

BHEL		SQP:NP:01/04	Page 1 of 17
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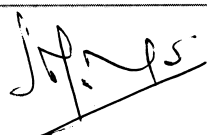
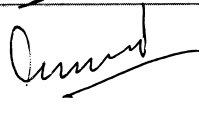
BHARAT HEAVY ELECTRICALS LIMITED

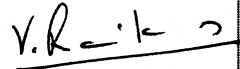
TIRUCHIRAPPALI 620 014 INDIA

STANDARD QUALITY PLAN FOR SQP:NP:01/04

DUCTS & HOPPERS

Page 1 of 17

Prepared by	A.FRANCIS
Quality assurance	
REVIEWED BY	SIGNATURE
ENGINEERING (V.SRIDHARAN)	
OUT SOURCING (S.MOHANRAM)	
QUALITY CONTROL (AMITROY)	
QUALITY ASSURANCE (BIKRAMADITYA ROY)	

REV.NO.	DATE	APPROVED BY	SIGNATURE
01	15. 07.96	Sr.Manager/ Q A	V.Ragavendran
02		DGM/QA	C.R.RAJU
03	1.12.2005	DGM/QA	C.R.RAJU
04	18.07. 2011	AGM/QA	V.Ravikumar 

Proprietary Data – For Internal Use only

BHEL		SQP:NP:01/04	Page 2 of 17
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Rev. No.	Clause No.	Details of revision
00	--	This document consolidates all requirements of various previous SQPs.
01	--	Totally revised incorporating all amendments issued and latest TDC numbers.
02	--	SIP nos updated.
	3.2 in Note 3	Tolerances for depth of section revised in line with AWS D1.1 (2002 edition)
	4.1.3 & 4.1.4 in Note 4	Modified to incorporate Amendment A3 to rev.01
	4.2.4	deleted under Fillet welds and included under Butt welds as 4.1.7
	4.3.4 in Note 4	Added to incorporate Amendment A4 to rev.01
	5.1 (Vi) in Note 5	Added to incorporate Amendment A2 to rev.01
	5.2.3 in Note 5	Out of straightness revised in line with AWS D1.1 (2002 edition)
	5.2.5	Revised in line with AWS D1.1
	P5 in Note 6	Modified to incorporate Amendment A1 to Rev 01
03	2.2	Additional inputs added.
	3.1	Additional character added in trial assy.
	Note cl. No.1	New norms added for spliced joints with extra clarity.
	Note cl. No 2.5,3.1,	
	3.2, 3.3	Extra input added.
	Note cl. No.4.0,4.1.4	Inspection tolerance for
	4.1.7	Ducts/Hopper/Transition/Flanges added during trial assy.
	Note cl. No.5	Pre-qualification for welding.
04	1.0	S-TEN1 Material added.
	Note:3	Trial assy for duct assy classified based on the Note sheet approved by ED Applicable for OS, Non-NTPC). For ACF vendors, it will be reviewed and extended.



STANDARD QUALITY PLAN

BOILER DUCTS & HOPPERS

QP NO.: SQP:NP: 01 REV.: 04
DATE : 18/07/2011
PAGE : 3 of 17

SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	CI.	TYPE OF CHECK	Quantum of Check	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD		Agency **			REMARKS
							D	M	TPI	C		

[illegible]

 Tiruchirappalli		QUALITY ASSURANCE		STANDARD QUALITY PLAN					QP NO. : SQP:NP: 01 REV.: 04				
BOILER DUCTS & HOPPERS					DATE : 18/07/2011 PAGE : 4 of 17								
SL. NO.	COMPONENT AND OPERATION	CHARECTERISTICS	CL	TYPE OF CHECK	Quantum of Check	REF.DOCUMENT/ ACCEPTANCE STD.	TYPE OF RECORD	Agency **				REMARKS	
							D	M	TPI	C			

2.2	Welding qualifications	New qualification OR Pre qualification Procedure (as below)*	Review of Documents	100%	SIP:NP:07	R		QC	V		Before commencement of elding,
WPS document is to be prepared by contractor (on form E-1 (Front) as per Annexe E of AWS D1.1 M: 2004 Edition Page 334 as applicable for the welding process to be used) and submitted to A I A / QC (BHEL) for review & approval .. (See Notes - 5 for guidance on welding parameters)											
2.3	Weld Inspection	Personnel		Review of Documents	100%	SIP:NP:07	R		QC	V	
		Weld size & shape Weld quality		Visual LPI	100% 10% #	Drawing / SIP:NP:06 BHE:NDT:PB:PT1	- R		QC QC	V	# 100% for SS
3.0	FINAL INSPECTION	Leak test *		Kerosene leak test	100%	SIP:NP:05	R		QC		*For single side welds
3.1	Trial Assembly	Orientation , Dimensions Match marks		Measurement	100%	Drawings Note - 3	R		QC		
3.2	Painting and Preservation	Paint finish coat thickness		Visual Measurement	-- Random	SIP:PP:22	-		QC		
3.3	Identification	WO No., DU No. Match marks Flow direction for aerofoil		Visual		Drawings Fig: 1,2,3 (as applicable)	-		QC		

NOTES

- 1 The following are the norms applicable for splicing through additional joints:. Any deviation from the same shall have the approval of Engineering.

For **stiffeners** up to 4 Meter length : Not permitted.

For stiffeners above 4 Meter length, permitted within 1/5th and 1/3rd of length from ends.

Duct walls : As below

<u>Area in Square meters:</u>	<u>Maximum No of joints.</u>
Up to and including 2.....	NIL
Above 2 upto and including 5.....	2
Above 5 upto and including 10.....	4
Above 10 upto and including 15.....	6
Above 15 upto and including 20.....	8
Above 20 upto and including 25.....	10
Above 25.....	15

- Welds joints shall be back gouged and 100% LPI tested before welding from second side.
- Welds joint to stiffener distance shall be 50 mm and above .
- Weld joints shall be ground flush at stiffener seating locations.
- Joints parallel to the bend shall be at least 100 mm away from the bend.

- 2 For aerofoil of flow meter no vertical joints are permitted in the inlet region (leading edge of flow meter).Joint can be permitted beyond 250mm from tapping points on downstream side. Refer figure 1.

- 2.1 If required horizontal joints, shall be permitted beyond 250mm from the tapping points.

- 2.2 The weld reinforcement on outside surface of aerofoil shall be ground flush so as to avoid any resistance to flow.

- 2.3 For despatchable rectangular / square wall of size 2M x 2M or smaller, smallest dimension of any piece shall be 300mm. For despatchable rectangular /square wall of size greater than 2M x2M, the smallest dimension shall be 500 mm. However in case of transition, hopper and chimney walls, for triangular and trapezium shapes the smallest dimension can be Zero.

- 2.4 "T" joints can also be permitted in layout / cutting plan.

- 2.5 Butt welds on divider plate & guide vanes and aerofoil shall be free from abrupt projection.
Weld reinforcement upto 2 mm is permitted.

3.0 Trial Assembly

- 3.1 To ensure correct matching during site erection/assembly, Trial assembly will be carried out at vendor works as below

- 3.2** .Trial Assembly is waived off for the following duct shapes.

- a) Straight duct with out internal Truss
- b) Straight duct with internal Truss.

- c) Elbow duct with out guide vane.
- d) Elbow duct with out internal truss.
- e) T-Duct with equal opening
- f) T-Duct with unequal openings.
- g) Bend duct with out truss.
- h) Transition duct on one plane only.

Dimension check on layout can be ensured a close tolerance Of 2mm.

3.3; Trial assembly of Elbow duct, Tee bend & Y- ducts with Guide Vanes ,Truss and partition plates are to be inspected/assembled as follows.

- a) The ducts with a height less than 6mtr shall be trial assembled completely .However the duct above 6 mtr can be assembled except the roof and the roof wall shall be trial assembled and checked on the ground.

3.4 Economiser out let ducts shall be trial assembled .A portion of the roof which may be difficult to assemble . A portion of roof height above 6 mtr , which is difficult to assemble can be checked on layout/ ground with prior written approval from BHEL/QC.

3.5 All other ducts such as T Duct,Hopper ,Transition non-symmetrical on axis or having bent plate corner arrangement and Aerofoil/Ventury ducts (flow meter duct) shall be fully trial assembled.

3.6 The schematic diagrams of the ducts of different configuration are enclosed for reference in the annexure –A.

3.7 Wherever trial assembly is waived off the tolerance as indicated in Note 4.1.8 of the this SQP (latest)shall be followed.

3.8 Chimney shells shall be trial assembled with suitable identification

3.9 Safety and stability is to be fully considered for trial assembly position and supporting during trial assembly.

3.10 During trial assembly, all segments shall be assembled together using temporary bolts, tack welds or other suitable means and held in position. For large and very odd shaped ducts, multiple stages of trial assembly is permitted after obtaining approval from Engineering and Quality.

3.11 All critical dimensions shall be checked and recorded during trial assembly. The tolerances given in the drawing shall be followed.

3.12 Before dismantling the assembly, the match marks shall be clearly punched, stenciled and bordered with white paint as shown in figure 2.

3.13 The manufacture and checking of duct walls shall be done on floor reasonably leveled and free from significant undulations.

3.14 All sides of ducts (top, bottom,& vertical sides) individually shall be assembled on level surface.

3.15 All profiled items (walls,shapes,angles&vanes) are to be checked by temp plate/layout. Other walls shall be checked by direct measurement.

3.16 After stiffener / flange welding the maximum gap between the temp plate and the bent wall profile (at the mid region) shall be 2mm.

3.17 All the profiled items are to be stiffened with stiffeners for retaining the profile

during transportation. Where profiling is shown in drawing such walls shall be checked on lay out.

- 3.18 The bent portion /corner angles to be welded to such walls shall be checked with templates/layout for profile prior to fit up on walls.
- 3.19 The vendors would also be informed that should there be any deviations noted during the site assembly , the vendors will be responsible for rectifying the same at site.

4.0 INSPECTION AND TOLERANCES (DUCTS / HOPPERS / TRANSITIONS) – when trial assembled as per Clause 3.0

- Length / width / diameter : ± 2 mm / meter (limited to 5 mm) of nominal dimensions
- Diagonals : @ of 1.5 mm / meter (limited to 5 mm) of nominal value.
- Circularity(at duct ends): @ of 2mm / meter (limited to 10 mm) of nominal diameter.
- Square ness (duct end) : @ 2mm/Mtr (limited to 10 mm) of nominal dimension –Fig 3
- Length : Limited to ± 5 mm variation (length up to 5 meters) and ± 10 mm for length above 5 meters.
- Flatness of flange face : Within 2 mm.
- Twist (in sections) : @ of 3 mm / meter (limited to 10 mm)
- Arm length of elbows : Within 2 mm. Refer figure 3.
- Center offset (figure 2.) : @ of 3 mm / meter (limited to 10 mm) between duct. openings
- Waviness (Duct walls) : @ of 6 mm / meter (limited to 10 mm).
- Height (Hopper/Chimney): ± 5 mm
- Stiffener shift on walls : ± 10 mm
- Guide vane shift : ± 5 mm
- Elbow arm length : ± 2 mm / meter (limited to 3 mm) - Fig: 3 b
- Center offset in transition : 3 mm / meter height (limited to 10 mm max) - Fig :3c (on top, bottom openings)
- Flow meters profile : 2 mm gap (maximum) with a template.(Fig:1)

4.1 Flow meters tolerances:(Unless otherwise specified in drg.)

- 4.1.1 Profile : 2 mm gap (maximum) with a template.(Fig:1)
- 4.1.2 Throat distance : within ± 2 mm.
- 4.1.3 The position of metering holes w.r.t. leading edges shall be within ± 2 mm.
- 4.1.4 Out of straightness of aerofoil(across the flow direction) shall be within 1mm/metre limited to 3mm max on the curvature side (flow entry)
- 4.1.5 Metering tubes shall be assembled separately outside maintaining the distance of tapping points and matched with tapping points on aerofoils.
- 4.1.6 Assembled tubes shall be kerosene leak tested for leak tightness and fitted with profile.

4.1.7 FLANGES Inside dimensions (rectangular / square / circular flanges) – when trial assembled

<u>Nominal dimension</u>	<u>1000 & less</u>	<u>above 1000 upto 3000</u>	<u>above >3000</u>
<u>Permissible deviation in mm</u>	- 0.0 to +1.0	- 0.0 to +2.0	- 0.0 to +4.0
Diagonals variation	: @ of 1.5 mm / meter (limited to 5 mm)		
Circularity in circular flange	: @ 2mm / meter (limited to 10 mm) of the nominal dimension..		
Center line of bolt holes	: Shall be parallel within ± 2 mm. (in opposite faces)		
Pitch of holes	: Individual - within ± 1 mm.		
	Cumulative (rectangular flanges) - with in ± 2 mm.		
Holes size	: With in ± 1 mm. (Only drilling permitted)		

4.1.8 INSPECTION AND TOLERANCES (DUCTS / HOPPERS / TRANSITIONS) – Loose walls
Wherever trial assembly **is not required** as per clause 3.0

- Length / width : ± 2 mm / meter (limited to 3 mm) of nominal dimensions
- Diagonals : @ of 1.5 mm / meter (limited to 5 mm) of nominal value.
- Flatness of flange face : Within 2 mm.
- Waviness (Duct walls) : @ of 6 mm / meter (limited to 10 mm).
- Stiffener shift on walls : ± 5 mm
- Center offset in transition: 3 mm / meter height (limited to 10 mm max) - Fig :3c
(on top, bottom openings)
- Corner angle tolerance : $+/- 2$ mm from nominal value
- Flange face to face : $+ 0 / -2$ mm from nominal value.

4.1.9 FLANGES Inside dimensions (rectangular / square) – Loose walls

Wherever trial assembly **is not required** as per clause 3.0

<u>Nominal dimension</u>	<u>1000 & less</u>	<u>above 1000 upto 3000</u>	<u>above >3000</u>
Permissible deviation in mm	- 0.0 to +1.0	- 0.0 to +2.0	- 0.0 to +4.0
Diagonals variation	: @ of 1.5 mm / meter (limited to 4 mm)		
Pitch of holes	: Individual - within ± 1 mm. Cumulative - with in ± 2 mm.		
End holes	: To be slotted (2 x D)		
Holes size	: With in ± 1 mm. (Only drilling permitted)		

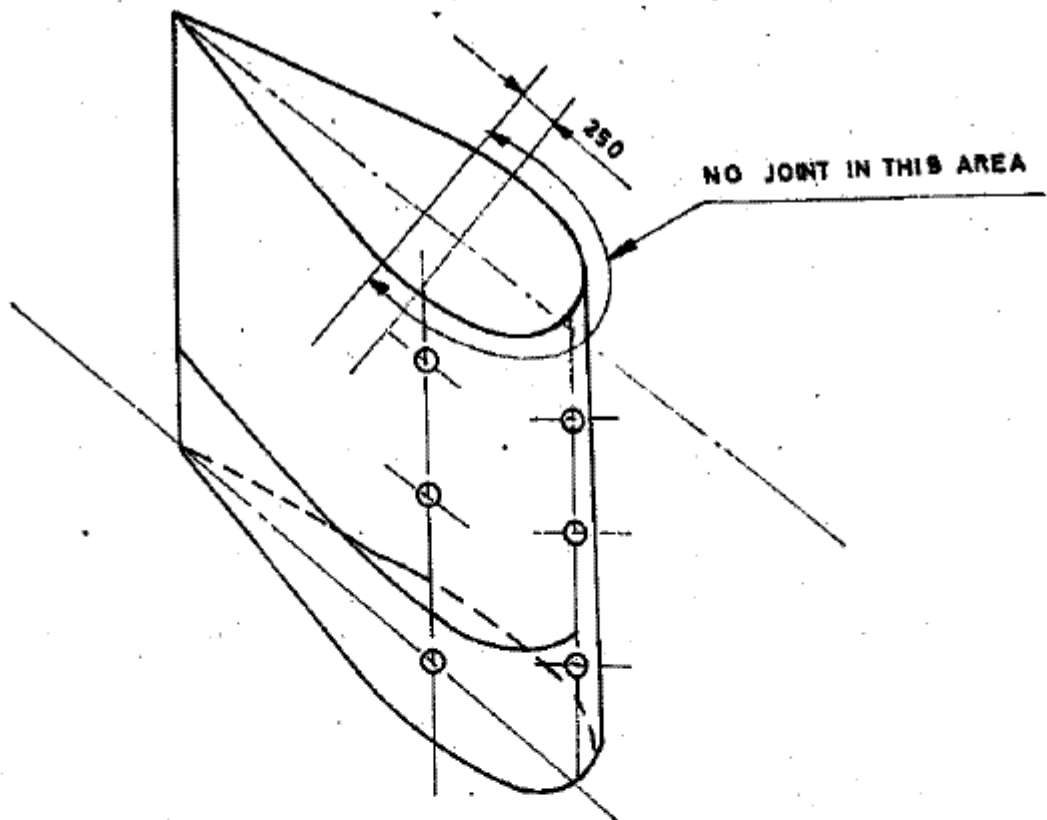
5.0 Guide lines for Pre qualification of WPS (Refer Clause 2.2). Refer to AWS D1.1 for further clarity.) as applicable for welds given in the drawing)

<u>WPS content</u>	<u>Requirements</u>
Electrode selection	E 60xx, or E 70xx for Plate T ≤ 20 mm E 70xx (with 10 deg C Pre heat for joints) for T > 20 mm
Weld groove/ fit up	As per Drawing
Weld width , depth	to be less than drawing weld face width, depth
Weld sizes (Groove , Fillet welds):	As per drawing but not less than the base metal thickness of thinner part T (T = thicker part if E 60xx is used)
Electrode dia (maximum) :	Dia 3.15mm (for Root pass), dia 4mm , (for balance passes)
Maximum current:	As per the recommendation of the electrode manufacturer
Maximum root pass thickness:	3 mm (for Horizontal welding), 4 mm (for Vertical welding and down hand welding)
Maximum filling pass thickness	4 mm .
Maximum fillet weld size when completed in single pass (for each welding position)	Within drawing weld size.

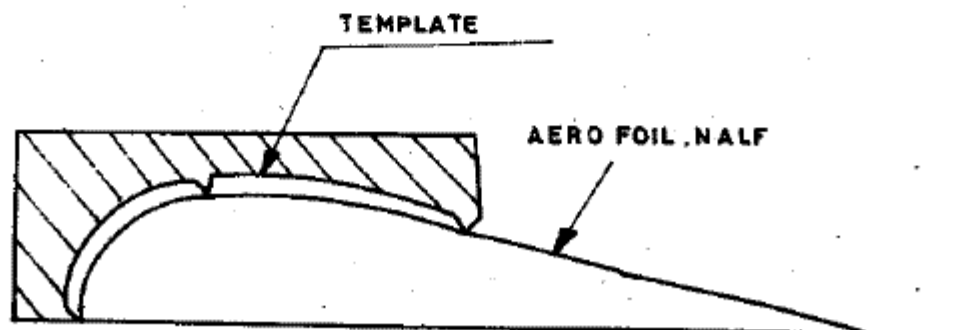
6.0 Surface preparation ,Painting and Identification

- 6.1.1 Temporary cleats, bridge-on pieces shall be removed carefully so as to avoid damage to parent material . Temporary tack welds shall be ground smooth. The completed assembly shall be thoroughly cleaned to remove spatter, slag, rust, oil or grease.

Fig. 1 : Splicing detail of Aerofoil and Profile Template

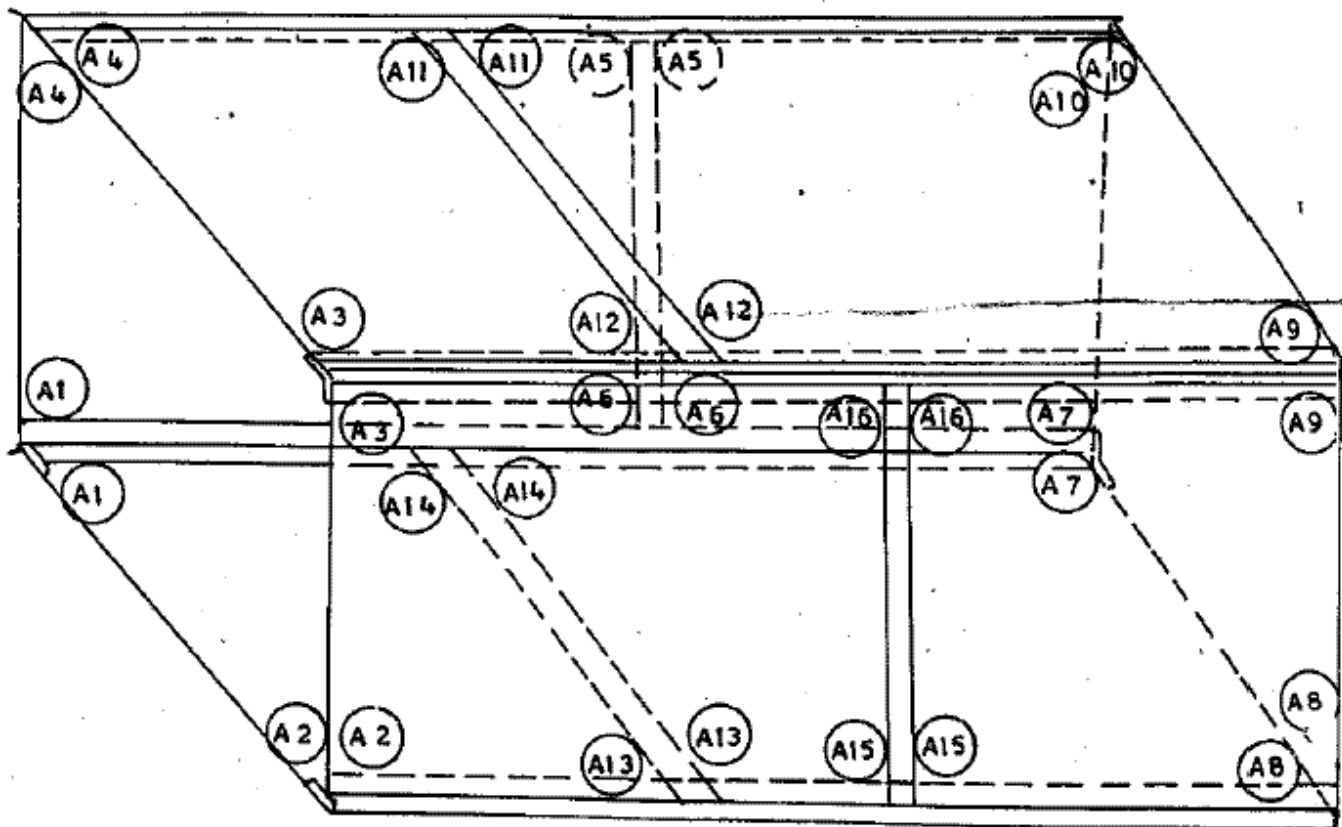


1. NO VERTICAL JOINT IS PERMITTED IN THE LEADING END MARK.
2. HORIZONTAL JOINT SHALL BE 250 MM AWAY FROM TAPPING POINTS.
3. FORMATION OF PLUS JOINTS SHALL BE AVOIDED



4. TEMPLATE SHALL BE MADE FROM 5MM. PLATE
5. VARIATION IN GAP BETWEEN TEMPLATE AND AERO FOIL SHALL BE LESS THAN ± 2.00 MM

Fig-2 : Match marking after trial assembly

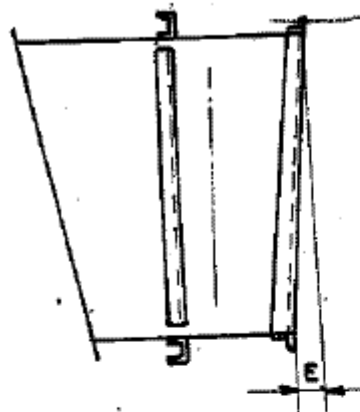


(X) FARSIDE

(X) NEAR SIDE

Fig. 3a, 3b and 3c : Tolerances

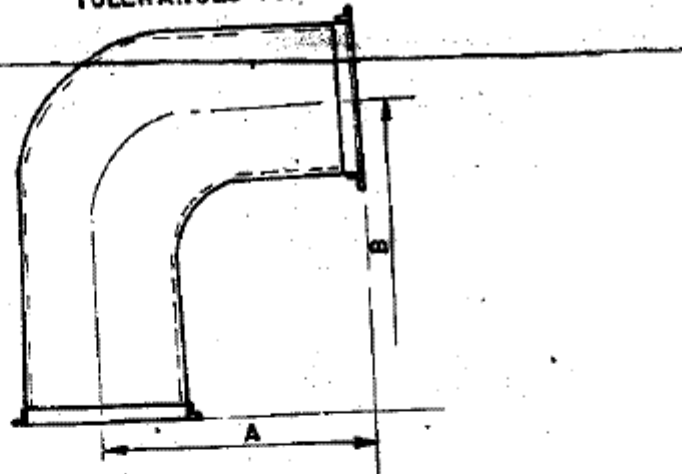
END OUT OF SQUARENESS



END OUT OF SQUARENESS
'E' SHALL NOT EXCEED 2MM
PER METRE OF DIAMETER OR
THE DEPTH OF THE SECTION

3a

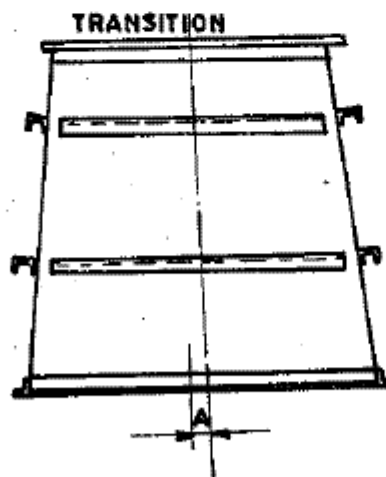
TOLERANCES FOR ELBOW



TOLERANCE ON A : $\pm 2 \text{ MM/M}$ NOT
EXCEEDING 3MM

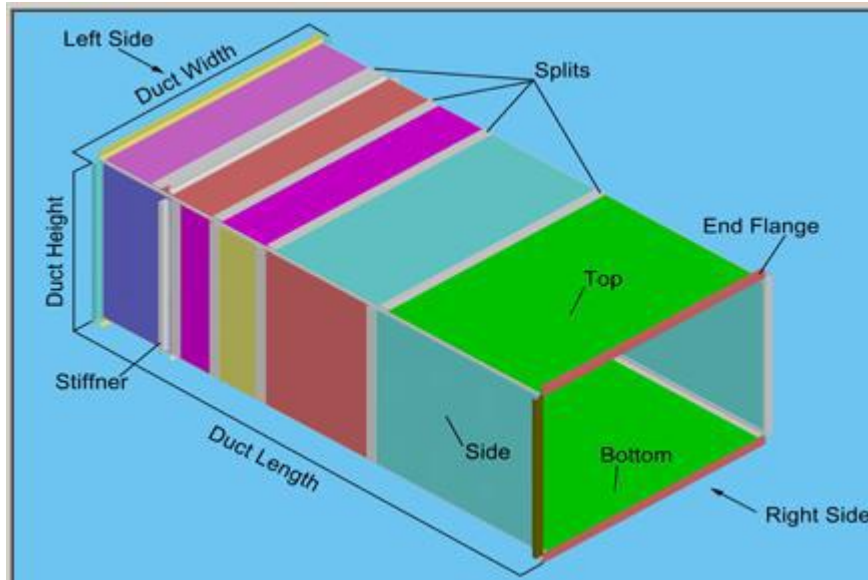
3b

TOLERANCE ON B : 2 MM/M NOT
EXCEEDING 5MM

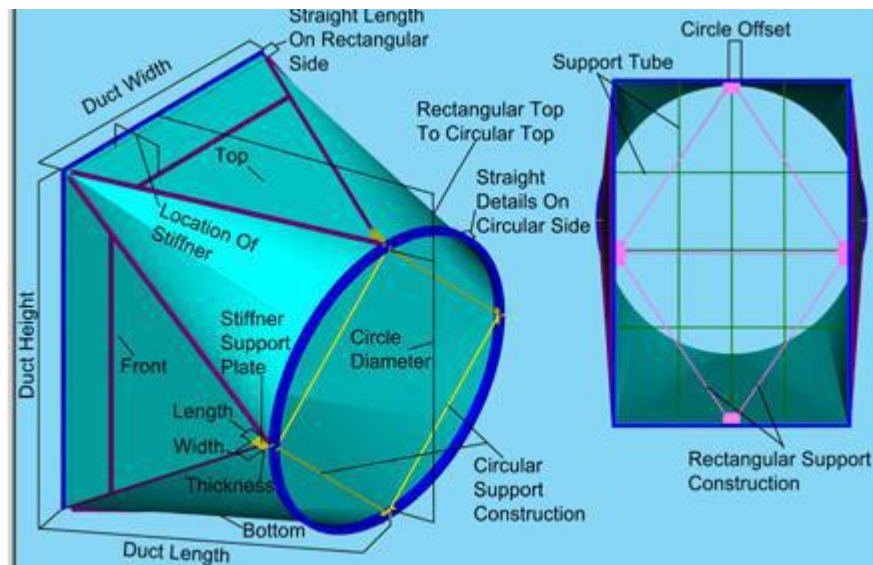


3c. AXES SHIFT 3MM M/OF NOMINAL HEIGHT
NOT EXCEEDING 5MM.

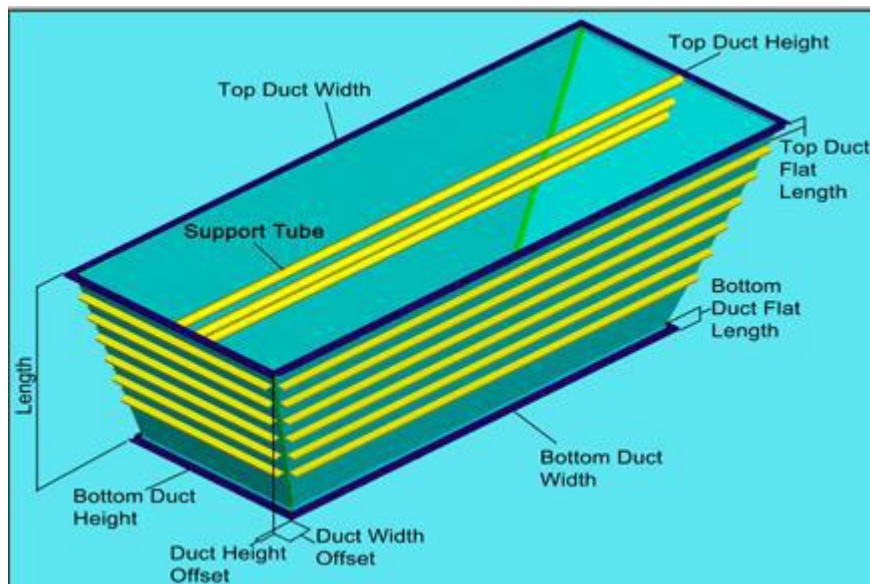
ANNEXURE-A



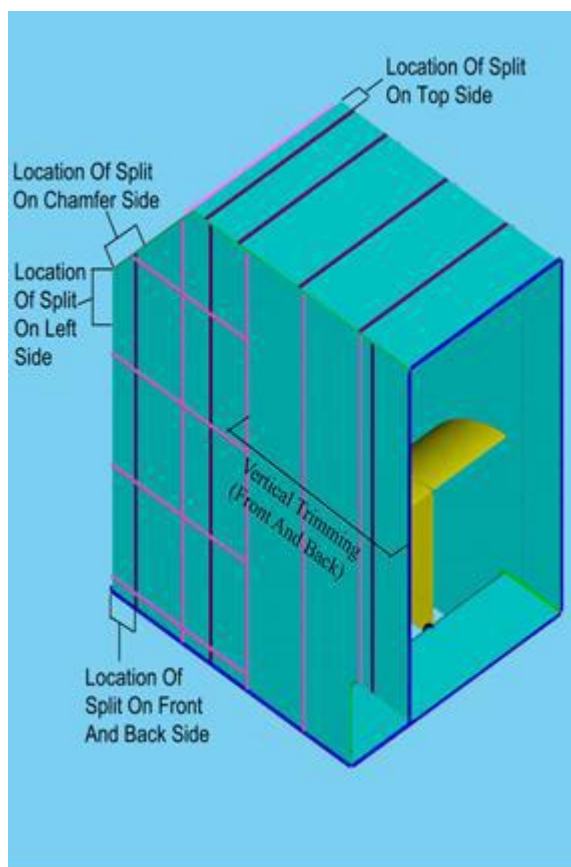
Straight Duct



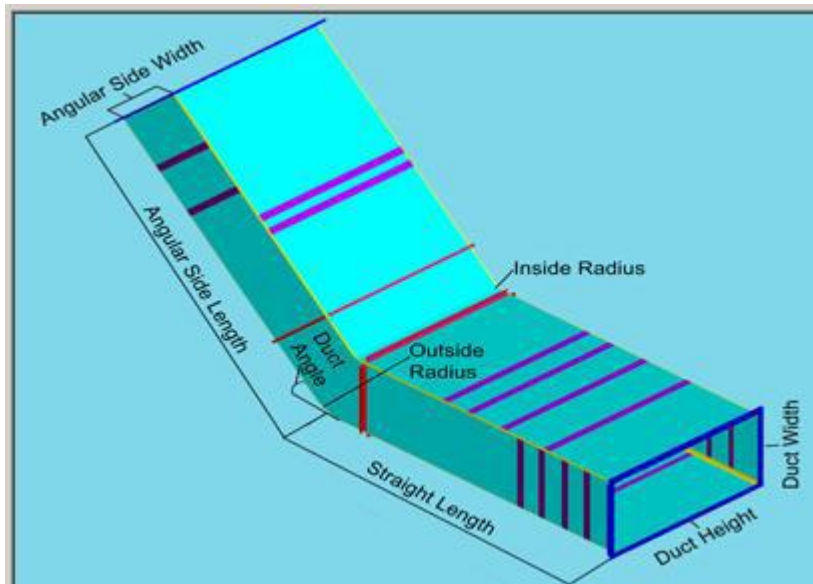
Transition from rectangular to Circular



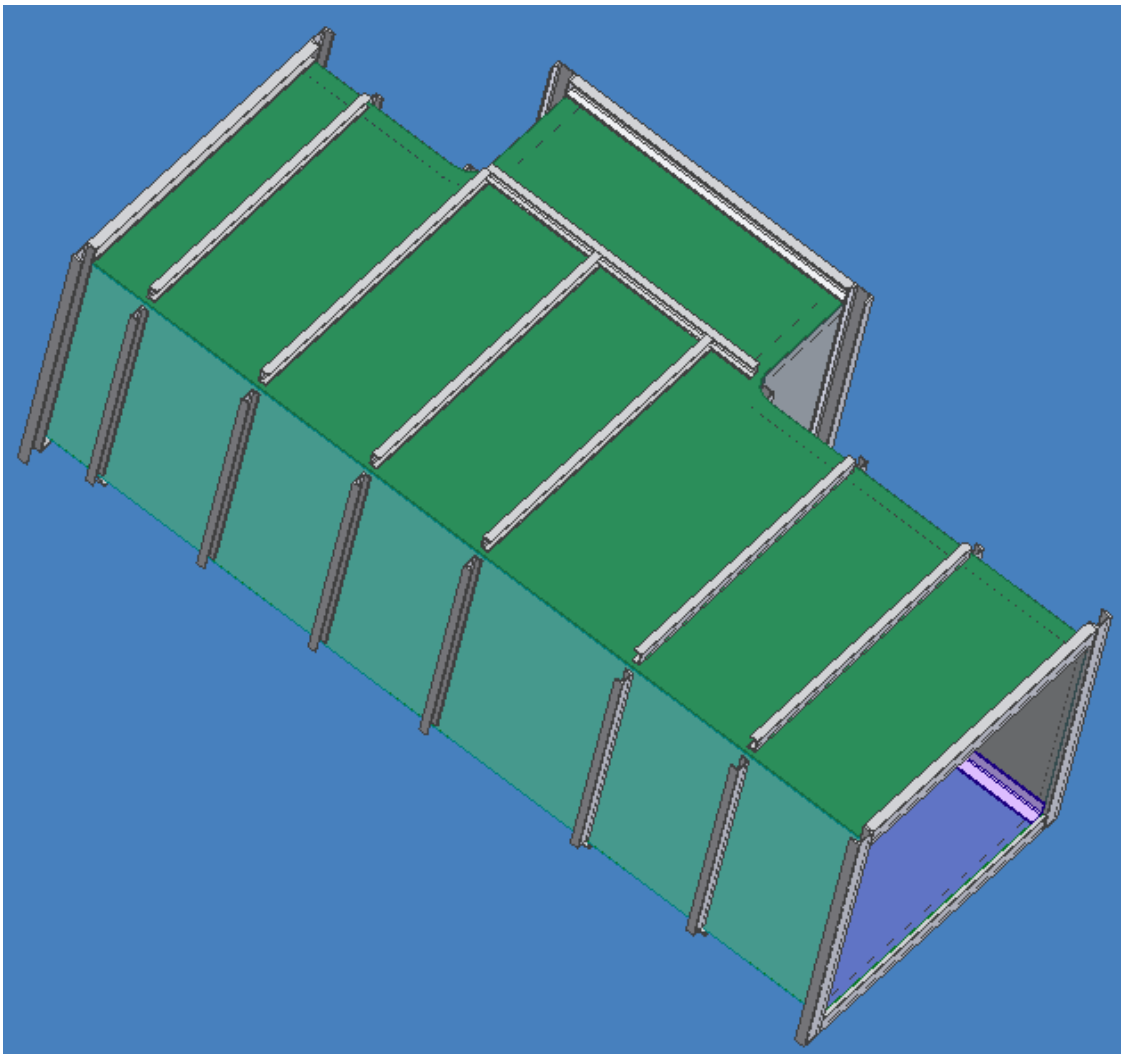
Transition in multiple planes



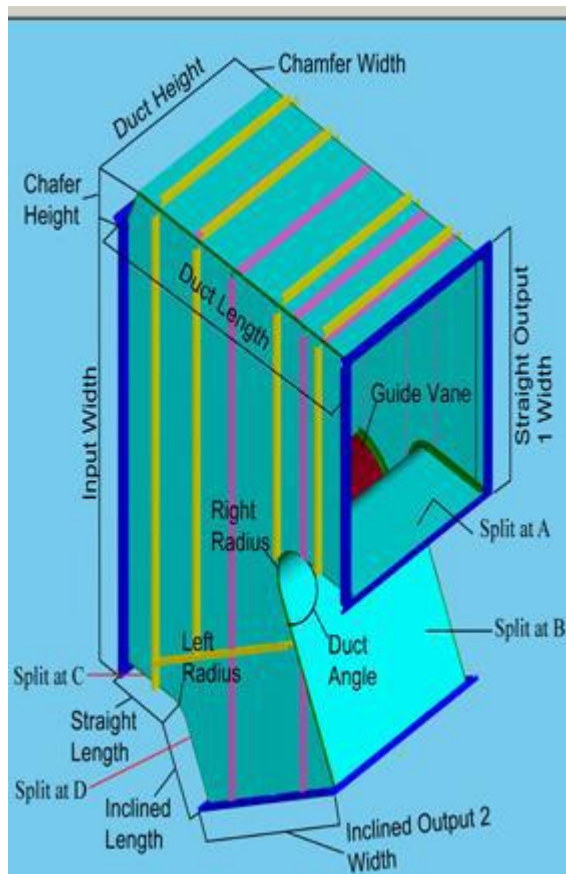
Elbow with guide vane



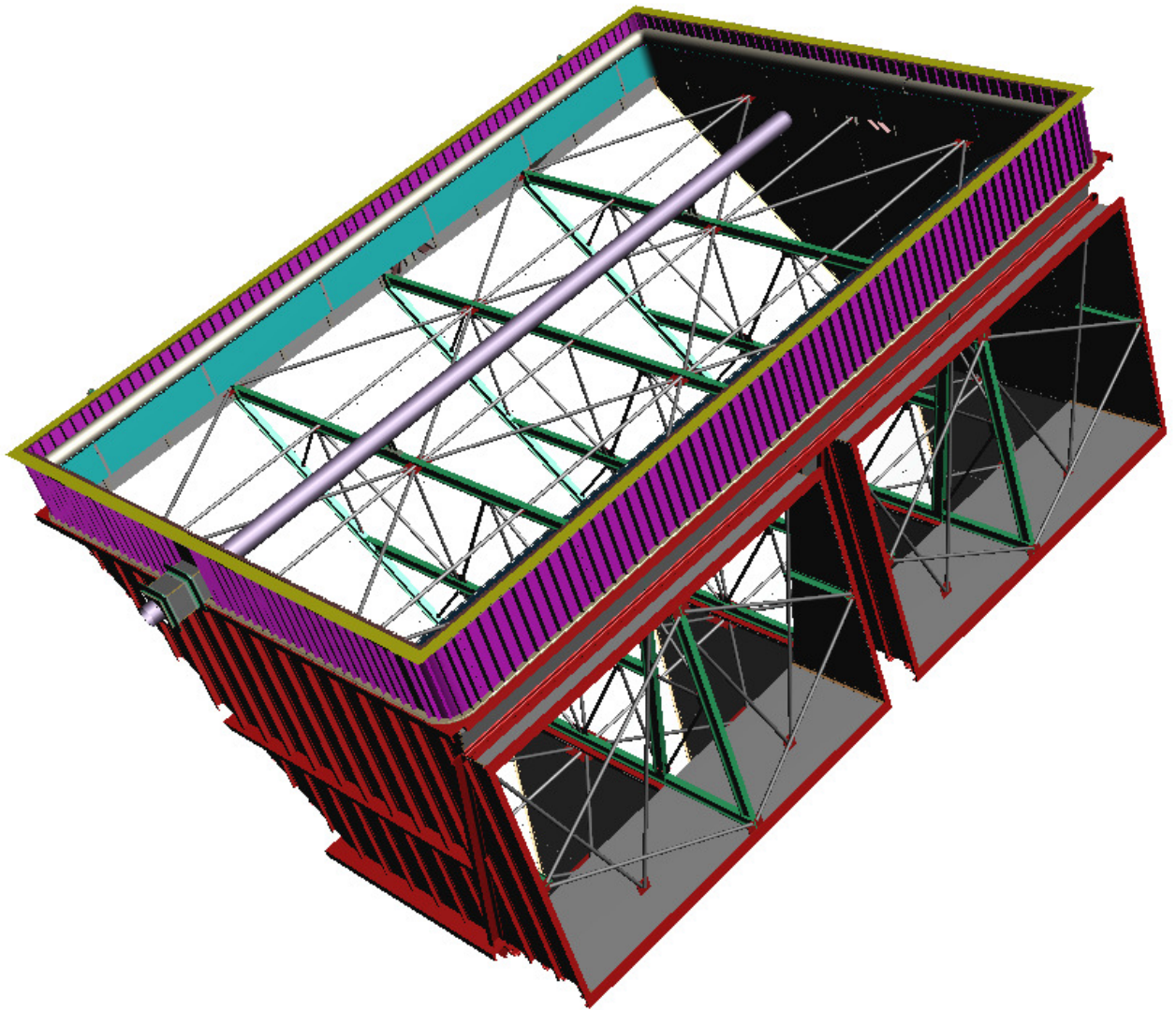
Bend Duct



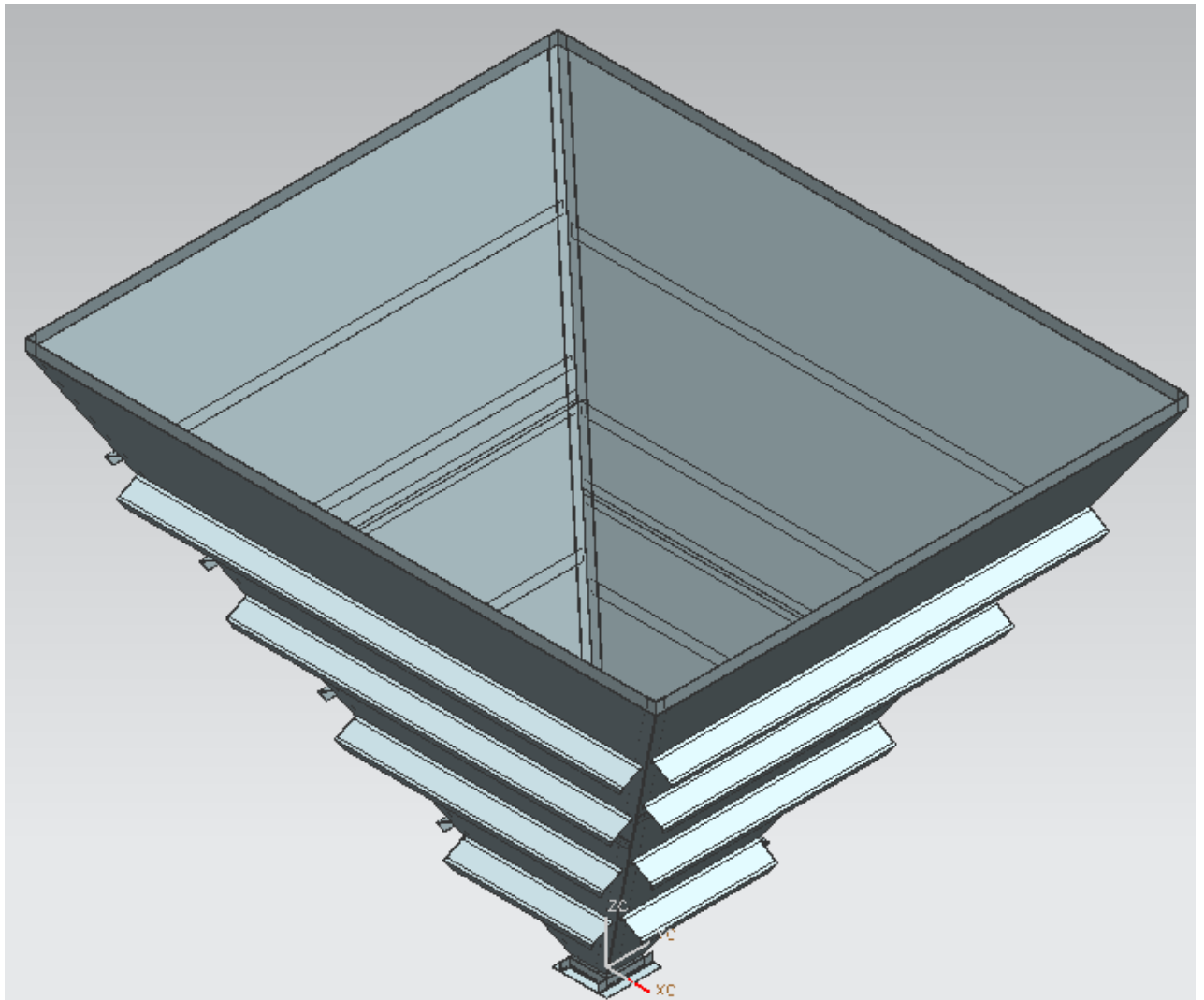
Tee Duct



Y duct



Eco Duct

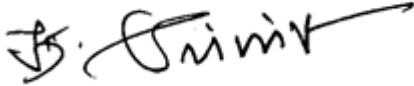


Hopper Duct

BHARAT HEAVY ELECTRICALS LIMITED
Tiruchirappalli - 620 014



BHUSAWAL THERMAL POWER PLANT, 1 X 660 MW
M/s. MAHAGENCO, JALGOAN DIST., MAHARASHTRA
CUSTOMER NO. U6/1727, UNIT-6
PAINTING SCHEDULE

Prepared by	K. Srinivasan Senior Engineer/ Plant Lab		Document No: PL: C3 - PS / 1727
Reviewed by	D. Vijayakumar SM /PE/FB		Revision No: 00 Dated: 11-06-2018
Approved by	A. Santha kumari AGM / Plant Lab		Sheet No. 01 of 11

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RECORD OF REVISIONS

Rev. No	Date	Details of revision	Remarks
00	11-06-2018	New	Prepared in line with MAHAGENCO Bid Specification. No. DG/BSL U-6/2011/ T-1 & clarifications to Bidding Documents.

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
1 PS1AC	Collector & Separator Vessels (Except Internals), Supports 04-147,321,547;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	1	--	--	Synthetic enamel paint (Long Oil Alkyd) to IS2932 (DFT = 20 μm /coat)	2	International orange Shade No: 592 of IS 5	70
2 PSSB	Collector & Separator Vessels Internals & foundation materials 04-347; Machined components and threaded surfaces (Dd items): 07-302,303,309,331,360,361,362,393;09-303,304; 12-306,314,317,324,327,328,344,348,354,393; 17-304,306,319;19-304,306,307;21-602,605; 24-352,803,818,823,827,842;28-700; 32-700; 35-010,190,700; 39-012,700; 41-710;42-700,710; 43-710;45-710;47-710;48-019;65-710;67-710;	SSPC-SP1/ or SSPC – SP3 Solvent / Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04 DFT=20 μm per coat	2	--	--	--	--	--	40
3 PS 1JT	<u>Buck stays</u> 08-001,003,006,007,111,501,503,901, 08-910;34-100,200,300; <u>Boiler supporting structures,</u> <u>Columns, Girders, Bracings</u> 35-211,212,213,214,221,222,231,232; 35-311,312,321,322,331,332,341,342,351; 35-352,361,362, 381,382; 35-383, 390,441,442; 35-443, 451,452,453; 35-511,512,513;35-521,522,523; 35-531,532,533,993,995;	Blast cleaning to SA2 ½ or SSPC-SP10 (Near white metal) with surface profile 35 μ	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 35 μm per coat	2	--	--	#Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 25 μm per coat # Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20 μm per coat	2* 1	Light Grey Shade No: 631 of IS5	140

Out of 3 coats of finish paint, *first coat of synthetic enamel finish paint to 25 microns shall be given at shop / subcontracting works. Second coat of synthetic enamel finish to 25 microns and third coat of synthetic enamel paint to 20 microns shall be applied at site.

S. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
3 PS 1JT (continuation)	36-110,150,311,312,313,314; 36-315,316,321,322,323,324,325, 36-326,331,613,993; <u>Galleries, Stair-ways & inter connecting Walkways</u> 36-332,333,334,335, 341,342; 36-343,344,345,351,352,353,354,355; 36-361,362,363; 36-391,392,393,394; 36-395,610,620,740; 38-210,299,310; 38-381,410,510,610,710,993; 39-101,102, 39-141,142,150, 300,301,304,305,306,993; 48-015,115,225,265,385,435,465,485,495; 48-665,911,912;	Blast cleaning to SA2 ½ or SSPC-SP10 (Near white metal) with surface profile 35 μ	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 35 μm per coat	2	--	--	#Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 25 μm per coat # Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20 μm per coat	2* 1	Light Grey Shade No: 631 of IS5	140
4 PS3	Components >95° C Insulated other than components in Sl.No.6 &8 Ring Headers, Down Comers, Hot air Headers outside the gas path etc. 05-155,227,231,251,327,330,350; 07-110,125,223,231,232; 10-174,178,191,274,278,283,284, 10-285,291;12-178,900; 15-136,178;15-236,278;17-504,807,900; 18-001,010;19-701,702,753,903;21-600; 24-800,805,806,807,808,809,811,815; 32-010,210,810; 33-970; 37-010; 42-020,030,128,150,158; <u>Hot Air:</u> 48-202, 207,208,212,214, 48-222,224,232,234,262,264,267,662,664,667. <u>Flue Gas:</u> 48-372,382,384,386,432,434 48-462,464,482, 484,492,494;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	2	--	--	No paint	No paint	Red oxide	60

Out of 3 coats of finish paint, *first coat of synthetic enamel finish paint to 25 microns shall be given at shop / subcontracting works. Second coat of synthetic enamel finish to 25 microns and third coat of synthetic enamel paint to 20 microns shall be applied at site.

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
5 PS9	Components >95° C and <400°C uninsulated other than components coming in gas path. 20-511; 24-820,824,835,860,865,867; 42-200,300,358;48-200,915;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. II DFT 20 μm per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. II DFT 20 μm per coat	1	Aluminum	40
6 PS10	<u>Components uninsulated other than components coming in gas path.</u> Temp: >400°C & <600°C 09-003,004,005,503; 28-220;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT 20 μm per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. I DFT 20 μm per coat	1	Aluminum	40
7 PS2	Loose tubes, SH, RH & Eco. coils, 11-074,078,374,378,406,416,467, 11-487,606,608,684,694,716,718, 11-767; 11-769,787,791,916,918,967,969,987,991; 12-184,187,368,405,514,515; 12-524,544,554,803,805;12-852,903,914,917; 12-924,927,928,944,948,954,968; 16-079,201,202,203,270,379; 19-402,802,814,824,884; 19-914,924,984;	SSPC – SP2 or SSPC – SP3 Hand tool / Power tool cleaning	Red Oxide Zinc Phosphate Dip coat primer to PR: CHEM: 09 – 03 DFT=35 μm per coat	1*	--	--	No paint	No paint	Red Oxide	35

*-In lieu of dip painting, 2 coats of brush painting of Red oxide Zinc Phosphate primer to a coating thickness of 60 μ is also permitted in line with Sr.No.9.

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate Coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
8 PS1A	Miscellaneous casing sheets, fuel piping, duct plates, expansion joints and coal handling items 07-409,431,460,461,462,502,503,531,560; 12-906,907;21-601,604,700; 24-350,700,804; 24-817,822,825,826,836,837,840; 24-841,855,950,955,960; 30-219,233,234,235; 36-611, 621; 38-611; 39-302; 41-350,390,500; 42-001,002,005,010,046,065,070; 42-120,152,154; 42-157;43-004,005,104,105,200;45-200,801; 45-802,804,805,858;47-261,263,858; <u>Cold Air</u> 48-012,014,018,112,114,141; <u>Tempering Air:</u> 48-142,144,145,204,205; 65-736;67-204,272,276,283,801,802,803; 95-088,089,091,485;96-186;97-585,591,592; Handling equipments: 99-099,100,300,400,600;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	1	--	--	Synthetic Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20 μm per coat	2	Smoke Grey Shade No: 692 of IS5	70

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
9 PS3	Components >95° C coming in the gas path, Headers, Commissioning Spares & erection Materials, Miscellaneous materials etc., 05-137,147;06-400,401, 434,437; 06-451,453,455,500,501,731,732; 06-734, 737,741,744, 747,751,752; 06-753,755;07-315,316,318,423,993; 10-182,183,184,185;11-408,491; 12-850,993; 17-506;19-763,783,793,850,851,852,853; 20-998;24-993; 30-215; 30-103,223,224; 31-010,104; 34-390,400,500; 35-111,112,121,122,130,140,150; 36-130,327;42-858; 48-993;65-200;67-200;97-282,590; 20-988;21-987,988;24-987,988; 24-989;41-988;42-988;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μm per coat	2	--	--	No paint	No paint	Red oxide	60
10 PS6	Hand rails and posts, ladders / rungs 34 - 820,850; 35 - 821,822, 823,851; 36 -820,851,852,853; 38 - 820,850;39 - 820,850; Floor Grills, Guard plates 34-810;35 -811;36-811,812,813,814; 38 -810;39 – 810;	Acid pickling to SSPC-SP8	Hot dip Galvanizing to a coating weight of 610 g/m ² (minimum) Refer Notes given below **							

Notes **: Guard plates, Hood Ladders, Stringer channels, angles and plates shall be painted as per painting scheme prescribed in Sl. No: 03

PAINTING SCHEME FOR VALVES

Sl. No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μ m (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
11	Cast carbon steel valves (Conventional) Cast alloy steel valves (Conventional) All API valves, QCNRV, SV & SRV Silencers, 24-885; 21-800,825; Safety valves & ERV 21-850; 24-880,881;	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr. I/DFT 20 μ m per coat	1	--	--	Heat Resistant Aluminium Paint to IS 13183 Gr. I/DFT 20 μ m per coat	1	Aluminium	40
-	Forged valves	Chemical cleaning	Phosphating to a coating weight of 1500 mg per sq.ft.	--	--	--	--	--	--	--
12	Soot Blower components (Outside surface – shell) 20-051,054,201,204,794,962;	SSPC-SP3/ Power Tool Cleaning	Red Oxide Zinc phosphate Primer (Alkyd Base) to IS 12744 DFT= 30 μ m per coat	2	--	--	Syn. Enamel paint (Long Oil Alkyd) to IS 2932 DFT= 20 μ m per coat	2	Verdigris Green Shade No. 280 of IS5	100
PS 1AS	HP / LP system	SSPC-SP3/ Power Tool Cleaning	Heat Resistant Aluminium Paint to IS 13183 Gr.I 20 μ m per coat	2	--	--	--	--	--	40

Sl.No.	PGMA / Description	Surface Preparation & Surface Profile	Primer coat		Intermediate coat		Finish coat			Total DFT μm (min)
			Paint	No. of coats	Paint	No. of coats	Paint	No. of coats	Shade	
13 PS15	For CLH & VLH* PGs 07,08,12,17,19,21,24,47,48 &80 07-402,403,405,505;12-506; 17-904,906,919; 19-506,507,904,905,906,907; 24-351,353,810; 48-206,395;	Abrasive blast cleaning to Sa2½ 35- 50 μm	Epoxy zinc rich Primer to IS 14589 Gr II % VS = 35(min)	1 DFT =40 μm Per coat	--	--	Aliphatic acrylic poly-urethane paint % VS = 35(min)	1 DFT= 30 μm Per coat	Phirozi blue Shade No. 176 of IS 5	70
14 PS8A	Components >95 C & < 150 C, un-insulated Fuel pipes 47-269;	SSPC-SP3/ Power Tool Cleaning	General purpose Aluminium paint to IS 2339 DFT= 20 μm per coat	1	--	--	General purpose Aluminium paint to IS 2339 DFT= 20 μm per coat	1	Aluminum	40
15 PS 5B	All Columns below '0' level (embedded in concrete) PGs 34, 35,36,38 39	SSPC-SPI/ or SSPC – SP3 Solvent / Power Tool Cleaning	Rust Preventive Fluid to PR: CHEM: 09 – 04 DFT=20 μm per coat	2	--	--	--	--	--	40

*- For components other than CLH & VLH, Painting scheme shall be as given in Sl. No. 8.

NOTES:

1. Rust Preventive Coating should be given on HSFG Bolt and nut threads.
2. All threaded and other surfaces of foundation bolts and its materials, insulation pins, Anchor channels, Sleeves, machined surfaces and retainers shall be coated with Temporary Rust Preventive Fluid and during execution of civil works; the dried film of coating shall be removed using organic solvents.
3. Ground shade/ colour of Finish paints & identification tag/Band for equipments, pipings pipe service, boiler supporting structures and other boiler components shall be followed.
4. Refer respective engineering document for all sub-vendor items not covered under this document.
5. No painting is required for Stainless Steel, non-ferrous & galvanized components. Abrasive blast cleaning to SSPC-SP6 (Sa2) shall be done to prepare the surfaces of hot worked pipes prior to application of primer.
6. Wherever inside surfaces of components under PGMA 48 – XXX & others, need protection till erection, two coats of Red-oxide zinc phosphate primer paint to IS12744 to a DFT of 60 microns followed by 1 coat of synthetic enamel paint to IS 2932 – shade smoke grey shall be applied, after blast cleaning. For items meant for spares and subcontracting where no further processing is involved, the painting scheme selected shall be the same as that of similar product configuration/ description.
07. The Temporary Rust Preventive coating that already been applied on any components, tubes, pipes etc., shall be visually inspected for good adherence. If the coating is intact, direct coating of alkyd based red oxide paints over the coating is permitted. In case the coating has peeled off over a large area, the coating is to be removed by suitable solvents / heating to 350 –400 °C for an hour before primer paint application –but, in this case, it should be ensured that the minimum surface cleanliness required for primer paint application shall be SSPC – SP2 (equivalent – Hand Tool cleaning).
08. In components, wherever plates / sheets of thickness less than or equal to 5 mm and rods of <25mm/tubes/drain pipes are used, power tool / hand tool cleaning to SSPC – SP3 shall be followed and the painting shall be done as described in Sl.No.8.
09. For all commissioning components-erection materials (xx-993) two coats of Redoxide Zinc Phosphate Primer shall be applied to meet the temporary protection till erection, after power tool cleaning. This painting Schedule is valid for only Customer No: U6/1727- 1X660 MW BOILER for MAHAGENCO BHUSAWAL TPP.
10. Touch-up painting of damaged areas shall be carried out as per clause no. 15.1 of Page. No. 80 of 555 of Section – 4, Volume – II, master specifications of bid specification no. DG/BSL U-6/2011/ T-1.
11. All components covered under different PGMA's are to be painted in case any component is left out, the same shall be deemed to be included under the relevant section based on paint logic approved.
12. For very small components like clamps etc. Sl.no.8 shall be followed with power tool cleaning.
13. Only weldable primer 2 coats to a DFT of 50 μ (2x25 μ) shall be applied on both external and internal surfaces within 50mm from the end of the component to be welded subsequently at site. At those locations no other paint shall be applied. All small components (less than 300x300 mm in dimension) shall be given only weldable primer.
14. DUs coming under Constant Load Hangers (CLH)/ Variable Load Hangers (VLH) shall be painted as per the system - PS 15 indicated in Sl. No. 13 of the table. However, for DUs other than CLH/VLH, the painting shall be as per Painting Scheme PS 1A indicated in Sl. No. 8 of the table.
15. For internal protection of Pipes, tubes, headers and other pressure parts, Volatile Corrosion Inhibitor (VCI) pellets shall be put (after sponge testing/ draining/ or drying) and subsequently end capped. The dosage of VCI pellets shall be approximately 100 g/ Cu.m. For tubes typically 4 – 5 tablets per end are to be put. For C & I items the dosage of self-indicating Silica Gel (colourless) shall be 250 g/ cu.m. (About 2 to 3 bags weighing approximately 100 grams each). VCI pellets shall not be used for stainless steel components and its composite associates.
16. All threaded components of spring assemblies and turnbuckles shall be galvanized and achromatized to 15 microns minimum thickness.
17. Soot blower components i.e Valve head assembly having high surface temperature (> 200 and <600 deg. C) shall be applied with HR aluminium IS13183 Gr.II paint (up to 400 deg.C) and Gr.I paint (up to 600 deg.C)
18. Handrails of PGMA under Sl. No. 3 need to be galvanized in line with scheme for handrails (i.e. Sl .No. 10). For chequered plates having thickness <=5mm, surface preparation can be power tool cleaning to St3 and painting shall be in line with Sl. No. 8.
19. It is mandatory that for finish coat each layer shall have a permanent DFT and free from any paint defects like sags, wrinkles etc. Total DFT of a component correspond to respective painting scheme has to be ensured.
20. Inside surfaces of fabricated structure (e.g. Box type column) shall be painted with two coats of red oxide primer paint during fit up stage.
21. Painting of bunker structures to be in line with painting scheme of supporting structures (Sl. No. 3).

Details for paint procurement & application purposes

Sl.No.	Generic nature of paint	Theoretical Covering Capacity Sq.m per Litre.	No. of pack	Volume solids, % (min)**	DFT in microns per coat (approx.)	Shade	Shade No. to IS5	Mode of appln.	Over coating interval, Hrs.
1	Epoxy Zinc rich primer to IS14589 Gr.II	8	2	35	40	Grey	--	Spray	24
2	Aliphatic acrylic polyurethane paint to IS 13213	12	2	40	30	Phirozi – Blue.	176	Spray	24
3	Heat resistant Aluminium paint to IS 13183 Grade I/II	10	1	-	20	--	--	Brush / Spray	24
4	Red oxide zinc phosphate primer paint to IS 12744	10	1	--	30	-	--	Brush / Spray	12
5	Red oxide Zinc Phosphate Dip coat primer paint to PR: CHEM: 09-03	10	1	--	35	--	---	Dip	12
6	Long oil alkyd synthetic enamel finish paint to IS2932	10	1	--	20	Reqd. shade	Corrpdg. Shade no.	Brush / Spray	12
7	Temporary Rust preventive fluid to PR: CHE: 09 – 04	10	1	--	20	--	--	--	12
8	General purpose Aluminium paint to IS 2339	10	2	--	20	Aluminum	--	Brush	12

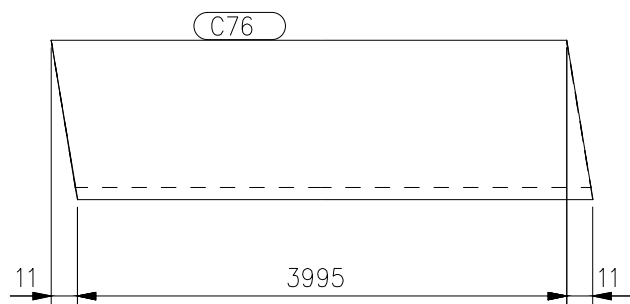
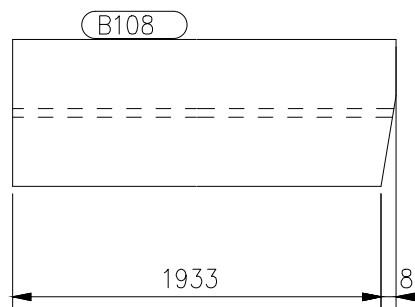
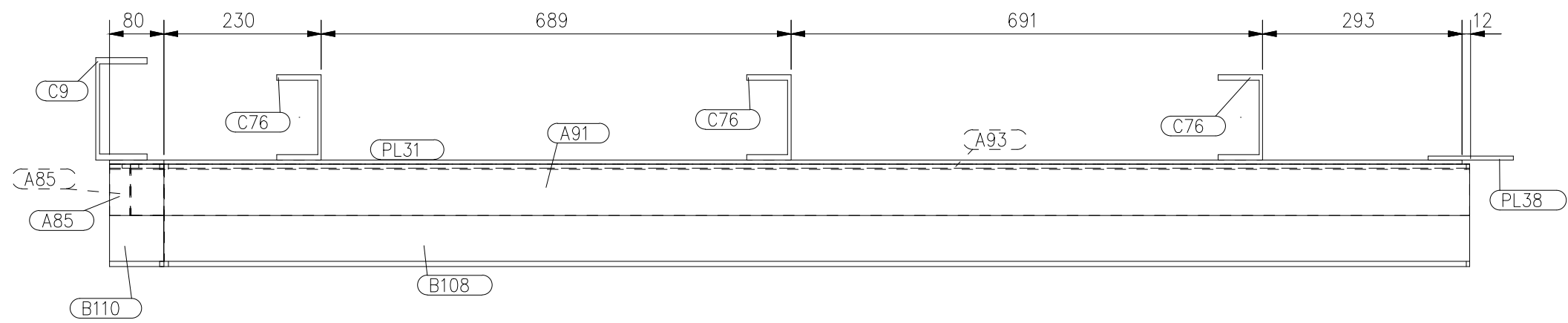
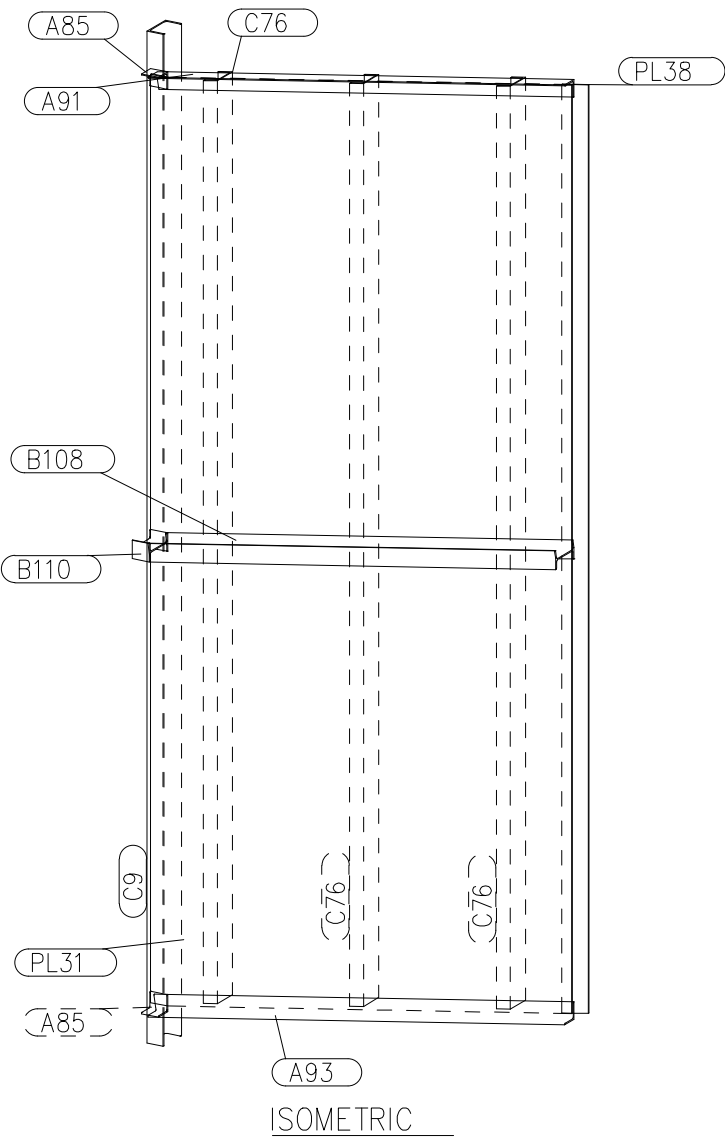
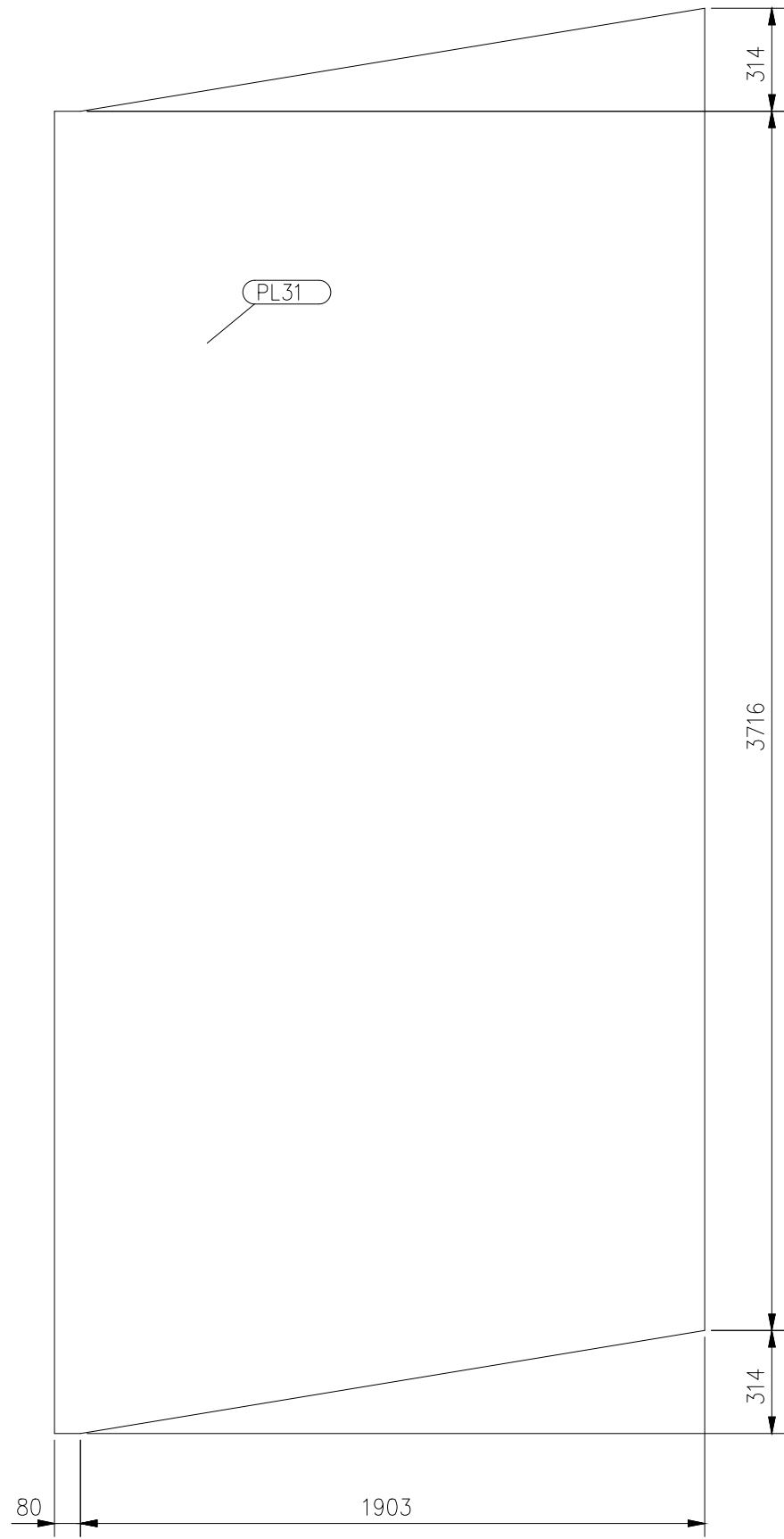
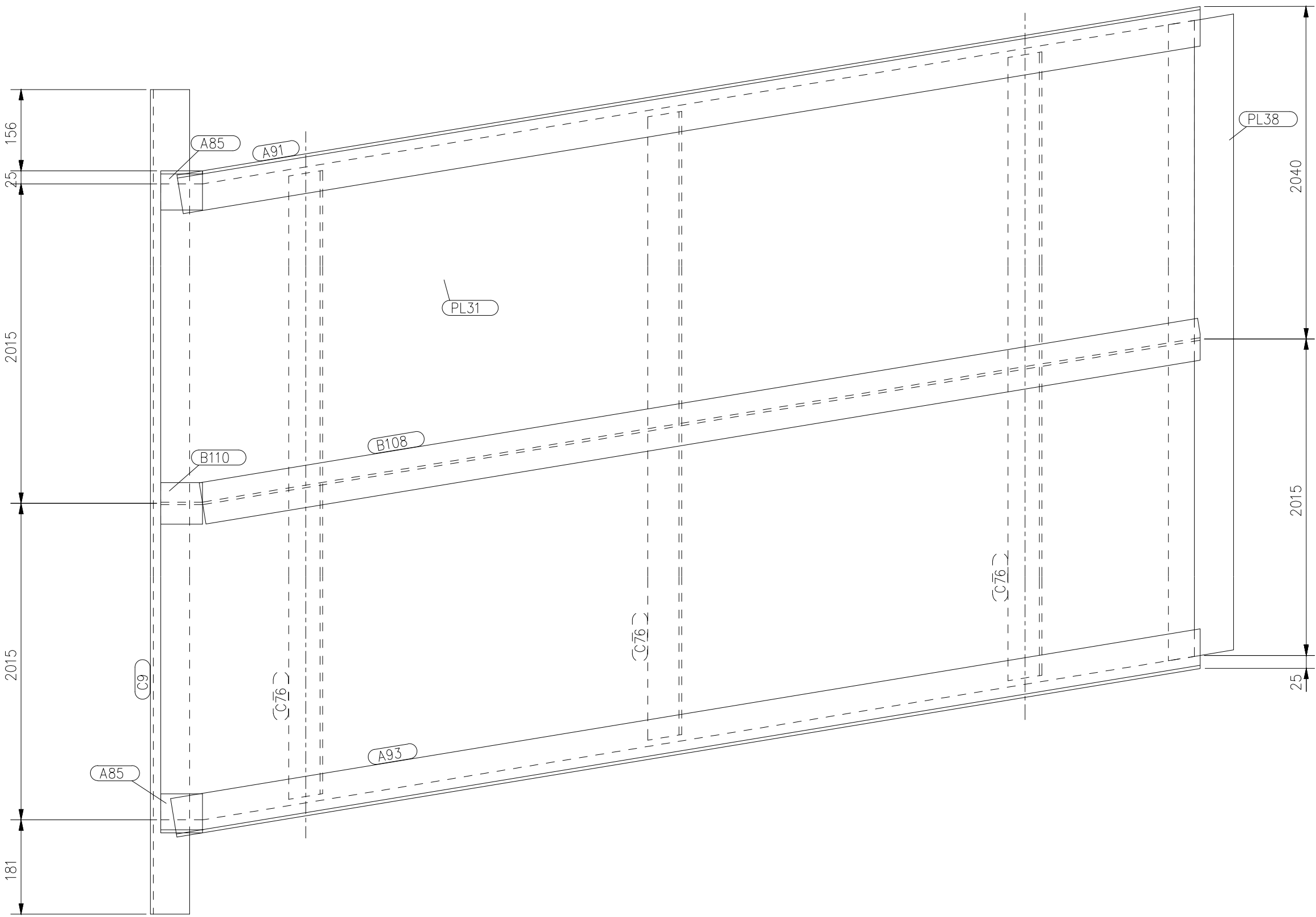
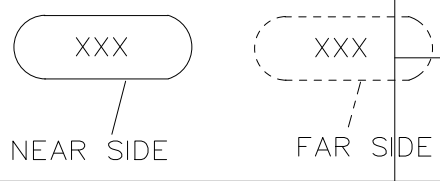
Brush painting is accepted, if recommended by the Paint suppliers. The covering capacity of paints specified is only approximate. The paints and Rust Preventive fluid shall be procured from BHEL's approved suppliers. ** Values are indicative.

1-48-012-44764
DRAWING NO.

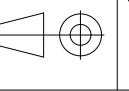
FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD. NO TP 023 0299

- NOTES:
01. FOR GENERAL NOTES REFER PAGE NO.41 (REF.41) OF DUCT CONSTRUCTION MANUAL
REF. 121 FOR CONSTRUCTION DETAIL
02. THIS DRAWING TO BE READ ALONG WITH ASSEMBLY DRAWING 1-48-012-44767

PART MARK LEGEND



1	A85	ISA75X75X6 80				150130050000		0.544			
						IS2062E250A		2			
2	A91	ISA75X75X6 1989				150130050000		13.524			
						IS2062E250A		1			
3	A93	ISA75X75X6 2002				150130050000		13.608			
						IS2062E250A		1			
4	B108	ISMB150 1941				150090220000		29.113			
						IS2062E250A		1			
5	B110	ISMB150 80				150090220000		1.200			
						IS2062E250A		1			
6	C9	ISMC150 4392				150100350000		73.786			
						IS2062E250A		1			
7	C76	ISMC125 4016				150100020000		52.615			
						IS2062E250A		3			
8	PL31	PLATE 6 4344.0x1983.0				152110920000		376.304			
						IS2062E250A		1			
9	PL38	PLATE 6 4051.0x125.0				152110920000		23.727			
						IS2062E250A		1			
VARIANT NUMBER	SNO	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO VAR NO	MATERIAL CODE MATERIAL SPECN	UNIT DI	UNIT WEIGHT QUANTITY	GS	ZONE

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	 Bharat Heavy Electricals Ltd. UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014									
	DEPT DUCT CODE 124	355-053	ALL DIMENSIONS ARE IN MM	PROJECTION 	SCALE NTS	WEIGHT (Kg) 690.193	REF TO ASSY / OLD DWG	DRN SS MANI	SIGNATURE RAJ	DATE 29.09.2018
	TITLE TRANSITION DUCT WALL							DRAWING NO : 1-48-012-44764		
								REV		

DU NO: 12 DU QTY: 2

1-48-202-42835

ON DIMENSIONS

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD. NO TP 023 0299

NOTE:

01. FOR GENERAL NOTES REFER PAGE NO. 41 (REF:41) OF DUCT CONSTRUCTION MANUAL.
REF121 FOR CONSTRUCTION DETAIL.

DESPATCH TABLE

SL. NO.	DESCRIPTION	DU NO.	NO. OFF	ITEM NO. NO.OFF									
				01	19	40	48						
1	T DUCT WALL	207	1	1	2	1	1						
2	T DUCT WALL	208	1	02	20	40	48						
				1	2	2	1						
3	T DUCT WALL	209	1	03	21	40	48						
				1	2	2	1						
4	T DUCT WALL	210	1	04	22	23	25	26	38	40			
				1	1	1	1	1	1	2			
5	T DUCT WALL	211	1	05	31	40	48						
				1	2	1	1						
6	T DUCT WALL	212	1	06	30	40	48						
				1	2	2	1						
7	T DUCT WALL	213	1	07	29	40	48						
				1	2	2	1						
8	T DUCT WALL	214	1	08	28	32	40						
				1	2	1	2						
9	T DUCT WALL	215	1	09	25	39	41	42					
				1	1	1	1	1					
10	T DUCT WALL	216	1	10	25	27	37						
				1	2	2	1						
11	T DUCT WALL	217	1	11	43	49							
				1	1	1							
12	T DUCT WALL	218	1	12	43	49							
				1	1	1							
13	T DUCT WALL	219	1	13	36	44							
				1	1	1							
14	T DUCT WALL	220	1	14	36	44							
				1	1	1							
15	T DUCT WALL	221	1	15	35	45							
				1	1	5							
16	T DUCT WALL	222	1	16	24	35	45						
				1	1	1	5						
17	T DUCT WALL	223	1	17	35	46	47						
				1	1	1	1						
18	T DUCT WALL	224	1	18	35	46	47						
				1	1	1	1						
19	COLLECTOR FLANGE	225	1	33									
				1									
20	COLLECTOR FLANGE	226	1	34									
				1									

49	PLATE 5 C.T.S. 125x5750			150110290000		28.210	
				IS2062 E250A		2	
48	PLATE 5 125x4700			150110290000		23.050	
				IS2062 E250A		6	
47	ISMC 100 1841			150100030000		17.600	
				IS2062 E250A		2	
46	ISMC 75 C.T.S 4700			150100360000		33.550	
				IS2062 E250A		2	
45	ISMC 75 852			150100360000		6.080	
				IS2062 E250A		10	
44	ISMC 250 5415			150100340000		185.190	
				IS2062 E250A		2	
43	ISMC 300 5828			150100060000		211.550	
				IS2062 E250A		2	
42	ISMC 100 2410			150100030000		23.040	
				IS2062 E250A		1	
41	ISMC 150 C.T.S. 2410			150100350000		40.480	
				IS2062 E250A		1	
40	ISMC 250 4676			150100340000		159.910	
				IS2062 E250A		14	
39	ISMC 150 2350			150100350000		39.480	
				IS2062 E250A		1	
38	ISMC 150 2505			150100350000		42.080	
				IS2062 E250A		1	
37	ISMC 250 4760			150100340000		162.790	
				IS2062 E250A		1	
36	ISMC 250 5264			150100340000		180.020	
				IS2062 E250A		2	

35	ISMC 150 6210			150100350000		104.320	
				IS2062 E250A		4	
34	ISMC 250 2460			150100340000		84.130	
				IS2062 E250A		1	
33	ISMC 250 3360			150100340000		114.910	
				IS2062 E250A		1	
32	PLATE 5 150x4600			150110290000		27.080	
				IS2062 E250A		1	
31	ISA 75X75X6 2484.5			150130050000		16.890	
				IS2062 E250A		2	
30	ISA 75X75X6 2497			150130050000		16.980	
				IS2062 E250A		2	
29	ISA 75X75X6 2497			150130050000		16.980	
				IS2062 E250A		2	
28	ISA 75X75X6 2342.5			150130050000		15.920	
				IS2062 E250A		2	
27	ISA 75X75X6 615			150130050000		4.180	
				IS2062 E250A		2	
26	ISA 75X75X6 2330			150130050000		15.840	
				IS2062 E250A		1	
25	ISA 75X75X6 105			150130050000		0.710	
				IS2062 E250A		4	
24	ISA 75X75X6 895			150130050000		6.080	
				IS2062 E250A		1	
23	ISA 75X75X6 2448.5			150130050000		16.650	
				IS2062 E250A		1	
22	ISA 75X75X6 2478.5			150130050000		16.850	
				IS2062 E250A		1	
21	ISA 75X75X6 2447			150130050000		16.640	
				IS2062 E250A		2	
20	ISA 75X75X6 2397			150130050000		16.300	
				IS2062 E250A		2	
19	ISA 75X75X6 2243.5			150130050000		15.250	
				IS2062 E250A		2	
18	PLATE 5 2068x6205			150110290000		318.980	
				IS2062 E250A		1	
17	PLATE 5 2068x6205			150110290000		318.980	
				IS2062 E250A		1	
16	PLATE 5 845x6205			150110290000		205.790	
				IS2062 E250A		1	
15	PLATE 5 845x6260			150110290000		207.620	
				IS2062 E250A		1	
14	PLATE 5 1632.5x5678			150110290000		351.050	
				IS2062 E250A		1	
13	PLATE 5 1632.5x5678			150110290000		351.050	
				IS2062 E250A		1	
12	PLATE 5 1632.5x5950			150110290000		375.580	
				IS2062 E250A		1	
11	PLATE 5 1632.5x5950			150110290000		375.580	
				IS2062 E250A		1	
10	PLATE 5 1380x4810			150110290000		257.960	
				IS2062 E250A		1	
09	PLATE 5 2345x2410			150110290000		221.810	
				IS2062 E250A		1	
08	PLATE 5 4700x2286.5			150110290000		421.800	
				IS2062 E250A		1	
07	PLATE 5 4700x2475			150110290000		456.570	
				IS2062 E250A		1	
06	PLATE 5 4700x2475			150110290000		456.570	
				IS2062 E250A		1	
05	PLATE 5 4700x2473.5			150110290000		456.290	
				IS2062 E250A		1	
04	PLATE 5 4700x2467.5			150110290000		449.680	
				IS2062 E250A		1	
03	PLATE 5 4700x2425			150110290000		447.350	
				IS2062 E250A		1	
02	PLATE 5 4700x2375			150110290000		438.120	
				IS2062 E250A		1	
01	PLATE 5 4700x2232.5			150110290000		411.840	
				IS2062 E250A		1	

CAUTION: The information in this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any form without the prior written consent of the company.	TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		NAME EOL/KUMAR/KP		SIGNATURE	DATE 04-11-14
	Bharat Heavy Electricals Ltd		EOL/KUMAR/KP			
	UNIT: HIGH PRESSURE BOILER PLANT		RAMANA			04-11-14
	TIRUCHIRAPALLI - 620014		SHANMUGAM			04-11-14
	355-053					
DEPT DU	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE N.T.S	WEIGHT (Kg) 11520.510	REF TO ASSY / OLD DWG	
CODE 124						
TITLE T DUCT				DRAWING NO : 1-48-202-42835		
				REV		

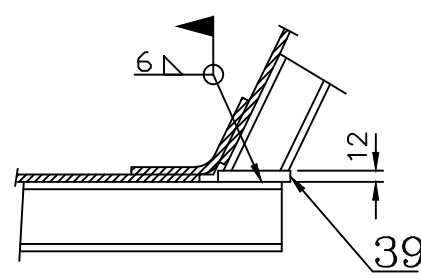
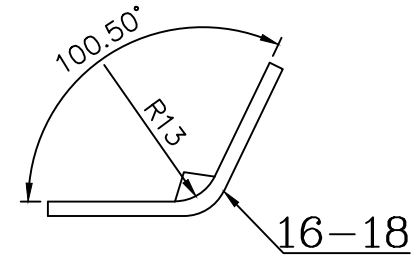
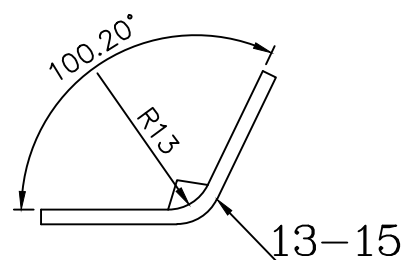
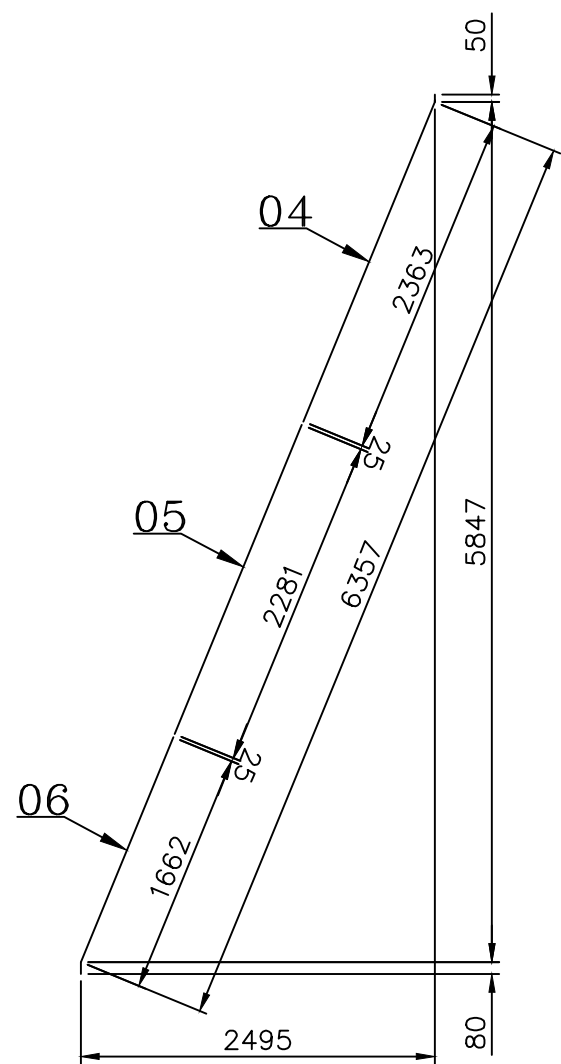
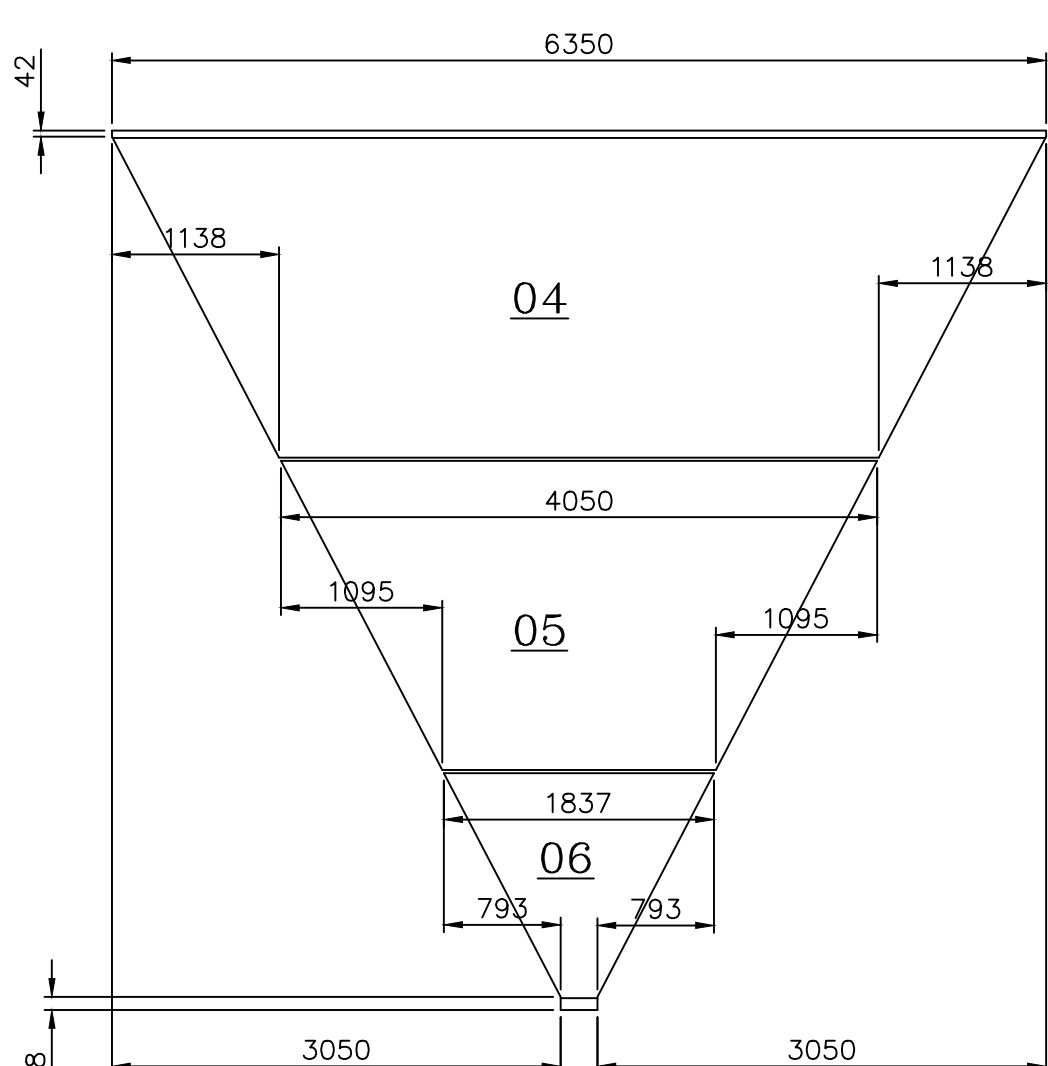
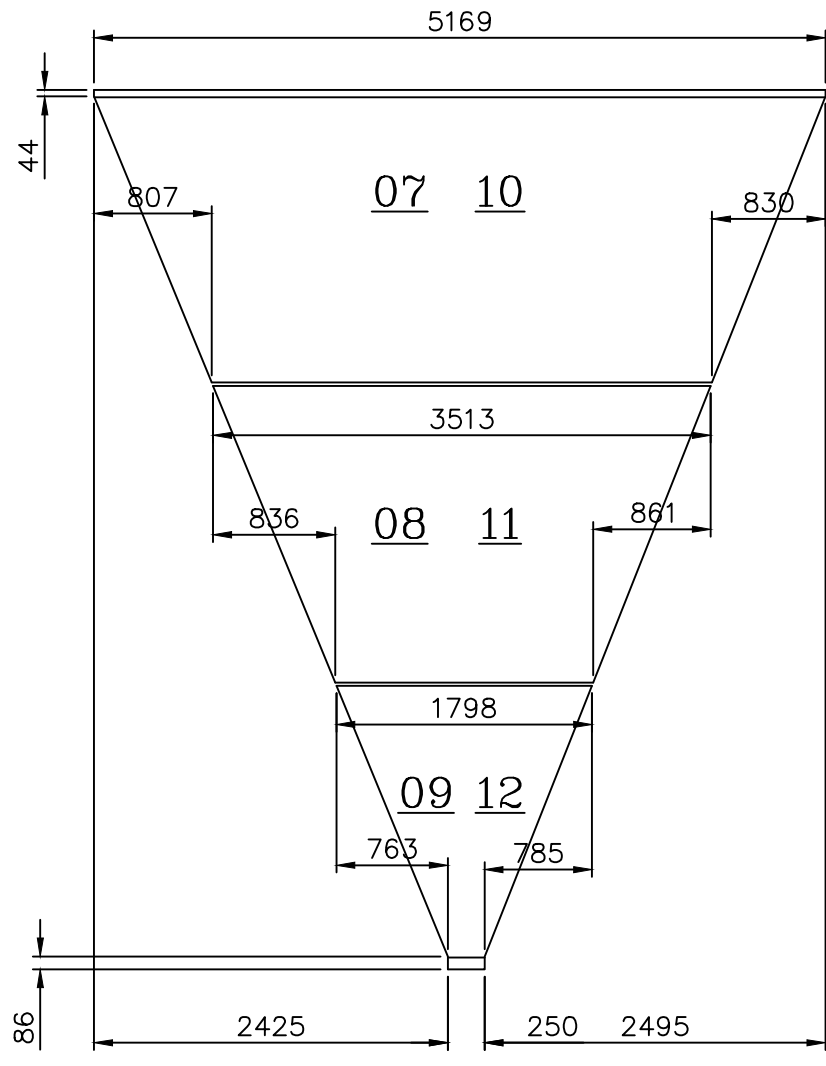
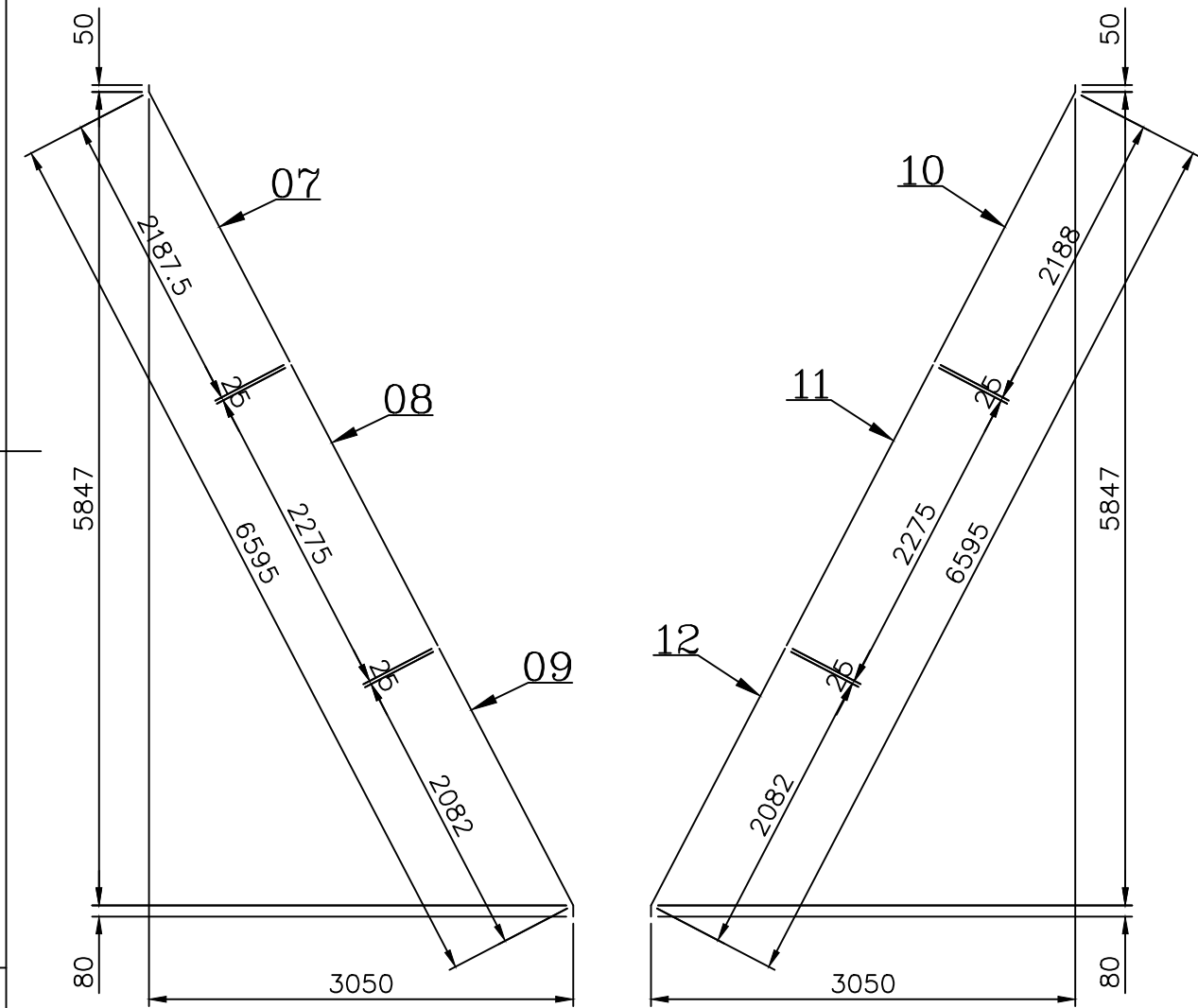
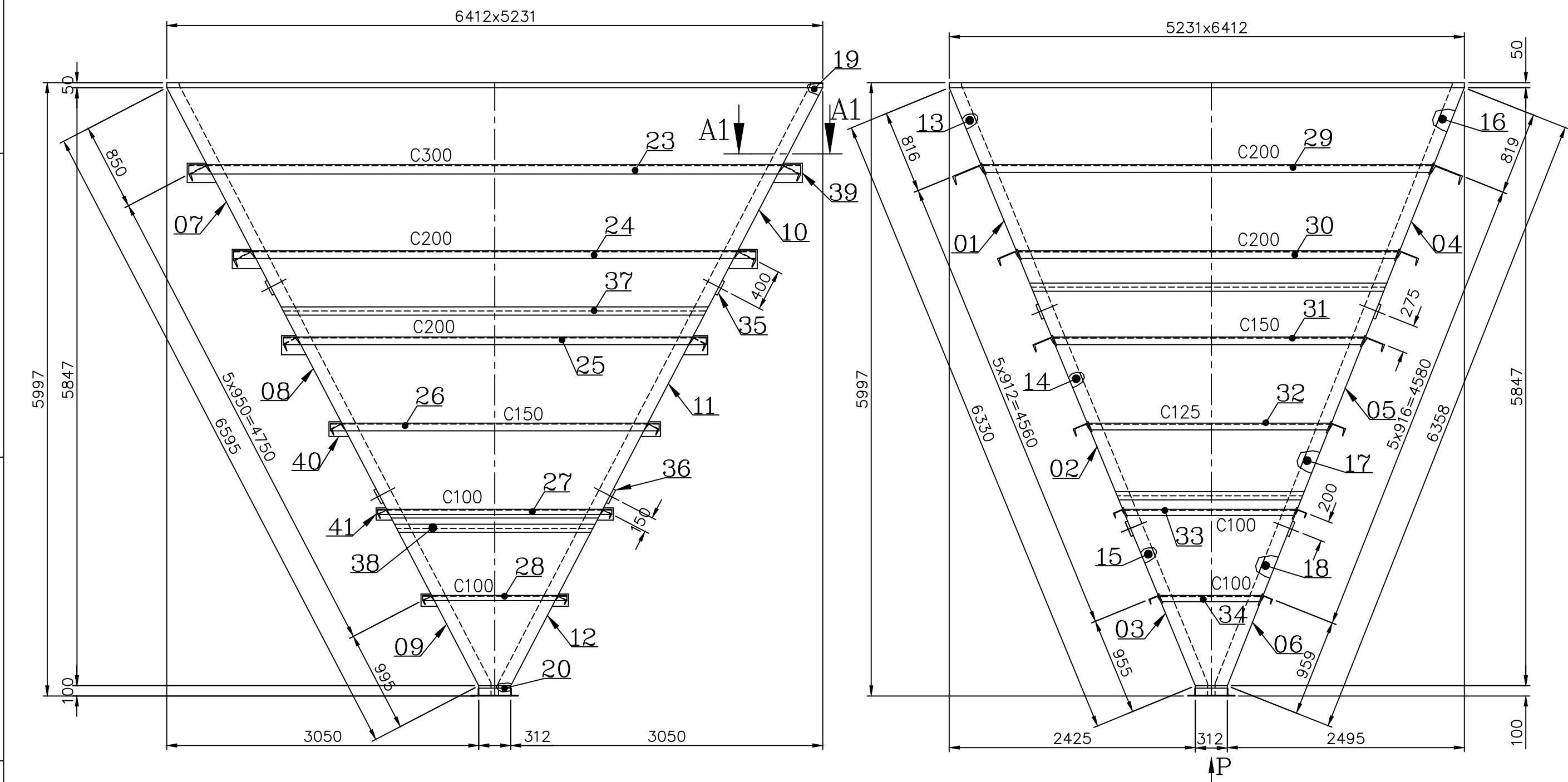
REV 01	DATE	ALTERED :
ZONE		CHD & APPD :

DESPATCH TABLE											
SL. NO.	DESCRIPTION	DU NO.	NO. OFF.	ITEM NO.							
				NO. OFF.							
1	HOPPER WALL	134	1	01	13	19	23	24	37		
				1	2	2	1	1	1		
2	HOPPER WALL	135	1	02	14	25	26	27	38		
				1	2	1	1	1	1		
3	HOPPER WALL	136	1	03	15	20	21	28			
				1	2	2	1	1			
4	HOPPER WALL	137	1	04	16	19	23	24	37		
				1	2	2	1	1	1		
5	HOPPER WALL	138	1	05	17	25	26	27	38		
				1	2	1	1	1	1		
6	HOPPER WALL	139	1	06	18	20	21	28			
				1	2	2	1	1	1		
7	HOPPER WALL	140	1	07	29	30	35	39			
				1	1	1	1	4			
8	HOPPER WALL	141	1	08	31	32	39	40			
				1	1	1	2	2			
9	HOPPER WALL	142	1	09	22	33	34	36	41		
				1	1	1	1	1	4		
10	HOPPER WALL	143	1	10	29	30	35	39			
				1	1	1	1	4			
11	HOPPER WALL	144	1	11	31	32	39	40			
				1	1	1	2	2			
12	HOPPER WALL	145	1	12	22	33	34	36	41		
				1	1	1	1	1	4		

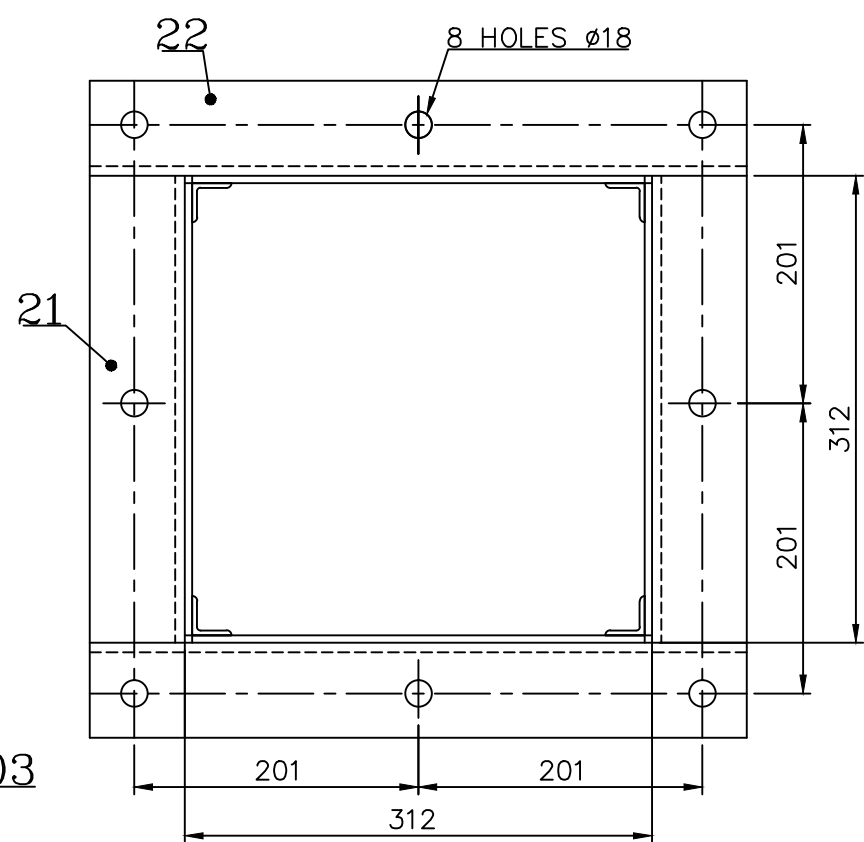
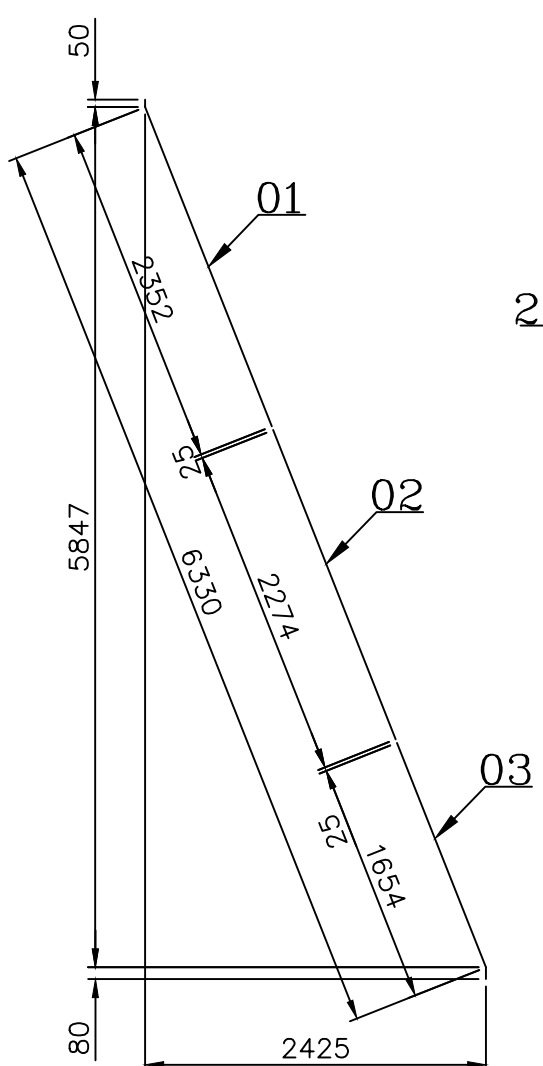
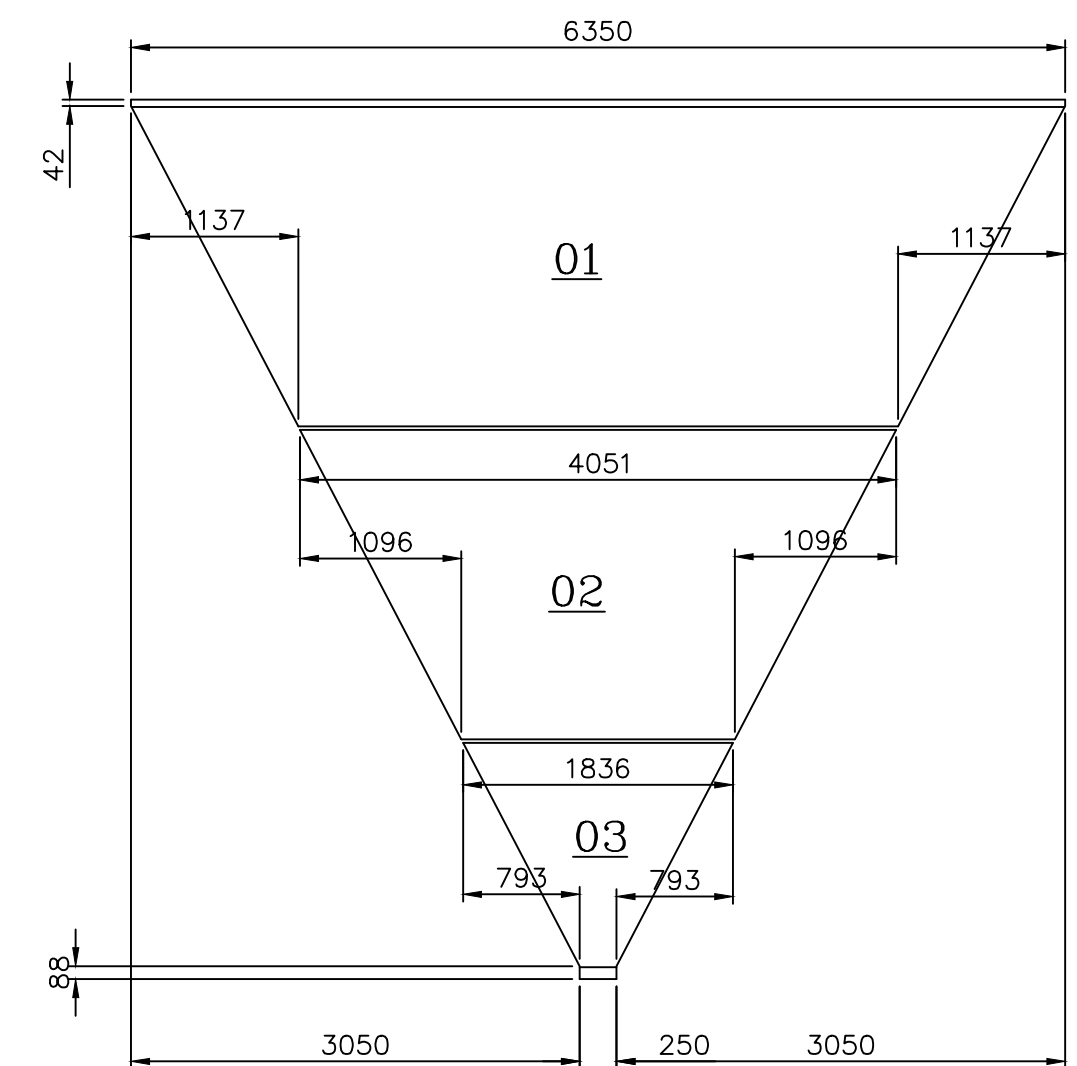
36	PLATE 6 125X1897				152110920000		11.169		
					IS2062E250A		2		
35	PLATE 6 125X3612				152110920000		21.266		
					IS2062E250A		2		
34	ISM 100X50 1028				150100030000		9.828		
					IS2062E250A		2		
33	ISM 100X50 1737				150100030000		16.606		
					IS2062E250A		2		
32	ISM 125X65 2445				150100020000		32.030		
					IS2062E250A		2		
31	ISM 150X75 3154				150100350000		52.987		
					IS2062E250A		2		
30	ISM 200X75 3862				150100380000		86.123		
					IS2062E250A		2		
29	ISM 200X75 4571				150100380000		101.933		
					IS2062E250A		2		
28	ISM 100X50 1409				150100030000		13.470		
					IS2062E250A		2		
27	ISM 100X50 2288				150100030000		21.873		
					IS2062E250A		2		
26	ISM 150X75 3211				150100350000		53.945		
					IS2062E250A		2		
25	ISM 200X75 4134				150100380000		92.188		
					IS2062E250A		2		
24	ISM 200X75 5102				150100380000		113.775		
					IS2062E250A		2		
23	ISM 300X90 5980				150100060000		217.074		
					IS2062E250A		2		
22	ISA 75X75X6 462				150130050000		3.142		
					IS2062E250A		2		
21	ISA 75X75X6 312				150130050000		2.122		
					IS2062E250A		2		
20	ISA 75X75X6 110				150130050000		1.748		
					IS2062E250A		4		
19	ISA 75X75X6 50				150130050000		1.340		
					IS2062E250A		4		
18	PLATE 6 150X1882				152110920000		13.296		
					IS2062E250A		2		
17	PLATE 6 150X2552				152110920000		18.030		
					IS2062E250A		2		
16	PLATE 6 150X2634				152110920000		18.609		
					IS2062E250A		2		
15	PLATE 6 150X1875				152110920000		13.247		
					IS2062E250A		2		
14	PLATE 6 150X2546				152110920000		17.987		
					IS2062E250A		2		
13	PLATE 6 150X2623				152110920000		18.531		
					IS2062E250A		2		
12	PLATE 6 2162X1798				152110920000		100.920		
					IS2062E250A		1		
11	PLATE 6 2275X3513				152110920000		285.507		
					IS2062E250A		1		
10	PLATE 6 2238X5169				152110920000		460.512		
					IS2062E250A		1		
9	PLATE 6 2162X1798				152110920000		100.846		
					IS2062E250A		1		
8	PLATE 6 2275X3513				152110920000		285.507		

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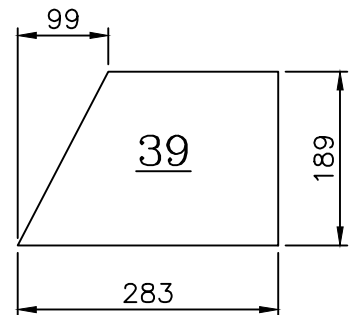
TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT										NAME EOL/KUMAR		SIGNATURE		DATE 06.01.2016	
 Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI – 620014										CHD R.C.Gaulam				06.01.2016	
										APPD A.S.Vasukumar				06.01.2016	
DEPT DU		ALL DIMENSIONS ARE IN MM		PROJECTION 		SCALE N.T.S		WEIGHT (Kg) 5726.924		REF TO ASSY / OLD DWG					
CODE 124															
TITLE HOPPER									DRAWING NO : 1-48-372-43476			REV			



SECTION—A1 A1



VIEW—P



	41	PLATE 12 121X159				150111320000			1.808		
						S2062E250A			8		
	40	PLATE 12 146X194				150111320000			2.145		
						S2062E250A			4		
	39	PLATE 12 189X283				150111320000			4.157		
						S2062E250A			12		
	38	PLATE 6 125X1960				152110920000			11.540		
						S2062E250A			2		
	37	PLATE 6 125X4175				152110920000			24.586		
						S2062E250A			2		
VARIANT NUMBER	ITEM NUMBER	DESCRIPTION	STD.	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT		
					VAR NO	MATERIAL SPECN	DI		QUANTITY	CS	ZONE

REV	DATE	ALTERED :
01		CHD & APPD :

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96039-202-87-2

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD. NO TP 023 0299

NOTE:
FOR GENERAL NOTES REFER PAGE NO. 41 (REF:41) OF DUCT CONSTRUCTION MANUAL.
REF121 FOR CONSTRUCTION DETAIL.

18	PLATE 5 125x4700			150110290000		23.050	
				IS2062 E250A		4	
17	PLATE 5 125x5950			150110290000		29.190	
				IS2062 E250A		4	
16	ISMC 250 4676			150100340000		159.910	
				IS2062 E250A		8	
15	ISMC 300 5926			150100060000		215.110	
				IS2062 E250A		11	
14	ISA 75X75X6- 4910			150130050000		33.380	
				IS2062 E250A		4	
13	ISA 75X75X6- 6010			150130050000		40.860	
				IS2062 E250A		4	
12	ISA 75X75X6 1778.5			150130050000		12.090	
				IS2062 E250A		4	
11	ISA 75X75X6 2197			150130050000		14.940	
				IS2062 E250A		4	
10	ISA 75X75X6 1978.5			150130050000		13.450	
				IS2062 E250A		4	
09	PLATE 5 4700x1767.5			150110290000		326.060	
				IS2062 E250A		2	
08	PLATE 5 4700x2175			150110290000		401.230	
				IS2062 E250A		2	
07	PLATE 5 4700x1967.5			150110290000		362.950	
				IS2062 E250A		2	
06	PLATE 5 5950x2077.5			150110290000		485.170	
				IS2062 E250A		1	
05	PLATE 5 5950x1565			150110290000		365.480	
				IS2062 E250A		1	
04	PLATE 5 5950x2267.5			150110290000		529.540	
				IS2062 E250A		1	
03	PLATE 5 5950x2167.5			150110290000		506.190	
				IS2062 E250A		1	
02	PLATE 5 5950x2075			150110290000		484.590	
				IS2062 E250A		1	
01	PLATE 5 5950x1667.5			150110290000		389.420	
				IS2062 E250A		1	
VARIANT NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	ZONE
ITEM NUMBER				VAR NO	MATERIAL SPECN	DI	

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REV 01	DATE 09.06.15	ALTERED : MAASI
ZONE	CHD & APPD : RCG	
ITEM NO 13&14 REMOVED		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT			
	Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014		
DRN	NAME EOL/KUMAR/NM	SIGNATURE	DATE 02-11-14
CHD	RAMANA		02-11-14
APPD	SHANMUGAM		02-11-14
DEPT DU	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE
CODE 124			N.T.S
WEIGHT (Kg) 8957.240		REF TO ASSY / OLD DWG	
TITLE DUCT		DRAWING NO : 2-48-202-53096	
		REV 01	

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96039-202-87-2

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD. NO TP 023 0299

NOTE:
FOR GENERAL NOTES REFER PAGE NO. 41 (REF:41) OF DUCT CONSTRUCTION MANUAL.
REF121 FOR CONSTRUCTION DETAIL.

18	PLATE 5 125x4700			150110290000		23.050	
				IS2062 E250A		4	
17	PLATE 5 125x5950			150110290000		29.190	
				IS2062 E250A		4	
16	ISMC 250 4676			150100340000		159.910	
				IS2062 E250A		8	
15	ISMC 300 5926			150100060000		215.110	
				IS2062 E250A		11	
14	ISA 75X75X6- 4910			150130050000		33.380	
				IS2062 E250A		4	
13	ISA 75X75X6- 6010			150130050000		40.860	
				IS2062 E250A		4	
12	ISA 75X75X6 1778.5			150130050000		12.090	
				IS2062 E250A		4	
11	ISA 75X75X6 2197			150130050000		14.940	
				IS2062 E250A		4	
10	ISA 75X75X6 1978.5			150130050000		13.450	
				IS2062 E250A		4	
09	PLATE 5 4700x1767.5			150110290000		326.060	
				IS2062 E250A		2	
08	PLATE 5 4700x2175			150110290000		401.230	
				IS2062 E250A		2	
07	PLATE 5 4700x1967.5			150110290000		362.950	
				IS2062 E250A		2	
06	PLATE 5 5950x2077.5			150110290000		485.170	
				IS2062 E250A		1	
05	PLATE 5 5950x1565			150110290000		365.480	
				IS2062 E250A		1	
04	PLATE 5 5950x2267.5			150110290000		529.540	
				IS2062 E250A		1	
03	PLATE 5 5950x2167.5			150110290000		506.190	
				IS2062 E250A		1	
02	PLATE 5 5950x2075			150110290000		484.590	
				IS2062 E250A		1	
01	PLATE 5 5950x1667.5			150110290000		389.420	
				IS2062 E250A		1	
VARIANT NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	ZONE
ITEM NUMBER				VAR NO	MATERIAL SPECN	DI	

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REV 01	DATE 09.06.15	ALTERED : MAASI
ZONE	CHD & APPD : RCG	
ITEM NO 13&14 REMOVED		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT			
	Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014		
DRN	NAME EOL/KUMAR/NM	SIGNATURE	DATE 02-11-14
CHD	RAMANA		02-11-14
APPD	SHANMUGAM		02-11-14
DEPT DU	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE
CODE 124			N.T.S
WEIGHT (Kg) 8957.240		REF TO ASSY / OLD DWG	
TITLE DUCT		DRAWING NO : 2-48-202-53096	
		REV 01	

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96039-202-87-2

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD. NO TP 023 0299

NOTE:
FOR GENERAL NOTES REFER PAGE NO. 41 (REF:41) OF DUCT CONSTRUCTION MANUAL.
REF121 FOR CONSTRUCTION DETAIL.

18	PLATE 5 125x4700			150110290000		23.050	
				IS2062 E250A		4	
17	PLATE 5 125x5950			150110290000		29.190	
				IS2062 E250A		4	
16	ISMC 250 4676			150100340000		159.910	
				IS2062 E250A		8	
15	ISMC 300 5926			150100060000		215.110	
				IS2062 E250A		11	
14	ISA 75X75X6- 4910			150130050000		33.380	
				IS2062 E250A		4	
13	ISA 75X75X6- 6010			150130050000		40.860	
				IS2062 E250A		4	
12	ISA 75X75X6 1778.5			150130050000		12.090	
				IS2062 E250A		4	
11	ISA 75X75X6 2197			150130050000		14.940	
				IS2062 E250A		4	
10	ISA 75X75X6 1978.5			150130050000		13.450	
				IS2062 E250A		4	
09	PLATE 5 4700x1767.5			150110290000		326.060	
				IS2062 E250A		2	
08	PLATE 5 4700x2175			150110290000		401.230	
				IS2062 E250A		2	
07	PLATE 5 4700x1967.5			150110290000		362.950	
				IS2062 E250A		2	
06	PLATE 5 5950x2077.5			150110290000		485.170	
				IS2062 E250A		1	
05	PLATE 5 5950x1565			150110290000		365.480	
				IS2062 E250A		1	
04	PLATE 5 5950x2267.5			150110290000		529.540	
				IS2062 E250A		1	
03	PLATE 5 5950x2167.5			150110290000		506.190	
				IS2062 E250A		1	
02	PLATE 5 5950x2075			150110290000		484.590	
				IS2062 E250A		1	
01	PLATE 5 5950x1667.5			150110290000		389.420	
				IS2062 E250A		1	
VARIANT NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	ZONE
ITEM NUMBER				VAR NO	MATERIAL SPECN	DI	

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REV 01	DATE 09.06.15	ALTERED : MAASI
ZONE	CHD & APPD : RCG	
ITEM NO 13&14 REMOVED		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT			
	Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014		
DRN	NAME EOL/KUMAR/NM	SIGNATURE	DATE 02-11-14
CHD	RAMANA		02-11-14
APPD	SHANMUGAM		02-11-14
DEPT DU	ALL DIMENSIONS ARE IN MM	PROJECTION	SCALE
CODE 124			N.T.S
WEIGHT (Kg) 8957.240		REF TO ASSY / OLD DWG	
TITLE DUCT		DRAWING NO : 2-48-202-53096	
		REV 01	

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96039-202-87-2

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD. NO TP 023 0299

NOTE:
FOR GENERAL NOTES REFER PAGE NO. 41 (REF:41) OF DUCT CONSTRUCTION MANUAL.
REF121 FOR CONSTRUCTION DETAIL.

18	PLATE 5 125x4700			150110290000		23.050	
				IS2062 E250A		4	
17	PLATE 5 125x5950			150110290000		29.190	
				IS2062 E250A		4	
16	ISMC 250 4676			150100340000		159.910	
				IS2062 E250A		8	
15	ISMC 300 5926			150100060000		215.110	
				IS2062 E250A		11	
14	ISA 75X75X6- 4910			150130050000		33.380	
				IS2062 E250A		4	
13	ISA 75X75X6- 6010			150130050000		40.860	
				IS2062 E250A		4	
12	ISA 75X75X6 1778.5			150130050000		12.090	
				IS2062 E250A		4	
11	ISA 75X75X6 2197			150130050000		14.940	
				IS2062 E250A		4	
10	ISA 75X75X6 1978.5			150130050000		13.450	
				IS2062 E250A		4	
09	PLATE 5 4700x1767.5			150110290000		326.060	
				IS2062 E250A		2	
08	PLATE 5 4700x2175			150110290000		401.230	
				IS2062 E250A		2	
07	PLATE 5 4700x1967.5			150110290000		362.950	
				IS2062 E250A		2	
06	PLATE 5 5950x2077.5			150110290000		485.170	
				IS2062 E250A		1	
05	PLATE 5 5950x1565			150110290000		365.480	
				IS2062 E250A		1	
04	PLATE 5 5950x2267.5			150110290000		529.540	
				IS2062 E250A		1	
03	PLATE 5 5950x2167.5			150110290000		506.190	
				IS2062 E250A		1	
02	PLATE 5 5950x2075			150110290000		484.590	
				IS2062 E250A		1	
01	PLATE 5 5950x1667.5			150110290000		389.420	
				IS2062 E250A		1	
VARIANT NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	ZONE
ITEM NUMBER				VAR NO	MATERIAL SPECN	DI	

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. it must not be used directly or indirectly in any way detrimental to the interest of the company.

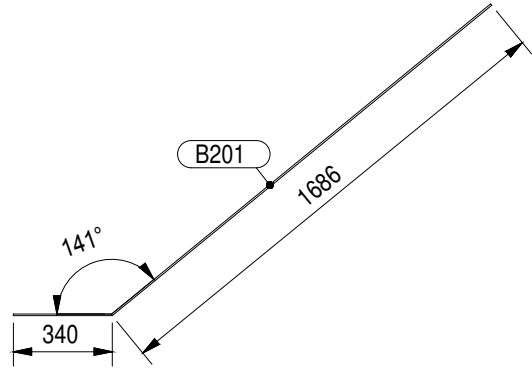
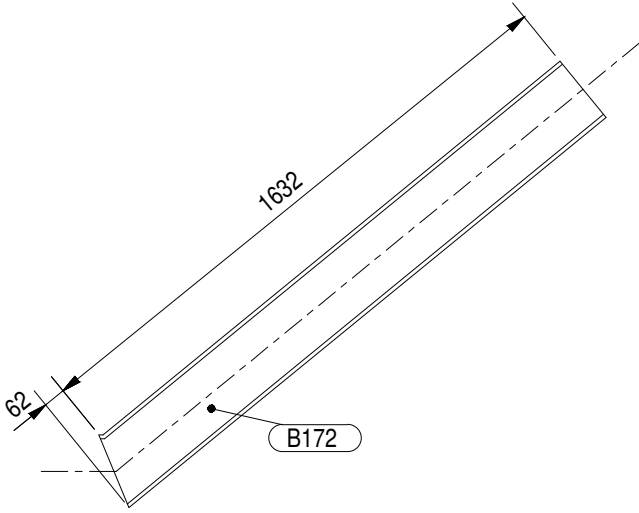
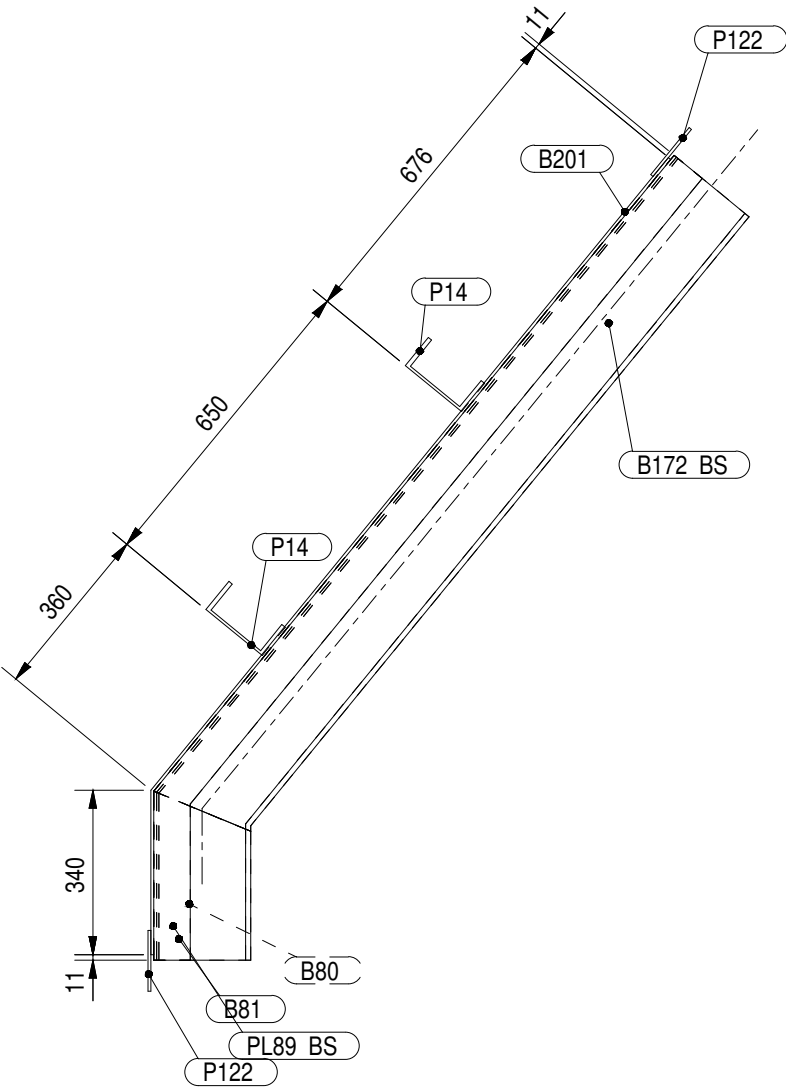
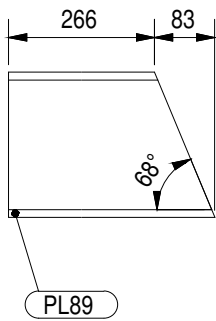
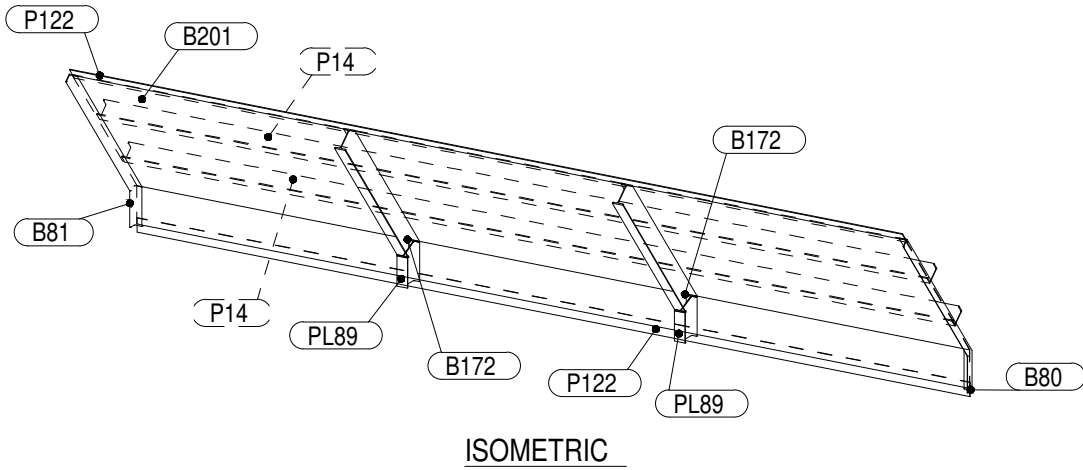
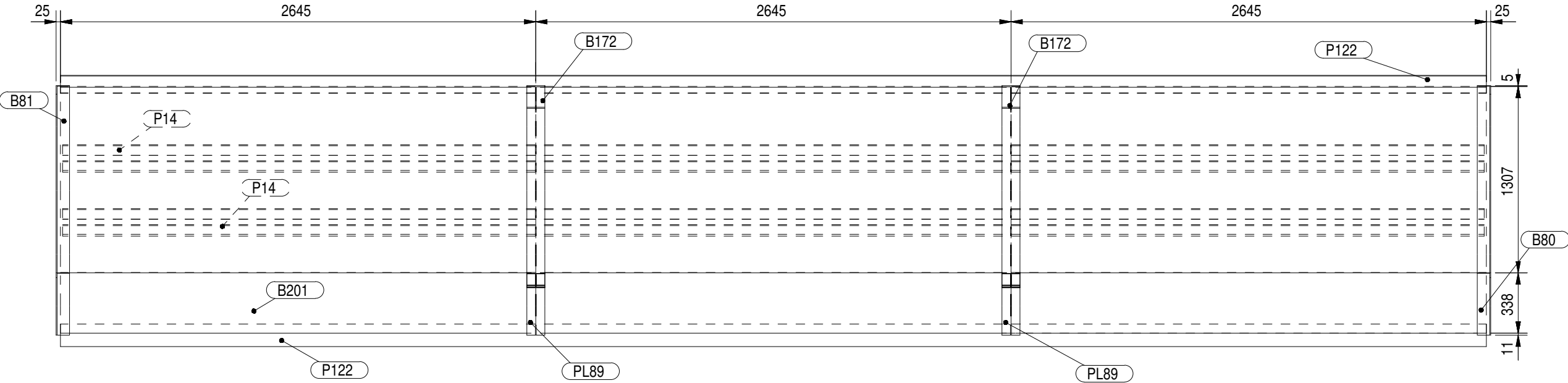
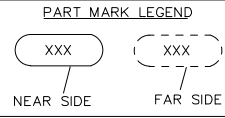
REV 01	DATE 09.06.15	ALTERED : MAASI
ZONE	CHD & APPD : RCG	
ITEM NO 13&14 REMOVED		

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT			
	Bharat Heavy Electricals Ltd UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014		
DRN	NAME EOL/KUMAR/NM	SIGNATURE	DATE 02-11-14

DRAWING NO:
2-48-208-62358

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD. NO TP 023 0299

- NOTES:**
01. FOR GENERAL NOTES REFER PAGE NO.41 (REF.41) OF DUCT CONSTRUCTION MANUAL
REF. 121 FOR CONSTRUCTION DETAIL
02. THIS DRAWING TO BE READ ALONG WITH ASSEMBLY DRAWING 1-48-208-44748



1	B80	ISA75X75X6 2043			150130050000		13.892	1	
					IS2062E250A				
2	B81	ISA75X75X6 2043			150130050000		13.892	1	
					IS2062E250A				
3	B172	ISMB200 1395			150090120000		35.425	2	
					IS2062E250A				
4	B201	PLATE 6 7935.0x2021.0			152110920000		756.307	1	
					IS2062E250A				
5	P14	ISMC150 7911			150100350000		132.905	2	
					IS2062E250A				
6	P122	PLATE 6 7935.0x125.0			152110920000		46.718	2	
					IS2062E250A				
7	PL89	ISMB200 349			150090120000		8.852	2	
					IS2062E250A				

VARIANT NUMBER	S.NO	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT	QS	ZONE
						VAR NO	MATERIAL SPECN		DI	QUANTITY		

CAUTION: The information on this document is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used directly or indirectly in any way detrimental to the interest of the company.	TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT											
	 Bharat Heavy Electricals Ltd. UNIT: HIGH PRESSURE BOILER PLANT TIRUCHIRAPALLI - 620014						DRN	NAME SSM	SIGNATURE	DATE		
							CHD	RCG		12.10.2018		
							APPD	BMK		13.10.2018		
DEPT DUCT CODE 124		ALL DIMENSIONS ARE IN MM		PROJECTION		SCALE NTS		WEIGHT (Kg) 1231.889		REF TO ASSY / OLD DWG		
TITLE										DRAWING NO : 2-48-208-62358		REV
ELBOW DUCT WALL												

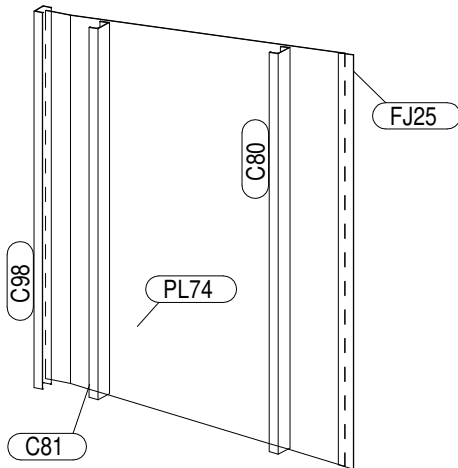
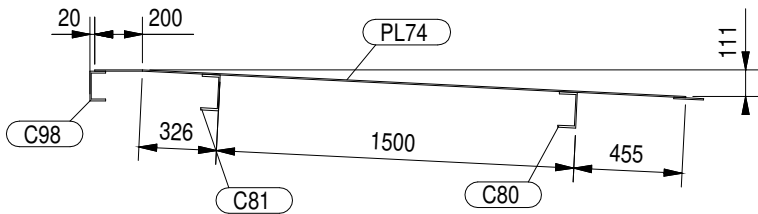
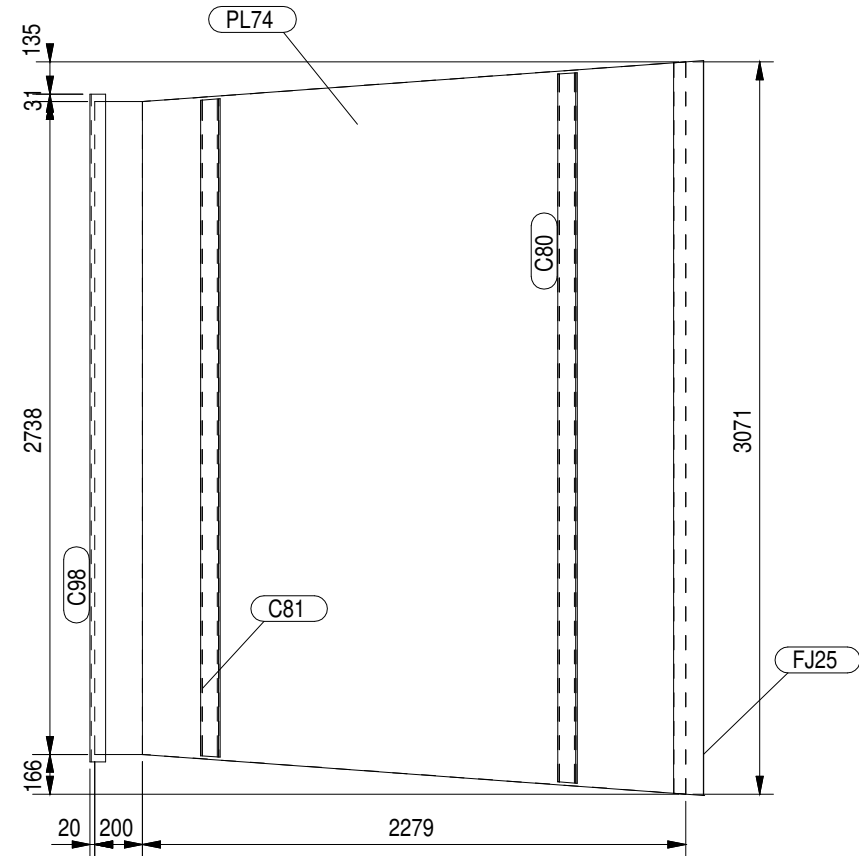
DU NO: 14 DU QTY: 2

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD.NO TP 023 0299

3-48-112-C8184
DRAWING NO:

NOTES:

01. FOR GENERAL NOTES REFER PAGE NO.41 (REF.41) OF DUCT CONSTRUCTION MANUAL
REF. 121 FOR CONSTRUCTION DETAIL
02. THIS DRAWING TO BE READ ALONG WITH ASSEMBLY DRAWING 2-48-112-62261



ISOMETRIC

PART MARK LEGEND	
XXX	XXX
NEAR SIDE	FAR SIDE

VARIANT NUMBER	S.NO	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT	GS	ZONE
						VAR NO	MATERIAL SPECN	A/C/P	DI	QUANTITY		
	1	C80	ISMC 150 2980				150100350000			50.071		
							IS2062E250A			1		
	2	C81	ISMC 150 2762				150100350000			46.394		
							IS2062E250A			1		
	3	C98	ISMC 125 2800				150100020000			36.680		
							IS2062E250A			1		
	4	FJ25	PLATE 6 3082.0x125.0				152110920000			18.091		
							IS2062E250A			1		
	5	PL74	PLATE 6 3071.0x2482.0				152110920000			337.940		
							IS2062E250A			1		

DU NO: 4 DU QTY: 4

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TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT

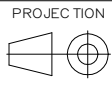


Bharat Heavy Electricals Ltd.

UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI - 620014

DEPT
DUCT
CODE
124

ALL DIMENSIONS
ARE IN MM



SCALE
NTS

WEIGHT (Kg)
489.176

REF TO ASSY / OLD DWG

TITLE

TRANSITION DUCT WALL

DRAWING NO :

3-48-112-C8184

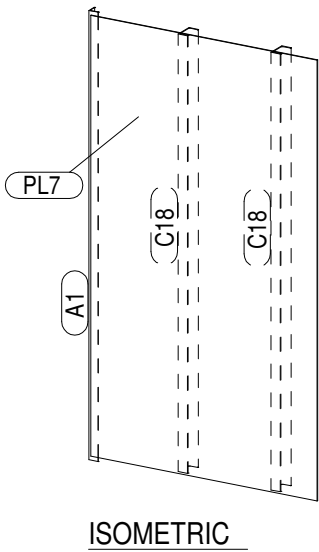
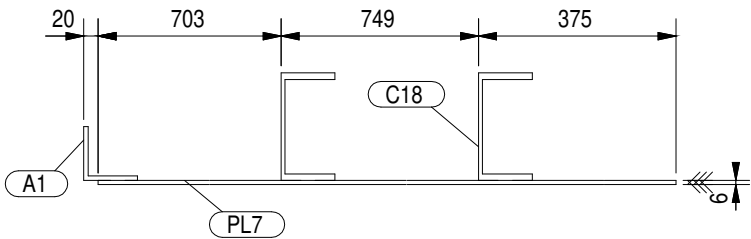
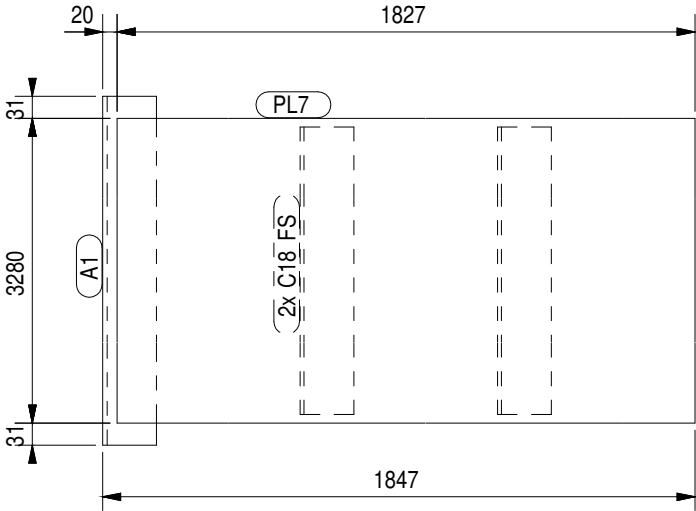
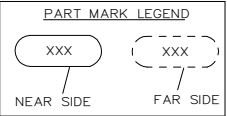
REV

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD.NO TP 023 0299

DRAWING NO:
3-48-112-C8213

NOTES:

01. FOR GENERAL NOTES REFER PAGE NO.41 (REF.41) OF DUCT CONSTRUCTION MANUAL
REF. 121 FOR CONSTRUCTION DETAIL
02. THIS DRAWING TO BE READ ALONG WITH ASSEMBLY DRAWING 2-48-112-62264



ISOMETRIC

VARIANT NUMBER	S.NO	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT	GS	ZONE
						VAR NO	MATERIAL SPECN		DI	QUANTITY		
	1	A1	ISA75X75X6 3342				150130050000			22.719		
							IS2062E250A			1		
	2	C18	ISMC 150 3256 0				150100350000			54.701		
							IS2062E250A			2		
	3	PL7	PLATE 6 3280.0x1827.0				152110920000			282.250		
							IS2062E250A			1		

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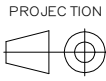
TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT



Bharat Heavy Electricals Ltd.
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI - 620014

DEPT
DUCT
CODE
124

ALL DIMENSIONS
ARE IN MM



SCALE
NTS

WEIGHT (Kg)
414.370

REF TO ASSY / OLD DWG

TITLE

BRANCH DUCT WALL

DRAWING NO :

3-48-112-C8213

REV

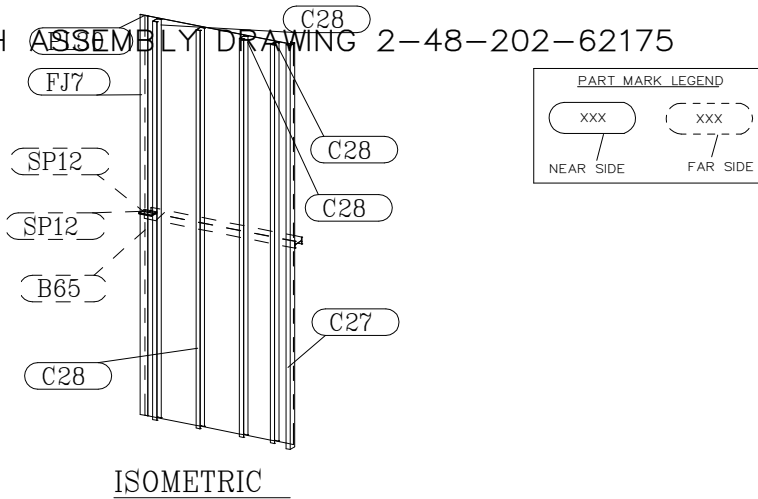
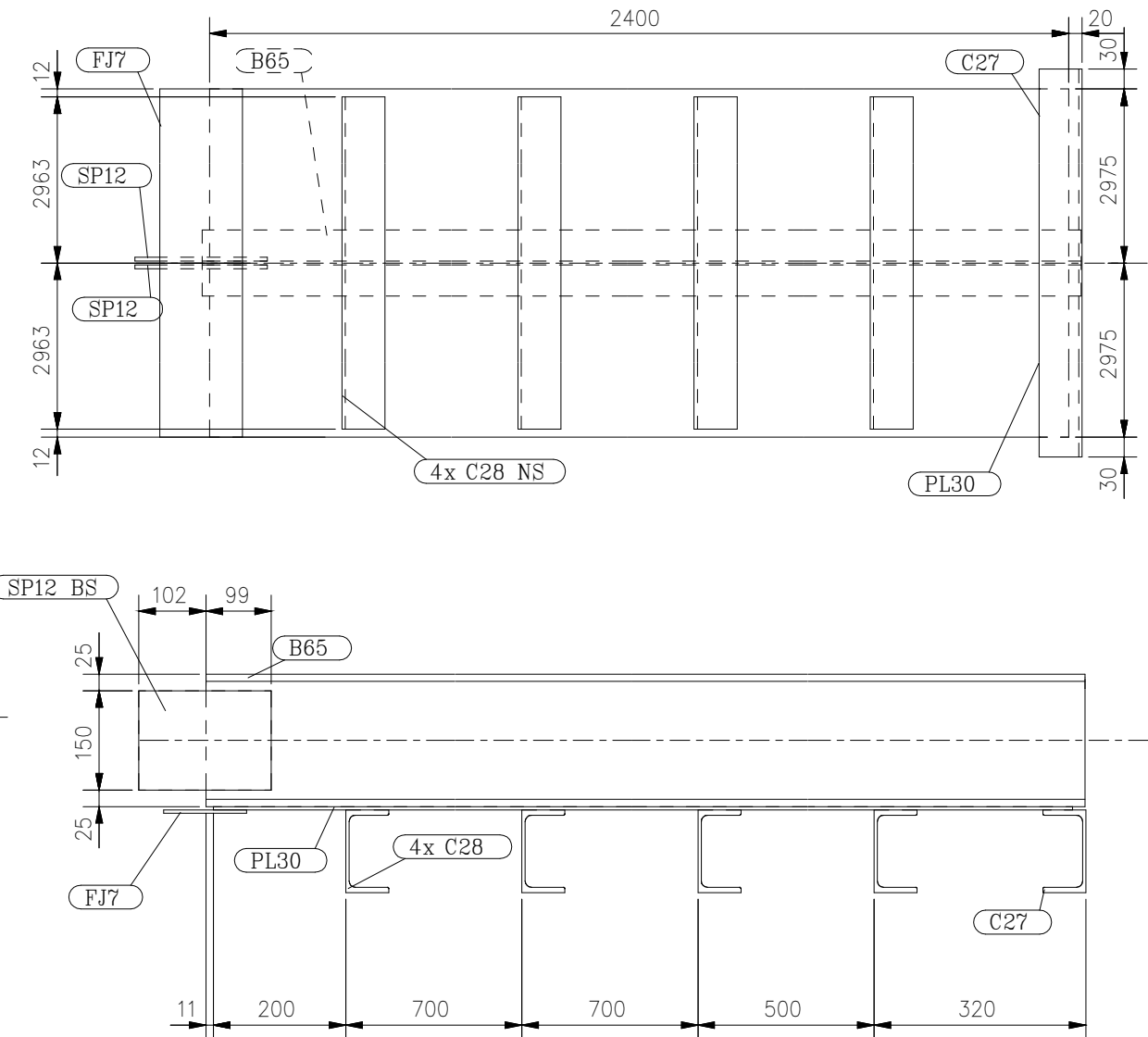
DU NO: 33 DU QTY: 1

3-48-202-C7935
DRAWING NO:

FOR TOLERANCES OF UNTOLERANCED
DIMENSIONS DURING MANUFACTURE
REFER PLANT STD.NO TP 023 0299

NOTES:

01. FOR GENERAL NOTES REFER PAGE NO.41 (REF.41) OF DUCT CONSTRUCTION MANUAL
REF. 121 FOR CONSTRUCTION DETAIL
02. THIS DRAWING TO BE READ ALONG WITH ASSEMBLY DRAWING 2-48-202-62175



VARIANT NUMBER	S.NO	ITEM NUMBER	DESCRIPTION	STD	DRAWING NUMBER	ITEM NO	MATERIAL CODE	A/C/P	UNIT	UNIT WEIGHT	GS	ZONE
						VAR NO	MATERIAL SPECN	A/C/P	DI	QUANTITY		
	1	B65	ISMB 200 2430				150090120000			61.709		
							IS2062E250A			1		
	2	C27	ISMC 125 6010				150100020000			78.731		
							IS2062E250A			1		
	3	C28	ISMC 125 5926 0				150100020000			77.631	4	
							IS2062E250A					
	4	FJ7	PLATE 5 5950.0x125.0				150110290000			29.192	1	
							IS2062E250A					
	5	PL30	PLATE 5 5950.0x2400.0				150110290000			560.490	1	
							IS2062E250A					
	6	SP12	PLATE 6 200.0x150.0				152110920000			1.413	2	
							IS2062E250A					

DU NO: 60 DU QTY: 2

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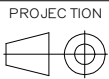
TYPE OF PRODUCT
OR NAME OF
CUSTOMER/PROJECT



Bharat Heavy Electricals Ltd.
UNIT: HIGH PRESSURE BOILER PLANT
TIRUCHIRAPALLI - 620014

DEPT
DUCT
CODE
124

ALL DIMENSIONS
ARE IN MM



SCALE
NTS

WEIGHT (Kg)
1043.471

REF TO ASSY / OLD DWG

TITLE

STRAIGHT DUCT WALL

DRAWING NO :

3-48-202-C7935

REV