

List of Enquiry Items for Enquiry BAP/PUR/FGD/EQS/2014/4231581E dt 13.03.2014

Sl.No	Material Code	Description	Unit	Qty	Destination
1.	RFW301290000	EMERGENCY QUENCHING SYSTEM AT GGH INLET AS PER TECHNICAL SPECIFICATION NTPC:FGD:BONG:EM.QUENCH:50	ST	3	BHEL Stores Ranipet

BONGAIGAON– 3X250 MW FLUE GAS DESULPHURIZATION SYSTEM

TECHNICAL SPECIFICATION

OF

EMERGENCY QUENCHING NOZZLES &

HEADERS IN GGH INLET

CUSTOMER: NATIONAL THERMAL POWER CORPORATION LIMITED



NTPC: FGD: BONG: EM.QUENCH:50

Flue Gas Desulphurization Group
Air Quality Control Systems
BAP :: BHEL :: Ranipet



**TECHNICAL SPECIFICATION
FOR
EMERGENCY QUENCHING NOZZLES & SPRAY HEADERS ARRANGEMENT**

BHEL Document No.: NTPC: FGD: BONG: EM.QUENCH:50

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Dated 03 02 2014		




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1.0	PROJECT INFORMATION	
	▪ Owner	NTPC
	▪ Buyer	BHEL, Ranipet
	▪ Capacity	3X250MW
	▪ Process / application	Wet Lime Stone FGD system
	▪ No of FGD units	3
1.1	SITE CONDITIONS	
	▪ Ambient temperature (Guarantee)	27 Deg C
	▪ Ambient temperature (Design)	50 Deg C
	▪ Relative Humidity	60 %
1.2	LOCATION AND APPROACH	
	▪ Project location	Bongaigaon Assam
	▪ Place	Kumkuri near Salakati, Bongaigaon
	▪ District	Kokrajhar
	▪ State	Assam
	▪ Height above sea level	47 m

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2.0 INTENT OF SPECIFICATION

The Bidder shall offer only proven design of Quenching system in successful operation.

This specification together with the attendant Technical Data Sheet and other specifications/attachments defines the minimum requirements for Emergency Quenching Nozzles and Headers along with their accessories/auxiliaries for use in the process of 3 No's of Flue gas Desulphurization (FGD) units of NTPC Bongaigaon 3X250MW Project.

Bidder shall make all possible efforts to comply strictly with the requirements of this specification and other specifications/attachments to inquiry/order.

In case, deviations are considered essential by the Bidder (after exhausting all possible efforts), these shall be separately listed in the Bidder's proposal under separate section, titled as "List of Deviations/Exceptions to the Enquiry Document (Annexure-V)". Deviation shall be listed separately for each document with cross reference to Page No./Section/Clause No. /Para etc. of the respective document supported with proper reasons for the deviation for purchaser's consideration. Any deviation, not listed under the above section, even if reflected in any other portion of the proposal, shall not be considered applicable. No deviation or exception shall be permitted without the written approval of the purchaser.


Compliance to this specification shall not relieve the Bidder of the responsibility of furnishing equipment and accessories/auxiliaries of proper design, materials and workmanship to meet the specified start up and operating conditions.

In case the Bidder considers requirement of additional instrumentation, controls, safety devices and any other accessories/auxiliaries essential for safe and satisfactory operation of the equipment, he shall recommend the same along with reasons in a separate section along with his proposal and include the same in his scope of supply.

2.1 CODES AND STANDARDS

The design, manufacture, inspection and testing of Emergency Quenching System shall comply with all the currently applicable statutes, regulations and safety codes in the locality where the equipment are to be installed. The equipment shall also conform to the latest applicable Indian/British/American standards.

Other Internationally acceptable standards, which ensure equal or higher performance than those specified, shall also be accepted. Nothing in this specification shall be construed to relieve the Contractor of the required statutory responsibility. In particular the nozzles shall conform to the latest edition of the applicable standards.

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3.0 SCOPE OF SUPPLY

3.1 GENERAL

The flue gas system including GGH and its flue gas ducts shall be designed to meet the following conditions:

- Short temp excursion temperature of inlet gas -300 deg. C
(For approx. fifteen(15) minutes at a time)
- Emergency Quenching system is to be provided in all 3 no's of FGD units at GGH inlet to meet the above mentioned requirement.

a. Quenching Nozzles and Spray Headers Quantity :

Refer Table.1 for details on operating conditions to calculate the Quenching nozzles and spray headers quantity based on amount of water required for quenching.

b. Mandatory Spares - As per Annexure - II.

c. Service Engineer Visit :

Bidder's Service Engineer shall visit the site for supervision of Erection and commissioning of the complete emergency quenching system.

Erection and commissioning supports:

Six (6) Man days are considered for supervision of Erection& commissioning of all the nozzle arrangement in all three (3) FGD units at Bongaigaon site.

d. Operation & Erection Manuals :

Ten (10) Hard copies of O&M Manual including erection and installation procedure shall be submitted by the Bidder. A soft copy of the O&M manual containing all details of reference drawings and technical data shall be furnished by the Bidder in CD (soft copy).


4.0 BASIC DESIGN

4.1 GENERAL

This section covers the manufacturing and performance requirement of the Emergency Quenching nozzles, Spray Headers and its accessories.

4.2 NOZZLES TYPE AND OPERATION

- a. The nozzles shall be designed for mode of operation as mentioned in Table 1.

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4.3 OPERATING CONDITIONS

Table.1 Operating conditions of Emergency Quenching System

Sl. No	Description	Guarantee Point	Design Point
1.	Purpose of Emergency Quenching System	To cool down Flue gas in emergency situation	
2.	No of Emergency Quenching System required	3(Unit #1-3)	
3.	Cooling Media	Service Water	
4.	Operation Method	Gravity Method	
5.	Design Flow Capacity	150m ³ /hr	
6.	Holding Capacity of Emergency Tank(BHEL Scope)	80m ³	
7.	Emergency Tank Location	35m above Ground Level	
8.	GGH inlet Duct Location	25m above Ground Level	
9.	Emergency Quenching Pipe up to common header refer Annexure-IX	200NB/C.S	
10.	Spray Nozzle Type	Spiral	
11.	Spray Pattern	Full Cone	
12.	Spray angle	170°	
13.	Spray Nozzle flow rate	≥50 LPM	
14.	Spray Nozzles Quantity	≥48 No's	
15.	Operating Pressure	0.7-1.5 bar	
16.	MOC of Main header	C.S	
17.	MOC of Spray header	AL6XN OR SS 904L SCH 40	
18.	MOC of Nozzle	PTFE	
19.	Gas Volume in Nm ³ /sec	303.3	
20.	Density of flue gas in kg/m ³	0.794	
21.	Flue Gas Pressure	360mmwc	
22.	Inlet Flue Gas Temperature	300 deg celsius	
23.	Desired Flue Gas Temperature after Quenching	170 deg celsius	
24.	Excursion Time	15 min	
25.	Duct Dimension	6mx6m	
26.	Flue Gas Velocity	12-15 m/s	



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4.4 DUTY PARAMETERS AND REQUIREMENT

- a. Bidder to submit the filled in data sheet as mentioned in Datasheets as mentioned in Annexure 8.1

4.5 REQUIREMENTS

- a. Design criterion of nozzles and all headers shall be consistent with a minimum service life of 10 years.
- b. **"Zero Leakage"**, should be ensured. If it is required, manufacturer to indicate the plan and necessary piping.

4.6 NOZZLES & MISCELLANEOUS CONNECTIONS

- a. Spray Headers should be as per standard nominal pipe (NPS) or DN.
- b. Flanges should be of same rating and raised- face, suitable for through bolting.
- c. All connections shall be suitable for hydrostatic test pressure
- d. Companion flange along with necessary Bolt, Nut and Gasket shall be taken as Vendor's scope of supply. Material of the companion flange should be as per attached Vendor scope drawing.

4.7 EXTERNAL NOZZLES FORCES & MOMENTS

Allowable nozzle load and a figure that defines the co-ordinate system, in which the load are applied, shall be supplied with tender. Permissible load and moment from pipe line should be as per HI 12.2-12.6-2005 or ISO standard.

4.8 ASSEMBLY AND DISMANTLING


Assembly and dismantling of each nozzle with spray pipes shall be possible without disturbing the alignment and easy handling.

4.9 OTHER COMPONENTS

All internal fasteners, coming in contact with liquid medium should be Type A4, ISO-3506. Other fasteners should be of Class 6.6 or higher, galvanized as per ISO-898. All other components, not mentioned anywhere in the specification but required for assembly of equipment are as per manufacturer's own practice.

4.10 MATERIALS

- a. Nozzles and spray headers designated as "Full Compliance Material" shall meet the

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requirements of the industry specification as listed for the material in the table as well as in the specification in the respective section.

- b. Material shall be clearly identified in the proposal with their applicable industry standard number (along with equivalent ASTM, if different standard is followed) and grade.
- c. If no such designation is available, the supplier material specification, giving physical properties, chemical composition, and test requirements, shall be included in the proposal.
- d. Materials casting factors and the quality of any welding shall be equal to those required by Section VIII, Division-1 of ASME Code or equivalent.(if applicable)
- e. A detail quality plan is to be submitted along with offer for all items marked "ASTM Full Compliance Material".
- f. Final acceptance of the quality plan will be approved by ultimate user (hereafter called NTPC). Hence, it is expected that manufacturer to submit quality plan (QAP) along with the offer. The same shall be followed at post order stage also. QAP should be as per the best practice followed internationally to avoid any conflict of interest
- g. Scope of supply incorporates the material, testing/inspection, painting, packing forwarding, installing at site and commissioning at site of the equipment.
- h. Certain activities may be excluded from Bidder's scope as per "Annexure VI - Scope of Supply" which shall be mutually agreed upon as per the sheet.

5.0. ACCESSORIES

5.1 SPECIAL TOOLS

Emergency quenching arrangement shall be designed to be assembled, disassembled, and maintained with standard hand tools. However, if at all the Vendor desires special tools are required; the same has to be supplied along with the Emergency quenching system. List of the special tool is to be indicated in Annexure VI (Scope of supply).

6.0 INSPECTION AND TESTS

- a. Material test: All material inspection and testing will be as per submitted QAP, Purchaser's representative shall have access to review the supplier's quality assurance program.
- b. Maximum severity level of defects in casting for the Linear Discontinuities, Shrinkage, Inclusions, Chill and Chaplets, Porosity and Welds must be indicated in QAP.(if applicable)
- c. The customer hold points can be altered at the discretion of ultimate customer

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(NTPC). The same will be intimated when approving the final quality plan.

- d. Performance test: Performance testing of nozzles at manufacturer's shop shall be conducted.
- e. Guaranteed Data as indicated in Annexure I of Data Sheet shall be the final acceptance norm of equipment.

6.1 PREPARATION FOR SHIPMENT

Flanged openings shall be provided with metal closure of 4.8 mm (3/16 inch) minimum thickness with rubber gaskets and at least four full diameter bolts.

The equipment shall be protected for storage of 12 months at site, if any extra precaution is to be taken by the Purchaser for storage beyond 12 months the same shall be explicitly indicated in the operation and maintenance manuals.

6.2 GUARANTEE REQUIREMENT:


12 months from the date of commissioning or 18 months from the date of supply whichever is earlier for defective material and workmanship

7.0 BIDDER'S DATA AND DOCUMENTATION

7.1 CONTRACT DATA

Documentation: Following items are required to be duly filled and submitted along with the proposals minimum requirement;

- a. Compliance of the specification, duly signed and stamped by the designating authority of manufacturer, duly indicating the deviation that are taken.
- b. General arrangement drawing, indicating showing direction of rotation, size, battery limit, indicating scope of supply, connection detail, overall dimensions, maintenance clearance, overall weight and maximum weight to be handled. Final drawing, after post order stage, has to be in scale.
- c. Cross-sectional drawing of Nozzles and Spray Headers (Type).
- d. Data sheet clearly indicating exhaustive data of Spray Nozzles and Headers etc along with material of construction.
- e. List of Mandatory spares and recommended spares for 2 Years of operation. (Annexure I & II)
- f. Experience Record Performa. (Annexure IV)
- g. List of Deviations/Exceptions to the Enquiry Documents. (Annexure V)
- h. List of scope of supply (Annexure VI)

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8.0 ANNEXURES

ANNEXURE-I

8.1 SCHEDULE OF GUARANTEED DATA (TO BE FILLED BY VENDOR)


Sl. No	Description	Vendor's Reply
1.	Spray Nozzle Type	
2.	Spray Pattern	
3.	Spray angle	
4.	Water Pressure at nozzle outlet	
5.	MOC of nozzle	
6.	MOC of Spray header	
7.	Common Header Flange details	
8.	Amount of water to be sprayed in lpm	
9.	Straight Height Required in m	

Note: No (-) negative tolerance on efficiency and desired outlet Flue gas temperature is admissible.

SIGNATURE OF BIDDER

NAME

DESIGNATION

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ANNEXURE-II

8.2 LIST OF MANDATORY SPARES (SHALL BE SUPPLIED ALONG WITH THE NOZZLES AND HEADERS)

Quantity will be Number or Set as applicable

SI No.	Item		Mandatory Spares
1.	Spray Nozzles	:	20% of each type
2.	Spray Headers	:	10% of each type
3.	Flanges and fasteners	:	10% of each type

ANNEXURE-III

8.3 LIST OF RECOMMENDED SPARES (PROVIDED BY VENDOR)

SI No.	Item		Recommended by vendor
1.			
2.			
3.			
4.			

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----

ANNEXURE - IV

8.4 EXPERIENCE RECORD PERFORMA (ERP)

Sl. No	Customer	Project	Model	Flue Gas Flow m ³ /hr	Inlet Flue Gas Temp deg C	Desire d Flue Gas Temp deg C	Year of Commg	Purpose	Qty
1.									
2.									
3.									

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----

8.5 LIST OF DEVIATIONS


SI No	Clause No	Page No	Description of deviation

Note: Enlarge the table to incorporate items

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----

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ANNEXURE -VI

8.6 SCOPE OF SUPPLY

A--Materials:

Sl. No.	Item	Unit of Quantity	Quantity
1.	Spray Nozzles for 3 units	No	
2.	Headers for 3 units	No	
3.	Fasteners	No	
4.	Flanges	No	
5.	Special Tools	Set	
6.	Supporting arrangement for all headers and nozzles	Set	
7.	Mandatory Spares	Set	

Note: Enlarge the table to incorporate items

SIGNATURE OF BIDDER -----

NAME -----

DESIGNATION -----

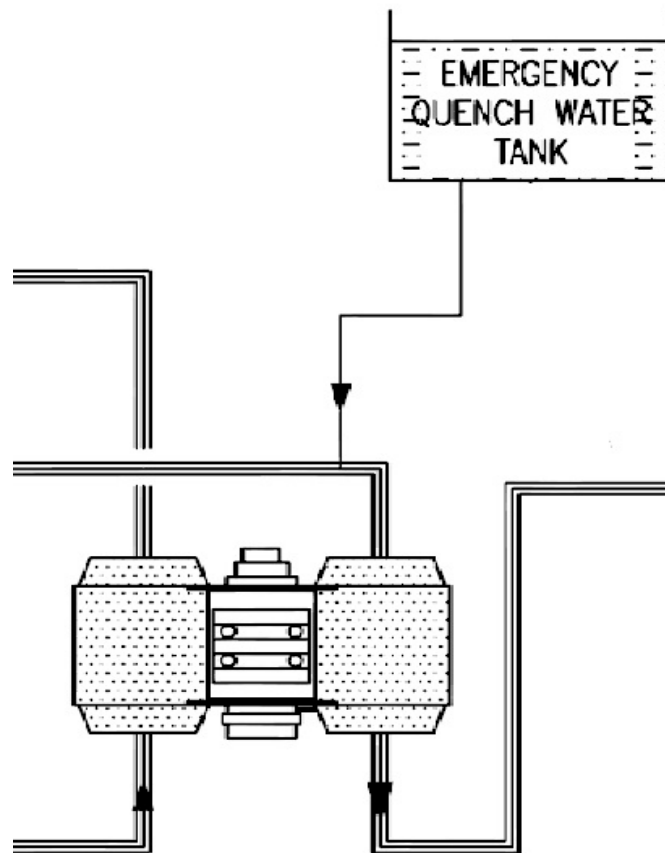


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ANNEXURE -VII

8.7 FLOW DIAGRAM:



- Emergency Tank is placed at a height of 35m above ground level
- Gas to Gas Heater Inlet Duct is at a height of 25m above ground level

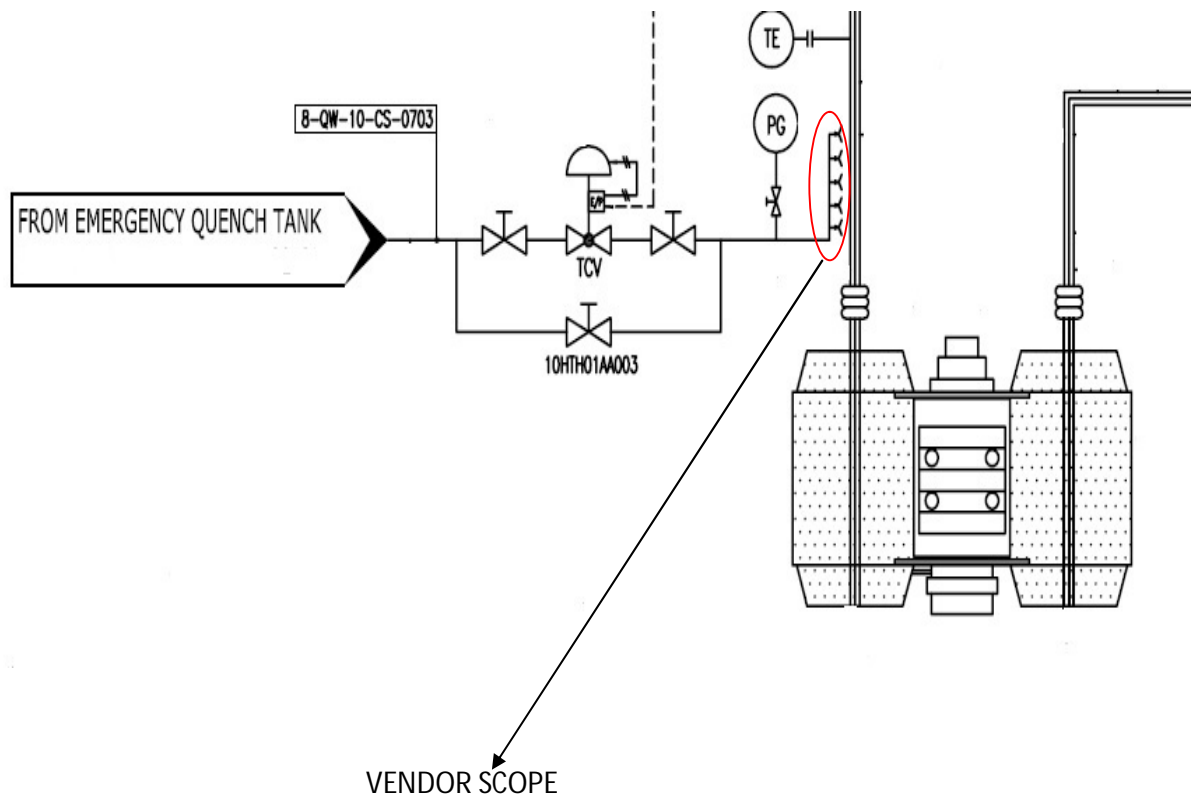


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ANNEXURE -VIII

8.8 P&ID OF EMERGENCY QUENCHING SYSTEM



NOTE:

All other equipments except Quenching arrangement shown in the P&ID will be in BHEL Scope of Supply

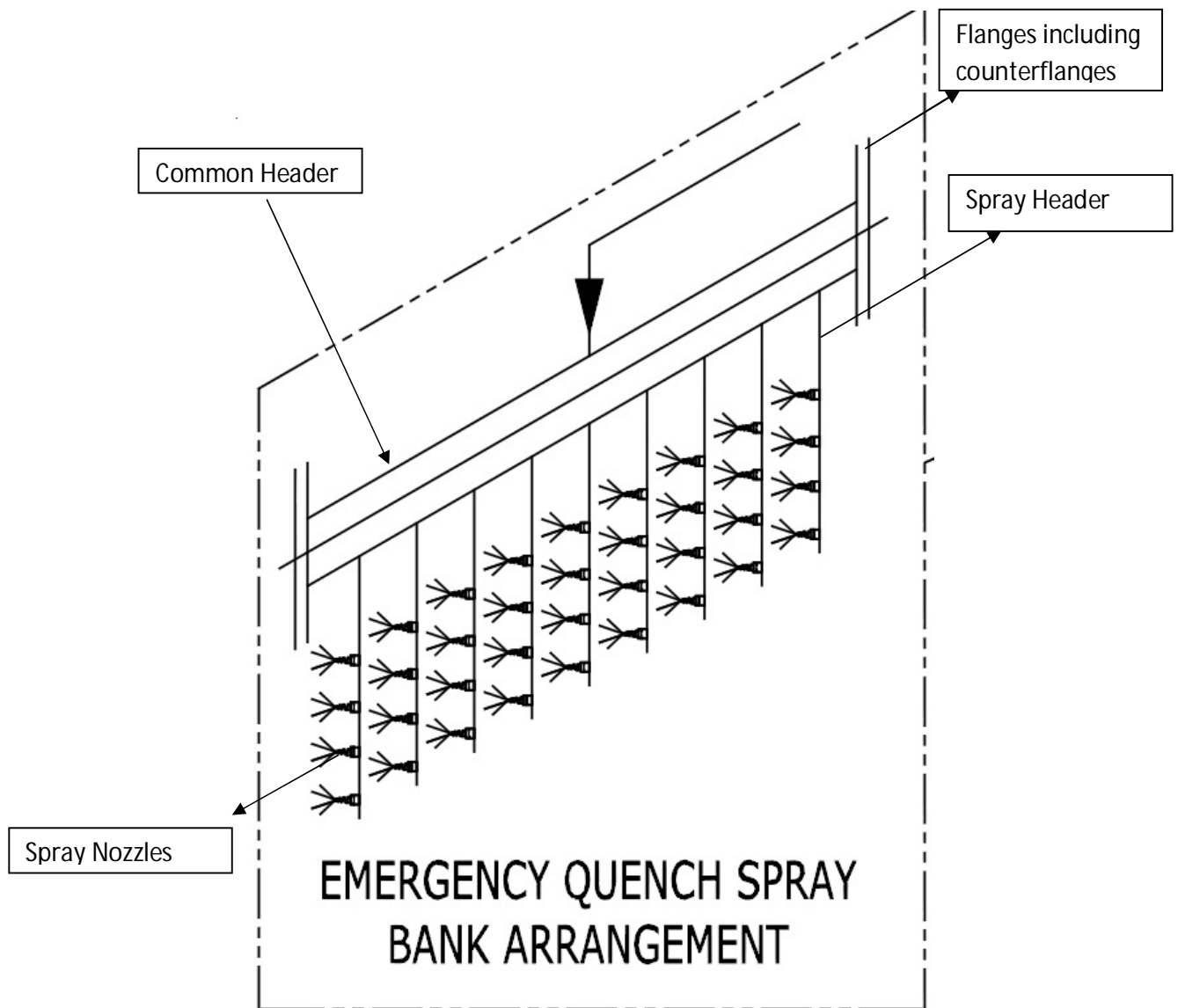


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ANNEXURE -IX

8.9 VENDOR SCOPE



- Common Header, Spray Headers and Spray Nozzles
- Flanges
- Fasteners

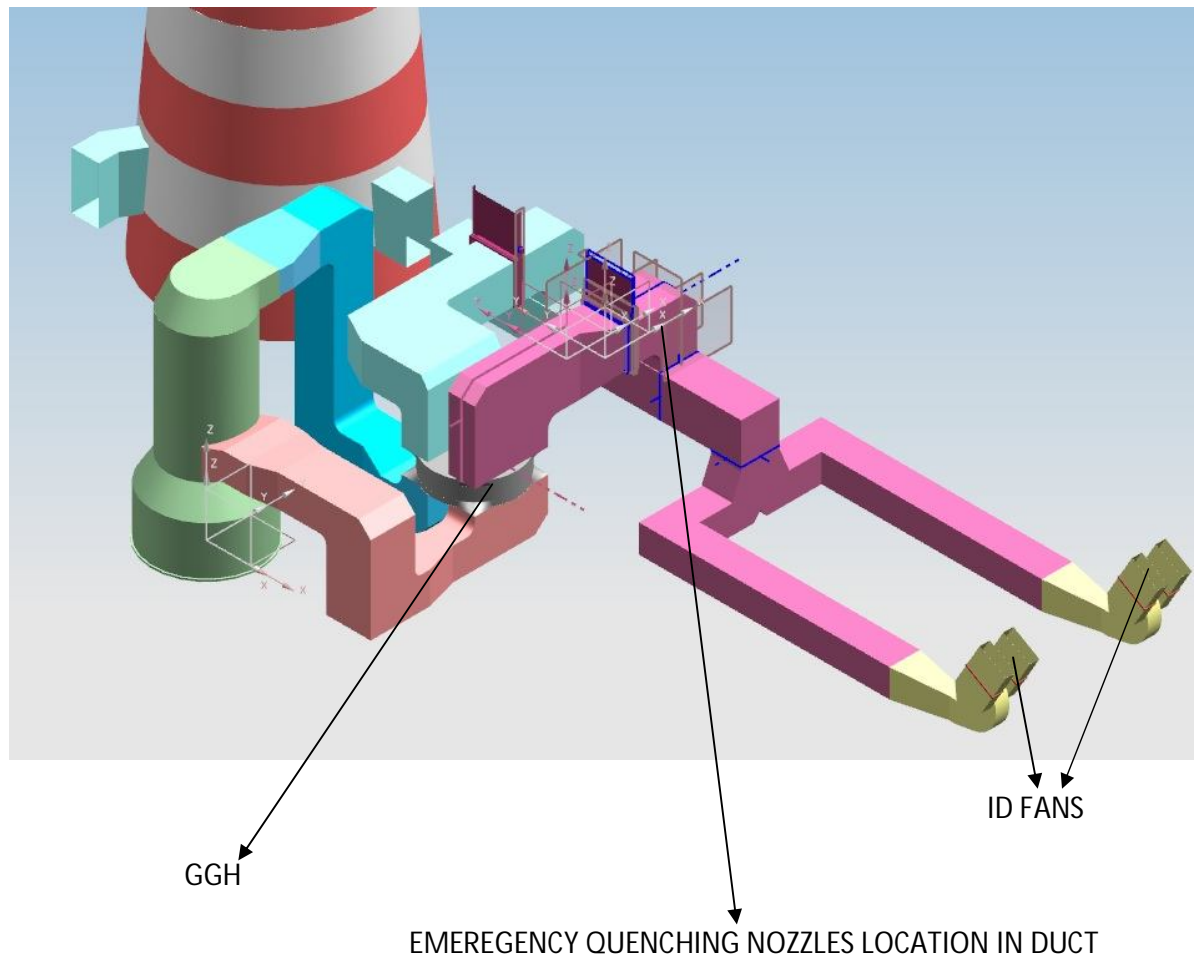


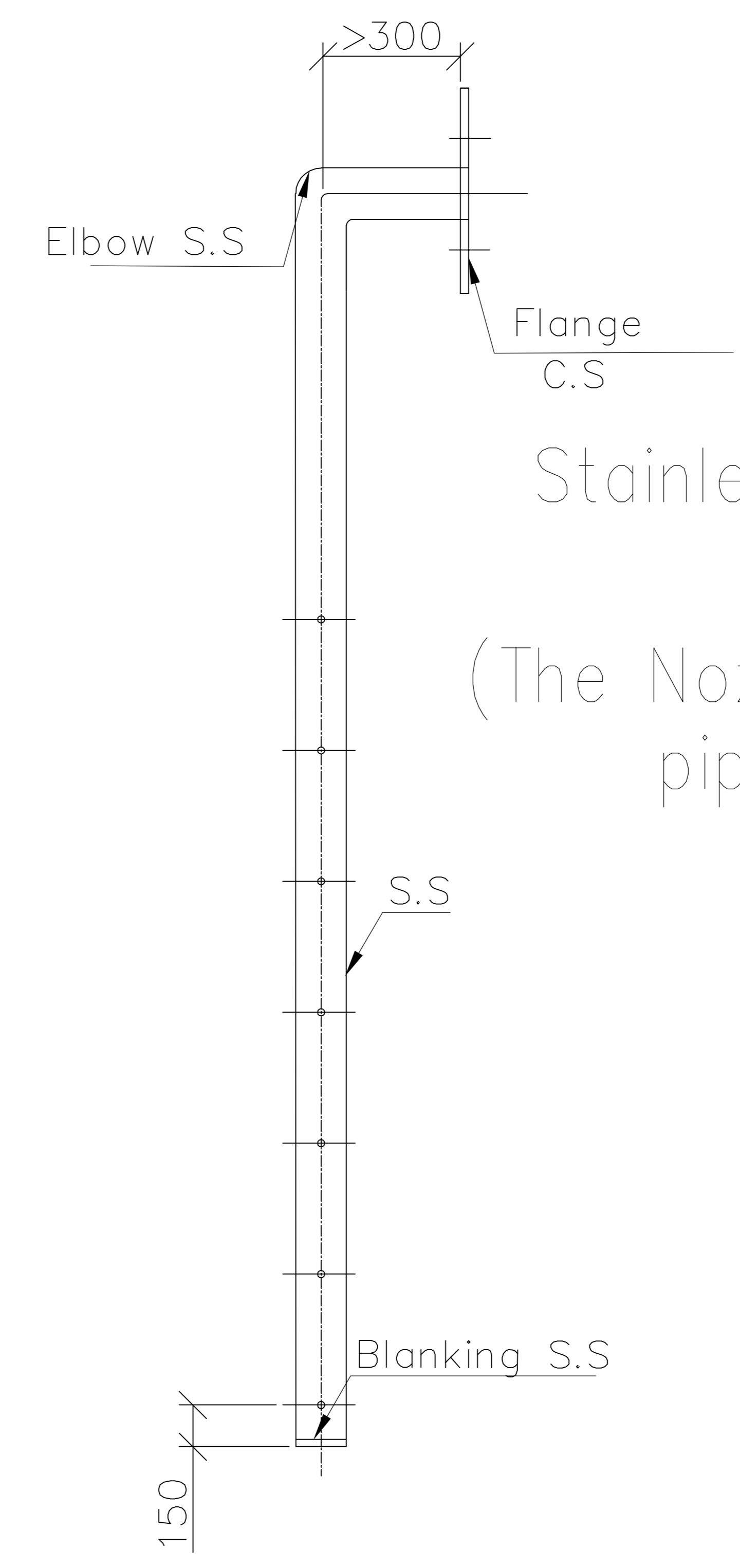
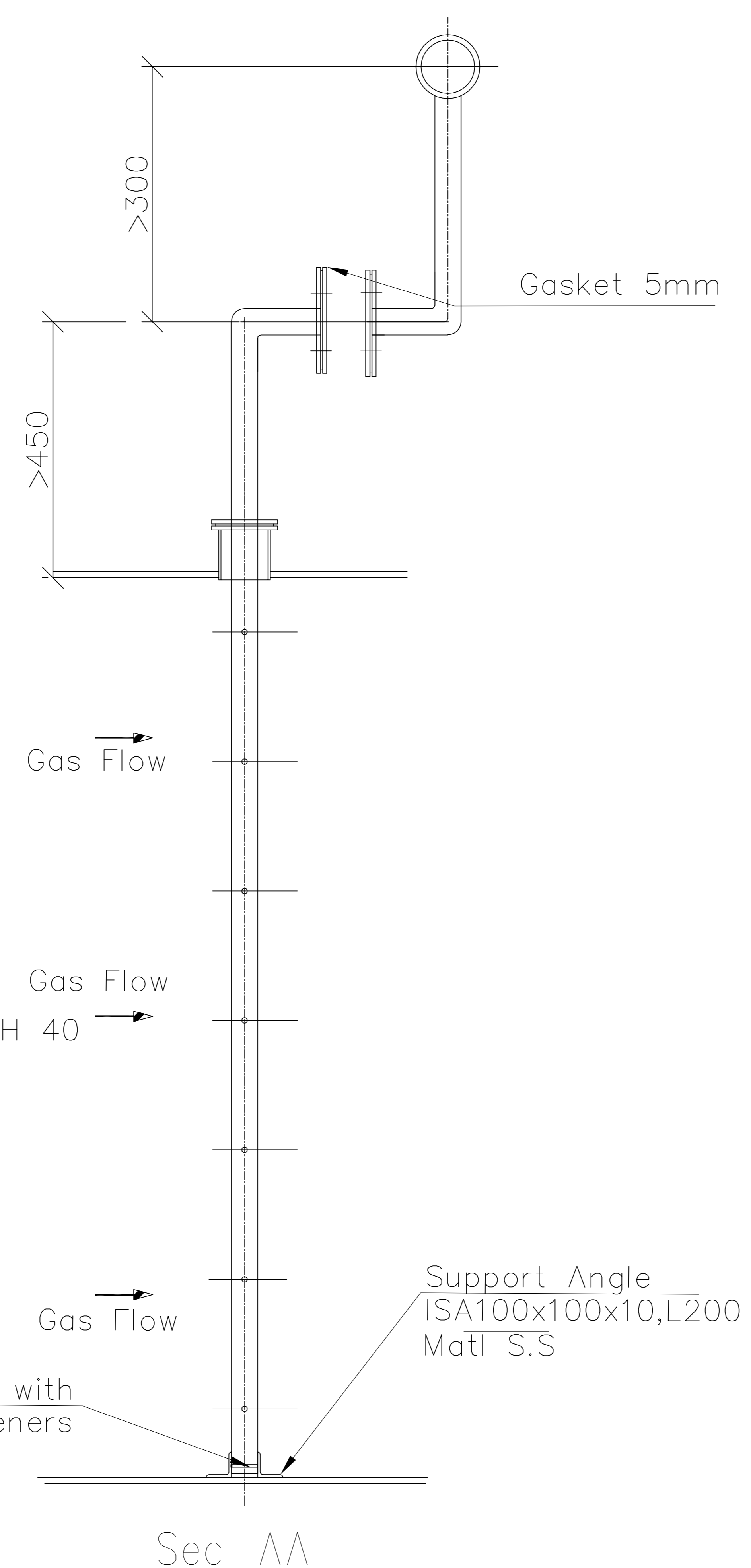
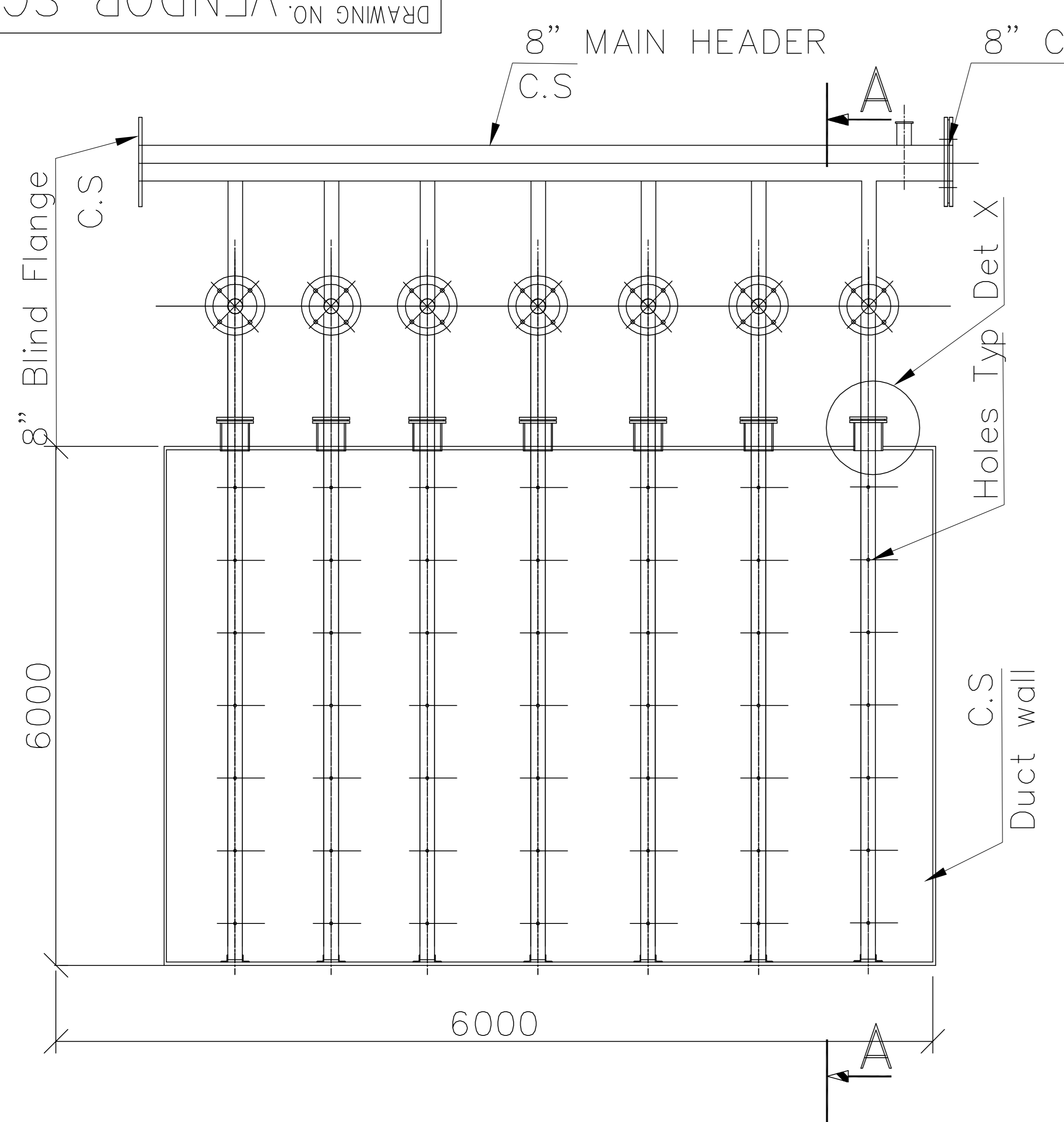
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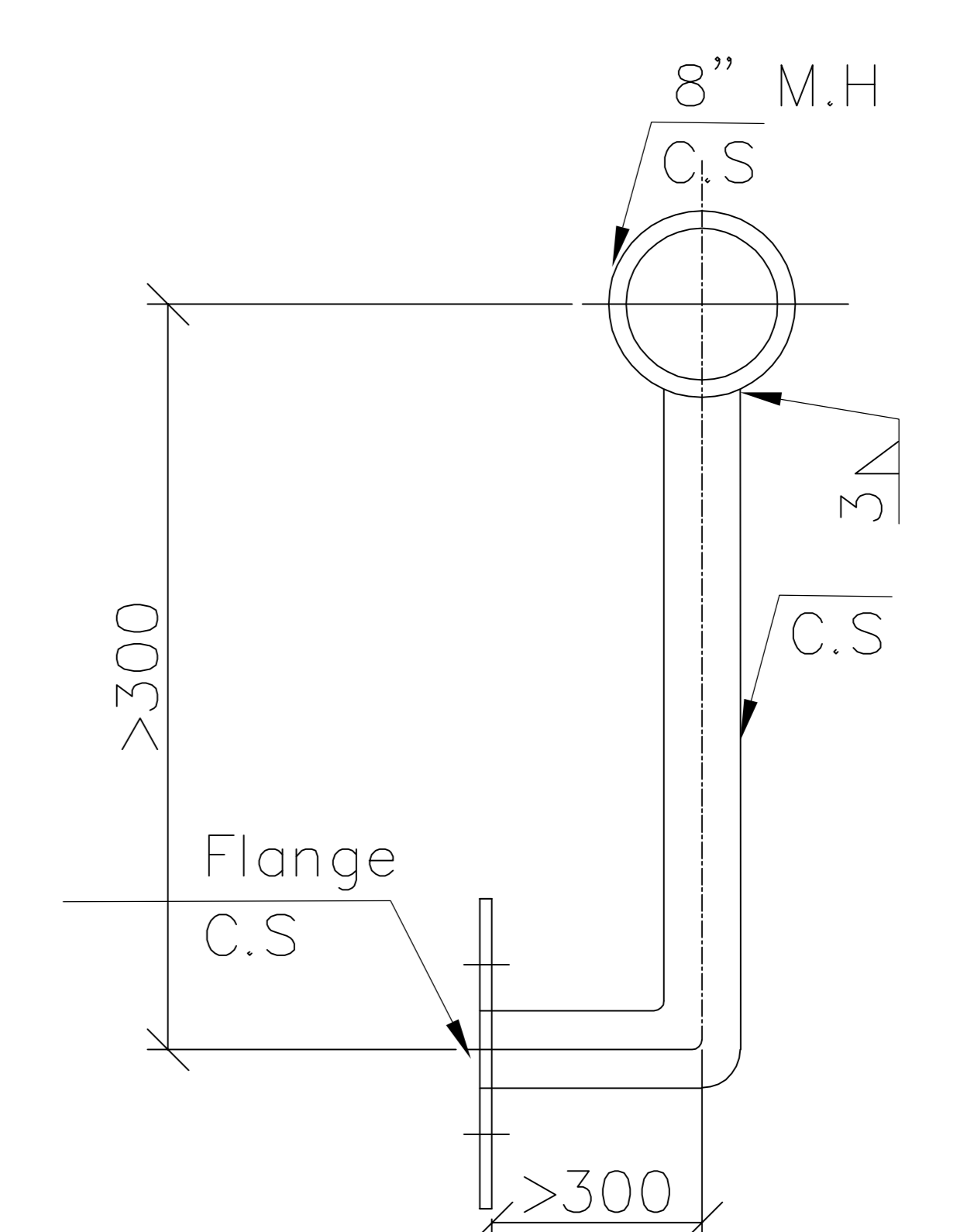
Annexure-X

8.10 3D LAYOUT



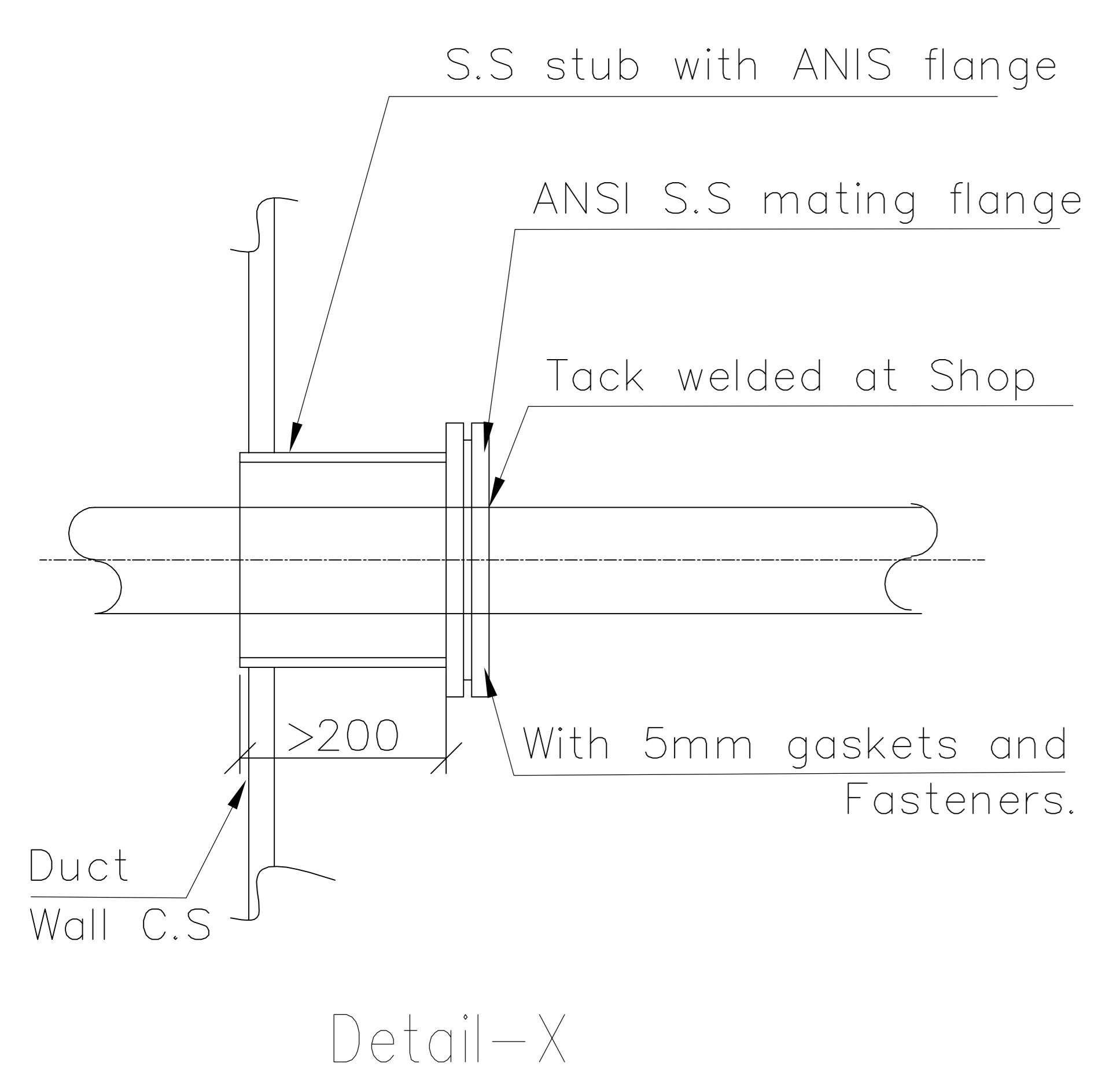


Stainless steel Spray Headers
 Quantity: 07 nos
 (The Nozzle arrangement for alternate pipe shall be as per assy.)



SS header connection pipe
 Quantity: 07 nos

- NOTE:
01. The supply should be as per technical specification
 02. SS Spray Header Material Specification—AL6XN or SS904L SCH 40
 03. Nozzles Material Specification—PTFE
 04. Main Header Material Specification—Carbon Steel
 05. Necessary Supporting arrangement for Nozzles and Headers shall be provided.



REV	DATE	ALTERED	CHECKED

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TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT					
BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT, RANIPET - 632 406.		DRN	NAME	SIGN	DATE
DEPT AQCS		CHD	N.SRIDHAR		04.02.14
GODE 862		APPD	K.M.KABILASH		04.02.14
GRADE OF UNTOL.DIM			S.K.DASH		04.02.14
SCALE	WEIGHT (KG).	REF. TO ASSY/OLD DRG.		ITEM NO.	NO. OF ITEMS
N.T.S.	----	-		-	-
TITLE			CARD CODE	DRAWING NO.	
EMERGENCY QUENCHING NOZZLES AND HEADERS ARRGMT			U 01	VENDOR SCOPE	
					REV
					00