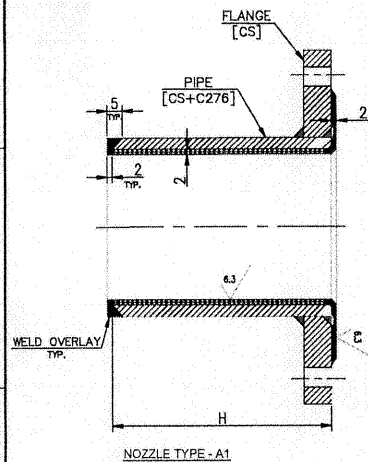


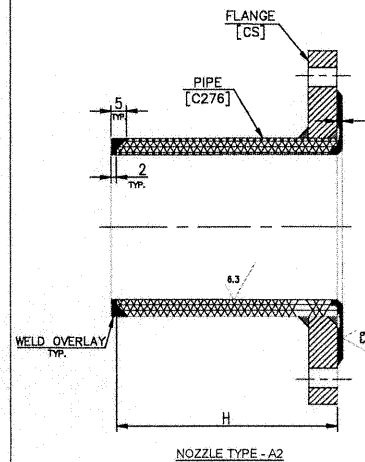
2-FW-203-01163
DRAWING NO.

ALL DIMENSIONS ARE IN MILLIMETRES



NOZZLE SCHEDULE (TYPE-A1):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	QTY (Nos.)	NOZZLE ID
1	8"	6.35	17.5	310	6	N5 (A TO B)
2	10"	6.35	17.5	310	3	N8
3	4"	6.02	15.9	210	3	N15
4	10"	6.35	17.5	210	6	N17 (A TO B)
5	10"	6.35	17.5	160	6	N21 (A TO B)
6	10"	6.35	17.5	160	6	N22 (A TO B)
7	10"	6.35	17.5	160	6	N23 (A TO B)
8	8"	6.35	17.5	210	12	N56 (A TO D)
9	8"	6.35	17.5	210	30	N55 (A TO J)
10	8"	6.35	17.5	210	30	N54 (A TO J)
11	8"	6.35	17.5	210	12	N53 (A TO D)
12	8"	6.35	17.5	210	24	N52 (A TO H)
13	8"	6.35	17.5	210	24	N51 (A TO H)



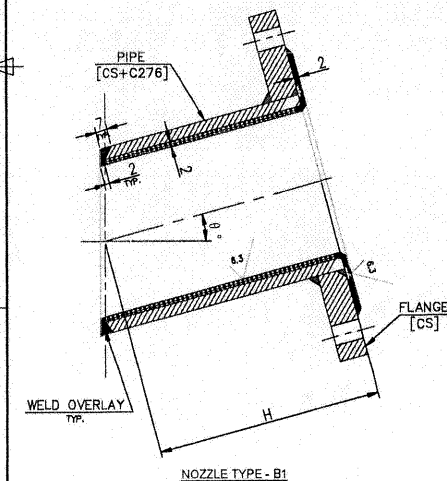
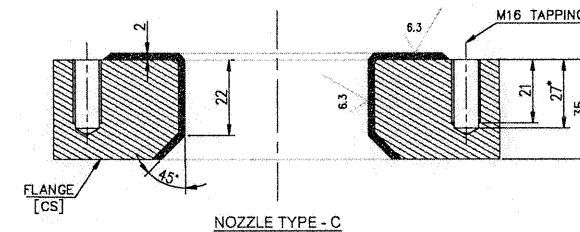
NOZZLE SCHEDULE (TYPE-A2):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	QTY (Nos.)	NOZZLE ID
1	2"	3.91	19.1	160	9	S51 (A TO C)
2	2"	3.91	19.1	160	9	S52 (A TO C)
3	2"	3.91	19.1	160	9	S53 (A TO C)
4	2"	3.91	19.1	160	9	S54 (A TO C)
5	2"	3.91	19.1	160	6	N27 (A TO B)

NOZZLE SCHEDULE (TYPE-C):

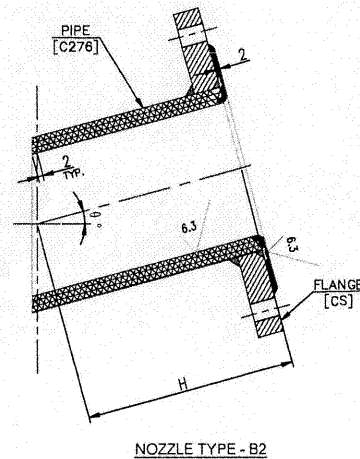
SL.NO	SIZE	QTY (Nos.)	NOZZLE ID
1	3"	9	N14 (A TO C)
2	3"	9	L1 (A TO C)
3	3"	3	N61
4	3"	3	N62
5	3"	3	N63

* HOLE DEPTH BEFORE THREADING



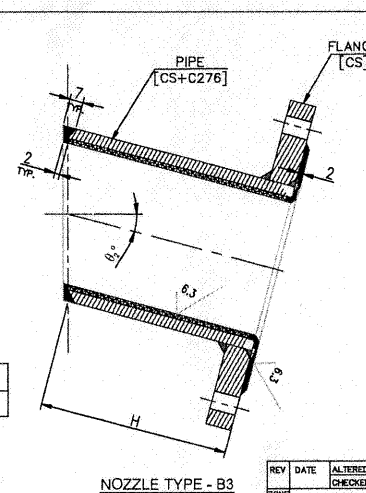
NOZZLE SCHEDULE (TYPE-B1):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (Nos.)	NOZZLE ID
1	4"	6.02	15.9	310	45	3	N4
2	10"	6.35	17.5	310	30	3	N7
3	10"	6.35	17.5	250	15	24	N11 (A TO H)
4	8"	6.35	17.5	310	30	3	N9
5	8"	6.35	17.5	310	30	3	N10
6	4"	6.02	15.9	310	45	3	N25



NOZZLE SCHEDULE (TYPE-B2):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (Nos.)	NOZZLE ID
1	2"	3.91	19.1	160	10	3	P51
2	2"	3.91	19.1	160	10	3	P52
3	2"	3.91	19.1	160	10	3	P53
4	2"	3.91	19.1	160	10	3	P54
5	2"	3.91	19.1	160	10	3	P55
6	2"	3.91	19.1	160	10	3	P56



NOZZLE SCHEDULE (TYPE-B3):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (Nos.)	NOZZLE ID
1	10"	6.35	17.5	160	10	12	N24 (A TO D)

NOTES:

- ALL SHARP EDGES SHALL BE ROUNDED OFF. WELD SHALL BE FINISHED ROUND & SMOOTH.
- MATERIAL DETAILS:
PIPE: ASTM A 106 Gr.B
FLANGE: IS2062 Gr. B
LINING/OVERLAY: HASTELLOY (C276)
- TOLERANCE:
NOZZLE HEIGHT: ± 1 MM; ANGLE: $\pm 0.5^\circ$
- 2MM THICK C276 LINING SHALL BE IN ADDITION TO THE PIPE & FLANGE THICKNESS SPECIFIED.
- FLANGE OD, ID, HOLE DRILLING SHALL BE AS PER ASME B 16.5 #150.
- FLANGE HOLES SHALL BE SUITABLY STAGGERED (OFF-CRS) WITH RESPECT TO LONGITUDINAL AXIS OF THE NOZZLE.
- FLANGE FACE SHALL BE PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE NOZZLE.
- THE DETAILS VIZ. NOZZLE SIZE, TAG, ANGLE ETC. SHALL BE SUITABLY MARKED ON THE FINISHED PRODUCT.
- THE NOZZLE QUANTITY INDICATED IS FOR THREE UNITS.

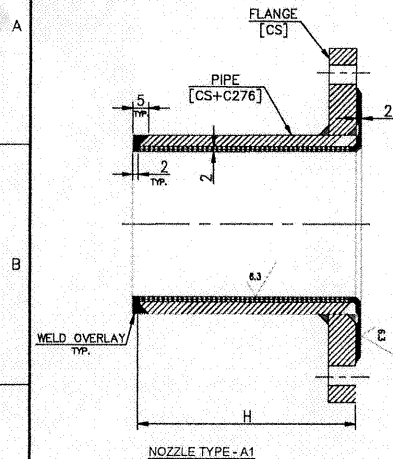
FOR TENDER PURPOSE ONLY

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		FLUE GAS DE-SULPHURIZATION NTPC/BARH STPP, STAGE-1 3x660MW	
DEPT. NO.	GRADE OF UNTOLOM	SCALE	WEIGHT (KG)
CODE 8778	PR-QA: 800		
Bharat Heavy Electricals Ltd., UNIT: BOLDAR AUXILIARIES PLANT, RAIPUR - 832 408		DRN. NAME S.VINCK	SIGN P.KONDAPPA NADU
DATE 17/01/20		DATE 17/01/20	DATE 17/01/20
REF. TO ASSY/OLD DWG		CARD CODE U 01	DRAWING NO. 2-FW-203-01163
REV. DATE		REV. DATE	
ZONE		ZONE	

AKH-1

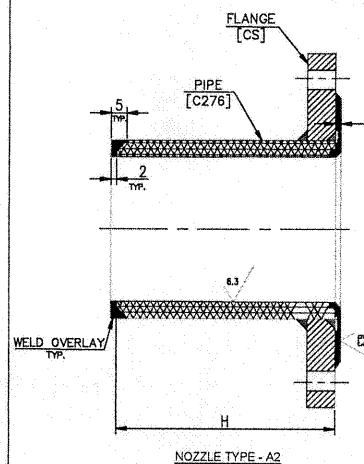
2-FW-203-01164
DRAWING NO.

ALL DIMENSIONS ARE IN MILLIMETRES



NOZZLE SCHEDULE (TYPE-A1):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	QTY (Nos.)	NOZZLE ID
1	8"	6.35	17.5	310	4	N5 (A TO B)
2	10"	6.35	17.5	310	2	N8
3	4"	6.02	15.9	210	2	N15
4	10"	6.35	17.5	210	4	N17 (A TO B)
5	10"	6.35	17.5	160	4	N21 (A TO B)
6	10"	6.35	17.5	160	4	N22 (A TO B)
7	10"	6.35	17.5	160	4	N23 (A TO B)
8	8"	6.35	17.5	210	8	N56 (A TO D)
9	8"	6.35	17.5	210	20	N55 (A TO J)
10	8"	6.35	17.5	210	20	N54 (A TO J)
11	8"	6.35	17.5	210	8	N53 (A TO D)
12	8"	6.35	17.5	210	16	N52 (A TO H)
13	8"	6.35	17.5	210	16	N51 (A TO H)

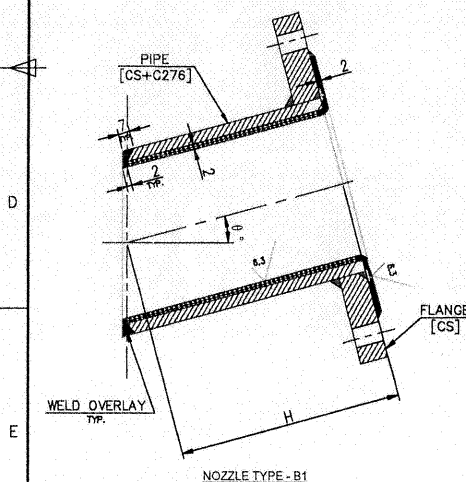
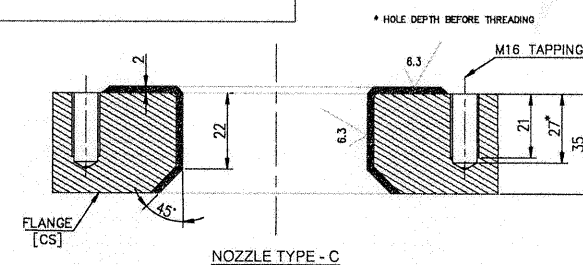


NOZZLE SCHEDULE (TYPE-A2):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	QTY (Nos.)	NOZZLE ID
1	2"	3.91	19.1	160	6	S51 (A TO C)
2	2"	3.91	19.1	160	6	S52 (A TO C)
3	2"	3.91	19.1	160	6	S53 (A TO C)
4	2"	3.91	19.1	160	6	S54 (A TO C)

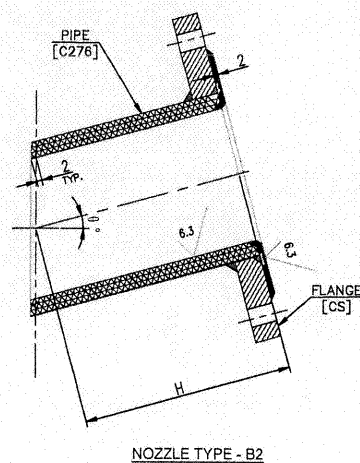
NOZZLE SCHEDULE (TYPE-C):

SL.NO	SIZE	QTY (Nos.)	NOZZLE ID
1	3"	6	N14 (A TO C)
2	3"	6	L1 (A TO C)
3	3"	2	N61
4	3"	2	N62
5	3"	2	N63



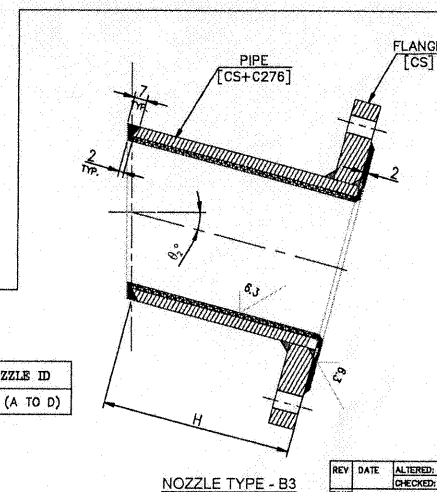
NOZZLE SCHEDULE (TYPE-B1):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (Nos.)	NOZZLE ID
1	4"	6.02	15.9	310	45	2	N4
2	10"	6.35	17.5	310	30	2	N7
3	10"	6.35	17.5	250	15	20	N11 (A TO J)
4	8"	6.35	17.5	310	30	2	N9
5	8"	6.35	17.5	310	30	2	N10
6	4"	6.02	15.9	310	45	2	N25
7	3"	5.49	22.3	210	30	4	N27 (A TO B)



NOZZLE SCHEDULE (TYPE-B2):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (Nos.)	NOZZLE ID
1	2"	3.91	19.1	160	10	2	P51
2	2"	3.91	19.1	160	10	2	P52
3	2"	3.91	19.1	160	10	2	P53
4	2"	3.91	19.1	160	10	2	P54
5	2"	3.91	19.1	160	10	2	P55
6	2"	3.91	19.1	160	10	2	P56



NOZZLE SCHEDULE (TYPE-B3):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (Nos.)	NOZZLE ID
1	10"	6.35	17.5	160	10	8	N24 (A TO D)

NOTES:

- ALL SHARP EDGES SHALL BE ROUNDED OFF. WELD SHALL BE FINISHED ROUND & SMOOTH.
- MATERIAL DETAILS:
PIPE: ASTM A 106 Gr.B
FLANGE: IS2062 Gr. B
LINING/OVERLAY: HASTELLOY (C276)
- TOLERANCE:
NOZZLE HEIGHT: ± 1 MM; ANGLE: $\pm 0.5^\circ$
- 2MM THICK C276 LINING SHALL BE IN ADDITION TO THE PIPE & FLANGE THICKNESS SPECIFIED.
- FLANGE OD, ID, HOLE DRILLING SHALL BE AS PER ASME B 16.5 #150.
- FLANGE HOLES SHALL BE SUITABLY STAGGERED (OFF-CRS) WITH RESPECT TO LONGITUDINAL AXIS OF THE NOZZLE.
- FLANGE FACE SHALL BE PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE NOZZLE.
- THE DETAILS VIZ. NOZZLE SIZE, TAG, ANGLE ETC. SHALL BE SUITABLY MARKED ON THE FINISHED PRODUCT.
- THE NOZZLE QUANTITY INDICATED IS FOR TWO UNITS.

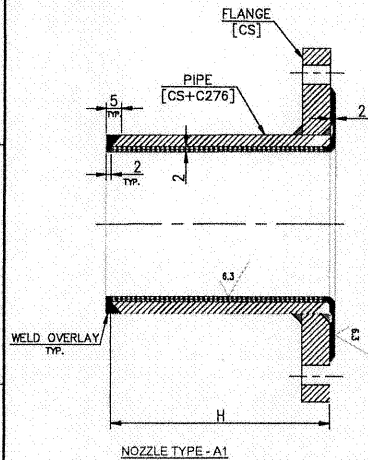
FOR TENDER PURPOSE ONLY

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		FLUE GAS DE-SULPHURIZATION NTPC/BARH STPP, STAGE-2 2x660MW			
DEPT	GRADE OF UNIFORM	SCALE	WEIGHT (KG)	REF. TO ASSY/OLD DRG.	REV
NP	PR: QA: B00	8776			
TITLE		ABSORBER NOZZLE DETAILS		CARD CODE	REV
				U 01	
				DRAWING NO.	
				2-FW-203-01164	
				00	

BATH-10

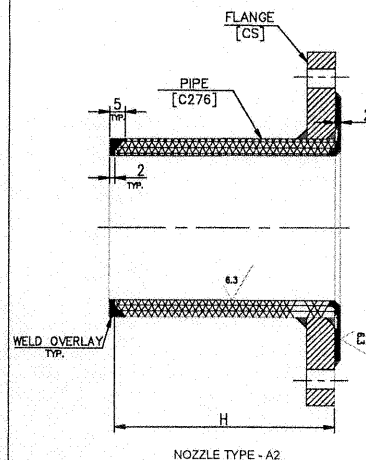
2-FW-203-01132
DRAWING NO.

ALL DIMENSIONS ARE IN MILLIMETRES



NOZZLE SCHEDULE (TYPE-A1):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	QTY (NOs.)	NOZZLE ID
1	6"	7.11	17.5	310	4	N5 (A TO B)
2	10"	6.35	17.5	310	2	N8
3	4"	6.02	15.9	210	2	N15
4	10"	6.35	17.5	210	4	N17 (A TO B)
5	10"	6.35	17.5	160	4	N21 (A TO B)
6	10"	6.35	17.5	160	4	N22 (A TO B)
7	10"	6.35	17.5	160	4	N23 (A TO B)
8	8"	6.35	17.5	215	12	N51 (A TO F)
9	8"	6.35	17.5	215	12	N52 (A TO F)
10	8"	6.35	17.5	215	8	N53 (A TO D)
11	8"	6.35	17.5	215	16	N54 (A TO H)
12	8"	6.35	17.5	215	16	N55 (A TO H)
13	8"	6.35	17.5	215	8	N56 (A TO D)



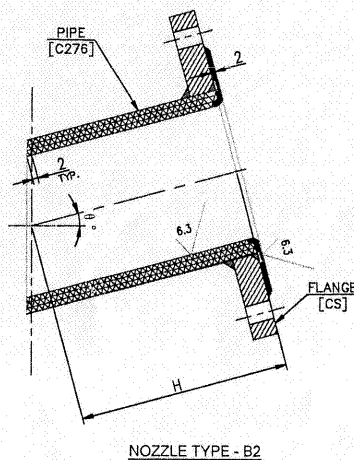
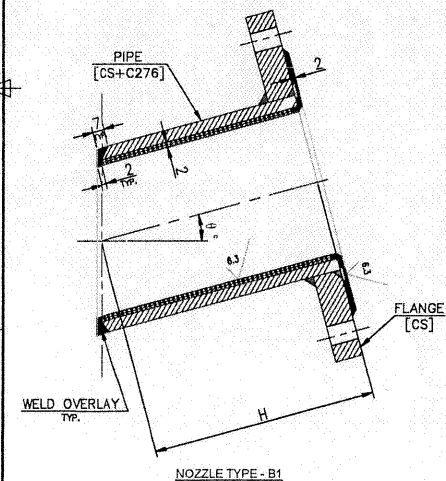
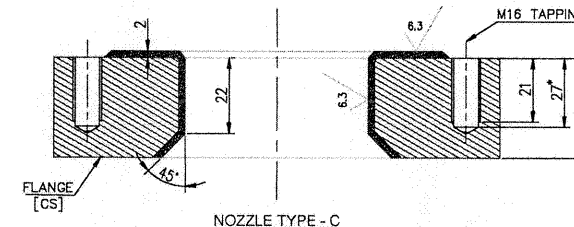
NOZZLE SCHEDULE (TYPE-A2):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	QTY (NOs.)	NOZZLE ID
1	2"	3.91	17.5	160	12	SS1 (A TO F)
2	2"	3.91	17.5	160	12	SS2 (A TO F)

NOZZLE SCHEDULE (TYPE-C):

SL.NO	SIZE	QTY (NOs.)	NOZZLE ID
1	3"	6	N14 (A TO C)
2	3"	6	L1 (A TO C)
3	3"	2	N61
4	3"	2	N62
5	3"	2	N63

* HOLE DEPTH BEFORE THREADING



NOZZLE SCHEDULE (TYPE-B2):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (NOs.)	NOZZLE ID
1	2"	3.91	17.5	160	10	2	P51
2	2"	3.91	17.5	160	10	2	P52
3	2"	3.91	17.5	160	10	2	P53
4	2"	3.91	17.5	160	10	2	P54
5	2"	3.91	17.5	160	10	2	P55
6	2"	3.91	17.5	160	10	2	P56

NOTES:

- ALL SHARP EDGES SHALL BE ROUNDED OFF. WELD SHALL BE FINISHED ROUND & SMOOTH.
- MATERIAL DETAILS:
PIPE: ASTM A 106 Gr.B
FLANGE: IS2062 Gr. B
LINING/OVERLAY: HASTELLOY (C276)
- TOLERANCE:
NOZZLE HEIGHT: ± 1 MM; ANGLE: $\pm 0.5^\circ$
- 2MM THICK C276 LINING SHALL BE IN ADDITION TO THE PIPE & FLANGE THICKNESS SPECIFIED.
- FLANGE OD, ID, HOLE DRILLING SHALL BE AS PER ASME B 16.5 #150.
- FLANGE HOLES SHALL BE SUITABLY STAGGERED (OFF-CRS) WITH RESPECT TO LONGITUDINAL AXIS OF THE NOZZLE.
- FLANGE FACE SHALL BE PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE NOZZLE.
- THE DETAILS VIZ. NOZZLE SIZE, TAG, ANGLE ETC. SHALL BE SUITABLY MARKED ON THE FINISHED PRODUCT.
- THE NOZZLE QUANTITY INDICATED IS FOR TWO UNITS.

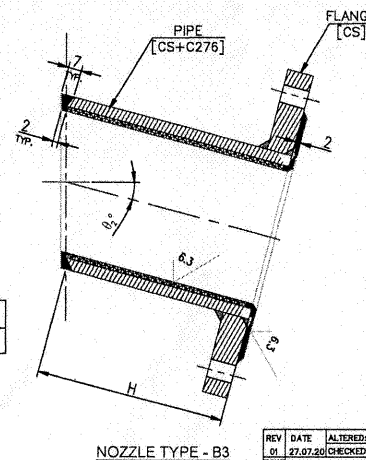
FOR TENDER PURPOSE ONLY

NOZZLE SCHEDULE (TYPE-B1):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (NOs.)	NOZZLE ID
1	4"	6.02	15.9	310	45	4	N4, N25
2	10"	6.35	17.5	310	30	2	N7
3	6"	7.11	17.5	310	30	2	N9
4	8"	6.35	17.5	310	30	2	N10
5	10"	6.35	17.5	250	15	16	N11 (A TO H)
6	3"	5.49	22.3	210	30	4	N27 (A TO B)

NOZZLE SCHEDULE (TYPE-B3):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (NOs.)	NOZZLE ID
1	10"	6.35	17.5	160	10	4	N24 (A TO B)



NOZZLE TYPE - B3

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		NAME S. VIVEK		SIGN [Signature]	DATE 08.06.20
BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT, RANIPET - 632 408.		DRN P. CHANDRAN	CHD G. RAJENDRAN	DATE 08.06.20	DATE 08.06.20
DEPT NP	GRADE OF UNTOLOM PRI: QAI/500	SCALE	WEIGHT (KG)	REV. TO ASST/OLD DRG.	FILE NO.
TITLE ABSORBER NOZZLE DETAILS		CARD CODE U 01	DRAWING NO. 2-FW-203-01132		REV 01

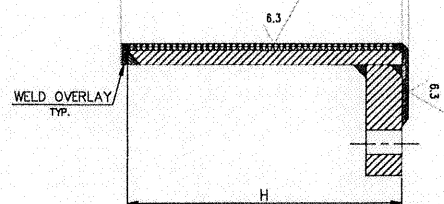
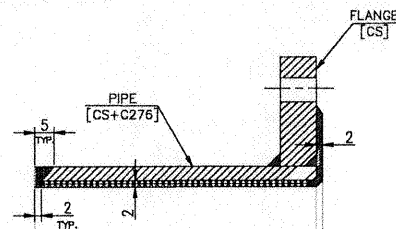
CAUTION: The information on this drawing is the property of BHARAT HEAVY ELECTRICALS LTD. It must not be used for any purpose other than that for which it was prepared without the written consent of the company.

REV
01
DATE
27.07.20
CHECKED
PC
ZONE
NOZZLE FOR 4000 IN SL NO-1 AT
TYPE B-1, QTY INCREASED TO 4 NOS

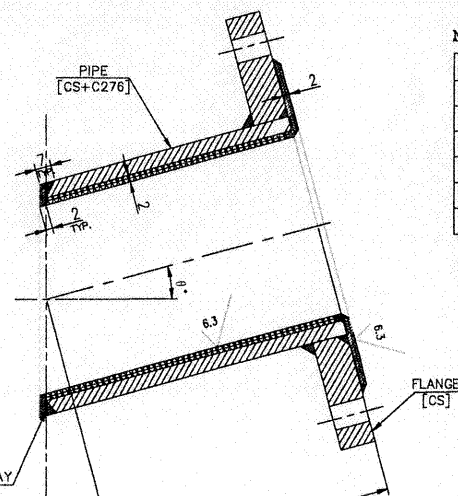
Size A2

2-FW-203-01162

ON DWYMRQ



NOZZLE TYPE - A



NOZZLE TYPE - B1

NOZZLE SCHEDULE (TYPE-A):

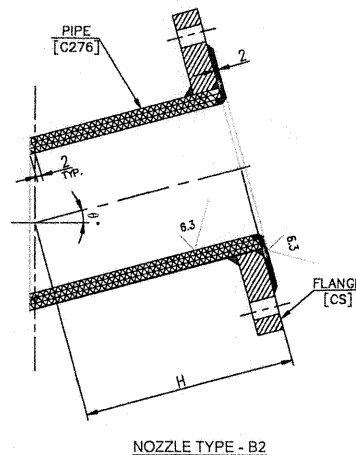
SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	QTY (NOs)	NOZZLE ID
1	8"	6.35	17.5	410	6	N5 (A TO B)
2	6"	7.11	17.5	160	3	N15
3	10"	6.35	17.5	210	6	N17 (A TO B)
4	10"	6.35	17.5	160	6	N21 (A TO B)
5	8"	6.35	17.5	160	6	N22 (A TO B)
6	8"	6.35	17.5	160	6	N23 (A TO B)
7	4"	6.02	15.9	310	3	N26
8	3"	5.49	23.9	110	6	N27 (A TO B)
9	4"	6.02	15.9	260	21	S51 (A TO G)
10	4"	6.02	15.9	260	21	S52 (A TO G)
11	10"	6.35	17.5	251	30	N51 (A TO J)
12	10"	6.35	17.5	251	30	N52 (A TO J)
13	10"	6.35	17.5	251	30	N53 (A TO J)
14	10"	6.35	17.5	251	30	N54 (A TO J)
15	10"	6.35	17.5	251	30	N55 (A TO J)
16	10"	6.35	17.5	251	30	N56 (A TO J)
17	10"	6.35	17.5	310	3	N8

NOZZLE SCHEDULE (TYPE-B1):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (NOs)	NOZZLE ID
1	4"	6.02	15.9	310	45	3	N4
2	10"	6.35	17.5	310	30	3	N7
3	8"	6.35	17.5	310	30	3	N9
4	10"	6.35	17.5	310	30	3	N10
5	10"	6.35	17.5	250	15	30	N11 (A TO J)
6	4"	6.02	15.9	310	45	3	N25

NOTES:

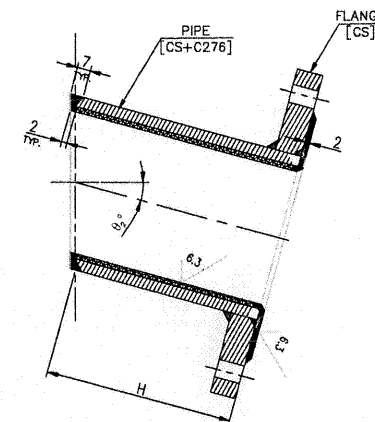
- ALL SHARP EDGES SHALL BE ROUNDED OFF. WELD SHALL BE FINISHED ROUND & SMOOTH.
- MATERIAL DETAILS:
PIPE: ASTM A 106 Gr.B
FLANGE: IS2062 Gr. B
LINING/OVERLAY: HASTELLOY (C276)
- TOLERANCE:
NOZZLE HEIGHT: ± 1 MM; ANGLE: $\pm 0.5^\circ$
- 2MM THICK C276 LINING SHALL BE IN ADDITION TO THE PIPE & FLANGE THICKNESS SPECIFIED.
- FLANGE OD, ID, HOLE DRILLING SHALL BE AS PER ASME B 16.5 #150.
- FLANGE HOLES SHALL BE SUITABLY STAGGERED (OFF-CRS) WITH RESPECT TO LONGITUDINAL AXIS OF THE NOZZLE.
- FLANGE FACE SHALL BE PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE NOZZLE.
- THE DETAILS VIZ. NOZZLE SIZE, TAG, ANGLE ETC. SHALL BE SUITABLY MARKED ON THE FINISHED PRODUCT.
- THE NOZZLE QUANTITY INDICATED IS FOR THREE UNITS.



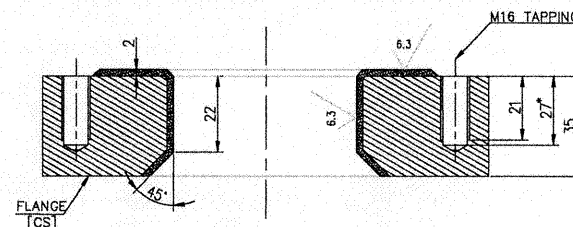
NOZZLE TYPE - B2

NOZZLE SCHEDULE (TYPE-B3):

SL.NO	SIZE	PIPE THK	FLG. THK	HEIGHT (H)	ANGLE (°)	QTY (NOs)	NOZZLE ID
1	8"	6.35	17.5	160	10	12	N24 (A TO D)



NOZZLE TYPE - B3



NOZZLE TYPE - C

(FLANGE DRILLING AS PER ASME B 16.5 #150)

NOZZLE SCHEDULE (TYPE-C):

SL.NO	SIZE	QTY (NOs)	NOZZLE ID
1	3"	9	N14 (A TO C)
2	3"	9	L1 (A TO C)
3	3"	3	N61
4	3"	3	N62
5	3"	3	N63

* HOLE DEPTH BEFORE THREADING

FOR TENDER PURPOSE ONLY

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		FLUE GAS DE-SULPHURIZATION NORTH KARANPURA STPP 3x660MW			
BHARAT HEAVY ELECTRICALS LTD., UNIT: BOILER AUXILIARIES PLANT, RANIPET - 632 406.		NAME S. VIVEK	SIGN M.	DATE 04.09.20	NO. OF VAR.
DEPT: NP		GRD. OF UNTOLOIM	SCALE	WEIGHT (KG)	REF. TO ASSY/OLD DNG.
CODE: 8778		PR: QA/500			
TITLE ABSORBER NOZZLE DETAILS		CARD CODE U 01	DRAWING NO. 2-FW-203-01162		REV 00

NRP