An ISO 9001 Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)
Tiruchirappalli – 620014, TAMIL NADU, INDIA
PRODUCT ENGINEERING (FOSSIL BOILERS)

TITLE **OUTSOURCING OF THE PREPARATION OF DUCT ARRANGEMENT & DETAILED DRAWINGS**	Phone: +91 (0431) 2575541 Fax : +91 431 252 0730 Email : **sekar@bheltry.co.in**

	Reference Number: Enquiry TS/Duct/EOL/00	**Enquiry Date: 20.02.2013**	**Due date for submission of quotation: 15.03.2013**
You are requested to quote the Enquiry number date and due date in all your correspondences. This is only a request for quotation and not an order			

BHEL Tiruchirappalli (Tamilnadu) invites two part sealed bids from suitable vendors for its outsourcing of the preparation of Duct arrangement & detailed drawings preparation for the thermal power plant ducting systems of the projects executed by BHEL, Trichy for 2 years 2013-2015.

BHEL commercial terms & conditions with Price Bid formats and all annexure can be downloaded from BHEL web site http://www.bhel.com or from the Government tender website http://tenders.gov.in (public sector units) Bharat Heavy Electricals Limited) under enquiry reference "TS/Duct/EOL/00"	
Tenders should reach us before 14:00 hours on the due date Technical bid will be opened at 14:30 hours on the due date Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.	Yours faithfully, For **Bharat Heavy Electricals Limited** DGM, Quality Control, New Quality Building, BHEL, Tiruchirappalli-620 014, Tamil Nadu Ph: 0431- 2575541, Email: sekar@bheltry.co.in

Tender Specification

For

Outsourcing of preparation of

Duct arrangement & Duct Detailed Drawings

Quality Control	Engineering	Finance
S. Sekar, DGM / QC	**B. Muthukumar, Mgr / PE(B)** **M. Shanmugam, SM / PE(B)**	**M. Venkataraman, DGM / Fin**

Clause		Description
1.0	**Scope of Work in brief**	1.1) Preparation of ducts arrangement and detailed fabrication drawings in latest authenticated version of Autocad. 1.2) The duct arrangement drg shall contain the routing of the ducting system with all component detail like stiffeners, expansion joints, gates, dampers, support sections, details of external supports and internal truss works, BOM, etc as per example shown in annexure-H. 1.3) The detail drawing (fabrication) shall be prepared for duct modules and supports with all details and BOM separately as per example shown in annexure J.
2.0	**Inputs from BHEL for the duct arrangement drawing preparation (will be furnished as hardcopy or softcopy in pdf format)**	• Duct layout (annex. E) • Duct loading & location transmittals (annex. F) • Duct stiffener chart & other relevant inputs. (annex. G)
3.0	**Contents of detailed drawing to be prepared by the outsourcing vendor**	• Duct assembly view • Duct plate cutting plan with dimensions • Item level BOM • Despatch & fitup hole table other details as applicable
4.0	**Deliverables from Vendor**	4.1) Supply of one check print of all drawings(For A0 size drg. Print can be given in A1 size) 4.2) Submission of corrected final drawings in CDs and corrected prints for our checking.
5.0	**Work content**	5.1) The total estimated preparation of drawings will be around 16,000, A4

		equivalent depending on the Power Projects availability for BHEL.
6.0	**Terms and Conditions**	
6.1	**General**	
		6.1.1)The drawing should be prepared to proper scale in the form and shape in the terms of detailing, conventions etc as indicated in typical sample drawing furnished by BHEL for guidance (Ref Annexure I &II)
		6.1.2) All drawing should be prepared in contractor's facility with AUTOCAD 2007 or above versions.
		6.1.3) It is the responsibility of the Contractor to collect all relevant input from DUCTs /PE (FB), BHEL, design office and get any doubts clarified prior to taking up the work. Any change in drawing size if felt necessary has to be approved by DUCTS/PE(FB)
		6.1.4) It is the responsibility of the Vendor to understand the duct arrangement and detailing practice of BHEL and use the input information effectively to convert them into output detailed drawings in BHEL standard practice.
		6.1.5) For each work order covering a duct system**,** a separate job order number will be assigned and this reference number is to be quoted in further correspondence.
		6.1.6) Preliminary drawings shall be submitted to BHEL for checking in check prints. After getting the

		comments from BHEL the corrections are to be incorporated in the final drawings.
		6.1.7) Final drawings in CDs and the corrected print for verification shall positively be submitted to BHEL as per schedule specified on the basis of work
		6.1.8) Upon completion of Jobs all typical sample drawings and transmittal information, which are provided for guidance shall be returned to BHEL
		6.1.9)The contractor shall preserve the AUTOCAD drawing files either on the hard disk of PC or on backup CDS till such time they get clearance from BHEL to erase them.
6.2	**Qualifications/Technical requirements.**	
		6.2.1) The bidder should have necessary experience of minimum 2years in preparing manufacturing drawings for ducting systems of utility thermal power plants of ratings 500MW and above. Vendor to produce sample of such outputs produced and necessary credentials like Order placed & completed on the vendor, Agreement executed and other relevant details in support of their experience in the technical bid.
		6.2.2) In order to have better, efficient and frequent interaction, Firms registered

		and operating in Tamilnadu only need to apply.
		6.2.3) Vendor should have a local representative with adequate technical knowledge & Liaison office stationed at Trichy to complete the work in time and for effective co-ordination and clarification.
		6.2.4) Knowledge of IS 800 standard codes are essential for duct detailing.
6.3	**Infrastructure facilities:**	Vendor shall possess the following infrastructure:
		6.3.1) Minimum 4 nos of PCs with Licensed version of AutoCAD package shall be available
		6.3.2) An office with sufficient space to accommodate the above said PCs with telephone and email facilities
		6.3.3) Minimum 4 drafting staff with one supervisor to guide and check all drawings shall be available.
		6.3.4) A spot visit by a designated team from BHEL will assess the technical capabilities and requirement of the bidder as given above in the technical requirements.
6.4	**Statutory requirements**	
		6.4.1) Vendor shall confirm his compliance with all statutory requirements, rules, regulations, notifications in relation to employment of his employees issued from time to time by the concerned authorities.

7.0	**Schedule of the job completion**	
		Schedule of the job completion is to be strictly adhered to, any repeated failure in meeting the schedule will result termination of the contract.
7.1	**Preparation of duct arrangement drawings**	Schedule No. of .days for completion – 15 days from the receipt of input
8.0	**Preparation of duct detail drawings**	(from the date of submission of Arrangement drawings) – 15 days
9.0	**Method of tendering**	
		9.1) The bidder should submit two bids ie technical and price bids separately in sealed covers
		9.2) Point wise confirmation to be given for this specification by the vendors.
		9.3) BHEL reserves the right to increase or decrease the tendered quantity and split the tendered quantity among more than one tenderer and place orders accordingly in any proportion, based on commitment, requirement and suppliers' capability in terms of delivery and quality.
		9.4) Lowest prices received against BHEL tender need not be the technically acceptable L1 price and BHEL reserve the right not to consider the same
		9.5) BHEL reserves the right to negotiate or refloat the tender if the lowest prices received are not the lowest acceptable price to them inter alias other reasons
		9.6) BHEL reserves the right to

		negotiate/reject the L1 rate without assigning any reason thereof
		9.7) BHEL may order on more than one vendor in the lowest acceptable price to BHEL
		9.8) The works contract entered into with the successful tenderer will be governed by the BHEL revised General Conditions of Contracts in force.
		9.8.1)In all the matters of dispute the decision of the Additional GM/Non-pressure parts/PE (FB), BHEL_Trichy-14. shall be final binding on the tenderer / contractor. AGM / PE(B) reserves all the right to reject any or all the tenders received or accept any tender or part thereof without assigning any reason therefore.
		9.9) Offers will be obtained from the eligible vendors drawing sheet size-wise (A4 to A0) as in the **annex-B**. The open tender shall be on two part bid process. Based on the evaluation of the technical bid (as in **annex-A**) & commercial bid (as in **annex-B**), the price bid of the technical and commercial qualified vendors will be opened.
		9.10) Rate of L1 (size-wise) will be offered as counter offer for all the technically qualified vendors participating in the bidding to enable us to avail the services of adequate vendors for timely completion of the jobs. Whoever accepts the counter offer will be enlisted for drafting works after signing confidentiality agreement. *BHEL reserves the right of deciding the number of such*

		acceptance from vendors depending on the projects availability and work load for BHEL.
		9.11) Depending on the contract availability for BHEL, Trichy and the project schedule, each vendor will be loaded based on their response, time adherence and quality of output. The work will be awarded based on the quality and timely completion. However the L1 vendor will be given more percentage of work than the other vendors depending upon their performance of work.
		9.12) Rates quoted shall be FIRM throughout the period or 2 years of the contract.
		9.13) Lowest bidder L1 will be decided on the formula (as per **annex-C**)
10.0	**Service Tax**	SERVICE TAX: As applicable and shall be quoted extra.
		The quoted rate should be exclusive of Service Tax and inclusive of any taxes and duties levied or to be levied both by Central and State Government Statutory / regulatory authorities from time to time.. BHEL will not entertain any claim whatsoever in this regards.
11.0	**Security Deposit**	SECURITY DEPOSIT:
		(a) Security Deposit should be paid by the Vendor. Security Deposit shall be collected from the successful tenderer as shown below: Up to Rs.10 Lakhs: 10% of Contract Value

		Above Rs.10 lakhs up to Rs.50 Lakhs : 1 Lakh + 7.5% of the amount exceeding Rs.10Lakhs The Security Deposit shall be collected before start of the Work.
		(b) Vendor may furnish the Security Deposit in any one of the following forms: i) Cash (as permissible under the Income Tax Act) ii) Demand Draft in favour of BHEL Trichy -14.
		c)Security deposit can also be recovered at the rate of 10% from the running bills. However in such cases at least 50% of the Security Deposit should be collected (any of the above form) and the balance 50% may be recovered from the running bills.
		d)The security deposit shall not carry any interest.
		e)REFUND OF SECURITY DEPOSIT:- The Security Deposit mentioned above may be refunded to the Contractor after a period of 6 months on termination or expiry of the contract provided always that the Contractor shall first have been paid the last and final bill and have rendered a "NO DEMAND CERTIFICATE
12.0	**SUBMISSION OF BILLS BY CONTRACTOR:**	The Vendor after completing drawings of a job order shall submit a bill in duplicate detailing the various items of work done in the job order supported by the requisitions issued from time to time.

13.0	**PAYMENT OF BILLS:-**	All payments to be made to the Vendor, under this contract shall be through electronic mode within a reasonable time after the certification of bills by the Engg. dept. Requisite mandate in the prescribed format to be submitted before release of the first payment.
14)	**Penalty / Diversion / Cancellation**	1.0)Schedule of the job duration as enlisted above shall be strictly adhered by the Vendor. 2.0)If the schedule is violated for the first time, a warning letter will be issued. If the delay occurs repeatedly for the next time, the job order will be diverted to any other vendor or even the contract is liable to be cancelled. 3.0)If there is no response from the vendor for BHEL intimations, it will be assumed that the Vendor is not interested in the contract and the job order will be diverted to suitable vendor who meets schedule and the required quality. 4.0)Also the security deposit or any other payment, if any, due to vendor will be forfeited in total without prejudice to any other action like blacklisting the vendor for subsequent tender etc.,
15)	**Address / Last date for tender applications.**	Tenders along with filled up annexures to be sent to **The AGM, Quality Control, New Quality Building, BHEL, Trichy-14** on or before xx/xx/2013.

		Late tenders will not be taken into consideration. Sealed envelop should bear the caption “Tender application for outsourcing of Duct drawings”. Tender opening time & date for technical bid and price bid will be intimated later.

Annex – B PRICE BID

SL NO	DRAWING SIZE	DUCT ARRANGEMENT DRAWING RATE IN Rs (excluding taxes)	DUCT DETAIL DRAWINGS RATE IN Rs (excluding taxes)
01	A0		
02	A1		
03	A2		
04	A3		
05	A4		

Annex – A TECHNICAL BID

The Technical bid shall contain the following details:

1) Name and address of the bidder

2) Telephone no and e-mail details

3) Office space availability information

4) No of PCs in working condition with licensed AutoCAD package.

5) No of working staff with their qualification.

6) Point wise confirmation of the terms and conditions in the annexure- D.

7) Following supporting drgs are to be furnished:

   a) Copy of the orders received & completed invoice from companies for the preparation of Duct Arrangement with supports and Duct detail (Fabrication) drgs of the ducting systems for Utility thermal power plants of 500MW rating and above

b) A Sample copy of the duct arrangement and detail drg carried out by the bidder for Utility thermal power plants of 500MW rating and above

Annexure – C

Rates furnished by the bidder for duct arrangement and detailed drawing will be multiplied by the factors given below to arrive the total value. The lowest of the total value will be the L1 value.

Size	Factor
Arrangement	
A0	**0.9**
A1	**0.1**
Detailed	
A0	**0.4**
A1	**0.2**
A2	**0.1**
A3	**0.2**
A4	**0.1**

Annexure – D

Clause		Description	Vendor's comments: Agreed / Not Agreed (Conditional agreement Is liable for rejection)
1.0	**Scope of Work in brief**	1.1)Preparation of ducts arrangement and detailed fabrication drawings in latest authenticated version of Autocad. 1.2)The duct arrangement drg shall contain the routing of the ducting system with all component detail like stiffeners, expansion joints, gates, dampers, support sections, details of external supports and internal truss works, BOM, etc as per example shown in annexure-I. 1.3)The detail drawing (fabrication) shall be prepared for duct modules and supports with all details and BOM separately as per example shown in annexure II.	
2.0	**Inputs from BHEL for the duct arrangement drawing preparation (will be furnished as hardcopy or softcopy in pdf format)**	• Duct layout drawings • Duct loading & location transmittals • Duct stiffener chart & other relevant inputs.	
3.0	**Contents of detailed drawing to be prepared by the**	• Duct assembly view • Duct plate cutting	

	outsourcing vendor	plan with dimensions • Item level BOM • Despatch & fitup hole table other details as applicable	
4.0	**Deliverables from Vendor**	4.1)Supply of one check print of all drawings(For A0 size drg. Print can be given in A1 size) 4.2)Submission of corrected final drawings in CDs and corrected prints for our checking.	
5.0	**Work content**	5.1)The total estimated preparation of drawings will be around 16,000, A4 equivalent depending on the Power Projects availability for BHEL.	
6.0	**Terms and Conditions**		
6.1	**General**		
		6.1.1)The drawing should be prepared to proper scale in the form and shape in the terms of detailing, conventions etc as indicated in typical sample drawing furnished by BHEL for guidance (Ref Annexure I &II)	
		6.1.2)All drawing should be prepared in contractor's facility with AUTOCAD 2007 or above versions.	
		6.1.3) It is the responsibility of the Contractor to collect all relevant input from DUCTs /PE (FB), BHEL, design office	

		and get any doubts clarified prior to taking up the work. Any change in drawing size if felt necessary has to be approved by DUCTS/PE(FB)	
		6.1.4) It is the responsibility of the Vendor to understand the duct arrangement and detailing practice of BHEL and use the input information effectively to convert them into output detailed drawings in BHEL standard practice.	
		6.1.5) For each work order covering a duct system, a separate job order number will be assigned and this reference number is to be quoted in further correspondence.	
		6.1.6) Preliminary drawings shall be submitted to BHEL for checking in check prints. After getting the comments from BHEL the corrections are to be incorporated in the final drawings.	
		6.1.7)Final drawings in CDs and the corrected print for verification shall positively be submitted to BHEL as per schedule specified on the basis of work	
		6.1.8) Upon completion of Jobs all typical sample drawings and transmittal information, which are provided for guidance shall be returned to BHEL	
		6.1.9)The contractor shall preserve the AUTOCAD drawing files either	

		on the hard disk of PC or on backup CDS till such time they get clearance from BHEL to erase them.	
6.2	**Qualifications/Technical requirements.**		
		6.2.1) The bidder should have necessary experience of minimum 2years in preparing manufacturing drawings for ducting systems of utility thermal power plants of ratings 500MW and above. Vendor to produce sample of such outputs produced and necessary credentials like Order placed & completed on the vendor, Agreement executed and other relevant details in support of their experience in the technical bid.	
		6.2.2) In order to have better, efficient and frequent interaction, Firms registered and operating in Tamilnadu only need to apply.	
		6.2.3)Vendor should have a local representative with adequate technical knowledge & Liaison office stationed at Trichy to complete the work in time and for effective co-ordination and	

		clarification.	
		6.2.4) Knowledge of IS 800 standard codes are essential for duct detailing.	
6.3	**Infrastructure facilities:**	Vendor shall possess the following infrastructure:	
		6.3.1) Minimum 4 nos of PCs with Licensed version of AutoCAD package shall be available	
		6.3.2)An office with sufficient space to accommodate the above said PCs with telephone and email facilities	
		6.3.3) Minimum 4 drafting staff with one supervisor to guide and check all drawings shall be available.	
		6.3.4) A spot visit by a designated team from BHEL will assess the technical capabilities and requirement of the bidder as given above in the technical requirements.	
6.4	**Statutory requirements**		
		6.4.1) Vendor shall confirm his compliance with all statutory requirements, rules, regulations, notifications in relation to employment of his employees issued from time to time by the concerned authorities.	

7.0	**Schedule of the job completion**		
		Schedule of the job completion is to be strictly adhered to, any repeated failure in meeting the schedule will result termination of the contract.	
7.1	**Preparation of duct arrangement drawings**	Schedule No. of .days for completion – 15 days from the receipt of input	
8.0	**Preparation of duct detail drawings**	(from the date of submission of Arrangement drawings) – 15 days	
9.0	**Method of tendering**		
		9.1)The bidder should submit two bids ie technical and price bids separately in sealed covers	
		9.2)Point wise confirmation to be given for this specification by the vendors.	
		9.3)BHEL reserves the right to increase or decrease the tendered quantity and split the tendered quantity among more than one tenderer and place orders accordingly in any proportion, based on commitment, requirement and suppliers' capability in terms of delivery and quality.	
		9.4)Lowest prices received against BHEL tender need not be the technically acceptable L1 price and BHEL reserve the right not to consider the same	

		9.5)BHEL reserves the right to negotiate or refloat the tender if the lowest prices received are not the lowest acceptable price to them inter alias other reasons	
		9.6)BHEL reserves the right to negotiate/reject the L1 rate without assigning any reason thereof	
		9.7)BHEL may order on more than one vendor in the lowest acceptable price to BHEL	
		9.8)The works contract entered into with the successful tenderer will be governed by the BHEL revised General Conditions of Contracts in force.	
		9.8.1)In all the matters of dispute the decision of the Additional GM/Non-pressure parts/PE (FB), BHEL_Trichy-14. Shall be final binding on the tenderer / contractor. AGM / PE(B) reserves all the right to reject any or all the tenders received or accept any tender or part thereof without assigning any reason therefore.	
		9.9) Offers will be obtained from the eligible vendors drawing sheet size-wise (A4 to A0) as in the **annex-B**. The open tender shall be on two part bid process. Based on the evaluation of the technical bid (as in **annex-A**) & commercial bid (as in **annex-B**), the price bid of the technical and commercial qualified	

		vendors will be opened.	
		9.10)Rate of L1 (size-wise) will be offered as counter offer for all the technically qualified vendors participating in the bidding to enable us to avail the services of adequate vendors for timely completion of the jobs. Whoever accepts the counter offer will be enlisted for drafting works after signing confidentiality agreement. *BHEL reserves the right of deciding the number of such acceptance from vendors depending on the projects availability and work load for BHEL.*	
		9.11)Depending on the contract availability for BHEL, Trichy and the project schedule, each vendor will be loaded based on their response, time adherence and quality of output. The work will be awarded based on the quality and timely completion. However the L1 vendor will be given more percentage of work than the other vendors depending upon their performance of work.	
		9.12) Rates quoted shall be FIRM throughout the period or 2 years of the contract.	
		9.13)Lowest bidder L1 will be decided on the formula (as per **annex-C**)	
10.0	**Service Tax**	SERVICE TAX: As applicable and shall	

		be quoted extra.	
		The quoted rate should be exclusive of Service Tax and inclusive of any taxes and duties levied or to be levied both by Central and State Government Statutory / regulatory authorities from time to time.. BHEL will not entertain any claim whatsoever in this regards.	
11.0	**Security Deposit**	SECURITY DEPOSIT:	
		a)Security Deposit should be paid by the Vendor. Security Deposit shall be collected from the successful tenderer as shown below: Up to Rs.10 Lakhs: 10% of Contract Value Above Rs.10 lakhs up to Rs.50 Lakhs : 1 Lakh + 7.5% of the amount exceeding Rs.10Lakhs The Security Deposit shall be collected before start of the Work.	
		b)Vendor may furnish the Security Deposit in any one of the following forms: i) Cash (as permissible under the Income Tax Act) ii) Demand Draft in favour of BHEL Trichy -14.	
		c)Security deposit can also be recovered at the rate of 10%	

		from the running bills. However in such cases at least 50% of the Security Deposit should be collected (any of the above form) and the balance 50% may be recovered from the running bills.	
		d)The security deposit shall not carry any interest.	
		e)REFUND OF SECURITY DEPOSIT:- The Security Deposit mentioned above may be refunded to the Contractor after a period of 6 months on termination or expiry of the contract provided always that the Contractor shall first have been paid the last and final bill and have rendered a "NO DEMAND CERTIFICATE	
12.0	**SUBMISSION OF BILLS BY CONTRACTOR:**	The Vendor after completing drawings of a job order shall submit a bill in duplicate detailing the various items of work done in the job order supported by the requisitions issued from time to time.	
13.0	**PAYMENT OF BILLS:-**	All payments to be made to the Vendor, under this contract shall be through electronic mode within a reasonable time after the certification of bills by the Engg. dept. Requisite mandate in the prescribed format to be submitted	

		before release of the first payment.	
14)	**Penalty / Diversion / Cancellation**	1.0)Schedule of the job duration as enlisted above shall be strictly adhered by the Vendor. 2.0)If the schedule is violated for the first time, a warning letter will be issued. If the delay occurs repeatedly for the next time, the job order will be diverted to any other vendor or even the contract is liable to be cancelled. 3.0)If there is no response from the vendor for BHEL intimations, it will be assumed that the Vendor is not interested in the contract and the job order will be diverted to suitable vendor who meets schedule and the required quality. 4.0)Also the security deposit or any other payment, if any, due to vendor will be forfeited in total without prejudice to any other action like blacklisting the vendor for subsequent tender etc.,	
15)	**Address / Last date for tender applications.**	Tenders along with filled up annexures to be sent to **The AGM, Quality Control, New Quality Building, BHEL, Trichy-14, Tamilnadu** on or	

		before xx/xx/2013. Late tenders will not be taken into consideration. Sealed envelop should bear the caption “Tender application for outsourcing of Duct drawings”. Tender opening time & date for technical bid and price bid will be intimated later.	

DEVIATION REPORT

Vendor has to sign with seal on every page of the xerox copy of the specification TS/DUCT/EOL/Rev.00….for acceptance.

And if any deviation in any clause of the specification, then it is to be clearly mentioned in this deviation report.

If no deviation taken, then NIL deviation report to be submitted along with offer.

Clause. No.	Requirement	COMMENT / Deviation

DATE:

Signature of vendor

Seal

ANNEXURE – E (Sample Input – Layout Drgs)

1. Drg.No. 0-00-020-76005
2. Drg.No. 0-00-020-76006

ANNEXURE – F (Sample Input – Transmittal – Loading & Location)

1. Transmittal –

ANNEXURE – G (Sample Input – Stiffener Chart)

1. Stiffener chart transmittal – (12 Sheets)

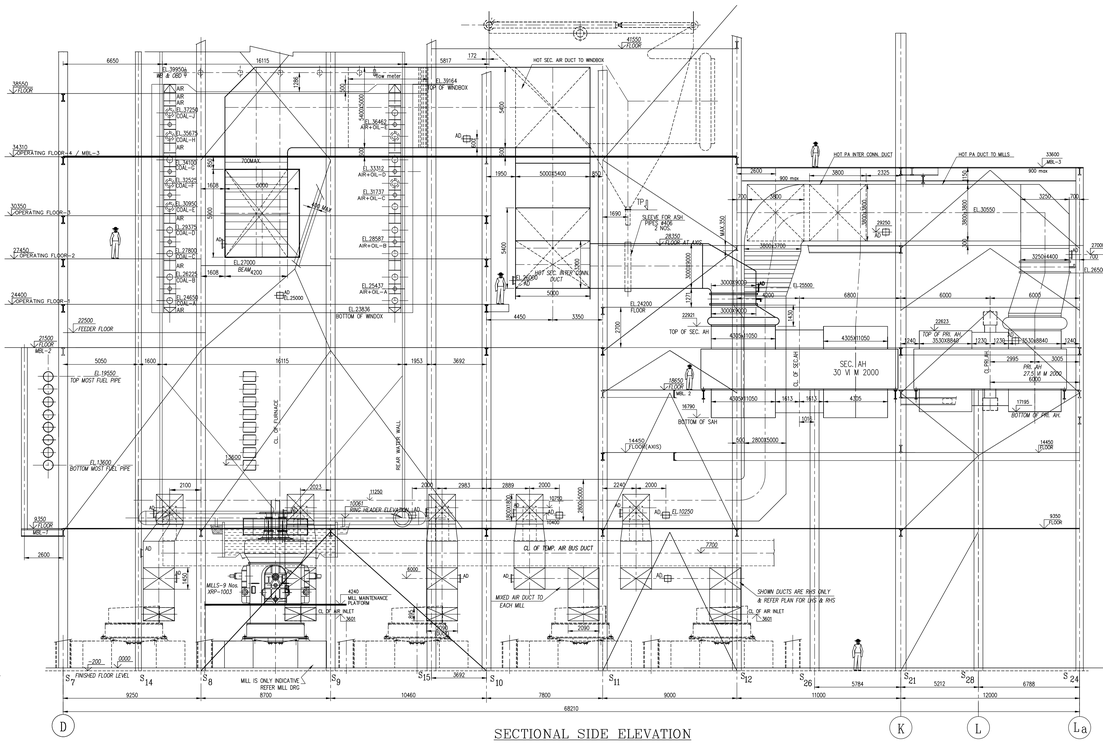
ANNEXURE – H (Sample Output – Duct Arrangement Drawings)

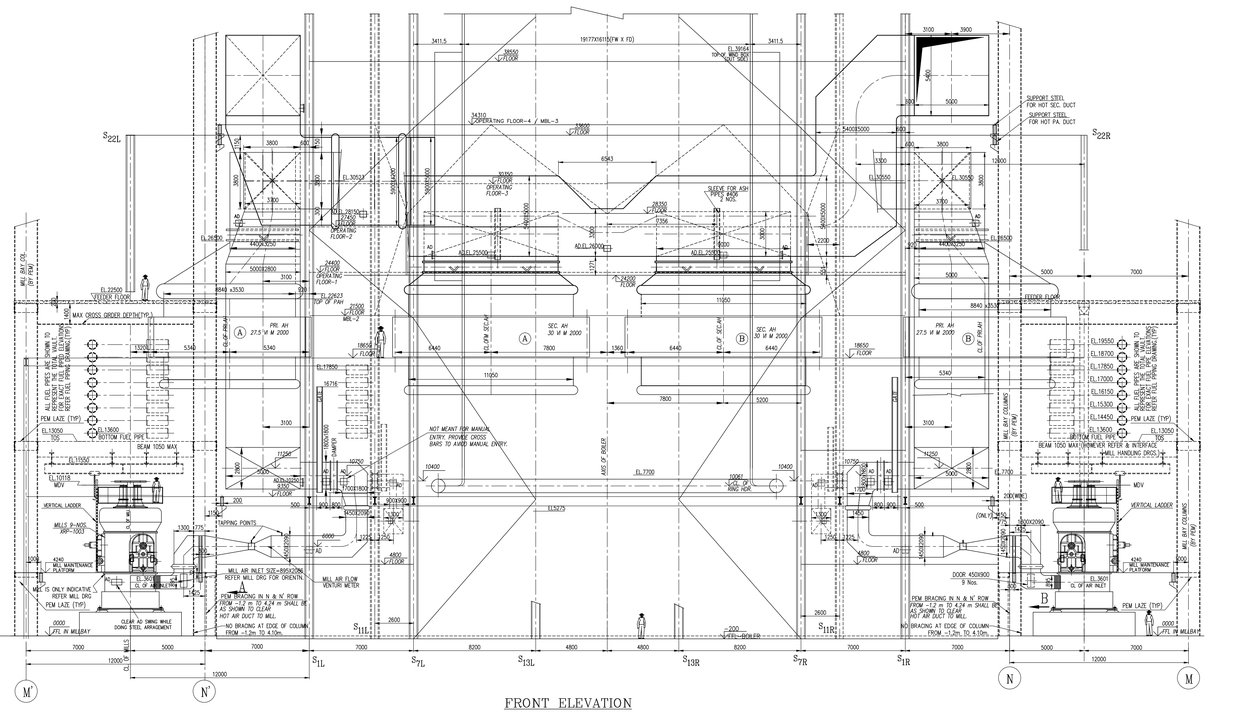
1. Drg.No. 0-00-264-89962
2. Drg.No. 0-00-264-89997
3. Drg.No. 0-00-264-89998
4. Drg.No. 1-00-264-20880
5. Drg.No. 0-00-264-89999

ANNEXURE – J (Sample Output – Duct Detail Drawings)

1. Drg.No. 1-48-202-40984
2. Drg.No. 1-48-202-40985
3. Drg.No. 1-48-202-40986
4. Drg.No. 1-48-202-40987
5. Drg.No. 1-48-202-40988
6. Drg.No. 1-48-202-40989
7. Drg.No. 1-48-202-40990
8. Drg.No. 1-48-202-42159
9. Drg.No. 2-48-202-49652
10. Drg.No. 2-48-202-49653
11. Drg.No. 2-48-202-49654
12. Drg.No. 2-48-202-49655
13. Drg.No. 2-48-202-49656
14. Drg.No. 3-48-202-73079
15. Drg.No. 3-48-202-73081
16. Drg.No. 3-48-202-73082
17. Drg.No. 3-48-202-73083
18. Drg.No. 3-48-202-73084
19. Drg.No. 3-48-202-78238
20. Drg.No. 3-48-202-78241

DRAWING NO: 0-00-020-76005



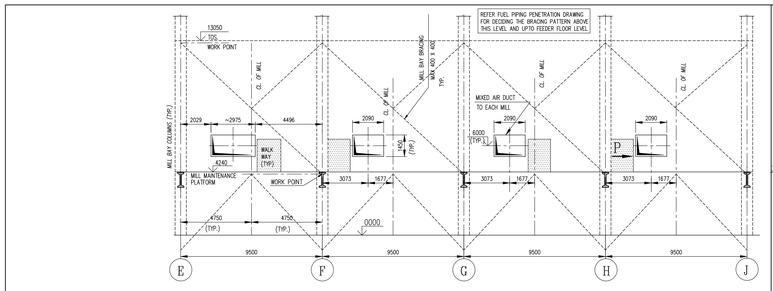


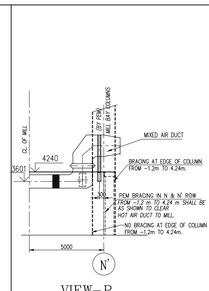
REFERENCE DRAWING NOS.:-

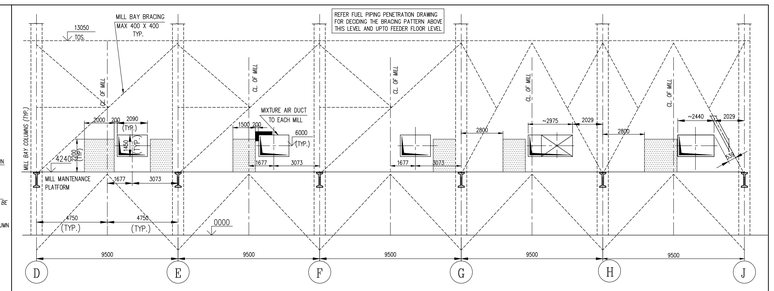
1. G.A. OF BOILER SECTIONAL SIDE ELEVATION --- 0-00-022-75995
2. G.A. BOILER SECTIONAL PLAN (SECTION "AA") -- 0-00-022-75996

NOTES:-

1. ALL THE DUCT SIZES ARE TO INSIDE ONLY UNLESS SPECIFIED.
2. ALL INNER CORNERS OF DUCT TURNING ARE 300 RADIUS ONLY.
3. THIS DRAWING IS VALID ONLY FOR HOT AIR DUCTING & HENCE OTHER DETAILS CAN BE REFERRED IN RELEVANT DRAWINGS ONLY.
4. THIS DRAWING SHOULD BE READ ALONG WITH 0-00-020-76006
5. THE CABLE RACKS AND PIPE RACKS SHOULD CLEAR ALL DUCTINGS AND SUPPORTS.
6. PEM TO RESTRICT THEIR MEMBER SIZES AND VERTICAL BRACINGS IN MILL BAY AREA TO CLEAR THE EXISTING ROUTING OF HOT AIR DUCTS.
7. THE ELEVATION 0.00m CORRESPONDS TO RL. (+)34.5m
8. ACCESS DOORS ARE SHOWN FOR THE INTERNAL MAINTENANCE OF DUCT & ALLIED SYSTEMS.
9. ALL ACCESS DOORS SHALL BE LOCATED 500 TO 600 mm FROM BOTTOM OF DUCT ACCORDING TO FLOOR PLAN AND SITE CONDITIONS.
10. ALL MATING FLANGE OF DAMPER CONNECTING DUCTS SHOULD NOT TO BE GREATER THAN DAMPER FLANGE WIDTH TO CLEAR LINKAGES AND ACTUATOR.



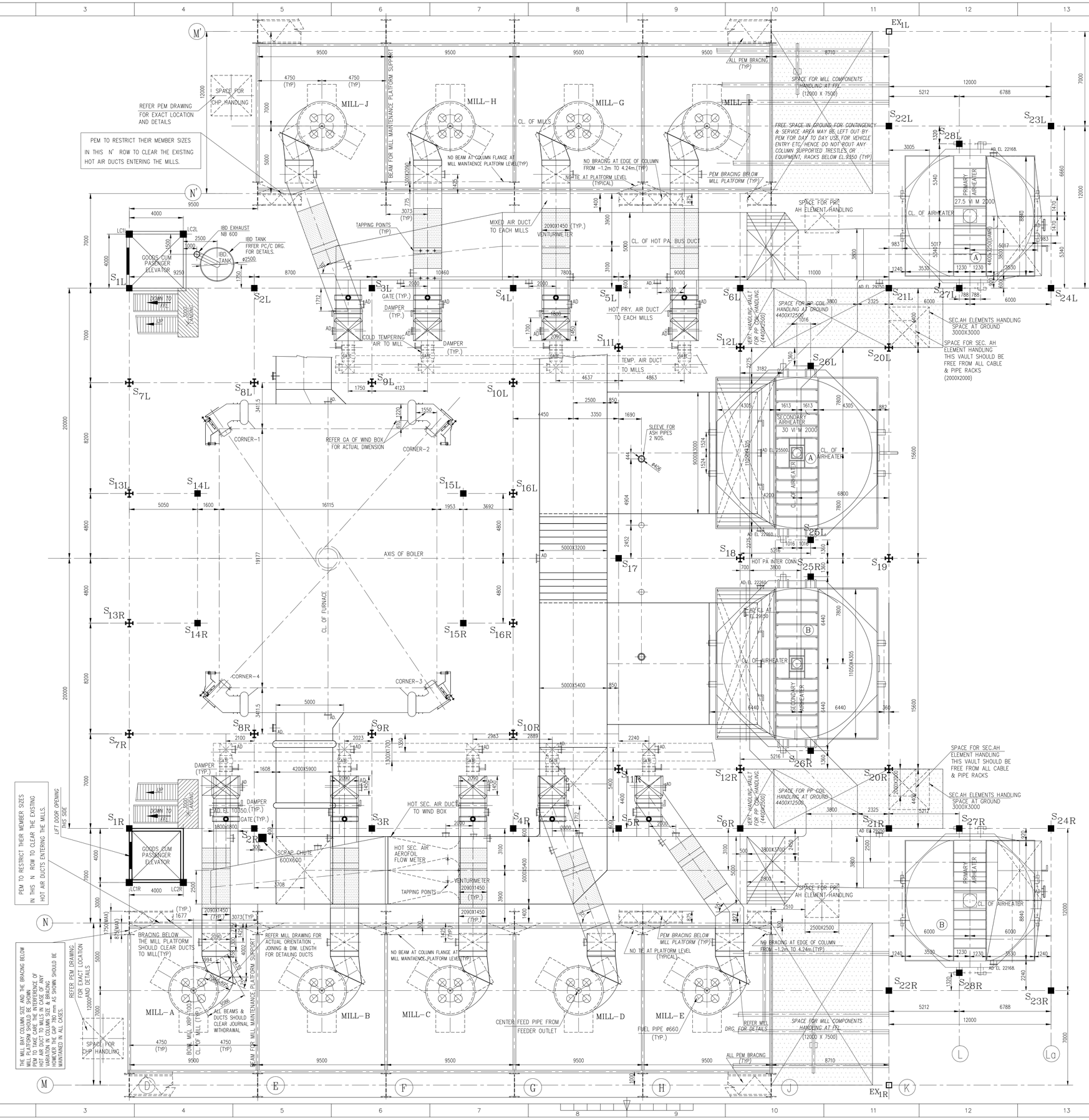




BHARAT HEAVY ELECTRICALS LIMITED., BOILER PLANT UNIT; TIRUCHIRAPALLI-620014				
COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.		NAME	SIGN	DATE
	DRN			
	CHD		-sd-	
	APPD			
TITLE: LAYOUT OF HOT AIR DUCTING (ELEVATION)				
DRAWING NO. 0-00-020-76005	SCALE 1:150	CUSTOMER DRAWING NO.		
		SHEET 01 OF 02		REV. 00

A0-SIZE

DRAWING NO: 0-00-020-76006



NOTES:-

1. ALL THE DUCT SIZES ARE TO INSIDE ONLY UNLESS SPECIFIED.
2. ALL INNER CORNERS OF DUCT TURNING ARE 300 RADIUS ONLY.
3. THIS DRAWING IS VALID ONLY FOR HOT AIR DUCTING & HENCE OTHER DETAILS CAN BE REFERRED IN RELEVANT DRAWINGS ONLY.
4. THIS DRAWING SHOULD BE READ ALONG WITH 0-00-020-76005
5. THE CABLE RACKS AND PIPE RACKS SHOULD CLEAR ALL DUCTINGS AND SUPPORTS.
6. THE ELEVATION 0.00m CORRESPONDS TO RL. (+)34.5 m
7. ACCESS DOORS ARE SHOWN FOR THE INTERNAL MAINTENANCE OF DUCT & ALLIED SYSTEMS.
8. ALL ACCESS DOORS SHALL BE LOCATED 500 TO 600 mm FROM BOTTOM OF DUCT ACCORDING TO FLOOR PLAN AND SITE CONDITIONS.
9. ALL MATING FLANGE OF DAMPER CONNECTING DUCTS SHOULD NOT TO BE GREATER THAN DAMPER FLANGE WIDTH TO CLEAR LINKAGES AND ACTUATOR.

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER PLANT UNIT; TIRUCHIRAPALLI-620014

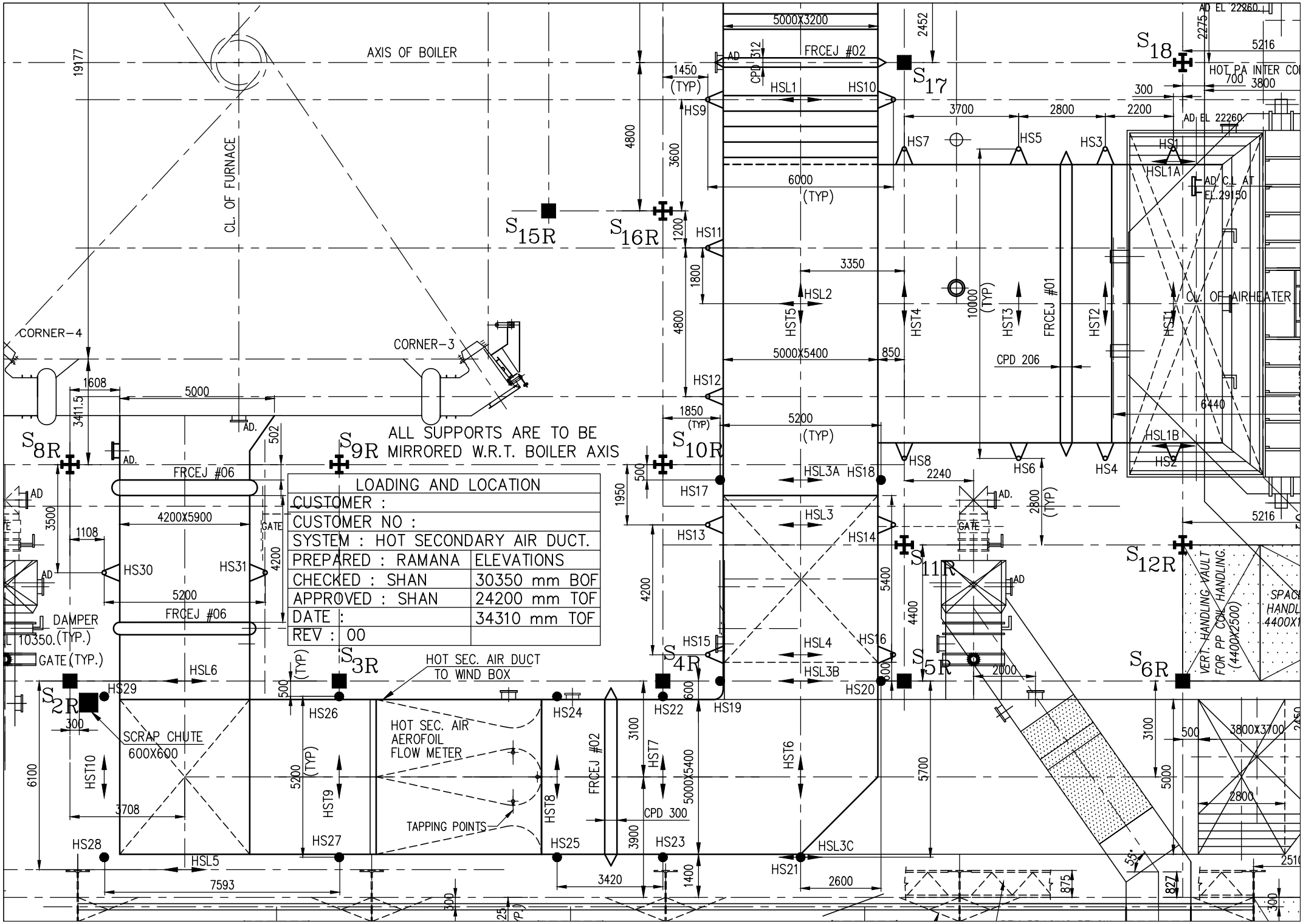
	NAME	SIGN	DATE
DRN			
CHD		-sd-	
APPD			

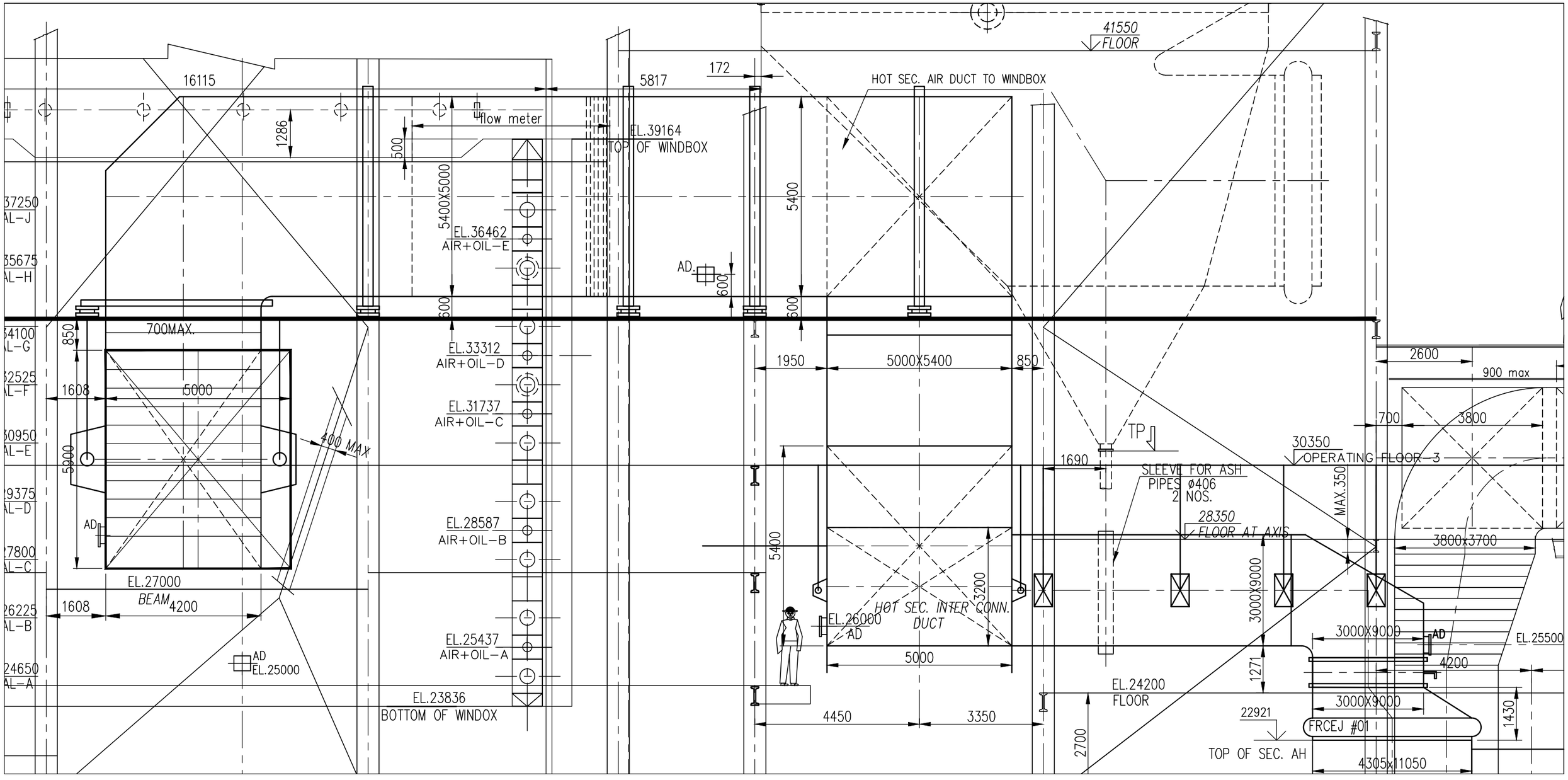
TITLE: LAYOUT OF HOT AIR DUCTING (PLAN)

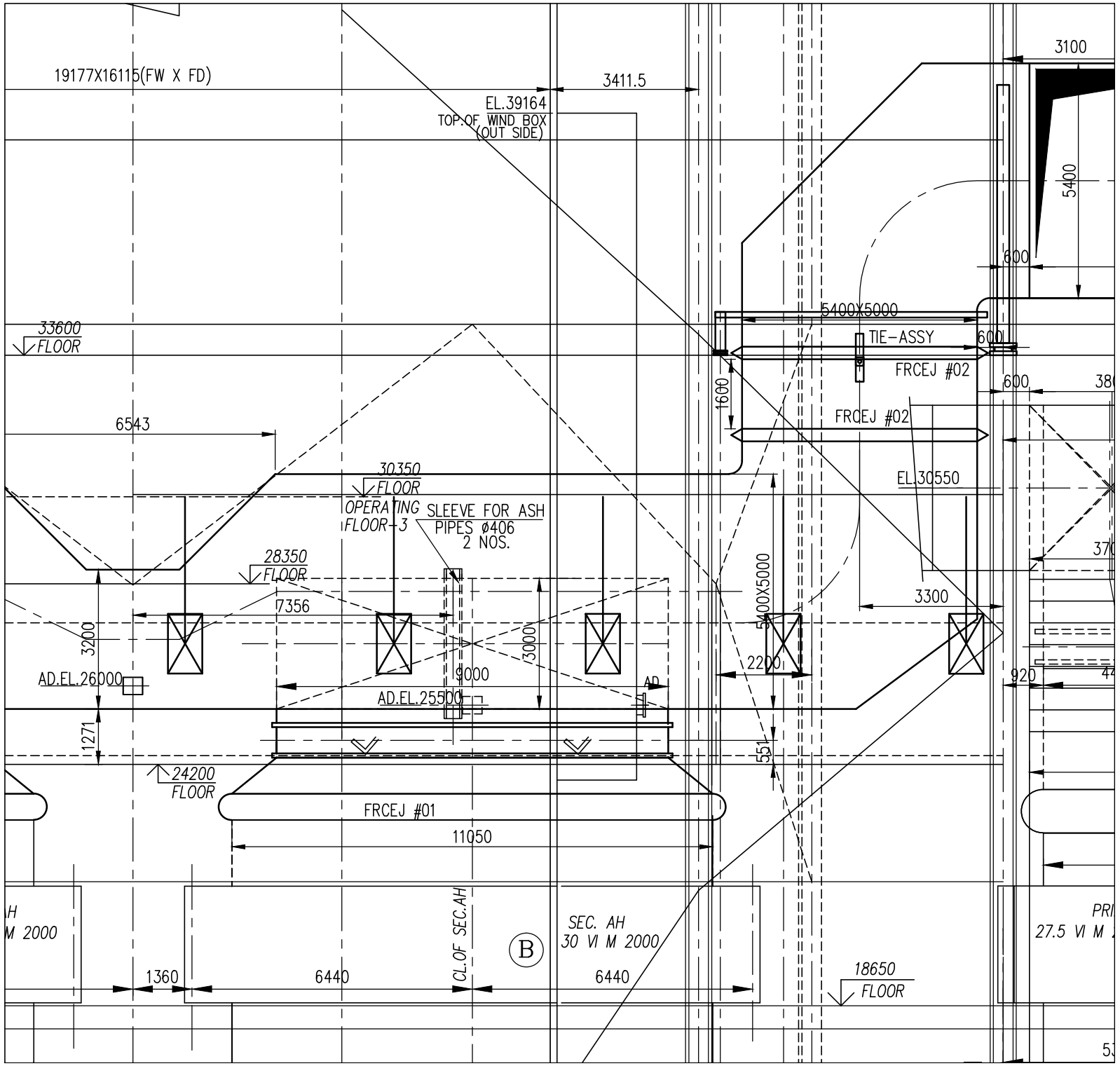
DRAWING NO. 0-00-020-76006 | SCALE 1:100 | CUSTOMER DRAWING NO.

SHEET 02 OF 02 | REV. 00

A0-SIZE


AXIS OF BOILER
CL. OF FURNACE
CL. OF AIRHEATER
CORNER-4
CORNER-3
ALL SUPPORTS ARE TO BE MIRRORED W.R.T. BOILER AXIS
LOADING AND LOCATION
CUSTOMER :
CUSTOMER NO :
SYSTEM : HOT SECONDARY AIR DUCT.
PREPARED : RAMANA
CHECKED : SHAN
APPROVED : SHAN
DATE :
REV : 00
ELEVATIONS
30350 mm BOF
24200 mm TOF
34310 mm TOF
FRCEJ #01
FRCEJ #02
FRCEJ #06
HOT SEC. AIR DUCT TO WIND BOX
HOT SEC. AIR AEROFOIL FLOW METER
TAPPING POINTS
SCRAP CHUTE 600X600
DAMPER 10350.(TYP.)
GATE(TYP.)
CPD 206
CPD 300
VERT. HANDLING VAULT FOR PP COIL HANDLING. (4400X2500)
HOT PA INTER CO
AD EL 22260.
AD C.L AT EL.29150
5000X3200
5000X5400
4200X5900
3800X3700
S2R
S3R
S4R
S5R
S6R
S8R
S9R
S10R
S11R
S12R
S15R
S16R
S17
S18


41550
FLOOR
16115
5817
172
HOT SEC. AIR DUCT TO WINDBOX
1286
500
flow meter
EL.39164
TOP OF WINDBOX
5400X5000
EL.36462
AIR+OIL-E
5400
AD.
600
600
600
37250
AL-J
35675
AL-H
64100
AL-G
32525
AL-F
30950
AL-E
29375
AL-D
27800
AL-C
26225
AL-B
24650
AL-A
850
700MAX.
1608
5000
5900
400 MAX
AD
EL.27000
BEAM 4200
1608
AD
EL.25000
EL.33312
AIR+OIL-D
EL.31737
AIR+OIL-C
EL.28587
AIR+OIL-B
EL.25437
AIR+OIL-A
EL.23836
BOTTOM OF WINDOX
1950
5000X5400
850
2600
900 max
700
3800
TP
30350
OPERATING FLOOR -3
1690
SLEEVE FOR ASH
PIPES ø406
2 NOS.
MAX.350
28350
FLOOR AT AXIS
3800x3700
5400
3200
HOT SEC. INTER CONN.
DUCT
EL.26000
AD
5000
3000X9000
3000X9000
AD
EL.25500
4200
1271
EL.24200
FLOOR
3000X9000
22921
FRCEJ #01
1430
2700
TOP OF SEC. AH
4305x11050
4450
3350


19177X16115(FW X FD)
3411.5
EL.39164
TOP OF WIND BOX
(OUT SIDE)
3100
5400
600
5400X5000
TIE-ASSY
600
FRCEJ #02
600
FRCEJ #02
1600
33600
FLOOR
6543
30350
FLOOR
OPERATING
FLOOR+3
SLEEVE FOR ASH
PIPES ø406
2 NOS.
EL.30550
28350
FLOOR
7356
3200
3000
5400X5000
3300
2200
AD.EL.26000
9000
AD.EL.25500
AD
920
1271
551
24200
FLOOR
FRCEJ #01
11050
CL OF SEC.AH
B
SEC. AH
30 VI M 2000
1360
6440
6440
18650
FLOOR

CUSTOMER:

CUSTOMER NO:

SYSTEM : ***HOT SECONDARY AIR DUCTING SYSTEM***

VERTICAL LOADS (IN kgs)

SUPPORT DESIGN.	DEAD LOAD	LIVE LOAD	ASH LOAD	PR. LOAD	EJ LOAD	OTM	SUPPORT ELEV. mm	BEAM SIZE **
HS1,HS2	14100	….	**2900**	**3500**	**3200**	**…..**	30350 BOF	
HS3,HS4	3200	1200	**2900**	**….**	**….**	**…..**	30350 BOF	
HS5,HS6	3900	1500	**3500**	**….**	**….**	**…..**	30350 BOF	
HS7,HS8	5300	1500	**3500**	**….**	**….**	**…..**	30350 BOF	
HS9,HS10	5300	1500	**3500**	**….**	**….**	**…..**	30350 BOF	
HS11,HS12	5300	1500	**3500**	**….**	**….**	**…..**	30350 BOF	
HS13,HS14	4600	….	**1200**	**1000**	**….**	**…..**	30350 BOF	
HS15,HS16	4600	….	**1200**	**1000**	**….**	**…..**	30350 BOF	
HS17,HS18	5500	1300	**….**	**1000**	**….**	**…..**	34310 TOF	
HS19,HS20	5500	1300	**2200**	**1000**	**….**	**…..**	34310 TOF	
HS21	7300	1800	**4200**	**….**	**….**	**…..**	34310 TOF	
HS22,HS23	2300	600	**1300**	**….**	**….**	**…..**	34310 TOF	
HS24,HS25	5500	1300	**3100**	**….**	**…..**	**…..**	34310 TOF	
HS26,HS27	8833	1300	**4200**	**….**	**…..**	**…..**	34310 TOF	
HS28,HS29	8900	1300	**….**	**….**	**…..**	**…..**	34310 TOF	
HS30,HS31	6200	2600	**3100**	**….**	**…..**	**…..**	34310 BOF	

ALL SUPPORTS ARE TO BE MIRRORED W.R.T. BOILER AXIS

** BEAM SIZE TO BE PROVIDED BY SS/PE(B) FOR DUCT SUPPORT DESIGN.

PREP:	REVD:	APPD:	DATE:	EV. NO	00	KETCH NO:
RAMANA	SHAN	SHAN				

CUSTOMER:

CUSTOMER NO:

SYSTEM : ***HOT SECONDARY AIR DUCTING SYSTEM***

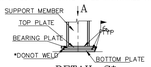
HORIZONTAL LOAD TABLE (LOAD IN kgs)

SUPPORT DESIGN.	WINDLOAD (TRANS.)	WINDLOAD (LONG)	Pr.LOAD	Exp. Joint Load	SUPPORT ELEV. in mm	BEAM SIZE**
HST1	**3700**	**…..**	**….**	**….**	30350 BOF	
HST2	**1600**	**…..**	**….**	**….**	30350 BOF	
HST3	**2000**	**…..**	**….**	**….**	30350 BOF	
HST4	**2100**	**…..**	**1200**	**1700**	30350 BOF	
HST5	**3200**	**…..**	**1200**	**1700**	30350 BOF	
HST6	**5100**	**…..**	**….**	**….**	34310 TOF	
HST7	**4300**	**…..**	**….**	**….**	34310 TOF	
HST8	**5700**	**…..**	**….**	**….**	34310 TOF	
HST9	**7600**	**…..**	**1800**	**….**	34310 TOF	
HST10	**9000**	**…..**	**1800**	**….**	34310 TOF	
HSL1A,HSL1B	**….**	**7800**	**2000**	**3800**	30350 BOF	
HSL1	**….**	**4800**	**1300**	**2500**	30350 BOF	
HSL2	**….**	**7400**	**1300**	**2500**	30350 BOF	
HSL3	**….**	**7800**	**1300**	**2500**	24200 TOF	
HSL4	**….**	**3100**	**….**	**….**	24200 TOF	
HSL3A	**….**	**4700**	**….**	**….**	34310 TOF	
HSL3B	**….**	**8800**	**2000**	**2600**	34310 TOF	
HSL3C	**….**	**3100**	**2000**	**2600**	34310 TOF	
HSL5,HSL6	**….**	**6400**	**2000**	**2600**	34310 TOF	
**- BEAM SIZE TO BE PROVIDED BY SS/PE(B) for Duct Support Design.						
PREPARED:	REVIEWED:	APPROVED	DATE:		SKETCH NO:	
RAMANA	SHANMUGAM	B.M.K.			REVISION NO:	00
ALL SUPPORTS ARE TO BE MIRRORED W.R.T. BOILER AXIS						

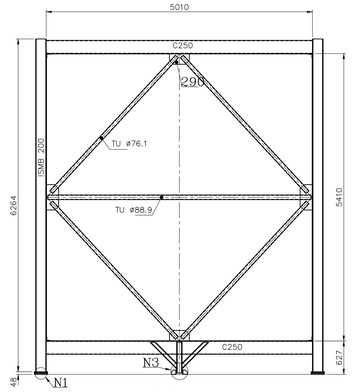
DRAWING NO: PEB-DU-SUP-01

SYMBOL	DESCRIPTION
HANGER SUPPORT	6± TYP; CL OF DUCT; 6± TYP
MOVEMENT RESTRICTED IN THIS DIRECTION MARKED BY ARROWS	RESTRAINT MEMBER; STOPPER; 25 TYP; 2GAP TYP; VIEW–N
MOVEMENT RESTRICTED IN THIS DIRECTION MARKED BY ARROWS	2GAP TYP; BEARING PLATE; *DONOT WELD; TOP PLATE; STOPPER; VIEW–E; BOTTOM PLATE
FREE SUPPORT	SUPPORT MEMBER; BEARING PLATE; *DONOT WELD; BOTTOM PLATE; TOP PLATE; VIEW–A
MOVEMENT RESTRICTED IN THIS DIRECTION MARKED BY ARROWS	RESTRAINT MEMBER; STOPPER; 2GAP TYP; 25 TYP; VIEW–G
MOVEMENT RESTRICTED IN ALL DIRECTION	SUPPORT MEMBER; BEARING PLATE; 2GAP TYP; STOPPER; BOTTOM PLATE; TOP PLATE; VIEW–M

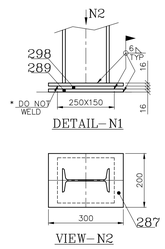
NOTES
01. SUPPORT LOCATION AND DIRECTION SHOWN IN THE SKETCH IS VALID FOR ALL POINTS.
02. THE ARRANGEMENT OF BOTTOM PLATE, BEARING PLATE AND TOP PLATE SHOULD BE INLINE AT COLD CONDITION AS SHOWN IN DETAIL–S*.
03. THE GAP BETWEEN STOPPER AND TOPLATE SHOULD BE 2mm GAP ONLY.
04. THE ELEVATION OF SUPPORT POINTS TO BE MAINTAINED AT SITE.



DETAIL–S*

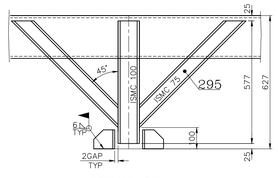


SECTION–1

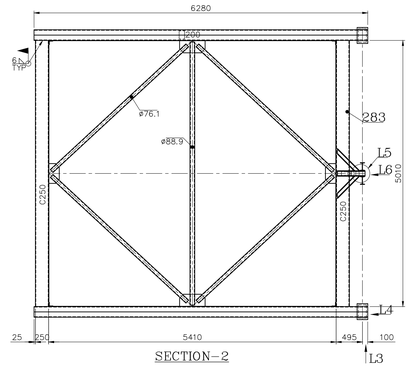


DETAIL–N1

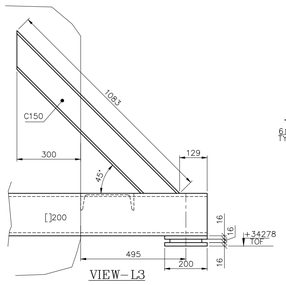
VIEW–N2



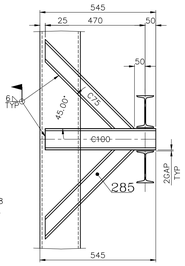
DETAIL–N3



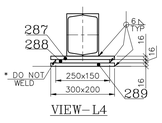
SECTION–2



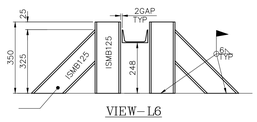
VIEW–L3



DETAIL–L5

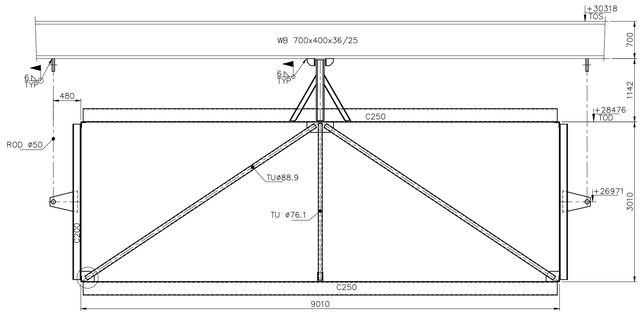


VIEW–L4

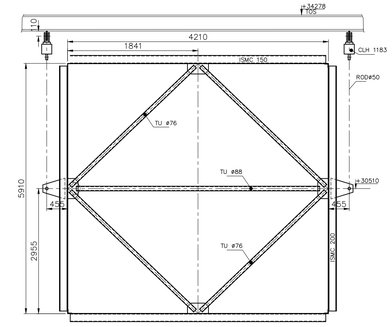


VIEW–L6

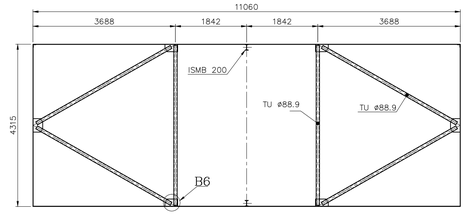
FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299



SECTION–3



SECTION–4



SECTION–5

CUSTOMER NO:

PROJECT

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER PLANT UNIT; TIRUCHIRAPALLI–620014
EQUIPMENT : STEAM GENERATOR

355–029

	NAME	SIGNATURE	DATE
DRN	KULA		29.06.12
CHD	RAMANA		29.06.12
APPD	SHAN		29.06.12

TITLE: TYPICAL DUCT SUPPORT SECTIONS

ALL DIMENSIONS IN MILLIMETRE

PROJECTION | SCALE:

DRG. NO. PEB–DU–SUP–01 | REV 00

REV	DATE	ALTERED :
01		CHD & APPD :
ZONE		

STIFFENER SELECTION CHART

STIFFENER SELECTION CHART FOR TOP PANELS : STIFFENER SPACING VS STIFFENER SPAN

(NOTE: THE FIRST VALUE OF SPAN IS FOR SINGLE SPAN CONDITION AND THE SECOND FOR MULTIPLE SPAN CONDITION)

SPACING (MM)	FLAT50	FLAT65	ISMC75	ISMC100	ISMC125	ISMC150	ISMC200	ISMC250	ISMC300	ISMC400	ISMB125	ISMB150	ISMB200	ISMB250	ISMB300
1094	925	1186	1703	2193	2813	3427	4447	5680	6238	7129	2860	3281	4830	5793	6320
	925	1186	1703	2193	2813	3427	4447	5680	6238	7129	2860	3281	4840	5793	6320
1050	925	1190	1725	2228	2862	3490	4531	5680	6238	7129	2911	3340	4895	5793	6320
	925	1190	1725	2228	2862	3490	4531	5680	6238	7129	2911	3340	4933	5793	6320
1000	925	1198	1752	2271	2923	3568	4635	5680	6238	7129	2973	3414	4973	5793	6320
	925	1198	1752	2271	2923	3568	4635	5680	6238	7129	2973	3414	5046	5793	6320
950	925	1209	1784	2318	2990	3652	4747	5680	6238	7129	3041	3494	5056	5793	6320
	925	1209	1784	2318	2990	3652	4747	5680	6238	7129	3041	3494	5169	5793	6320
900	926	1222	1819	2371	3063	3744	4869	5680	6238	7129	3115	3582	5145	5793	6320

	926	1222	1819	2371	3063	3744	4869	5680	6238	7129	3115	3582	5188	5793	6320
850	929	1240	1859	2430	3143	3844	4979	5680	6238	7129	3197	3677	5188	5793	6320
	929	1240	1859	2430	3143	3844	5002	5680	6238	7129	3197	3677	5188	5793	6320
800	935	1261	1905	2495	3231	3929	5078	5680	6238	7129	3287	3783	5188	5793	6320
	935	1261	1905	2495	3231	3954	5139	5680	6238	7129	3287	3783	5188	5793	6320
750	945	1287	1957	2568	3329	4012	5139	5680	6238	7129	3372	3899	5188	5793	6320
	945	1287	1957	2568	3329	4076	5139	5680	6238	7129	3387	3899	5188	5793	6320
700	958	1318	2015	2650	3413	4103	5139	5680	6238	7129	3449	4005	5188	5793	6320
	958	1318	2015	2650	3438	4211	5139	5680	6238	7129	3498	4028	5188	5793	6320
650	977	1354	2082	2742	3496	4203	5139	5680	6238	7129	3534	4102	5188	5793	6320
	977	1354	2082	2742	3560	4361	5139	5680	6238	7129	3623	4172	5188	5793	6320
600	1000	1398	2159	2839	3589	4313	5139	5680	6238	7129	3627	4210	5188	5793	6320
	1000	1398	2159	2847	3698	4448	5139	5680	6238	7129	3763	4334	5188	5793	6320
550	1030	1449	2233	2921	3691	4436	5139	5680	6238	7129	3731	4330	5188	5793	6320
	1030	1449	2247	2966	3854	4448	5139	5680	6238	7129	3922	4442	5188	5793	6320

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  500   1067    1510    2304    3013    3807    4448    5139    5680    6238    7129    3848    4442    5188    5793    6320
        1067    1510    2349    3103    4034    4448    5139    5680    6238    7129    4050    4442    5188    5793    6320
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STIFFENER SELECTION CHART FOR SIDE PANELS : STIFFENER SPACING VS STIFFENER SPAN

(NOTE: THE FIRST VALUE OF SPAN IS FOR SINGLE SPAN CONDITION AND THE SECOND FOR MULTIPLE SPAN CONDITION)

SPACING (MM)	FLAT50	FLAT65	ISMC75	ISMC100	ISMC125	ISMC150	ISMC200	ISMC250	ISMC300	ISMC400	ISMB125	ISMB150	ISMB200	ISMB250	ISMB300
1242	1012	1295	1847	2374	3044	3712	4826	5680	6238	7129	3095	3550	5102	5793	6320
	1012	1295	1847	2374	3044	3712	4826	5680	6238	7129	3095	3550	5188	5793	6320
1200	1012	1298	1865	2404	3088	3769	4897	5680	6238	7129	3141	3605	5161	5793	6320
	1012	1298	1865	2404	3088	3769	4904	5680	6238	7129	3141	3605	5188	5793	6320
1150	1012	1303	1890	2443	3145	3833	4967	5680	6238	7129	3199	3674	5188	5793	6320
	1012	1303	1890	2443	3145	3843	5004	5680	6238	7129	3199	3674	5188	5793	6320
1100	1012	1310	1917	2487	3207	3890	5041	5680	6238	7129	3262	3749	5188	5793	6320
	1012	1310	1917	2487	3207	3922	5111	5680	6238	7129	3262	3749	5188	5793	6320
1050	1012	1320	1948	2534	3274	3951	5120	5680	6238	7129	3315	3830	5188	5793	6320
	1012	1320	1948	2534	3274	4007	5139	5680	6238	7129	3331	3830	5188	5793	6320

1000	1012	1334	1983	2587	3334	4016	5139	5680	6238	7129	3370	3916	5188	5793	6320
	1012	1334	1983	2587	3347	4100	5139	5680	6238	7129	3405	3918	5188	5793	6320
950	1014	1350	2022	2645	3391	4085	5139	5680	6238	7129	3428	3983	5188	5793	6320
	1014	1350	2022	2645	3427	4200	5139	5680	6238	7129	3486	4014	5188	5793	6320
900	1019	1370	2066	2708	3453	4159	5139	5680	6238	7129	3490	4056	5188	5793	6320
	1019	1370	2066	2708	3514	4310	5139	5680	6238	7129	3575	4118	5188	5793	6320
850	1027	1393	2116	2778	3519	4239	5139	5680	6238	7129	3557	4134	5188	5793	6320
	1027	1393	2116	2779	3610	4430	5139	5680	6238	7129	3673	4232	5188	5793	6320
800	1038	1421	2164	2835	3591	4326	5139	5680	6238	7129	3630	4218	5188	5793	6320
	1038	1421	2171	2857	3715	4448	5139	5680	6238	7129	3780	4357	5188	5793	6320
750	1054	1454	2211	2896	3669	4420	5139	5680	6238	7129	3709	4310	5188	5793	6320
	1054	1454	2233	2944	3832	4448	5139	5680	6238	7129	3899	4442	5188	5793	6320
700	1073	1493	2262	2964	3755	4448	5139	5680	6238	7129	3795	4410	5188	5793	6320
	1073	1493	2304	3041	3961	4448	5139	5680	6238	7129	4031	4442	5188	5793	6320

650	1098	1538	2319	3038	3849	4448	5139	5680	6238	7129	3890	4442	5188	5793	6320
	1098	1538	2383	3150	4037	4448	5139	5680	6238	7129	4050	4442	5188	5793	6320
600	1128	1590	2382	3120	3953	4448	5139	5680	6238	7129	3995	4442	5188	5793	6320
	1128	1590	2474	3274	4037	4448	5139	5680	6238	7129	4050	4442	5188	5793	6320
550	1166	1652	2452	3212	4037	4448	5139	5680	6238	7129	4050	4442	5188	5793	6320
	1166	1652	2578	3415	4037	4448	5139	5680	6238	7129	4050	4442	5188	5793	6320
500	1211	1725	2531	3316	4037	4448	5139	5680	6238	7129	4050	4442	5188	5793	6320
	1211	1725	2699	3565	4037	4448	5139	5680	6238	7129	4050	4442	5188	5793	6320

STIFFENER SELECTION CHART FOR BOTTOM PANELS : STIFFENER SPACING VS STIFFENER SPAN

(NOTE: THE FIRST VALUE OF SPAN IS FOR SINGLE SPAN CONDITION AND THE SECOND FOR MULTIPLE SPAN CONDITION)

SPACING (MM)	FLAT50	FLAT65	ISMC75	ISMC100	ISMC125	ISMC150	ISMC200	ISMC250	ISMC300	ISMC400	ISMB125	ISMB150	ISMB200	ISMB250	ISMB300
1161	964	1234	1765	2269	2908	3540	4591	5680	6238	7129	2956	3389	4931	5793	6320
	964	1234	1765	2269	2908	3540	4591	5680	6238	7129	2956	3389	4996	5793	6320
1150	964	1235	1770	2277	2919	3555	4611	5680	6238	7129	2968	3403	4947	5793	6320
	964	1235	1770	2277	2919	3555	4611	5680	6238	7129	2968	3403	5018	5793	6320
1100	964	1240	1794	2316	2974	3626	4706	5680	6238	7129	3024	3470	5018	5793	6320
	964	1240	1794	2316	2974	3626	4706	5680	6238	7129	3024	3470	5122	5793	6320
1050	964	1247	1821	2358	3034	3702	4808	5680	6238	7129	3086	3543	5094	5793	6320
	964	1247	1821	2358	3034	3702	4808	5680	6238	7129	3086	3543	5188	5793	6320
1000	964	1257	1851	2405	3099	3785	4917	5680	6238	7129	3152	3622	5175	5793	6320
	964	1257	1851	2405	3099	3785	4918	5680	6238	7129	3152	3622	5188	5793	6320

950	964	1270	1886	2456	3171	3868	4999	5680	6238	7129	3225	3707	5188	5793	6320
	964	1270	1886	2456	3171	3875	5037	5680	6238	7129	3225	3707	5188	5793	6320
900	967	1286	1925	2513	3249	3936	5087	5680	6238	7129	3305	3801	5188	5793	6320
	967	1286	1925	2513	3249	3972	5139	5680	6238	7129	3305	3801	5188	5793	6320
850	972	1306	1969	2577	3335	4010	5139	5680	6238	7129	3371	3903	5188	5793	6320
	972	1306	1969	2577	3335	4079	5139	5680	6238	7129	3392	3903	5188	5793	6320
800	980	1330	2018	2647	3402	4090	5139	5680	6238	7129	3438	3992	5188	5793	6320
	980	1330	2018	2647	3429	4197	5139	5680	6238	7129	3489	4015	5188	5793	6320
750	992	1359	2074	2725	3474	4176	5139	5680	6238	7129	3511	4076	5188	5793	6320
	992	1359	2074	2725	3534	4326	5139	5680	6238	7129	3595	4138	5188	5793	6320
700	1009	1393	2137	2811	3553	4271	5139	5680	6238	7129	3591	4169	5188	5793	6320
	1009	1393	2137	2812	3650	4448	5139	5680	6238	7129	3713	4276	5188	5793	6320
650	1030	1433	2202	2880	3640	4374	5139	5680	6238	7129	3678	4270	5188	5793	6320
	1030	1433	2209	2911	3779	4448	5139	5680	6238	7129	3845	4428	5188	5793	6320

600	1056	1481	2260	2956	3735	4448	5139	5680	6238	7129	3775	4382	5188	5793	6320
	1056	1481	2291	3022	3926	4448	5139	5680	6238	7129	3994	4442	5188	5793	6320
550	1089	1536	2326	3041	3842	4448	5139	5680	6238	7129	3883	4442	5188	5793	6320
	1089	1536	2385	3149	4037	4448	5139	5680	6238	7129	4050	4442	5188	5793	6320
500	1130	1602	2400	3137	3962	4448	5139	5680	6238	7129	4004	4442	5188	5793	6320
	1130	1602	2494	3295	4037	4448	5139	5680	6238	7129	4050	4442	5188	5793	6320

PHASE-3: MAXIMUM STIFFENER SPAN BASED ON CORNER ANGLE REACTION LIMITATION

(NOTE: THE FIRST VALUE OF SPAN IS FOR SINGLE SPAN CONDITION AND THE SECOND FOR MULTIPLE SPAN CONDITION)

******* 1)FOR TOP PANELS *******				****** 2)FOR SIDE PANELS ******				****** 3)FOR BOTTOM PANELS ******			
SPACING (MM)	--MAX.STIFF.SPAN IN MM-- SS CORNER	WB CORNER	DS CORNER	SPACING (MM)	--MAX.STIFF.SPAN IN MM-- SS CORNER	WB CORNER	DS CORNER	SPACING (MM)	--MAX.STIFF.SPAN IN MM-- SS CORNER	WB CORNER	DS CORNER
1094	2189	3760	4832	1242	2506	4309	5539	1161	2331	4007	5149
	2600	4564	5903		2977	5231	6768		2769	4863	6291
1050	2236	3873	4989	1200	2551	4417	5690	1150	2343	4034	5187
	2664	4710	6105		3039	5372	6962		2785	4899	6340
1000	2296	4015	5187	1150	2611	4558	5886	1100	2398	4166	5372
	2746	4894	6359		3120	5554	7214		2860	5070	6577
950	2366	4175	5409	1100	2678	4714	6103	1050	2461	4314	5577
	2839	5101	6643		3210	5755	7491		2945	5261	6840

900	2446	4356	5658	1050	2755	4888	6342	1000	2533	4478	5804
	2945	5333	6960		3312	5978	7796		3041	5473	7130
850	2539	4561	5940	1000	2841	5081	6608	950	2615	4662	6058
	3067	5595	7318		3426	6226	8135		3150	5709	7454
800	2646	4794	6259	950	2939	5297	6904	900	2709	4870	6344
	3207	5893	7724		3555	6502	8512		3274	5975	7817
750	2770	5062	6625	900	3051	5540	7237	850	2817	5105	6665
	3369	6234	8187		3702	6812	8933		3415	6275	8225
700	2917	5372	7046	850	3179	5814	7611	800	2941	5373	7030
	3558	6628	8721		3868	7162	9407		3577	6616	8688
650	3089	5733	7536	800	3326	6126	8035	750	3086	5679	7447
	3780	7086	9339		4058	7558	9944		3764	7005	9216
600	3294	6159	8112	750	3497	6483	8519	700	3254	6033	7928
	4043	7624	10066		4277	8010	10555		3981	7454	9822

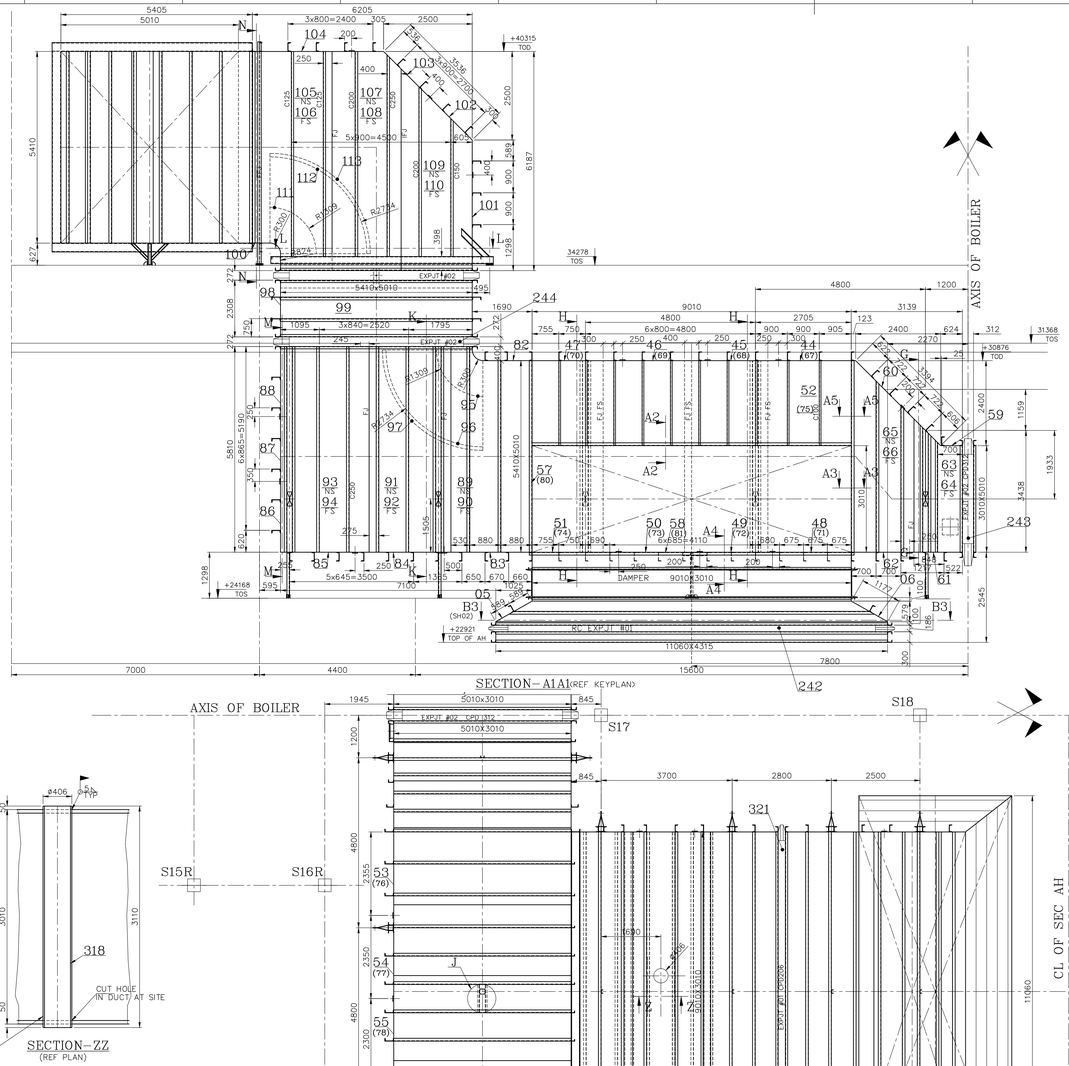
550	3542	6667	8798	700	3695	6894	9076	650	3453	6445	8485
	4359	8265	10929		4531	8530	11257		4235	7975	10526
500	3843	7281	9625	650	3927	7373	9722	600	3689	6930	9141
	4742	9039	11969		4827	9135	12071		4536	8588	11351
				600	4202	7935	10480	550	3972	7508	9919
					5178	9844	13025		4896	9316	12330
				550	4532	8604	11381	500	4316	8206	10859
					5596	10686	14157		5333	10196	13511
				500	4933	9412	12466				
					6103	11703	15520				

DRAWING NO: 0-00-264-89962

SYMBOL	DESCRIPTION
HANGER SUPPORT	
MOVEMENT RESTRICTED IN THIS DIRECTION MARKED BY ARROWS	VIEW-N
MOVEMENT RESTRICTED IN THIS DIRECTION MARKED BY ARROWS	VIEW-E
FREE SUPPORT	VIEW-A
MOVEMENT RESTRICTED IN THIS DIRECTION MARKED BY ARROWS	VIEW-G
MOVEMENT RESTRICTED IN ALL DIRECTION	VIEW-M

NOTES
01. SUPPORT LOCATION AND DIRECTION SHOWN IN THE SKETCH IS VALID FOR ALL POINTS.
02. THE ARRANGEMENT OF BOTTOM PLATE, BEARING PLATE AND TOP PLATE SHOULD BE INLINE AT COLD CONDITION AS SHOWN IN DETAIL-S*
03. THE GAP BETWEEN STOPPER AND TOPLATE SHOULD BE 2mm GAP ONLY.
04. THE ELEVATION OF SUPPORT POINTS TO BE MAINTAINED AT SITE.

DETAIL-S*



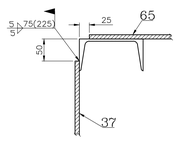
KEY PLAN
(SCALE 1:150)

SECTION-ZZ
(REF PLAN)

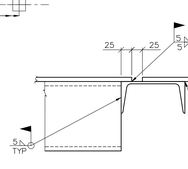
PLAN

SECTION-A1A1 (REF KEYPLAN)

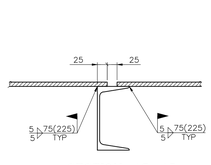
SECTION-A2-A2



SECTION-A3-A3



SECTION-A4-A4



SECTION-A5-A5

ERECTOR NOTES

1. THE DUCT SYSTEM IS DESIGNED WITHOUT REGARD TO THE LOCATION OF BLANKING OFF PLATES WHICH MAY BE REQUIRED FOR TESTING. REACTIONS WHICH MAY BE INTRODUCED BY THESE PLATES MUST BE TAKEN CARE OF BY THE ERECTOR BY PROVIDING ADEQUATE STOPS AND BRACINGS.
2. EXTERNALLY SEAL WELD AROUND ALL EXPOSED BOLTS HEADS OR NUTS WITH A SPACING GREATER THAN 100mm.
3. PATCH ALL HOLES PLACED IN STIFFENER FOR LIFTING PURPOSES AFTER DUCT IS IN PLACE.
4. FOR ADDITIONAL WELDING AND ERECTION NOTES NOT SHOWN. SEE REFERENCE NOS. OF REFERENCE DRG. NO.

   0-00-264-89997
   0-00-264-89998
   0-00-264-89999
   1-00-264-20880

5. WASHERS TO BE USED ON SLOTTED CONNECTIONS ONLY AND MUST BE LOCATED ON SLOTTED SIDE.NUT TO BE FINGER TIGHTNED.BACKED OF 1/2 TURN AND TACK WELDED TO BOLT WITH 3 .6mm LONG.
6. FIXED SUPPORTS SHOULD BE IN PLACE AND SPRING SUPPORTS AT PROPER COLD SETTING WITH STOPS AND BLOCKS REMOVED BEFORE CUTTING LOOSE.
7. ALL PIPE STRUTS OR OTHER STRUCTURAL SHAPES PAINTED WITH A YELLOW BAND ARE TO BE REMOVED AFTER DUCT ERECTION IS COMPLETE.

GENERAL NOTES

1. ONE COMPLETE DUCT ARRANGEMENT REQUIRED PER UNIT.
2. QUANTITIES INDICATED ARE FOR ONE (1)_ COMPLETE UNIT.
3. DUCTS ARE TO BE OF WELDED CONSTRUCTION PER REFERENCE NOS. IN DRG. No. 0-
4. ALL MATERIAL TO BE _CARBON_ STEEL UNLESS NOTED.
5. ALL PLATES TO BE _5mm_ UNLESS NOTED.
6. ALL DIMENSIONS ARE TO OUTSIDE OF PLATES UNLESS NOTED.
7. "F.F.J" INDICATES FLANGED FIELD JOINT.
8. "F.J" INDICATES SPLICED FIELD JOINT.
9. EXPANSION JOINTS(S) ARE TO BE FABRICATED AT A NEUTRAL POSITION PER EXPANSION JOINT ASSY. DRAWING. AT ERECTION EXPANSION JOINTS ARE TO BE INSTALLED AT THE DIMENSIONS INDICATED IN THE DUCT ARRANGEMENT DRGS.
10. ALL PIPE STRUTS OR OTHER STRUCTURAL MEMBERS THAT ARE ADDED BY THE SHOP TO DUCT SECTIONS SOLELY FOR THE PURPOSE OF SHIPPING WILL BE PAINTED WITH A YELLOW BAND.
11. CORNER CONSTRUCTION S.S TYPE.
12. ALL STIFFENERS ARE TO BE ISMC150,ISMC100,ISMC75 UNLESS NOTED.
13. THIS DRAWING IS READ ALONG WITH DRG. NO. 0-00-264-89997
    0-00-264-89998
    0-00-264-89999
    1-00-264-20880

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

CUSTOMER NO:

PROJECT

SAMPLE-ARRANGEMENT DRG - (SH.01/05)

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER PLANT UNIT; TIRUCHIRAPALLI-620014
EQUIPMENT : STEAM GENERATOR

	NAME	SIGNATURE	DATE
DRN	KULA		29.06.12
CHD	RAMANA		29.06.12
APPD	SHAN		29.06.12

TITLE: AH TO WINDBOX DUCTING (SH 01/05)

ALL DIMENSIONS IN MILLIMETRE | PROJECTION | SCALE:

DRG. NO. 0-00-264-89962 | REV 00

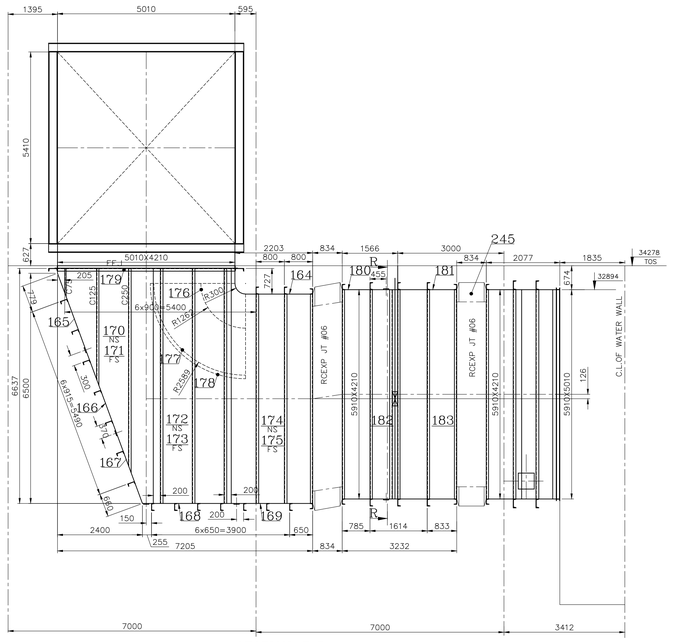
REV	DATE	ALTERED :
01		CHD & APPD :
ZONE		

DRAWING NO. 0-00-264-89997

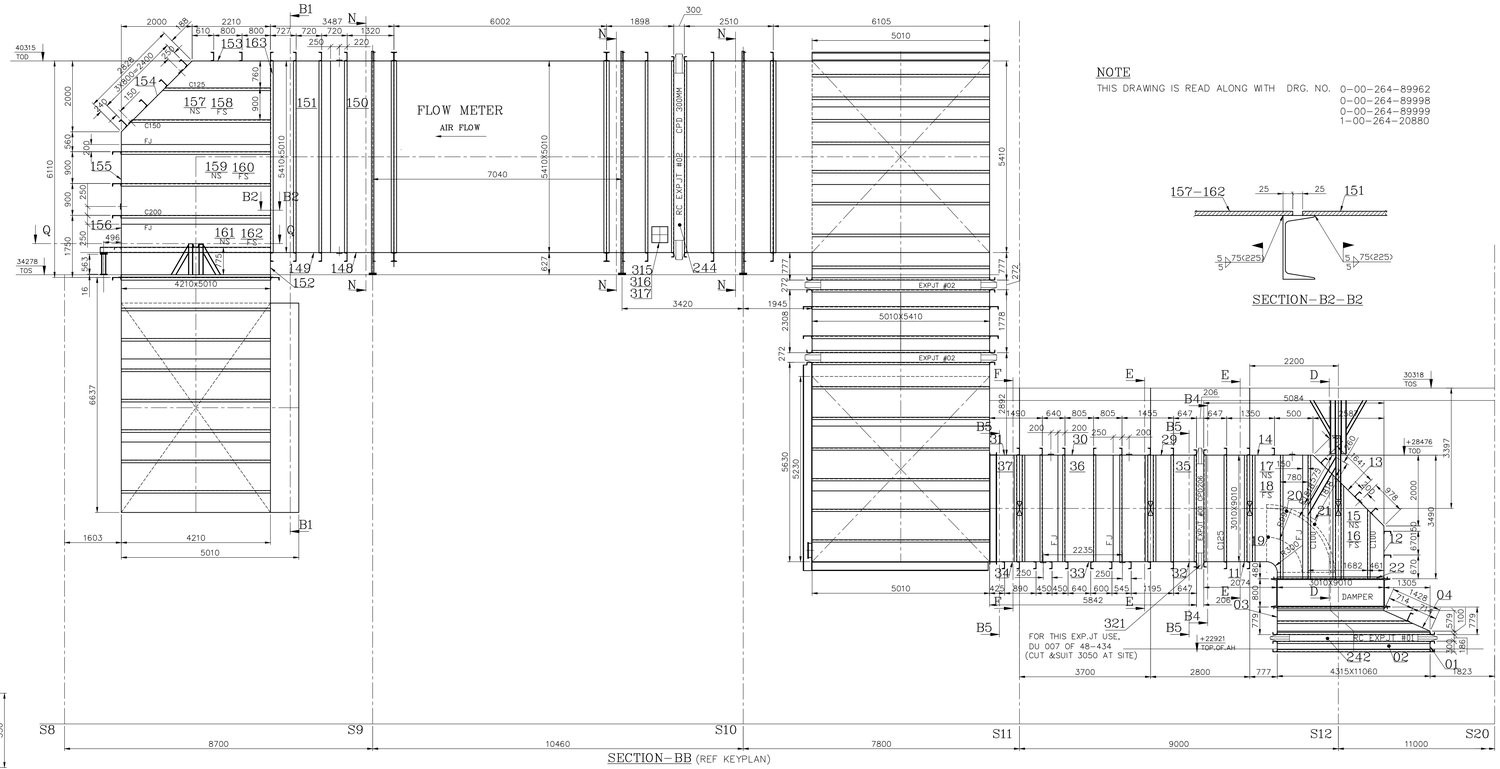
FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299

NOTE

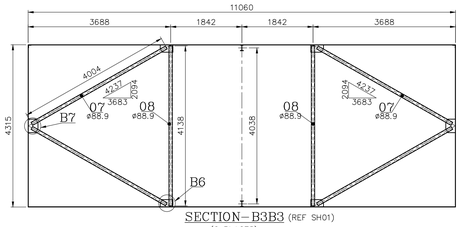
THIS DRAWING IS READ ALONG WITH DRG. NO. 0-00-264-89962
0-00-264-89998
0-00-264-89999
1-00-264-20880



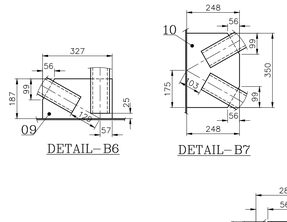
SECTION–B1B1



SECTION–BB (REF KEYPLAN)

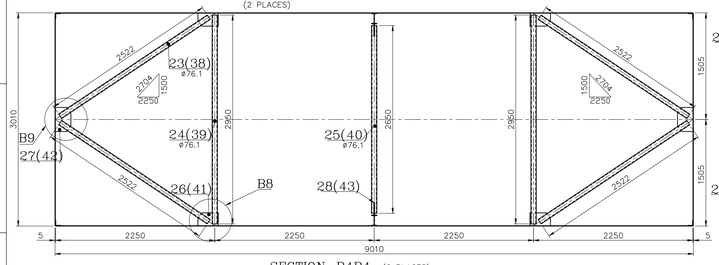


SECTION–B3B3 (REF SH01)
(2 PLACES)

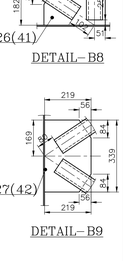


DETAIL–B6

DETAIL–B7



SECTION–B4B4 (2 PLACES)
SECTION–(B5B5) (4 PLACES)



DETAIL–B8

DETAIL–B9

187	48–202	TRANSITION WALL	187	2	H–2 SH–02
186	48–202	TRANSITION WALL	186	2	H–2 SH–02
185	48–202	TRANSITION WALL	185	2	H–3 SH–02
184	48–202	TRANSITION WALL	184	2	H–1 SH–02
183	48–202	DUCT WALL	183	4	D–4 SH–02
182	48–202	DUCT WALL	182	4	D–4 SH–02
181	48–202	DUCT WALL	181	4	C–4 SH–02
180	48–202	DUCT WALL	180	4	C–3 SH–02
179	48–202	COLLECTOR FLANGE	179	4	C–4 SH–02
178	48–202	DIVIDER PLATE	178	2	C–3 SH–02
177	48–202	GUIDE VANE	177	4	C–2 SH–02
176	48–202	GUIDE VANE	176	4	C–2 SH–02
175	48–202	ELBOW WALL	175	2	D–3 SH–02
174	48–202	ELBOW WALL	174	2	D–2 SH–02
173	48–202	ELBOW WALL	173	2	D–2 SH–02
172	48–202	ELBOW WALL	172	2	D–2 SH–02
171	48–202	ELBOW WALL	171	2	C–2 SH–02
170	48–202	ELBOW WALL	170	2	C–2 SH–02
169	48–202	ELBOW WALL	169	2	D–3 SH–02
168	48–202	ELBOW WALL	168	2	D–2 SH–02
167	48–202	ELBOW WALL	167	2	D–2 SH–02
166	48–202	ELBOW WALL	166	2	D–2 SH–02

165	48–202	ELBOW WALL	165	2	C–2 SH–02
164	48–202	ELBOW WALL	164	2	C–3 SH–02
163	48–202	COLLECTOR CHANNEL	163	4	A–7 SH–02
162	48–202	ELBOW WALL	162	2	B–7 SH–02
161	48–202	ELBOW WALL	161	2	B–7 SH–02
160	48–202	ELBOW WALL	160	2	B–7 SH–02
159	48–202	ELBOW WALL	159	2	B–7 SH–02
158	48–202	ELBOW WALL	158	2	B–7 SH–02
157	48–202	ELBOW WALL	157	2	B–7 SH–02
156	48–202	ELBOW WALL	156	2	B–6 SH–02
155	48–202	ELBOW WALL	155	2	B–6 SH–02
154	48–202	ELBOW WALL	154	2	B–7 SH–02
153	48–202	ELBOW WALL	153	2	A–7 SH–02
152	48–202	ELBOW WALL	152	2	C–7 SH–02
151	48–202	DUCT WALL	151	4	B–8 SH–02
150	48–202	DUCT WALL	150	4	B–8 SH–02
149	48–202	DUCT WALL	149	4	C–8 SH–02
148	48–202	DUCT WALL	148	4	C–5 SH–02
147	48–202	DUCT WALL	147	4	L–5 SH–01
146	48–202	DUCT WALL	146	4	L–5 SH–01
145	48–202	DUCT WALL	145	4	L–5 SH–01
144	48–202	DUCT WALL	144	4	L–5 SH–01
143	48–202	COLLECTOR FLANGE	143	2	K–7 SH–01

142	48–202	DIVIDER PLATE	142	1	L–6 SH–01
141	48–202	GUIDE VANE	141	2	L–6 SH–01
140	48–202	GUIDE VANE	140	2	L–6 SH–01
139	48–202	ELBOW WALL	139	1	L–6 SH–01
138	48–202	ELBOW WALL	138	1	L–6 SH–01
137	48–202	ELBOW WALL	137	1	L–6 SH–01
136	48–202	ELBOW WALL	136	1	L–6 SH–01
135	48–202	ELBOW WALL	135	1	L–7 SH–01
134	48–202	ELBOW WALL	134	1	L–7 SH–01
133	48–202	ELBOW WALL	133	1	L–6 SH–01
132	48–202	ELBOW WALL	132	1	L–6 SH–01
131	48–202	ELBOW WALL	131	1	L–7 SH–01
130	48–202	ELBOW WALL	130	1	L–7 SH–01
129	48–202	ELBOW WALL	129	1	K–6 SH–01
128	48–202	COLLECTOR FLANGE	128	2	K–7 SH–01
127	48–202	DIVIDER PLATE	127	1	L–6 SH–01
126	48–202	GUIDE VANE	126	2	L–6 SH–01
125	48–202	GUIDE VANE	125	2	L–6 SH–01
124	48–202	ELBOW WALL	124	1	L–6 SH–01
123	48–202	ELBOW WALL	123	1	L–6 SH–01
122	48–202	ELBOW WALL	122	1	L–6 SH–01
121	48–202	ELBOW WALL	121	1	L–6 SH–01
120	48–202	ELBOW WALL	120	1	L–7 SH–01
119	48–202	ELBOW WALL	119	1	K–7 SH–01
118	48–202	ELBOW WALL	118	1	L–6 SH–01
117	48–202	ELBOW WALL	117	1	L–6 SH–01
116	48–202	ELBOW WALL	116	1	L–7 SH–01
115	48–202	ELBOW WALL	115	1	L–7 SH–01
114	48–202	ELBOW WALL	114	1	K–6 SH–01
113	48–202	DIVIDER PLATE	113	2	B–5 SH–01
112	48–202	GUIDE VANE	112	4	B–5 SH–01
111	48–202	GUIDE VANE	111	4	B–5 SH–01
110	48–202	ELBOW WALL	110	2	B–6 SH–01
109	48–202	ELBOW WALL	109	2	B–6 SH–01
108	48–202	ELBOW WALL	108	2	B–6 SH–01
107	48–202	ELBOW WALL	107	2	A–6 SH–01
106	48–202	ELBOW WALL	106	2	B–5 SH–01
105	48–202	ELBOW WALL	105	2	A–5 SH–01

104	48–202	ELBOW WALL	104	2	A–5 SH–01
103	48–202	ELBOW WALL	103	2	A–6 SH–01
102	48–202	ELBOW WALL	102	2	A–6 SH–01
101	48–202	ELBOW WALL	101	2	B–6 SH–01
100	48–202	ELBOW WALL	100	2	B–5 SH–01
99	48–202	DUCT WALL	099	4	C–6 SH–01
98	48–202	DUCT WALL	098	4	C–5 SH–01
97	48–202	DIVIDER PLATE	097	2	D–6 SH–01
96	48–202	GUIDE VANE	096	4	D–6 SH–01
95	48–202	GUIDE VANE	095	4	C–6 SH–01
94	48–202	ELBOW WALL	094	2	D–5 SH–01
93	48–202	ELBOW WALL	093	2	D–5 SH–01
92	48–202	ELBOW WALL	092	2	D–6 SH–01
91	48–202	ELBOW WALL	091	2	D–6 SH–01
90	48–202	ELBOW WALL	090	2	D–6 SH–01
89	48–202	ELBOW WALL	089	2	D–6 SH–01
88	48–202	ELBOW WALL	088	2	C–5 SH–01
87	48–202	ELBOW WALL	087	2	D–5 SH–01
86	48–202	ELBOW WALL	086	2	D–5 SH–01
85	48–202	ELBOW WALL	085	2	D–5 SH–01
84	48–202	ELBOW WALL	084	2	D–6 SH–01
83	48–202	ELBOW WALL	083	2	D–6 SH–01
82	48–202	ELBOW WALL	082	2	C–7 SH–01
81	48–202	CHANNEL	081	1	D–8 SH–01
80	48–202	CHANNEL	080	2	D–7 SH–01
79	48–202	T DUCT WALL	079	1	H–6 SH–01
78	48–202	T DUCT WALL	078	1	H–6 SH–01
77	48–202	T DUCT WALL	077	1	G–6 SH–01
76	48–202	T DUCT WALL	076	1	G–6 SH–01
75	48–202	T DUCT WALL	075	1	D–8 SH–01
74	48–202	T DUCT WALL	074	1	D–7 SH–01
73	48–202	T DUCT WALL	073	1	D–7 SH–01
72	48–202	T DUCT WALL	072	1	D–8 SH–01
71	48–202	T DUCT WALL	071	1	D–9 SH–01
70	48–202	T DUCT WALL	070	1	C–7 SH–01
69	48–202	T DUCT WALL	069	1	C–7 SH–01
68	48–202	T DUCT WALL	068	1	C–8 SH–01
67	48–202	T DUCT WALL	067	1	C–8 SH–01

66	48–202	TRANSITION WALL	066	2	D–9 SH–01
65	48–202	TRANSITION WALL	065	2	D–9 SH–01
64	48–202	TRANSITION WALL	064	2	D–9 SH–01
63	48–202	TRANSITION WALL	063	2	D–9 SH–01
62	48–202	TRANSITION WALL	062	2	D–9 SH–01
61	48–202	TRANSITION WALL	061	2	D–9 SH–01
60	48–202	TRANSITION WALL	060	2	C–9 SH–01
59	48–202	TRANSITION WALL	059	2	D–9 SH–01
58	48–202	CHANNEL	058	1	D–8 SH–01
57	48–202	CHANNEL	057	2	D–7 SH–01
56	48–202	T DUCT WALL	056	1	H–6 SH–01
55	48–202	T DUCT WALL	055	1	H–6 SH–01
54	48–202	T DUCT WALL	054	1	G–6 SH–01
53	48–202	T DUCT WALL	053	1	G–6 SH–01
52	48–202	T DUCT WALL	052	1	C–8 SH–01
51	48–202	T DUCT WALL	051	1	D–7 SH–01
50	48–202	T DUCT WALL	050	1	D–7 SH–01
49	48–202	T DUCT WALL	049	1	D–8 SH–01
48	48–202	T DUCT WALL	048	1	D–9 SH–01
47	48–202	T DUCT WALL	047	1	C–7 SH–01
46	48–202	T DUCT WALL	046	1	C–7 SH–01
45	48–202	T DUCT WALL	045	1	C–8 SH–01
44	48–202	T DUCT WALL	044	1	C–8 SH–01
43	48–202	GUSSET PLATE	043	8	H–3 SH–02
42	48–202	GUSSET PLATE	042	8	H–1 SH–02
41	48–202	GUSSET PLATE	041	16	H–2 SH–02
40	48–202	STRUT PIPE	040	4	H–3 SH–02
39	48–202	STRUT PIPE	039	8	H–2 SH–02
38	48–202	STRUT PIPE	038	16	G–2 SH–02
37	48–202	DUCT WALL	037	4	D–12 SH–02
36	48–202	DUCT WALL	036	4	D–12 SH–02
35	48–202	DUCT WALL	035	4	D–13 SH–02
34	48–202	DUCT WALL	034	2	E–12 SH–02
33	48–202	DUCT WALL	033	2	E–13 SH–02
32	48–202	DUCT WALL	032	2	E–13 SH–02
31	48–202	DUCT WALL	031	2	D–12 SH–02
30	48–202	DUCT WALL	030	2	D–12 SH–02
29	48–202	DUCT WALL	029	2	D–13 SH–02

28	48–202	GUSSET PLATE	028	4	H–3 SH–02
27	48–202	GUSSET PLATE	027	4	H–1 SH–02
26	48–202	GUSSET PLATE	026	8	H–2 SH–02
25	48–202	STRUT PIPE	025	2	H–3 SH–02
24	48–202	STRUT PIPE	024	4	H–2 SH–02
23	48–202	STRUT PIPE	023	8	G–2 SH–02
22	48–202	COLLECTOR FLANGE	022	4	E–14 SH–02
21	48–202	DIVIDER PLATE	021	2	D–14 SH–02
20	48–202	GUIDE VANE	020	6	D–14 SH–02
19	48–202	GUIDE VANE	019	6	E–14 SH–02
18	48–202	ELBOW WALL	018	2	D–14 SH–02
17	48–202	ELBOW WALL	017	2	D–14 SH–02
16	48–202	ELBOW WALL	016	2	E–14 SH–02
15	48–202	ELBOW WALL	015	2	D–14 SH–02
14	48–202	ELBOW WALL	014	2	D–14 SH–02
13	48–202	ELBOW WALL	013	2	D–14 SH–02
12	48–202	ELBOW WALL	012	2	E–14 SH–02
11	48–202	ELBOW WALL	011	2	G–13 SH–02
10	48–202	GUSSET PLATE	010	4	E–14 SH–02
09	48–202	GUSSET PLATE	009	8	E–4 SH–02
08	48–202	STRUT PIPE	008	4	F–3 SH–02
07	48–202	STRUT PIPE	007	8	F–3 SH–02
06	48–202	TRANSITION WALL	006	2	E–9 SH–01
05	48–202	TRANSITION WALL	005	2	E–6 SH–01
04	48–202	TRANSITION WALL	004	2	E–15 SH–02
03	48–202	TRANSITION WALL	003	2	E–14 SH–02
02	48–202	DUCT WALL	002	4	E–15 SH–02
01	48–202	DUCT WALL	001	4	E–15 SH–02

SL.No	PG.MA	DESCRIPTION	DU.No	QTY	ZONE

157–162 — 25 — 25 — 151
5 — 75(225) — 5 — 75(225)

SECTION–B2–B2

CUSTOMER NO:

PROJECT

SAMPLE–ARRANGEMENT DRG – (SH.02/05)

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER PLANT UNIT; TIRUCHIRAPALLI–620014
EQUIPMENT : STEAM GENERATOR

	NAME	SIGNATURE	DATE
DRN	KULA		29.06.12
CHD	RAMANA		29.06.12
APPD	SHAN.		29.06.12

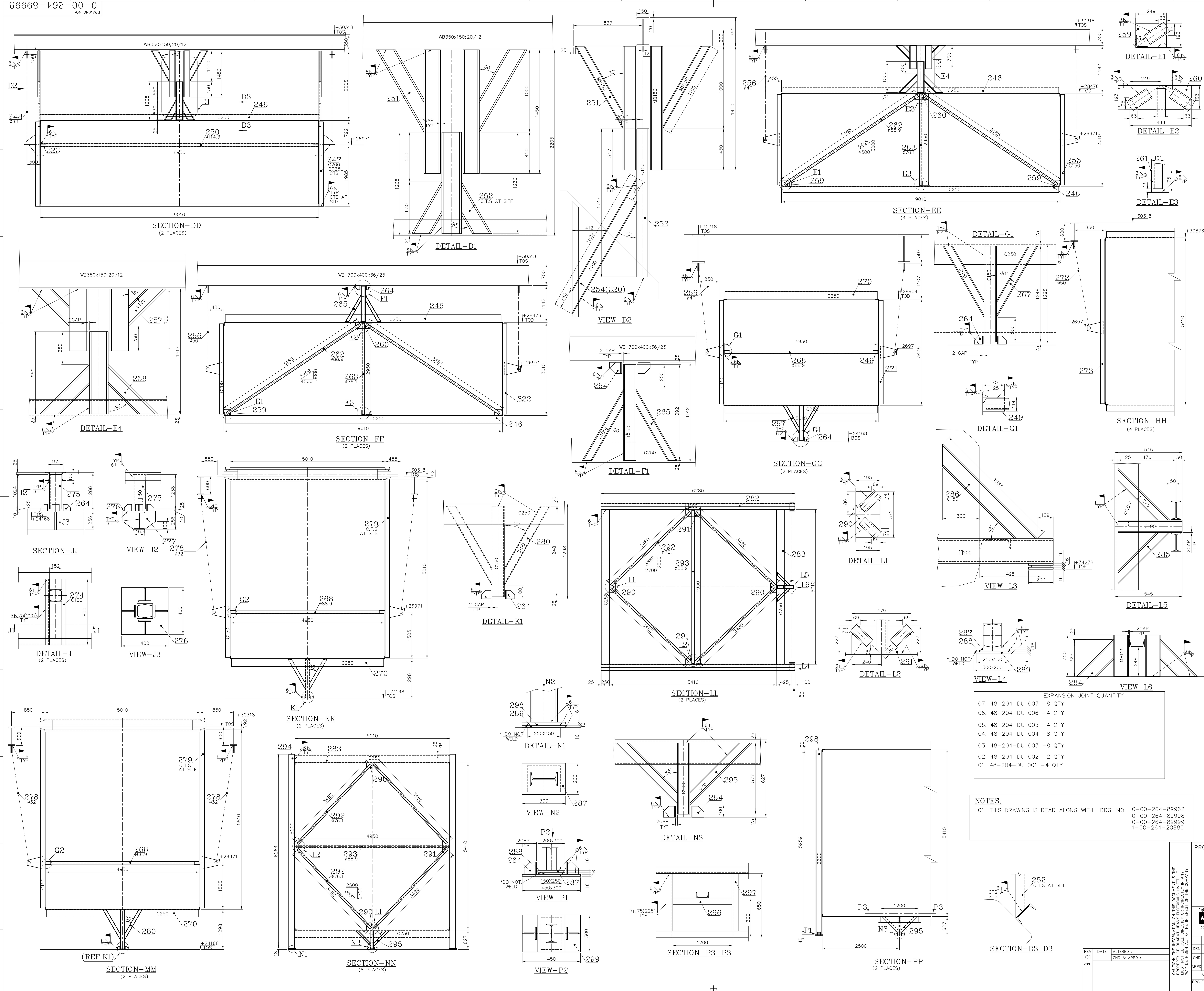
TITLE: AH TO WINDBOX DUCTING

ALL DIMENSIONS IN MILLIMETRE
PROJECTION
SCALE:
DRG. NO. 0–00–264–89997 (SH 02/05)
REV 00

REV	DATE	ALTERED :
01		CHD & APPD :
ZONE		

CAUTION: THE INFORMATION ON THIS DOCUMENT IS THE PROPRIETARY PROPERTY OF BHEL AND IS LOANED SUBJECT TO AGREEMENT THAT IT MUST NOT BE USED, DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.

0-00-264-89998



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

SL.No	PG.MA	DESCRIPTION	DU.No	QTY	ZONE
250	48-205	PIPEø114.3x6.02;8950	005	2	B-3 SH-03
249	48-205	PL10x115x175	004	12	B-1 SH-03
248	48-205	HANGER ASSY -1	003	4	B-1 SH-03
247	48-205	ISMC 200;2928	002	8	C-4 SH-03
246	48-205	ISMC 250;8950	001	14	B-3 SH-03
245	48-204	RC FS EXPJT.#06 5910X4210	007	4	C-4 SH-02
244	48-204	RC FS EXPJT.#02 5410X5010	003-006	6	B-10 SH-02
243	48-204	RC FS EXPJT.#02 3010X5010	002	1	D-9 SH-01
242	48-204	RC FS EXPJT.#01 11060X4315	001	2	E-14 SH-02
241	48-212	WIND BOX CONNECTING DUCT	054	1	SH05
240	48-212	WIND BOX CONNECTING DUCT	053	1	SH05
239	48-212	WIND BOX CONNECTING DUCT	052	1	SH05
238	48-212	WIND BOX CONNECTING DUCT	051	1	SH05
237	48-212	WIND BOX CONNECTING DUCT	050	1	SH05
236	48-212	WIND BOX CONNECTING DUCT	049	1	SH05
235	48-212	WIND BOX CONNECTING DUCT	048	1	SH05
234	48-212	WIND BOX CONNECTING DUCT	047	1	SH05
233	48-212	WIND BOX CONNECTING DUCT	046	1	SH05
232	48-212	WIND BOX CONNECTING DUCT	045	1	SH05
231	48-212	WIND BOX CONNECTING DUCT	044	1	SH05
230	48-212	WIND BOX CONNECTING DUCT	043	1	SH05
229	48-212	WIND BOX CONNECTING DUCT	042	1	SH05
228	48-212	WIND BOX CONNECTING DUCT	041	1	SH05
227	48-212	WIND BOX CONNECTING DUCT	040	1	SH05
226	48-212	WIND BOX CONNECTING DUCT	039	1	SH05
225	48-212	WIND BOX CONNECTING DUCT	038	1	SH05
224	48-212	WIND BOX CONNECTING DUCT	037	1	SH05
223	48-212	WIND BOX CONNECTING DUCT	036	1	SH05
222	48-212	WIND BOX CONNECTING DUCT	035	1	SH05
221	48-212	WIND BOX CONNECTING DUCT	034	1	SH05
220	48-212	WIND BOX CONNECTING DUCT	033	1	SH05
219	48-212	WIND BOX CONNECTING DUCT	032	1	SH05
218	48-212	WIND BOX CONNECTING DUCT	031	1	SH05
217	48-212	WIND BOX CONNECTING DUCT	030	1	SH05
216	48-212	WIND BOX CONNECTING DUCT	029	1	SH05
215	48-212	WIND BOX CONNECTING DUCT	028	1	SH05
214	48-212	WIND BOX CONNECTING DUCT	027	1	SH05
213	48-212	WIND BOX CONNECTING DUCT	026	1	SH05
212	48-212	WIND BOX CONNECTING DUCT	025	1	SH05
211	48-212	WIND BOX CONNECTING DUCT	024	1	SH05
210	48-212	WIND BOX CONNECTING DUCT	023	1	SH05
209	48-212	WIND BOX CONNECTING DUCT	022	1	SH05
208	48-212	WIND BOX CONNECTING DUCT	021	1	SH05
207	48-212	WIND BOX CONNECTING DUCT	020	1	SH05
206	48-212	WIND BOX CONNECTING DUCT	019	1	SH05
205	48-212	WIND BOX CONNECTING DUCT	018	1	SH05
204	48-212	WIND BOX CONNECTING DUCT	017	1	SH05
203	48-212	WIND BOX CONNECTING DUCT	016	1	SH05
202	48-212	WIND BOX CONNECTING DUCT	015	1	SH05
201	48-212	WIND BOX CONNECTING DUCT	014	1	SH05
200	48-212	WIND BOX CONNECTING DUCT	013	1	SH05
199	48-212	WIND BOX CONNECTING DUCT	012	1	SH05
198	48-212	WIND BOX CONNECTING DUCT	011	1	SH05
197	48-212	WIND BOX CONNECTING DUCT	010	1	SH05
196	48-212	WIND BOX CONNECTING DUCT	009	1	SH05
195	48-212	WIND BOX CONNECTING DUCT	008	1	SH05
194	48-212	WIND BOX CONNECTING DUCT	007	1	SH05
193	48-212	WIND BOX CONNECTING DUCT	006	1	SH05
192	48-212	WIND BOX CONNECTING DUCT	005	1	SH05
191	48-212	WIND BOX CONNECTING DUCT	004	1	SH05
190	48-212	WIND BOX CONNECTING DUCT	003	1	SH05
189	48-212	WIND BOX CONNECTING DUCT	002	1	SH05
188	48-212	WIND BOX CONNECTING DUCT	001	1	SH05

EXPANSION JOINT QUANTITY

07. 48-204-DU 007 -8 QTY
06. 48-204-DU 006 -4 QTY
05. 48-204-DU 005 -4 QTY
04. 48-204-DU 004 -8 QTY
03. 48-204-DU 003 -8 QTY
02. 48-204-DU 002 -2 QTY
01. 48-204-DU 001 -4 QTY

NOTES;

01. THIS DRAWING IS READ ALONG WITH DRG. NO. 0-00-264-89962, 0-00-264-89998, 0-00-264-89999, 1-00-264-20880

CUSTOMER NO:

PROJECT

SAMPLE-ARRANGEMENT DRG - (SH.03/05)

355-029

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER PLANT UNIT; TIRUCHIRAPALLI-620014
EGUIPMENT : STEAM GENERATOR

	NAME	SIGNATURE	DATE
DRN	KULA		29.06.12
CHD	RAMANA		29.06.12
APPD.	SHAN		29.06.12

ALL DIMENSIONS IN MILLIMETRE

PROJECTION | SCALE:

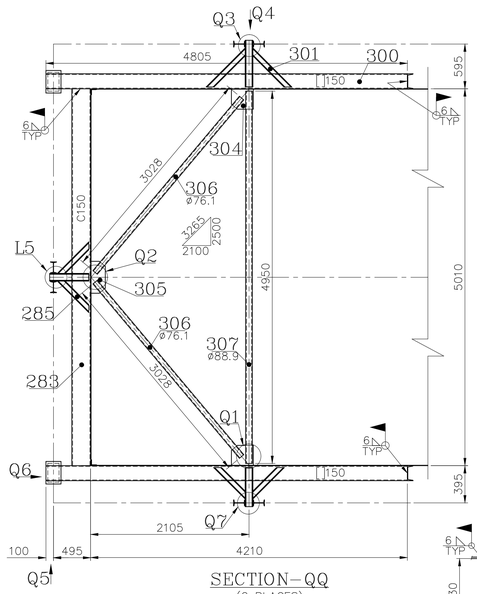
TITLE: AH TO WINDBOX DUCTING

DRG. NO. 0-00-264-89998 (SH 03/05) REV 00

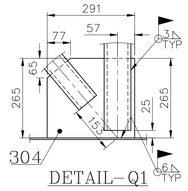
REV 01 | DATE | ALTERED : | CHD & APPD : | ZONE

DRAWING NO: 1-00-264-20880

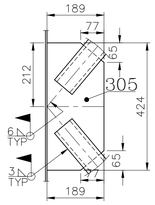
FOR TOLERANCES OF UNTOLERANCED DIMENSIONS DURING MANUFACTURE REFER PLANT STD. NO TP 023 0299



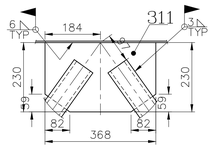
SECTION-QQ
(2 PLACES)



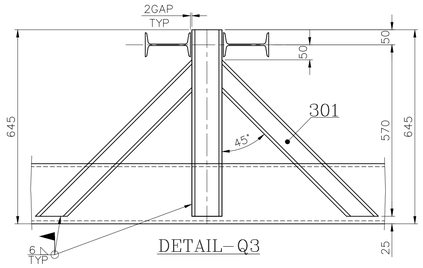
DETAIL-Q1



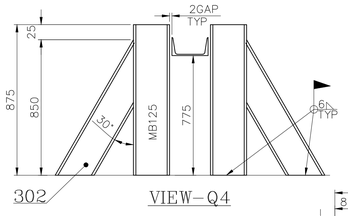
DETAIL-Q2



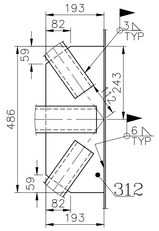
DETAIL-R1



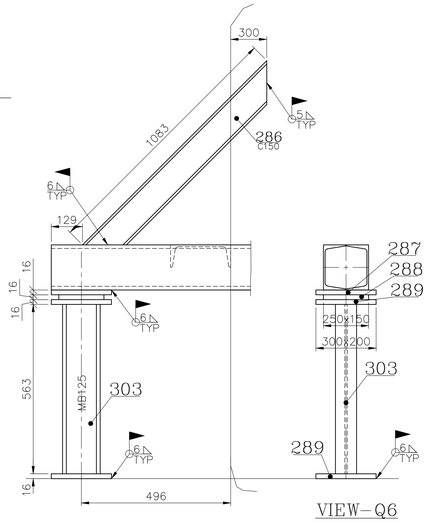
DETAIL-Q3



VIEW-Q4

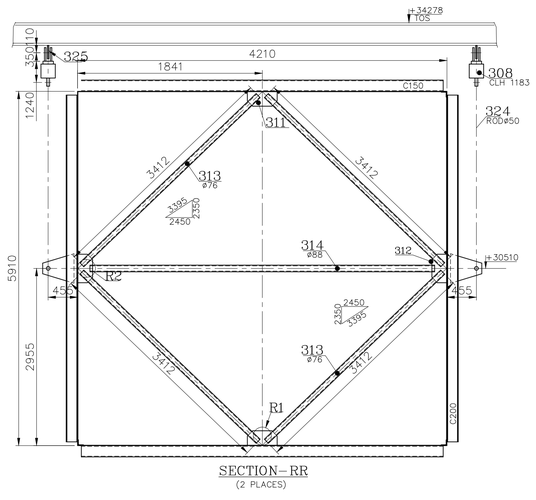


DETAIL-R2

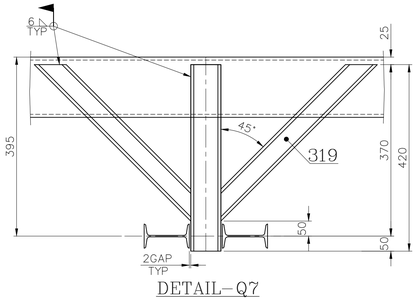


VIEW-Q5

VIEW-Q6



SECTION-RR
(2 PLACES)



DETAIL-Q7

ITEM NO 308,310 TO 314 USED AS ERECTION MATERIAL

NOTES:

01. THIS DRAWING IS READ ALONG WITH DRG. NO. 0-00-264-89962, 0-00-264-89998, 0-00-264-89999, 0-00-264-89997

325	48-205	LUG ASSY CLH	079	4	D-6 SH-04
324	48-205	HANGER ASSY CLH	078	4	D-6 SH-04
323	48-205	PL10x139x175	077	4	C-1 SH-03
322	48-205	ISMC 200;2950	076	8	F-6 SH-03
321	48-204	RCFSEXPJT.#01 3010X9010		2	F-8 SH-01
320	48-205	STIFFENER-2	075	1	F-8 SH-04
319	48-205	RESTRAIN-9	074	2	G-2 SH-04
318	48-205	PIPEø406x12.7;3110L	073	2	G-4 SH-01
317	48-205	GRAB BAR-II	072	7	C-10 SH-02
316	48-205	GRAB BAR-I	071	7	C-10 SH-02
315	48-205	MAN HOLE DOOR	070	7	C-10 SH-02
314	48-205	PIPEø88.9x5.49;4150	069	2	E-5 SH-04
313	48-205	PIPEø76.1x4.5;3412	068	8	E-5 SH-04
312	48-205	GUSSET PLATE-8	067	4	E-14 SH-04
311	48-205	GUSSET PLATE-7	066	4	F-4 SH-04
310	48-205	ISMC 200;5850	065	8	F-5 SH-04
309	48-205	ISMC 250;4150	064	4	D-5 SH-04
308	48-205	CLH 1183	063	4	D-3 SH-04
307	48-205	PIPEø88.9x5.49;4950	062	2	C-2 SH-04
306	48-205	PIPEø76.1x4.5;3028	061	4	C-2 SH-04
305	48-205	GUSSET PLATE-6	060	2	B-1 SH-04
304	48-205	GUSSET PLATE-5	059	4	A-2 SH-04
303	48-205	ISMB 125;563	058	4	F-3 SH-04
302	48-205	STOPPER-5	057	12	C-5 SH-04
301	48-205	RESTRAINT-8	056	2	A-2 SH-04
300	48-205	CHANNEL BOX-3	055	4	A-3 SH-04
299	48-205	PL16x300x450	054	2	L-7 SH-03
298	48-205	ISMB 200;5959	053	2	J-10 SH-03
297	48-205	ISMC 150;650	052	4	L-9 SH-03
296	48-205	ISMC 150;1200	051	2	L-8 SH-03
295	48-205	RESTRAINT-7	050	10	K-9 SH-03
294	48-205	ISMB 200;6264	049	16	K-4 SH-03
293	48-205	PIPEø88.9X5.49;4950	048	10	L-5 SH-03
292	48-205	PIPEø76.1X4.5;3480	047	40	G-8 SH-03
291	48-205	GUSSET PLATE-4	046	20	H-10 SH-03
290	48-205	GUSSET PLATE-3	045	20	L-5 SH-03
289	48-205	PL 16x200x300	044	28	H-12 SH-03

288	48-205	BEARING PLATE	043	26	H-11 SH-03
287	48-205	TOP PLATE	042	26	H-11 SH-03
286	48-205	STIFFENER	041	8	F-11 SH-03
285	48-205	RESTRAINT-6	040	4	G-13 SH-03
284	48-205	STOPPER-4	039	4	J-14 SH-03
283	48-205	ISMC 250;5010	038	22	G-9 SH-03
282	48-205	CHANNEL BOX-2	037	4	G-9 SH-03
281	48-205	HANGER ASSY -7	036	2	K-3 SH-03
280	48-205	RESTRAINT-5	035	4	G-6 SH-03
279	48-205	ISMC 150;5780	034	16	G-5 SH-03
278	48-205	HANGER ASSY -6	033	6	G-5 SH-03
277	48-205	STIFFENER PLATE	032	4	F-2 SH-03
276	48-205	PL 10x400x400	031	2	H-2 SH-03
275	48-205	CHANNEL BOX-1	030	2	G-1 SH-03
274	48-205	ISMC 100;800 CTS	029	4	H-1 SH-03
273	48-205	C200;5350	028	8	E-13 SH-03
272	48-205	HANGER ASSY-5	027	4	D-13 SH-03
271	48-205	ISMC 150;3378	026	8	E-10 SH-03
270	48-205	C250 ;4950	025	8	D-10 SH-03
269	48-205	HANGER ASSY-4	024	4	D-8 SH-03
268	48-205	PIPE ø88.9x5.49;4950	023	6	E-9 SH-03
267	48-205	RESTRAINT-4	022	2	D-9 SH-03
266	48-205	HANGER ASSY-3	021	4	E-3 SH-03
265	48-205	RESTRAINT-3	020	2	F-8 SH-03
264	48-205	STOPPER	019	48	D-10 SH-03
263	48-205	PIPE ø76.1x4.5;2950	018	6	B-11 SH-03
262	48-205	PIPE ø88.9x5.49;5185	017	12	B-10 SH-03
261	48-205	PL10x101x175	016	6	C-13 SH-03
260	48-205	GUSSET PLATE-2	015	6	B-11 SH-03
259	48-205	GUSSET PLATE-1	014	12	C-12 SH-03
258	48-205	RESTRAINT-2	013	4	E-2 SH-03
257	48-205	STOPPER-3	012	8	D-2 SH-03
256	48-205	HANGER ASSY-2	011	8	B-9 SH-03
255	48-205	ISMC 150 ;2950	010	16	C-12 SH-03
254	48-205	STIFFENER-1	009	1	D-7 SH-03
253	48-205	ISMC 150;1797	008	4	C-8 SH-03
252	48-205	RESTRAINT-1	007	2	C-6 SH-03
251	48-205	STOPPER-2	006	12	B-7 SH-03
SL.No	PG.MA	DESCRIPTION	DU.No	QTY	ZONE

CUSTOMER NO:

CAUTION: THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTERESTS OF THE COMPANY.

PROJECT

SAMPLE-ARRANGEMENT DRG - (SH.04/05)

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER PLANT UNIT; TIRUCHIRAPALLI-620014
EQUIPMENT : STEAM GENERATOR

355-029

	NAME	SIGNATURE	DATE
DRN.	KULA		28.06.12
CHD.	RAMANA		28.06.12
APPD.	SHAN		28.06.12

TITLE: AH TO WINDBOX DUCTING

ALL DIMENSIONS IN MILLIMETRE

PROJECTION

SCALE:

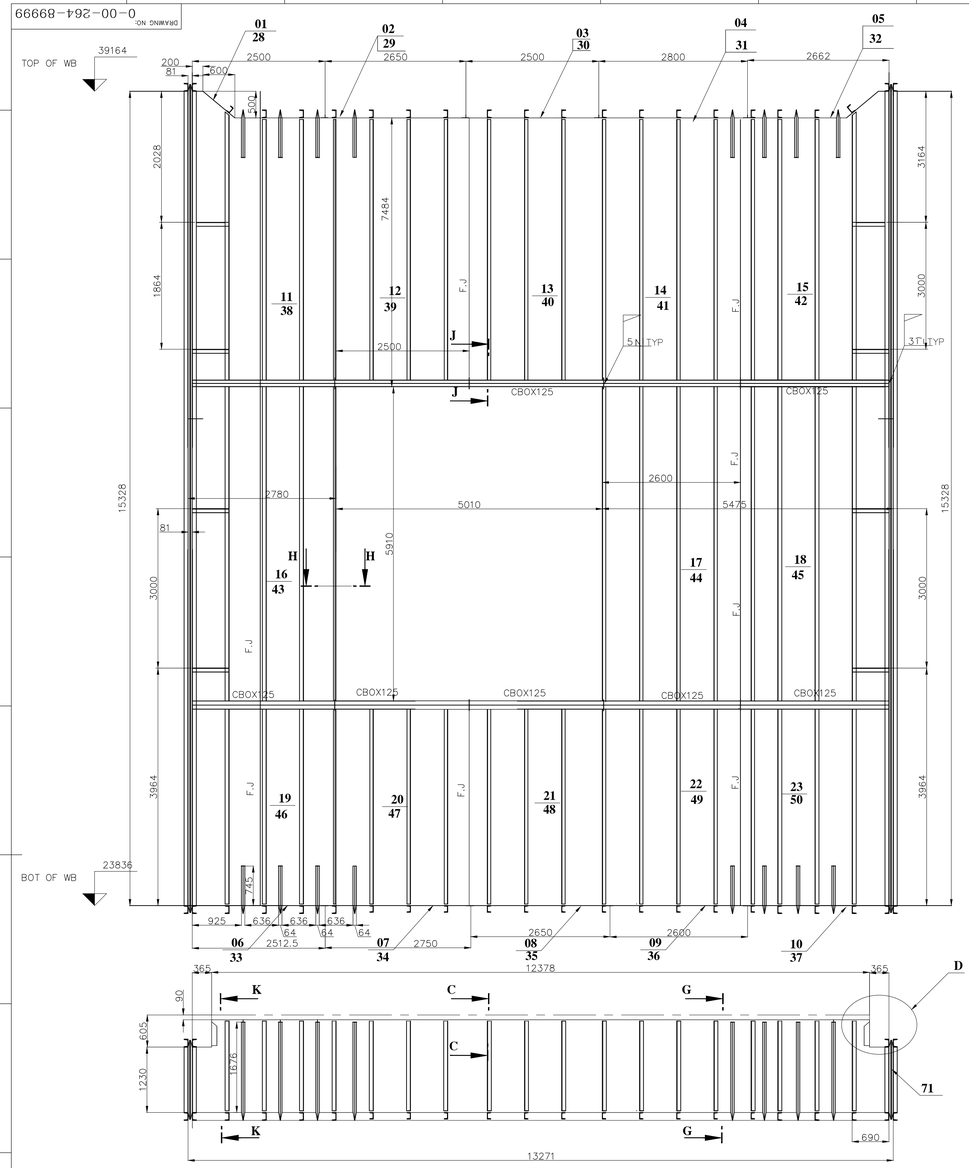
DRG. NO. 1-00-264-20880 (SH 04/ 05)

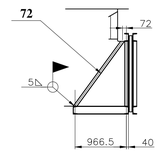
REV 00

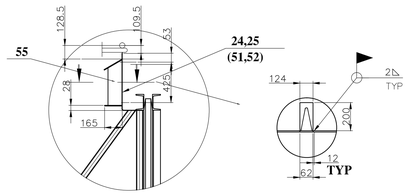
REV	DATE	ALTERED :
01		CHD & APPD :

ZONE

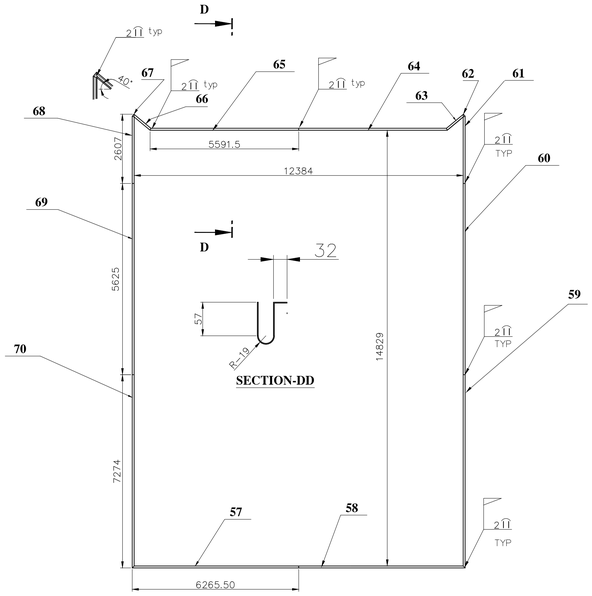
DRAWING NO. 0-00-264-89999



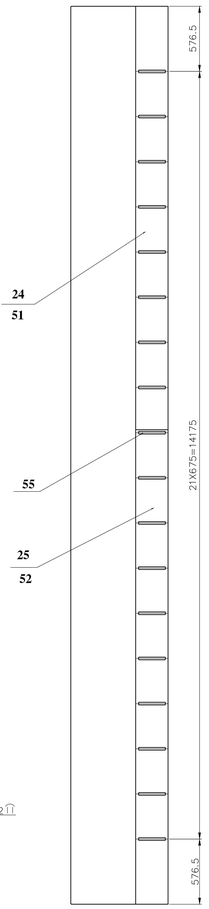




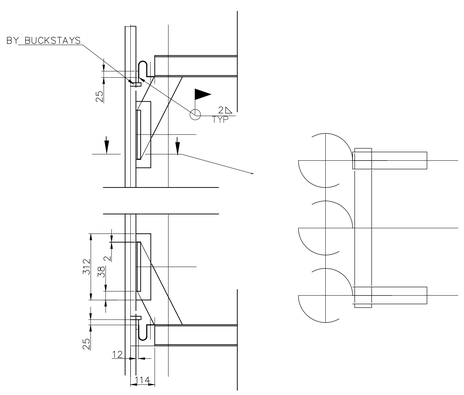
DETAIL-D



SECTION-DD



SECTION-KK

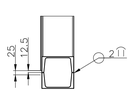


SECTION-CC

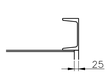
NOTE:

READ THIS DRAWING ALONG WITH THE FOLLOWING DRAWINGS

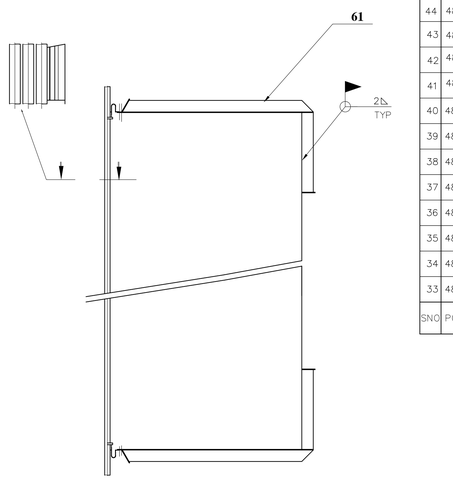
0-00-264-89962
0-00-264-89998
1-00-264-20880
0-00-264-89997



SECTION-JJ



SECTION-HH



SECTION-GG

72	48-212	TUBE DIA 76.1X4.5:70 MTR		*	1	* MATL FROM 48-993
71	48-214	HS EXPN JT # 16943X1260		017	4	
70	48-214	EXPN. JOINT (PART) SH 2x207x6800		016	2	
69	48-214	EXPN. JOINT (PART) SH 2x207x6236		015	2	
68	48-214	EXPN. JOINT (PART) SH 2x207x2368		014	2	
67	48-214	EXPN. JOINT (PART) SH 2x78X120		013	2	
66	48-214	EXPN. JOINT (PART) SH 2x207x775 (CTS)		012	2	
65	48-214	EXPN. JOINT (PART) SH 2x207x5755 (CTS)		011	2	
64	48-214	EXPN. JOINT (PART) SH 2x207x5755 (CTS)		010	2	
63	48-214	EXPN. JOINT (PART) SH 2x207x773 (CTS)		009	2	
62	48-214	EXPN. JOINT (PART) SH 2x78X120		008	2	
61	48-214	EXPN. JOINT (PART) SH 2x207x2368		007	2	

SNO	PG-MA	DESCRIPTION	PIECE MARK NO	DU NO	QTY	ZONE
60	48-214	EXPN. JOINT (PART) SH 2x207x6236		006	2	
59	48-214	EXPN. JOINT (PART) SH 2x207x6800		005	2	
58	48-214	EXPN. JOINT (PART) SH 2x207x6266		004	2	
57	48-214	EXPN. JOINT (PART) SH 2x207x6266		003	2	
56	48-214	EXPN. JOINT		002	32	
55	48-214	EXPN. JOINT		001	80	
54	48-212	DUCT WALL		054	1	
53	48-212	DUCT WALL		053	1	
52	48-212	DUCT WALL		052	2	
51	48-212	DUCT WALL		051	2	
50	48-212	DUCT WALL		050	1	
49	48-212	DUCT WALL		049	1	
48	48-212	DUCT WALL		048	1	
47	48-212	DUCT WALL		047	1	
46	48-212	DUCT WALL		046	1	
45	48-212	DUCT WALL		045	1	
44	48-212	DUCT WALL		044	1	
43	48-212	DUCT WALL		043	1	
42	48-212	DUCT WALL		042	1	
41	48-212	DUCT WALL		041	1	
40	48-212	DUCT WALL		040	1	
39	48-212	DUCT WALL		039	1	
38	48-212	DUCT WALL		038	1	
37	48-212	DUCT WALL		037	1	
36	48-212	DUCT WALL		036	1	
35	48-212	DUCT WALL		035	1	
34	48-212	DUCT WALL		034	1	
33	48-212	DUCT WALL		033	1	

SNO	PG-MA	DESCRIPTION	PIECE MARK NO	DU NO	QTY	ZONE
32	48-212	DUCT WALL		032	1	
31	48-212	DUCT WALL		031	1	
30	48-212	DUCT WALL		030	1	
29	48-212	DUCT WALL		029	1	
28	48-212	DUCT WALL		028	1	
27	48-212	DUCT WALL		027	1	
26	48-212	DUCT WALL		026	1	
25	48-212	DUCT WALL		025	2	
24	48-212	DUCT WALL		024	2	
23	48-212	DUCT WALL		023	1	
22	48-212	DUCT WALL		022	1	
21	48-212	DUCT WALL		021	1	
20	48-212	DUCT WALL		020	1	
19	48-212	DUCT WALL		019	1	
18	48-212	DUCT WALL		018	1	
17	48-212	DUCT WALL		017	1	
16	48-212	DUCT WALL		016	1	
15	48-212	DUCT WALL		015	1	
14	48-212	DUCT WALL		014	1	
13	48-212	DUCT WALL		013	1	
12	48-212	DUCT WALL		012	1	
11	48-212	DUCT WALL		011	1	
10	48-212	DUCT WALL		010	1	
09	48-212	DUCT WALL		009	1	
08	48-212	DUCT WALL		008	1	
07	48-212	DUCT WALL		007	1	
06	48-212	DUCT WALL		006	1	
05	48-212	DUCT WALL		005	1	
04	48-212	DUCT WALL		004	1	
03	48-212	DUCT WALL		003	1	
02	48-212	DUCT WALL		002	1	
01	48-212	DUCT WALL		001	1	

CUSTOMER NO:

PROJECT

SAMPLE-ARRANGEMENT DRG - (SH.05/05)

BHARAT HEAVY ELECTRICALS LIMITED.,
BOILER PLANT UNIT; TIRUCHIRAPALLI-620014
EQUIPMENT : STEAM GENERATOR

355-029

	NAME	SIGNATURE	DATE
DRN	KULA		29.06.12
CHD	RAMANA		29.06.12
APPD	SHAN		29.06.12

TITLE: AH TO WINDBOX DUCTING (SH 05/05)

ALL DIMENSIONS IN MILLIMETRE

PROJECTION

SCALE: N.T.S

DRG. NO. 0-00-264-89999

REV

REV: 01 DATE: ALTERED : CHD & APPD :

ZONE