as per BHEL requirement after placement of PO. Before taking action for drilling tools and fixture, BHEL confirmation will be required lot wise.
10. Drilling & Machine tools, Jigs and Fixture shall be in vendor scope.
11. Plug gauge tools preferably shall be in vendor scope. BHEL may provide subject to Plug Gauge availability for issuing on loan basis.


 नवल किशोर मंडल / Nawal Kishor Mandal
 अभियंता / Engineer
 रचना आ योजना / HCM Planning
 ई.एच.ई.एल. भोपाल / BHEL, BHOPAL


 पंकज निमजे / PANKAJ NIMJE
 सप महाप्रबंधक / DGM
 6 एच. सी. एम. विभाग / HCM Division
 बी.एच.ई.एल., भोपाल / BHEL, BHOPAL

A-FORM



BHARAT HEAVY ELECTRICALS LIMITED - BHOPAL

MM DEPARTMENT

ESTIMATE SHEET FOR ISSUE OF MATERIAL/COMPONENTS FROM BHEL

CHECKLIST

FORM NO BP-0021

A-FORM NO : A211A11

REV NO : 0

A-FORM DATE : 29-DEC-24

DATE : 29-DEC-24

PAGE : 1 / 3

DEPARTMENT : 211

PROJECT : BHEL JHANSI

PO NO : A211A11

END PRODUCT : DRILL OF TUBE PLATE

INDENT NO : 221140086

WORK ORDER NO : 14045T14301

PO DATE : 23/02/25

INDENT DATE : 29122024

MATERIAL ISSUE DIV : 211

SUPP CODE : SUPP NAME :

DETAILS OF FINISHED GOODS

A-SLNO

PO IT NO

PLIT 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

SMIV/ WIP

MATERIAL PPMIV NO VALUE

TARRIF HEAD

MATL ISSUE QTY

DESCRIPTION OF FREE ISSUE MATERIAL AND WEIGHT /VOLUME/AREA

1

0

1

28.000

ST

211

211

211

M/CING & DRILLING OF TUBE PLATE INNER FIXED END

1.0000

NO

21296.000

28.00

NO

WIP

596288.000

1.0000

M/CING & DRILLING OF TUBE PLATE INNER FIXED END DRG NO-11650440340 ITEM 02 MATERIAL SIZE 600X40MM TK R.WT-88 KG & F.WT-60.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

2

0

1

28.000

ST

211

211

211

M/CING & DRILLING OF TUBE PLATE OUTER FIXED END

1.0000

NO

23718.000

28.00

NO

WIP

664104.000

1.0000

M/CING & DRILLING OF TUBE PLATE OUTER FIXED END DRG NO-11650440340 ITEM 03 MATERIAL SIZE 600X45MM TK R.WT-98 KG & F.WT-59.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

3

0

1

28.000

ST

211

211

211

M/CING & DRILLING OF TUBE PLATE INNER FLOATING END

1.0000

NO

8954.000

28.00

NO

WIP

250712.000

1.0000

M/CING & DRILLING OF TUBE PLATE INNER FLOATING END DRG NO-11650440340 ITEM 04 MATERIAL SIZE 410X36 MM TK R.WT-37 KG & F.WT-30.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

4

0

1

28.000

ST

211

211

211

M/CING & DRILLING OF TUBE PLATE OUTER FLOATING END

1.0000

NO

8954.000

28.00

NO

WIP

250712.000

1.0000

M/CING & DRILLING OF TUBE PLATE OUTER FLOATING END DRG NO-11650440340 ITEM 05 MATERIAL SIZE 410X36 MM TK R.WT-37 KG & F.WT-28.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

1 MATERIAL TO BE ISSUED ON :-

FREE ISSUE BASIS

2.TRANSPORT TO BE PROVIDED BY :-

SUPPLIER

3.EXCISE DUTY ON ISSUE MATL TO BE BORNE BY :-

SUPPLIER

4.SCRAP TO BE RETURNED :-

NO

5 INVARIABLY ISSUE WT. TO BE RECORDED ON SMIV/PMIV

7

SIGNATURE OF INDENTOR

NAME

DESIGNATION

TELEPHONE


SIGNATURE OF ASC EXECUTIVE

NAME

DESIGNATION

TELEPHONE

A-FORM



BHARAT HEAVY ELECTRICALS LIMITED - BHOPAL

MM DEPARTMENT

ESTIMATE SHEET FOR ISSUE OF MATERIAL/COMPONENTS FROM BHEL

CHECKLIST

A-FORM NO : A211A11

REV NO : 0

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DATE : 29-DEC-24

PAGE : 2 / 3

A-SLNO

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

SMIV/PPMIV NO

MATERIAL VALUE

TARRIF HEAD

MATL ISSUE QTY

DESCRIPTION OF FREE ISSUE MATERIAL AND WEIGHT /VOLUME/AREA

5

0

2

10.000

ST

211

211

211

1.0000

M/CING & DRILLING OF TUBE PLATE INNER FIXED END

SA240TP304

1.0000

NO

25652.000

10.00

NO

WIP

256520.000

1.0000

M/CING & DRILLING OF TUBE PLATE INNER FLOATING END DRG NO-11650440376 ITEM 02 MATERIAL SIZE 620X45 MM TK R.WT-106 KG & F.WT-76.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

6

0

2

10.000

ST

211

211

211

1.0000

M/CING & DRILLING OF TUBE PLATE OUTER FIXED END

SA240TP304

1.0000

NO

22748.000

10.00

NO

WIP

227480.000

1.0000

M/CING & DRILLING OF TUBE PLATE OUTER FIXED END DRG NO-11650440376 ITEM 03 MATERIAL SIZE 620X40 MM TK R.WT-94 KG & F.WT-73.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

7

0

2

10.000

ST

211

211

211

1.0000

M/CING & DRILLING OF TUBE PLATE INNER FLOATING END

SA240TP304

1.0000

NO

14520.000

10.00

NO

WIP

145200.000

1.0000

M/CING & DRILLING OF TUBE PLATE INNER FLOATING END DRG NO-11650440376 ITEM 04 MATERIAL SIZE 520X36 MM TK R.WT-60 KG & F.WT-42.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

8

0

2

10.000

ST

211

211

211

1.0000

M/CING & DRILLING OF TUBE PLATE OUTER FLOATING END

SA240TP304

1.0000

NO

14520.000

10.00

NO

WIP

145200.000

1.0000

M/CING & DRILLING OF TUBE PLATE OUTER FLOATING END DRG NO-11650440376 ITEM 05 MATERIAL SIZE 520X36 MM TK R.WT-60 KG & F.WT-45.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

9

0

3

9.000

ST

211

211

211

1.0000

M/CING & DRILLING OF TUBE PLATE INNER FIXED END

SA240TP304

1.0000

NO

15972.000

9.00

NO

WIP

143748.000

1.0000

M/CING & DRILLING OF TUBE PLATE INNER FIXED END DRG NO-11650440380 ITEM 02 MATERIAL SIZE 490X45 MM TK R.WT-66 KG & F.WT-50.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)

1 MATERIAL TO BE ISSUED ON :-

FREE ISSUE BASIS

2.TRANSPORT TO BE PROVIDED BY :-

SUPPLIER

3.EXCISE DUTY ON ISSUE MATL TO BE BORNE BY :-

SUPPLIER

4.SCRAP TO BE RETURNED :-

NO

5 INVARIABLY ISSUE WT. TO BE RECORDED ON SMIV/PMIV

8

SIGNATURE OF INDENTOR

SIGNATURE OF ASC EXECUTIVE

NAME


NAME

DESIGNATION

DESIGNATION

TELEPHONE

TELEPHONE

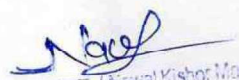
<div><div>A-FORM</div><div></div></div> <div><div>BHARAT HEAVY ELECTRICALS LIMITED - BHOPAL</div><div>MM DEPARTMENT</div><div>ESTIMATE SHEET FOR ISSUE OF MATERIAL/COMPONENTS FROM BHEL</div><div>CHECKLIST</div></div>										<div>A-FORM NO : A211A11</div> <div>REV NO : 0</div> <div>A-FORM DATE 29-DEC-24</div> <div>DATE : 29-DEC-24</div> <div>PAGE : 3 / 3</div>			
FORM NO BP-0021													
A-SLNO 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	SMIV/ PPMIV NO	MATERIAL VALUE	TARRIF HEAD	MATL ISSUE QTY				
DESCRIPTION OF FREE ISSUE MATERIAL AND WEIGHT /VOLUME/AREA													
10 0 3 9.000 ST 211 211 211													
M/CING & DRILLING OF TUBE PLATE OUTER FIXED END													
SA240TP304 1.0000 NO 14278.000 9.00 NO WIP 128502.000 1.0000													
M/CING & DRILLING OF TUBE PLATE OUTER FIXED END DRG NO-11650440380 ITEM 03 MATERIAL SIZE 490X40 MM TK R.WT-59 KG & F.WT-45.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)													
11 0 3 9.000 ST 211 211 211													
M/CING & DRILLING OF TUBE PLATE INNER FLOATING END													
SA240TP304 1.0000 NO 7986.000 9.00 NO WIP 71874.000 1.0000													
M/CING & DRILLING OF TUBE PLATE INNER FLOATING END DRG NO-11650440380 ITEM 04 MATERIAL SIZE 390X36 MM TK R.WT-33 KG & F.WT-23.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)													
12 0 3 9.000 ST 211 211 211													
M/CING & DRILLING OF TUBE PLATE OUTER FLOATING END													
SA240TP304 1.0000 NO 7986.000 9.00 NO WIP 71874.000 1.0000													
M/CING & DRILLING OF TUBE PLATE OUTER FLOATING END DRG NO-11650440380 ITEM 05 MATERIAL SIZE 390X36 MM TK R.WT-33 KG & F.WT-20.00 KG APPROX.(SCRAP DEDUCTION RATE-62.4/KG)													
REMARKS -----NA-----													
TOTAL NO OF CANCEL ITEM 0													
AFORM TOTAL 2952214.000													


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	9		

Pre-Qualification Requirement: 221140086

S.No.	DESCRIPTION	Requirement	Vendor to specify
1	Details of past experience in Drilling/Machining of jobs of Minimum 300 X 450 mm including job executed and under progress, in last five year.	PO Copy/Job Completion Certificate	
2	Facility of CNC machine for Drilling of Tube Plate for drilling as per respective items of the Drawing.	As mentioned below	Vendor to confirm
2.1	Make	Vendor to Specify	
2.2	Qty	Vendor to Specify and confirm	
2.3	Capacity X Axis	Vendor to Specify and confirm.	
2.4	Capacity Y Axis	Vendor to Specify and confirm	
3	Facility of Machine for Machining of Tube Plate as per respective items of the Drawing.	Vendor to Specify machine details and confirm.	

All machineries, measuring instrument and inspection tool shall be in good working condition and valid calibration reports shall be available.


 Nawal Kishor Mandal / Engineer
 Prepared by
 DE (SKS)-ASC34203-HEP, DE, BHARAT HEAVY ELECTRICAL LTD
 BHEL, BHOPAL


 Lakshman Mardi / Manager
 Checked by
 एच.सी.एम. विभाग, HCM Division
 बी.एच.ई.एल. भोपाल / BHEL Bhopal


 Pankaj Nimje / DGM
 Approved by
 एच.सी.एम. विभाग, HCM Division
 बी.एच.ई.एल. भोपाल / BHEL, BHOPAL

Annexture-A				
PI ITEM	Set Description	One Set consist of Following Items	TOTAL QTY(SET)	PI QTY
1	Set of M/cing & Drilling of Tube Plate inner Fixed End to drg no-11650440340 item 02,Tube Plate outer Fixed End to drg no-11650440340 item 03,Tube Plate inner Floating End to drg no-11650440340 item 04 & Tube Plate outer Floating End to drg no-11650440340 item 05	MACHINING & DRILLING OF TUBE PLATE INNER FIXED END TO DRG NO-11650440340 REV-01 ITEM-02-01 No	28 SET	01 SET =(01+01+01+01) NOS
		MACHINING & DRILLING OF TUBE PLATE OUTER FIXED END TO DRG NO-11650440340 REV-01 ITEM-03-1 No		
		MACHINING & DRILLING OF TUBE PLATE INNER FLOATING END TO DRG NO-11650440340 REV-01 ITEM-04-1 No		
		MACHINING & DRILLING OF TUBE PLATE OUTER FLOATING END TO DRG NO-11650440340 REV-01 ITEM-05-1 No		
		MACHINING & DRILLING OF TUBE PLATE INNER FIXED END TO DRG NO-11650440376 REV-00 ITEM-02-01 No		
2	Set of M/cing & Drilling of Tube Plate inner Fixed End to drg no-11650440376 item 02,Tube Plate outer Fixed End to drg no-11650440376 item 03,Tube Plate inner Floating End to drg no-11650440376 item 04 & Tube Plate outer Floating End to drg no-11650440376 item 05	MACHINING & DRILLING OF TUBE PLATE OUTER FIXED END TO DRG NO-11650440376 REV-00 ITEM-03-1 No	10 SET	01 SET =(01+01+01+01) NOS
		MACHINING & DRILLING OF TUBE PLATE INNER FLOATING END TO DRG NO-11650440376 REV-00 ITEM-04-1 No		
		MACHINING & DRILLING OF TUBE PLATE OUTER FLOATING END TO DRG NO-11650440376 REV-00 ITEM-05-1 No		
		MACHINING & DRILLING OF TUBE PLATE INNER FIXED END TO DRG NO-11650440380 REV-00 ITEM-02-01 No		
		MACHINING & DRILLING OF TUBE PLATE OUTER FIXED END TO DRG NO-11650440380 REV-00 ITEM-03-1 No		
3	Set of M/cing & Drilling of Tube Plate inner Fixed End to drg no-11650440380 item 02,Tube Plate outer Fixed End to drg no-11650440380 item 03,Tube Plate inner Floating End to drg no-11650440380 item 04 & Tube Plate outer Floating End to drg no-11650440380 item 05	MACHINING & DRILLING OF TUBE PLATE INNER FIXED END TO DRG NO-11650440380 REV-00 ITEM-02-01 No	09 SET	01 SET =(01+01+01+01) NOS
		MACHINING & DRILLING OF TUBE PLATE OUTER FIXED END TO DRG NO-11650440380 REV-00 ITEM-03-1 No		
		MACHINING & DRILLING OF TUBE PLATE INNER FLOATING END TO DRG NO-11650440380 REV-00 ITEM-04-1 No		
		MACHINING & DRILLING OF TUBE PLATE OUTER FLOATING END TO DRG NO-11650440380 REV-00 ITEM-05-1 No		
		MACHINING & DRILLING OF TUBE PLATE INNER FIXED END TO DRG NO-11650440380 REV-00 ITEM-02-01 No		