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SUPERSEDES INVENTORY NO.

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इस प्रलेख में दी गई सूचना भारत हेवी इलेक्ट्रिकल की सम्पत्ति है उसका प्रयोग एवं अन्यथा रूप में सिधे या परोक्ष प्रयोग जो कि कम्पनी के हित में हानिकारक हो न किया जाय।

SPECIFICATION FOR FABRICATION AND SUPPLY OF TURBINE INTEGRAL PIPING FOR POWER STATIONS

1. PROJECT INFORMATION

The piping covered under this specification are to be used in Steam Turbine Generator Plant and are to be suitable for carrying steam, condensate, oil and vapour upto design conditions specified in the relevant drawings.

2. SCOPE OF WORK

The scope of work for the piping vendor shall be to completely supply (which includes materials, fabrication, testing, cleaning, painting, packing and despatch) the turbine integral piping systems directly to power stations.

2.1 Unless otherwise specified in the drawings, all the free ends of the pipes are to be supplied with square ends.

2.2 Alloy steel TIG wire for site erection shall be supplied in a separate bag/box as per the quantity mentioned in the drawing / bill of materials.

2.3 Hydraulic Testing

2.3.1 Piping (with working/operating pressure less than or equal to 70 bar)
Hydraulic test certificate of mother pipe shall be supplied by fabricator. In the event of mill test certificate not being available, the pipeline shall be hydraulically tested in the shop as per ANSI B31.1 before fabrication. In case of standard fittings like elbows, tees, reducers etc, hydraulic test certificate of mother pipe shall be furnished.

2.3.2 Piping (with working/operating pressure more than 70 bar)
Mother pipes shall be hydraulically tested at 1.5 times the working/operating pressure alternatively ultrasonically tested. In case of standard fittings like elbows, tees, reducers etc, hydraulic test/ultrasonic test certificate of mother pipe shall be furnished.

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2.4 NDT REQUIREMENTS

2.4.1 All pipe lengths for the following design conditions shall be subjected to 100% ultrasonic examination and UT/RT on longitudinal welds at the tube mill:-
i) Temp greater than 400°C and/or pressure greater than 70 bar.
ii) Pipe NB ≥ 65 in excess of 175°C.

2.4.2 All mother pipes used for fittings shall be subjected to hydraulic test or an ultrasonic test at the tube mill. However an ultrasonic examination must be carried out on all the mother pipes, bar stocks and forgings for fittings for design temperature greater than 400°C and/or design pressure greater than 70 bar.

2.4.3 DPT/MPI shall be carried out on all the fittings for surface crack as per applicable ASME/ASTM.

2.4.4 Welded and cast fittings, if any, shall be subjected to suitable non-destructive test as per applicable standards. However as a minimum 100% radiographic test shall be carried out on all fittings for use above 70 bar design conditions.

2.4.5 The edge preparation of pipes and fittings for shop and site welds shall be subjected to magnetic particle examination.

2.4.6 Non-destructive testing of weld shall be carried out in accordance with the relevant design/manufacturing codes. However as a minimum, the requirements shall be met as per table AA & BB. For technical requirements of NDT, refer STD no. HW0850199.

2.4.7 NDT of welds shall be carried out after post weld heat treatment, if any.

2.4.8 Thickness of pipes bends shall be checked by Ultrasonic or other acceptable methods on sample basis for high pressure application (≥ 70 bar). Outer surface of bends shall be subjected to Magnetic particle examination.

2.5 Minimum thickness of all fittings shall be checked through ultrasonic thickness gauge.

2.6 Threaded stubs shall be supplied with suitable plugs along with sealing washer.

2.7 The purchaser's piping layout drgs indicate dimensioned layout of most of the piping. These piping layouts have been made after due care and are final. However any minor modification required at a later stage shall be done by the vendor at no extra cost to the purchaser.

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3. BILL OF MATERIALS

The drawings listed in the annexure shall be considered as an integral part of the specification and all work shall be performed as shown there in.

4. MATERIAL SPECIFICATION

4.1 The material to be used for fabrication of pipings are specified in the BOMs/isometrics.

4.2 The vendors shall furnish the correlated mill test certificate for the material used.

4.3 Plates to be used for flanges > 25 mm shall be checked for laminations by UT as per ASTM 435.

5. WELDING REQUIREMENTS

5.1 Testing of weld shall be according to TABLE "AA" or TABLE "BB" of this purchase specification as mentioned in the pipe assembly drawings / isometrics.

5.2 Welding of pipes according to BHEL standard No. HW0620599.

5.3 Access holes for shop radiography shall be provided only if the area to be radiographed is not possible through the ends of the pipe. Access holes for radiography shall be 100% radiographed after plugging.

5.4 No welding or welded parts shall be painted, plated, galvanized or heat treated until inspected by the purchaser's representative.

5.5 All edge preparation shall be done by machining. Manual flame cutting shall not be acceptable. Machine flame cutting for edge preparation shall be done where machining for edge preparation is not possible.

5.6 Arcs shall be struck only on joints to be welded, damage caused by striking arcs elsewhere on the work piece shall be replaced or repaired to the full satisfaction of the purchaser.

5.7 Except where necessary to grind flush for radiographic purposes, the centre of re–inforcement for butt welds shall not be less than 1/16" nor more than 1/8" above the normal surface of the joined members. The reinforcement shall be crowned at the center and tapered on each side to the surface of the joined members. The exposed surfaces of the weld shall be chipped or ground wherever required to present a workman like appearance & shall be free from depressions below the surfaces of the joined members.

5.8 Fillet welds shall have a leg dimension at least equal to 1.25 times nominal wall thickness specified for the pipe.

5.9 All weld seams in alloy steel piping and components shall be preheated for welding and stress relived after welding as per ANSI B31.1.

5.10 Non perpendicularity of welding ends of pipe line parts and fittings shall not be more than 0.5 mm for pipes NB125, 1mm for pipes NB150 and 200, 2 mm for pipes NB250 and above.

6.0 FABRICATION

6.1 Hot working : Upsetting and forging operations shall be performed at temperature above 850°c. After work is completed, the pipe shall be allowed to cool in still air.

6.1.1 All bends shall be visually examined for wrinkles. Permissible wrinkles are as follows :

a) The maximum vertical height of any wave measured from the average height of two adjoining crests to the valley should not exceed 3% of the nominal pipe size.

b) The minimum ratio of the distance between crests as compared to the height between crests and the included valley shall be 12 to 1.

6.2 All elbows shall be of long radius type with R = 1.5 NB or as specified in the BOMs / Isometrics.

6.3 Vendors shall clearly specify in his offer the specifications of the pipes and fitting to be used in the piping system.

6.4 All piping, bends, welds joints, flanges, fitting bolting material and gaskets shall be in accordance with the respective drawings and BOMs / isometrics.

6.5 Flanges or welded nozzles, branch connections, welding outlets, adapters, taps shall be true and faced at right angle to the axis of pipe as per ANSI B31.1.

6.6 All pipe bends shall be made to radii as specified on purchaser's drawings and they shall be true to angle and radii and maintain a true circular cross section of pipe without deformity or undue stretching or thinning of pipe walls. The allowable deviation from circularity at any cross section of a bend shall be as per regulation no. 361 (b) of IBR. Pipe bends shall be ultrasonically checked for their wall thickness. Tolerance for reduction in thickness shall not be more than 12.5%.

6.7 All pipe flanges and contact surface shall be concentric with axis of piping. All flanges & fittings shall be accurately machined & drilled true to template.

6.8 All flanges and machined parts bolted together shall be spot faced on the back to ensure that nuts and bolts heads bed down properly.

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6.9 Vendors shall completely machine all welding ends of piping, bends and fittings, wherever applicable to make all welds complete, both in the shop and in the field including those of valves, fittings for equipment. Weld rods shall deposit metal having essentially the same composition as the parts being formed.

6.10 Vendors shall employ qualified welders to the satisfaction of the purchaser. All welding procedures & welders/ welding operators are to be qualified as per ASME sec – IX.

7. INDIAN BOILER REGULATIONS

Where ever applicable the vendor is fully responsible for obtaining the approval from any of the inspecting authorities approval by IBR. The following are the documents which are to be submitted to the chief inspector of boilers as specified in IBR.

a Certificate for manufacture and test of steam pipes – from IIIA of IBR.

b Certificate for manufacture and test of tubes – from IIIB of IBR.

c Arrangement and fabrication detailed drawings of all piping coming under the purview of IBR.

The documents shall be submitted sufficiently in advance to suit material delivery.

8. CLEANING & PAINTING

8.1 All hot bent, forged, fabricated and straight sections of piping except the piping mentioned below for pickling with acid shall be thoroughly cleaned, wire brushed and purged with an air blast to remove all sand and scale for inner surfaces. The outside surfaces of all pipes shall also be free of sand, loosely adhering scale, dirt and other foreign matter. The method of cleaning shall not leave any material on the inner or outer surface that will affect the serviceability of the pipe.

Following pipes shall be treated by pickling with acid and neutralized before dispatch: -

(a) All small bore pipes NB 50 and below except stainless steel material.
(b) All lub oil pipes (PGMA 13111) except stainless steel material.
(c) All control oil/ fluid pipes (PGMA 13112, 13155 and 13157) except stainless steel material.

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INVENTORY NO. P-5030

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Pickling is overall an effective method of removing scale, dust etc from pipes.

All pipes which are cleaned by acid pickling shall be passivated & conserved in accordance with the produce detailed below. Any alternative method used by the supplier shall have to be get approved from BHEL for which the supplier shall furnish all the details along with the acceptance norms etc. with this offer.

PICKLING AND PASSIVATION PROCEDURE :

Step. 1 Degreasing

Sodium hydroxide	Solution	Temperature	Duration
	~ >10%	60 – 70°c	2 hours

Step. 2 Rinsing
By tap water

Step. 3 Descoling

Hydrochloric acid with inhibitor	Solution	Temperature	Duration
	10- 15%	Room temp.	50 -60 minutes

Step. 4 Rinsing
By tap water

Step. 5 Phosphate treatment

Phosphate With inhibitor	Solution	Temperature	Duration
	8%	50 -60°c	50 minutes

Step. 6 Rinsing
By hot tap water above 50°c

Step. 7 All pipes should be dried with the help of hot air.

Step. 8 Antirust treatment.

Vapour phase inhibitor shall be used for protecting the inner surface of all the pipes after cleaning by picking or otherwise as the case may be. The recommended quantity is 60 gm/m2 (minimum). The vapour phase inhibitor used by the supplier shall be such that it is affective for the purpose for which it is used and does not leave any residue after vapourisation. This VPI should in no way corrode or influence the inner surface which is considered harmful for the pipe material for which these pipe lines are to be used.

8.2 After cleaning, the pipes shall be painted as per detailed given below:

Painting will be done for Turbine integral piping as per table given below (applicable for carbon and alloy steel piping) and primer paint shall be applied on seal steam, turbine drainage & overload piping system where temp is more than 60°C

Paint (Coat)	Paint type	No. of coat	DFT
Primer paint	Epoxy base zinc phosphate	1 coat	35
Intermediate paint	Epoxy TiO2 pigmented coat paint	1 coat	70
Finish (Final) paint	Epoxy based finish coat	2 coat	75
Total DFT	Dry film thickness (Final) in microns		180
Shade	As per RAL grey 9002		

8.2.1 There shall be no painting on stainless steel pipes spools/assemblies.

8.3 The inner surface of the pipe shall be protected with the help of vapour phase inhibitors (VPI) put inside the pipe with both inner & outer end sealed caps with suitable adhesive taping.

9. GENERAL INSPECTION

All items covered by this specification shall be subjected to inspection by the purchaser or by our customer and vendor shall render all possible help in this regard to the purchaser promptly when item are ready for inspection.

9.1 Vender shall agree to permit purchaser and our customer to maintain one or more of his representatives in his shop for the purpose of inspection at various stages in shop fabrication of the material specified herein. Purchaser's representatives shall at all time have free access to vendor's shops. They shall also have access to vendors ultrasonic or radiographic inspection records, reports of repairs etc.

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9.2 If any shop fabricated part fails to meet field tests in such a manner that purchaser's inspector believes that the defect is minor, it will be remedied in field by the vendor at no cost to purchaser. In the event purchaser rejects defective part as not being capable of remedy in the field, vendor may at purchaser's discretion be required to ship new parts from his shop at his own expense.

9.3 The vendor shall submit in advance the stage wise inspection procedure and quality plan schedule of testing for the approval of the purchaser with due corelation to material identification.

9.4 All materials including pipes, fittings etc. shall have mill test certificates with due corelation to material identification.

9.5 All pipes shall be subjected to hydraulic test at the mill.

10. PACKING & MARKING

10.1 All the pipes/pipe assembly shall be marked as per table given below:-

Item No. / Spool No.	
BOM No. / Doc No.	
Material	

10.2 Marking on pipes/pipe assemblies should be punch in addition to paint mark. Internal marking system of vendor should not reflect on pipe/pipe assemblies while dispatching the same to sites. All stencil marks on the outside of casing and pipes shall be either of water proof material or protected by shellac or varnish to prevent obliteration during transit/storage.

10.3 All the parts shall be carefully packed for transport in such a manner that these are protected against all damage and the climatic conditions including saline atmosphere to which it may be subjected in transit and one year of storage.

10.4 Pipe ends, flanges and other similar open ends shall be protected from both external damage (by provision of caps) and ingress of dirty or moisture during transit and storage. All machined surfaces shall be protected by means of wooden protecting pieces bolted to such surfaces.

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10.5 Small bore items are to be bundled or bagged and fitted with wired metal tags marked with Table as mentioned in serial no. 10.1.

10.6 Water proof paper and felt lining of the packages shall overlap at seams at least 15mm and the seams shall be sealed.

10.7 All material should be packed in box. No loose (except pipe/assembly above 500NB) items are acceptable at site.

10.8 Items of two systems should not be mixed in one box i.e. one system of TIP should be supplied in one packing box.

10.9 Items of two project units should not be mixed in one packing box as well as one truck/ trailer i.e. separate shall be required for separate project unit.

10.10 Please ensure to take receipt from site for boxes for every dispatch against GR. Verification of items sent inside box should be in presence of supplier's representative at site. Supplier is required to depute their representative to site (one visit per set) on demand from site for verification of items sent inside box and ensure receipt of all items. Any shortage found during verification is to be replenished free of charge by supplier on for site basis. However payment will be released against dispatch documents as per present practice.

10.11 Each straight pipe, pipe assembly/spool and pipe fitting shall be color coded by way of followings :-

a) Color band/strip all along the length of straight/loose pipes.
b) On pipe assembly/ spool and pipe fittings by marking one band on each free end of the component & color coding should be at least 200mm away from each free end.

Different color for color band/strip used by supplier against different pipes shall be as per table mentioned below for identification of material:-

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S.No.	DESCRIPTION	MAT. SPECIFICATION	COLOUR CODE
1.	Pipe	ASTM A106 Gr.B	Red
	Pipe	ASTM A335 Gr.P11	Yellow
	Pipe	ASTM A335 Gr.P22	Green
	Pipe	ASTM A335 Gr.P91	Blue
	Pipe	ASTM A335 Gr.P92	Purple
	Pipe	ASTM A335 TP321	Pink
	Pipe	SA672 C70	Red
	Pipe	SA691 1 ¼ Cr	Yellow
2.	Fittings (Tee, Reducer, Elbow, Closing disc & cap)	ASTM A234 WPB ASTM A234 WP11 ASTM A234 WP22 ASTM A234 WP91 ASTM A234 WP92 ASTM A403 WP321	According to corresponding pipe material
3.	Flange, Stub, Adapter, Connecting piece	ASTM A105 SA182 F11 SA182 F22 SA182 F91 SA182 F92 ASTM A182 F321	According to corresponding pipe material
4.	Orifice Plate, Orifice Plate	SA516 GR.70 ASTM A387 GR.11 AISI321 ASTM A240 TY321	According to corresponding pipe material

10.12 Punching to be done at least 200mm away from end for loose and fabricated pipe assemblies/spools.

11. **GUARANTEE**

Vendor shall guarantee all material, fabrication and worksmanship of all piping furnished by him for period of 24 months from the actual delivery or 18 months from the date of commissioning of the piping system, whichever is earlier.

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12. DISTRIBUTION SCHEDULE FOR VENDOR'S DRAWINGS AND DOCUMENTS

In the event of order is placed, the vendor will be provided the latest BOMs and drawing to start manufacturing.

Below mentioned "Distribution Schedule" is to be followed for distribution of tender documents, bill of materials, drawings, production schedule, test reports and correspondence pertaining to the project.

(a) Correspondence	In duplicate.
(b) Test reports and certificates	In duplicate.
(c) Quality plan	In duplicate.
(d) Bind sets of BHEL bill of materials and related drawings for each system.	15 copies in A3 size of each system per set.

13. INSTRUCTION FOR BID PREPERATION

13.1 Vendor shall indicate average rate per kg. for the Turbine Integral piping systems. Final value of the purchase order shall be worked-out on the basis of weight mentioned in the "ADDENDUM" of the concerned project as per BHEL sizes for pipes and fittings. Any change in the range of 0 to 3% will not have any commercial implications.

13.2 The supplier shall furnish a quality plan on BHEL's format detailing all the tests/checks conducted by supplier at various stages including receipt of raw material, machining, fabrication, sub-assembly, assembly, packing and despatch etc. He shall also furnish two copies of all in-house test procedure alongwith quality plan. The quality plan should be drawn on guide lines suggested in the format. BHEL/BHEL's customer shall identify customer hold points in this quality plan beyond which work shall not proceed without the approval of BHEL. The quality plan will form a pre-approval document.

13.3 The supplier shall furnish a list of deviations with respect to this purchase specification, if any. Otherwise mention "NO DEVIATIONS".

13.4 Vendor may raise queries related to drawings/BOM/isometrics discrepancies (if any) within one month of providing final BOM to them.

14. NOTES

1. All pipes NB50& below shall be supplied in approximately 6.0 meter legth until and unless specified in BOM. If specified in BOM, fabrication & bending of pipes shall be carried out as per respective drawings.

2. Despatchable length of running pipes shall be 6 meter approx.

3. Vendor to supply SS piping & fittings in seamless construction for size 8 inch (200 NB) & below unless noted otherwise.

4. Vendor to supply Carbon steel & alloy steel piping in seamless construction for size 20 inch (500 NB) & below unless noted otherwise.

15. CROSS REFERRED STANDARDS:-

ANSI B31.1	ASTM A403
ASTM 435	ASTM A105
HW0620599	ASTM A285
ASTM A106	ASTM A 182
SA691	ASTM A335
ASTM A312	ASTM A234
SA672	HW0850199

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दिनांक एवं हस्ताक्षर SIGN & DATE
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TABLE - AA

For oil and Control Fluid Services

SL. No.	Type of Weld	Operating Pressure (bar)	DIA	RT	UT	SCE	Hardness
1.	Circumferential and longitudinal welds	≤ 2.5	All	--	-	Random (5%)	-
2.	-do-	> 2.5 upto ≤ 16	DN ≤20	-	-	25%	(A)
3.	-do-	-do-	DN >20	10%	-	10%	(A)
4.	-do-	> 16	DN ≤20	-	-	100%	(B)
5.	-do-	> 16	DN >20	100%	-	100%	(B)
6.	Nipples and Nozzles	≤ 2.5	All	-	(C)	10%	Random (5%)
7.	-do-	> 2.5 upto ≤ 16	All	-	(C)	10%	(A)
8.	-do-	> 16	All	-	(C)	100%	(B)
9.	Weld on parts (Fillet Welds)	≤ 2.5	Without load transfer	-	(C)	Random (5%)	-
10.	-do-	-do-	With load transfer	-	(C)	10%	-
11.	-do-	< 2.5 upto ≤ 16	Without load transfe	-	(C)	Random (5%)	(A)
12.	-do-	-do-	With load transfer	-	(C)	50%	(A)
13.	-do-	> 16	With load transfer	-	(C)	10%	(B)
14.	-do-	-do-	With load transfer	-	(C)	100%	(B)

(A) Means 10% hardness tests on grades such as 13CrMo44 and 10CrMo910 or other equivalent grades.

(B) Means 25% hardness tests on grades like 13CrMo44 or equivalent grades.
50% hardness tests on grades like 10CrMo910 or equivalent grades.

(C) For Nipples & nozzles and weld on parts with wall thickness >15 mm, in addition to SCE, RT or UT with same scope as SCE to be carried out.

दिनांक एवं हस्ताक्षर SIGN & DATE

सामग्री सूची संख्या को अधिक्रमित करता है SUPERSEDES INVENTORY

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TABLE-BB

For water, steam and condensate Se vices

SL. No.	Type of Weld	Operating Pressure (bar)	Dia	Material	Remarks	RT	UT	SCE	Hardness
1.	Longitudinal welds	≤ 2.5	All	All	Not full Stressed welds	Random (5%)	Random (5%)	Random (5%)	-
2.	-do-	-do-	All	All	full Stressed welds	10%	10%	10%	-
3.	-do-	> 2.5	All	All	-	100%	100%	100%	-
4.	Circumferential	≤ 2.5	All	All	-	Random (5%)	Random (5%)	Random (5%)	-
5.	-do-	> 2.5 - ≤ 16	DN ≤100	A	-	5%	5%	10%	-
6.	-do-	-do-	-do-	B	-	10%	10%	10%	(A&B)
7.	-do-	-do-	-do-	G	-	100%	100%	100%	100%
8.	-do	-do-	DN >100	C	-	10%	10%	10%	-
9.	-do-	-do-	-do-	B	-	5%	25%	100%	(A&B)
10.	-do-	-do-	-do-	G	-	100%	100%	100%	100%
11.	-do-	> 16	DN ≤100	A	-	25%	25%	10%	-
12.	-do-	-do-	-do-	D	-	50%	50%	50%	(A&B)
13.	-do-	-do-	-do-	E	-	100%	100%	100%	(C)
14.	-d -	-do-	-do-	G	-	100%	100%	100%	100%
15.	-do-	-do-	DN >100	A	-	50%	50%	10%	-
16.	-do-	-do-	-do-	F	-	100%	100%	100%	(C)
17.	-do-	-do-	-do-	G	-	100%	100%	100%	100%
18.	Nipples and Nozzles	≤ 2.5	All	All	-	-	-	Random (5%)	-
19.	-do-	> 2.5	DN ≤100	ll	-	-	-	100%	-
20.	-do-	-do-	DN >100	T ≤15mm	-	-	-	10 %	-
21.	-do-	-do-	-do-	T >15mm	-	100%	100%	100%	100%
22.	Welds on parts fillet	≤ 2.5	All	-	-	-	-	25%	-
23.	-do-	> 2.5	DN ≤100	All	Load Bearing welds	-	-	100%	-
24.	-do-	-do-	DN >100	T ≤15mm	do-	-	-	100%	-
25.	-do-	-do-	-do-	T >15mm	-do-	100%	100%	100%	-

(A) Means 20% hardness test for grades such as 13CrMo44 and t ≥ 15mm or equivalent grades.
(B) Means 30% hardness test for grades such as 10CrMo910 and t ≥ 15mm or equivalent grades.
(C) 100% Hardness test with t ≥ 5 mm except Austenitic material.

Note:- 1. Wherever test scope is less than 100%, a butting ends between circumferential weld and longitudinal weld shall be examined by SCE.
2. Non- destructive testing of welds shall be carried out after post weld heat treatment, if any.
3. Either RT or UT of weld joint to be carried out.

MATERIAL GROUPS

Group A Materials : Material grades such as C22.3, C22.8,GSC25, Hll, RST37-2, ST-35, ST35.4, ST35-8, ST37.0, 15Mo3 or equivalent grades.

Group B Materials : Material grades like to 10CrMo910, 13CrMo44,16CrMo44 or equivalent grades.

Group C Materials : All group (A) materials if used in sizes beyond DN $\geq$100mm.

Group D Materials : GS22Mo44 and group B materials if used in services beyond 16 bar pressure.

Group E Materials : CrMoV steels such as G17CrMoV510, G17CrMo55, G18CrMo910, X22 CrMoV121
Stainless steels such as X10CrNiNb189, X10CrNiTi189 or equivalent grade.

Group F Materials : Group (D) and (E) materials if used in services beyond 16 bar and size more than 100 mm.

Group G Materials : Material grades ASTM A335 P91, ASTM A234 WP91, ASTM A182 F91, ASTM A335 P92, ASTM A234 WP92 & ASTM A182 F92.

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SUPERSEDES INVENTORY
सामग्री सूची संख्या को अधिक्रमित करता है

SIGN & DATE
दिनांक एवं हस्ताक्षर

REV. NO. 08	निर्माणकर्ता WORKED BY	SUMIT TRIPATHI		26.12.15
	जांचकर्ता CHECKED BY	S.K.GUPTA		26.12.15

INVENTORY NO. R5038

	TURBINE LAYOUT GROUP BHEL HARIDWAR	BHEL DOCUMENT NO. – 413182W3100	
		REV - 0	DATE: 26.07.2019
		MATERIAL CODE : W90313182043	

Bill Of Materials for TURBINE INTEGRAL PIPING

SL.NO.	BOM NO.	TITLE	REV.	QTY/SET	WEIGHT (KG/SET)
1	313126V6200	TURBINE DRAINAGE PIPING BOM	0	1	4,009
2	313181V6200	OVER LOAD VALVE PIPING BOM	0	1	9,651
TOTAL WEIGHT (PER SET) =					**13,660**

Note for Supplier:

1. This is Preliminary BOM, and final BOM shall be furnished only after placement of PO. Hence, this Preliminary BOM may change at a later stage.
2. Wherever project name is indicated as "North Chennai 800MW" in the BOMs/documents, it has to be read as "Uppur, 800 MW".

26.07.2019.

नवनीत चक्रपाणि
Navneet Chakrapani
व. अभि., पी.ई.डी. / Sr. Engineer, P.E.D.
बी.एच.ई.एल., हरिद्वार / BHEL, Haridwar

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BHARAT HEAVY ELECTRICALS LIMITED, HARDWAR
PROJECT ENGINEERING DEPARTMENT

LIST OF ISOMETRIC DRAWINGS FOR TURBINE DRAINAGE PIPING

CUSTOMER / PROJECT: NORTH CHENNAI 1X800 MW DOC NO.: 313126V6200 REV NO.:00

SYSTEM DESCRIPTION: TURBINE DRAINAGE PIPING BOM DATE: 19.02.19

SL NO	DOC REV.NO	DRAWING NO.	DRG REV NO.	Material
01	00	MAL01BR001	00	ASTM A335 Gr.P92
02	00	MAL02BR001	00	ASTM A335 Gr.P92
03	00	MAL03BR001	00	ASTM A335 Gr.P92
04	00	MAL04BR001	00	ASTM A335 Gr.P92
05	00	MAL11BR001	00	ASTM A335 Gr.P92
06	00	MAL11BR002	00	ASTM A335 Gr.P92
07	00	MAL12BR001	00	ASTM A335 Gr.P92
08	00	MAL12BR002	00	ASTM A335 Gr.P92
09	00	MAL19BR001	00	ASTM A335 Gr.P92
10	00	MAL19BR002	00	ASTM A335 Gr.P92
11	00	MAL23BR001	00	ASTM A335 Gr.P92
12	00	MAL23BR002	00	ASTM A335 Gr.P92
13	00	MAL24BR001	00	ASTM A335 Gr.P92
14	00	MAL24BR002	00	ASTM A335 Gr.P92
15	00	MAL26BR001	00	ASTM A335 Gr.P92
16	00	MAL26BR002	00	ASTM A335 Gr.P92
17	00	MAL27BR001	00	ASTM A335 Gr.P92
18	00	MAL27BR002	00	ASTM A335 Gr.P92
19	00	MAL31BR001	00	ASTM A335 Gr.P92
20	00	MAL31BR002	00	ASTM A335 Gr.P92
21	00	MAL31BR003	00	ASTM A335 Gr.P92
22	00	MAL31BR004	00	ASTM A335 Gr.P92
23	00	MAL91BR001	00	ASTM A335 Gr.P92
24	00	MAL92BR001	00	ASTM A335 Gr.P92
25	00	SPARE	00	ASTM A335 Gr.P92

TOTAL WEIGHT: **4008.9294**KG

PRELIMINARY BOM IS VALID FOR UPPUR 2X800MW

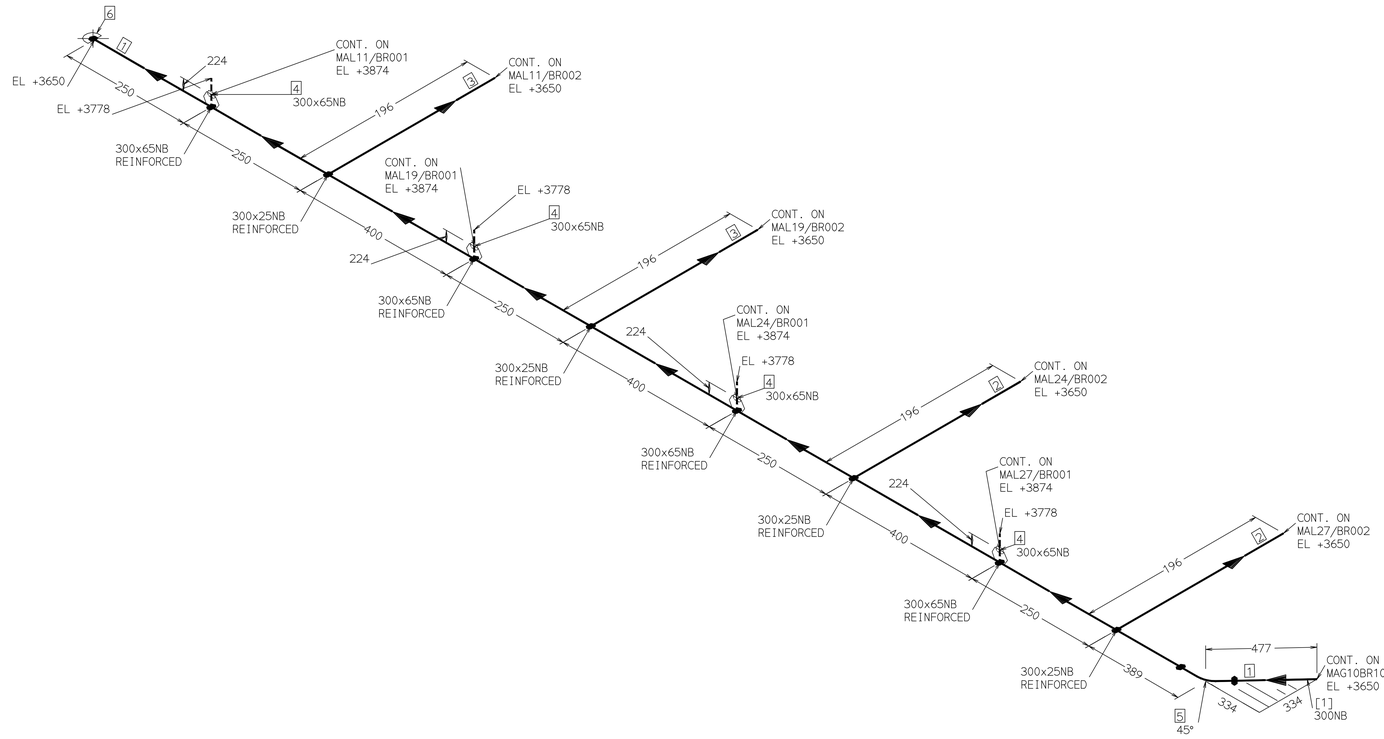
FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	2933MM	300	ASTM A335 GR.P92	SH-STD	323.8	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	108MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
3	TUBI	108MM	25	ASTM A335 GR.P92	SH-XXS	33.4	9.09			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
4	OLET	4	300 x 65	ASTM A182 F92	WOL-SH-160			73	9.53	WELDOLETS AS PER MSS-SP-97 ASTM A182 F92
5	ELBO	1	300	ASTM A234 GR.WP92	SH-STD	323.8	9.53			ELBOW LR ANSI B16.9 BW ASTM A234 GR.WP92

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
										FITTINGS
6	CAP	1	300	ASTM A234 GR.WP92	SH-STD					CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

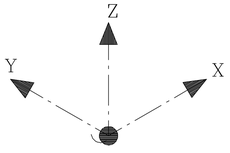
[1]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6. ITEM NOS. ARE MARKED WITHIN ☐ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS.H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. →ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, -HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 1.013
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM
M/CG.-C/M/F,AA0230208
WELDING-A/B/C/D / AA0621101
GAS CUTTING-'T3'AA0621101

~~GMS No.~~/ C.B.O.M				STATUS OF DRG
AGREED DEPT.	NAME	SIGN	DATE	

REV	DATE	ALTERED / CHECKED	ZONE

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR -

DEPT PED | CODE 4066 | SCALE | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM

CARD CODE

DRAWING NO. 7 MAL01BR001 22 23 24 | REV. 00

SHEET No. 1 1 | No. OF SHEETS 1 1

A0 SIZE

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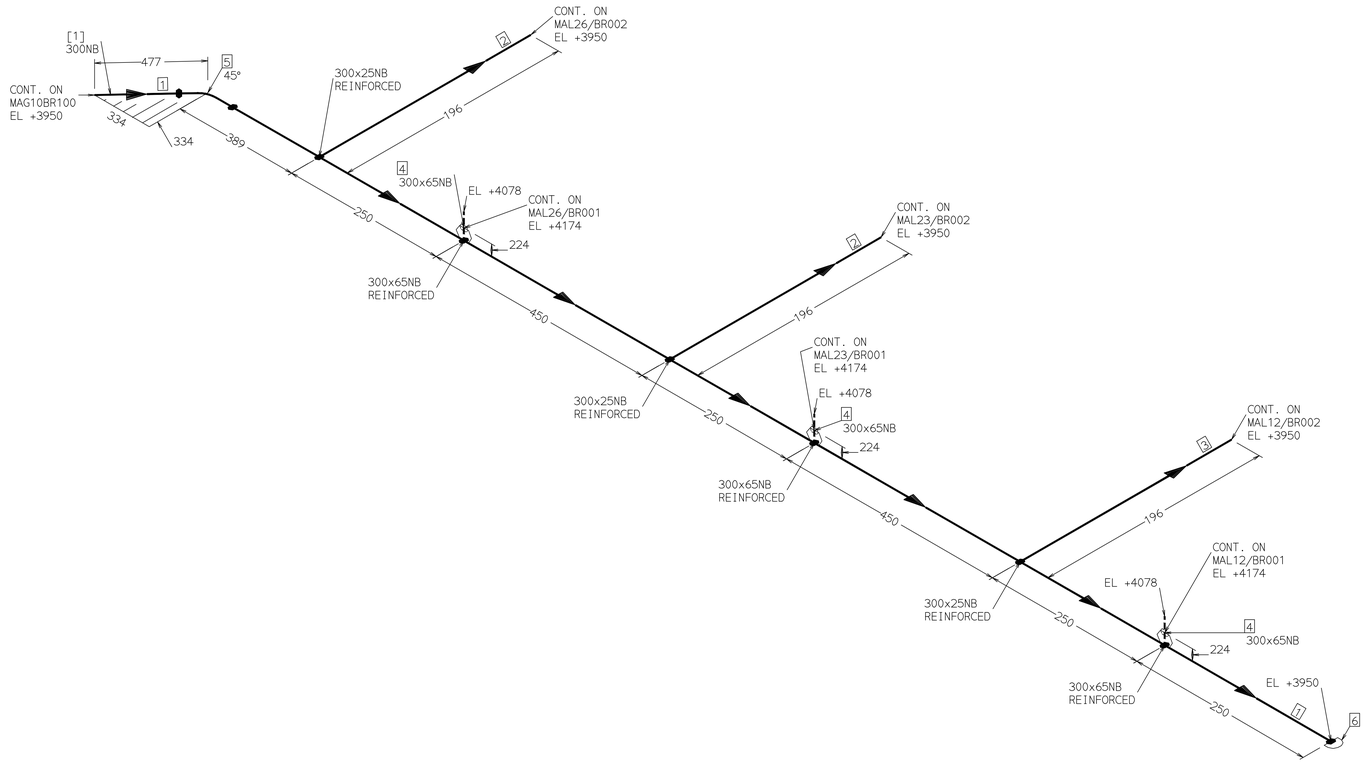
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	2383MM	300	ASTM A335 GR.P92	SH-STD	323.8	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	108MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
3	TUBI	54MM	25	ASTM A335 GR.P92	SH-XXS	33.4	9.09			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
4	OLET	3	300 x 65	ASTM A182 F92	WOL-SH-160			73	9.53	WELDOLETS AS PER MSS-SP-97 ASTM A182 F92
5	ELBO	1	300	ASTM A234 GR.WP92	SH-STD	323.8	9.53			ELBOW LR ANSI B16.9 BW ASTM A234 GR.WP92
6	CAP	1	300	ASTM A234 GR.WP92	SH-STD					CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

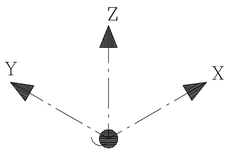
[1]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6. ITEM NOS. ARE MARKED WITHIN □ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS.H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. →ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, 33-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 1.013
OPERATING TEMP.(DEG.C)- 608

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE			ZONE		

GRADE OF UNTOL.DIM
M/CG.-C/M/F.AA0230208
WELDING-N/B/C/D AA0621104
GAS CUTTING-'T3'AA0621101

~~GMS No.~~/ C.B.O.M	AGREED DEPT	NAME	SIGN	DATE	STATUS OF DRG

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR -

DEPT PED | CODE 4066 | SCALE | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL02BR001 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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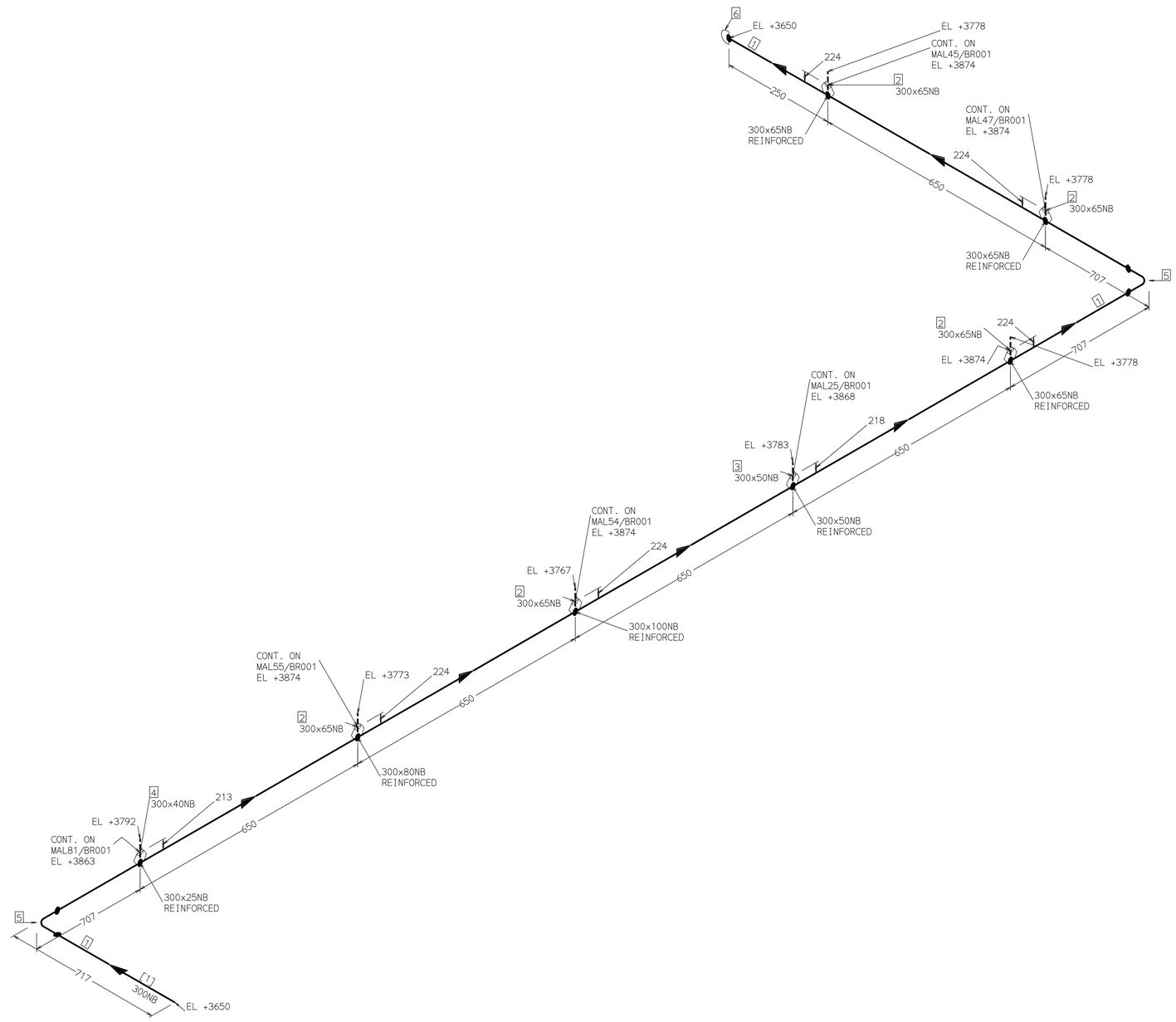
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	4498MM	300	ASTM A335 GR.P92	SH-STD	323.8	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
2	OLET	5	300 x 65	ASTM A182 F92	WOL-SH-160			73	9.53	WELDOLETS AS PER MSS-SP-97 ASTM A182 F92
3	OLET	1	300 x 50	ASTM A182 F92	WOL-SH-160			60.3	8.74	WELDOLETS AS PER MSS-SP-97 ASTM A182 F92
4	OLET	1	300 x 40	ASTM A182 F92	WOL-SH-160			48.3	7.14	WELDOLETS AS PER MSS-SP-97 ASTM A182 F92
5	ELBO	2	300	ASTM A234 GR.WP92	SH-STD	323.8	9.53			ELBOW LR ANSI B16.9 BW ASTM A234 GR.WP92
6	CAP	1	300	ASTM A234 GR.WP92	SH-STD					CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

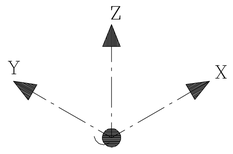
[1]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5."DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6.ITEM NOS. ARE MARKED WITHIN □ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7.WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8.FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9.FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10.FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11.EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12.LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13.SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS.H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14.FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15.→ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, 33-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1.SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2.SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 1.013
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621104
GAS CUTTING-'T3'AA0621101

~~GMS No:~~/ C.B.O.M

	AGREED DEPT	NAME	SIGN	DATE
STATUS OF DRG				

REV	DATE	ALTERED / CHECKED
ZONE		

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	SHRI PAL	-Sd-	23.07.18	
CHD	NILESH	-Sd-	23.07.18	
APPD	AS.RAJPUT	-Sd-	23.07.18	-

DEPT	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
PED			-	-	-
CODE 4066					

TITLE : TURBINE DRAINAGE SYSTEM

CARD CODE

DRAWING NO. MAL03BR001 REV. 00

SHEET No. 1 NO. OF SHEETS 1

A0 SIZE

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

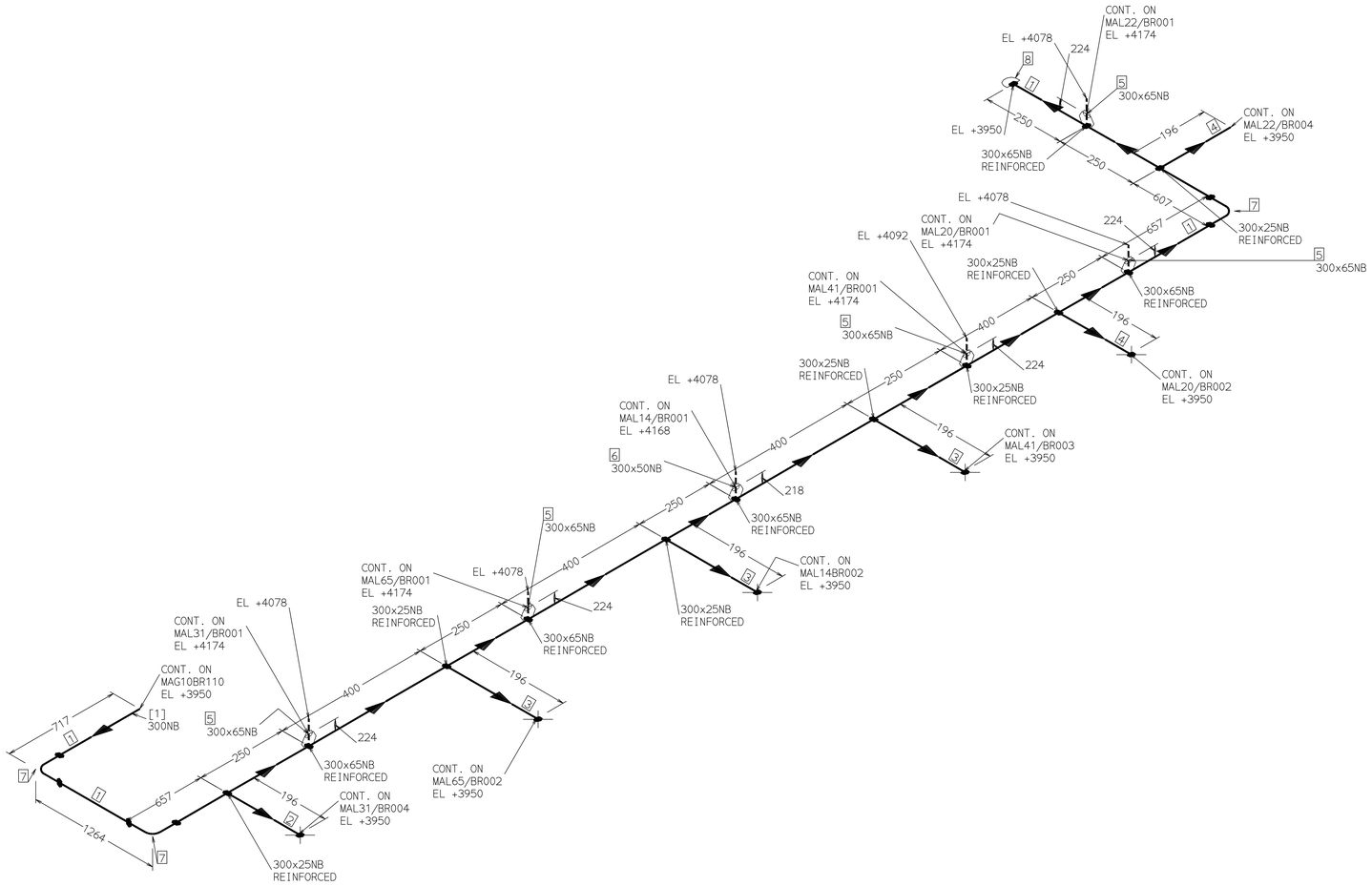
REF.DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	4505MM	300	ASTM A335 GR.P92	SH-STD	323.8	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	54MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
3	TUBI	162MM	25	ASTM A335 GR.P92	SH-STD	33.4	3.38			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
4	TUBI	108MM	25	ASTM A335 GR.P92	SH-160	33.4	6.35			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
5	OLET	5	300 x 65	ASTM A182 F92	WOL-SH-160			73	9.53	WELDOLETS AS PER MSS-SP-97 ASTM A182 F92
6	OLET	1	300 x 50	ASTM A182 F92	WOL-SH-160			60.3	8.74	WELDOLETS AS PER MSS-SP-97 ASTM A182 F92
7	ELBO	3	300	ASTM A234 GR.WP92	SH-STD	323.8	9.53			ELBOW LR ANSI B16.9 BW ASTM A234 GR.WP92
8	CAP	1	300	ASTM A234 GR.WP92	SH-STD					CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

[1]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6. ITEM NOS. ARE MARKED WITHIN □ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS.H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. →ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, -HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
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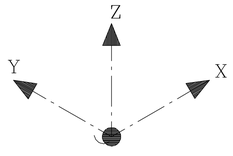

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 1.013
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM
M/CG.-C/M/F,AA023020B
WELDING-A/B/C/D / AA0621101
GAS CUTTING-'T3'AA0621101

REV	DATE	ALTERED / CHECKED	ZONE

~~GMS No.~~/ C.B.O.M			STATUS OF DRG
AGREED DEPT.	NAME	SIGN	DATE

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR: -

DEPT PED | CODE 4066 | SCALE - | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE: TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL04BR001 | REV. 00 | SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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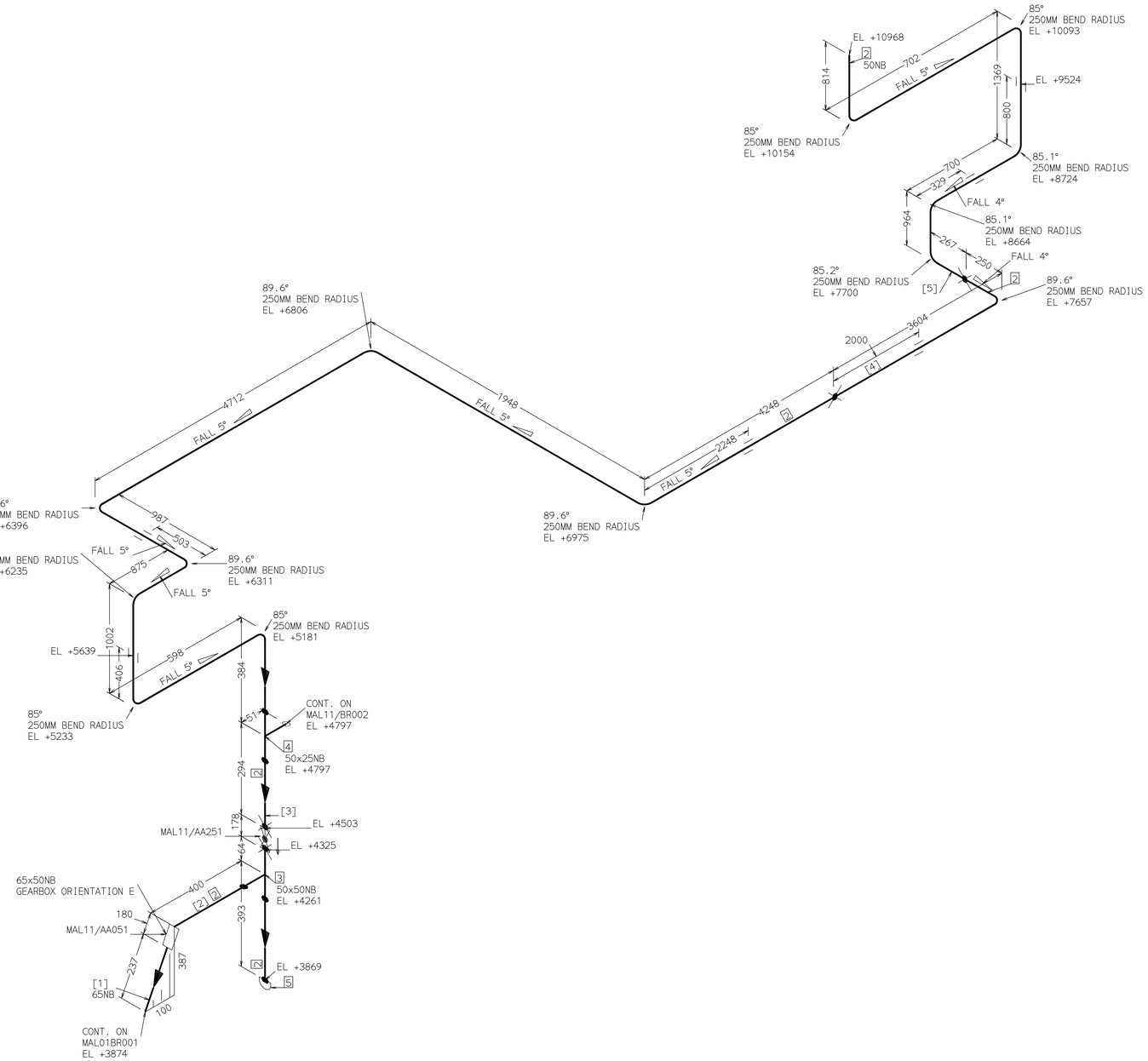
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	237MM	65	ASTM A335 GR.P92	SH-160	73	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	23022MM	50	ASTM A335 GR.P92	SPECIAL/12.05THK	60.3	12.05			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
3	TEE	1	50 x 50	ASTM A234 GR.WP92	SPECIAL	60.3	12.05	60.3	12.05	TEE ANSI B16.9 BW ASTM A234 GR.WP92
4	TEE	1	50 x 25	ASTM A234 GR.WP92	SH-XXS	60.3	11.07	33.4	9.09	TEE ANSI B16.9 BW ASTM A234 GR.WP92
5	CAP	1	50	ASTM A234 GR.WP92	SPECIAL-THK	60.3	12.05			CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

[1] [2] [3] [4] [5]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
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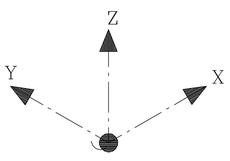
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS. H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. → ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, 33-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 291.01
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA023020B
WELDING-A/B/C/D / AA0621104
GAS CUTTING- T3/AA0621101

GMS No./ C.B.O.M	AGREED DEPT	NAME	SIGN	DATE	STATUS OF DRG

REV	DATE	ALTERED / CHECKED	ZONE

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR -

DEPT PED | CODE 4066 | SCALE | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE: TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL11/BR001 | REV. 00 | SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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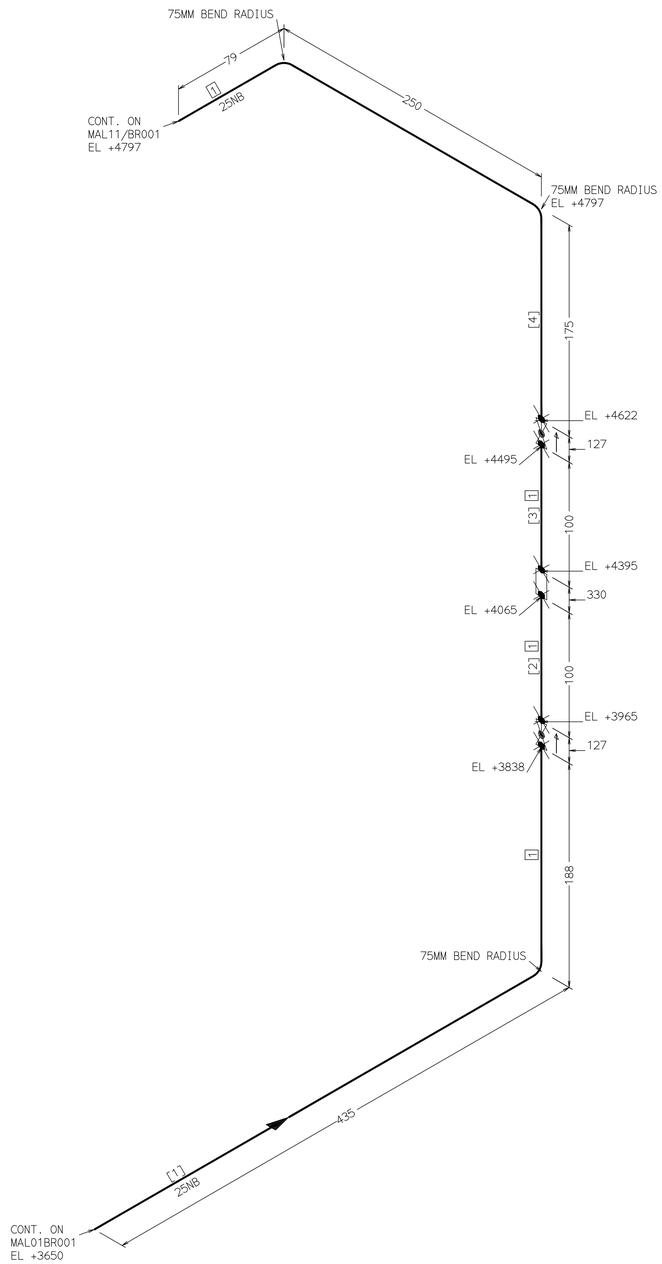
IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	1231MM	25	ASTM A335 GR.P92	SH-XXS	33.4	9.09			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92

PIPE ASSEMBLIES

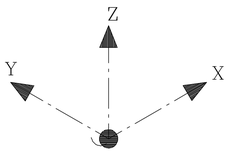
[1] [2] [3] [4]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6. ITEM NOS. ARE MARKED WITHIN □ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS. H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. → ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, 33-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 291.01
OPERATING TEMP.(DEG.C)- 608

REV	DATE		REV	DATE	ALTERED	REV	DATE	ALTERED	REV	DATE	ALTERED
		CHECKED			CHECKED			CHECKED			CHECKED
ZONE			ZONE			ZONE			ZONE		

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-M/B/C/D AA0621104
GAS CUTTING-'T3'AA0621101

~~GMS No.~~/ C.B.O.M				STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE	

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited Chennai

BHARAT HEAVY ELECTRICALS LTD
RANIPUR, HARIDWAR

	NAME	SIGN	DATE	
DRN	SHRI PAL	-Sd-	23.07.18	NO. OF VAR
CHD	NILESH	-Sd-	23.07.18	-
APPD	AS.RAJPUT	-Sd-	23.07.18	

DEPT PED	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
CODE 4066			-	-	-

TITLE : TURBINE DRAINAGE SYSTEM
CARD CODE
DRAWING NO. MAL11/BR002
REV. 00
SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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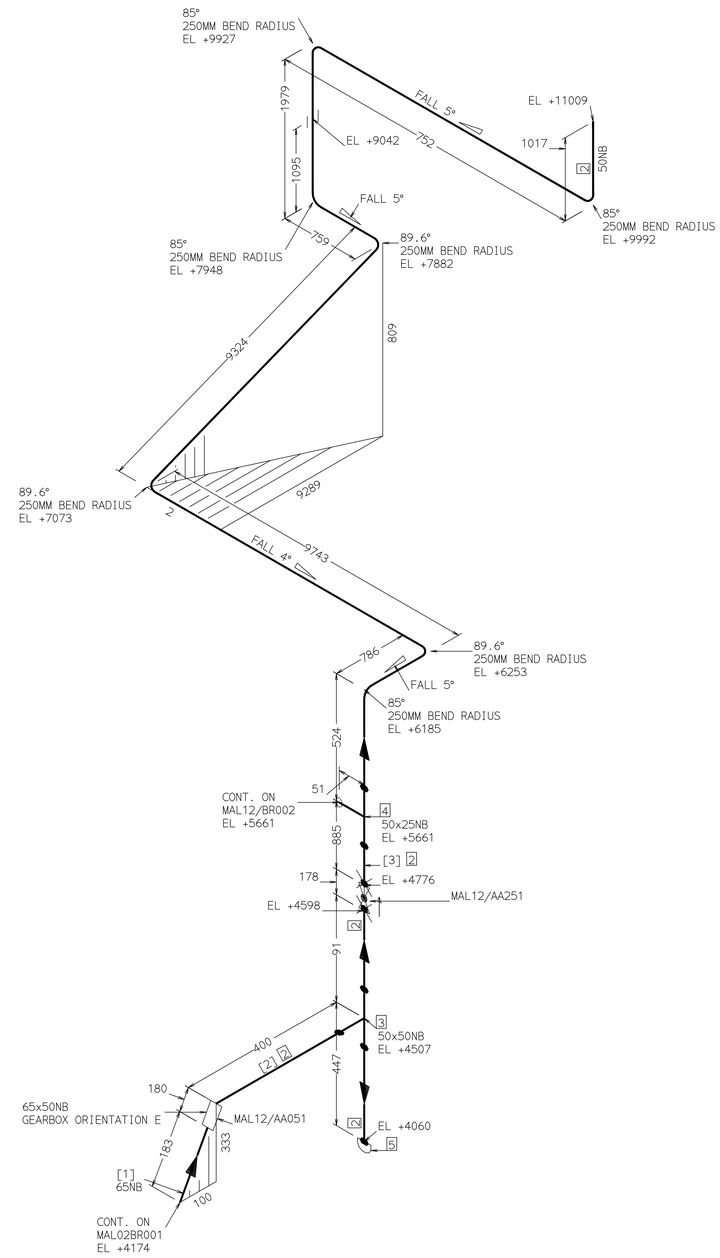
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	183MM	65	ASTM A335 GR.P92	SH-160	73	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	25718MM	50	ASTM A335 GR.P92	SPECIAL/12.05THK	60.3	12.05			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
3	TEE	1	50 x 50	ASTM A234 GR.WP92	SPECIAL	60.3	12.05	60.3	12.05	TEE ANSI B16.9 BW ASTM A234 GR.WP92
4	TEE	1	50 x 25	ASTM A234 GR.WP92	SH-XXS	60.3	11.07	33.4	9.09	TEE ANSI B16.9 BW ASTM A234 GR.WP92
5	CAP	1	50	ASTM A234 GR.WP92	SPECIAL-THK	60.3	12.05			CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

[1] [2] [3]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
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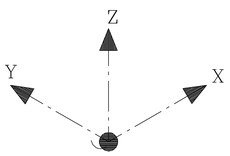
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS.H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. → ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, 33-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 291.01
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621104
GAS CUTTING-'T3'AA0621101

~~GMS No:/~~ C.B.O.M			STATUS OF DRG
AGREED DEPT.	NAME	SIGN	DATE

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE			ZONE		

PROJECT TITLE:
1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR: -

DEPT	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
PED CODE 4066	-		-	-	-

TITLE : TURBINE DRAINAGE SYSTEM
CARD CODE
DRAWING NO. MAL12/BR001
REV. 00
SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY

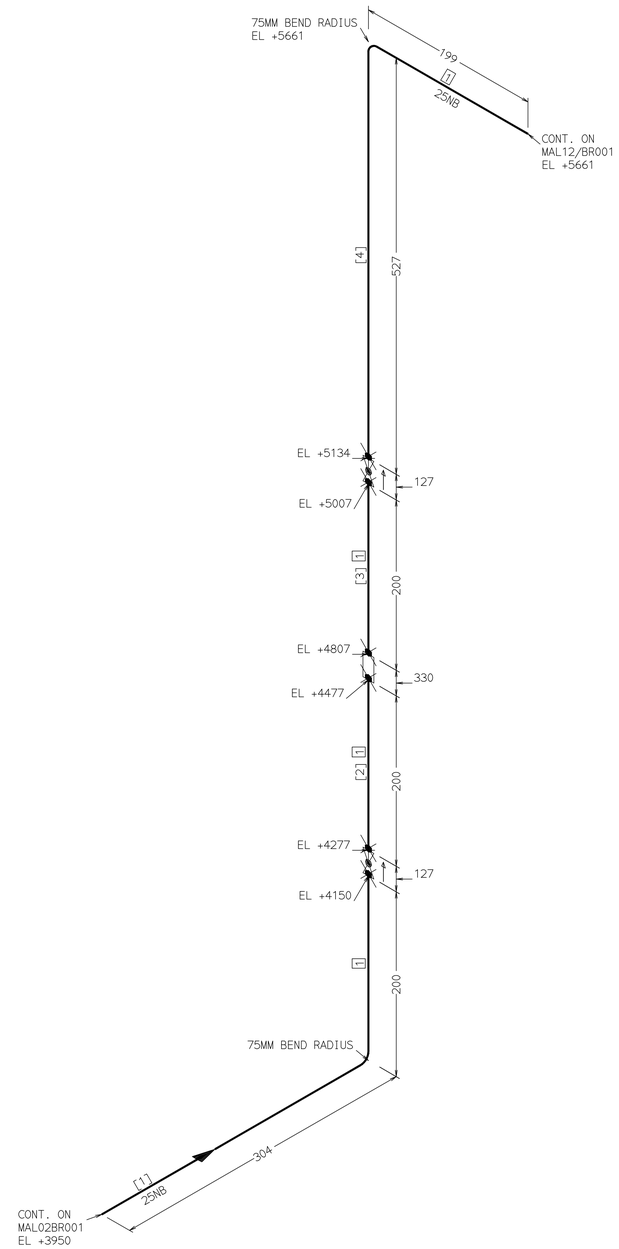
INVENTORY No. | SIGN & DATE | REF.DRAWING No. | DRAWING No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	1566MM	25	ASTM A335 GR.P92	SH-XXS	33.4	9.09			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92

PIPE ASSEMBLIES

[1] [2] [3] [4]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
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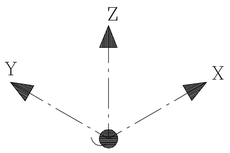

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 291.01
OPERATING TEMP.(DEG.C)- 608

REV	DATE		REV	DATE	ALTERED	REV	DATE	ALTERED	REV	DATE	ALTERED
		CHECKED			CHECKED			CHECKED			CHECKED
ZONE			ZONE			ZONE			ZONE		

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-M/B/C/D AA0621104
GAS CUTTING-'T3'AA0621101

~~GMS No.~~/ C.B.O.M			STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited Chennai

BHARAT HEAVY ELECTRICALS LTD
RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR -

DEPT PED
CODE 4066
SCALE
WEIGHT (KG)
REF. TO ASSY. DRG. -
ITEM No. -
NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM
CARD CODE
DRAWING NO. MAL12/BR002
REV. 00
SHEET No. 1 No. OF SHEETS 1

A0 SIZE

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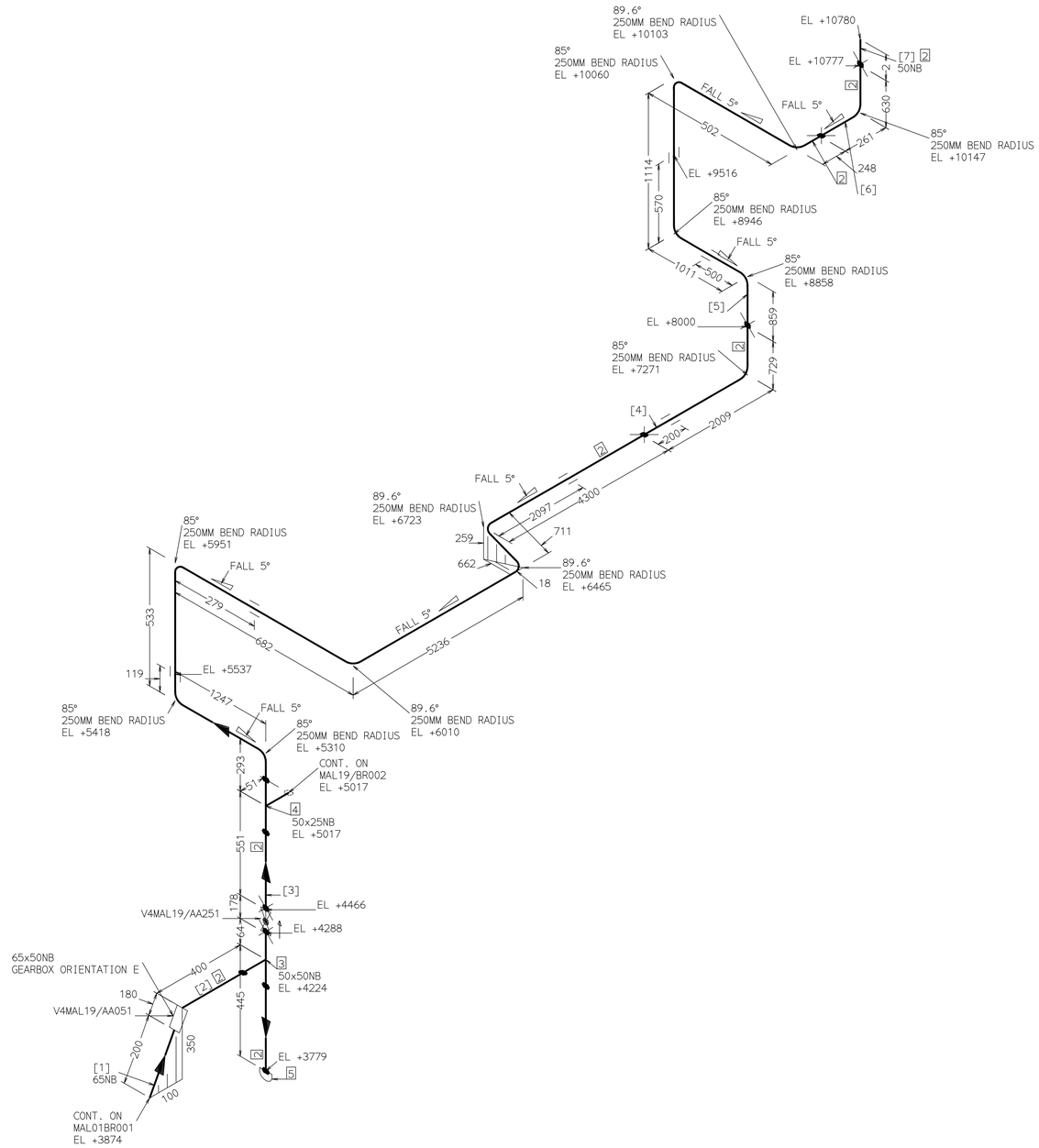
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	200MM	65	ASTM A335 GR.P92	SH-160	73	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	20380MM	50	ASTM A335 GR.P92	SPECIAL/12.05THK	60.3	12.05			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
3	TEE	1	50 x 50	ASTM A234 GR.WP92	SPECIAL	60.3	12.05	60.3	12.05	TEE ANSI B16.9 BW ASTM A234 GR.WP92
4	TEE	1	50 x 25	ASTM A234 GR.WP92	SH-XXS	60.3	11.07	33.4	9.09	TEE ANSI B16.9 BW ASTM A234 GR.WP92
5	CAP	1	50	ASTM A234 GR.WP92	SPECIAL-THK	60.3	12.05			CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

[1] [2] [3] [4] [5] [6] [7]



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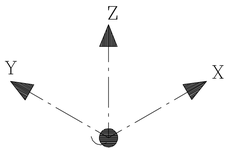

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 291.01
OPERATING TEMP.(DEG.C)- 608

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR: -

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA023020B
WELDING-A/B/C/D / AA062110A
GAS CUTTING-'T3'AA0621101

~~GMS No.~~/ C.B.O.M | STATUS OF DRG | AGREED DEPT. | NAME | SIGN | DATE

REV	DATE	ALTERED	CHECKED	ZONE

DEPT PED | CODE 4066 | SCALE - | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL19/BR002 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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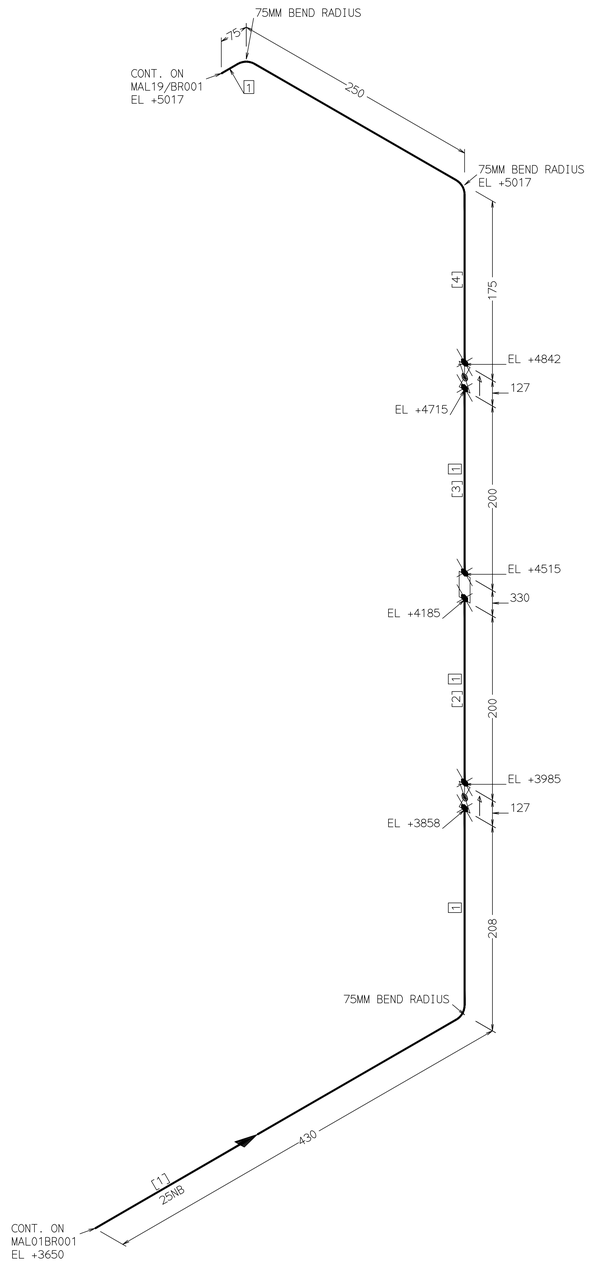
REF. DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	1442MM	25	ASTM A335 GR.P92	SH-XXS	33.4	9.09			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92

PIPE ASSEMBLIES

[1] [2] [3] [4]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
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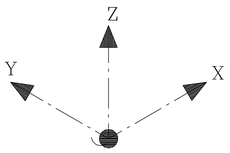

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 291.01
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM			
M/CG.-C/M/F/AA0230208			
WELDING-A/B/C/D/ AA0621104			
GAS CUTTING-'T3'AA0621101			

~~GMS No.~~/ C.B.O.M			STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE			ZONE		

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited Chennai

BHARAT HEAVY ELECTRICALS LTD — RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR -

DEPT PED	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
CODE 4066			-	-	-

TITLE : TURBINE DRAINAGE SYSTEM

CARD CODE | DRAWING NO. MAL19/BR002 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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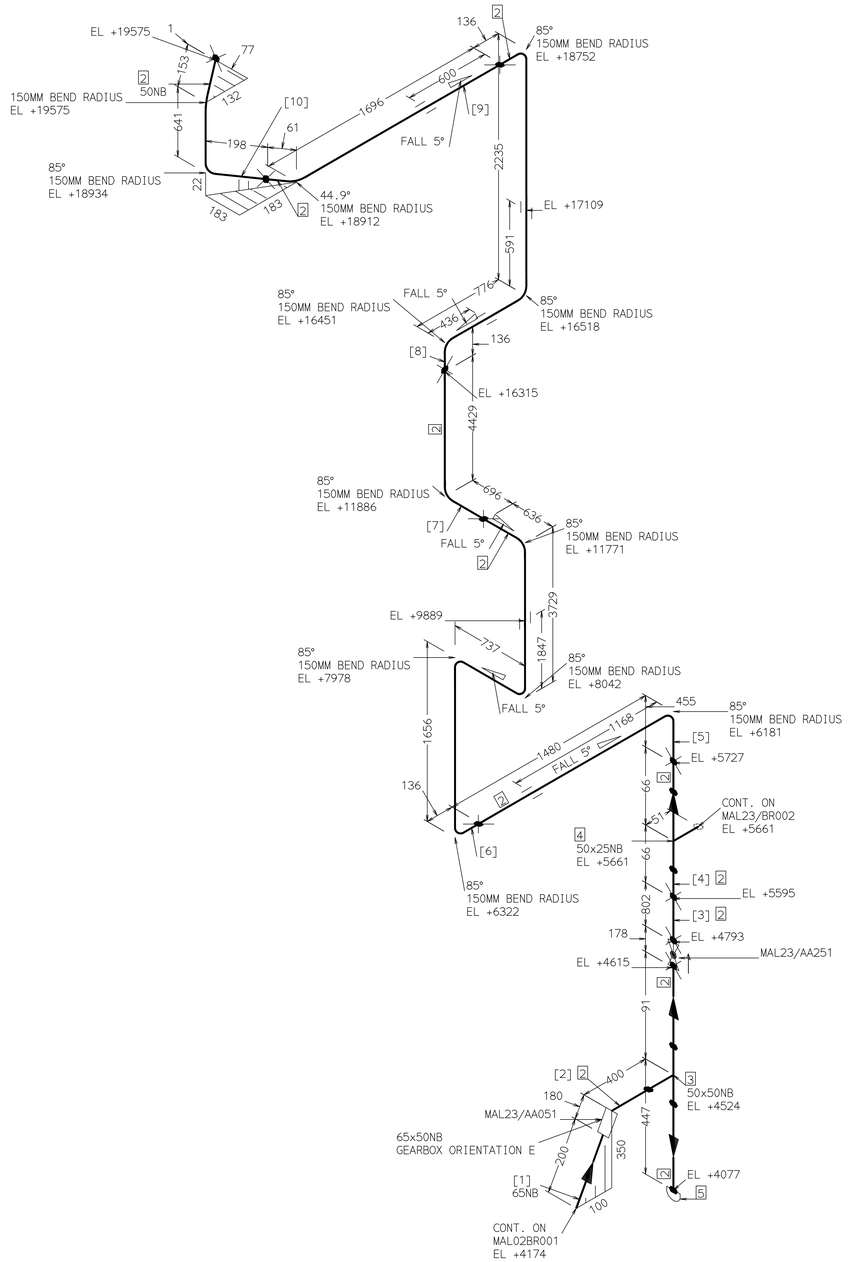
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	200MM	65	ASTM A335 GR.P92	SH-160	73	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	20949MM	50	ASTM A335 GR.P92	SH-XS	60.3	5.54			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
3	TEE	1	50 x 50	ASTM A234 GR.WP92	SH-XS	60.3	5.54	60.3	5.54	TEE ANSI B16.9 BW ASTM A234 GR.WP92
4	TEE	1	50 x 25	ASTM A234 GR.WP92	SH-XS	60.3	5.54	33.4	4.55	TEE ANSI B16.9 BW ASTM A234 GR.WP92
5	CAP	1	50	ASTM A234 GR.WP92	SH-XS	60.3	5.54			CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

[1] [2] [3] [4] [5] [6] [7] [8] [9] [10]



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Z Y X

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

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BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

~~GMS No.~~/ AGREED DEPT	C.B.O.M NAME	SIGN	STATUS OF DRG W DATE

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621104
GAS CUTTING-'T3'AA0621101

REV	DATE	ALTERED / CHECKED
ZONE		

DEPT PED | CODE 4066 | SCALE | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL23/BR001 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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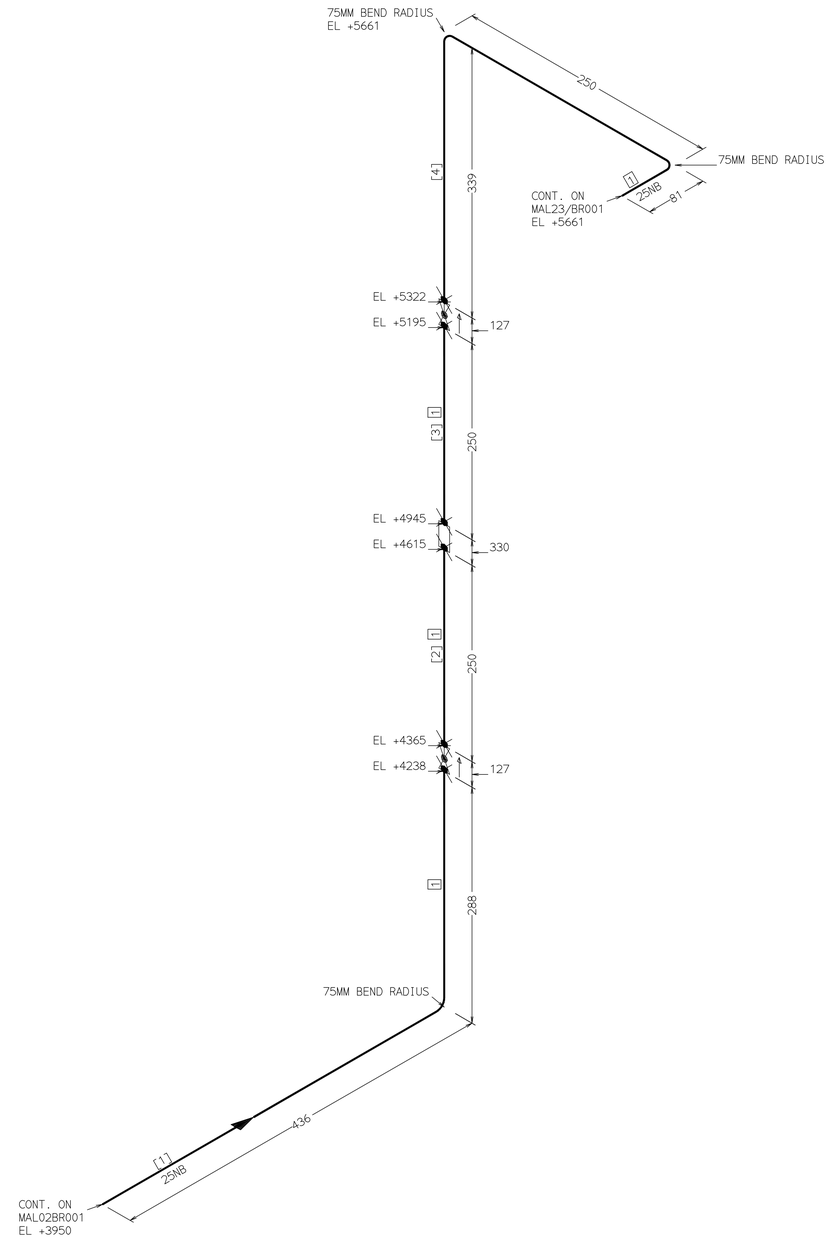
DRAWING No.
REF.DRAWING No.
SIGN & DATE
INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	1798MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92

PIPE ASSEMBLIES

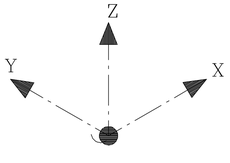
[1] [2] [3] [4]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6. ITEM NOS. ARE MARKED WITHIN □ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS. H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. → ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, 33-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM			
M/CG.-C/M/F/AA0230208			
WELDING-M/B/C/D AA0621104			
GAS CUTTING-'T3'AA0621101			

~~GMS No.~~/ C.B.O.M			STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE			ZONE		

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited Chennai

BHARAT HEAVY ELECTRICALS LTD — RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR: -

DEPT PED	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
CODE 4066	-		-	-	-

TITLE: TURBINE DRAINAGE SYSTEM

CARD CODE | DRAWING NO. MAL23/BR002 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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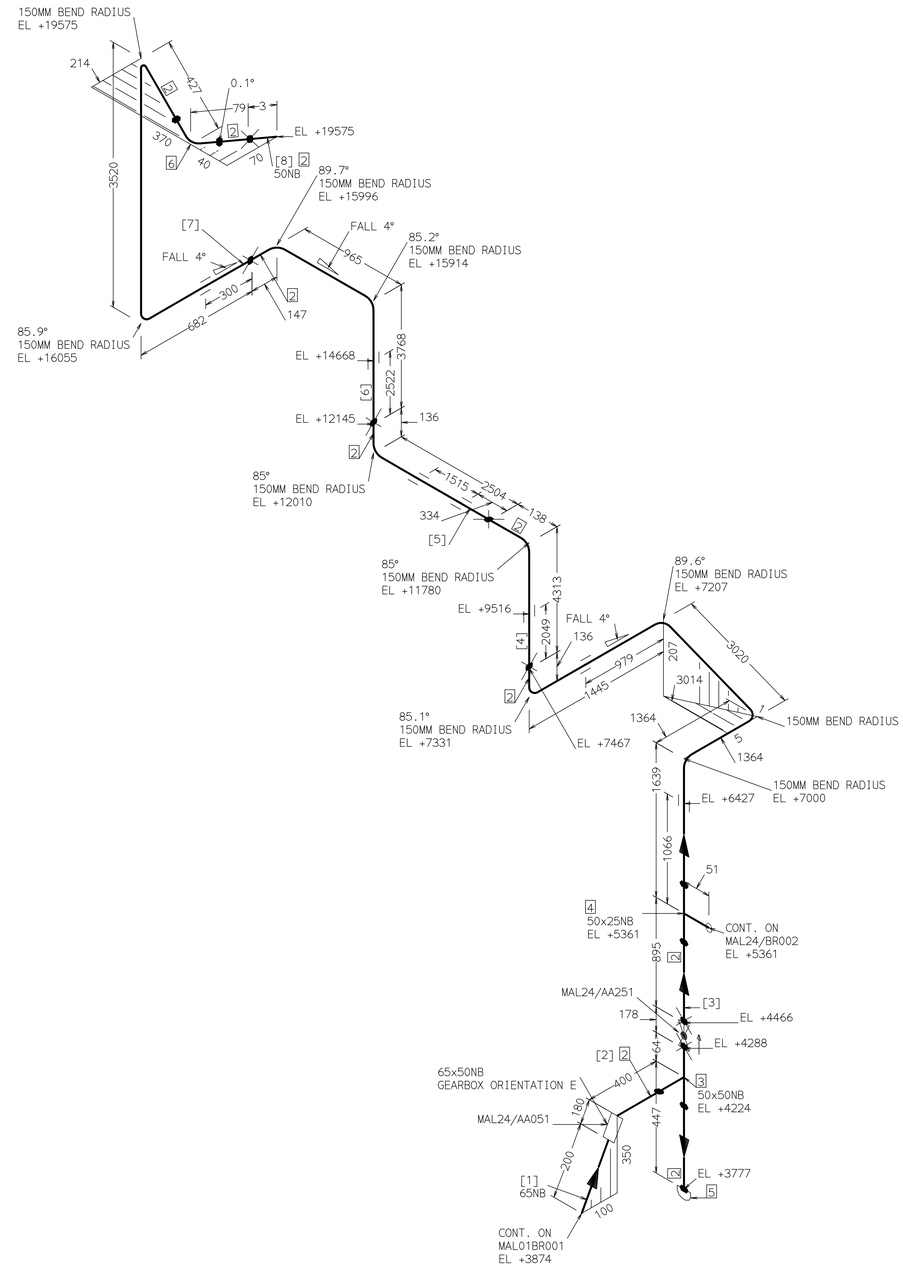
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	200MM	65	ASTM A335 GR.P92	SH-160	73	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	25039MM	50	ASTM A335 GR.P92	SH-XS	60.3	5.54			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
3	TEE	1	50 x 50	ASTM A234 GR.WP92	SH-XS	60.3	5.54	60.3	5.54	TEE ANSI B16.9 BW ASTM A234 GR.WP92
4	TEE	1	50 x 25	ASTM A234 GR.WP92	SH-XS	60.3	5.54	33.4	4.55	TEE ANSI B16.9 BW ASTM A234 GR.WP92
5	CAP	1	50	ASTM A234 GR.WP92	SH-XS	60.3	5.54			CAP,ANSI B16.9,BW ASTM A234 GR.WP92
6	ELBO	1	50	ASTM A234 GR.WP92	SH-XS	60.3	5.54			ELBOW LR ANSI B16.9 BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

[1] [2] [3] [4] [5] [6] [7] [8]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

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2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
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9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
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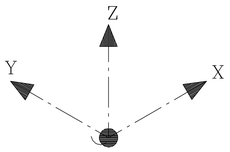

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621104
GAS CUTTING-'T3'AA0621101

~~GMS No:/~~ C.B.O.M | STATUS OF DRG | AGREED DEPT | NAME | SIGN | DATE

REV	DATE	ALTERED / CHECKED	ZONE

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR: -

DEPT PED | CODE 4066 | SCALE - | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE: TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL24/BR001 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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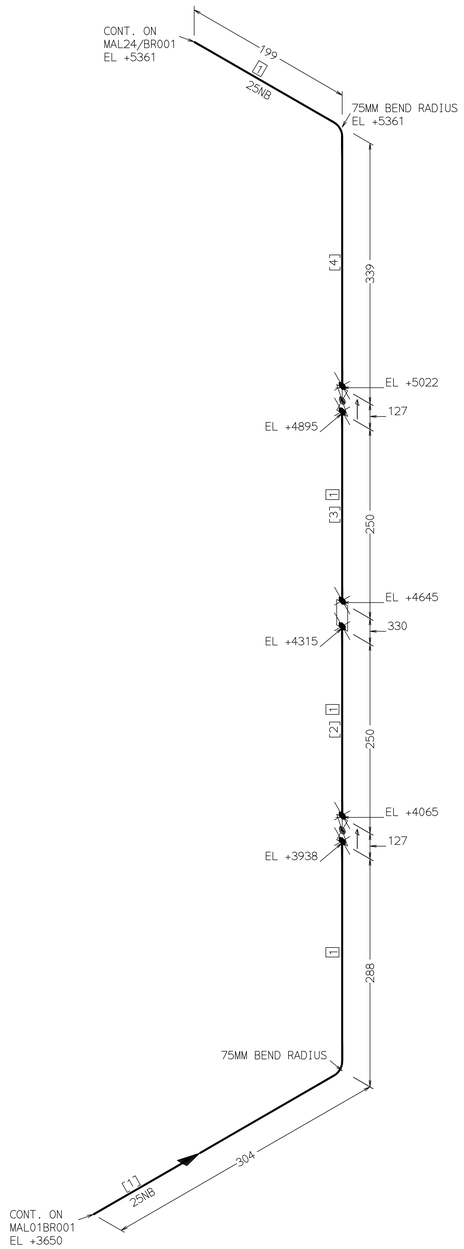
REF.DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	1566MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92

PIPE ASSEMBLIES

[1] [2] [3] [4]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

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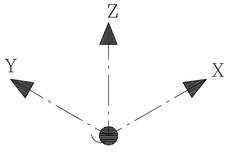

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

~~GMS No:~~/ C.B.O.M			STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621101
GAS CUTTING-'T3'AA0621101

REV	DATE	ALTERED / CHECKED
ZONE		

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

DEPT	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
PED			-	-	-
CODE 4066					

TITLE : TURBINE DRAINAGE SYSTEM

CARD CODE | DRAWING NO. MAL24/BR002 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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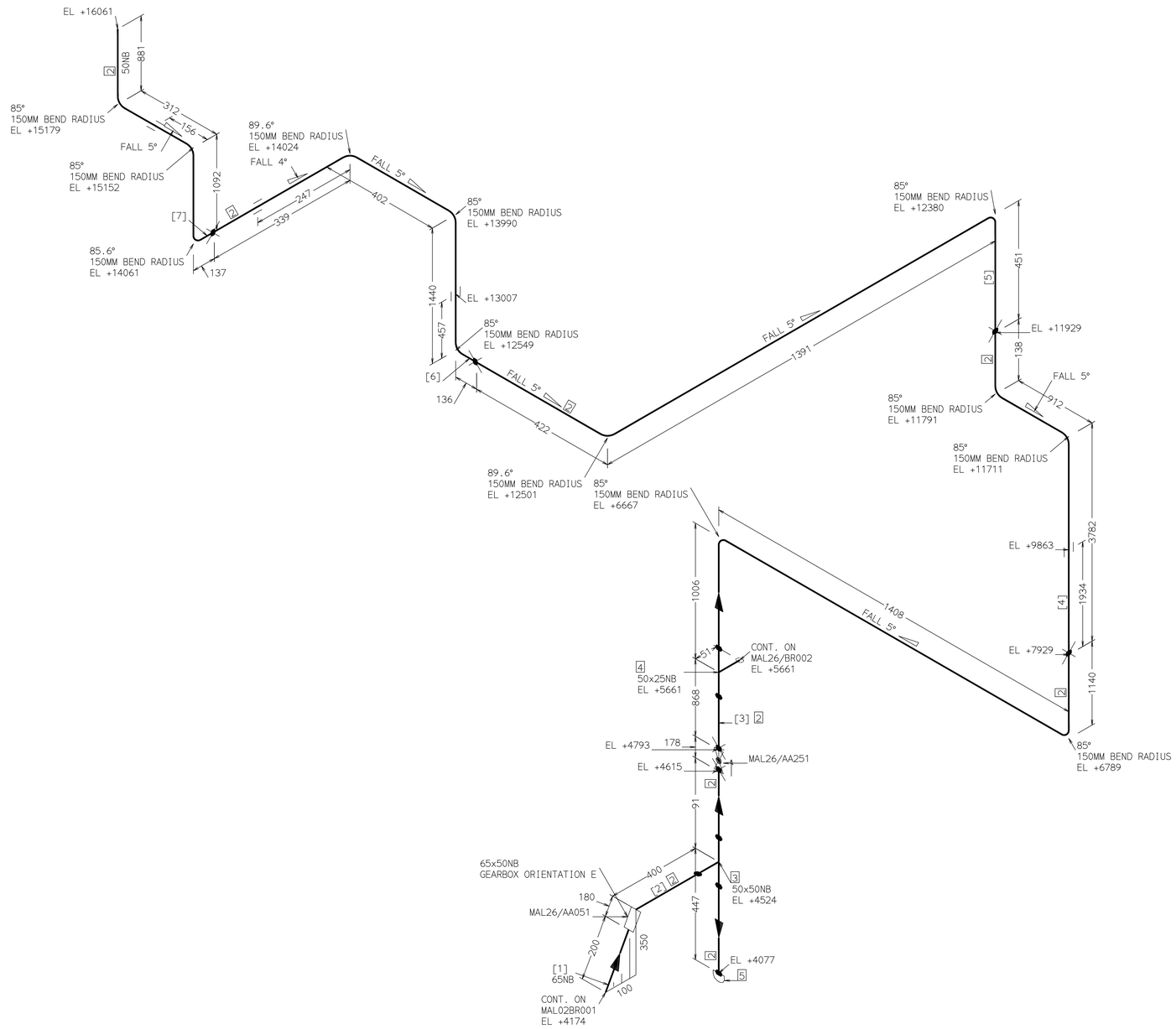
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm) FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	200MM	65	ASTM A335 GR.P92	SH-160	73	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	16226MM	50	ASTM A335 GR.P92	SH-XS	60.3	5.54			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
3	TEE	1	50 x 50	ASTM A234 GR.WP92	SH-XS	60.3	5.54	60.3	5.54	TEE ANSI B16.9 BW ASTM A234 GR.WP92
4	TEE	1	50 x 25	ASTM A234 GR.WP92	SH-XS	60.3	5.54	33.4	4.55	TEE ANSI B16.9 BW ASTM A234 GR.WP92
5	CAP	1	50	ASTM A234 GR.WP92	SH-XS	60.3	5.54			CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

[1] [2] [3] [4] [5] [6] [7]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

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Z Y X

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621104
GAS CUTTING-T3'AA0621101

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE			ZONE		

GMS No:/ C.B.O.M — AGREED DEPT | NAME | SIGN | DATE — STATUS OF DRG

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

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DRN	SHRI PAL	-Sd-	23.07.18
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NO. OF VAR: -

DEPT PED | CODE 4066 | SCALE | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL26/BR001 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

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PIPE ASSEMBLIES

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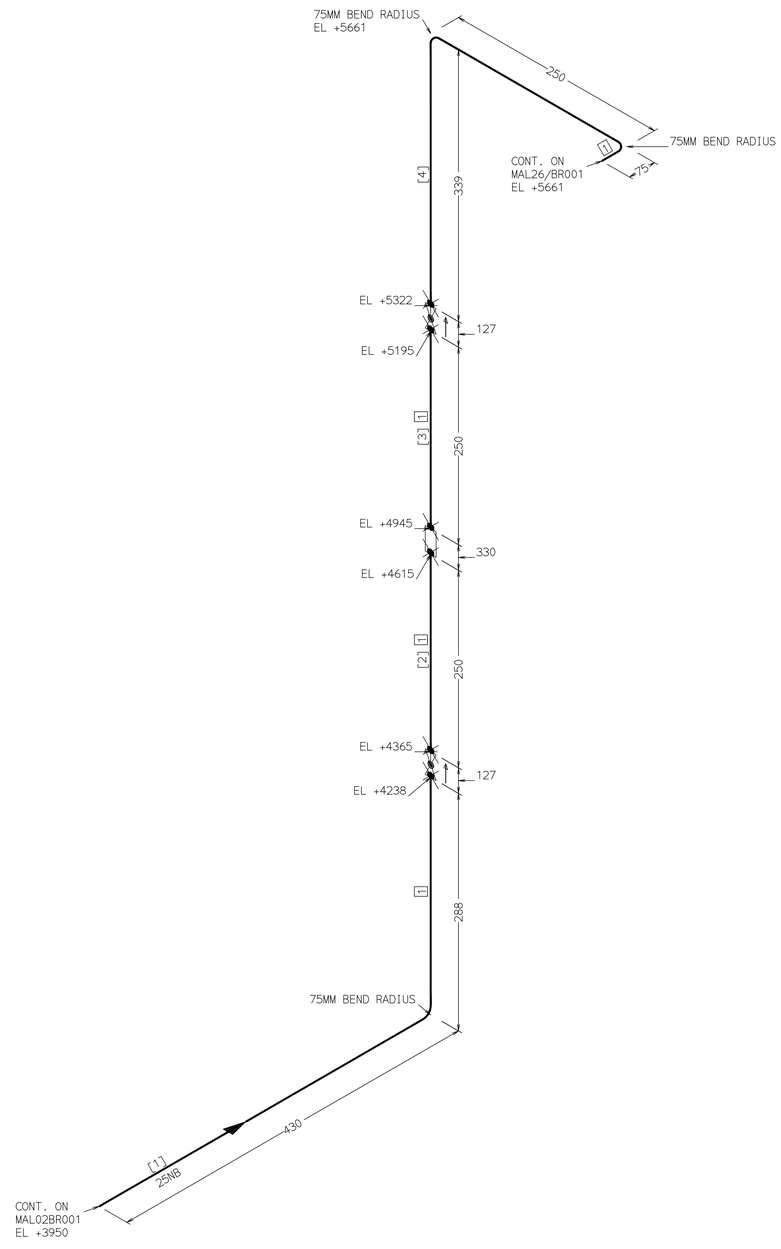

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Z
Y
X

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

REV	DATE		REV	DATE	ALTERED	REV	DATE	ALTERED	REV	DATE	ALTERED
		CHECKED			CHECKED			CHECKED			CHECKED
ZONE			ZONE			ZONE			ZONE		

GRADE OF UNTOL.DIM
M/CG.-C/M/F.AA0230208
WELDING-M/B/C/D AA0621104
GAS CUTTING-T3'AA0621101

~~GMS No.~~/ C.B.O.M			STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE

PROJECT TITLE:
1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA
FICHTNER Consulting Engineers (India) Private Limited
Chennai

BHARAT HEAVY ELECTRICALS LTD
RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR -

DEPT PED	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
CODE 4066	-		-	-	-

TITLE : TURBINE DRAINAGE SYSTEM

CARD CODE

DRAWING NO. MAL26/BR002 REV. 00

SHEET No. 1 No. OF SHEETS 1

A0 SIZE

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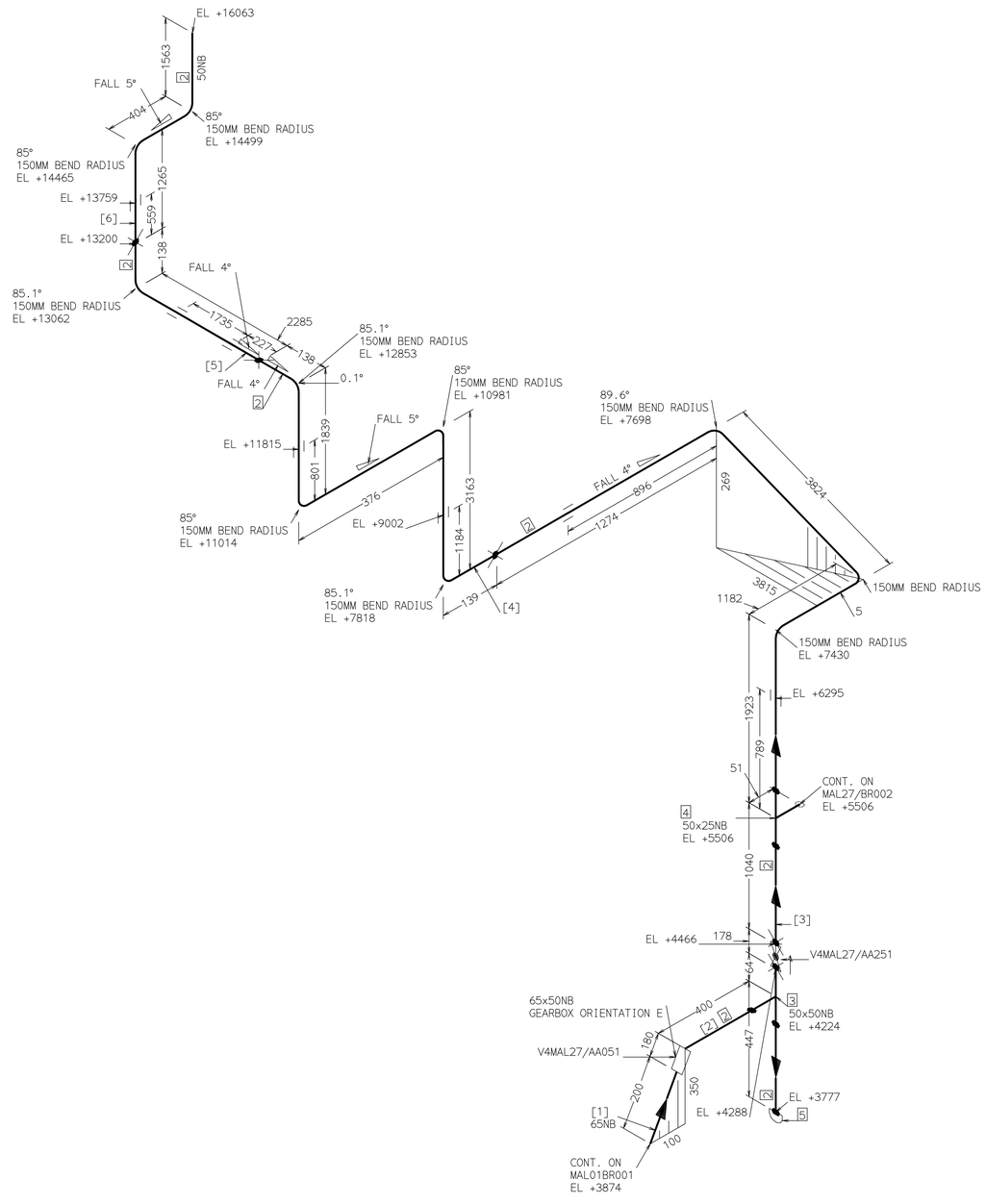
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	200MM	65	ASTM A335 GR.P92	SH-160	73	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	20589MM	50	ASTM A335 GR.P92	SH-XS	60.3	5.54			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
3	TEE	1	50 x 50	ASTM A234 GR.WP92	SH-XS	60.3	5.54	60.3	5.54	TEE ANSI B16.9 BW ASTM A234 GR.WP92
4	TEE	1	50 x 25	ASTM A234 GR.WP92	SH-XS	60.3	5.54	33.4	4.55	TEE ANSI B16.9 BW ASTM A234 GR.WP92
5	CAP	1	50	ASTM A234 GR.WP92	SH-XS	60.3	5.54			CAP,ANSI B16.9,BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

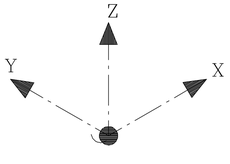
[1] [2] [3] [4] [5] [6]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6. ITEM NOS. ARE MARKED WITHIN □ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS.H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. ▶ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, 33-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621101
GAS CUTTING-'T3'AA0621101

~~GMS No:~~/	C.B.O.M			STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE	

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

DEPT	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
PED			-	-	-
CODE 4066					

TITLE: TURBINE DRAINAGE SYSTEM

CARD CODE | DRAWING NO. MAL27/BR001 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

REV	DATE		ALTERED	CHECKED
ZONE				

A0 SIZE

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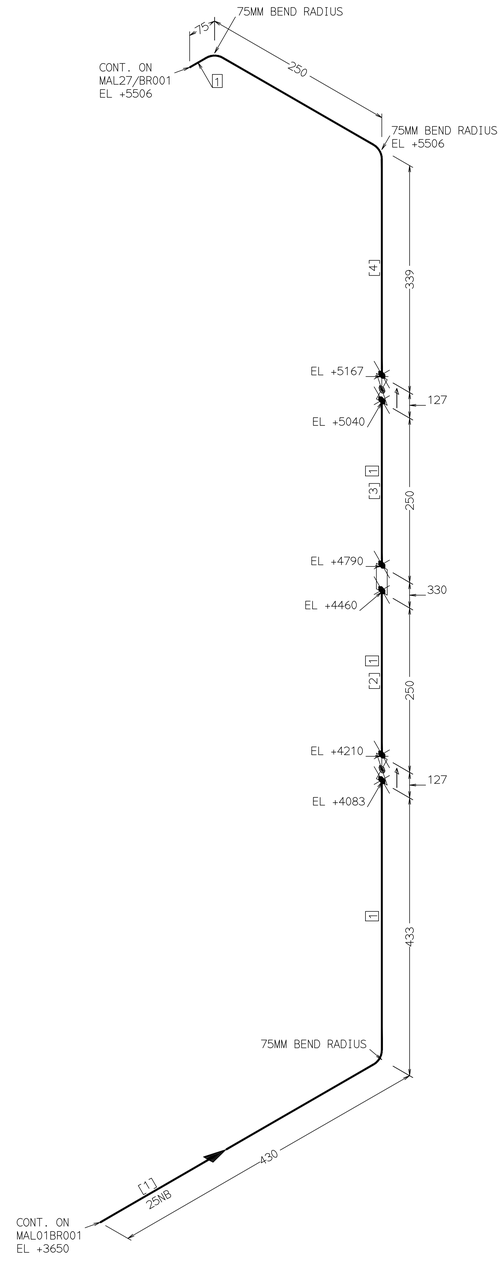
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	1931MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92

PIPE ASSEMBLIES

[1] [2] [3] [4]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
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8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
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14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
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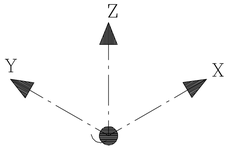

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

GRADE OF UNTOL.DIM			
M/CG.-C/M/F/AA0230208			
WELDING-M/B/C/D AA0621104			
GAS CUTTING-'T3'AA0621101			

~~GMS No.~~/ C.B.O.M			STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE			ZONE		

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited Chennai

BHARAT HEAVY ELECTRICALS LTD
RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR -

DEPT	PED	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
CODE	4066	-		-	-	-

TITLE : TURBINE DRAINAGE SYSTEM

CARD CODE

DRAWING NO. MAL27/BR002 REV. 00

SHEET No. 1 No. OF SHEETS 1

A0 SIZE

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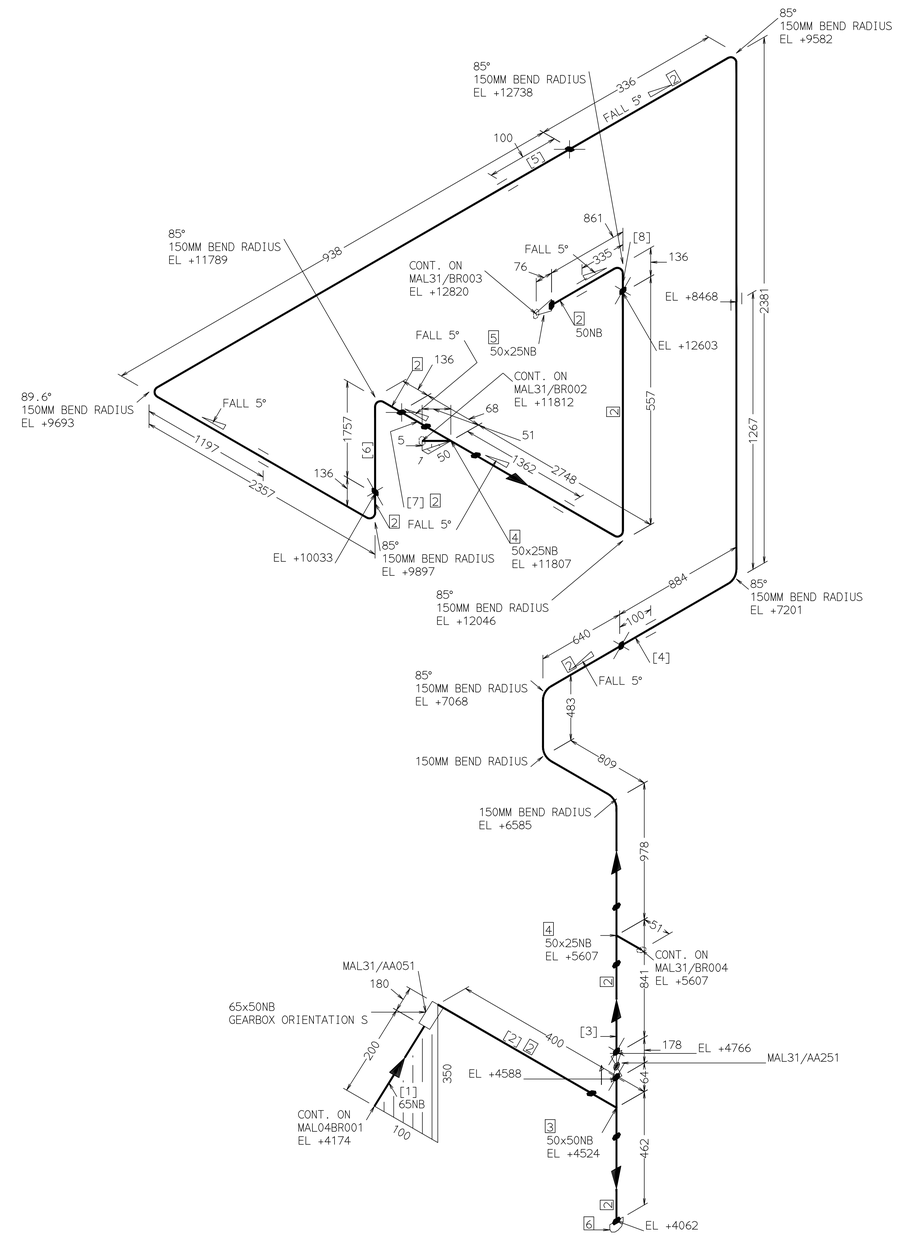
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION (ALL DIMENSIONS ARE IN mm) FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	200MM	65	ASTM A335 GR.P92	SH-160	73	9.53			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
2	TUBI	16971MM	50	ASTM A335 GR.P92	SH-XS	60.3	5.54			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
3	TEE	1	50 x 50	ASTM A234 GR.WP92	SH-XS	60.3	5.54	60.3	5.54	TEE ANSI B16.9 BW ASTM A234 GR.WP92
4	TEE	2	50 x 25	ASTM A234 GR.WP92	SH-XS	60.3	5.54	33.4	4.55	TEE ANSI B16.9 BW ASTM A234 GR.WP92
5	REDU	1	50 x 25	ASTM A234 GR.WP92	SH-XS	60.3	5.54	33.4	4.55	CONC. REDUCER, ANSI B16.9, BW ASTM A234 GR.WP92
6	CAP	1	50	ASTM A234 GR.WP92	SH-XS	60.3	5.54			CAP,ANSI B16.9,BW ASTM A234 GR.WP92
										SUPPORTS
7	ATTA	1	50		ATTA					

PIPE ASSEMBLIES

[1] [2] [3] [4] [5] [6] [7] [8]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

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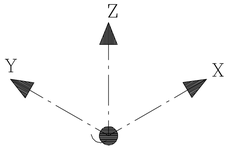

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR: -

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA023020B
WELDING-A/B/C/D / AA0621104
GAS CUTTING- T3'AA0621101

~~GMS No:~~/ C.B.O.M — AGREED DEPT | NAME | SIGN | DATE — STATUS OF DRG

REV	DATE	ALTERED / CHECKED	ZONE

DEPT PED | CODE 4066 | SCALE | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL31/BR001 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

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FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

DRAWING No.

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
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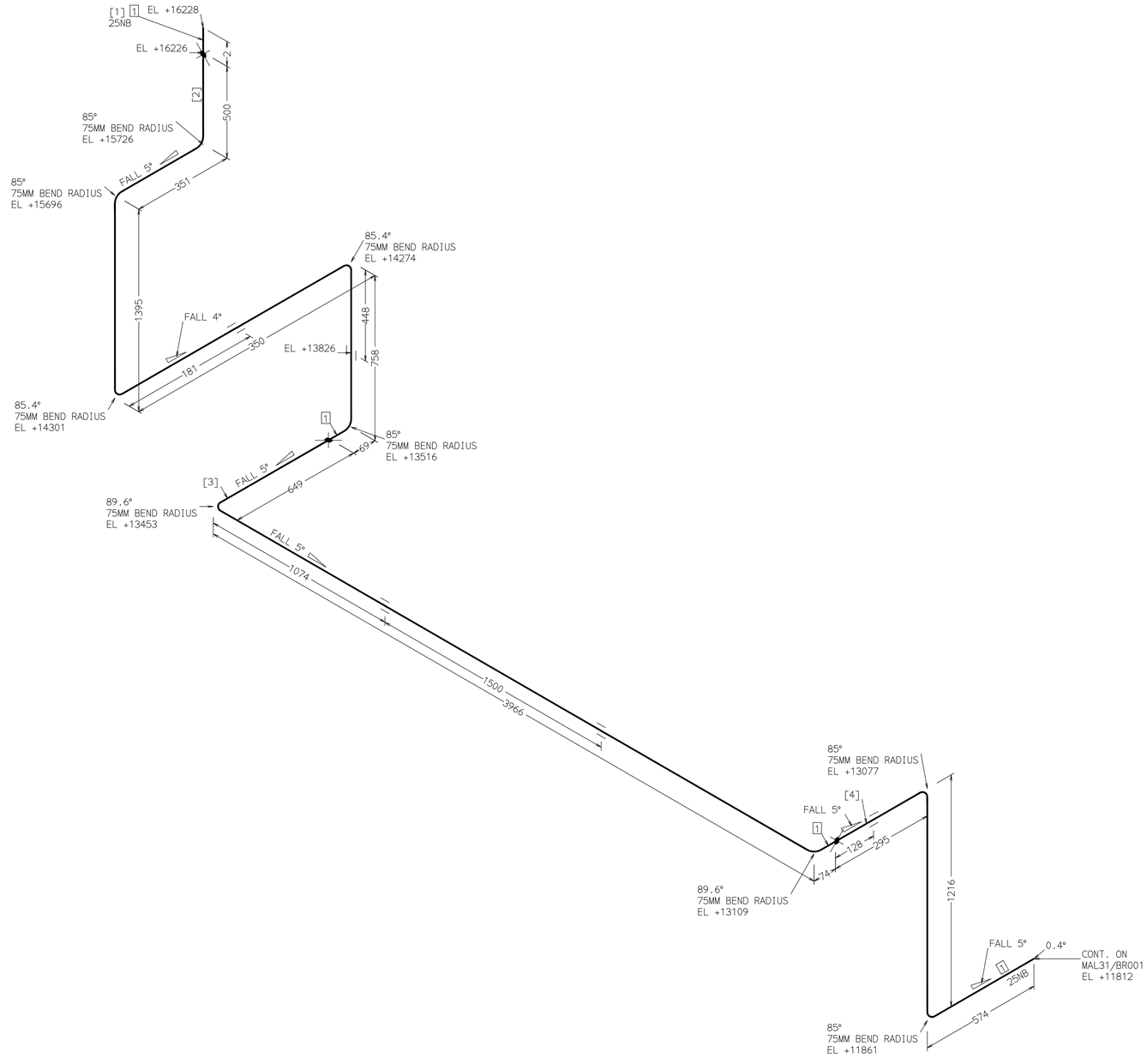
PIPE ASSEMBLIES

[1] [2] [3] [4]



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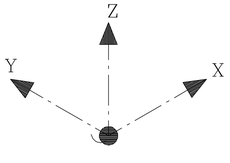

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

~~GMS No.~~/	C.B.O.M			STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE	

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-N/B/C/D AA0621104
GAS CUTTING-'T3'AA0621101

REV	DATE		REV	DATE	ALTERED	REV	DATE	ALTERED	REV	DATE	ALTERED
		CHECKED			CHECKED			CHECKED			CHECKED
ZONE			ZONE			ZONE			ZONE		

PROJECT TITLE:
1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
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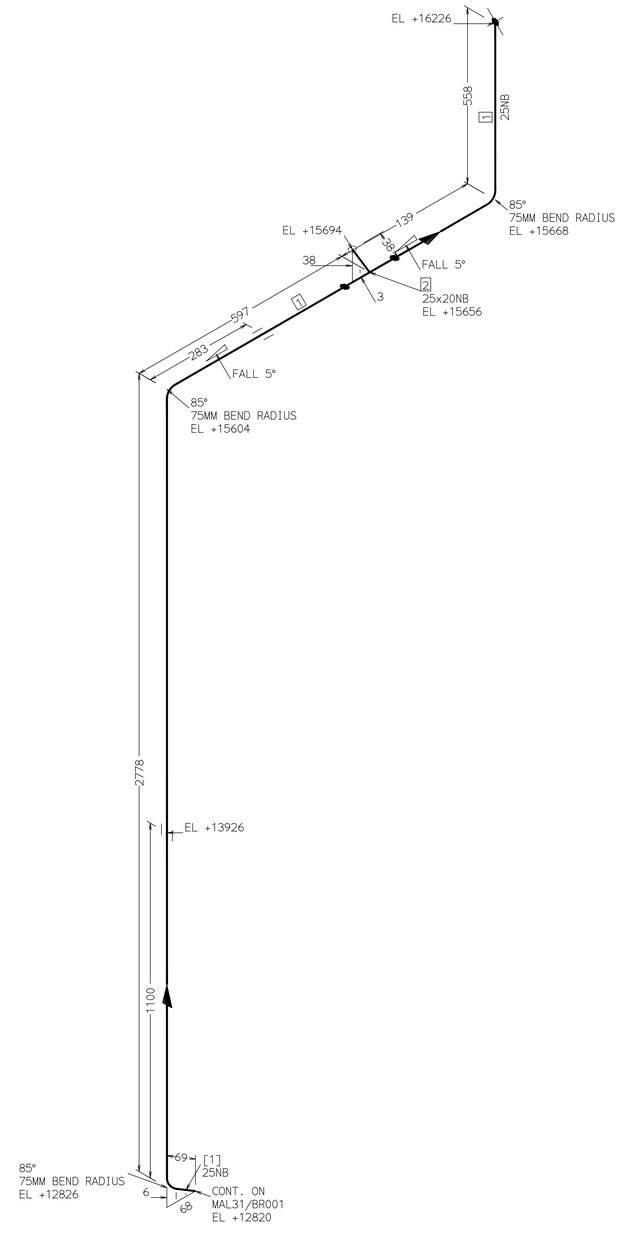
2	TEE	1	25 x 20	ASTM A234 GR.WP92	SH-XS	33.4	4.55	26.7	3.91	TEE ANSI B16.9 BW ASTM A234 GR.WP92

PIPE ASSEMBLIES

[1]



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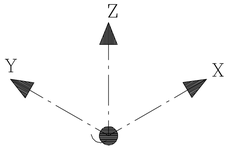
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS.H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. → ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, 33-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

1. SITE INSTRUCTION:-WHEREEVER THICKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.
2. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

NO. OF VAR -

GRADE OF UNTOL.DIM
M/CG.-C/M/F,AA0230208
WELDING-N/B/C/D AA0621104
GAS CUTTING-'T3'AA0621101

~~GMS No.~~/ C.B.O.M — AGREED DEPT | NAME | SIGN | DATE — STATUS OF DRG

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE			ZONE		

DEPT PED | CODE 4066 | SCALE | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL31/BR003 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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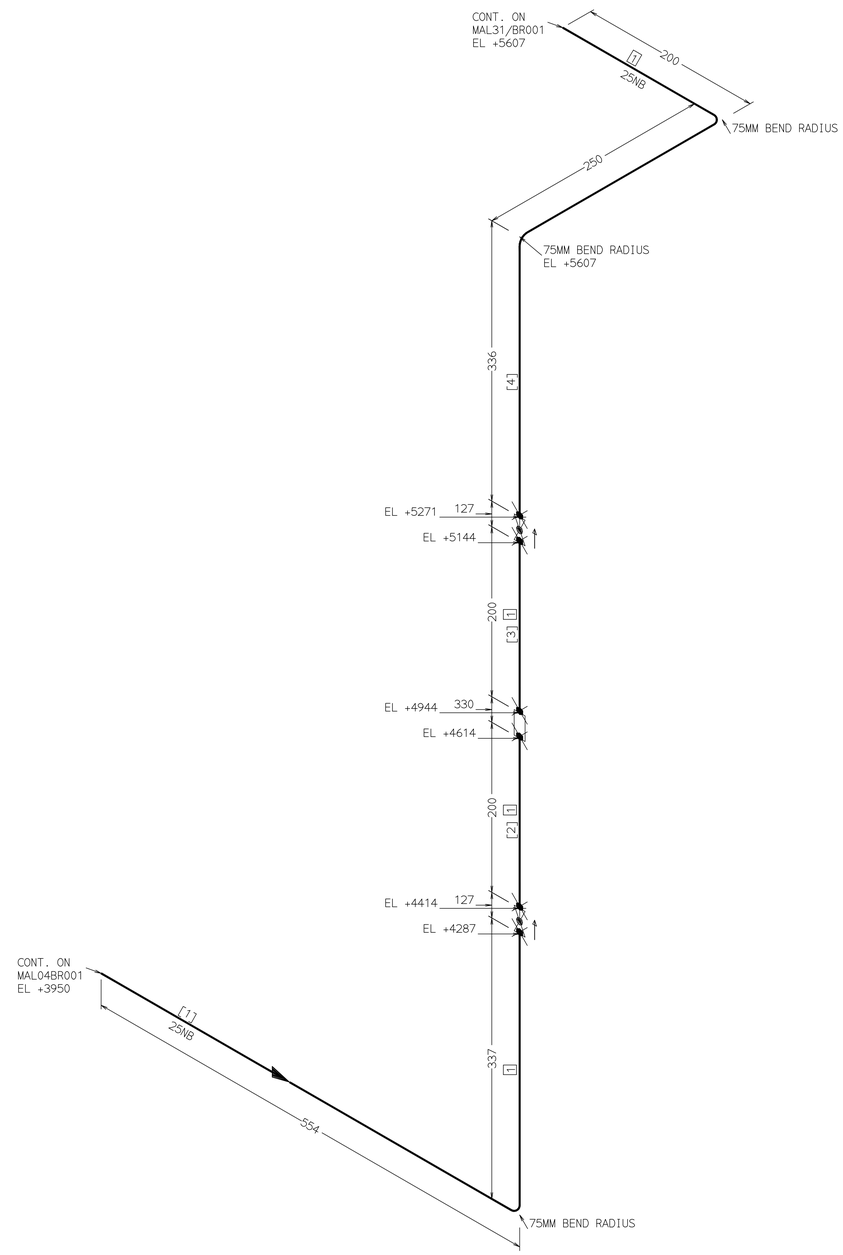
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	1981MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92

PIPE ASSEMBLIES

[1] [2] [3] [4]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6. ITEM NOS. ARE MARKED WITHIN □ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
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12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
13. SYMBOL ═ MARKED ON LINES ARE LOCATION OF HANGER & SUPPORTS.H&S & VALVES ARE NOT IN PIPING VENDOR'S SCOPE.
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. → ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
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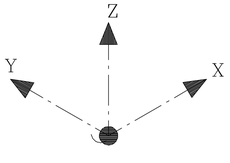

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 68.513
OPERATING TEMP.(DEG.C)- 608

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	SHRI PAL	-Sd-	23.07.18
CHD	NILESH	-Sd-	23.07.18
APPD	AS.RAJPUT	-Sd-	23.07.18

GRADE OF UNTOL.DIM
M/CG.-C/M/F,AA0230208
WELDING-A/B/C/D / AA0621101
GAS CUTTING-'T3'AA0621101

~~GMS No:~~/ C.B.O.M — AGREED DEPT | NAME | SIGN | DATE — STATUS OF DRG

REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE			ZONE			ZONE			ZONE		

DEPT	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
PED			-	-	-
CODE 4066					

TITLE: TURBINE DRAINAGE SYSTEM

CARD CODE | DRAWING NO. MAL31/BR004 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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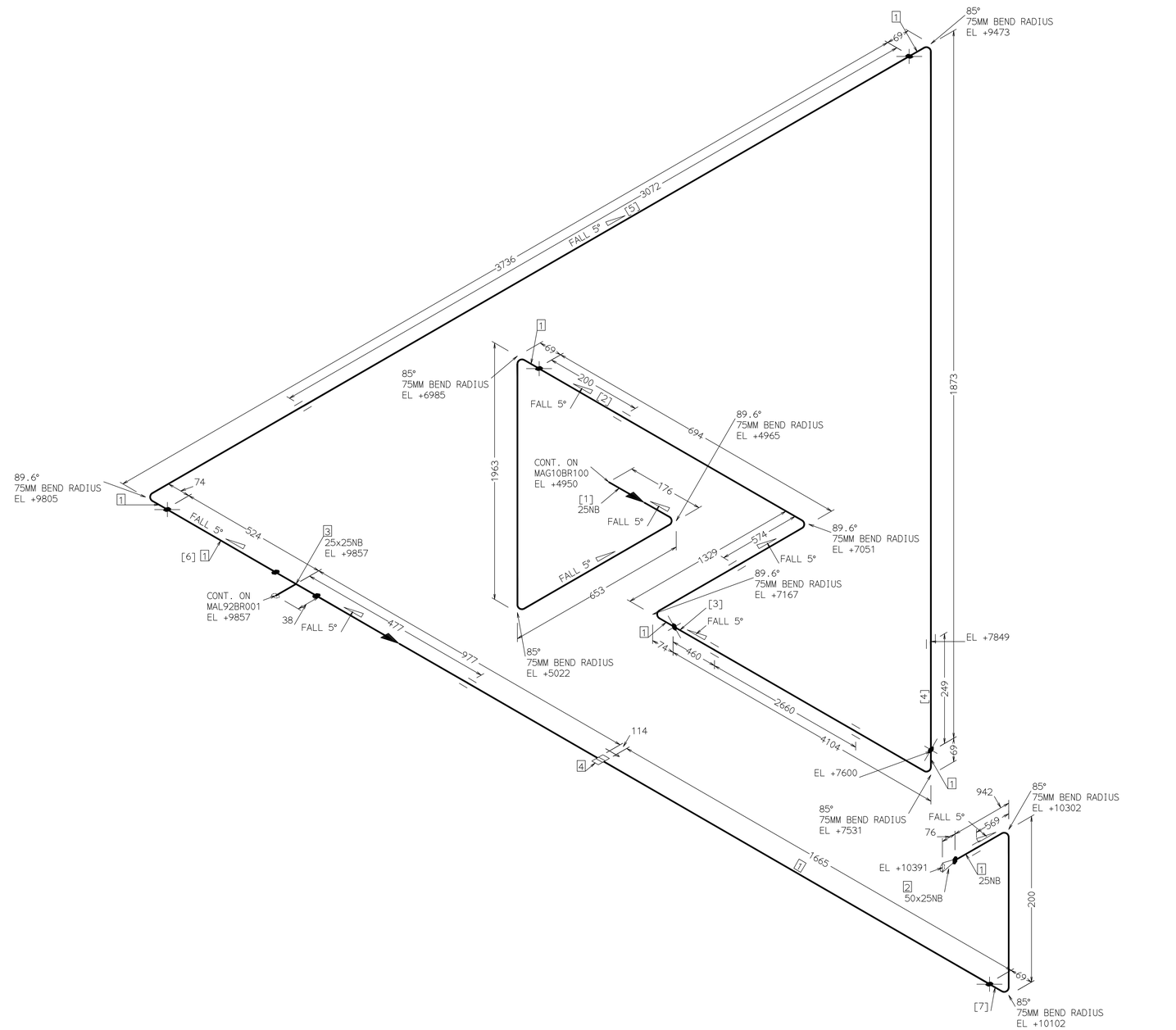
REF DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	18900MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
2	REDU	1	50 x 25	ASTM A234 GR.WP92	SH-XS	60.3	5.54	33.4	4.55	CONC. REDUCER, ANSI B16.9, BW ASTM A234 GR.WP92
3	TEE	1	25 x 25	ASTM A234 GR.WP92	SH-XS	33.4	4.55	33.4	4.55	TEE ANSI B16.9 BW ASTM A234 GR.WP92
										INSTRUMENTS
4	INST	1	25	SA182 P92	DRG.313126U2140-VAR01					BHEL STD ORIFICE ASSLY.DRG NO.313126U2140 SA182 P92

PIPE ASSEMBLIES

[1] [2] [3] [4] [5] [6] [7]



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9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
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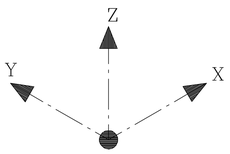

—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 67.8
OPERATING TEMP.(DEG.C)- 600

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621104
GAS CUTTING-'T3'AA0621101

~~GMS No:/~~ C.B.O.M				STATUS OF DRG
AGREED DEPT	NAME	SIGN	DATE	

REV	DATE		REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED	REV	DATE	ALTERED / CHECKED
ZONE		CHECKED	ZONE			ZONE			ZONE		

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	SHRI PAL	-Sd-	23.07.18	-
CHD	NILESH	-Sd-	23.07.18	
APPD	AS.RAJPUT	-Sd-	23.07.18	

DEPT	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM No.	NO. OF ITEMS
PED			-	-	-
CODE 4066					

TITLE : TURBINE DRAINAGE SYSTEM

CARD CODE | DRAWING NO. MAL91BR001 | REV. 00

SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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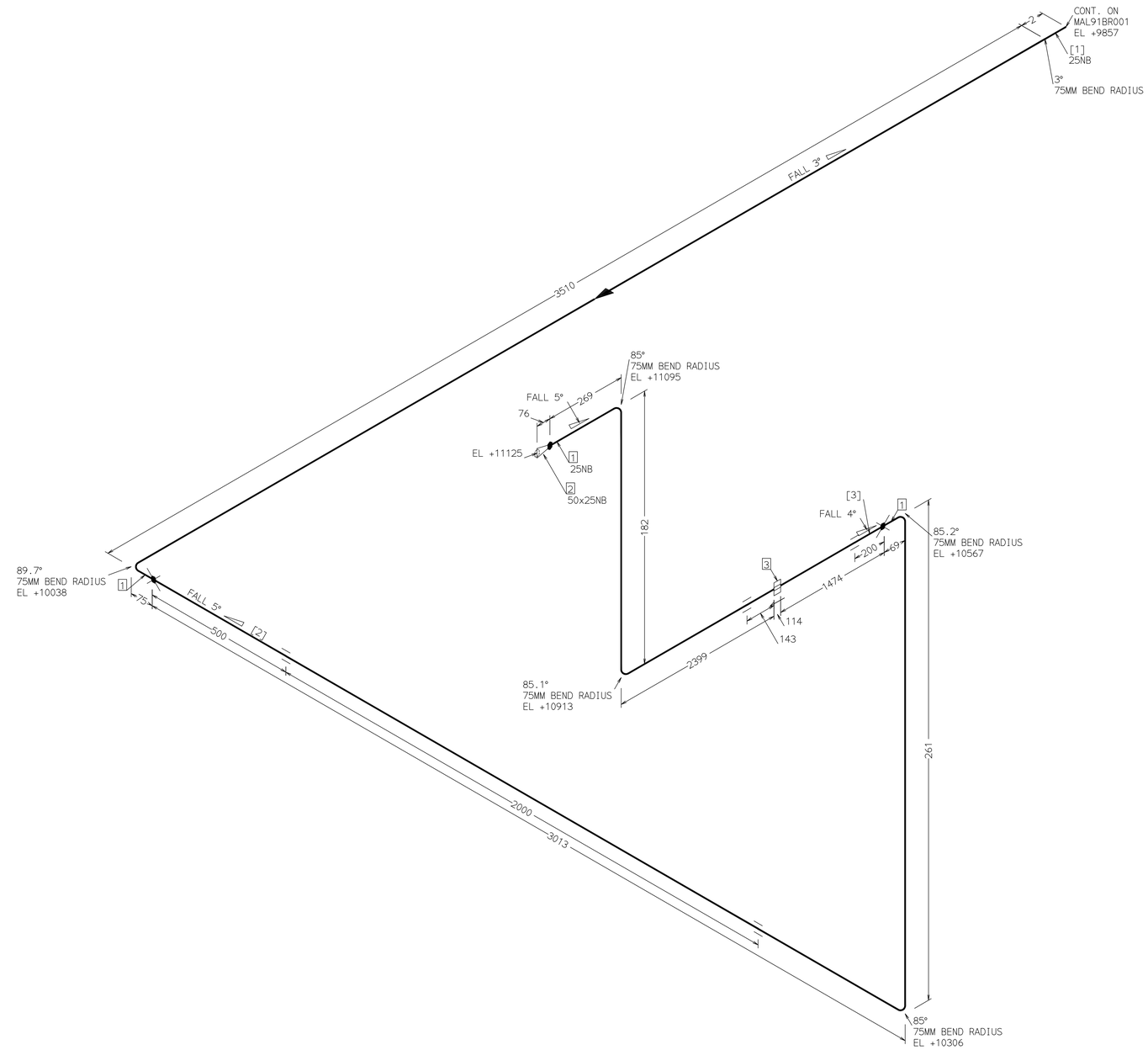
REF.DRAWING No. | SIGN & DATE | INVENTORY No.

FIRST ANGLE PROJECTION | (ALL DIMENSIONS ARE IN mm) | FORM DG 46 (B)

ITEM NOS.	TYPE	QTY.	NOM.BORE (MM)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	11114MM	25	ASTM A335 GR.P92	SH-XS	33.4	4.55			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
2	REDU	1	50 x 25	ASTM A234 GR.WP92	SH-XS	60.3	5.54	33.4	4.55	CONC. REDUCER, ANSI B16.9, BW ASTM A234 GR.WP92
										INSTRUMENTS
3	INST	1	25	SA182 P92	DRG.313126U2140-VAR01					BHEL STD ORIFICE ASSLY.DRG NO.313126U2140 SA182 P92

PIPE ASSEMBLIES

[1] [2] [3]



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
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8.FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9.FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10.FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11.EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
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14.FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15.→ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. -SXX, -HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
e.g. 33 IS H&S SYSTEM NO FOR SYSTEM& SXX IS SUPPORT NO & HXX IS HANGER NO.

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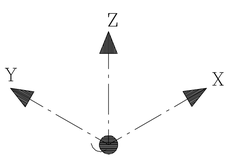
2.SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT.



—SITE WELD
—SHOP WELD

OPERATING PRESS.(BAR).- 67.8
OPERATING TEMP.(DEG.C)- 600

GRADE OF UNTOL.DIM
M/CG.-C/M/F/AA0230208
WELDING-A/B/C/D / AA0621104
GAS CUTTING-'T3'AA0621101

REV	DATE	ALTERED / CHECKED	ZONE

~~GMS No.~~/ C.B.O.M			STATUS OF DRG	
ASSRED DEPT	NAME	SIGN	DATE	

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED, 5th Floor, Western Wing, NPKRR Maaligai, 144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — Fichtner Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD, RANIPUR, HARIDWAR

	NAME	SIGN	DATE	NO. OF VAR
DRN	SHRI PAL	-Sd-	23.07.18	
CHD	NILESH	-Sd-	23.07.18	
APPD	AS.RAJPUT	-Sd-	23.07.18	-

DEPT PED | CODE 4066 | SCALE | WEIGHT (KG) | REF. TO ASSY. DRG. - | ITEM No. - | NO. OF ITEMS -

TITLE : TURBINE DRAINAGE SYSTEM | CARD CODE | DRAWING NO. MAL92BR001 | REV. 00 | SHEET No. 1 | No. OF SHEETS 1

A0 SIZE

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REF DRAWING No. | SIGN & DATE | INVENTORY No.

BHARAT HEAVY ELECTRICALS LIMITED, HARDWAR
PROJECT ENGINEERING DEPARTMENT

CUSTOMER / PROJECT:1x800MW NORTH CHENNAI
DESCRIPTION: SPARE PIPES & FITTINGS (P92) TURBINE DRAINAGE SYSTEM

DESC.	**MATERIAL**	**SIZE**	**Spare LENGTH (MM)**	**Weight(Kg)**
	Turbine Drainage System			
PIPE	ASTM A335 GR.P92	D323.9XSH-STD	2000	147.76
PIPE	ASTM A335 GR.P92	D60.3X12.05	7000	100.3695306
BEND(5D)	ASTM A335 GR.P92	D60.3X12.05	QTY-10	56.2
BEND(3D)	ASTM A335 GR.P92	D60.3XSH-XS	QTY-10	17.6
PIPE	ASTM A335 GR.P92	D60.3XSH-XS	10000	74.8
PIPE	ASTM A335 GR.P92	D33.4XSH-XS	5400	17.496
	ASTM A335 GR.P92	D33.4XSH-160	1000	4.24
PIPE	ASTM A335 GR.P92	D33.4XSH-XXS	1000	5.45
ELBOW	ASTM A335 GR.P92	90D323.9XSH-STD	QTY-03	158.46
OLET/STUB as per Drg No **41310081201**	ASTM A335 GR.P92		QTY-20	6
PIPE	ASTM A335 GR.P92	D48.3X7.14 (SH-160)	1200	8.7
PIPE	ASTM A335 GR.P92	D60.3X8.74 (SH-160)	800	11.11
PIPE	ASTM A335 GR.P92	D73.0X9.53 (SH-160)	4000	59.68
				667.8655306

BHARAT HEAVY ELECTRICALS LIMITED, HARDWAR
PROJECT ENGINEERING DEPARTMENT

LIST OF ISOMETRIC DRAWINGS FOR OVER LOAD VALVE PIPING

CUSTOMER / PROJECT: 1X800 MW NORTH CHENNAI/TANGEDCO DOC NO.: 313181V6200 REV NO.:00

SYSTEM DESCRIPTION: OVER LOAD VALVE PIPING BOM DATE: 19.02.19

DOC REV.NO	DRAWING NO.	DRG REV NO.	Material
00	MAA14BR001	00	ASTM A335 Gr.P92
00	MAA14BR002	00	ASTM A335 Gr.P92
00	PIPE D219.1XTHK-54, L=1600		ASTM A335 Gr.P92
00	BEND(3D) D219.1XTHK-54, QTY-1		ASTM A335 Gr.P92

TOTAL WEIGHT: **9651.00** KG

PRELIMINARY BOM IS VALID FOR UPPUR 2X800MW

FIRST ANGLE PROJECTION

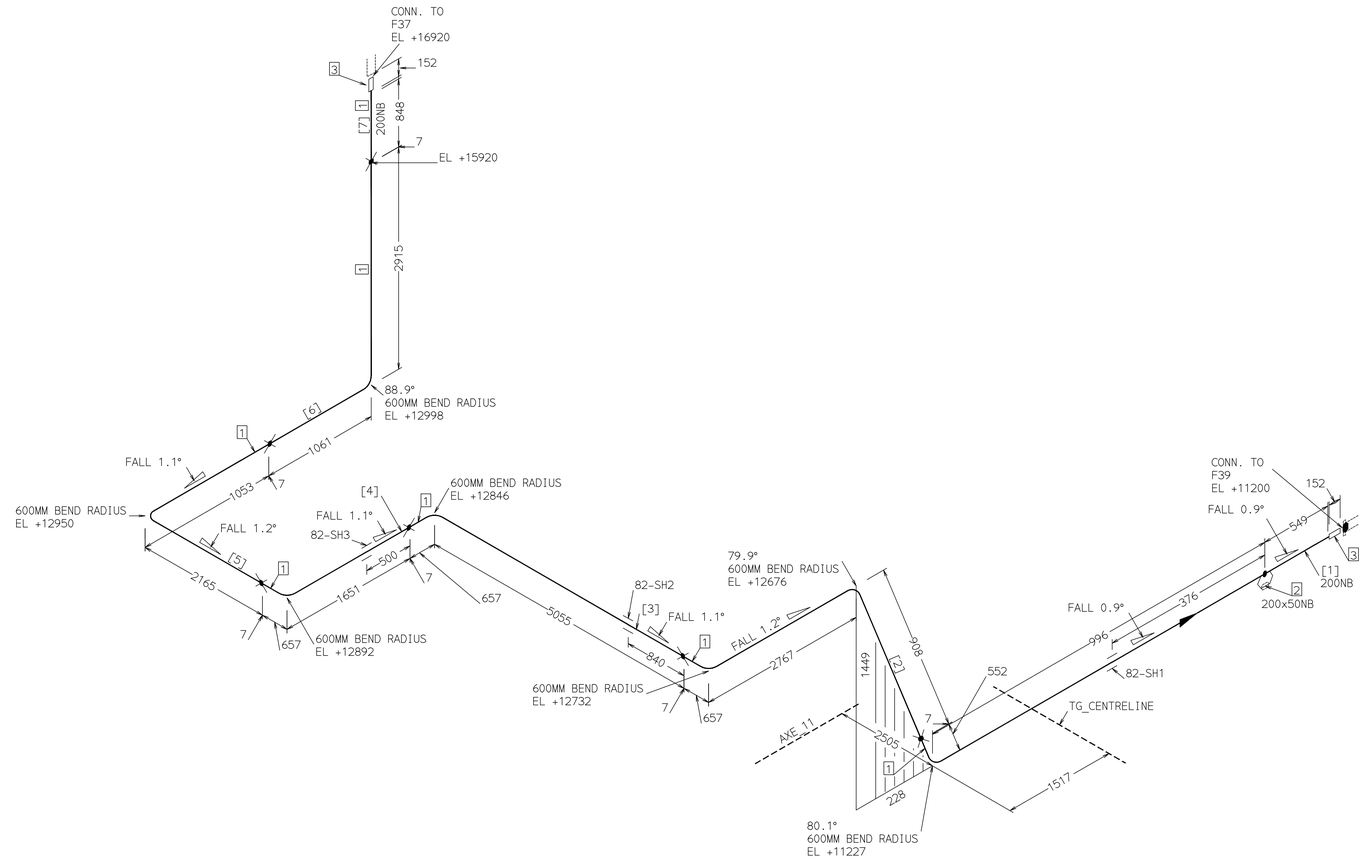
ALL DIMENSIONS ARE IN MM

DRAWING NO.

ITEM NOS.	TYPE	QTY. (MM)	BORE (NB)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	21631	200	ASTM A335 GR.P92	THK-54	219.1	54.00			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
2	OLET	1	200 x 50	ASTM A335 P92	WOL-THK-14.55	60.3	14.55			WELDOLETS AS PER MSS-SP-97 ASTM A335 P92
3	FTUB	2	200	ASTM A335 P92	FTUB	219.1	54	229	45.45	BHEL STD. CONNECTING PIECE AS PER DRG. NO. 413181V6001. ASTM A335 P92

PIPE ASSEMBLIES

[1] [2] [3] [4] [5] [6] [7]



OPERATING TEMP.(DEG.C)	OPERATING PRESS.(BAR).
600	277

TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
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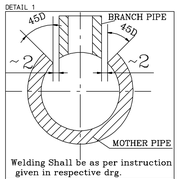
14. FOR DEVELOPMENTAL PLAN OF MOTHER TO BRANCH RUN PIPE WELD(REINFORCED), PLS REFER DRG NO.3-13100-82996.
15. -▶ARROW IS TO BE MARKED AT THE END OF EACH ASSLY IN THE DIRECTION OF NEXT ASSEMBLY.
16. 82-SXX, 82-HXX, REPRESENTS THE NAME OF SUPPORT & HANGER RESPECTIVELY.
    e.g. 82 IS H&S SYSTEM NO FOR OVERLOAD VALVE PIPING SYSTEM & SXX IS SUPPORT NO & HXX IS HANGER NO.

DETAIL 1



1. SITE INSTRUCTION:-DRG NO. OF THE ISOMETRIC DRG IS THE KKS TAG OF INDIVIDUAL BRANCH AS MARKED IN SCHEME & LAYOUT
2. SITE INSTRUCTION:-WHEREEVER THIKNESS OF COMPONENT/NOZZLE IS MORE, LOCALLY GRIND THE HIGHER THICKNESS TO MATCH PIPE ID.

✱ -SITE WELD

● -SHOP WELD

Y,N Z,U X,E

REV	DATE	ALTD	CHD	APPD	REV	DATE	ALTD	CHD	APPD	REV	DATE	ALTD	CHD	APPD

TO No.OFF							
REV 01	DATE 10.07.18	ALTD Shri.pal.	CHD Nilesh	APPD			
ZONE							

PROJECT TITLE: 1X800 MW TANGEDCO NORTH CHENNAI TPP STAGE III

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
5th Floor, Western Wing, NPKRR Maaligai,
144, Anna Salai, Chennai-600002

OWNER'S ENGINEER: FICHTNER INDIA — FICHTNER Consulting Engineers (India) Private Limited, Chennai

BHARAT HEAVY ELECTRICALS LTD
RANIPUR, HARIDWAR

	NAME	SIGN	DATE
DRN	S.PAL	-Sd-	13.11.17
CHD	NILESH	-Sd-	13.11.17
APPD	A.S.RAJPUT	-Sd-	13.11.17

NO. OF VAR -

TITLE: OVER LOAD VALVE PIPING SYSTEM

DEPT. / SCALE / SIGN / DATE

DRAWING NO. V6MAA14BR001

SHEET 1 OF 1 REV 00

SIZE-A0

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COMPUTER FILE NAME: MAA14BR001

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

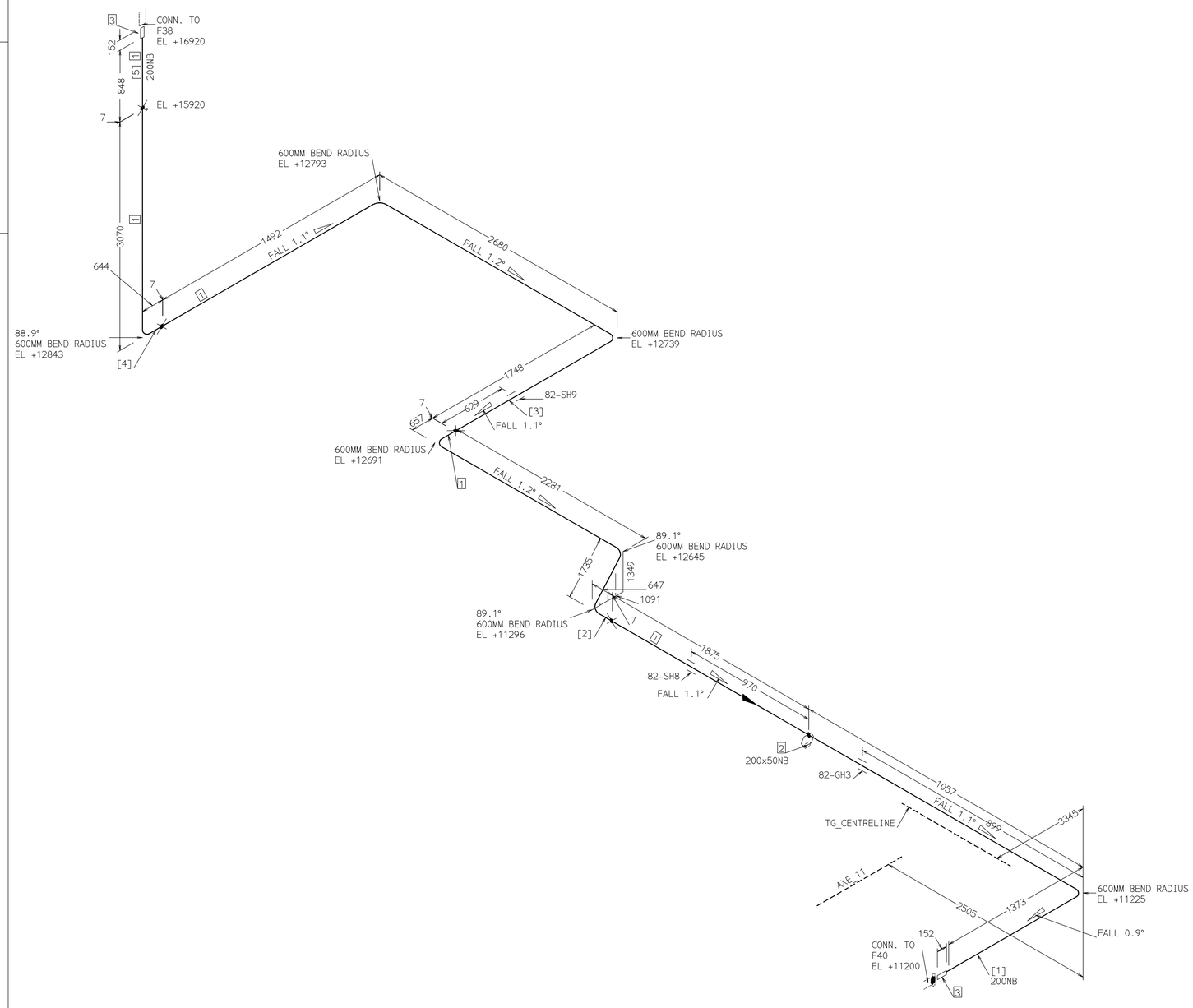
DRAWING NO.

ITEM NOS.	TYPE	QTY. (MM)	BORE (NB)	MATERIAL	DETAIL	OD1	THK1	OD2	THK2	DESC
1	TUBI	19089	200	ASTM A335 GR.P92	THK-54	219.1	54.00			ANSI B36 10 BE SMLS PIPE ASTM A335 GR.P92
										FITTINGS
2	OLET	1	200 x 50	ASTM A335 P92	WOL-THK-14.55	60.3	14.55			WELDOLETS AS PER MSS-SP-97 ASTM A335 P92
3	FTUB	2	200	ASTM A335 P92	FTUB	219.1	54	229	45.45	BHEL STD. CONNECTING PIECE AS PER DRG. NO. 413181V6001. ASTM A335 P92

PIPE ASSEMBLIES

[1] [2] [3] [4] [5]

OPERATING TEMP.(DEG.C)	OPERATING PRESS.(BAR).
600	277



TECHNICAL REQUIREMENTS & GENERAL NOTES:-

1. WELDING OF PIPES & FITTING AS PER PS HW 0620599.
2. CLASSIFICATION OF WELD GROUP BS AS PER HW 0620099.
3. WELDING TEST SCOPE AS PER HW 0850199 (PART-11 TABLE NO. 2)
4. FABRICATION, PICKLING, PASSIVATION, PAINTING & SUPPLY AS PER ST 34001.
5. "DRAWING NO- ASSLY NO" ARE TO BE MARKED AT THE END OF EACH ASSLY FOR IDENTIFICATION.
6. ITEM NOS. ARE MARKED WITHIN □ & ASSEMBLY NO'S ARE MARKED WITH IN [ ].
7. WORDS "F" ,"G" ARE USED WITH ITEM NOS AS A PREFIX FOR FLANGE & GASKET RESPECTIVELY & "B" FOR NUT BOLT & WASHER.
8. FOR WELDING DETAILS OF STUB/OLETS REFER DRG NO.4-13100-82998.
9. FOR FILLET WELD SIZE REFER DRG.NO.3-13100-82997.
10. FOR BUTT WELD SIZE REFER DRG.NO.3-13100-82999.
11. EDGE PREPARATION OF EACH ASSLY(BOTH ENDS) TO BE DONE AS PER 'ASME B16.25'.
12. LOOSE ITEMS ARE TO BE PACKED DRAWING WISE.
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NO. OF VAR -

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SHEET 1 OF 1 REV 00

SIZE-A0

COMPUTER FILE NAME: MAA14BR002

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