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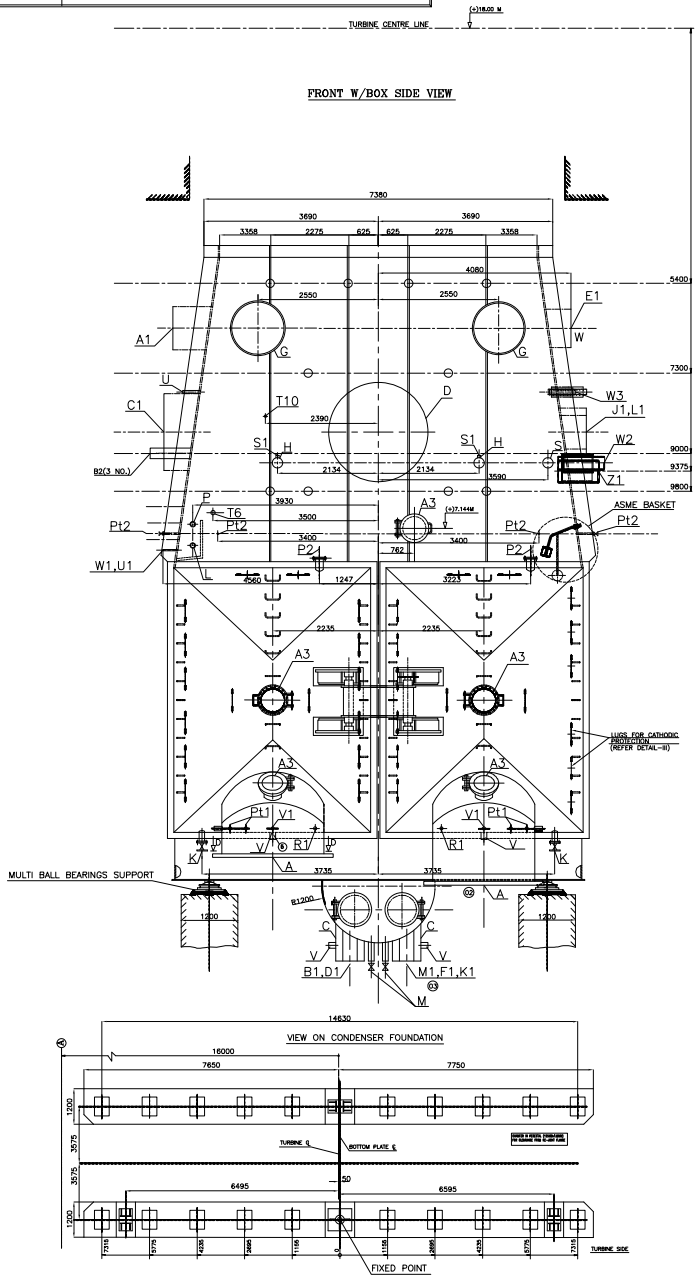


LIST OF CONNECTIONS:

REF	SIZE OF (ODXTK.)	TYPE	FLANGE DETAIL OD	PCD	R.FACE DIA	PRO	FLG. THK	NO/ BOLT SIZE	PCD	NO/ BOLT SIZE-2	DESCRIPTION	QTY.	ZONE	REMARKS
A	DIA 2572x36	FLG.	3300	3100	—	—	110	36/ 2.952	2760	60/ 2.256	CW INLET	2	D3	+ HOLE SIZE;PNOM 5 KG/SQ.CM
B	DIA 2572x36	FLG.	3300	3100	—	—	110	36/ 2.952	2760	60/ 2.256	CW OUTLET	2	D3	+ HOLE SIZE;PNOM 5 KG/SQ.CM
C	DIA 559x10	BW									CONDENSATE OUTLET	2	D3	
D	□2200x2100										LP HEATER NO.1	1	D3	
E	DIA 914x10	BW									EXTRACTION PIPE LPH-2	1	B3	
F	DIA 610x10	BW									EXTRACTION PIPE LPH-3	1	B2	
G	DIA 1118X28	BW									DUMP TUBE CONN.	2	B2	
H	DIA 219.1x8.18	BW									AIR EXTRACTION	2	B2	
J	DIA 33.4X4.55	SW									VACUUM MEASUREMENT	1	C3	
K	DIA 115x5.4	FLG.	220	180	158	3	20	8/M16			WATER BOX DRAIN WITH VALVE	4	D4	ROUND FLANGE FITTED; PNOM 10KG/SQ.CM
N	DIA 1829x16	BW									BFPT EXHAUST CONNECTION	2	C3	
Q	DIA 219X8.18	BW									MIN. FLOW RECIRCULATION OF GSC	1	C7	DISPERSER FITTED
S	DIA 219x8.18	BW									VACUUM BREAKER CONNECTION	1	B4	
T1	DIA 168.3X7.11	BW									LPH-1 VENT	1	B2	
T2	DIA 114.3X6.02	BW									LPH-2 VENT	1	B2	
T3	DIA 114.3X6.02	BW									LPH-3 VENT	1	B2	
U	DIA 60.3x5.54	SW									VENT FROM CONDENSATE EXTRACTION PUMPS (SUCTION SIDE)	3	B2	
V	1 1/4" NPT	SCR									CONDUCTIVITY MEASUREMENT CONNECTION	6	D3	PLUG FITTED
W	DIA 114.3x3.96	BW									LEAKAGES FROM U-RING, HPT INLET AND OVERLOAD PIPING TO INLET OF HPT	1	B2	
A1	DIA 914x10	BW									LP FLASH TANK VENT	1	B2	
B1	DIA 406.4x9.53	BW									LP FLASH TANK DRAIN	1	D3	
C1	DIA 1219x10	BW									HP FLASH TANK VENT	1	B2	
D1	DIA 508x12.7	BW									HP FLASH TANK DRAIN	1	D3	
E1	DIA 813x10	BW									STEAM DRAIN FLASH TANK 'A' VENT	1	B4	
F1	DIA 114.3x6.02	BW									STEAM DRAIN FLASH TANK "A" DRAIN	1	D3	
J1	DIA 1016x9.53	BW									TURBINE FLASH BOX I VENT	1	B4	
K1	DIA 323.2x7.1	BW									TURBINE FLASH BOX I DRAIN	1	D3	
L1	DIA 1016x9.53	BW									TURBINE FLASH BOX II VENT	1	B4	
M1	DIA 323.9x7.1	BW									TURBINE FLASH BOX II DRAIN	1	D3	
P1	DIA 114.3x5.0	FLG.	220	180	158	3	20	8/M16			REAR WATER BOX STARTING VENT WITH VALVE	2	C3	ROUND FLANGE FITTED; PNOM 10KG/SQ.CM
T6	DIA 88.9X5.49	SW									HEADER FOR CONDENSER INSTRUMENTS RACK	1	C2	
R1	M33x2	SCR									CW TEMPERATURE CONNECTION	4	D3	PLUG FITTED
S1	M33x2	SCR									AIR OUTLET TEMPERATURE CONNECTION	2	B3	PLUG FITTED
U1	M33x2	SCR									CONDENSER SHELL TEMP. CONNECTION	1	C2	PLUG FITTED
V1	NB 15	SW									CW PRESSURE GAUGE CONNECTION	4	D3	VALVE FITTED
W1	NB 15	SW									VACUUM GAUGE CONNECTION WITH VALVE	1	C2	VALVE FITTED
Z1	DIA 457x6.35	BW									EXCESS STEAM FROM SEAL STEAM HEADER	1	B4	
A3	DIA 610x10	FLG	755	705	670	5	32	20/ M24			MAN HOLES WITH HINGED COVERS	11	C3	PNOM 6KG/SQ.CM
B2	DIA 219.1x8.18	BW									CONDENSATE PUMPS MIN. FLOW RECIRCULATION	3	C2	DISPERSER FITTED
T4	DIA 114.3x6.02	BW									LPH-4 VENT	1	B3	
C2	DIA 168.3x7.11	BW									RINSE WATER FROM POLISHER UNIT	1	C2	DISPERSER FITTED
T5	M14x1	SCR									REMOTE TEMP MEASUREMENT FOR LP BY PASS SPRAY CONTROL	2	B3	PLUG FITTED
P11	M 33x2	SCR									CW INLET TEMP. CONN. FOR PERF TEST	4	D3	PLUG FITTED
P12	NB 15	SW									COND. VACUUM MEASUREMENT CONN. FOR PERF. TEST.	8	C2	VALVE FITTED
Z	DIA 60.8X4.5	SW									CONNECTION FOR STAND PIPES	4	D6	TO BE PROVIDED DURING STAND PIPE ERECTION
M	DIA 114.3X6.02	SW									HOT WELL DRAIN WITH VALVE	2	D3	
P	DIA 168.3X3.4	FLG.	220	180	158	3	20	8/M16			NORMAL/EMERGENCY CONDENSATE MAKE-UP	1	C2	DISPERSER FITTED; PNOM 10KG/SQ.CM
L	DIA 168.3X3.4	FLG.	220	180	158	3	20	8/M16			CONDENSATE QUICK FILL LINE	1	C4	DISPERSER FITTED; PNOM 10KG/SQ.CM
T10	DIA 48.3x3.68	BW									EXCESS WATER FROM STEAM THROW OFF DEVICE	1	B2	
W2	DIA 273.1X7.8	BW									STEAM EVACUATION FROM HPT/CRH	1	B4	
W3	DIA 88.9x3.96	BW									U-RING LEAK OFF FROM IP TURBINE	1	B4	
P2	DIA 168.3x7.11	FLG.	285	240	212	3	22	8/M20			FRONT WATER BOX STARTING VENT	2	C3	ROUND FLANGE FITTED; PNOM 10KG/SQ.CM

LIST OF FITTINGS / INSTRUMENTS:

SL. NO.	SIZE	DESCRIPTION	QTY.	TYPE	REMARKS
01	NB 100	WATER BOX DRAIN VALVE	4	FLG.	
02	NB 100	CONDENSER SHELL DRAIN VALVE	4	SW	
03	NB 100	WATER BOX VENT VALVE	4	FLG.	
04	NB 25	SHELL SIDE LEVEL GAUGE, L=1200	2	SW	LEVEL GAUGES ARE PROVIDED WITH MEDIA REMOVAL DEVICE(MRD) ONLY FOR LEVEL GAUGE ISOLATION
05	NB 50	STAND PIPE ISOLATING VALVE + ONE NO. VALVE ON EQUALISING LINE	4+1	SW	
06	NB 15	STAND PIPE VENT VALVE	2	SW	
07	NB 15	STAND PIPE DRAIN VALVE	2	SW	
08	M 33x2	THERMOWELL M20X1.5 (FEMALE) IN WATER BOX	4	SCR	IMMERSION LENGTH L=325 mm
09	M 33x2	THERMOWELL M20X1.5 (FEMALE) IN AIR OUTLET PIPE	2	SCR	L=125 mm
10	M 33x2	THERMOWELL M20X1.5 (FEMALE) IN CONDENSER SHELL	1	SCR	L=325 mm
11	NB 15	ISOLATING VALVE FOR CONDENSER VACUUM GAUGE	1	SW	
12	M20X1.5	DIAL THERMOMETERS FOR CW SIDE RANGE 0-80°C	4	SCP	
13	–	STAND PIPES (NB100)	2	–	
14	NB 50	ISOLATING VALVE FOR TRANSMITTERS	8	SW	
15	M 33X2	THERMOWELL M20X1.5 (IF) IN WATER BOX (FOR PERFORMANCE TEST)	4	SCR	L=135 & 325 mm (TWO, EACH) 1 No. EACH PER CW INLET CONN.
16	NB 15	ISOLATING VALVE FOR CONDENSER VACUUM MEASUREMENT (FOR PERF. TEST)	8	SW	
17	NB 25	ISOLATING VALVE FOR LEVEL GAUGE	8	SW	
18	NB 15	ISOLATING VALVE FOR CW PRESSURE GAUGE	4	SW	

LIST OF MATERIALS (MAJOR PARTS)

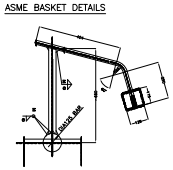
SL.NO.	DESCRIPTION	MATERIAL
1	BOTTOM PLATE,SUPPORT PLATES,DOME WALLS, SIDE WALLS, MAIN TUBE PLATES, WATER BOXES, WATER CHAMBERS	IS:2062, Gr.B
2	BAFFLES IN A.C. ZONE	IS:6911, Gr X 04 Cr 19 Ni9
3	PIPES	IS:1239, Gr.: ERW
4	TIE ROD	IS:1570, Gr20 C8

DESIGN DATA

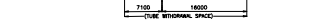
1. COOLING WATER FLOW = 74415 M^3/Hr
2. COOLING SURFACE AREA = 35752 M^2
3. COOLING WATER INLET TEMPERATURE (DESIGN) = 33°C
4. COOLING WATER SIDE PRESSURE DROP BETWEEN C.W.INLET AND OUTLET FLANGES OF CONDENSER. = 3.15 MWC
5. NO. OF COOLING TUBES = 35000 NOS. (Total)
6. EXCLUDING TOP TWO ROWS : NO. = 34720
   SIZE = DIA 22.225X0.7112, L=14730 MM
7. TUBES IN TOP TWO ROWS : NO. = 280
   SIZE = DIA 22.225X0.889, L=14730 MM
8. MATERIAL OF COOLING TUBES = SS (ASTM A249,TP304)
9. INCLINATION OF TUBES FOR SELF DRAINING = 0.5°
10. CONDENSER HOTWELL STORAGE CAPACITY BETWEEN THE NORMAL WATER LEVEL AND LOW WATER LEVEL = 3 MINUTES
11. CONDENSER BACK PRESSURE = 76.5 mm Hg (As per approved HBD)
12. REFERENCE HBD = IN 1056 -ES EN PTEC PP- TO329 RO
13. CORROSION ALLOWANCE = 3.2 mm FOR FERROUS PARTS
14. TUBE PLUGGING MARGIN = 5%
15. DESIGN HEAT LOAD = 664.225X10^6 kcal/Hr
16. CW OUTLET TEMPERATURE (02) = 41.983
17. DESIGN VELOCITY THROUGH TUBES = 1.737 m/sec

DESIGN CONDITION	STEAM SIDE	WATER SIDE
1. DESIGN PRESSURE	FULL VACUUM & 1.08Kg/cm^2g	5.0 kg/cm^2g & 0.1 kg/cm^2 (abs)
2. TEST PRESSURE	FILLING WATER UP TO 300mm ABOVE LP CASING AND CONDENSER DOME WALL JOINT.	6.5 Kg/cm^2g
3. DURATION OF TEST	24 HOURS (MIN.)	30 MINUTES (MIN.)
4. DESIGN TEMPERATURE	120°C	60° C

ASME BASKET DETAILS



(02) SPACE REQUIREMENT FOR WATER BOX OPENING AND TUBE WITHDRAWAL (RIGHT & REAR W/BOXES ARE PROVIDED WITH HINGE TYPE OPENING ARRANGEMENT) (N.T.S.)



NOTES

1. CONDENSER IS TO BE DESPATCHED IN LOOSE PARTS MAINLY COMPRISING, OF THE FOLLOWING.
   i) BOTTOM PLATE
   ii) TURBINE AND GENERATOR SIDE WALL PLATES.
   iii) DOME WALLS
   iv) FRONT WATER CHAMBERS AND REAR WATER CHAMBERS WITH TUBE PLATES
   v) TUBE SUPPORT PLATES 2 X 18 NOS.
   vi) FIXED SUPPORTS (MULTI BALL BEARINGS).
   vii) WATER BOX HINGE ARRANGEMENT FOR FRONT & REAR WATER BOXES.
2. FOR INSTRUMENTION & FITTING FOR CONDENSER LEVEL CONTROL REF. DRG. NO. 2160007001C4191
3. CONDENSER NOZZLE B2 ARE LEFT LOOSE TO FACILITATE WELDING OF ELBOW WITH NOZZLE SUITABLE ERECTION SEQENCE TO BE DECIDED AT SITE (PIPING CENTRE TO REPRODUCE THIS NOTE IN THEIR FABRICATOR ERECTION DRG. MATERIAL REQUIRED FROM B2 NOZZLE TO POINT "Z" SHALL BE MADE AVAILABLE BY PC. AT THE TIME OF CONDENSER ERECTION.)
4. CONDENSER IS DESIGNED MANUFACTURED AND TESTED AS PER HEI STANDARD.
5. THE EMBEDMENTS ARE TO BE PROVIDED BY CUSTOMER AS PER DETAILS SHOWN IN THE DRAWING.
6. THE EMBEDMENTS PROVIDED ARE FOR ANCHORING & GUIDING CONDENSER MOVEMENTS.
7. NO EMBEDMENTS ARE REQUIRED FOR THE CONDENSER SUPPORTS PROVIDED BELOW TUBE SUPPORT PLATES WHICH TAKE THE LOAD OF CONDENSER.
8. PROVISION FOR 40 SACRIFICIAL ANODES (AND 2 LUGS FOR EACH ANODE). REFER DETAIL-III.

WEIGHTS (APPROX.)

1. EMPTY WEIGHT OF CONDENSER (WITHOUT FIXED SUPPORTS) WITH L.P.HEATER NO.1 AND L.P.OUTER CASING. = 807 T
2. OPERATING WEIGHT (CONDENSER + LP HEATER NO.1) = 1250 T
3. FLOODED WEIGHT (WATER FILLED UP TO TURBINE BLADE TIP = 2300 T
4. WEIGHT OF COOLING WATER (OPERATING CONDITION) = 352800 KG
5. WEIGHT OF L.P. OUTER CASING = 140 T

PAINTING:

1. THE CONDENSER IS PAINTED AT WORKS AS FOLLWS:-
   STEAM SIDE SURFACES - STEAM WASABLE PAINT
   CW SIDE SURFACES ANTI CORROSIVE PRIMING PAINT
   OUTSIDE SURFACES EPOXY BASE ZINC RICH PRIMER AND INTERMEDIATE PAINT
2. THE CONDENSER IS TO BE PAINTED AT SITE AS FOLLOWS:-
   EXTERNAL SURFACE:- TO BE PAINTED WITH 2 COATS OF POLYURETHANE FINISH PAINTS. TOTAL DFT (FINAL) - 180 MICRONS
   C.W.SIDE SURFACE:- AFTER TUBING & BEFORE HYDRAULIC TESTING THE INTERIOR OF WATER BOXES AND WATER SIDE SURFACE OF WATER CHAMBER INCLUDING TUBE PLATES SHALL BE PAINTED WITH HIGH BUILD BLACK COAL TAR EPOXIDE, PAINT TOTAL DFT 0.25 MM .
3. DECONSERVATION:-
   STEAM SIDE SURFACES OF THE CONDENSER SHOULD BE THROUGHLY CLEANED WITH THE APPLICATION OF STEAM. SINCE THEY HAVE BEEN SUPPLIED COATED WITH STEAM WASHABLE RUST PREVENTIVE PAINT.

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD
03	04.08.14	MS	MUR	SJKANT	02	02.06.14	MT	SP	S.KANT	01	22.12.13	RK	SP	S.KANT
	– DWG REVISED AS PER CUSTOMER AND PEM COMMENTS. M1 CONNECTION SHIFTED TO 3600 FROM 3500 MARKED AS (03)					– DWG REVISED AS PER CUSTOMER AND PEM COMMENTS. CHANGES MADE ARE MARKED AS (02) – W/BOX LAYOUT CHANGED.					– DWG REVISED AS PER CUSTOMER AND PEM COMMENTS. CHANGES MADE ARE MARKED AS (01) – W/BOX LAYOUT CHANGED.			

JOB NO. 391
STATUS CONTRACT
DISTRIBUTION

OPGC DRAWING NO. : BTG-LC-DWG-M-0183 REV. 01

IB THERMAL POWER STATION, BANHARPALI
2 x 660 MW UNITS 3&4

ODISHA POWER GENERATION CORPORATION LIMITED

DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA• MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
HEEP – HARIDWAR

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DEPT CODE	NAME	SIGN	DATE
DESN	SP		16.09.2013
DRN	RAMESHKUMAR		16.09.2013
CHD	SP		16.09.2013
APPD	S.KANT		16.09.2013

TITLE CONDENSER ASSEMBLY : GENERAL ARRANGEMENT (GA)

DEPT. SIGN SCALE DRAWING NO. 01601070070C203
SHEET 02 OF 02 REV. 03

FILE NO. :

SIZE-A0

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