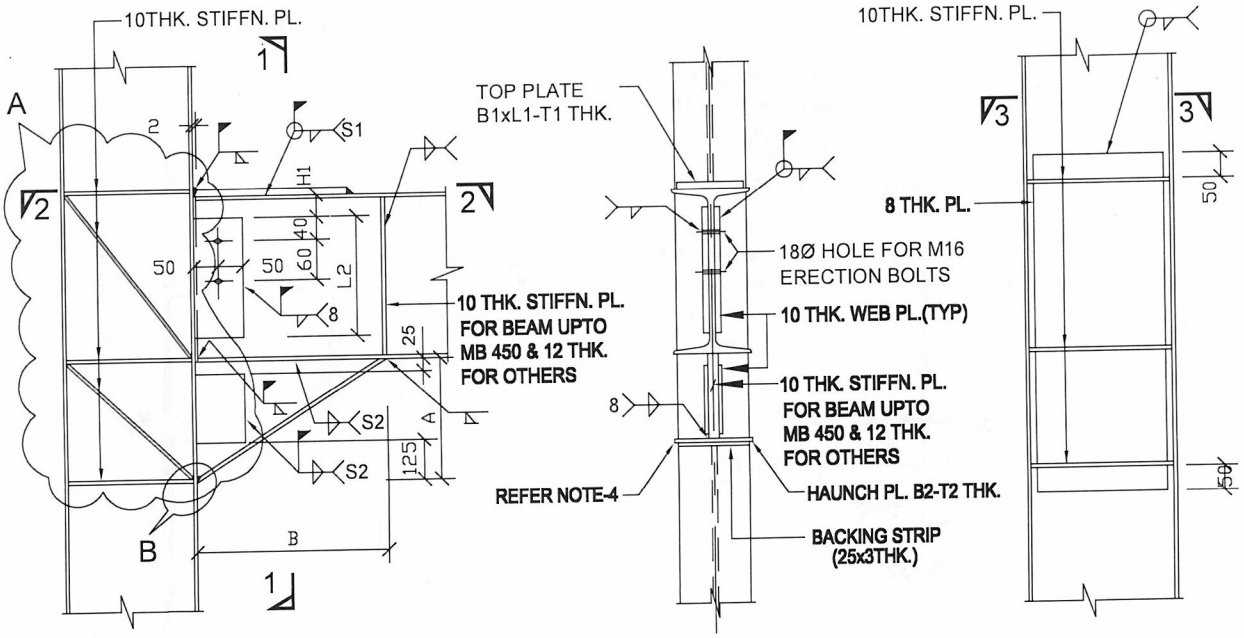
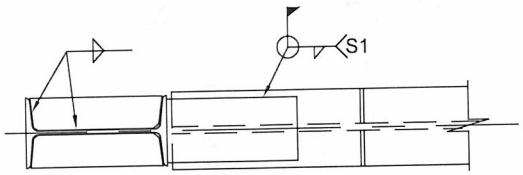


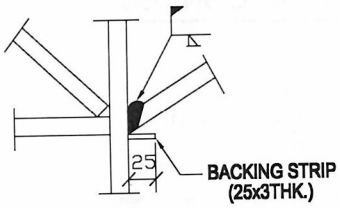
TYP. DET. OF MOMENT CONNECTION

SEC. 1-1

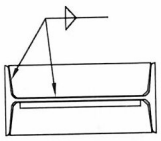
DETAIL-A
(ALTERNATE)



VIEW 2-2



DETAIL-B



SEC. 3-3

BEAM SIZE	COLUMN SIZE	TOP PLATE SIZE			HAUNCH PLATE SIZE				WEB PL. SIZE		WELD SIZE	
		L1	B1	T1	A	B	B2	T2	H1	L2	S1	S2
MB350	≥ MB250	225	120	20	260	450	140	16	50	250	8	10
MB400	≥ MB300	250	120	20	300	525	140	16	55	290	8	10
MB450	≥ MB300	300	130	22	340	600	150	20	55	340	8	10
MB500	≥ MB400	350	140	22	375	650	180	20	60	380	8	10
MB600	≥ MB500	400	180	25	450	800	210	22	70	460	10	10

NOTES:

1. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING STRENGTH & 50% OF SHEAR STRENGTH OF BEAM.
2. ALTERNATE DETAIL 'A' IS TO BE PROVIDED WHEN LONGITUDINAL BEAMS FOUL WITH STIFFENER.
3. CONNECTION IS SHOWN FOR FIELD MOMENT CONNECTION.
4. WIDTH OF PLATE SHALL BE NOTCHED IN 1:3 SLOPE AT COLUMN CONNECTION TO MATCH WITH COLUMN FLANGE WIDTH.
5. WHEREVER FILLET WELD SIZE NOT MARKED IT SHALL BE CONSIDERED AS 6mm.

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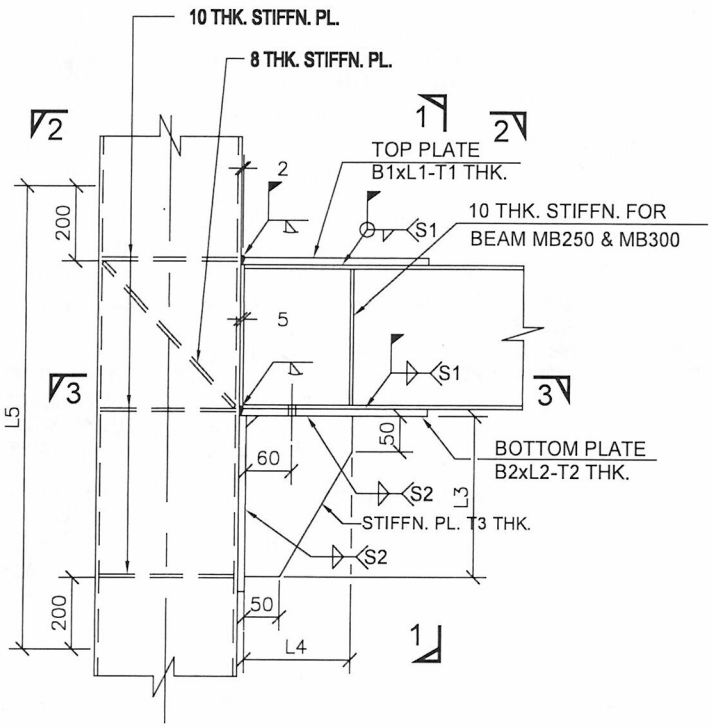
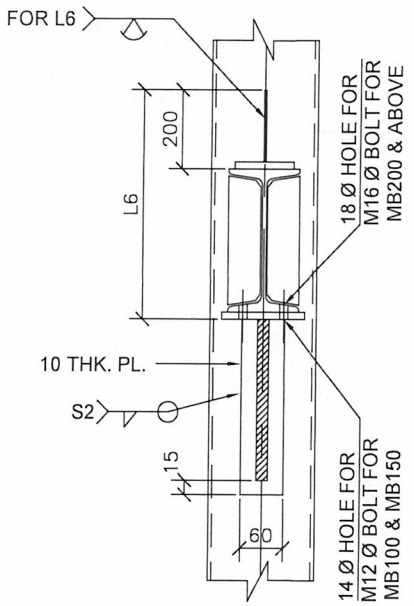
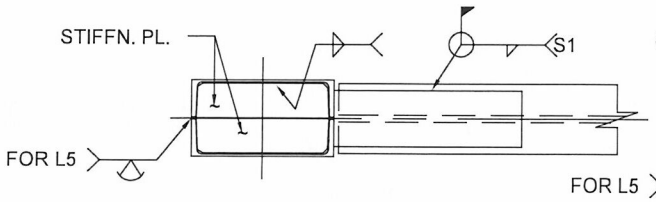


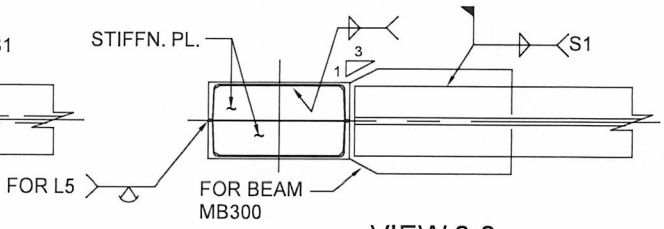
TYP. DET. OF MOMENT CONNECTION



SEC. 1-1



VIEW 2-2



VIEW 3-3

BEAM SIZE	COLUMN SIZE	TOP PLATE SIZE			BOTTOM PLATE SIZE			STIFFN. SIZE			WELD SIZE		
		L1	B1	T1	L2	B2	T2	L3	L4	T3	S1	S2	
MB100	≥MC100 []	150	55	16	150	95	10	175	150	10	6	6	
MB150	≥MC100 []	155	60	16	155	100	10	230	150	10	6	6	
MB200	≥MC150 []	260	80	20	260	120	16	225	150	10	6	10	
MB250	≥MC200 []	290	105	25	290	145	20	265	150	10	8	10	
MB300	≥MC200 []	335	120	25	335	160	20	330	170	10	8	10	

NOTES:-

1. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING AND SHEAR STRENGTH OF BEAM.
2. THIS STANDARD IS NOT APPLICABLE FOR BEAM CONNECTING WITH WEB OF MC BOX COLUMN.
3. CONNECTION IS SHOWN FOR FIELD MOMENT CONNECTION.
4. WHEREVER FILLET WELD SIZE NOT MARKED IT SHALL BE CONSIDERED AS 6mm.

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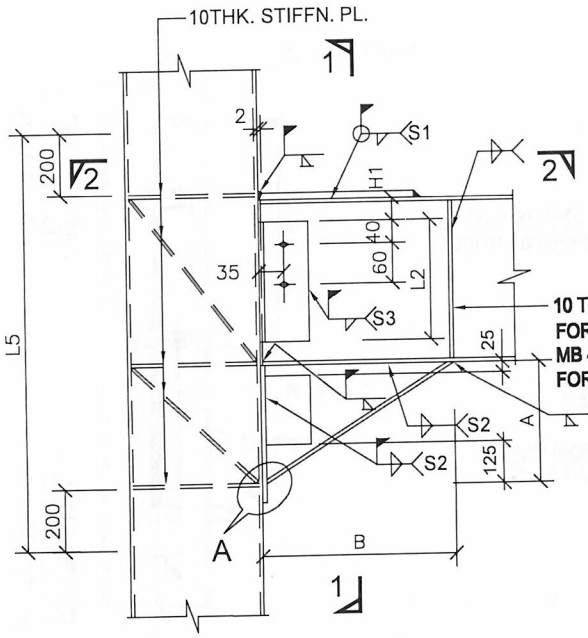
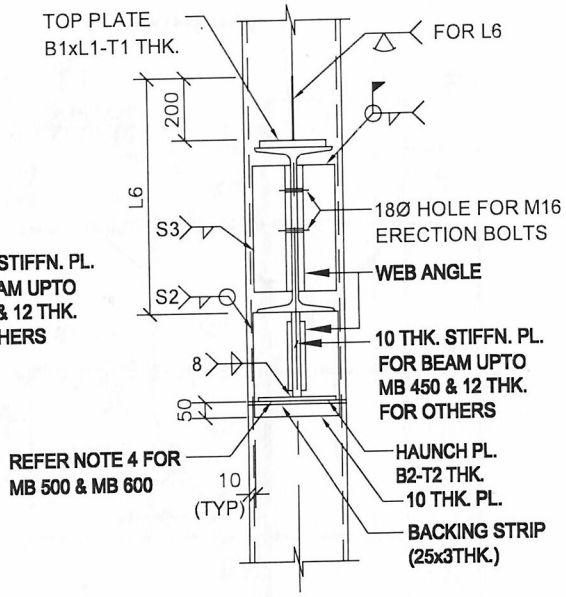
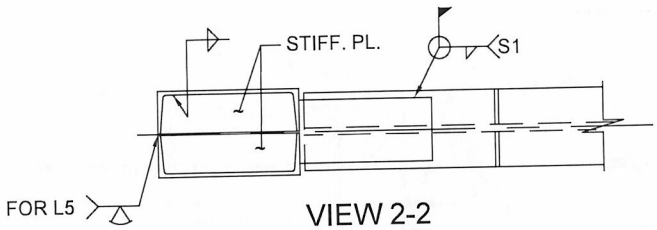


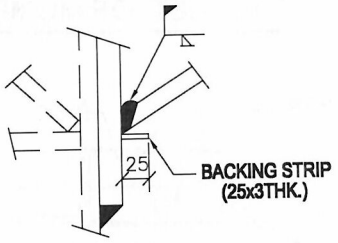
TYP. DET. OF MOMENT CONNECTION



SEC. 1-1



VIEW 2-2



DETAIL-A

BEAM SIZE	COLUMN SIZE	TOP PL. SIZE			HAUNCH PLATE SIZE				WEB ANGLE SIZE			WELD SIZE		
		L1	B1	T1	A	B	B2	T2	H1	L2	ANGLE SIZE	S1	S2	S3
MB350	≥ MC250 □	225	120	20	260	450	140	16	50	250	65x65x6	8	10	6
MB400	≥ MC250 □	250	120	20	300	525	140	16	55	290	65x65x6	8	10	6
MB450	≥ MC300 □	300	130	22	340	600	150	20	55	340	75x75x8	8	10	8
MB500	≥ MC300 □	350	140	22	375	650	180	20	60	380	75x75x8	8	10	8
MB600	≥ MC400 □	400	180	25	450	800	210	22	70	460	75x75x8	10	10	8

NOTES:

1. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING STRENGTH & 50% OF SHEAR STRENGTH OF BEAM.
2. **CONNECTION IS SHOWN FOR FIELD MOMENT CONNECTION.**
3. WHEREVER FILLET WELD SIZE NOT MARKED IT SHALL BE CONSIDERED AS 6mm.
4. **WIDTH OF PLATE SHALL BE NOTCHED IN 1:3 SLOPE AT COLUMN CONNECTION TO MATCH WITH COLUMN** FLANGE PLATE WIDTH.
5. **THIS STANDARD IS NOT APPLICABLE FOR BEAM CONNECTING WITH WEB OF MC BOX COLUMN.**

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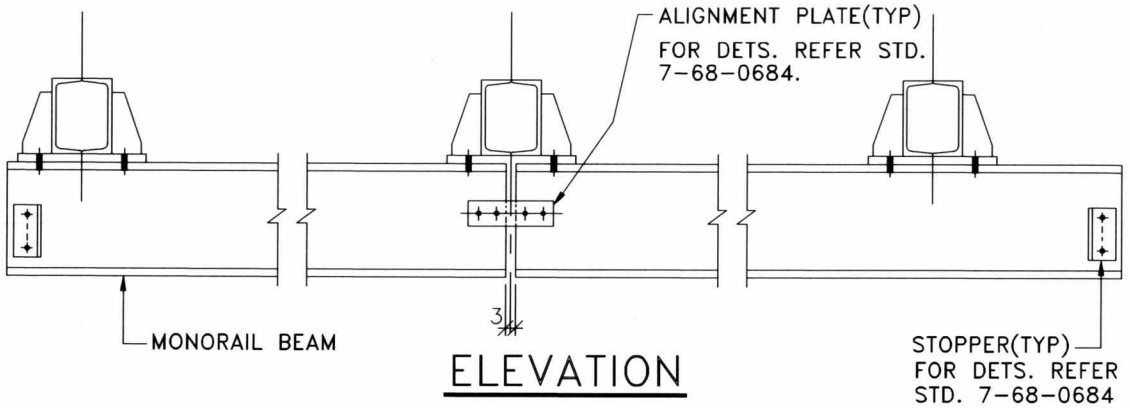
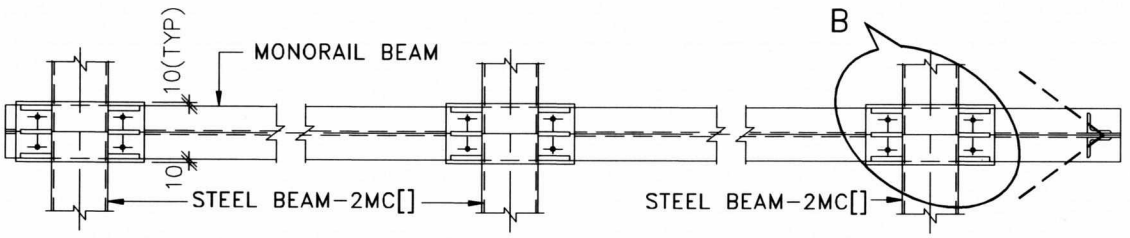
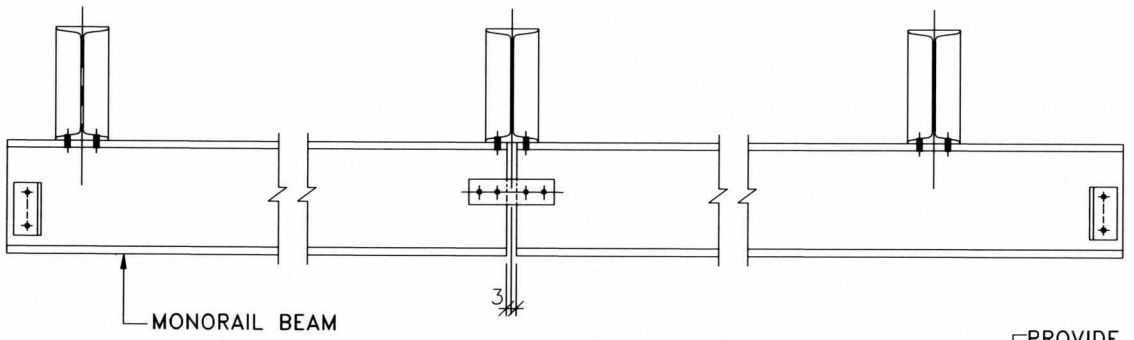


ELEVATION



PLAN

MONORAIL CONNECTION WITH 2 MC[]



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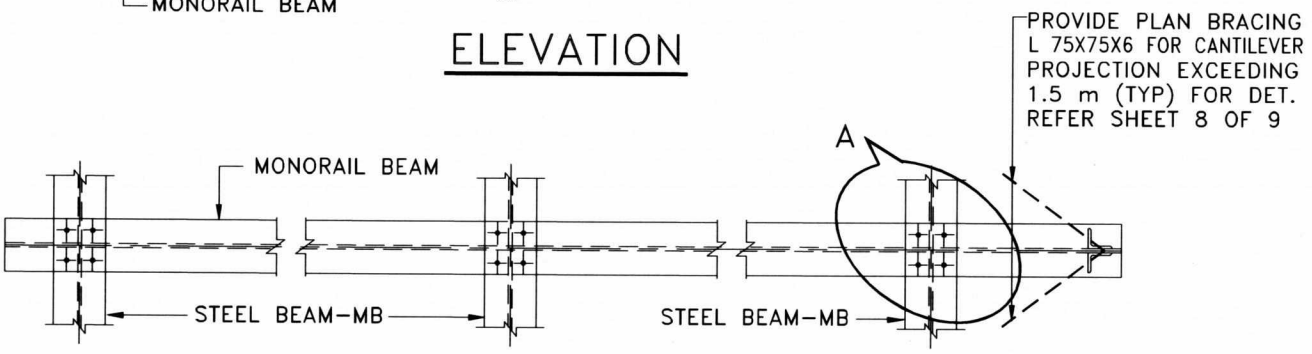

PLAN

MONORAIL CONNECTION WITH MB

APPLICABLE FOR LIFT CAPACITY UPTO 4.0 T

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	14-12-23	REVISED AND ISSUED AS STANDARD	AV	RM	ANURAG SINHA	MAINAK NANDI
4	06-06-18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

Approved by

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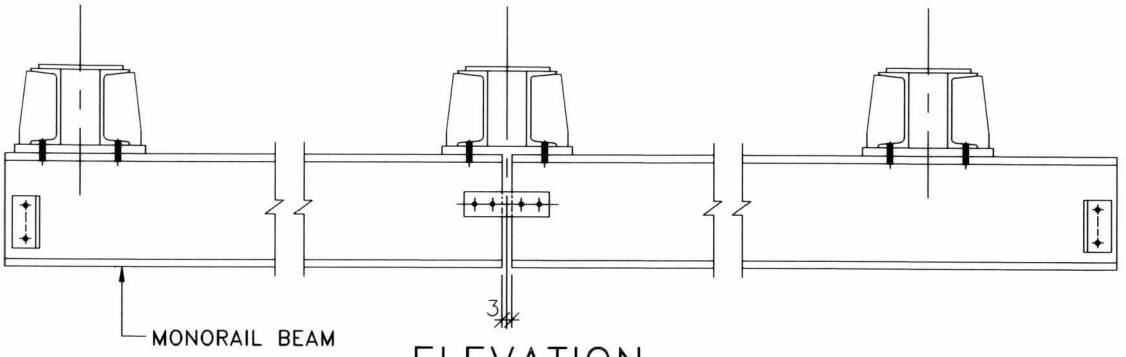

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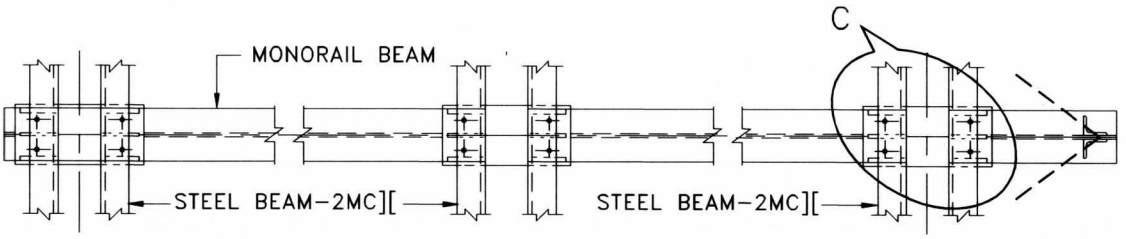
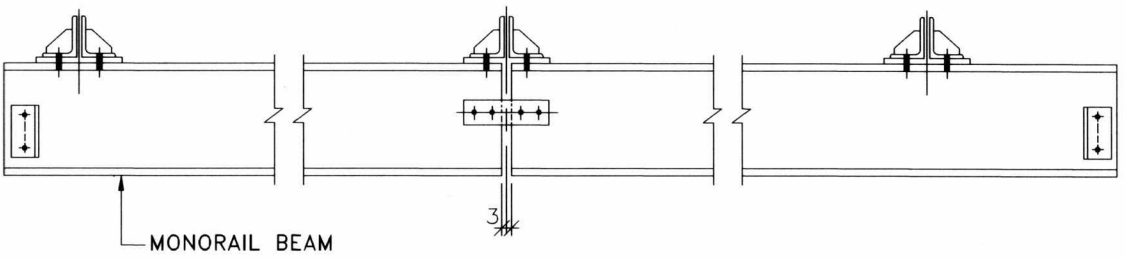


PLAN

MONORAIL CONNECTION WITH 2 MC][



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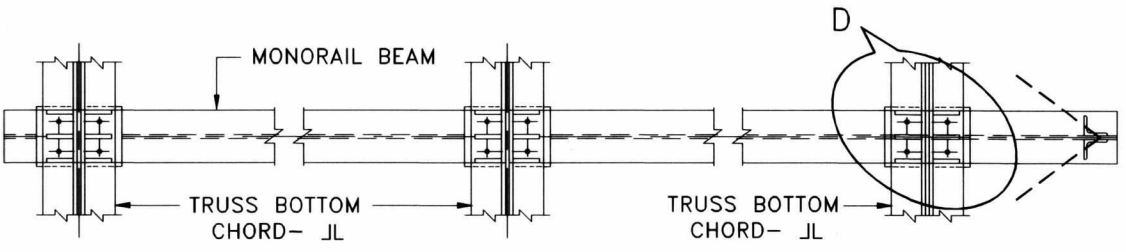

PLAN

MONORAIL CONNECTION WITH 2 ISA ⊥L

APPLICABLE FOR LIFT CAPACITY UPTO 4.0 T

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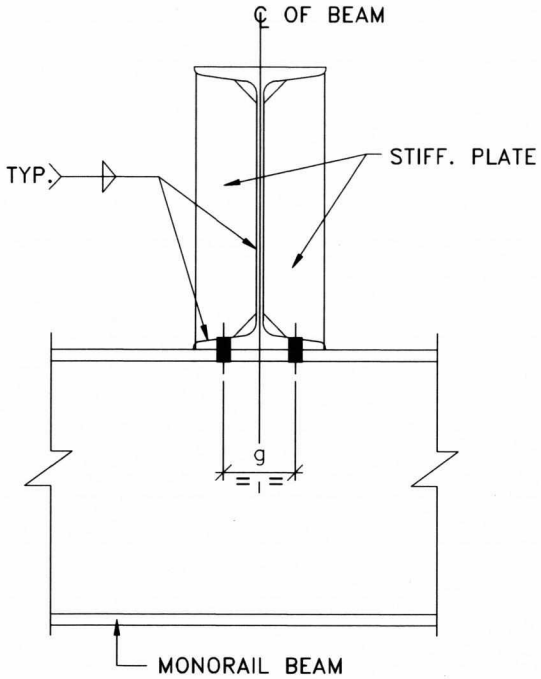

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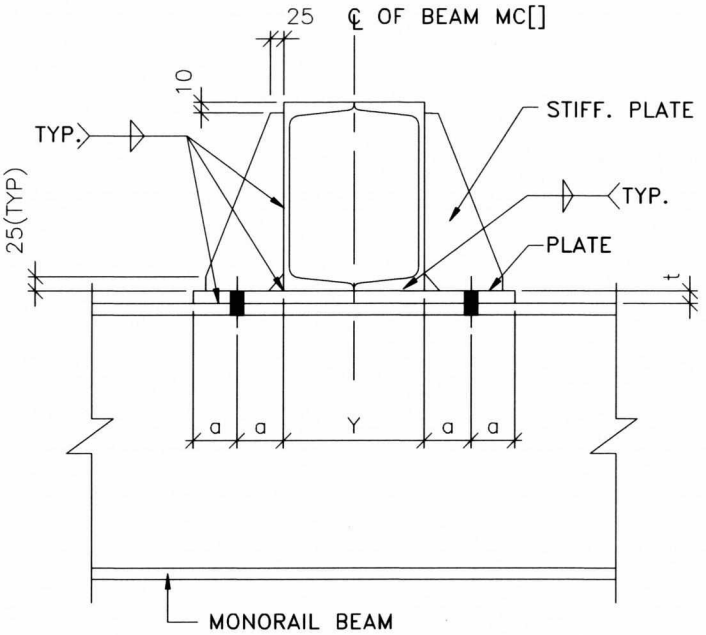
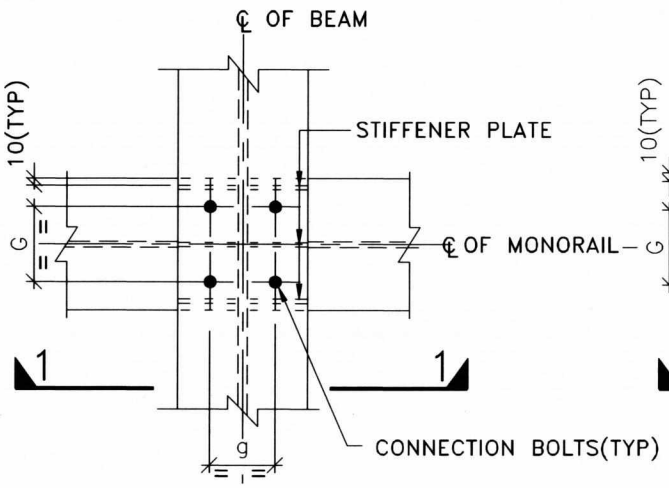
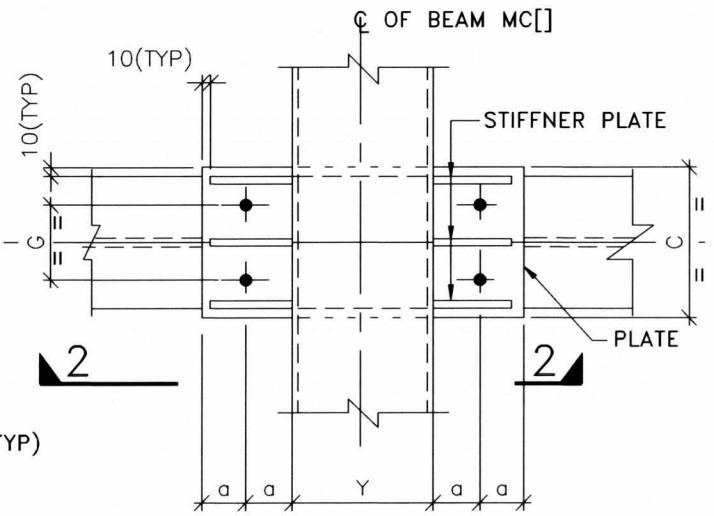


VIEW 2–2



DETAIL–A



DETAIL–B

APPLICABLE FOR LIFT CAPACITY UPTO 4.0 T

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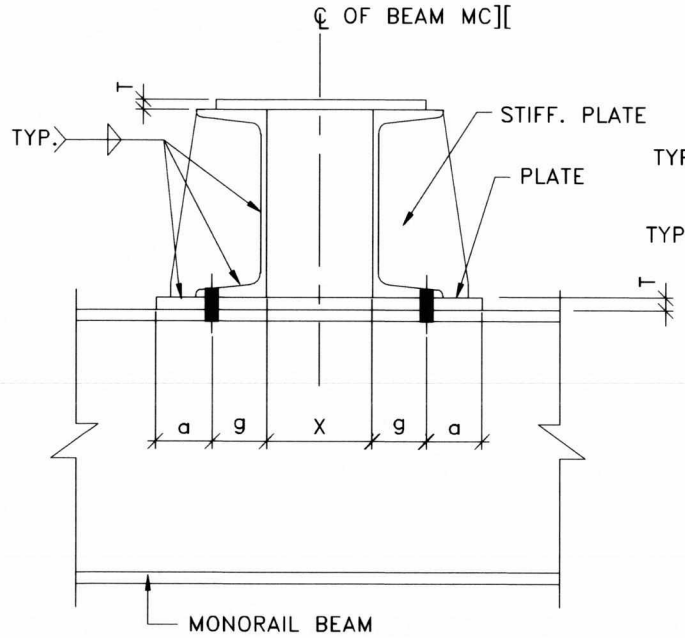
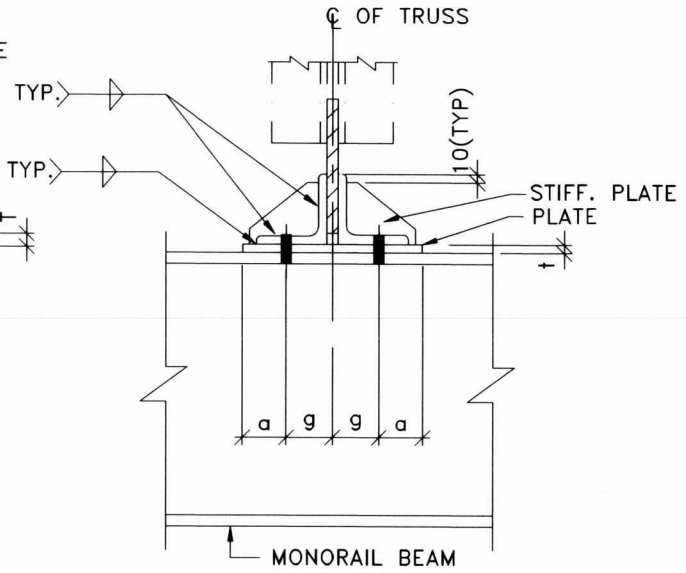
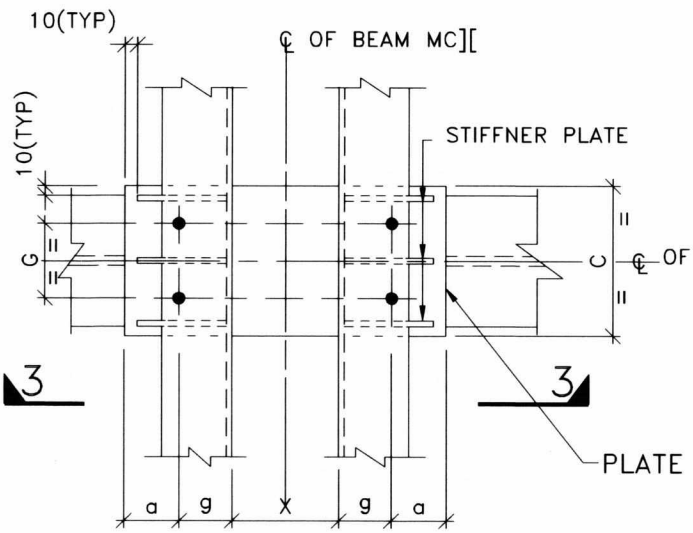


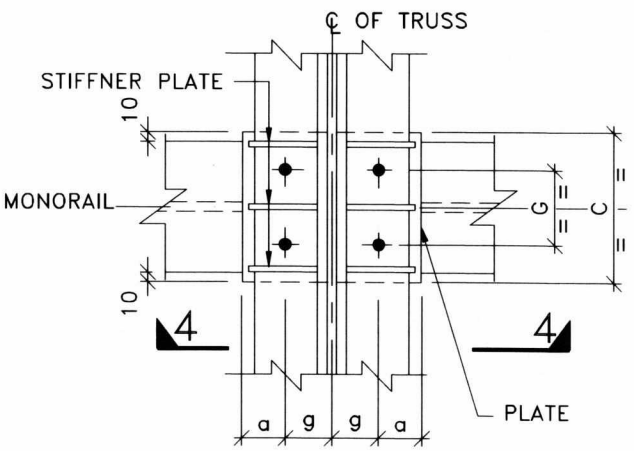
VIEW 3–3



VIEW 4–4



DETAIL–C



DETAIL–D

APPLICABLE FOR LIFT CAPACITY UPTO 4.0 T

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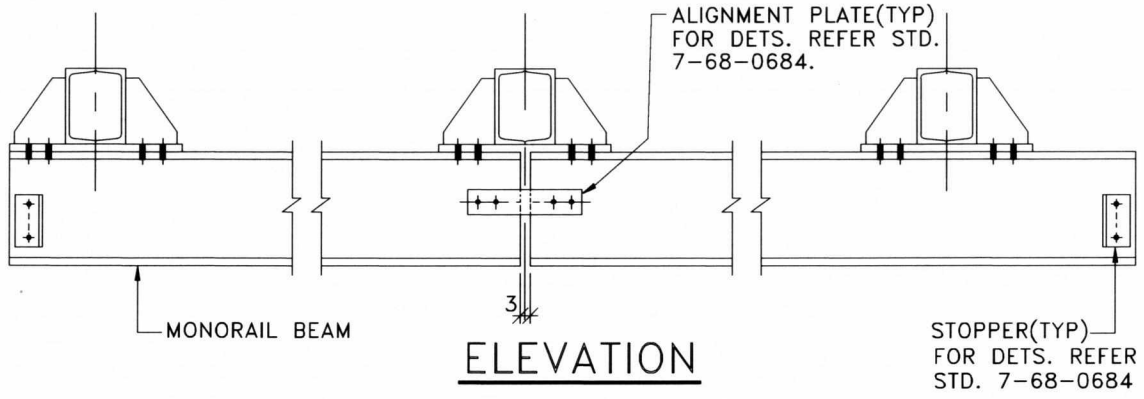

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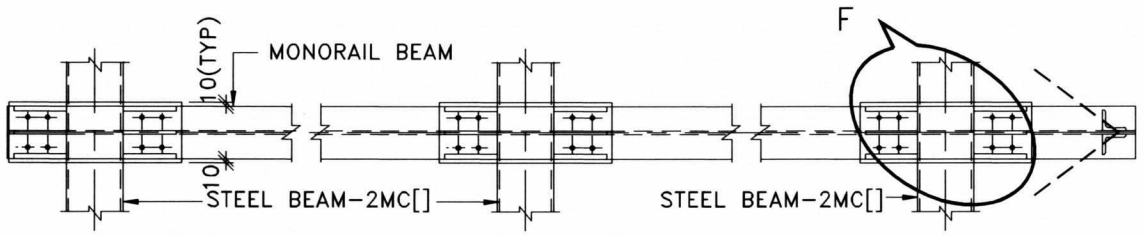
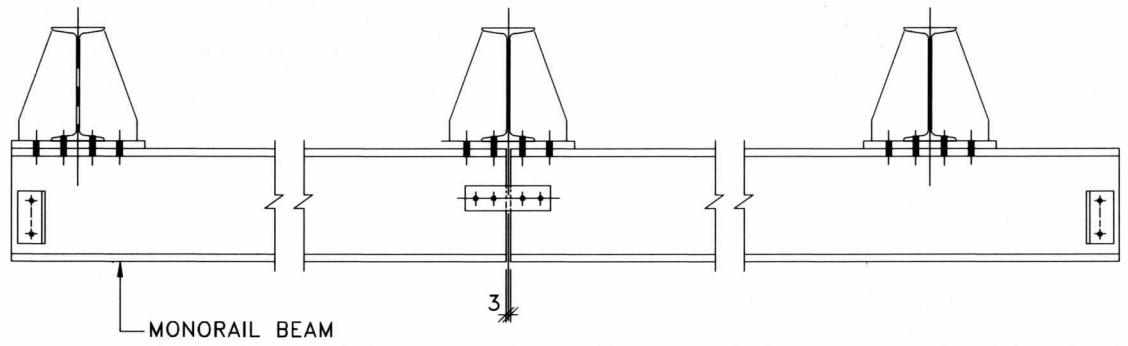


PLAN

MONORAIL CONNECTION WITH 2 MC[]



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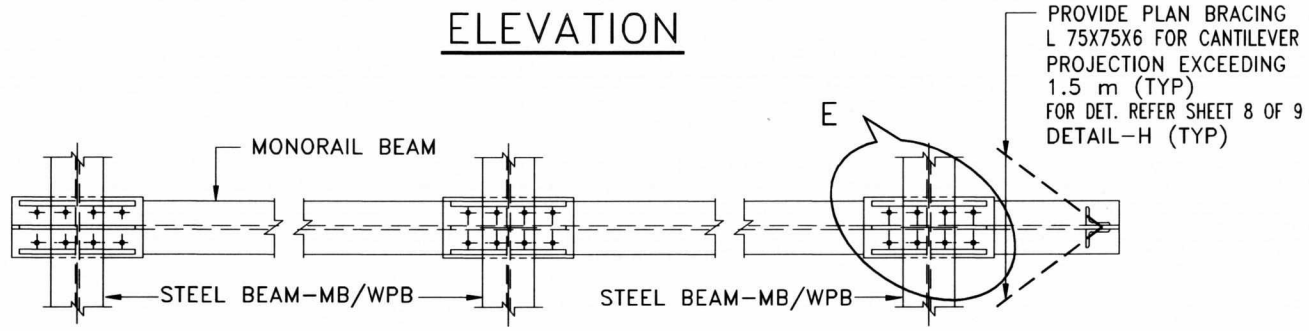
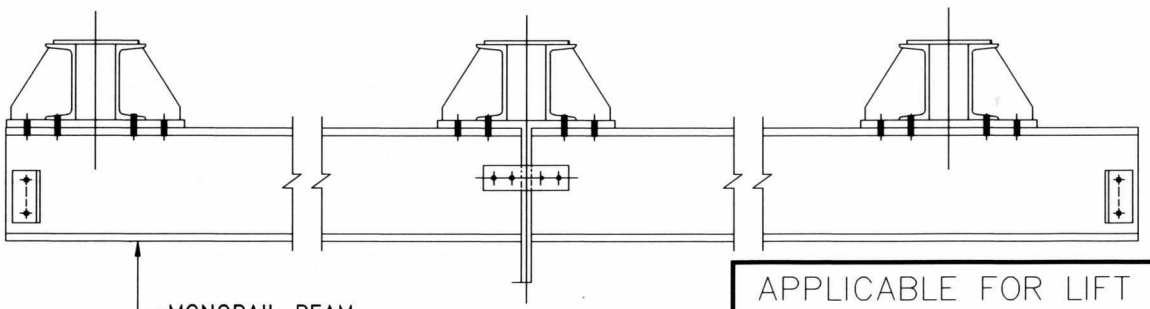


PLAN

MONORAIL CONNECTION WITH MB/WPB



ELEVATION

APPLICABLE FOR LIFT CAPACITY ABOVE 4.0 T TO 20.0 T

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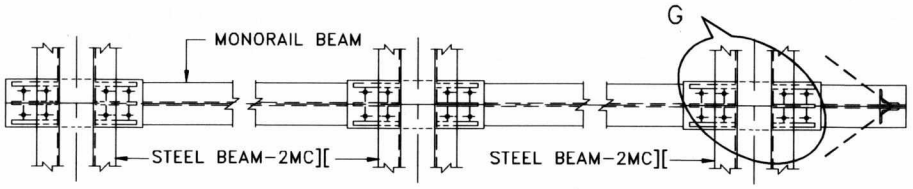
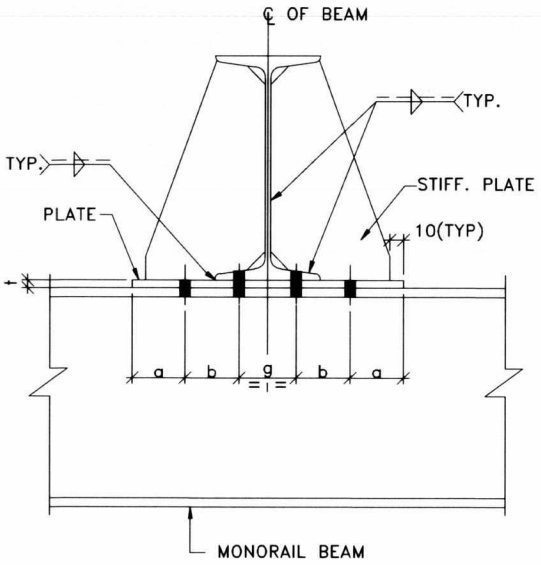
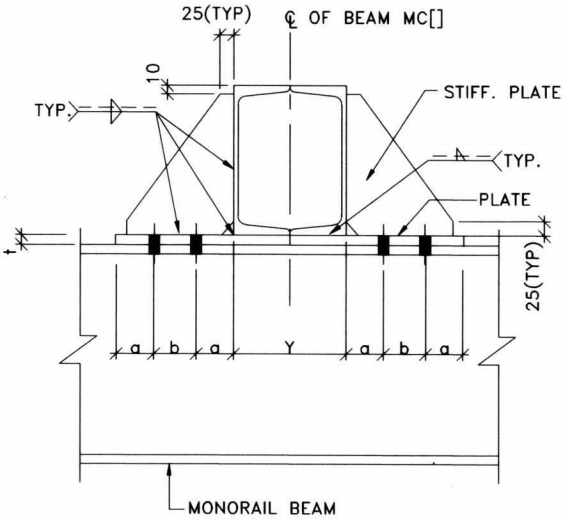


PLAN

MONORAIL CONNECTION WITH 2 MC][



VIEW 5-5



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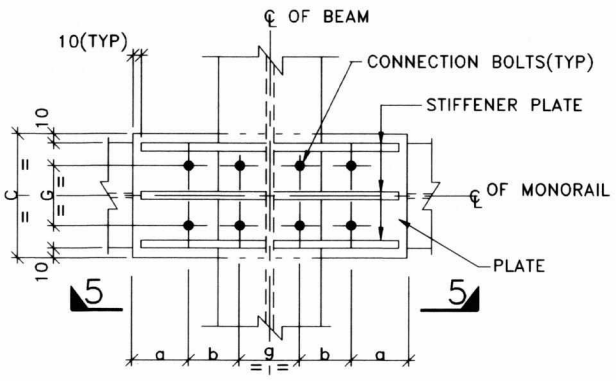
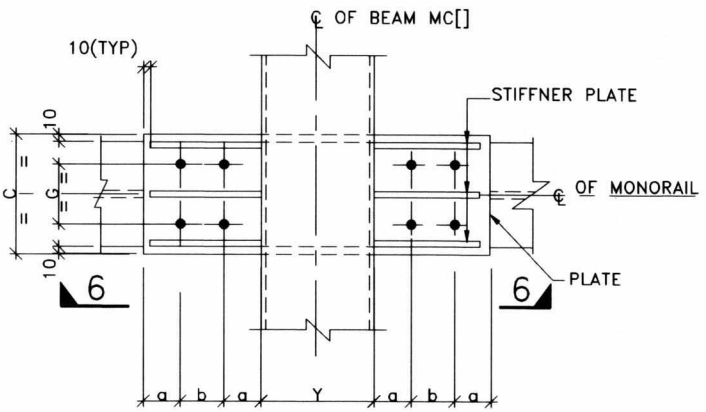


DETAIL-E



DETAIL-F

APPLICABLE FOR LIFT CAPACITY ABOVE 4.0 T TO 20.0 T

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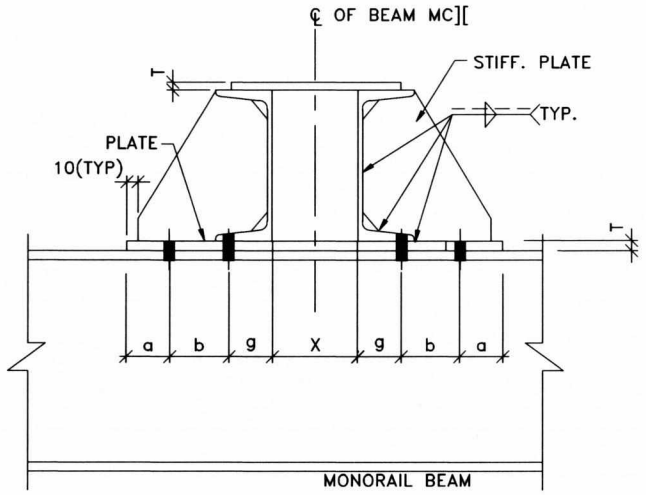
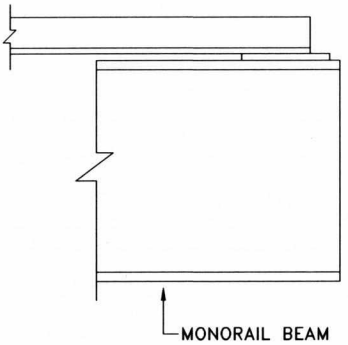
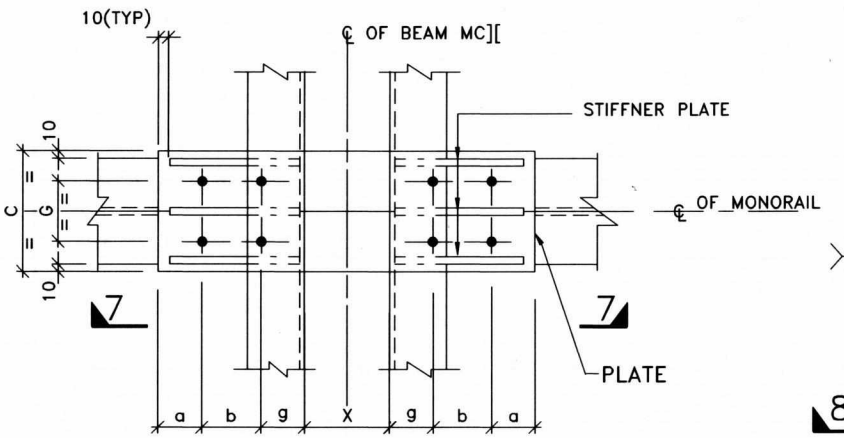


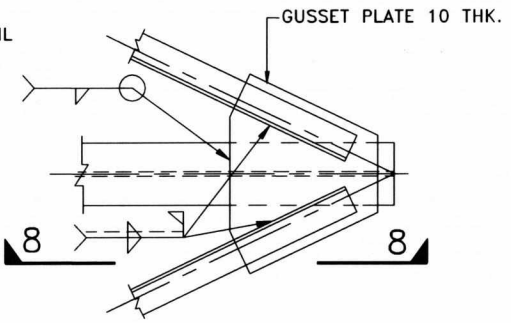
VIEW 7–7



VIEW 8–8



DETAIL–G



DETAIL–H
(BRACING DETAIL)

APPLICABLE FOR LIFT CAPACITY ABOVE 4.0 T TO 20.0 T

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NOTES:-

1. ALL CONNECTIONS ARE 6 mm FILLET ALL ROUND WELDS, EXCEPT BETWEEN MONORAIL AND MONORAIL SUPPORTING BEAM WHICH IS BOLTED CONNECTION.
2. ALL STIFFENER PLATES SHALL BE 8 mm THK. FOR MONORAIL CAPACITY UPTO 4.0 T AND 10 mm THK. FOR MONORAIL CAPACITY ABOVE 4.0 T TO 20.0 T.
3. DIMENSIONS G AND g CORRESPOND TO GAUGE DISTANCE OF MONORAIL BEAM AND MONORAIL SUPPORTING BEAM RESPECTIVELY.
4. ALSO REFER GEN. NOTES OF THE PROJECT.

SCHEDULE OF MONORAIL BEAM CONNECTION

MONORAIL BEAM	NO. OF CONNECTION BOLTS	DIA OF CONNECTION BOLT(mm)	DIMENSION IN mm				
			a	b	c	G	t
MB 200	PROVIDE 4 NOS. CONNECTION BOLTS UPTO 4.0 T LIFT CAP. / PROVIDE 8 NOS. CONNECTION BOLTS ABOVE 4.0 T TO 20.0 T LIFT CAP.	M-16	25	-	150	55	10
MB 250		M-20	30	-	170	65	10
MB 350		M-20	35	60	200	80	16
MB 400		M-20	35	60	200	80	16
MB 450		M-20	40	65	220	90	16
MB 500		M-22	40	65	240	100	16
MB 600		M-22	40	65	240	140	16
WPB 600x300x128.8		M-24	50	65	320	150	16
WPB 600x300x177.8		M-24	50	65	320	150	16
WPB 700x300x149.9		M-24	50	80	320	150	16
WPB 800x300x224		M-24	50	80	320	150	16

- DIMENSIONS ENCLOSED BY DOTTED LINES ARE APPLICABLE TO 8 BOLT CONNECTIONS ONLY (REFER SHEETS 6 AND 7.)

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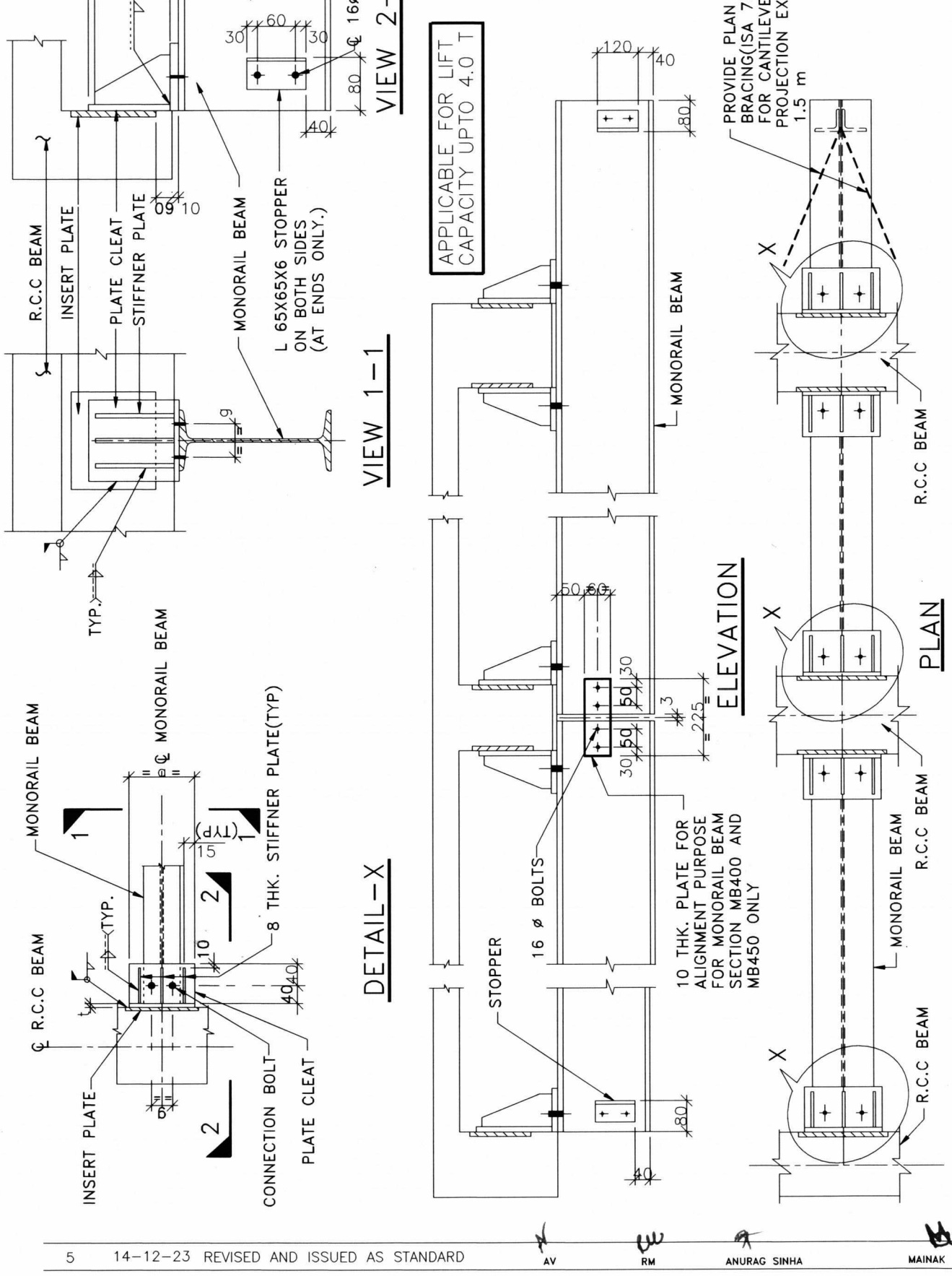
इंजीनियर्स इंडिया लिमिटेड (भारत सरकार का उपक्रम) ENGINEERS INDIA LIMITED (A Govt. of India Undertaking)

MONORAIL FIXING DETAIL WITH R.C.C BEAM

STANDARD No.
7-68-0684 Rev. 5



Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	14-12-23	REVISED AND ISSUED AS STANDARD	AV	RM	ANURAG SINHA	MAINAK NANDI
4	06-06-18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

Approved by

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Page 5192 of 5448 : B957-TENDER DOC-B957-999-69-41-PK-T-9501 : Rev. A

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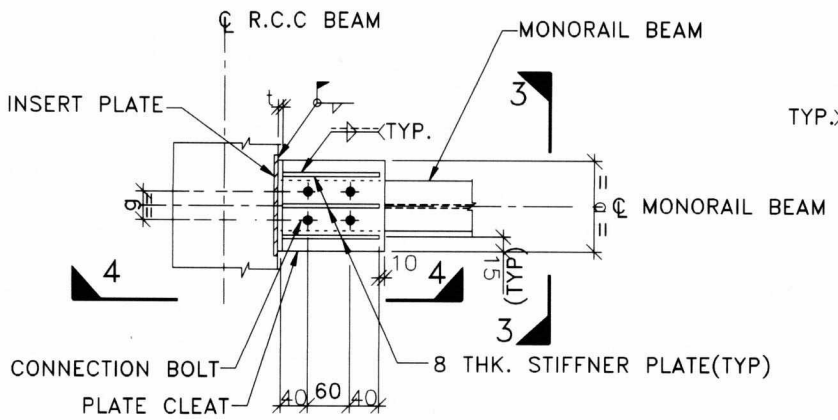
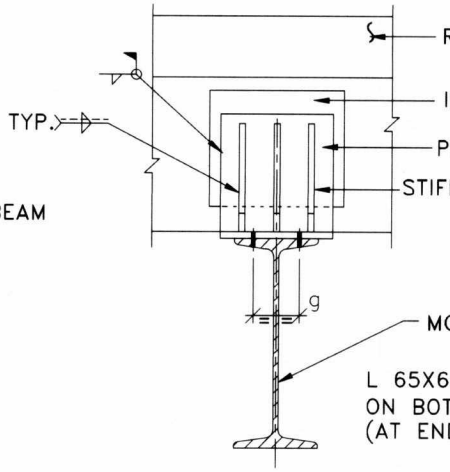
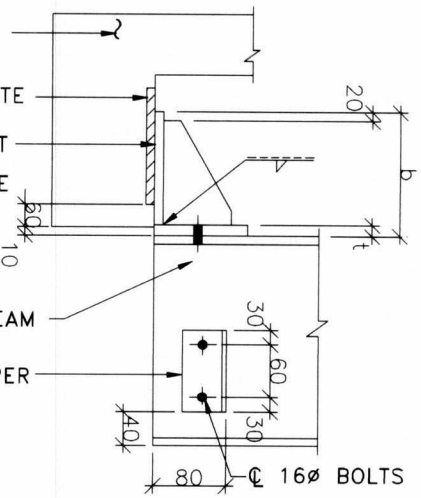


DETAIL–Y

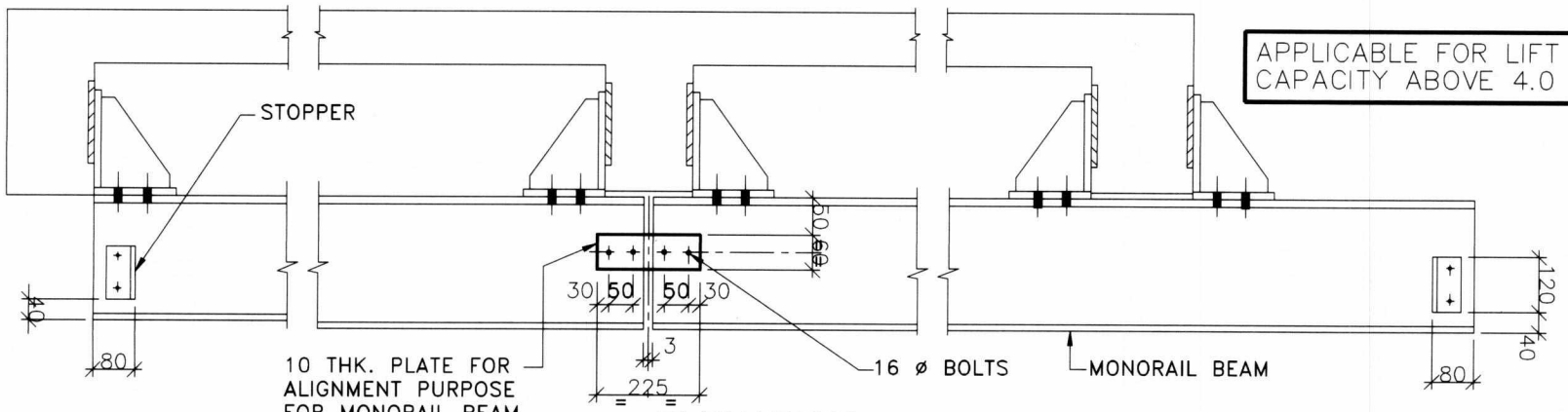


VIEW 3–3

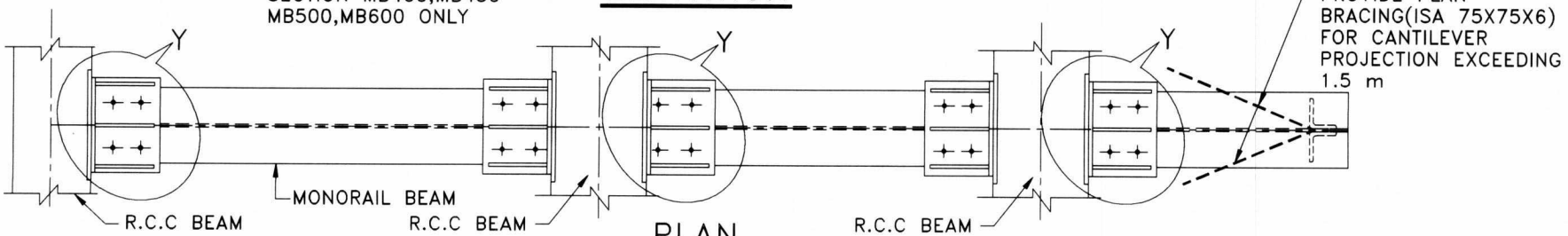


VIEW 4–4

APPLICABLE FOR LIFT CAPACITY ABOVE 4.0 T



ELEVATION



PLAN

MONORAIL FIXING DETAIL WITH R.C.C BEAM

STANDARD No. 7-68-0684 Rev. 5

SCHEDULE OF MONORAIL BEAM CONNECTION

(FOR SKETCH, REFER SHT. 1 OF 3 AND 2 OF 3)

MONORAIL BEAM	DIA OF CONNECTION BOLT(mm)	DIMENSION IN mm			
		a	b	g	t
MB 200	M-16	150	200	55	10
MB 250	M-20	170	250	65	10
MB 300	M-20	200	250	80	12
MB 350	M-20	200	250	80	16
MB 400	M-20	200	250	80	16
MB 450	M-20	220	350	90	16
MB 500	M-22	240	350	100	16
MB 600	M-22	240	350	140	16

NOTES :

GENERAL NOTES OF THE PROJECT SHALL ALSO BE REFERRED.

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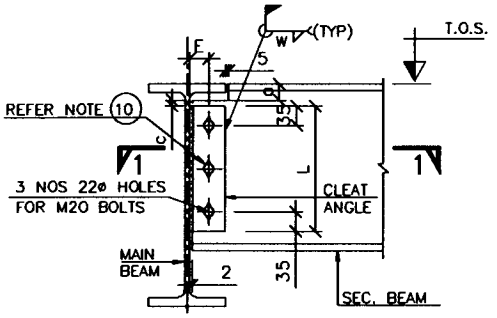
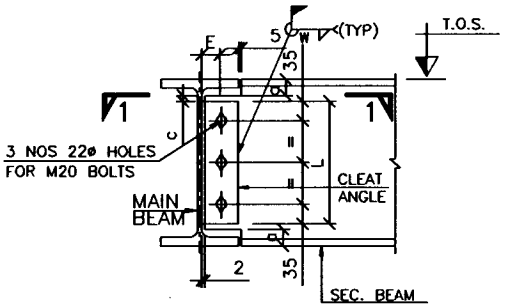
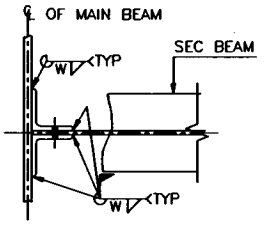


TYPE–I
(SECONDARY BEAM < MAIN BEAM)



TYPE–II
(SECONDARY BEAM = MAIN BEAM)

TYPICAL DETAILS OF SHEAR CONNECTION
BETWEEN PARALLEL FLANGED BEAMS



SECTION 1–1

LEGENDS :-

fy = SHEAR STRENGTH OF STEEL.
t = THICKNESS OF CLEAT ANGLE.
dW = BEAM DEPTH.
tw = WEB THICKNESS OF BEAM.

NOTES :-

1. ALL DIMENSIONS ARE IN mm.
2. PARALLEL FLANGE SECTIONS SHALL CONFORM TO IS:12778.
3. STRUCTURAL STEEL FOR CONNECTION PLATES SHALL BE OF SAME GRADE AS THAT OF THE CONNECTING MEMBERS.
4. CONNECTION DETAIL FOR SECONDARY BEAM > MAIN BEAM ARE NOT SHOWN HERE.
5. CONNECTION DETAILS SHOWN HERE ARE FOR FIELD CONNECTION ONLY, SAME SHALL BE FOLLOWED FOR SHOP CONNECTION ALSO.
6. ALL FIELD WELDS SHALL BE MINIMUM 6 mm FILLET WELD (UNO).
7. ALL HOLES ARE SHOWN THUS ⊕ ARE 22ø FOR M20 ERECTION BOLTS.
8. ERECTION BOLTS SHALL BE OF PROPERTY CLASS 4.6 CONFORMING TO IS:1367.
9. CENTRAL BOLT TO BE PROVIDED FOR BEAM DEPTH > 600.
10. FOR SHEAR CONNECTIONS OF ISMB SECTIONS, EIL STANDARD 7–68–0689 SHALL BE FOLLOWED.
11. SHEAR CAPACITY OF THE CONNECTION IS THE MINIMUM OF THE SHEAR CAPACITY FOR WELD, CLEAT ANGLE AND BEAM, WHICH HAS BEEN WORKED OUT AS FOLLOWS:
    a. CLEAT CAPACITY = 2 x L x t x 0.4 x fy
    b. BEAM CAPACITY = dW x tw x 0.4 x fy
    c. WELD CAPACITY = BEAM CAPACITY x (WELD SIZE PROVIDED/WELD SIZE REQUIRED).

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
1	22.09.20	REAFFIRMED & ISSUED AS STANDARD	JEETU	AVM	AS	SM
0	15.07.14	ISSUED AS STANDARD	VPS	AS	PKM	SC

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SHEAR CONNECTION BETWEEN PARALLEL FLANGE BEAMS

SL. NO.	SEC. BEAM SIZE	MAIN BEAM SIZE	CLEAT SIZE	L	a	c	E	W	TYPE	MINIMUM SHEAR CAPACITY (MT) OF CONNECTION	% SHEAR CAPACITY OF CONNECTION WRT BEAM SHEAR CAPACITY
1	NPB 450x190x67.15	MAIN BEAM SIZE SAME OR HIGHER THAN SECONDARY BEAM SIZE	ISA 90x90x10	315	65	15	50	8	I	29	85
				350	35				II	29	84
2	WPB 600x300x128.79		ISA 110x110x12	430	65	15	65	10	I	53	77
				450	45				II	55	80
3	WPB 600x300x177.77		ISA 110x110x12	430	65	15	65	10	I	53	69
				450	55				II	55	72
4	WPB 700x300x149.89		ISA 110x110x12	530	65	15	65	10	I	66	76
				550	45				II	68	78
5	WPB 700x300x204.48		ISA 130x130x12	530	65	15	65	12	I	78	78
				550	55				II	81	81
6	WPB 700x300x240.51		ISA 130x130x12	530	65	15	65	12	I	78	66
				550	60				II	81	68
7	WPB 800x300x224.37		ISA 150x150x15	630	65	15	90	12	I	94	79
				640	60				II	95	80
8	WPB 800x300x262.33		ISA 150x150x15	630	65	15	90	12	I	94	67
				640	65				II	95	68
9	WPB 900x300x291.45		ISA 150x150x15	730	65	15	90	12	I	109	66
				730	65				II	109	66

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
1	22.09.20	REAFFIRMED & ISSUED AS STANDARD	JEETU	AVM	AS	SM
0	15.07.14	ISSUED AS STANDARD	VPS	AS	PKM	SC

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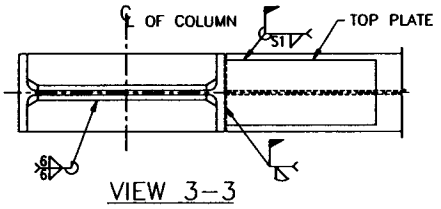
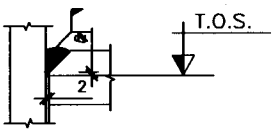
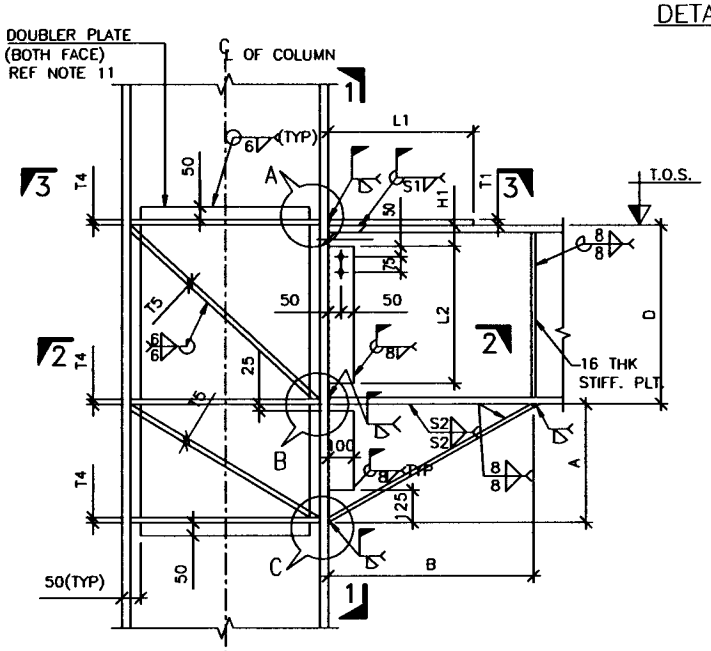


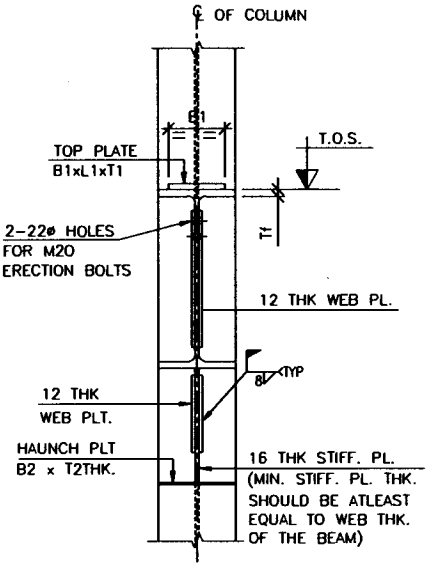
VIEW 3–3



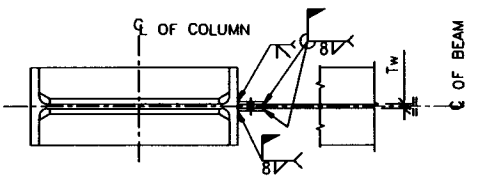
DETAIL–A



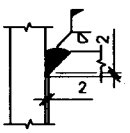
TYP. DETAIL OF MOMENT CONNECTION



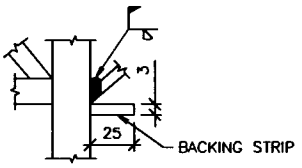
SEC. 1–1



SECTION 2–2



DETAIL–B



DETAIL–C

NOTES :-

1. ALL DIMENSIONS ARE IN mm.
2. PARALLEL FLANGE SECTIONS SHALL CONFORM TO IS:12778.
3. STRUCTURAL STEEL FOR CONNECTION PLATES SHALL BE OF SAME GRADE AS THAT OF THE CONNECTING MEMBERS.
4. ALL CONNECTIONS ARE DESIGNED FOR FULL BENDING STRENGTH & MINIMUM 50% OF SHEAR STRENGTH OF THE BEAM.
5. CONNECTION DETAILS SHOWN HERE ARE FOR FIELD MOMENT CONNECTION, SAME SHALL BE FOLLOWED FOR SHOP MOMENT CONNECTION.
6. ALL FIELD WELDS SHALL BE MINIMUM 8 mm FILLET WELD (UNO).
7. ALL HOLES ARE SHOWN THUS ⊕ ARE 22ø FOR M20 ERECTION BOLTS.
8. ERECTION BOLTS SHALL BE OF PROPERTY CLASS 8.8 CONFORMING TO IS:1367 & EQUALLY SPACED.
9. FOR MOMENT CONNECTIONS OF ISMB SECTIONS, EIL STANDARD 7–68–0660 SHALL BE FOLLOWED.
10. DOUBLER PLATE TO BE PRDVIDED DN COLUMN WEB ONLY WHERE DIAGONAL STIFFENER IS NOT POSSIBLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
1	22.09.20	REAFFIRMED & ISSUED AS STANDARD	JEETU	AVM	AS	SM
0	15.07.14	ISSUED AS STANDARD	VPS	AS	PKM	SC

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MOMENT CONNECTION BETWEEN PARALLEL FLANGE BEAMS & COLUMNS

SL. NO.	BEAM SIZE	COLUMN SIZE	BEAM DIMENSIONS			TOP PLATE SIZE			HAUNCH PLATE SIZE				WEB PLT SIZE		WELD SIZE		DBLR PLT	HOR STF PLT	DIAG STF PLT
			D	Tf	Tw	L1	B1	T1	A	B	B2	T2	H1	L2	S1	S2	T3	T4	T5
1	NPB 450x190x67.15	COLUMN SIZE EQUAL TO OR LARGER THAN BEAM SIZE	447	13.1	7.6	400	150	16	400	700	190	12	45	300	8	8	8	16	16
2	WPB 600x300x128.79		571	15.5	12.0	500	260	20	500	875	300	16	60	450	10	10	8	16	16
3	WPB 600x300x177.77		590	25.0	13.0	500	260	28	500	875	300	25	70	450	10	10	8	16	16
4	WPB 700x300x149.89		670	17.0	13.0	550	260	20	500	875	300	16	60	550	12	10	8	16	16
5	WPB 700x300x204.48		690	27.0	14.5	550	260	32	600	1050	300	28	70	550	12	10	8	16	16
6	WPB 700x300x240.51		700	32.0	17.0	550	260	36	600	1050	300	32	70	550	12	10	8	16	16
7	WPB 800x300x224.37		790	28.0	15.0	600	260	32	700	1200	300	28	70	650	14	10	8	16	16
8	WPB 800x300x262.33		800	33.0	17.5	600	260	36	700	1200	300	32	75	650	14	10	8	16	16
9	WPB 900x300x291.45		900	35.0	18.5	700	260	40	800	1400	300	36	80	750	16	10	8	16	16

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
1	22.09.20	REAFFIRMED & ISSUED AS STANDARD	JEETU	AVM	AS	SM
0	15.07.14	ISSUED AS STANDARD	VPS	AS	PKM	SC

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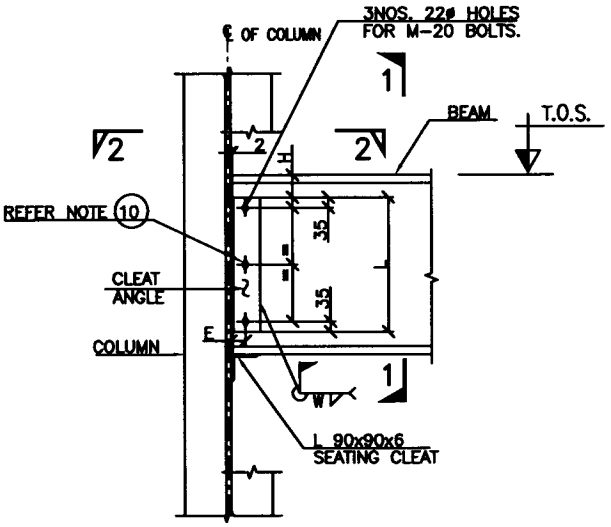
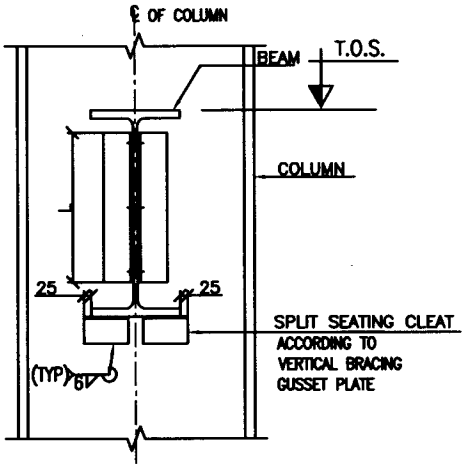
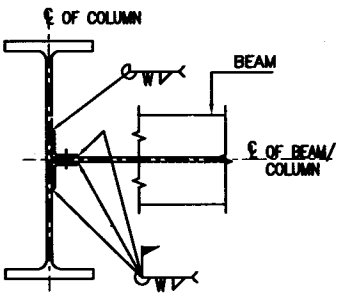
WELDED SHEAR CONNECTION DETAILS
FOR PARALLEL FLANGE BEAM WITH PARALLEL FLANGE COLUMN



TYP. DETAIL OF SHEAR CONNECTION BETWEEN COLUMN & BEAM



VIEW 1–1



VIEW 2–2

LEGENDS :-

fy = SHEAR STRENGTH OF STEEL.
t = THICKNESS OF CLEAT ANGLE.
dW = BEAM DEPTH.
tw = WEB THICKNESS OF BEAM.

NOTES :-

1. ALL DIMENSIONS ARE IN mm.
2. PARALLEL FLANGE SECTIONS SHALL CONFORM TO IS:808
3. STRUCTURAL STEEL FOR CONNECTION PLATES SHALL BE OF SAME GRADE AS THAT OF THE CONNECTING MEMBERS.
4. CONNECTION DETAILS SHOWN HERE ARE FOR SHEAR CONNECTION WITH COLUMN WEB ONLY, HOWEVER SAME CAN SUITABLY BE FOLLOWED FOR SHEAR CONNECTION WITH COLUMN FLANGE ALSO.
5. CONNECTION DETAILS SHOWN HERE ARE FOR FIELD CONNECTION ONLY, SAME SHALL BE FOLLOWED FOR SHOP CONNECTION ALSO.
6. ALL FIELD WELDS SHALL BE MINIMUM 6 mm FILLET WELD (UNO).
7. ALL HOLES ARE SHOWN THUS ⊕ ARE 22ø FOR M20 ERECTION BOLTS.
8. ERECTION BOLTS SHALL BE OF PROPERTY CLASS 4.6 CONFORMING TO IS:1367.
9. CENTRAL BOLT TO BE PROVIDED FOR BEAM DEPTH > 600.
10. FOR SHEAR CONNECTIONS OF ISMB SECTIONS, EIL STANDARD 7–68–0689 SHALL BE FOLLOWED.
11. SHEAR CAPACITY OF THE CONNECTION IS THE MINIMUM OF THE SHEAR CAPACITY FOR WELD, CLEAT ANGLE AND BEAM, WHICH HAS BEEN WORKED OUT AS FOLLOWS:
    a. CLEAT CAPACITY = 2 x L x t x 0.4 x fy
    b. BEAM CAPACITY = dW x tw x 0.4 x fy
    c. WELD CAPACITY = BEAM CAPACITY x (WELD SIZE PROVIDED/WELD SIZE REQUIRED)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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1	13.04.22	REVISED AND ISSUED AS STANDARD	SS	SP	AS	SM
0	15.07.14	ISSUED AS STANDARD	VPS	AS	PKM	SC

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SHEAR CONNECTION BETWEEN PARALLEL FLANGE BEAM AND COLUMN

SL NO	BEAM SIZE	CLEAT SIZE	L	E	H	W	MINIMUM SHEAR CAPACITY (MT) OF CONNECTION	% SHEAR CAPACITY OF CONNECTION WRT BEAM SHEAR CAPACITY
1	NPB 450x190x67.16	ISA 90x90x10	350	50	35	8	34	100
2	WPB 600x300x128.79	ISA 130x130x12	450	65	45	10	55	80
3	WPB 600x300x177.78	ISA 130x130x12	450	65	55	10	55	72
4	WPB 700x300x149.89	ISA 130x130x12	550	65	45	10	68	78
5	WPB 700x300x204.48	ISA 150x150x15	550	90	55	12	81	81
6	WPB 700x300x240.51	ISA 150x150x15	550	90	60	12	81	68
7	WPB 800x300x224.38	ISA 150x150x15	640	90	60	12	95	80
8	WPB 800x300x262.34	ISA 150x150x15	640	90	65	12	95	68
9	WPB 900x300x291.46	ISA 150x150x15	730	90	65	12	109	66

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
1	13.04.22	REVISED AND ISSUED AS STANDARD	SS	SP	AS	SM
0	15.07.14	ISSUED AS STANDARD	VPS	AS	PKM	SC

Approved by

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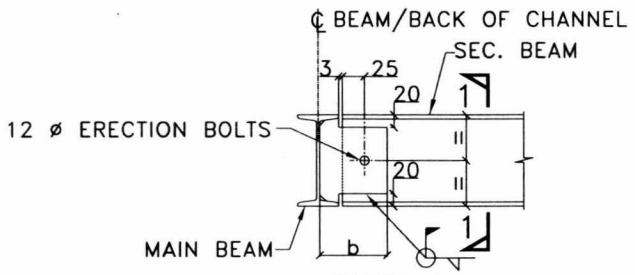

TYPE–I
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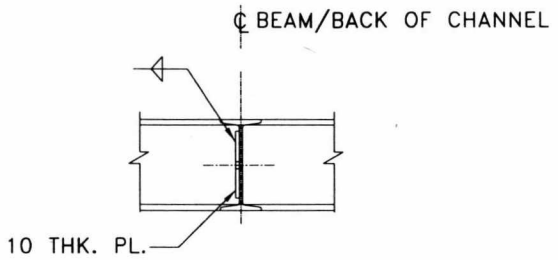
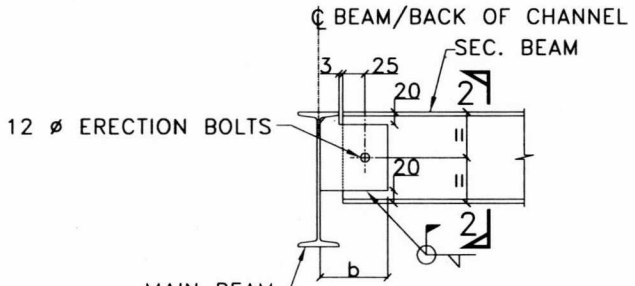


SECTION 1–1



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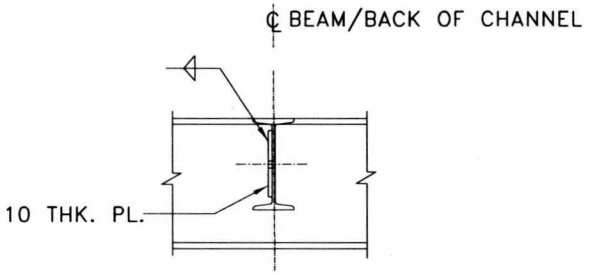
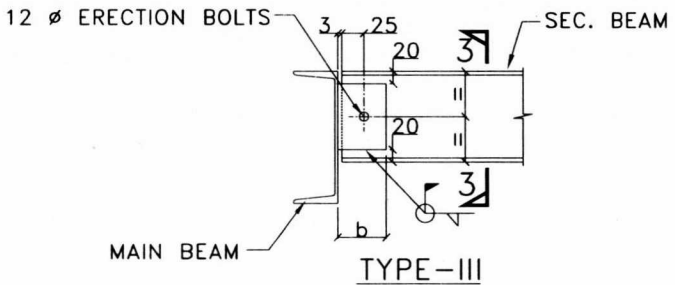


SECTION 2–2



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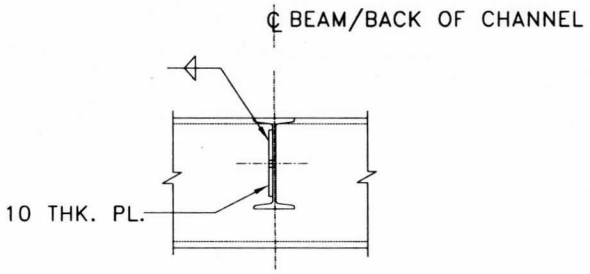

SECTION 3–3

SEC. BEAM	CONN TYPE	DIMENSION	MAIN BEAM																	
			MB100	MB125	MB150	MB200	MB250	MB300	MB350	MB400	MB450	MB500	MB600	MC100	MC125	MC150	MC200	MC250	MC300	MC400
MB100/ MC100	I	b	90	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	II	b	–	90	95	105	115	125	125	125	130	145	160	–	–	–	–	–	–	–
	III	b	–	–	–	–	–	–	–	–	–	–	–	55	55	55	55	55	55	55
MB125/ MC125	I	b	–	105	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	II	b	–	–	110	120	130	140	140	140	145	160	175	–	–	–	–	–	–	–
	III	b	–	–	–	–	–	–	–	–	–	–	–	–	70	70	70	70	70	70

NOTES:–

1 CONNECTION HAS BEEN DESIGNED TO CATER FOR FOLLOWING SHEAR STRENGTH.

MB100/MC100 = 2.5 T.
MB125/MC125 = 3.5 T.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
						Approved by
4	02.12.22	REAFFIRMED AND ISSUED AS STANDARD	HIMANSHU	VIKRAM GUPTA	ANURAG SINHA	S. MAZUMDAR
3	02.12.15	REVISED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET SINGH	RAJANJI SRIVASTAVA	S. CHANDA

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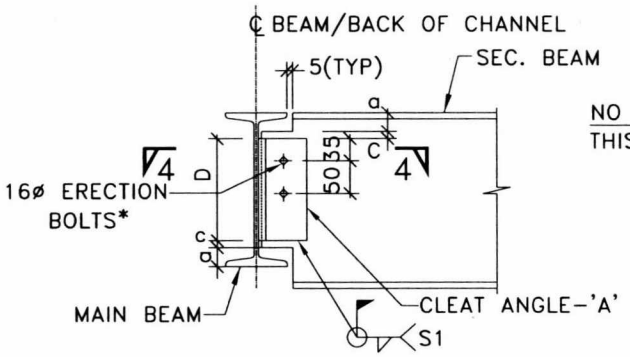
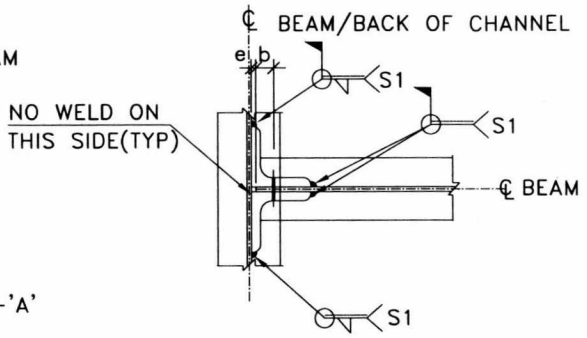
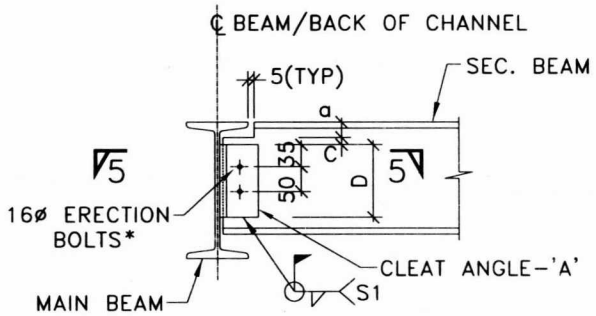


TYPE–IV



SECTION 4–4
(DRAWN FOR SEC. BEAM AS MB)



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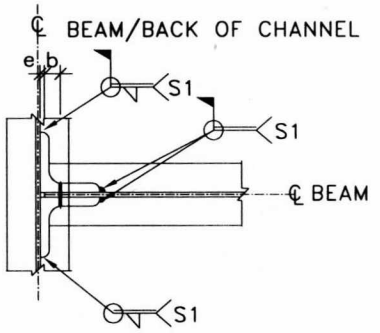

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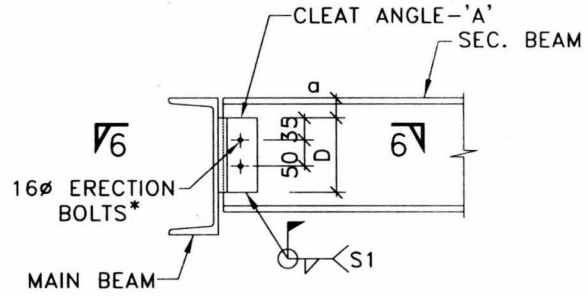
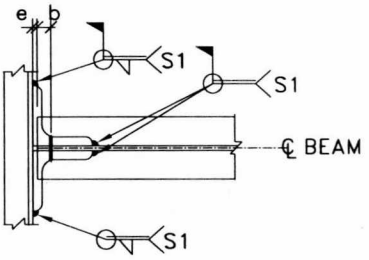


TYPE–VI



SECTION 6–6
(DRAWN FOR SEC. BEAM AS MB)

c= 15 FOR SEC. BEAM MB600
c= 10 FOR OTHERS
e= 2 mm CLEAR GAP
* 2 NOS. ERECTION BOLTS SHALL BE PROVIDED FOR SEC. BEAM ⩾ MB250 / MC250

CLEAT ANGLE SIZE	b
L 65x65x6	35
L 75x75x8	40
L 90x90x10	45
L 100x100x12	45

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman Approved by
4	02.12.22	REAFFIRMED AND ISSUED AS STANDARD	HIMANSHU	VIKRAM GUPTA	ANURAG SINHA	S. MAZUMDAR
3	02.12.15	REVISED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET SINGH	RAJANJI SRIVASTAVA	S. CHANDA

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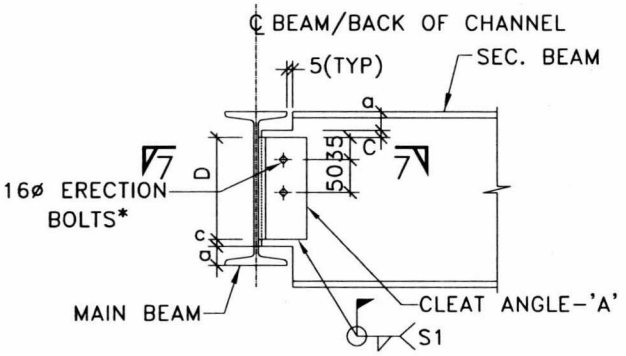
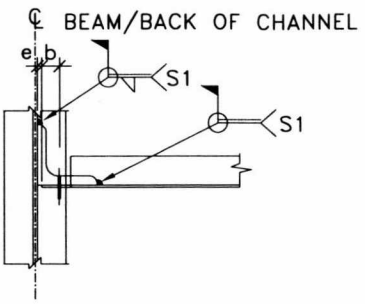
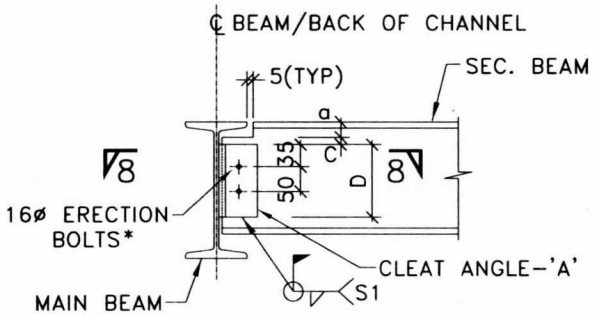


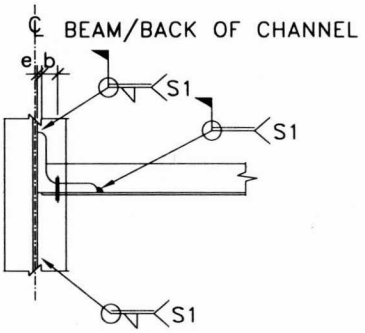
TYPE–VII



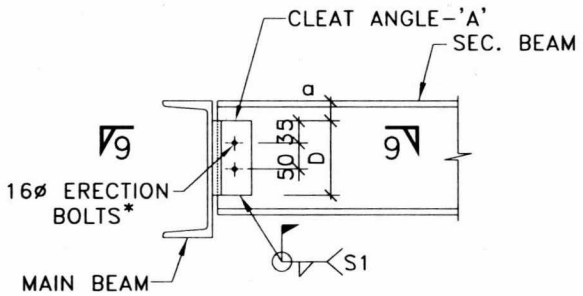
SECTION 7–7



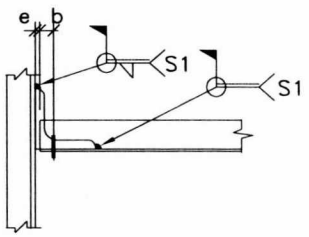
TYPE–VIII



SECTION 8–8



TYPE–IX



SECTION 9–9

e= 2 mm CLEAR GAP

* 2 NOS. ERECTION BOLTS SHALL BE PROVIDED FOR SEC. BEAM ≥ MB250 / MC250

CLEAT ANGLE SIZE	b
L 65x65x6	35
L 75x75x8	40
L 90x90x10	45
L 100x100x12	45

VALID FOR SEC. BEAM AS CHANNELS ONLY

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman Approved by
4	02.12.22	REAFFIRMED AND ISSUED AS STANDARD	HIMANSHU	VIKRAM GUPTA	ANURAG SINHA	S. MAZUMDAR
3	02.12.15	REVISED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET SINGH	RAJANJI SRIVASTAVA	S. CHANDA

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SCHEDULE OF CONNECTION

SEC. BEAM	CONN. TYPE	DIMENSION	MAIN BEAM														CLEAT ANGLE 'A'		WELD SIZE	MIN. SHEAR CAPACITY
			MB150	MB200	MB250	MB300	MB350	MB400	MB450	MB500	MB600	MC150	MC200	MC250	MC300	MC400	D	SIZE	S1	IN MT
MB150	IV	a	25	–	–	–	–	–	–	—	–	25	–	—	–	–	80	L65x65x6	6	4.0
	V	a	–	25	30	30	35	35	35	40	45	–	25	30	30	35	60			3.0
	VI	a	–		–	–	–	–	–	–	–	25	25	25	25	25	80			4.0
MB200	IV	a	25	25	–	–	–	–	–	–	–	25	25	–	–	–	80	L65x65x6	6	4.0
	V	a	–	–	30	30	35	35	35	40	45		–	30	30	35	100			6.5
	VI	a	–	–	–	–		–	–	–	–	25	25	25	25	25	100			6.5
MB250	IV	a	–	30	30	–	–	–	–	–	–	–	30	30	–	–	120	L75x75x8	6	7.5
	V	a	–	–	–	30	35	35	35	40	45	–	–	–	30	35	150			10.0
	VI	a	–	–		–	–	–	–	–	–	–	30	30	30	30	150			10.0
MB300	IV	a	–	–	30	30	–	–	–	–	–	–	–	30	30		170	L75x75x8	6	11.0
	V	a	–	–	–	–	35	35	35	40	45	–	–	–	–	35	200			13.5
	VI	a	–	–	–	–	–	–	–	–	–	–	–	30	30	30	200			13.5
MB350	IV	a	–	–	–	35	35	–	–	–	–	–	–	–	35	–	210	L75x75x8	6	14.0
	V	a	–	–	–	–	–	35	35	40	45	–	–	–	–	35	250			16.5
	VI	a	–	–	–	–	–	–	–	–	–	–	–	–	35	35	250			16.5
MB400	IV	a	–	–	–	35	35	35	–	–	–	–	–	–	35	35	210	L90x90x10	6	14.0
	V	a	–	–		–	–	–	35	40	45	–	–	–	–	–	300		8	25.0
	VI	a	–	–	–	–	–	–	–	–	–	–	–	–	35	35	250		6	16.5
MB450	IV	a	–	–	–	–	35	35	35		–	–	–	–	–	35	260	L90x90x10	8	21.0
	V	a	–	–	–	–	–	–	–	40	45	–	–	–	–		350			30.0
	VI	a	–	–	–	–	–	–	–	–	–	–	–	–	–	35	350			30.0
MB500	IV	a	–	–	–	–	–	40	40	40	–	–	–	–	–	40	300	L90x90x10	8	26.0
	V	a	–	–	–	–	–	–	–	–	45	–	–	–	–		390			36.0
	VI	a	–	–	–	–	–	–	–	–	–	–	–	–	–	40	300			26.0
MB600	IV	a	–	–	–	–	–	–	–	45	–	–	–	–	–	–	380	L100x100x12	10	40.0
	IV	a	–	–	–	–	–	–	–	–	45	–	–	–	–	–	480			50.0
MC150	IV/VII	a	25	–	–	–	–	–	–	–	–	25	–	–	–	–	80	L65x65x6	6	4.0
	V/VIII	a	–	25	30	30	35	35	35	40	45	–	25	30	30	35	60			3.0
	VI/IX	a	–	–	–	–	–	–	–	–	–	25	25	25	25	25	80			4.0
MC200	IV/VII	a	25	25	–	–	–	–	–	–	–	25	25	–	–	–	80	L65x65x6	6	4.0
	V/VIII	a	–	–	30	30	35	35	35	40	45	–	–	30	30	35	100			6.5
	VI/IX	a	–	–	–	–	–	–	–	–	–	25	25	25	25	25	100			6.5
MC250	IV/VII	a	–	30	30	–	–	–	–	–	–	–	30	30	–	–	120	L75x75x8	6	7.5
	V/VIII	a	–	–	–	30	35	35	35	40	45	–	–	–	30	35	150			10.0
	VI/IX	a	–	–	–	–	–	–	–	–	–	–	30	30	30	30	150			10.0
MC300	IV/VII	a	–	–	30	30	–	–	–	–	–	–	–	30	30		170	L75x75x8	6	11.0
	V/VIII	a	–	–	–	–	35	35	35	40	45	–	–			35	200			13.5
	VI/IX	a	–	–	–	–	–	–	–	–	–	–	–	30	30	30	200			13.5
MC400	IV/VII	a	–	–	–	35	35	35	–	–	–	–	–	–	30	35	210	L90x90x10	6	13.5
	V/VIII	a	–	–	–	–	–	–	35	40	45	–	–	–	–	–	300		8	25.0
	VI/IX	a	–	–	–	–	–	–	–	–	–	–	–	–	35	35	210		6	13.5

NOTES:

1 ALL WELDS SHALL BE 6 mm. THK. UNLESS NOTED OTHERWISE.

2 NO AXIAL FORCES ARE INCLUDED AND SHALL BE CHECKED AS PER ACTUAL DESIGN.

3 THIS STANDARD IS NOT APPLICABLE FOR COMBINATION OF BEAM MKD.

4 SHEAR CAPACITY GIVEN IN THE TABLE IS FOR CONNECTION– TYPE IV, V & VI.

5 CONNECTION TYPE I, II, III, VII, VIII & IX SHALL NOT BE USED FOR EQUIPMENT SUPPORTING MEMBERS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
			himanshu	Vikram		Approved by
4	02.12.22	REAFFIRMED AND ISSUED AS STANDARD	HIMANSHU	VIKRAM GUPTA	ANURAG SINHA	S. MAZUMDAR
3	02.12.15	REVISED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET SINGH	RAJANJI SRIVASTAVA	S. CHANDA

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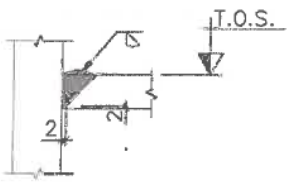
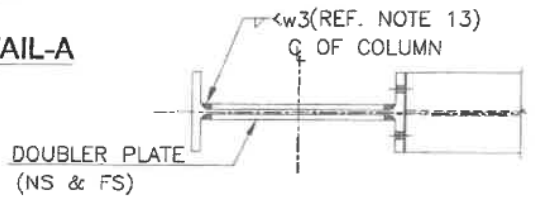
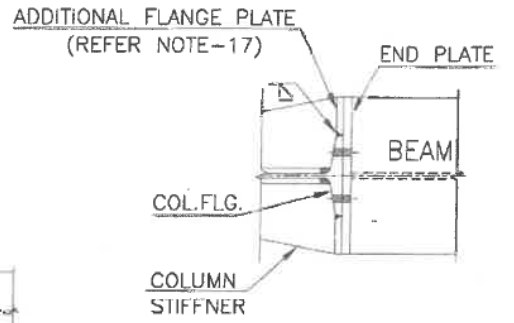


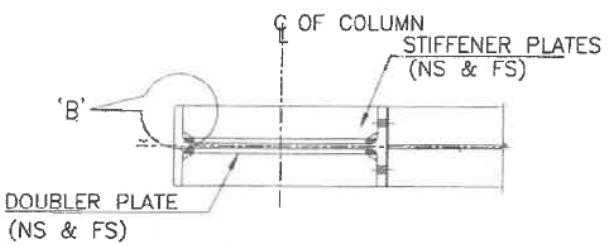
DETAIL-A



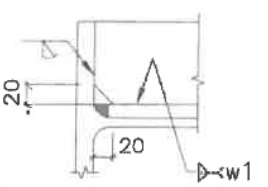
VIEW 2-2



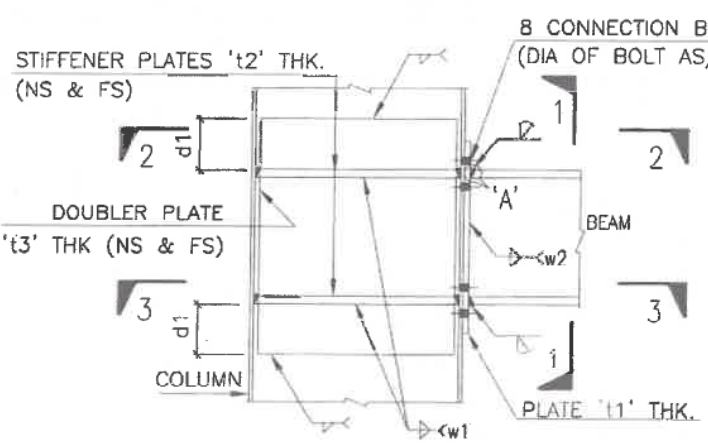
TYPICAL DETAIL OF ADDITIONAL FLANGE PLATE



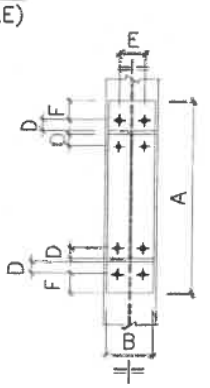
SECTION 3-3



DETAIL-B



TYPE-I



VIEW 1-1

BEAM SIZE	TYPE	NO OF BOLTS	DIA OF BOLTS	A	B	C	D	E	F	t1	t2	t3	d1	w1	w2
ISMB300	I	8	24	520	140	NA	50	80	60	30	16	10	150	8	8
ISMB400	I	8	30	650	140	NA	55	80	70	30	20	10	150	8	8
ISMB450	I	8	30	720	150	NA	60	90	75	30	25	10	150	10	8
ISMB500	I	8	30	770	180	NA	60	100	75	30	25	10	150	10	10
ISMB600	I	8	36	930	210	NA	75	100	90	36	25	12	150	12	10

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
0	22.05.24	ISSUED AS STANDARD	AK	SP	ANURAG SINHA	MAINAK NANDI

Approved by

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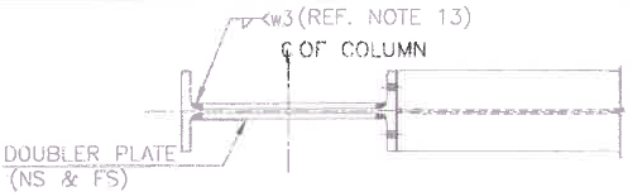
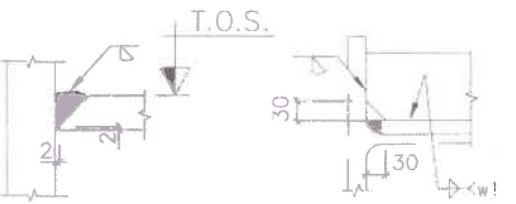
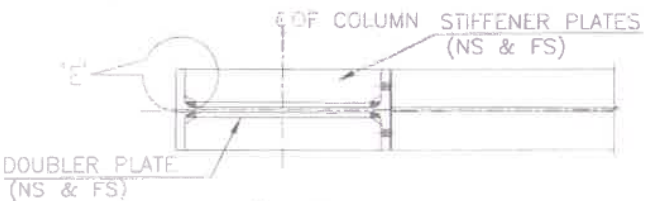


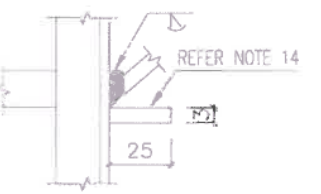
VIEW 5-5



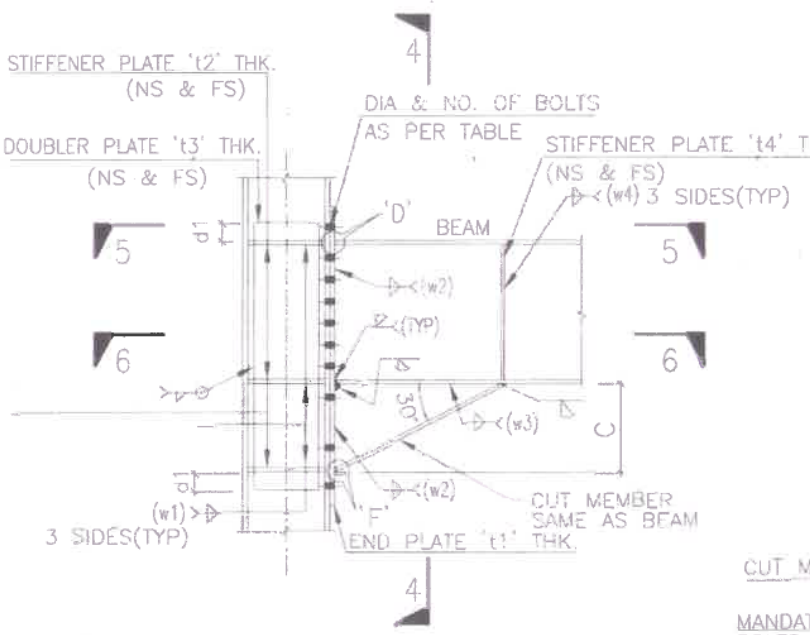
DETAIL-D DETAIL-E



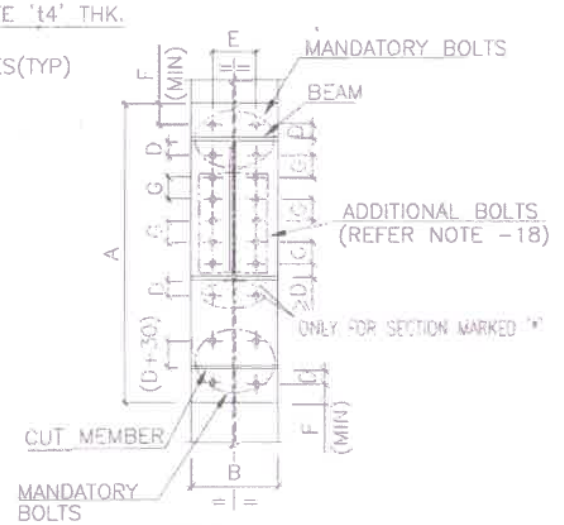
SECTION 6-6



DETAIL-F



TYPE-II



VIEW 4-4

BEAM SIZE	TYPE	NO OF BOLTS	BOLT GRADE	DIA OF BOLTS	A	B	C	D	E	F	G	t1	t2	t3	t4	d1	w1/w4/ w3	w2
WPB200X200X61.3	II	8	8.8	30	515	220	105	50	120	50	80	30	10	10	16	100	8	8
WPB250X250X73.14	II	8	8.8	30	585	260	130	50	120	50	80	30	12	10	16	100	8	8
WPB300X300X100.8	II	10	8.8	36	705	300	155	60	180	60	90	30	16	10	20	100	8	8
WPB360X300X141.8	II	12	8.8	36	785	300	180	60	180	60	90	40	16	10	25	100	8	10
WPB600x300x128.8	II	12	8.8	36	1100	300	285	60	180	60	90	30	16	12	25	150	8	10
WPB600x300x177.8	II	16	8.8	36	1130	300	295	60	180	60	90	30	16	12	30	150	8	10
WPB700x300x204.5	II	18	8.8	36	1280	300	345	60	180	60	90	40	20	12	36	150	10	12
WPB700x300x240.5(*)	II	20	8.8	36	1295	300	350	60	180	60	90	45	20	12	36	150	10	12
WPB800x300x262.5(*)	II	22	8.8	36	1445	300	400	60	180	60	90	45	20	12	40	150	10	12
WPB900x300x291.4(*)	II	22	8.8	36	1595	300	450	60	180	60	90	50	25	12	45	150	10	16
WPB900x300x333.0(*)	II	24	8.8	36	1605	300	455	60	180	60	90	55	28	12	45	150	10	16

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NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. THIS STANDARD IS VALID FOR STRUCTURAL STEEL OF GRADE E350 CONFIRMING TO IS2062.
3. COLUMN & BEAM SECTIONS SHALL CONFIRM TO IS808 & IS12778 (AS APPLICABLE).
4. BOLTED MOMENT CONNECTIONS ARE DESIGNED AS PER CLAUSE 10.3 (BEARING TYPE BOLTS) OF IS800 –2007 (LSD).
5. ALL CONNECTION BOLTS SHALL BE OF PROPERTY CLASS 8.8 CONFORMING TO IS3757 & IS4000.
6. HEXAGONAL NUTS SHALL CONFIRM TO IS6623.
7. WASHERS SHALL CONFORM TO IS6649.
8. TIGHTENING OF NUTS SHALL BE AS PER IS4000. NUTS SHALL BE "SNUG TIGHT" i.e. THE LEVEL OF TIGHTNESS ATTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR BY THE FULL EFFORTS OF A MAN USING A STANDARD/PODGER SPANNER OR A SPUD WRENCH.
9. ALL BOLTS, NUTS & WASHERS SHALL BE GALVANIZED AS PER IS1367, PART XIII.
10. THE CONNECTIONS ARE DESIGNED FOR 120% OF PLASTIC MOMENT CAPACITY OF CROSS–SECTIONS AS PER IS:800–2007 (LSD) CONNECTIONS HAVE BEEN DESIGNED FOR AT LEAST 70% OF ABOVE CAPACITY IN STRESS REVERSAL CASE.
11. THE CONNECTIONS ARE DESIGNED FOR 60% SHEAR CAPACITY OF THE MEMBERS.
12. THIS STANDARD IS VALID FOR COLUMN SIZES EQUAL OR HIGHER THAN BEAM SIZES.
13. WEB DOUBLER PLATE SHALL BE CONNECTED TO COLUMN FLANGE WITH FILLET WELD OF THICKNESS EQUAL TO DOUBLER PLATE THICKNESS(t3) AS SHOWN IN VIEW 2–2 & 5–5.
14. THE ROOT OF ALL BUTT WELD/ GROOVE WELD SHOULD BE BACKED BY A 8 MM FILLET WELD. ALTERNATIVELY BACKING PLATE MAY BE PROVIDED. A TYPICAL DETAIL OF BACKING PLATE IS SHOWN IN DETAIL 'F'.
15. COMPATIBLE WELD BASE METAL OF STRENGTH HIGHER THAN YIELD STRENGTH OF STEEL SHALL BE USED.
16. WHEN MOMENT CONNECTION IS PROVIDED AT TOP PLATFORM, COLUMN SHALL BE EXTENDED AS PER CONNECTION REQUIREMENT. TO AVOID TRIPPING HAZARD, A CAP PLATE SHALL BE PROVIDED AT TOP WITH EASILY IDENTIFIABLE COLOR.
17. IN CASE WHERE END PLATE WIDTH IS MORE THAN COLUMN FLANGE WIDTH, ADDITIONAL PLATE SHALL BE ADDED TO COLUMN FLANGE, AS SHOWN ON PAGE–1. THICKNESS OF ADDITIONAL FLANGE PLATE SHALL BE EQUAL TO OR MORE THAN COLUMN FLANGE THICKNESS.
18. ADDITIONAL BOLTS SHALL BE PROVIDED FROM TOP (i.e. BELOW MANDATORY BOLTS).
19. STANDARD NO. 7–68–0657 FOR BOLTED MOMENT CONNECTION IS RENUMBERED AND ISSUED AS PRESENT STANDARD.

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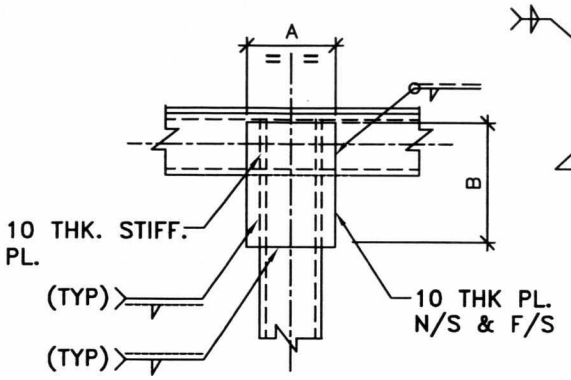
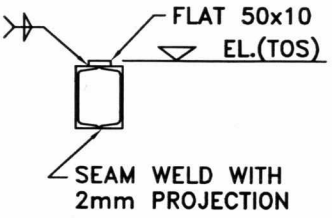
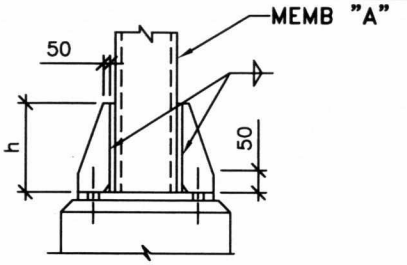


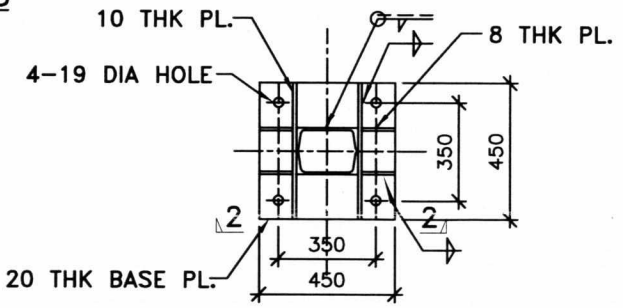
DETAIL – A



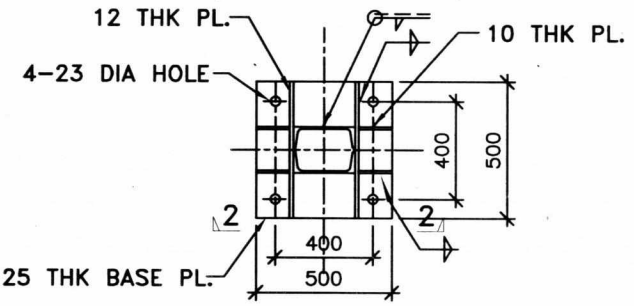
SEC 3–3



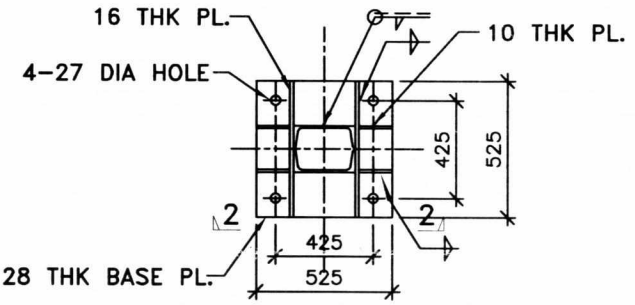
VIEW 2–2



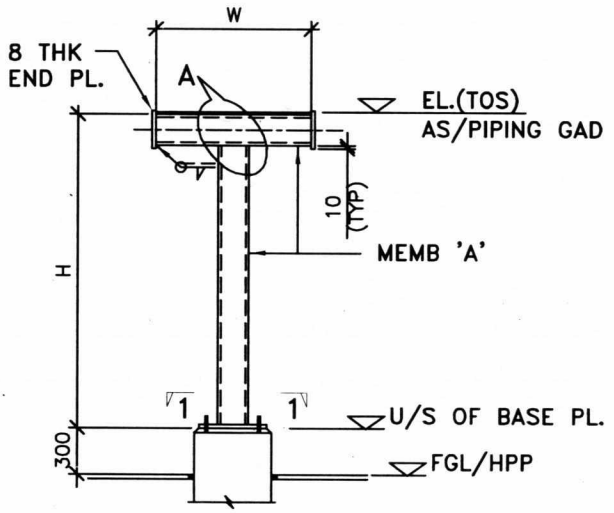
VIEW 1–1
(BASE PLATE TYPE I)



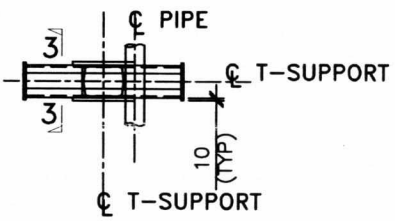
VIEW 1–1
(BASE PLATE TYPE II)



VIEW 1–1
(BASE PLATE TYPE III)



ELEVATION



PLAN

S. NO.	T–SUPPT. MKD.	WIDTH 'W'	HEIGHT 'H'	MEMB 'A'	BASE PLATE TYPE	h	CONN. PLATE		APPX. QTY IN KG
							A	B	
1	TSA	UPTO 750	UPTO 2000	ISMC150[]	I	200	200	225	150
2	TSB	UPTO 750	2000<H≤3000	ISMC200[]	II	275	250	300	260
3	TSC	UPTO 750	3000<H≤4000	ISMC250[]	III	325	300	350	410
4	TSD	750<W≤1500	UPTO 1500	ISMC150[]	I	200	200	225	160
5	TSE	750<W≤1500	1500<H≤2300	ISMC200[]	II	275	250	300	260
6	TSF	750<W≤1500	2300<H≤3000	ISMC250[]	III	325	300	350	400

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	12.04.23	REVISED AND ISSUED AS STANDARD	RKAUR	DK/BA	ANURAG SINHA	S.MAZUMDAR
3	15.04.17	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA
2	27.06.11	REVISED AND ISSUED AS STANDARD	SUSHMA	P.K.MITTAL	S.CHATURVEDI	D.MALHOTRA

Approved by

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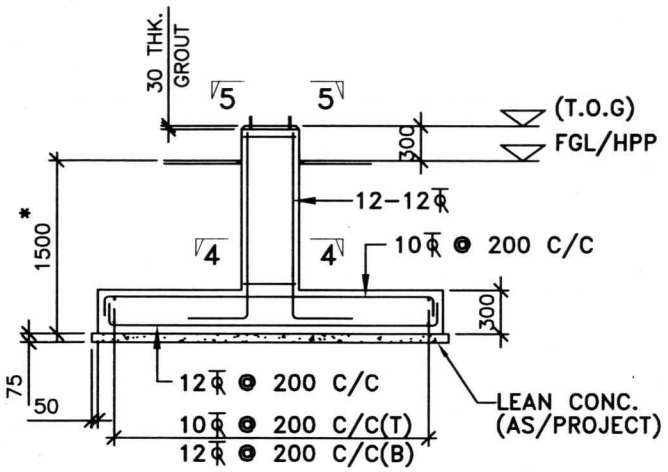

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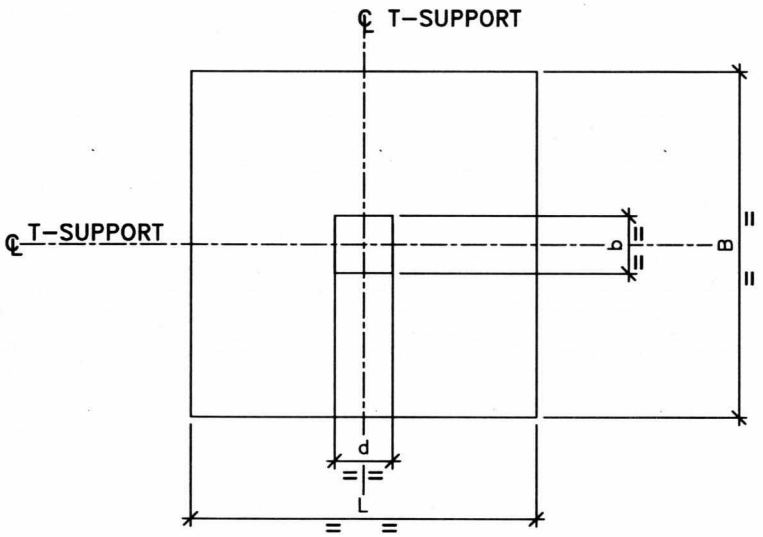
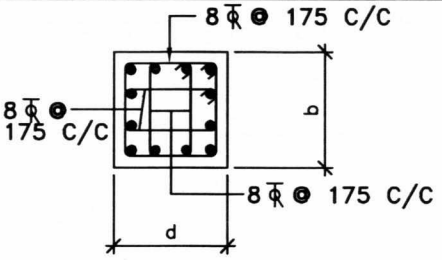
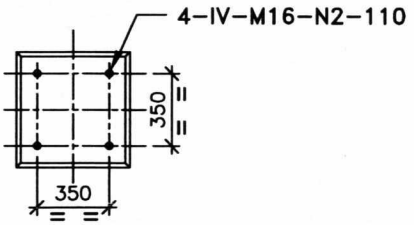


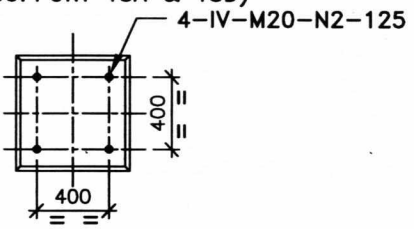
FDN. PLAN



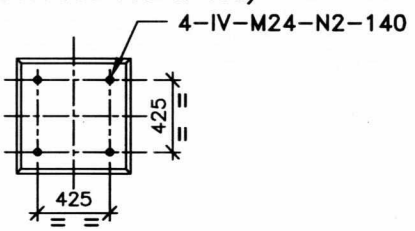
SECTION 4-4



VIEW 5-5
(FOR SUPPORT TSA & TSD)



VIEW 5-5
(FOR SUPPORT TSB & TSE)



VIEW 5-5
(FOR SUPPORT TSC & TSF)

S. NO.	T-SUPPORT MARKED	PED SIZE		5.0≤ S.B.C<10.0 T/sqM			10.0≤ S.B.C<15.0 T/sqM			S.B.C≥15.0 T/sqM		
				FDN. SIZE		QTY IN	FDN. SIZE		QTY IN	FDN. SIZE		QTY IN
		d	b	L	B	m^3	L	B	m^3	L	B	m^3
1	TSA	600	600	1800	1800	1.51	1600	1600	1.31	1500	1500	1.22
2	TSB	650	650	2000	2000	1.83	1750	1750	1.55	1600	1600	1.40
3	TSC	700	700	2250	2250	2.25	1800	1800	1.71	1800	1800	1.71
4	TSD	600	600	2000	2000	1.74	1750	1750	1.46	1600	1600	1.31
5	TSE	650	650	2250	2250	2.15	1800	1800	1.60	1700	1700	1.50
6	TSF	700	700	2250	2250	2.25	1900	1900	1.82	1900	1900	1.82

NOTES:-

1. FOLLOWING LOADS HAVE BEEN CONSIDERED IN DESIGN:
   a) VERTICAL LOAD = 1.0 MT FOR 750 WIDTH
   = 2.0 MT FOR 1500 WIDTH
   b) WIND INTENSITY = 150 Kg/sqm
   c) WIND ON 24" PIPE HAS BEEN CONSIDERED
   d) PIPE FRICTION COEFFICENT IN EITHER DIRECTION = 0.30
2. CONC GRADE SHALL BE AS PER GENERAL NOTES OF THE PROJECT BUT NOT LOWER THEN M20.

* DEPTH OF FDN. CAN BE INCREASED TO CLEAR U/G PIPING IF ANY.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	12.04.23	REVISED AND ISSUED AS STANDARD	RKAUR	DK/DA	ANURAG SINHA	S.MAZUMDAR
3	15.04.17	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA
2	27.06.11	REVISED AND ISSUED AS STANDARD	SUSHMA	P.K.MITTAL	S.CHATURVEDI	D.MALHOTRA

Approved by

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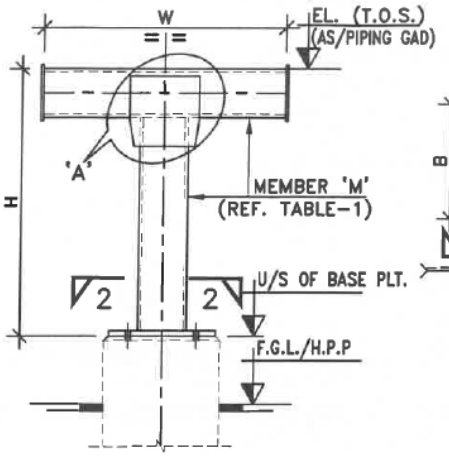
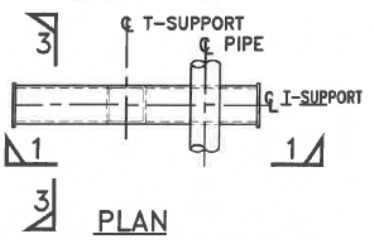
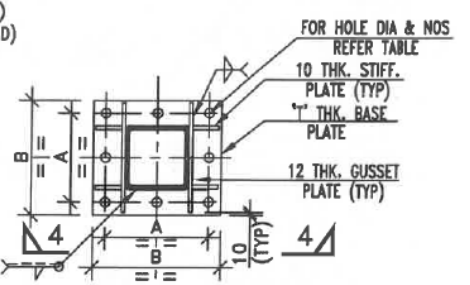


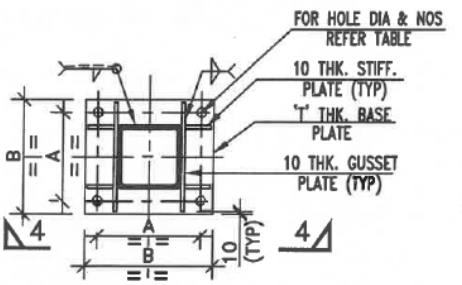
VIEW 1-1



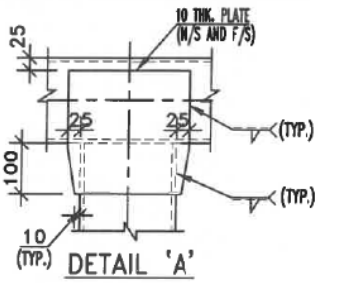
PLAN



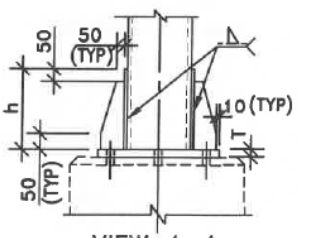
SECTION 2-2
(TYP. BASE PLATE DETAIL)
(FOR 8 NOS. BOLTS)



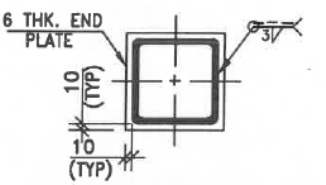
SECTION 2-2
(TYP. BASE PLATE DETAIL)
(FOR 4 NOS. BOLTS)



DETAIL 'A'



VIEW 4-4
(BOLTS AS PER PLAN)



SECTION 3-3

TABLE-1 (TABLE FOR SUPER STRUCTURE DETAIL OF T-SUPPORTS)

SL. NO.	T-SUPPT. MKD.	WIDTH 'W' (MM)	MAX. VERTICAL LOAD IN MT	HEIGHT 'H' (MM)	MEMBER 'M' (SHS)	BOLT (MM)				DIMENSIONS (MM)				APPX. QTY IN KG
						DIA	HOLE	NOS	P	A	B	T	h	
1	TS-01	UPTO 750	1.0	UPTO 2000	150X150X6	20	22	4	120	250	350	20	–	92
2	TS-02	UPTO 750	2.0		180X180X8	24	27	4	140	280	380	25	–	121
3	TS-03	UPTO 1000	1.5		180X180X8	24	27	4	140	280	380	25	–	121
4	TS-04	UPTO 750	1.0	2000<H≤3000	180X180X8	24	27	4	140	280	380	25	–	164
5	TS-05	UPTO 750	2.0		220X220X10	24	27	4	140	320	420	25	–	234
6	TS-06	UPTO 1500	1.5		220X220X10	24	27	4	140	320	420	25	–	234
7	TS-07	UPTO 750	1.0	3000<H≤4000	220X220X10	24	27	4	140	320	420	25	250	297
8	TS-08	UPTO 750	2.0		250X250X10	20	22	8	120	350	450	20	250	376
9	TS-09	UPTO 1500	1.5		250X250X10	20	22	8	120	350	450	20	250	376
10	TS-10	UPTO 750	1.0	4000<H≤5000	250X250X10	20	22	8	120	350	450	20	250	449
11	TS-11	UPTO 750	2.5		300X300X12	24	27	8	140	400	500	25	250	647
12	TS-12	UPTO 1500	1.5		300X300X12	24	27	8	140	400	500	25	250	647
13	TS-13	UPTO 750	2.0	5000<H≤6000	300X300X12	36	39	4	180	400	500	36	300	759
14	TS-14	UPTO 750	3.0		350X350X12	30	33	8	160	450	550	32	300	903
15	TS-15	UPTO 1500	2.5		350X350X12	30	33	8	160	450	550	32	300	903
16	TS-16	UPTO 1500	1.0	UPTO 1500	150X150X6	20	22	4	120	250	350	20	200	81
17	TS-17	UPTO 1500	2.0		180X180X8	20	22	8	120	280	380	20	200	120
18	TS-18	UPTO 2000	1.5		180X180X8	20	22	8	120	280	380	20	200	120
19	TS-19	UPTO 1500	1.0	1500<H≤2300	180X180X8	24	27	4	140	280	380	25	250	155
20	TS-20	UPTO 1500	2.5		220X220X10	20	22	8	120	320	420	20	250	221
21	TS-21	UPTO 2000	1.5		220X220X10	20	22	8	120	320	420	20	250	221
22	TS-22	UPTO 1500	2.0	2300<H≤3000	220X220X10	30	33	4	160	320	420	32	250	270
23	TS-23	UPTO 1500	2.5		250X250X10	30	33	4	160	350	450	32	250	308
24	TS-24	UPTO 2000	2.5		250X250X10	30	33	4	160	350	450	32	250	308
25	TS-25	UPTO 1500	1.0	3000<H≤4000	220X220X10	20	22	8	120	320	420	20	300	334
26	TS-26	UPTO 1500	3.0		300X300X12	36	39	4	180	400	500	36	300	548
27	TS-27	UPTO 3000	2.0		300X300X12	36	39	4	180	400	500	36	300	548
28	TS-28	UPTO 1500	1.0	4000<H≤5000	250X250X10	30	33	4	160	350	450	32	350	460
29	TS-29	UPTO 1500	3.5		350X350X12	30	33	8	160	450	550	32	350	784
30	TS-30	UPTO 3000	2.5		350X350X12	30	33	8	160	450	550	32	350	784
31	TS-31	UPTO 1500	1.0	5000<H≤6000	300X300X12	30	33	4	160	400	500	32	400	758
32	TS-32	UPTO 1500	3.5		400X400X12	36	39	8	180	500	600	36	400	1067
33	TS-33	UPTO 3000	3.0		400X400X12	36	39	8	180	500	600	36	400	1067

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
3	30.12.25	REVISED AND ISSUED AS STANDARD	NK/SSS	VK/ALS	ANURAG SINHA	MAINAK NANDI
2	13.03.25	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	RAJANJI SRIVASTAVA	R.K.TRIVEDI

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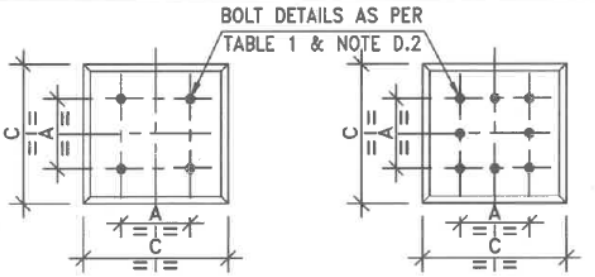
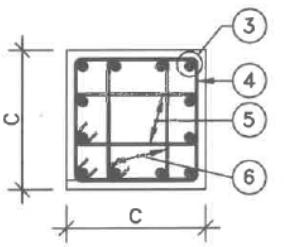
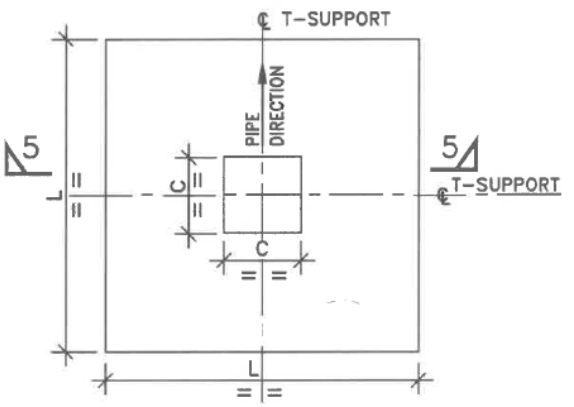


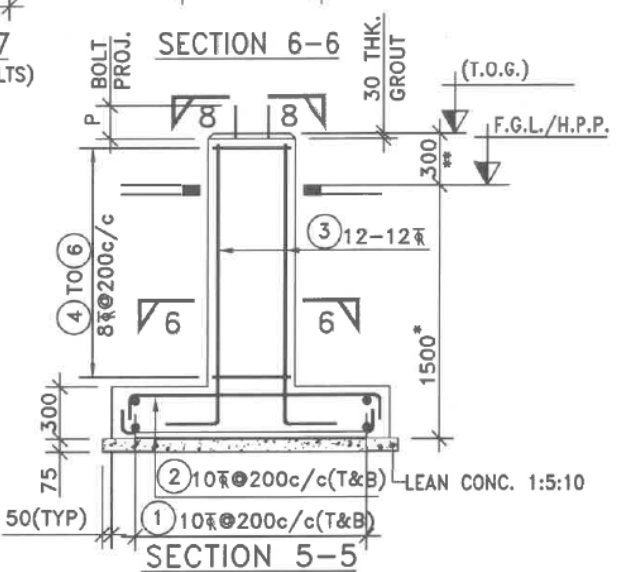
VIEW 7-7
(FOR 4 NOS. BOLTS)

VIEW 7-7
(FOR 8 NOS. BOLTS)





FOUNDATION PLAN



SECTION 5-5

(* DEPTH OF FDN. CAN BE INCREASED TO CLEAR U/G PIPING IF ANY.)

(**MIN. HEIGHT OF PEDESTAL SHALL BE AS PER EDB)

TABLE-2 (FOUNDATION DETAILS)

SL. NO.	T-SUPPT. MKD.	PED SIZE	5.0≤ S.B.C<10.0 T/sqM		10.0≤ S.B.C<15.0 T/sqM		S.B.C≥15.0 T/sqM	
			FDN. SIZE	QTY IN	FDN. SIZE	QTY IN	FDN. SIZE	QTY IN
		C	L	m^3	L	m^3	L	m^3
1	TS-01	550	1800	1.5	1600	1.2	1400	1.0
2	TS-02	600		1.5		1.3		1.1
3	TS-03	600		1.5		1.3		1.1
4	TS-04	600	2000	1.7	1800	1.5	1600	1.3
5	TS-05	650		1.8		1.6		1.4
6	TS-06	650		1.8		1.6		1.4
7	TS-07	650	2200	2.1	2000	1.8	1800	1.6
8	TS-08	650		2.1		1.8		1.6
9	TS-09	650		2.1		1.8		1.6
10	TS-10	650	2400	2.4	2200	2.1	2000	1.8
11	TS-11	700		2.5		2.2		1.9
12	TS-12	700		2.5		2.2		1.9
13	TS-13	700	2600	2.8	2400	2.5	2200	2.2
14	TS-14	750		2.9		2.6		2.3
15	TS-15	750		2.9		2.6		2.3
16	TS-16	550	1800	1.5	1600	1.2	1400	1.0
17	TS-17	600		1.5		1.3		1.1
18	TS-18	600		1.5		1.3		1.1
19	TS-19	600	2000	1.7	1800	1.5	1600	1.3
20	TS-20	650		1.8		1.6		1.4
21	TS-21	650		1.8		1.6		1.4
22	TS-22	650	2200	2.1	2000	1.8	1800	1.6
23	TS-23	650		2.1		1.8		1.6
24	TS-24	650		2.1		1.8		1.6
25	TS-25	650	2400	2.4	2200	2.1	2000	1.8
26	TS-26	700		2.5		2.2		1.9
27	TS-27	700		2.5		2.2		1.9
28	TS-28	650	2600	2.7	2400	2.4	2200	2.1
29	TS-29	750		2.9		2.6		2.3
30	TS-30	750		2.9		2.6		2.3
31	TS-31	700	2900	3.1	2600	2.8	2400	2.5
32	TS-32	800		3.3		3.0		2.7
33	TS-33	800		3.3		3.0		2.7

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NOTES:–

A. DESIGN PARAMETERS:–

1. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN DESIGN:
   a) FOR VERTICAL LOAD (INCLUDING PIPE EMPTY WEIGHT) REFER TABLE–1
   b) WIND LOAD = 150 Kg/sqM
   c) PIPE FRICTION COEFFICIENT IN EITHER DIRECTION ACTING SIMULTANEOUSLY = 0.3
2. ALLOWABLE HORIZONTAL DEFLECTION = H/250

B. MATERIAL PROPERTIES:–

1. CONC GRADE SHALL BE AS PER GENERAL NOTES OF THE PROJECT BUT NOT LOWER THAN M25.
2. GRADE OF REINFORCEMENT STEEL SHALL BE AS PER GENERAL NOTES OF THE PROJECT BUT NOT LESS THAN Fe500D.
3. GRADE OF HOLLOW SECTIONS SHALL BE YSt 310 (MINIMUM) AS PER IS 4923.
4. ALL STRUCTURAL STEEL OTHER THAN HOLLOW SECTIONS SHALL BE AS PER IS 2062 GRADE E250 QUALITY BR/BO.

C. GEOTECHNICAL:–

1. NET SAFE BEARING CAPACITY (SBC) SHALL BE AS PER GEOTECH RECOMMENDATION FOR THE PROJECT.

D. GENERAL:–

1. ALL FILLET WELDS SHALL BE 6mm THK. (UPTO 3M HEIGHT) & 8mm THK. (ABOVE 3M & UPTO TO 6M HEIGHT).
2. ANCHOR BOLTS SHALL BE DOUBLE NUT TYPE IV AS PER EIL STANDARD NO. 7–68–0417.
3. GROUT SHALL BE NON–SHRINK TYPE.
4. SMART FABRICATION FOR BASE PLATE SHALL BE PREFERRED.

E. LEGEND:–

1. F.G.L. – FINISHED GROUND LEVEL
2. H.P.P. – HIGHEST PAVEMENT POINT
3. SHS – SQUARE HOLLOW SECTION
4. T.O.G – TOP OF GROUT
5. T.O.S – TOP OF STEEL

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NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. STRUCTURAL STEEL TO BE USED SHALL CONFORM TO IS:2062 GRADE–A/B.
3. R/F SHALL BE HIGH STRENGTH DEFORMED BARS OF GRADE Fe500D CONFORMING TO IS:1786.
4. CONCRETE WORKS SHALL BE AS PER GENERAL NOTES OF THE PROJECT.
5. GUSSET PLATES SHALL BE 8mm THICK UNO.
6. ALL CONNECTIONS SHALL BE WELDED USING 6mm THICK FILLET WELD.
7. ANCHOR BOLTS SHALL BE AS PER EIL STD. NO. 7–68–0417.
8. FOUNDATIONS SHOWN IN THIS STANDARD ARE VALID FOR S.B.C. OF 5T/Sqm OR MORE AT FOUNDATION LEVEL.
9. GROUT SHALL BE ORDINARY 1:2 CEMENT SAND MORTAR.
10. THE STRUCTURES ARE DESIGNED FOR ELECTRICAL CABLE & TRAY LOAD OF 85Kg/m.
11. LOCATION OF CENTRE OF CABLE TRAY SUPPORTS SHALL BE AS PER GEN. CIVIL & PIPING GADS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	13.03.25	REAFFIRMED AND ISSUED AS STANDARD	JITENDER	AMARJEET	ANURAG SINHA	MAINAK NANDI
3	15.07.19	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	RAJANJI SRIVASTAVA	R.K.TRIVEDI

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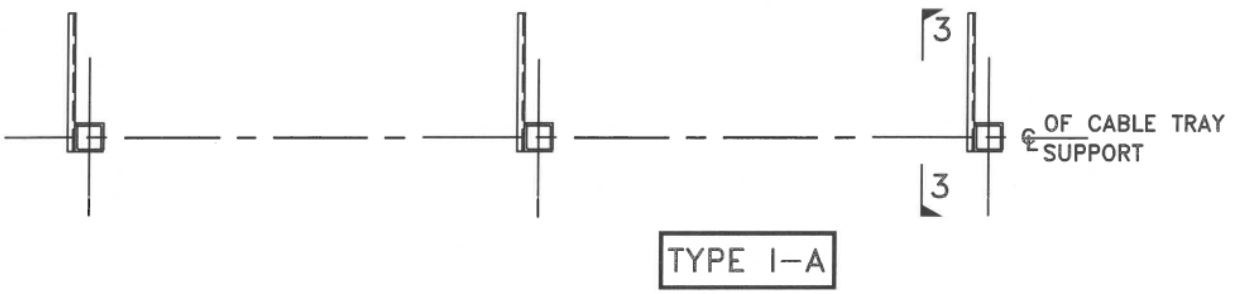
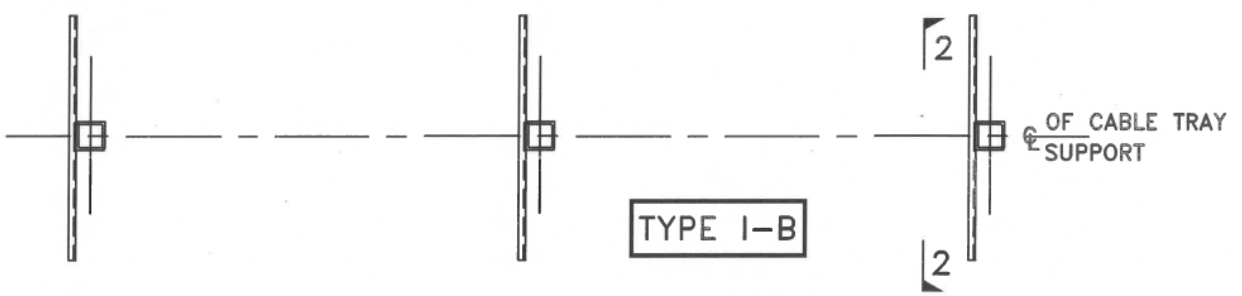
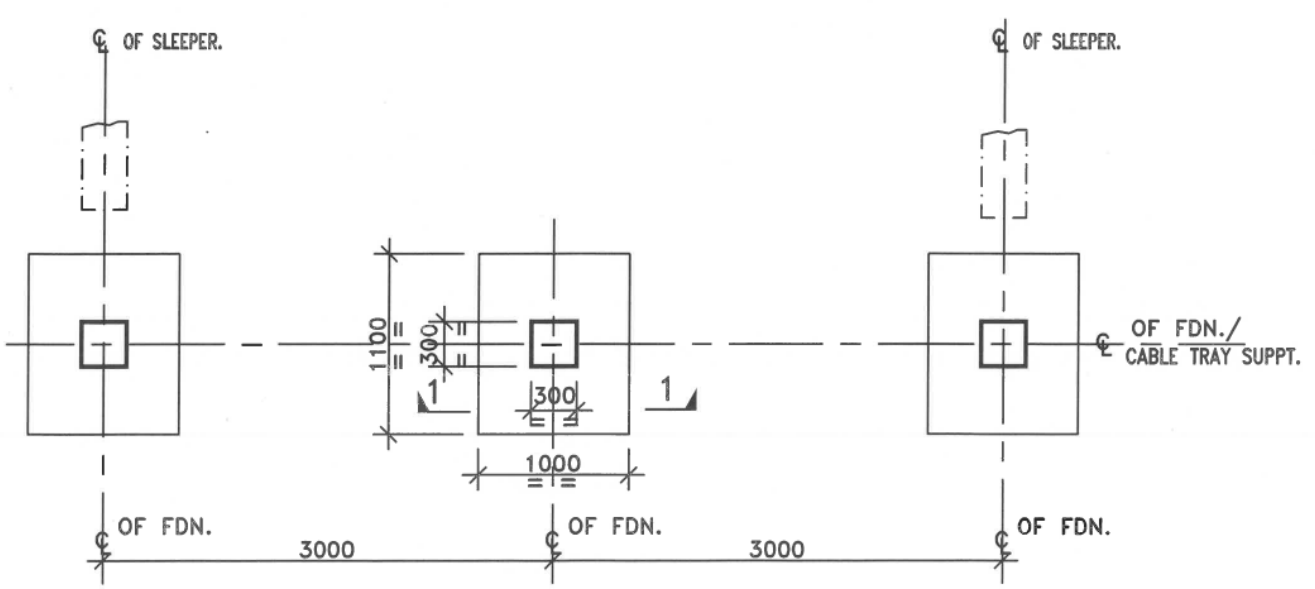
(A) 600mm WIDE TWO TIERED CABLE TRAY SUPPORTS TYPE-1



TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 1 SIDE CABLE TRAY)



TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 2 SIDE CABLE TRAY)



TYPICAL FDN. LAYOUT
(FOR 1 SIDE & 2 SIDE CABLE TRAY SUPPT.)

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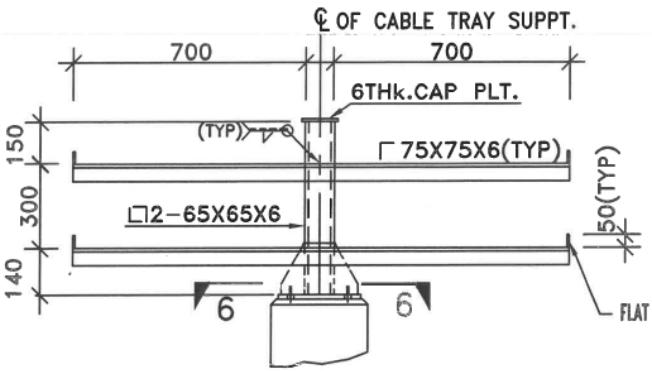
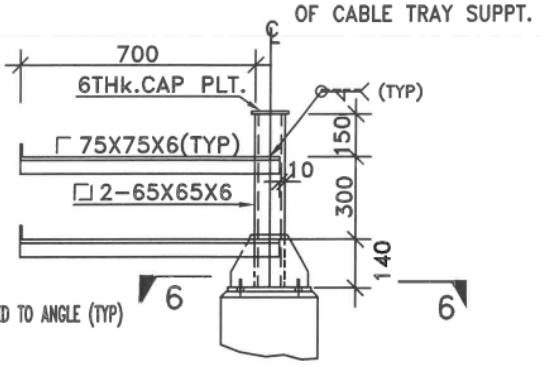
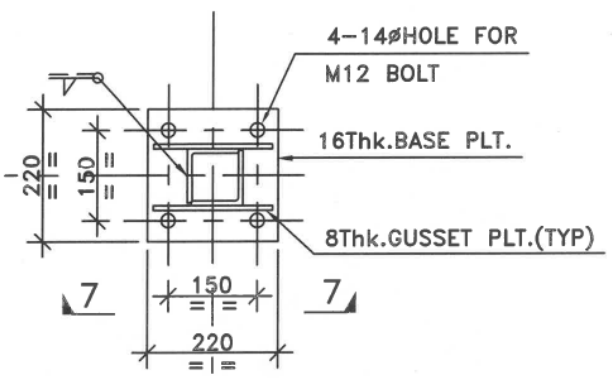


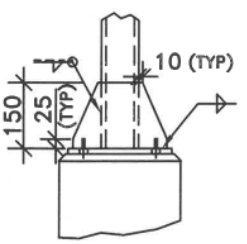
VIEW 2-2
(FOR 2 SIDE CABLE TRAY STR.)



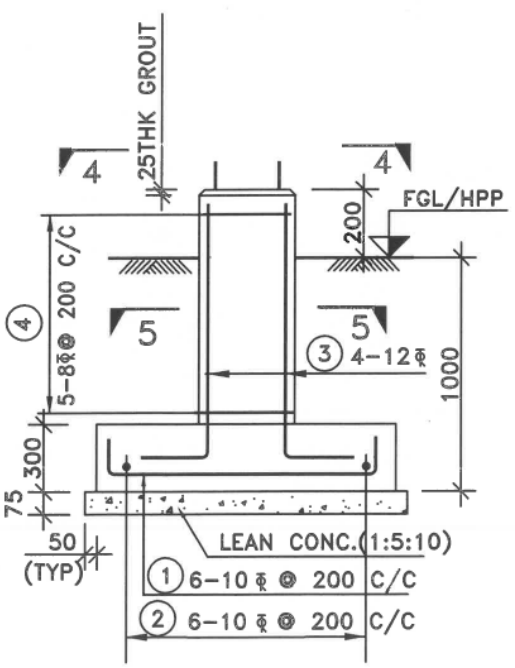
VIEW 3-3
(FOR 1 SIDE CABLE TRAY STR.)



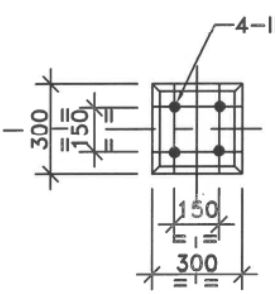
VIEW 6-6



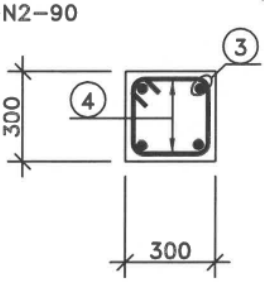
VIEW 7-7



SECTION 1-1



VIEW 4-4



SEC. 5-5

QUANTITIES (FOR EACH SUPPT.)		
PCC 1:5:10	=	0.10 CUM.
* CONC.	=	0.45 CUM.
STRL. STEEL	=	25 KG. (FOR 1 SIDE STR.)
	=	35 KG. (FOR 2 SIDE STR.)

(* GRADE OF CONC. SHALL BE AS PER GENERAL NOTES OF PROJECT.)

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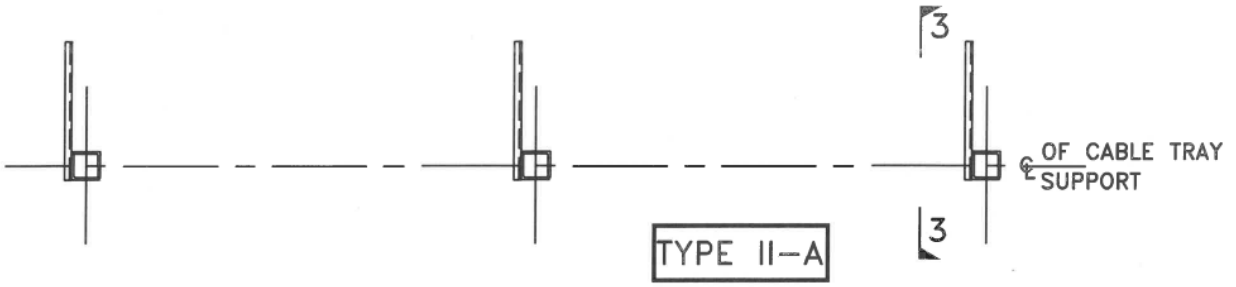
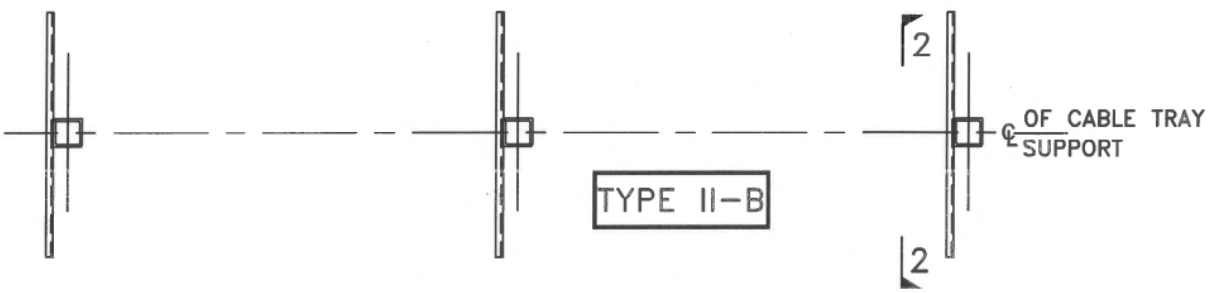
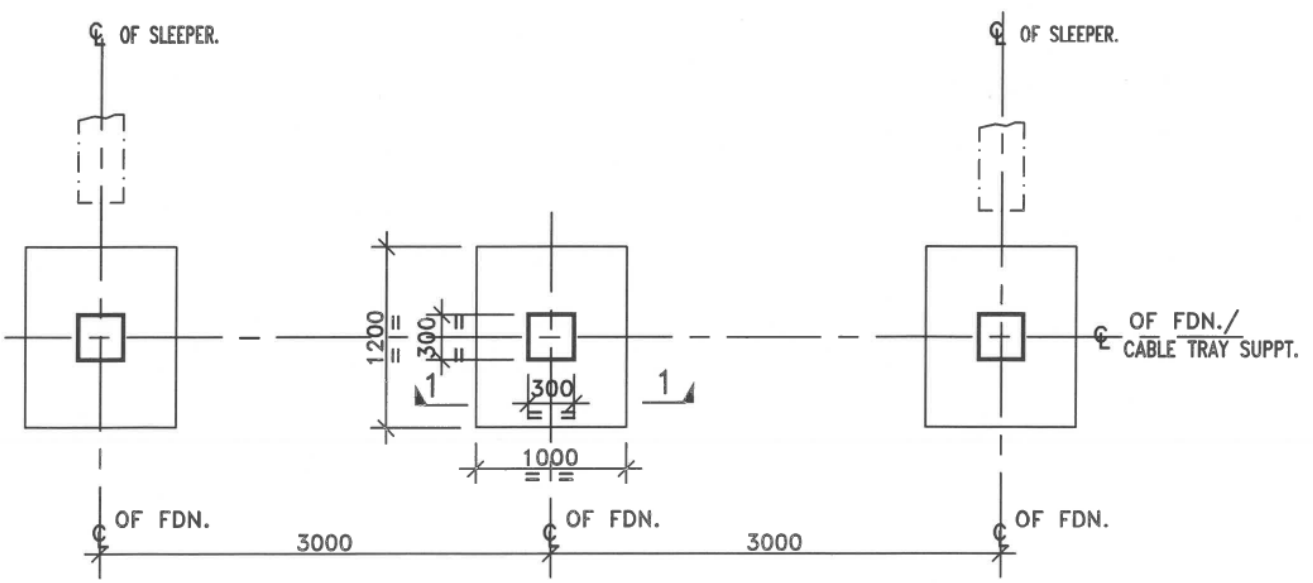
(B) 750mm WIDE TWO TIERED CABLE TRAY SUPPORTS TYPE–II



TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 1 SIDE CABLE TRAY)



TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 2 SIDE CABLE TRAY)



TYPICAL FDN. LAYOUT
(FOR 1 SIDE & 2 SIDE CABLE TRAY SUPPT.)

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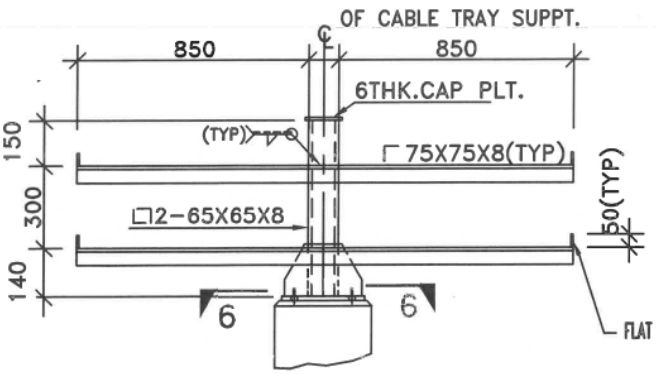
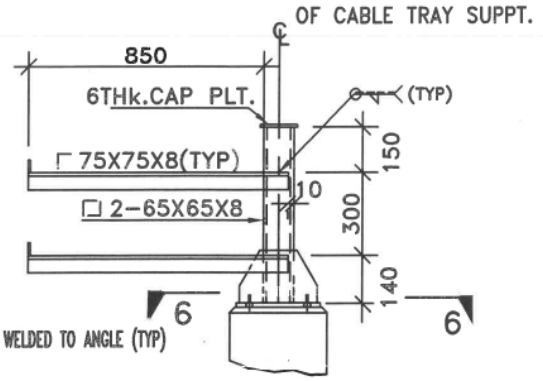
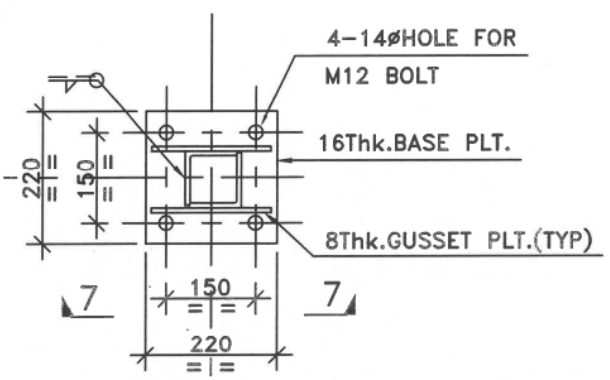


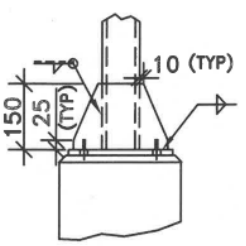
VIEW 2-2
(FOR 2 SIDE CABLE TRAY STR.)



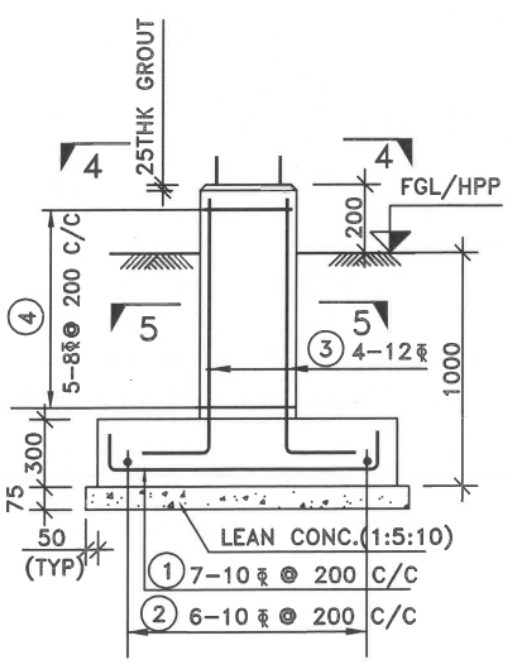
VIEW 3-3
(FOR 1 SIDE CABLE TRAY STR.)



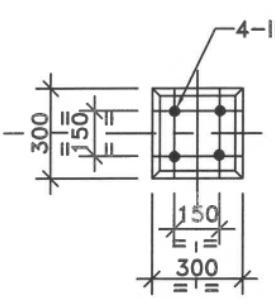
VIEW 6-6



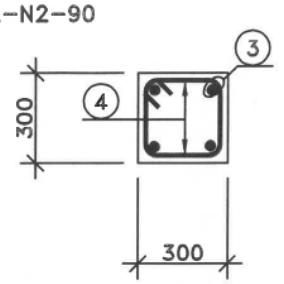
VIEW 7-7



SECTION 1-1



VIEW 4-4



SEC. 5-5

QUANTITIES (FOR EACH SUPPT.)		
PCC 1:5:10	=	0.11 CUM.
* CONC.	=	0.5 CUM.
STRL. STEEL	=	35 KG. (FOR 1 SIDE STR.)
	=	45 KG. (FOR 2 SIDE STR.)

(* GRADE OF CONC. SHALL BE AS PER GENERAL NOTES OF PROJECT.)

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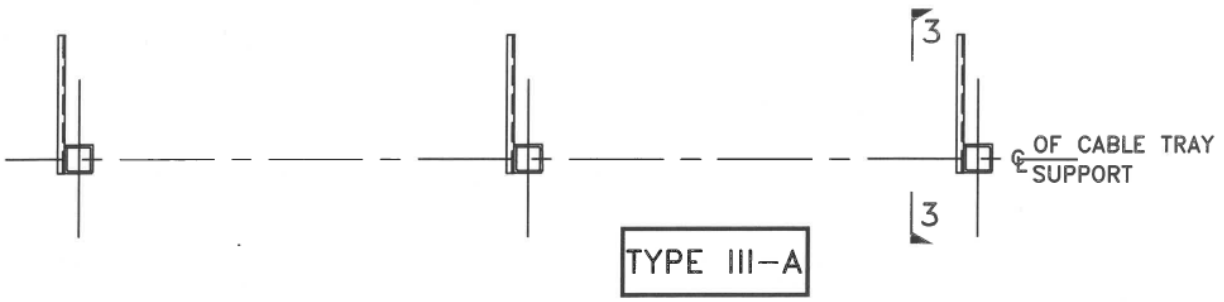
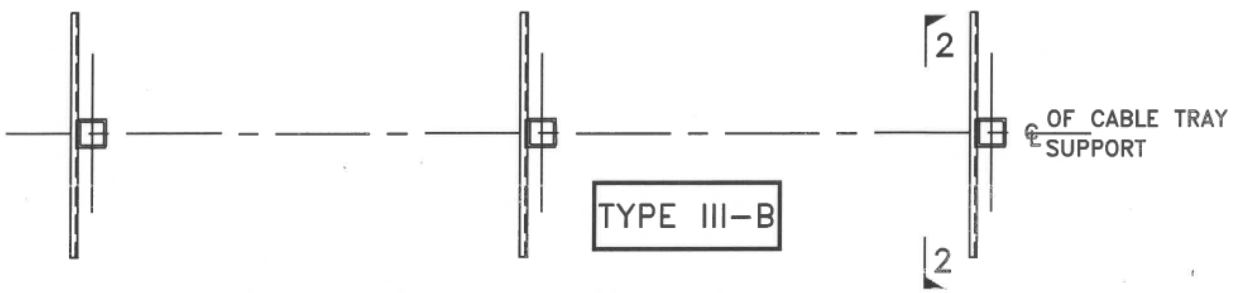
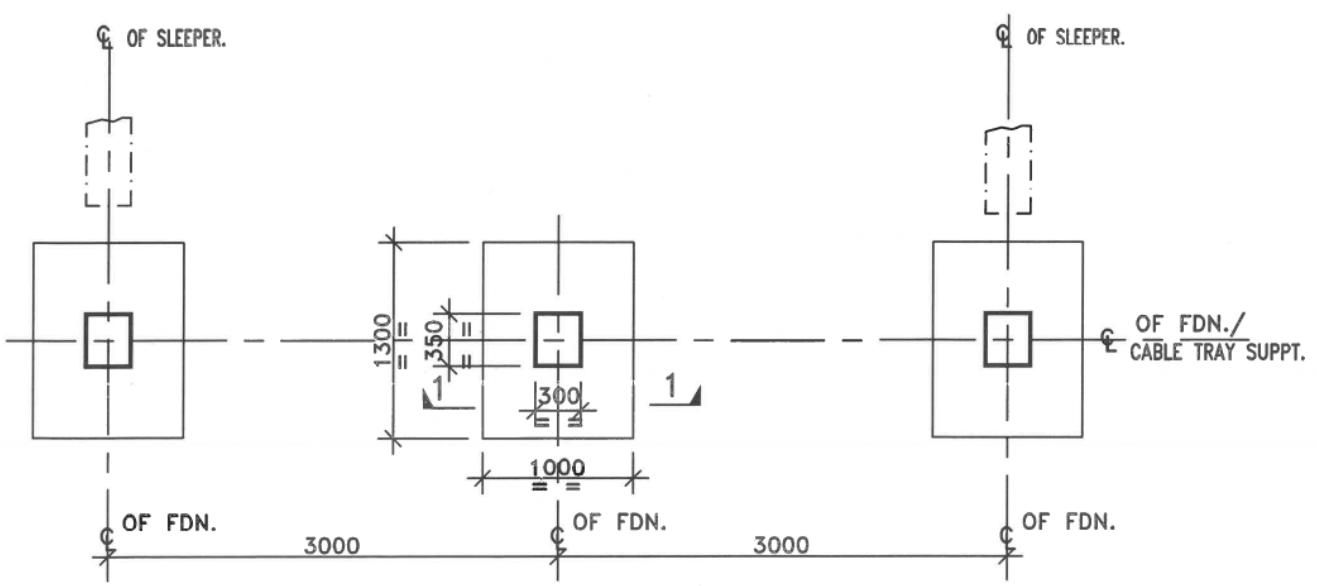
(C) 600mm WIDE THREE TIERED CABLE TRAY SUPPORTS TYPE–III



TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 1 SIDE CABLE TRAY)



TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 2 SIDE CABLE TRAY)



TYPICAL FDN. LAYOUT
(FOR 1 SIDE & 2 SIDE CABLE TRAY SUPPT.)

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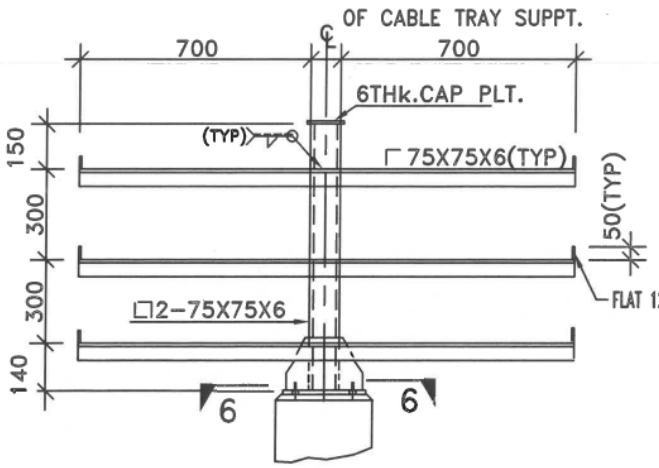
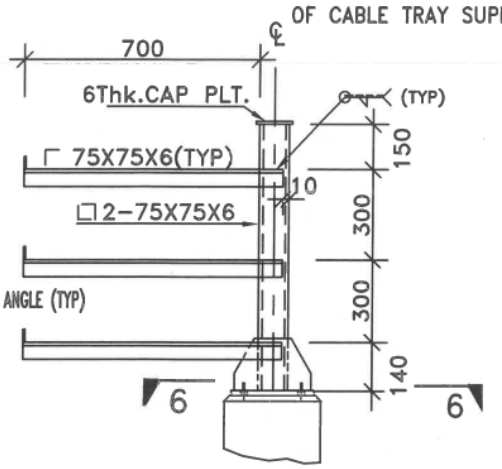
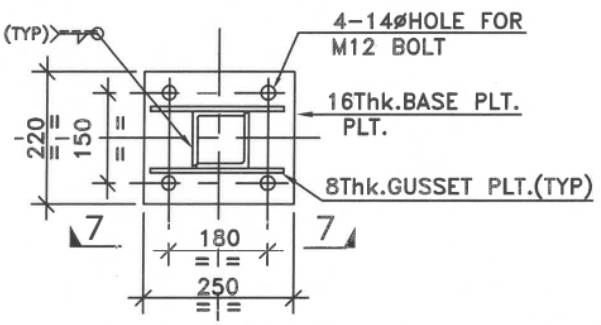


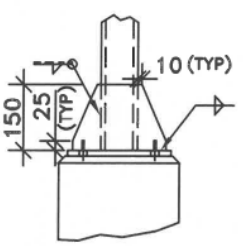
VIEW 2-2
(FOR 2 SIDE CABLE TRAY STR.)



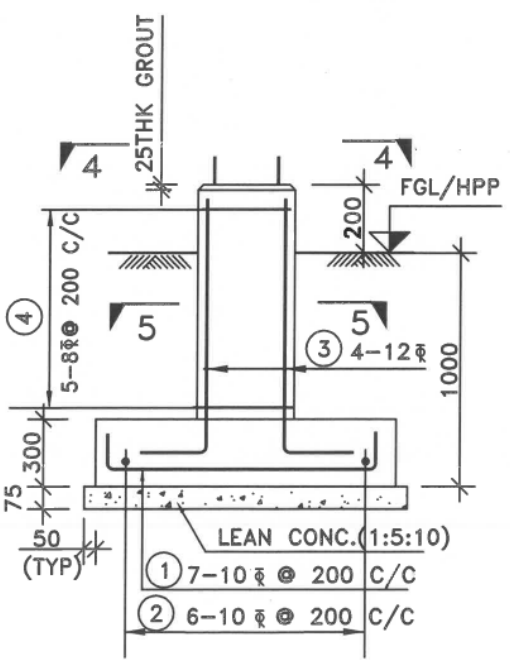
VIEW 3-3
(FOR 1 SIDE CABLE TRAY STR.)



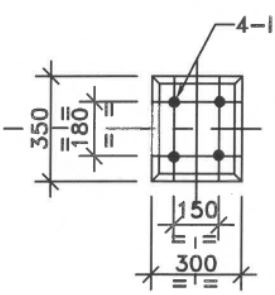
VIEW 6-6



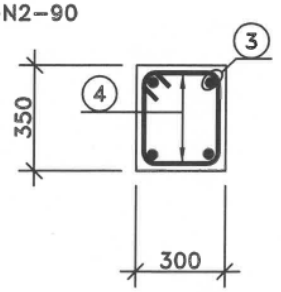
VIEW 7-7



SECTION 1-1



VIEW 4-4



SEC. 5-5

QUANTITIES (FOR EACH SUPPT.)		
PCC 1:5:10	=	0.12 CUM.
* CONC.	=	0.50 CUM.
STRL. STEEL	=	40 KG. (FOR 1 SIDE STR.)
	=	55 KG. (FOR 2 SIDE STR.)

(* GRADE OF CONC. SHALL BE AS PER GENERAL NOTES OF PROJECT.)

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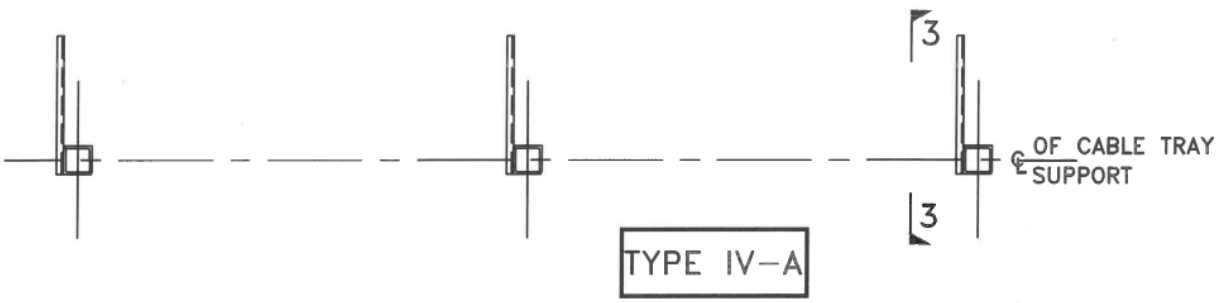
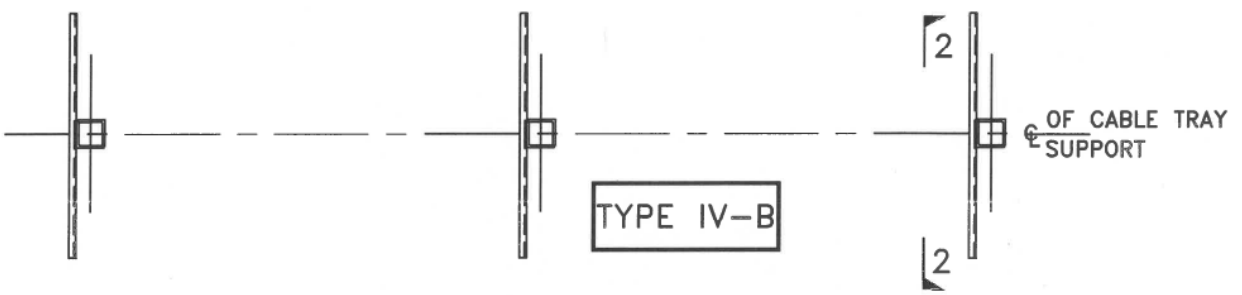
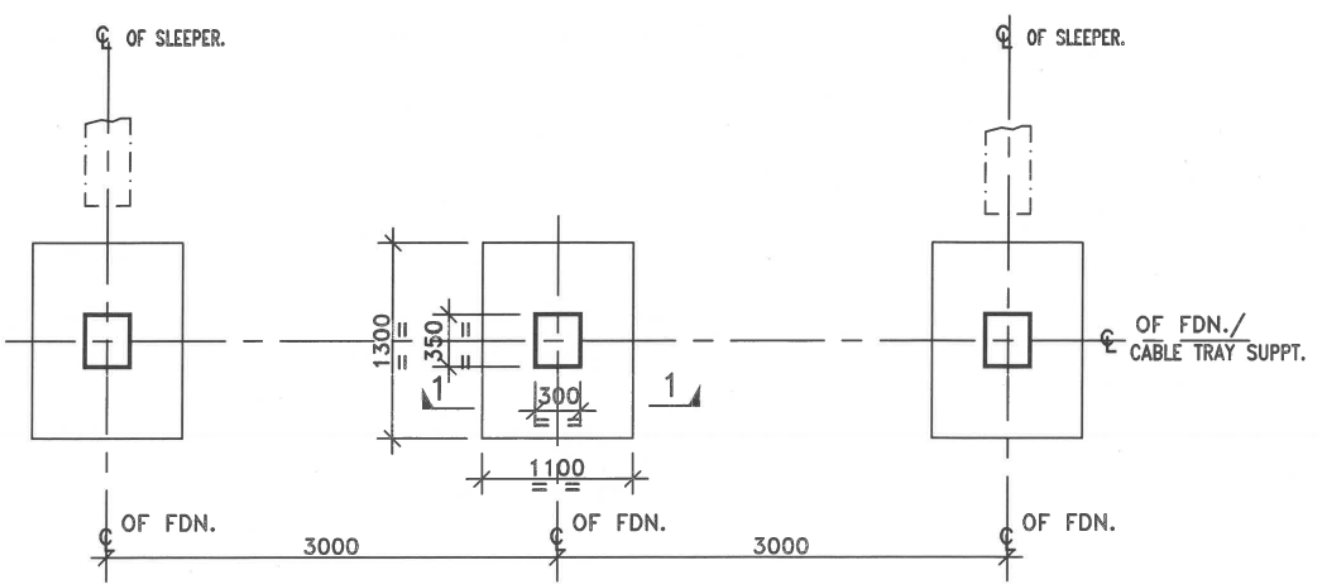
(D) 750mm WIDE THREE TIERED CABLE TRAY SUPPORTS TYPE–IV



TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 1 SIDE CABLE TRAY)



TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 2 SIDE CABLE TRAY)



TYPICAL FDN. LAYOUT
(FOR 1 SIDE & 2 SIDE CABLE TRAY SUPPT.)

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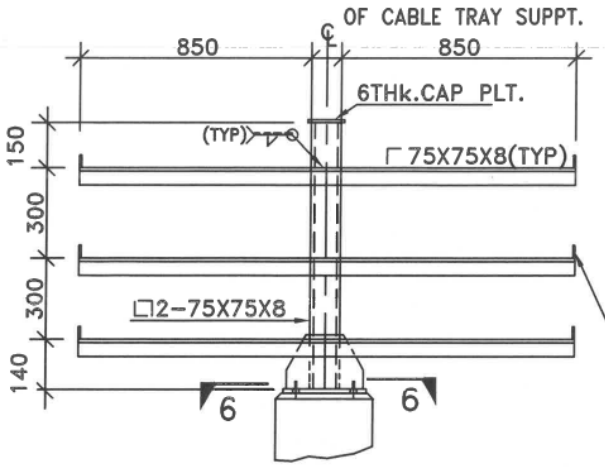
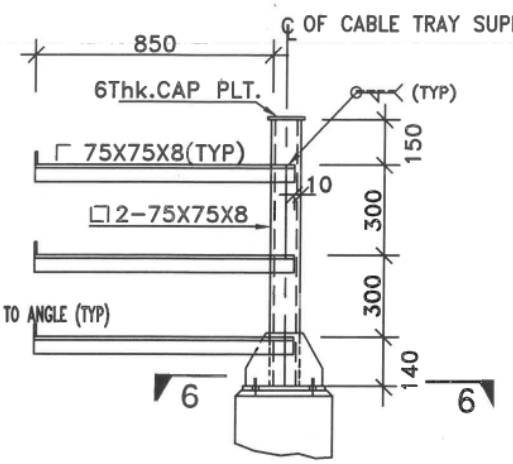
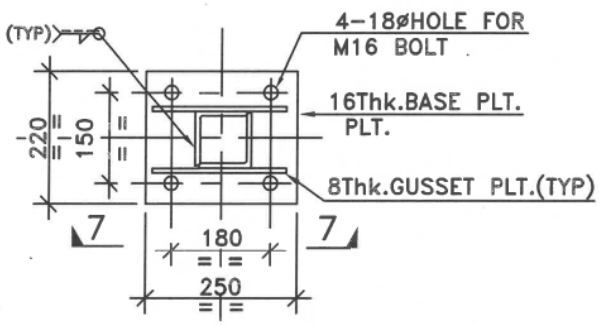


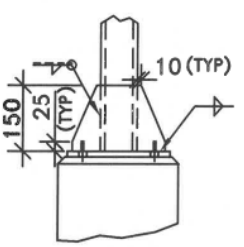
VIEW 2-2
(FOR 2 SIDE CABLE TRAY STR.)



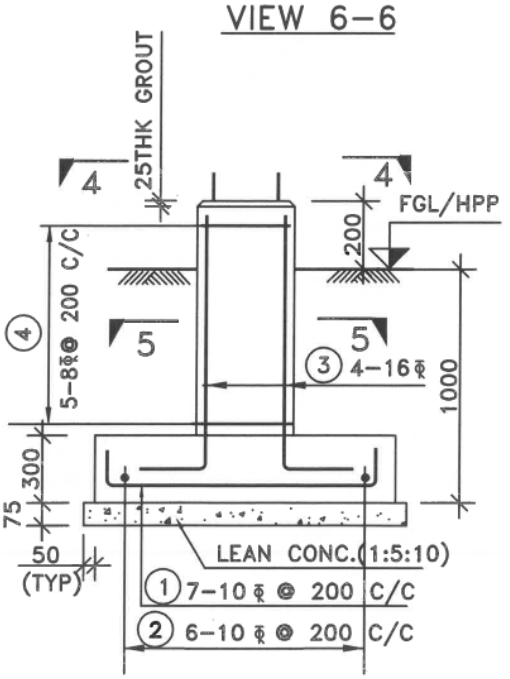
VIEW 3-3
(FOR 1 SIDE CABLE TRAY STR.)



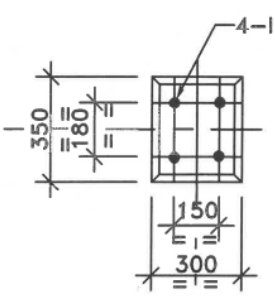
VIEW 6-6



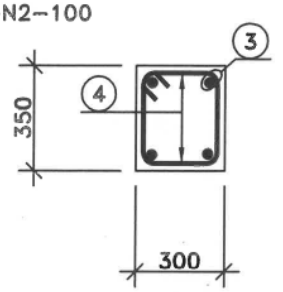
VIEW 7-7



SECTION 1-1



VIEW 4-4



SEC. 5-5

QUANTITIES (FOR EACH SUPPT.)		
PCC1:5:10	=	0.12 CUM.
* CONC.	=	0.55 CUM.
STRL. STEEL	=	45 KG. (FOR 1 SIDE STR.)
	=	65 KG. (FOR 2 SIDE STR.)

(* GRADE OF CONC. SHALL BE AS PER GENERAL NOTES OF PROJECT.)

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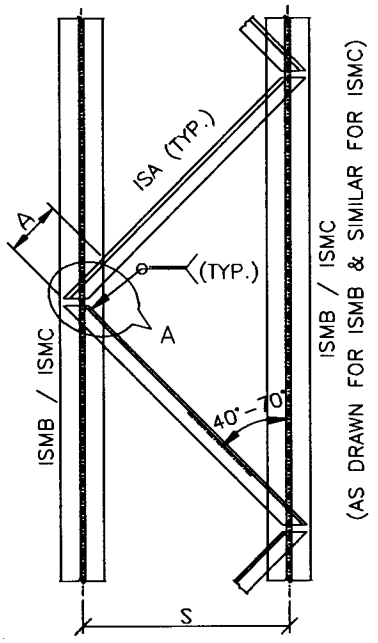
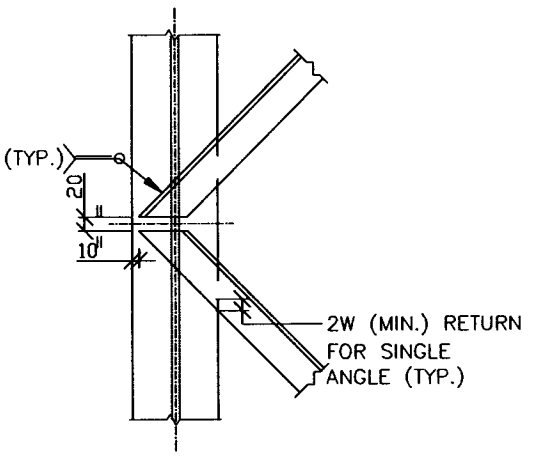
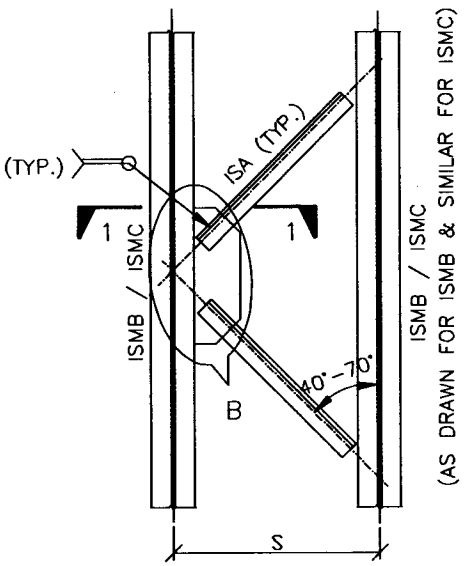
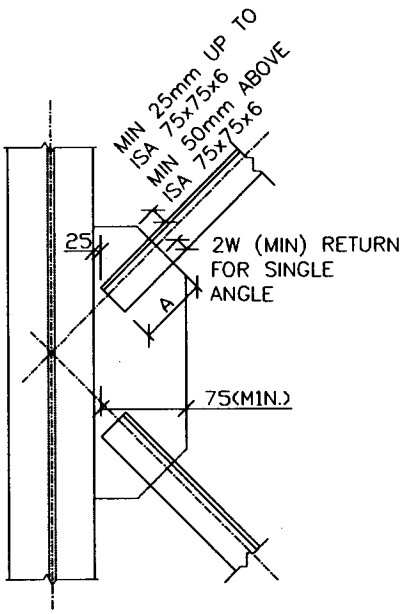




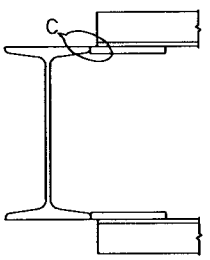
DET.–A

OPTION I–LACINGS LAPPED ON COLUMN FLANGE

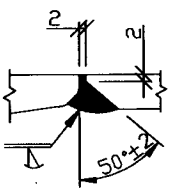




DET.–B



SEC. 1–1



DET.–C

OPTION II–LACINGS CONNECTED WITH GUSSET PLATES

(IN CASE OPTION–1 IS NOT FEASIBLE)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
3	29.09.20	REAFFIRMED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET	ANURAG SINHA	S.MAZUMDAR
2	11.08.14	REVISED AND ISSUED AS STANDARD	K K SHARMA	V. GOEL	P K MITTAL	S. CHANDA

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TABLE-I : FOR OPTION-I($S \leqslant 600$)

S. NO.	COLUMN SIZE ISMB / ISMC	MAXIMUM SIZE OF LACING ANGLE *
1	MB 150	50x50x6
2	MB 200	65x65x6
3	MB 250	75x75x6
4	MC 150	50x50x6
5	MC 200	50x50x6
6	MC 250	50x50x6

NOTE: * BASED ON 80% OF FULL STRENGTH OF MEMBER

LEGEND: W = WELD SIZE

S = C/C OF C.G. OF ISMB OR B/B OF ISMC SPACING

NOTES:

1 ALL DIMENSIONS ARE IN mm

2 SHOP WELDING SHALL BE USED IN CONNECTIONS.

3 LACING SHOWN IN OPTION II CAN BE PROVIDED ON INSIDE FACE OF GUSSET PLATE, FOR ISMB/ ISMC SIZES >300 MM AND SPACING >600MM.

4 SPACING 'S' BETWEEN COLUMNS IS TO BE SELECTED AS PER FOLLOWING BROAD GUIDELINES:

a) FOR COLUMNS UP TO 5M HEIGHT / CRANE CAPACITIES UP TO 5MT. – ($S \leqslant 600$)

b) FOR COLUMNS >5M HEIGHT / CRANE CAPACITIES >5MT. – ($S > 600$)

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2	11.08.14	REVISED AND ISSUED AS STANDARD	K K SHARMA	V. GOEL	P K MITTAL	S. CHANDA

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TABLE–II : FOR OPTION–I (S>600)

S. NO.	ANGLE SIZE AND SPACING		WELD LENGTH 'A' mm	WELD SIZE	GUSSET PLATE THK. 't' mm (OPTION II ONLY)
1	ISA 65x65x6	*S ⩽ 700mm FOR SINGLE ANGLE S ⩽ 1100mm FOR DOUBLE ANGLE	150	6	10
		S > 700mm FOR SINGLE ANGLE S > 1100mm FOR DOUBLE ANGLE	75	6	10
2	ISA 65x65x8	S ⩽ 700mm FOR SINGLE ANGLE S ⩽ 1100mm FOR DOUBLE ANGLE	200	6	10
		S > 700mm FOR SINGLE ANGLE S > 1100mm FOR DOUBLE ANGLE	100	6	10
3	ISA 75x75x6	S ⩽ 900mm FOR SINGLE ANGLE S ⩽ 1300mm FOR DOUBLE ANGLE	200	6	10
		S > 900mm FOR SINGLE ANGLE S > 1300mm FOR DOUBLE ANGLE	100	6	10
4	ISA 75x75x8	S ⩽ 900mm FOR SINGLE ANGLE S ⩽ 1300mm FOR DOUBLE ANGLE	250	6	10
		S > 900mm FOR SINGLE ANGLE S > 1300mm FOR DOUBLE ANGLE	125	6	10
5	ISA 90x90x6	S ⩽ 1000mm FOR SINGLE ANGLE S ⩽ 1600mm FOR DOUBLE ANGLE	225	6	10
		S > 1000mm FOR SINGLE ANGLE S > 1600mm FOR DOUBLE ANGLE	125	6	10

CONTD...

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
3	29.09.20	REAFFIRMED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET	ANURAG SINHA	S.MAZUMDAR
2	11.08.14	REVISED AND ISSUED AS STANDARD	K K SHARMA	V. GOEL	P K MITTAL	S. CHANDA

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TABLE II (CONTD...)

S. NO.	ANGLE SIZE AND SPACING		WELD LENGTH 'A' mm	WELD SIZE	GUSSET PLATE THK. 't' mm (OPTION II ONLY)
6	ISA 90x90x8	*S ≤ 1000mm FOR SINGLE ANGLE S ≤ 1600mm FOR DOUBLE ANGLE	275	8	10
		S > 1000mm FOR SINGLE ANGLE S > 1600mm FOR DOUBLE ANGLE	150	8	10
7	ISA 100x100x10	S ≤ 1100mm FOR SINGLE ANGLE S ≤ 1700mm FOR DOUBLE ANGLE	300 300	8	10 12
		S > 1100mm FOR SINGLE ANGLE S > 1700mm FOR DOUBLE ANGLE	150	8	10
8	ISA 110x110x10	S ≤ 1200mm FOR SINGLE ANGLE S ≤ 1900mm FOR DOUBLE ANGLE	325 325	8	10 12
		S > 1200mm FOR SINGLE ANGLE S > 1900mm FOR DOUBLE ANGLE	175	8	10
9	ISA 130x130x10	S ≤ 1500mm FOR SINGLE ANGLE S ≤ 2200mm FOR DOUBLE ANGLE	375 375	8	10 16
		S > 1500mm FOR SINGLE ANGLE S > 2200mm FOR DOUBLE ANGLE	200	8	10
10	ISA 150x150x12	S ≤ 1700mm FOR SINGLE ANGLE S ≤ 2600mm FOR DOUBLE ANGLE	425 425	10	12 16
		S > 1700mm FOR SINGLE ANGLE S > 2600mm FOR DOUBLE ANGLE	200	10	12

NOTE: *S(c/c OF C.G. OF ISMB OR B/B OF ISMC SPACING) SHOWN THUS 'S ≤' ARE SIZED FOR FULL STRENGTH OF MEMBER SPACING SHOWN THUS 'S >' ARE SIZED FOR 50% OF FULL STRENGTH OF MEMBER

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3	29.09.20	REAFFIRMED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET	ANURAG SINHA	S.MAZUMDAR
2	11.08.14	REVISED AND ISSUED AS STANDARD	K K SHARMA	V. GOEL	P K MITTAL	S. CHANDA

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NOTES :–

1. ALL DIMENSIONS ARE IN mm.
2. THE TYPE OF GRATING TO BE USED SHALL BE CALLED OUT ON THE DESIGN DRAWING.
3. MATERIAL FOR THE GRATING SHALL CONFORM TO FOLLOWING STANDARDS:

		CARBON STEEL (CS) GRATING	STAINLESS STEEL (SS) GRATING
(a)	MAIN MEMBER & END FLAT	IS 2062 (GRADE E250) SUB QUALITY–A/BR/BO	GRADE 409M CONFORMING TO ASTM 240/480 (UNS S40977)
(b)	CROSS MEMBER (SQ.TWISTED ACROSS BAR)	IS 7887	GRADE 409M CONFORMING TO ASTM 240/480 (UNS S40977) OR DESIGNATION X12Cr13 CONFORMING TO IS 6527/6528
(c)	FLAT FOR CLAMP	IS 513	GRADE 409M CONFORMING TO ASTM 240/480 (UNS S40977) OR DESIGNATION X12Cr12 CONFORMING TO IS 6603
(d)	DISC	CS 1038 GRADE	GRADE 1.4404 CONFORMING TO DIN EN 1.4404 OR GRADE 316/316L CONFORMING TO ASTM 240/480
(e)	STUD	CS 1038 GRADE	GRADE 1.4462 CONFORMING TO DIN EN 1.4462 OR GRADE F51 CONFORMING TO ASTM A182

4. ALL GRATINGS SHALL BE MANUFACTURED BY ELECTRO–FORGING PROCESS.
5. CARBON STEEL GRATINGS INCLUDING TOE PLATES & FLATS (AROUND OPENINGS) AND CLAMPS SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH IS 2629 AND TESTED AS PER IS 2633 & IS 6745. QUANTITY OF ZINC COATING SHALL BE MINIMUM 900 gm/sqm OF SURFACE AREA (0.12 mm MINIMUM AVERAGE THICKNESS). CLAMP BOLTS & NUTS SHALL HAVE MINIMUM AVERAGE ZINC COATING OF 375 gm/sqm (0.054 mm MINIMUM AVERAGE THICKNESS).
6. THE PANEL WIDTH SHOWN ON SUBSEQUENT SHEETS IS INDICATIVE. IT MAY BE INCREASED OR DECREASED AS REQUIRED TO SUIT THE GEOMETRY OF PLATFORM & CONVENIENCE OF HANDLING.
7. GRATINGS SHALL NOT BE USED FOR SUPPORTING THE PIPES DIRECTLY. ADDITIONAL MEMBERS (MINIMUM MC125) SHALL BE PROVIDED UNDER THE GRATING FOR SUPPORTING THE PIPE HAVING A MAXIMUM LOAD OF 500 Kg. THIS MEMBER SHALL SPAN IN SAME DIRECTION AS GRATING.
8. GRATING PANEL SHALL BE ALIGNED AND TACK WELDED TO THE SUPPORTING MEMBERS. FIXING OF GRATING PANEL WITH SUPPORTING MEMBERS SHALL EITHER BE DONE BY CLAMPS/ DISC (WITHOUT REMOVING TACK WELD) OR ALTERNATIVELY BY INTERMITTENT/STITCH WELDING 50(50).

   REMOVABLE GRATING PANEL AS SHOWN IN DRAWINGS SHALL BE FIXED BY CLAMPS/ DISC ONLY.
9. FOR GRATING PANELS WITH CUTOUTS/ OPENINGS; STRENGTHENING SHALL BE CARRIED OUT AS PER THE DETAILS GIVEN ON SHEET 6. ADDITIONAL MEMBERS WHEREVER SHOWN SHALL BE PROVIDED IN THE STRUCTURE.
10. THE FABRICATED GRATING SHALL FULFILL THE FOLLOWING MINIMUM REQUIREMENTS:
    (a) UNFUSED JOINTS ARE NOT IN EXCESS OF 5% OF TOTAL JOINTS AND ARE WELDED BY SMAW/GMAW PROCESS.
    (b) THE JOINTS ARE ABLE TO SUSTAIN A MINIMUM PULL OUT LOAD OF 1.2 TIMES THE SHEAR CAPACITY OF THE CROSS MEMBER.
11. EVERY FIFTH MAIN MEMBER SHALL NECESSARILY BE WELDED TO THE END FLAT FROM ONE SIDE. HOWEVER, THE END MAIN MEMBER SHALL ALWAYS BE WELDED TO THE END FLATS.
12. OPENINGS UP TO 200 mm DIA ARE NOT SHOWN ON THE DRAWING. THE SAME SHALL BE MADE AT SITE DURING ERECTION OF PIPING.
13. FOR CARBON STEEL GRATING, REPAIR TO THE DAMAGED AREA OF GALVANIZED COATING DUE TO WELDING AFTER ERECTION SHALL BE CARRIED OUT AS PER RECOMMENDED PRACTICE OF IS 11759 USING COLD GALVANIZING SPRAY PROCESS. ORGANIC PAINT SYSTEM IS NOT ACCEPTABLE.
14. MAXIMUM LENGTH OF SINGLE CONTINUOUSLY SUPPORTED GRATING SHALL BE FIXED ON THE BASIS OF HANDLING. HOWEVER PREFERABLY LENGTH OF GRATING SHALL BE RESTRICTED TO 6 M.
15. GRATING FASTENER DISC AND THREADED STUDS SHALL BE CERTIFIED BY EOTA (EUROPEAN ORGANIZATION FOR TECHNICAL ASSESSMENT). FOR INSTALLATION, PILOT HOLE SHALL BE DRILLED WITHOUT SELF–TAPPING. THE STUD WITH PRE–MOUNTED NEOPRENE (FOR CS)/ CHLOROPRENE (FOR SS) WASHER SHALL BE FASTENED INTO THE PILOT HOLE WITH PREDEFINED TORQUE VALUE BASED ON THE MANUFACTURER'S GUIDELINES. THE GRATING DISC SHALL THEN BE FIXED WITH ALLEN–TYPE BIT. VENDOR SHALL PROVIDE THE ENTIRE ARRANGEMENT INCLUDING THE SPECIALIZED TOOLS WITH INSTALLATION INSTRUCTIONS. VENDOR SHALL CARRY OUT PULL OUT LOAD TEST (WITH A LOAD VALUE SPECIFIED FOR THE GRATING PANEL) ON A SAMPLE STUD. THE VENDOR SHALL ALSO PROVIDE INSTALLATION TRAINING TO THE SITE WORKERS. HOT WORK PERMIT (NON–OPEN FLAME TYPE) MAY BE REQUIRED FOR INSTALLATION OF GRATING WITH DISC MECHANISM BASED ON HEAT DISSIPATION REPORT PROVIDED BY THE VENDOR.

    CARBON STEEL STUDS & DISC SHALL BE HOT DIP GALVANIZED (MIN. 900 gm/sqm FOR DISC & MIN. AVERAGE 375 gm/sqm FOR STUDS) OR SHALL HAVE A COATING THAT CAN WITHSTAND NEUTRAL SALT SPRAY TEST OF 2000H AS PER DIN EN ISO 9227.
16. STAINLESS STEEL GRATINGS INCLUDING LOCALIZED WELDING AREAS SHALL BE CHEMICALLY TREATED AS PER ASTM A380/A380M.
17. FOR STAINLESS STEEL GRATINGS, ELECTRODE OF GRADE E309L SHALL BE USED.

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6	04.07.24	REVISED & ISSUED AS STANDARD	JITENDER	AMARJEET	ANURAG SINHA	MAINAK NANDI
5	29.12.22	REVISED & ISSUED AS STANDARD	JITENDER	AMARJEET	ANURAG SINHA	S.MAZUMDAR

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TABLE–1

USE OF GRATING TYPE AT VARIOUS LOCATIONS & NET SAFE WORKING LOADS FOR GRATING TYPE–I & II

TYPE	APPLICATION	l	500 TO 800	900	1000	1100	1250	1400
		EITHER OF w(UDL IN KN/SQM) OR P(LINEAR LOAD IN KN/M)						
I	1. EQUIPMENT PLATFORM 2. WALKWAY FOR CABLE TRAY IN PIPE RACK 3. OPERATING PLATFORM FROM GRADE/SUPER STRUCTURE 4. APPROACHES	w	19.60	14.80	10.80	8.10	5.30	3.40
		P	9.00	8.00	6.60	5.40	4.00	2.70
II	1. STAIRS 2. FLOOR GRATING FOR a) COMPRESSOR HOUSE b) TECHNOLOGICAL STRUCTURE c) PIPE RACK WITH VALVE / PIPE SUPPORTS d) MAINTENANCE PLATFORM	w	19.60		17.60	13.20	8.70	5.50
		P	14.60	13.00	10.70	8.80	6.30	4.40

NOTE:– THE NET SAFE WORKING LOADS GIVEN ON TABLE–1 ARE BASED ON LIMITING VERTICAL DEFLECTION OF SPAN/200 OR 6mm, WHICHEVER IS LESS.

SYMBOLS :–

l = EFFECTIVE SPAN IN mm

b = BEARING WIDTH IN mm

w = UDL IN KN/SQM

P = LINEAR LOAD IN KN/M AT MID SPAN ALONG PANEL WIDTH.

= GRATING SPAN DIRECTION

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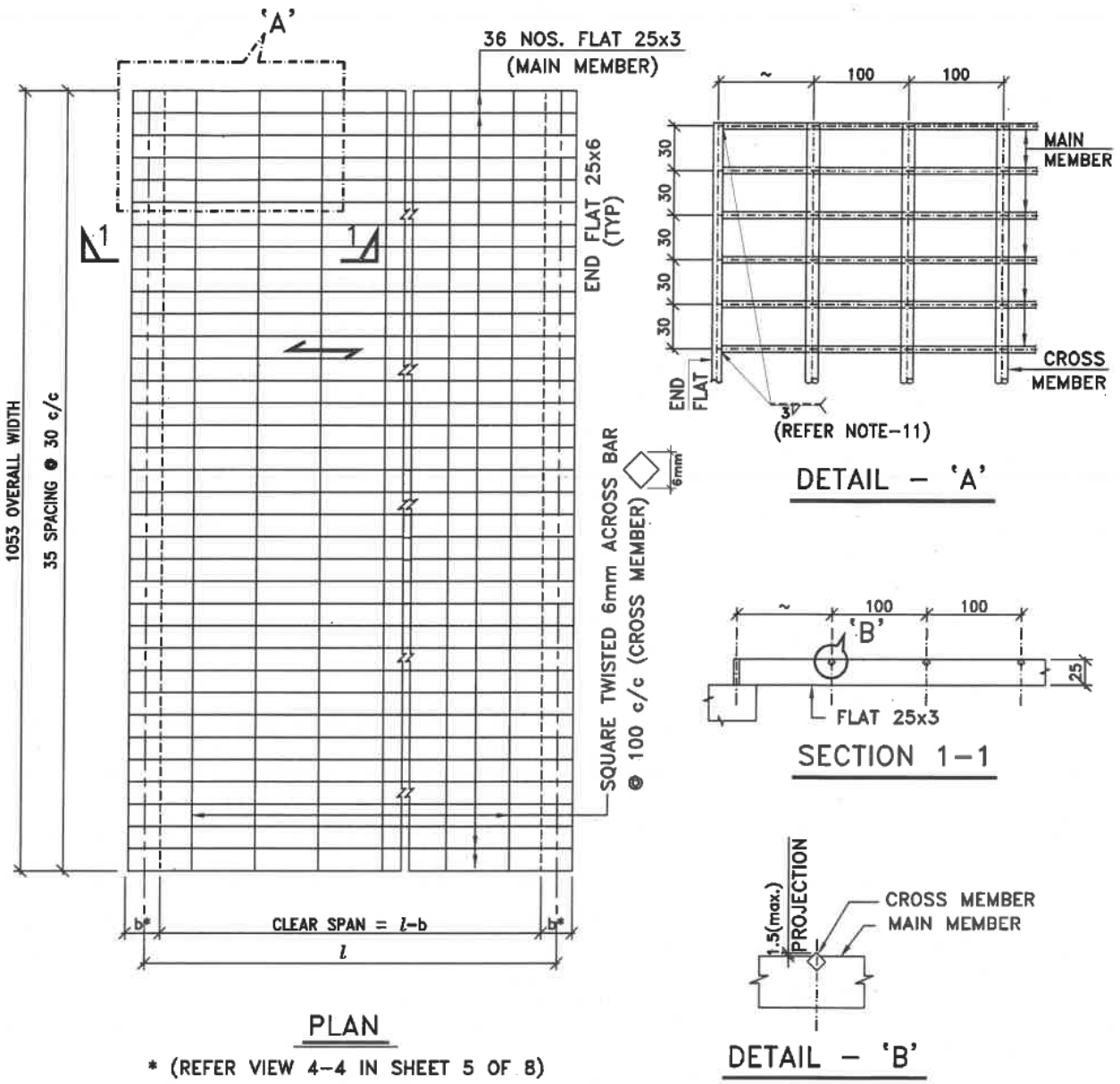

TABLE-2

WT. OF GRATING IN kg/m² (INDICATIVE ONLY, NOT FOR PAYMENT)				PROPERTIES WIDTH = 1053mm			REMARKS
FLAT 25x6	FLAT 25x3	SQUARE TWISTED 6mm ACROSS BAR	TOTAL	Ixx cm^4	Zxx cm^3	MR kgm	WEIGHT OF WELD, CLAMPS/DISC, GALVANISATION, ETC. NOT CONSIDERED
2.35	19.89	1.80	24.04	14.84	11.87	195.94	

GRATING TYPE - I

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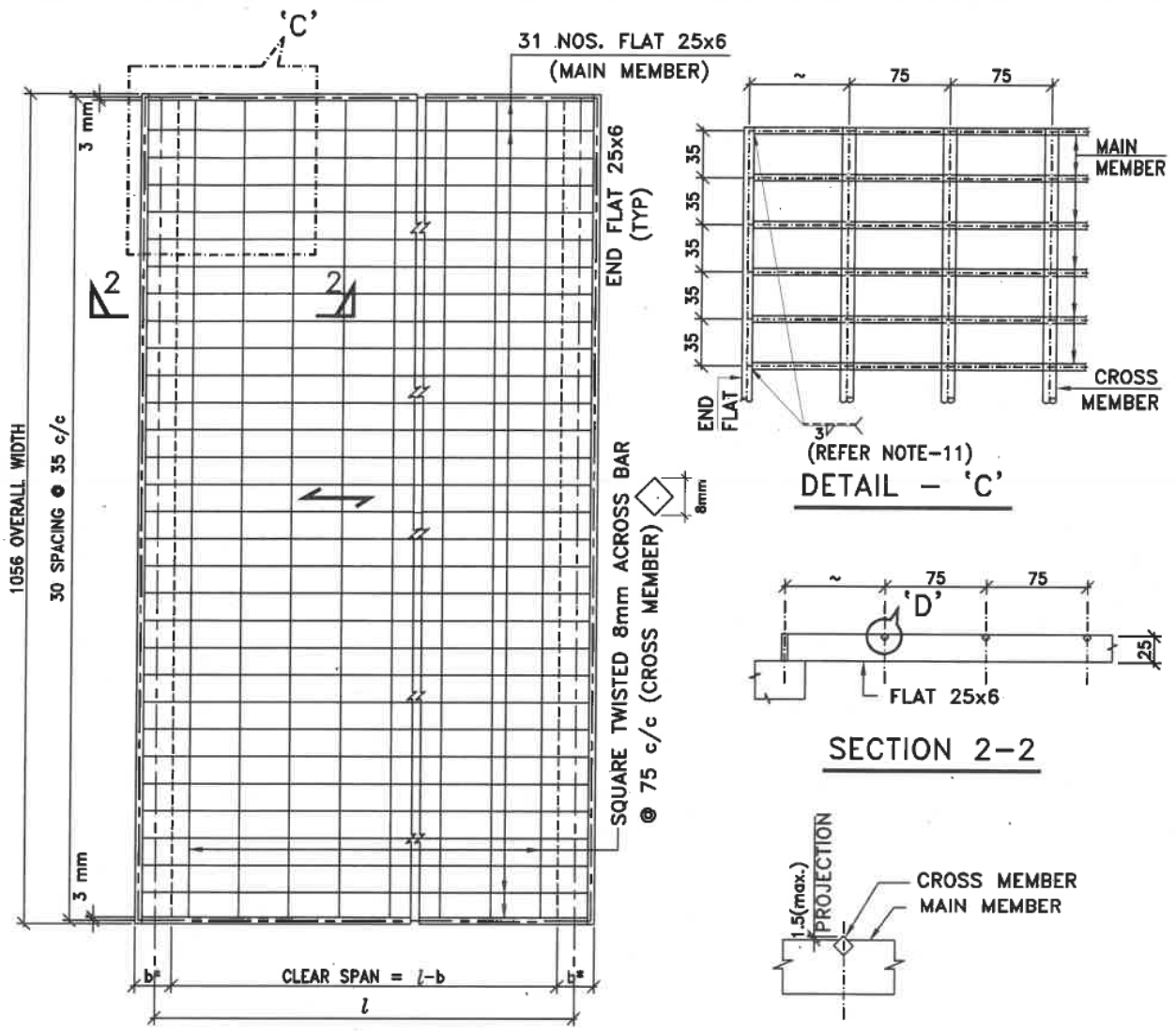

TABLE-3

WT. OF GRATING IN kg/sqm (INDICATIVE ONLY, NOT FOR PAYMENT)			PROPERTIES WIDTH = 1056mm			REMARKS
FLAT 25x6	SQUARE TWISTED 8mm ACROSS BAR	TOTAL	Ixx cm^4	Zxx cm^3	MR kgm	WEIGHT OF WELD, CLAMPS/DISC, GALVANISATION, ETC. NOT CONSIDERED
36.49	3.23	39.72	24.2	19.4	319.69	

GRATING TYPE – II

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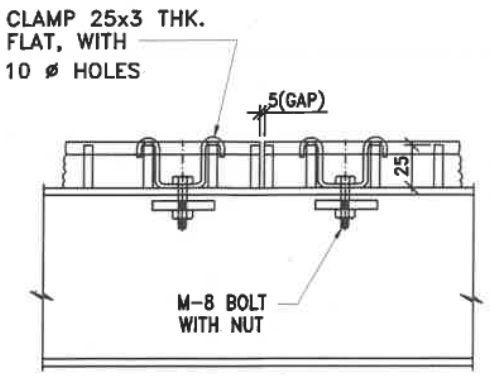
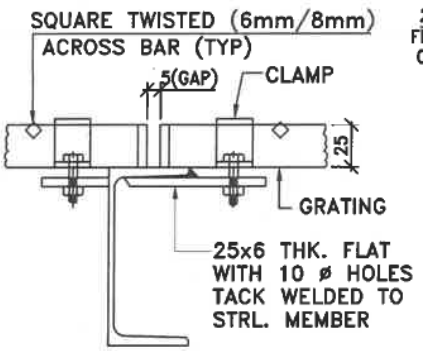
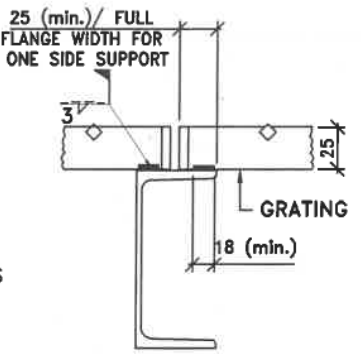


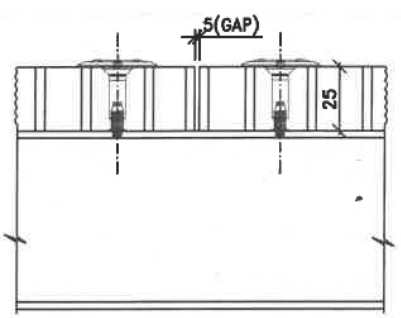
VIEW 3-3
GRATING FIXED WITH CLAMP



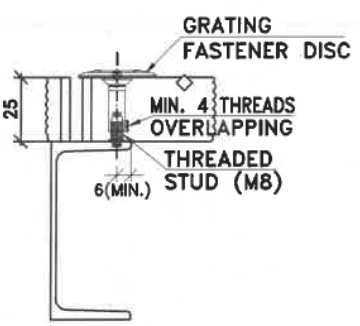
VIEW 4-4
GRATING FIXED WITH CLAMP
(REFER NOTE-8, 13 & 16)



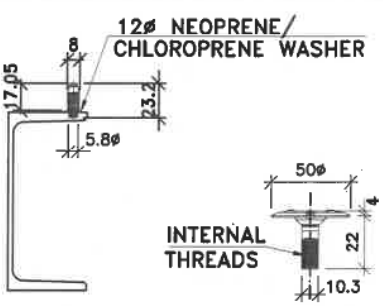
VIEW 4-4/VIEW 4B-4B
GRATING FIXED WITH WELDING
(REFER NOTE-8, 13 & 16)



VIEW 4A-4A
GRATING FIXED WITH DISC

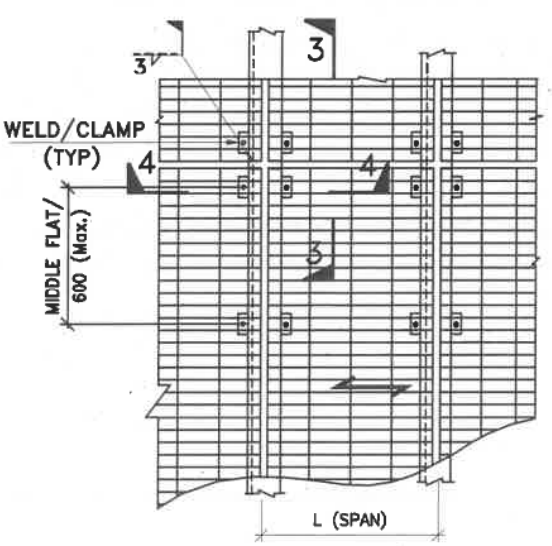


VIEW 4B-4B
GRATING FIXED WITH DISC
(REFER NOTE-8, 13, 15 & 16)

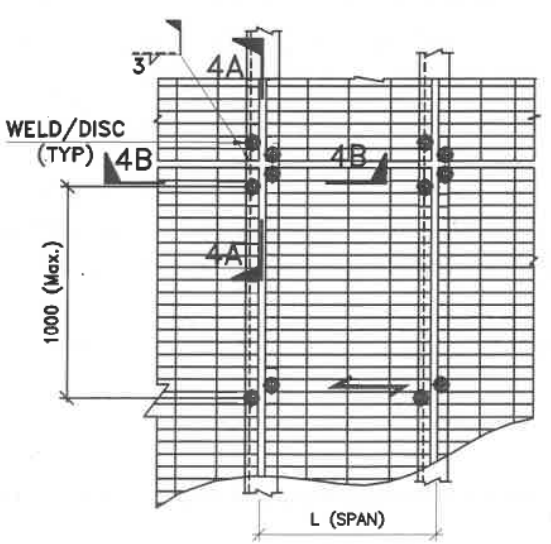


THREADED STUD FIXING DETAILS
(REFER NOTE-15)

GRATING FASTENER DISC DETAILS
(REFER NOTE-15)



OPTION-1
(WITH CLAMP)



OPTION-2
(WITH DISC)

FIXING DETAIL OF GRATING PANELS

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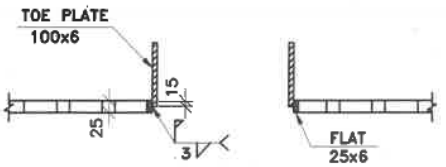
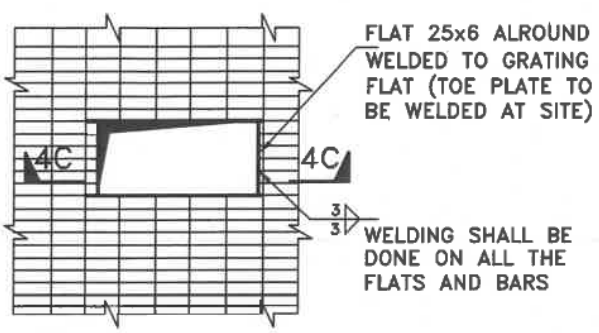
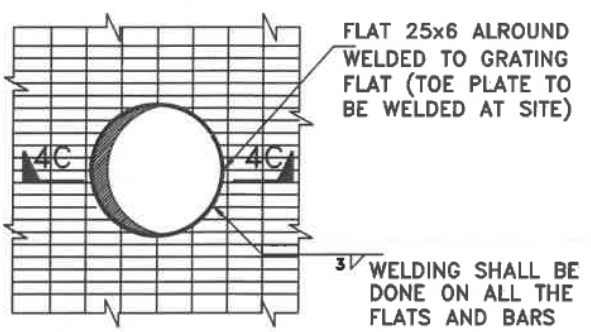


SEC. 4C–4C

(REFER NOTE–5, 13 & 16)



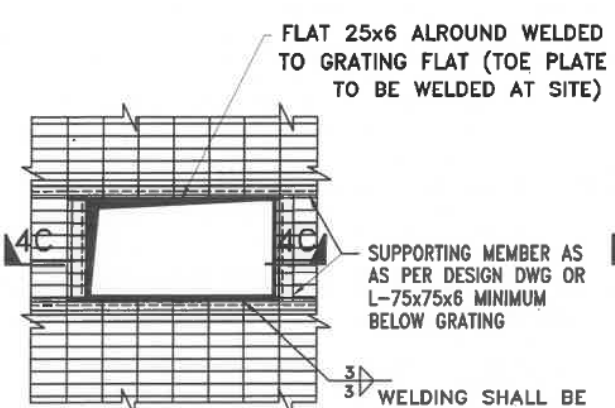
RECTANGULAR



CIRCULAR

(SIZE OF OPENING >200 & UP TO 400 mm)

(FOR OPENING UP TO 200 MM REFER NOTE–12)



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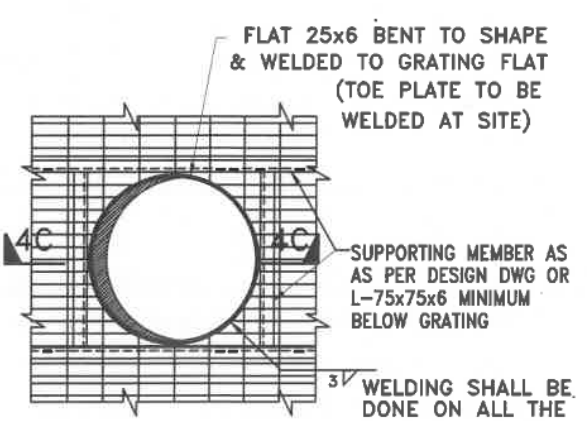

CIRCULAR

SIZE OF OPENING GREATER THAN 400 mm

TYPICAL DETAIL OF GRATING STRENGTHENING AT OPENINGS

(REFER NOTE–9)

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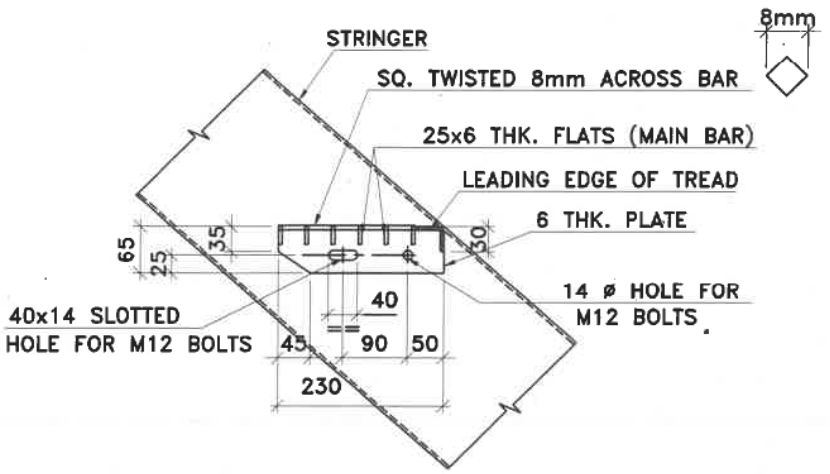
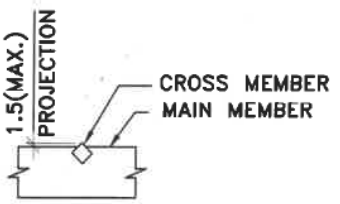
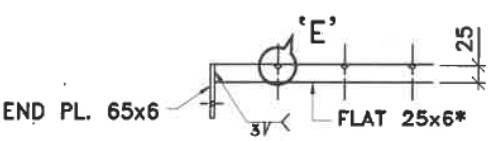
DET. OF 25 THK. GRATING STAIRCASE TREAD FOR 750 & 1000 WIDE STAIR



VIEW 6–6

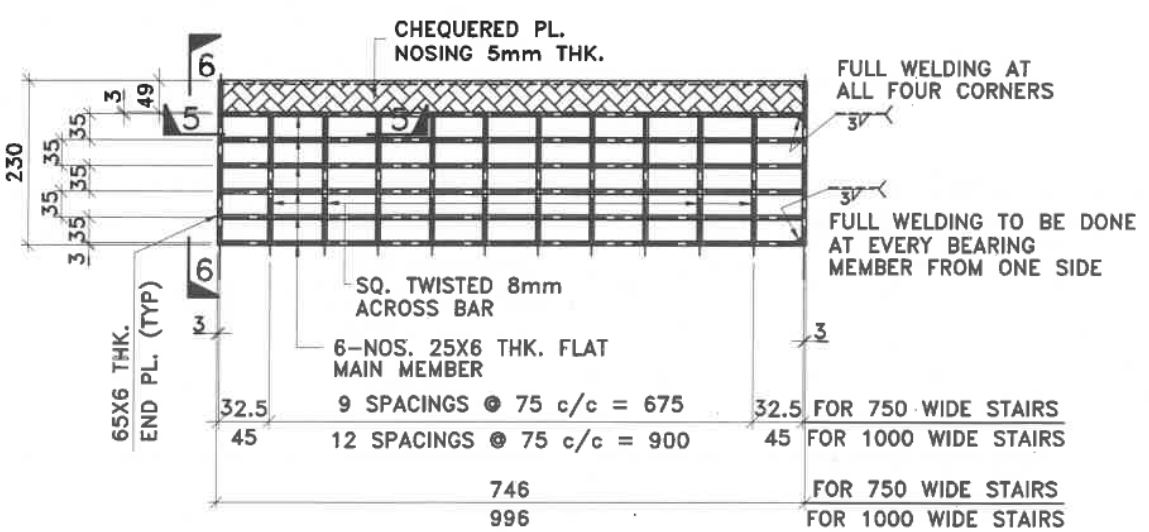


DETAIL– 'E'



SECTION 5–5

*ALL THE FLATS TO BE WELDED TO THE END FLATS



PLAN

(REFER NOTE–13 & 16)

TYP. DETAIL OF GRATING TO BE USED AS TREAD FOR 750/1000 WIDE STAIRS

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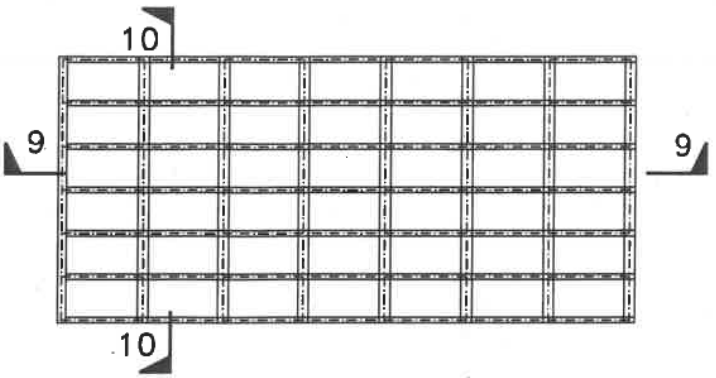

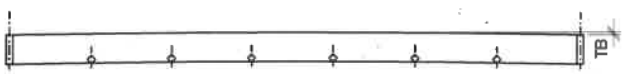

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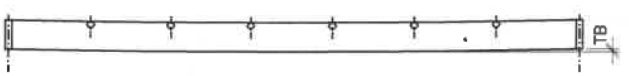
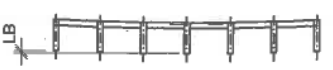


SECTION 9–9
(TB=TRANSVERSE BOW)

OR



SECTION 10–10
(LB=LONGITUDINAL BOW)

TABLE–4 (PERMISSIBLE AND MANUFACTURER TOLERANCES)

PERMISSIBLE TOLERANCES LOCATION	TOLERANCE (MM)
LENGTH OF GRATING PANEL OR INDIVIDUAL BEARING BAR	+0 / –5
WIDTH OF GRATING	+0 / –5
DEPTH OF BEARING BAR: FOR 25MM	+1 / –0.5
THICKNESS OF BEARING BAR:	±0.4
BINDING: TOP OF CROSS BAR ABOVE MAIN BAR	+0.5 / –0.5
MANUFACTURING TOLERANCES LOCATION	TOLERANCE (MM)
DIFFERENCE BETWEEN THE LENGTH OF DIAGONALS	±5 (OUT OF SQUARENESS OF GRATING PANEL)
CROSS BARS IN EITHER DIRECTION FROM PERPENDICULAR ALIGNMENT WITH MAIN BARS	1:100
CROSS BAR SPACING	±5 PER 1500 LENGTH OF BEARING BARS
BEARING BAR LEAN	1:10
TRANSVERSE BOW (TB) OF PANEL BEFORE FASTENING TO SUPPORTS	1:100
LONGITUDINAL BOW (LB) OF PANEL BEFORE FASTENING TO SUPPORTS	1:200

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LOAD TABLE

SADDLE TYPE	MAX. EQPT. WT.	HORZ. FORCE (SL, WL, BP)	HT. (EL'Y' – EL'X')
TYPE–I	100 T	20 T	850–1500 mm (MAX.)
TYPE–II	50 T	10 T	850–1500 mm (MAX.)
TYPE–III	25 T	5 T	850–1500 mm (MAX.)

NOTES :

1. ALL DIMENSIONS ARE IN mm & LEVELS IN METRES.
2. THIS STANDARD SHALL FORM PART OF THE DRAWING WHICH BEARS REFERENCE TO IT.
3. FOR VARIABLES A TO E , θ, L, X & Y THE TABLE (REFER PAGE 8 OF 8) RELEASED FOR INDIVIDUAL STRUCTURES SHALL BE REFERRED.
4. LOCATION OF FLOOR BEAMS & SUPPORTS SHALL BE INDICATED IN THE FLOOR PLANS SHOWN IN GEN. ARRANGEMENT DRAWINGS.
5. GENERAL NOTES FOR THE JOB SHALL BE REFERRED FOR OTHER NOTES.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	13.03.2025	REAFFIRMED AND ISSUED AS STANDARD	JG	AJS	ANURAG SINHA	M. NANDI
1	11.07.2019	REVISED AND ISSUED AS STANDARD	GULSHAN	AK/PAPIA	RAJANJI SRIVASTAVA	R.K. TRIVEDI

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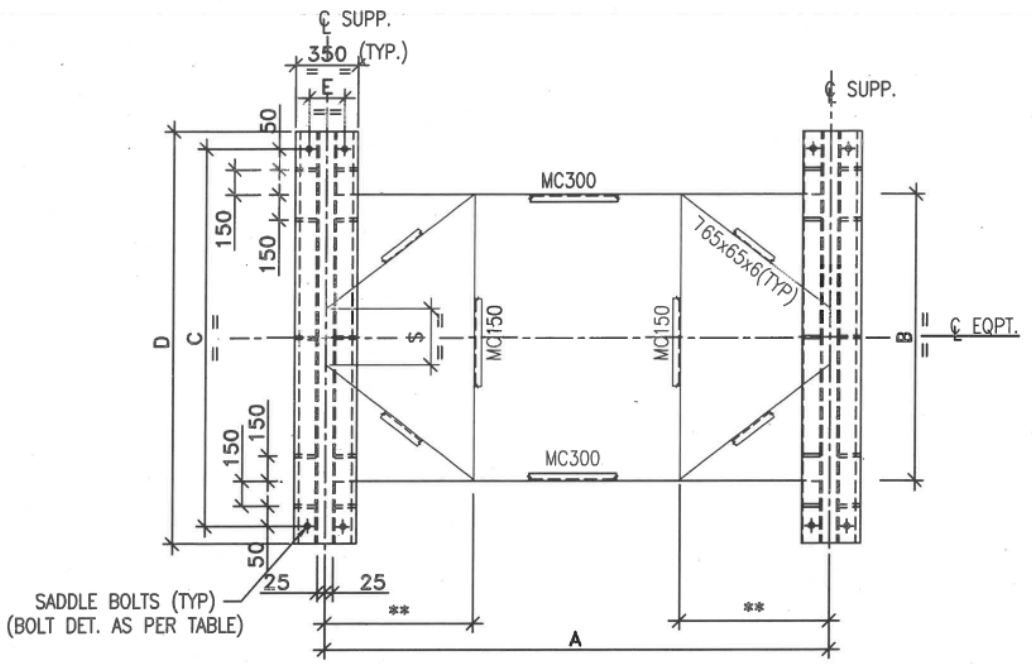
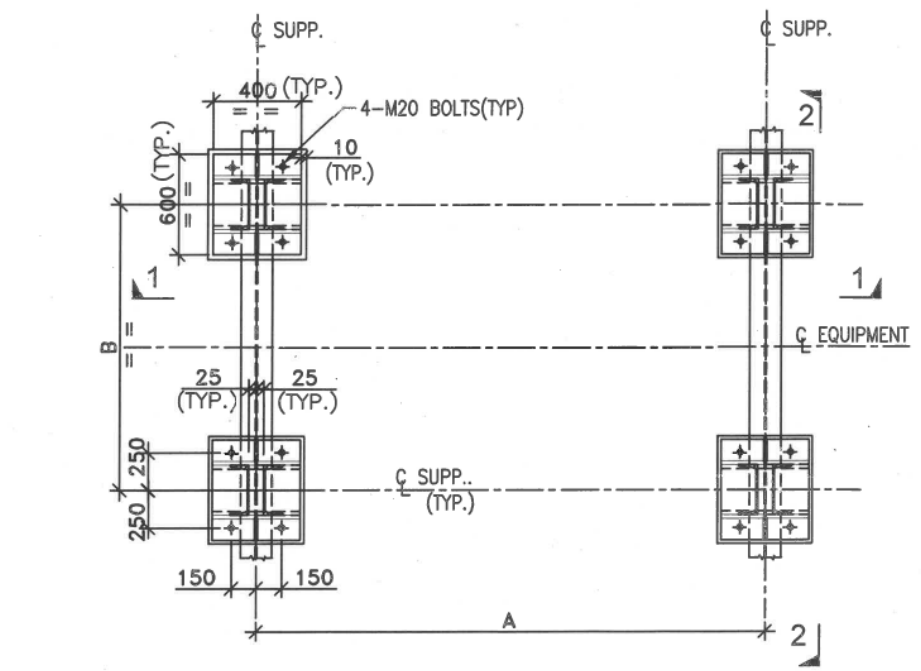


TOP PLAN AT EQUIPMENT SUPPORTING LEVEL
TYPE- I

($=B/3, ANY OTHER VALUE IF REQUIRED TO AVOID CLASH SHALL BE MENTIONED IN REMARKS)
(** FOR LOCATION REFER VIEW 1–1)



PLAN OF EQUIPMENT SADDLE SUPPORTS AT BASE PLATE LEVEL

TYPE- I

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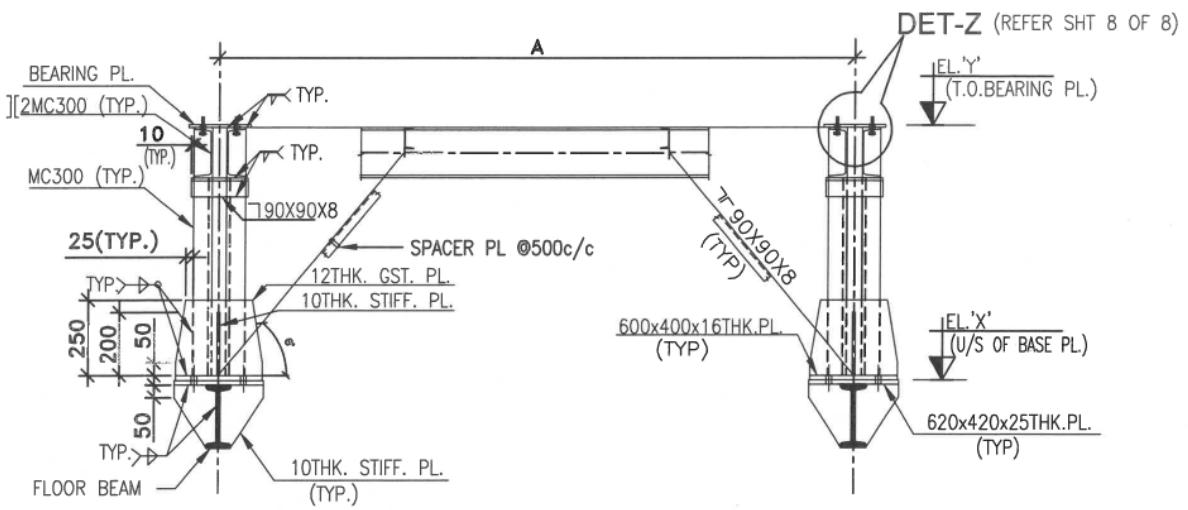
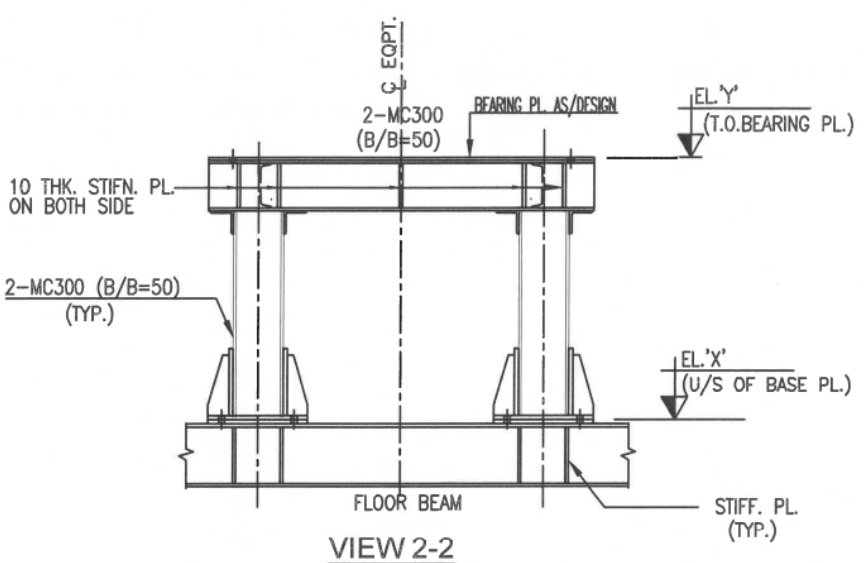


VIEW 1-1

(θ= PREFERABLY 45°, SHALL BE FINALIZED AFTER CLEARING CLASHES)



VIEW 2-2

TYPE-I

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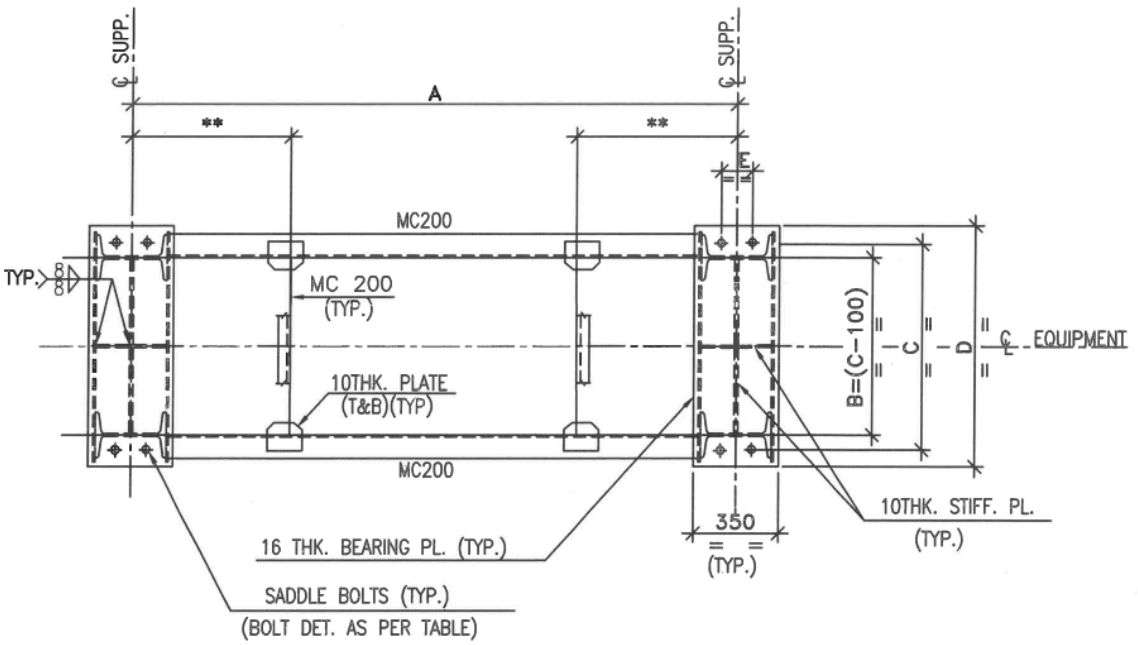
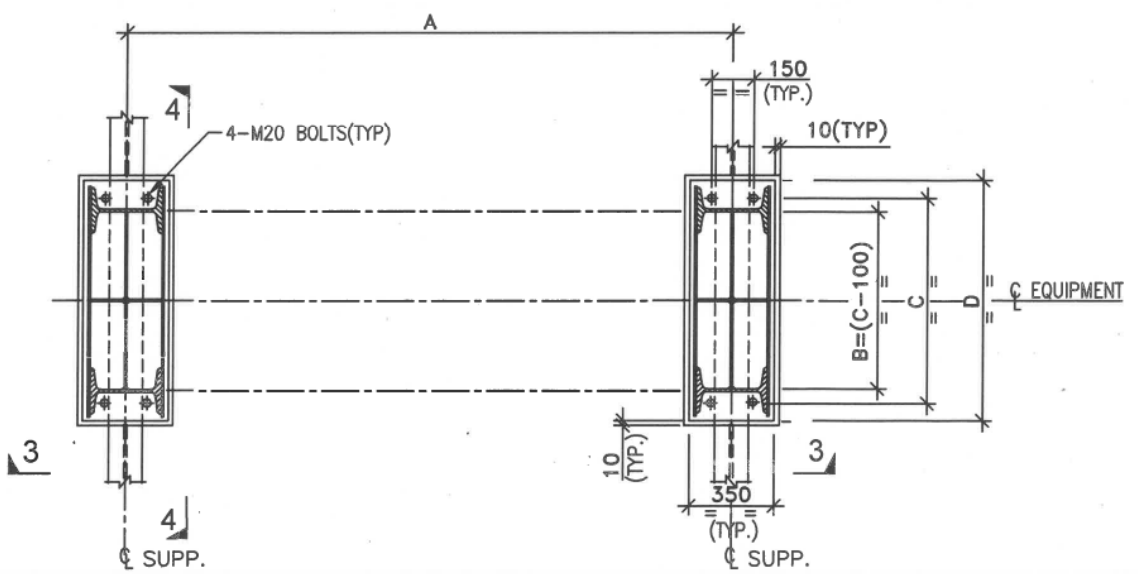


TOP PLAN AT EQUIPMENT SUPPORTING LEVEL

NOTE: BEAM MC200 TO BE VERIFIED BY USER FOR A>6.0m

(**FOR LOCATION REFER VIEW 3-3)



PLAN OF EQPUITMENT SADDLE SUPPORTS AT BASE PLATE LEVEL

TYPE- II

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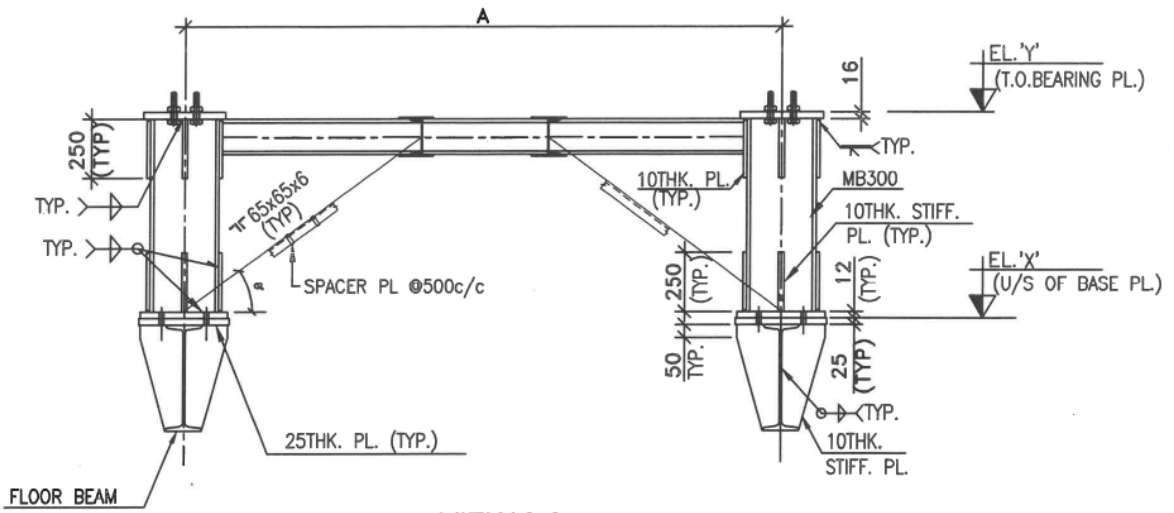
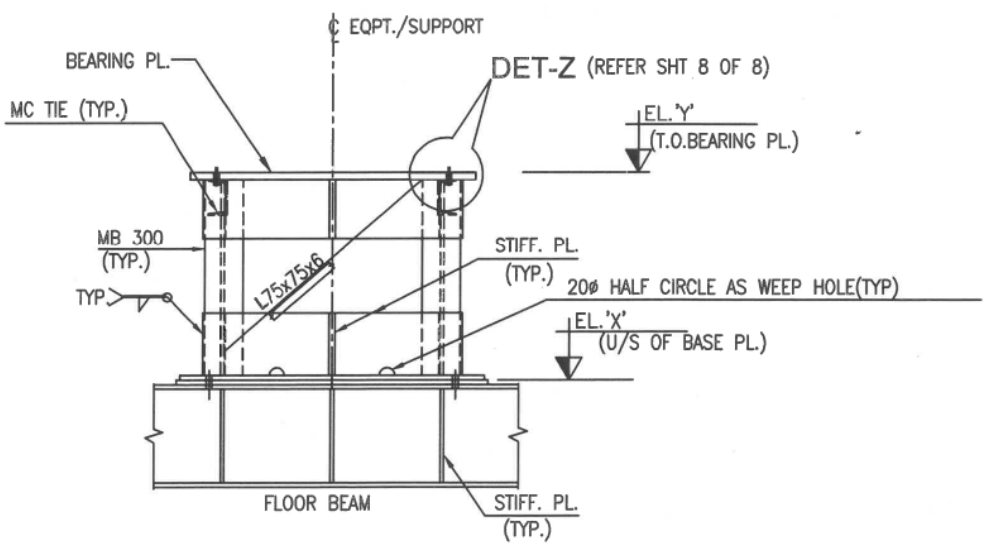


VIEW 3-3

(θ°= PREFERABLY 45°, SHALL BE FINALIZED AFTER CLEARING CLASHES)



VIEW 4-4

TYPE- II

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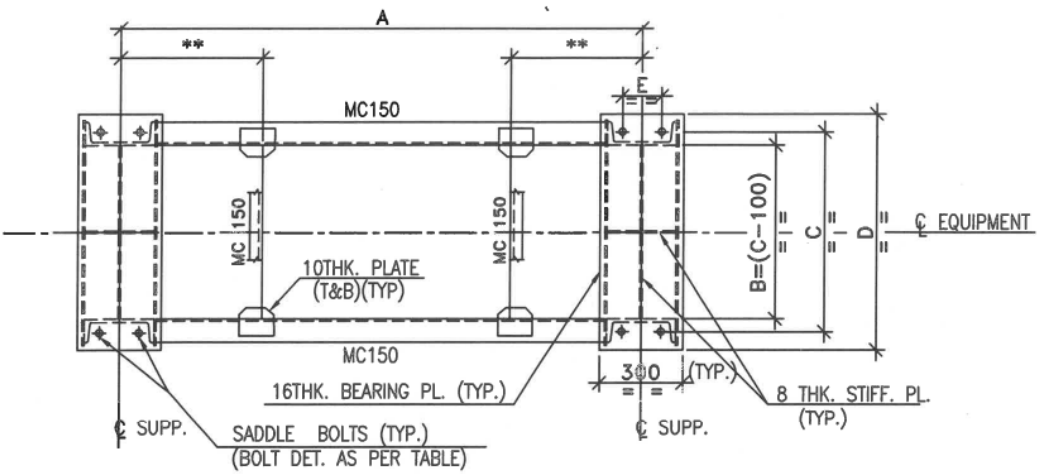
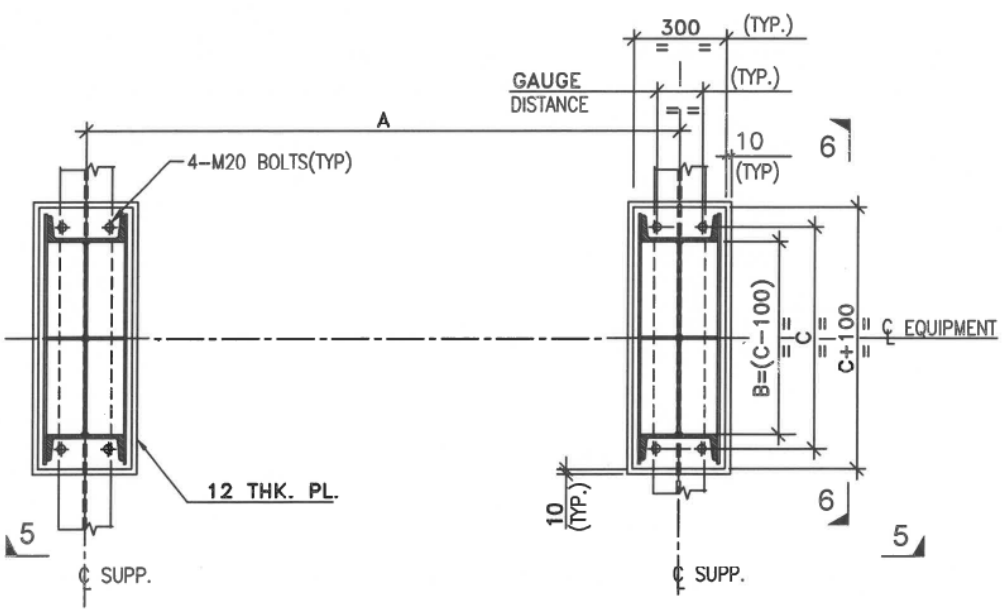


NOTE: BEAM MC150 TO BE VERIFIED BY USER FOR DIMENSION A>6.0m

TOP PLAN AT EQUIPMENT SUPPORTING LEVEL

(**FOR LOCATION REFER VIEW 5-5)



PLAN OF EQPUITMENT SADDLE SUPPORTS AT BASE PLATE LEVEL

TYPE- III

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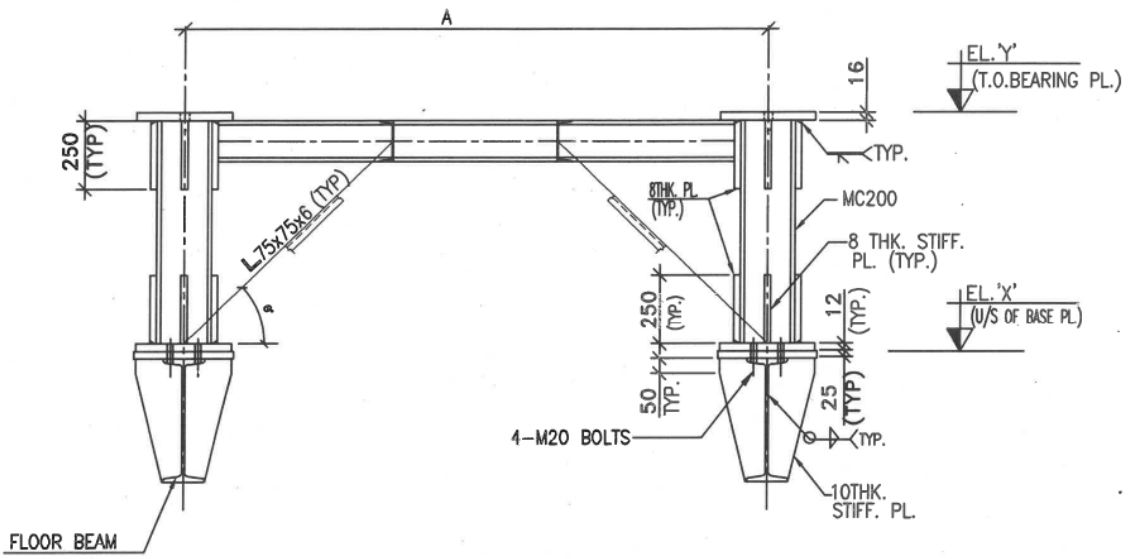
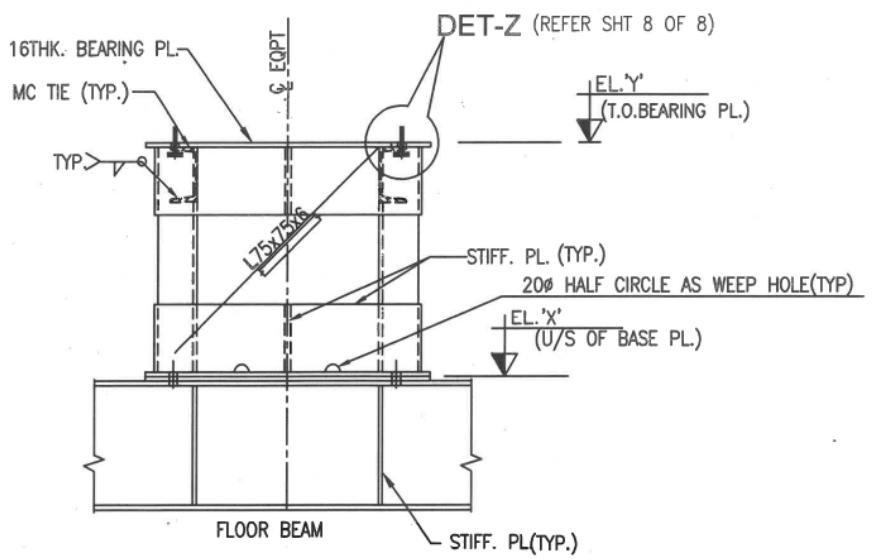


VIEW 5-5

(θ= PREFERABLY 45°, SHALL BE FINALIZED AFTER CLEARING CLASHES)



VIEW 6-6

TYPE- III

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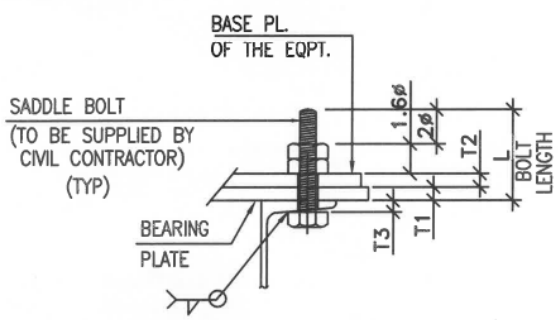
TABLE FOR SADDLE SUPPORT DETAILS FOR EQUIPMENTS:-

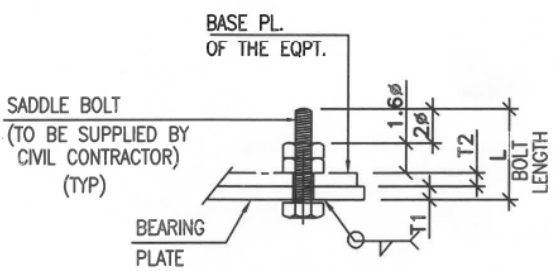
S.NO.	EQUIPMENT NO.	DIMENSIONS						BOLTS DETS				ELEVATION		REMARKS
		A	B	C	D	E	θ°	DIA	HOLE DIA	NOS	L	EL-X	EL-Y	

THIS TABLE WILL BE ISSUED AS A DWG FOR PROJECT



DETAIL- 'Z'(FOR TYPE-I)

ø=DIA OF BOLT
T1=THICKNESS OF BEARING PLATE
T2=THICKNESS OF EQPT BASE PLATE
T3=FLANGE THICKNESS OF MC300



DETAIL- 'Z'(FOR TYPE-II & III)

ø=DIA OF BOLT
T1=THICKNESS OF BEARING PLATE
T2=THICKNESS OF EQPT BASE PLATE

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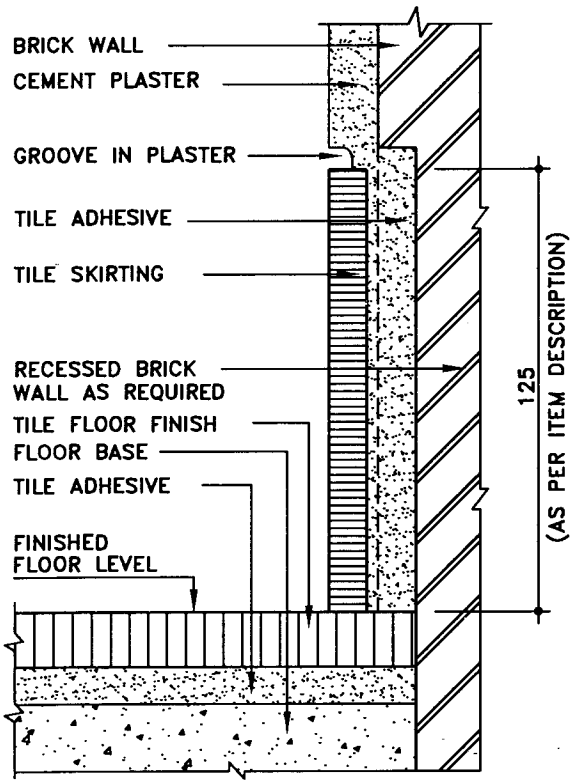
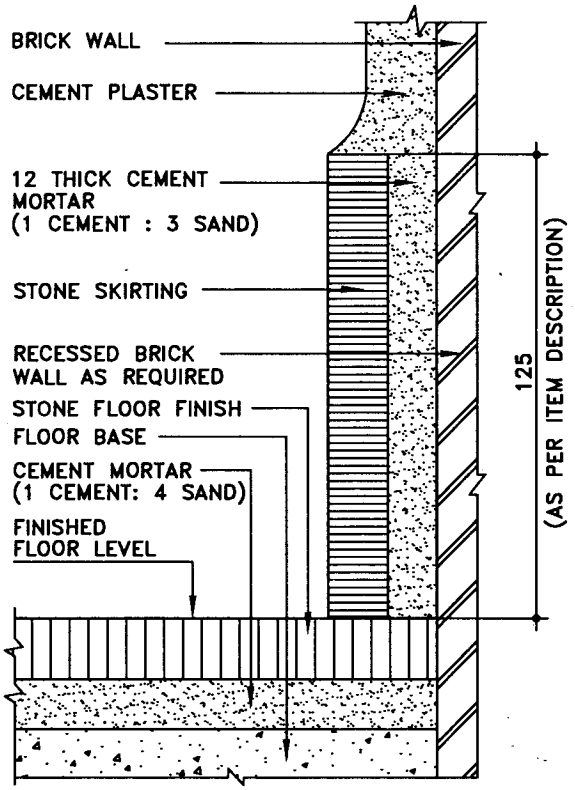
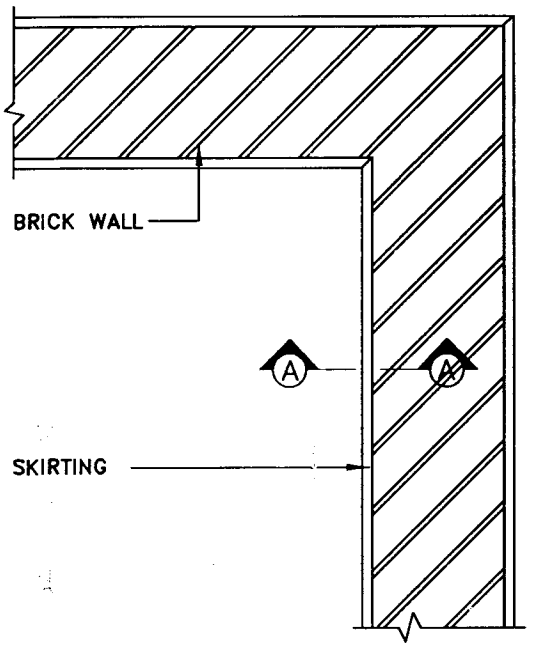
SKIRTING DETAIL (WITH BRICK WALL)



SECTION A–A
(TILE FLOORING–FLUSH SKIRTING)

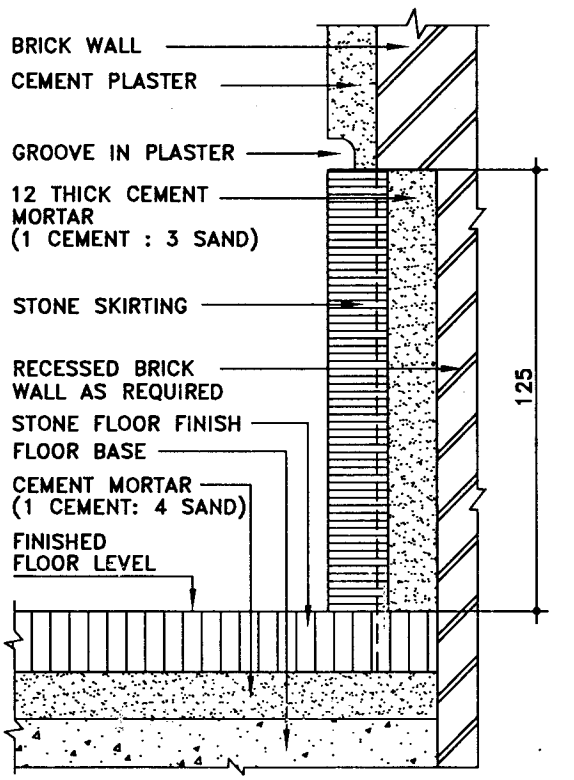


SECTION A–A
(STONE FLOORING–RAISED SKIRTING)



PLAN

NOTE: ALL DIMENSIONS ARE IN MM



SECTION A–A
(STONE FLOORING–FLUSH SKIRTING)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	11.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	ANISH MAHALA	SAMIR DAS	SANJAY MAZUMDAR
5	07.11.16	REAFFIRMED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

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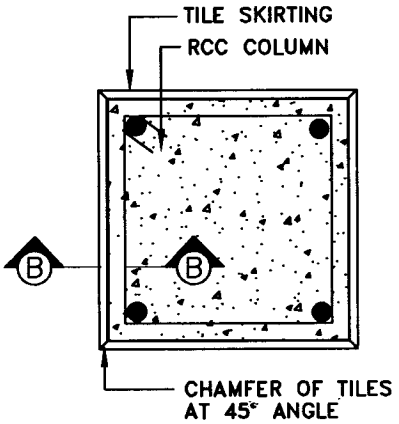
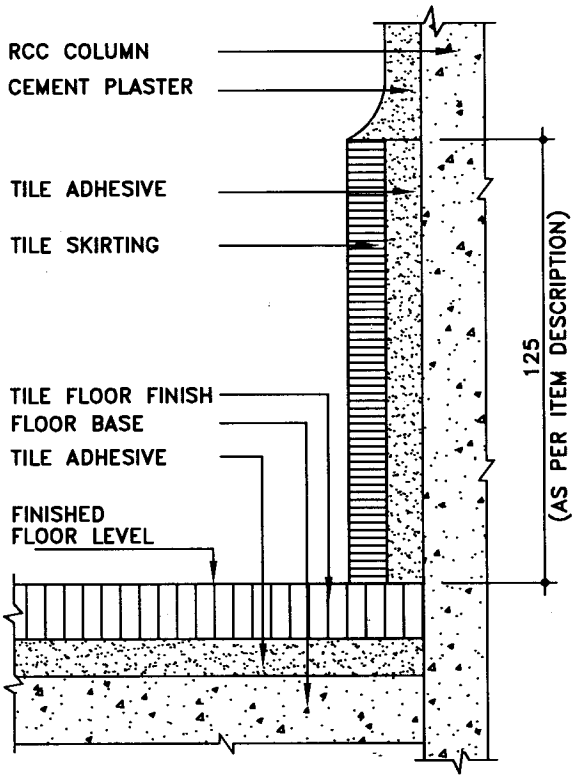
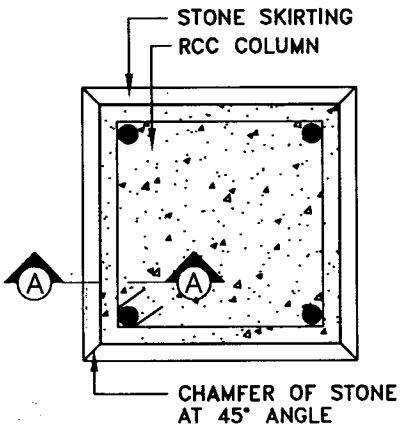


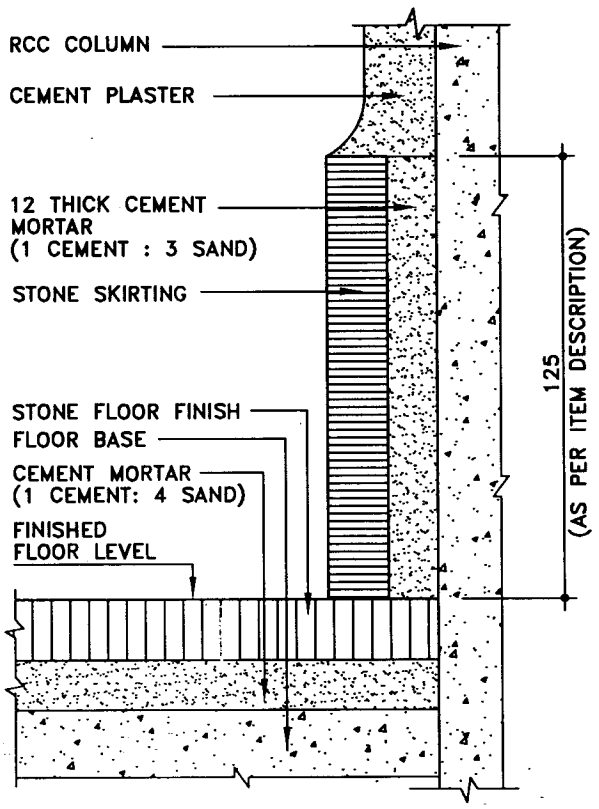
PLAN
(TILE SKIRTING)



SECTION B–B



PLAN
(STONE SKIRTING)



SECTION A–A

NOTE: ALL DIMENSIONS ARE IN MM

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	11.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	ANISH MAHALA	SAMIR DAS	SANJAY MAZUMDAR
5	07.11.16	REAFFIRMED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

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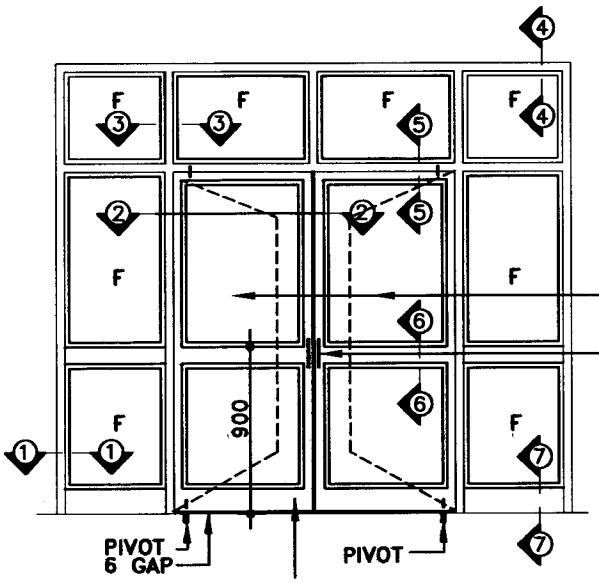
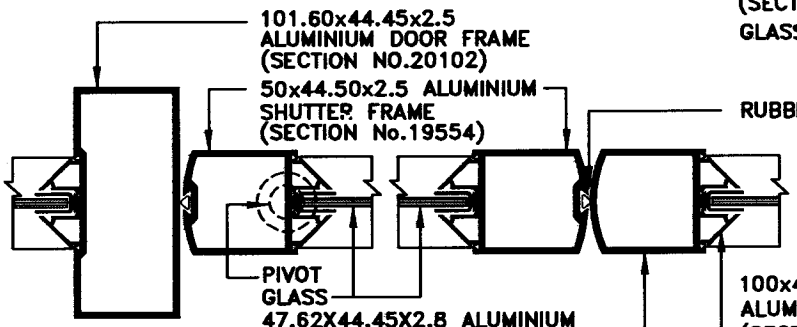
GLAZED ALUMINIUM DOOR

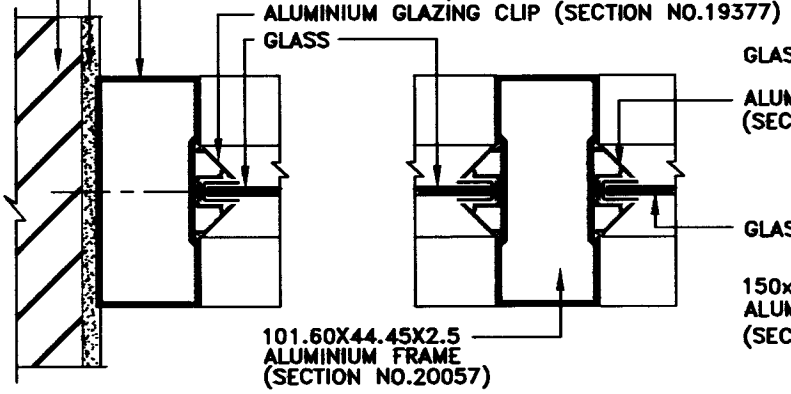


ELEVATION
(F-FIXED GLAZING)

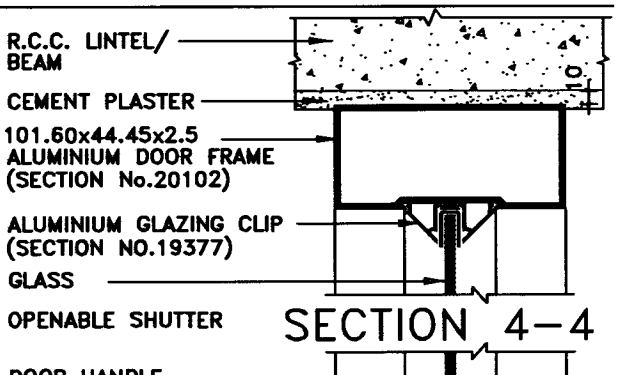
ALUMINIUM BOTTOM RAIL
(SECTION NO.19584)



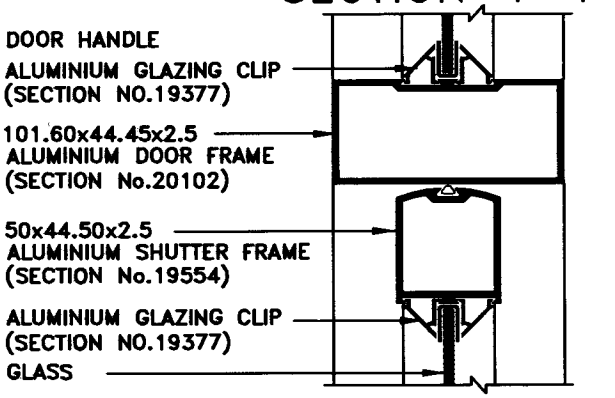
SECTION 2-2



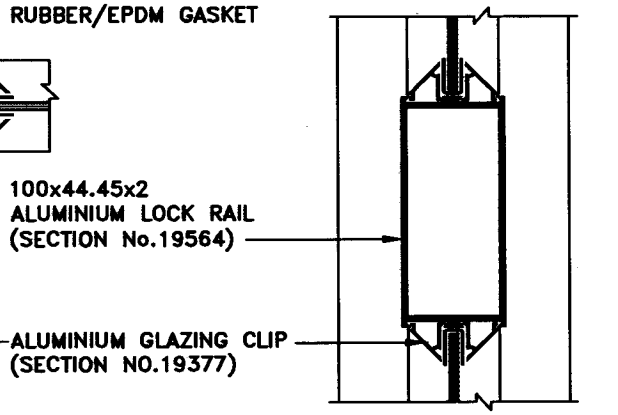
SECTION 1-1 SECTION 3-3



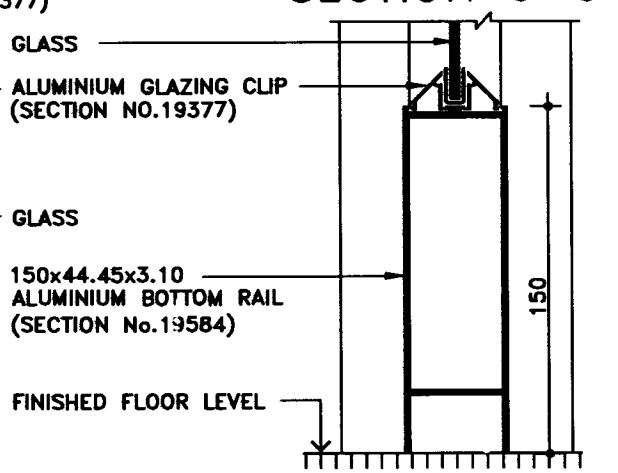
SECTION 4-4



SECTION 5-5



SECTION 6-6



SECTION 7-7

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. THE SECTION DESIGNATION NOS. PERTAIN TO EXTRUDED ALUMINIUM SECTIONS OF "JINDAL ALUMINIUM LTD." AND ARE INDICATED FOR REFERENCE. EQUIVALANT SECTIONS OF OTHER APPROVED MANUFACTURERS CAN ALSO BE USED.
3. FOR FINISHING OF ALUMINIUM SECTION (ANODISED/POWDER COATING) REFER BID/TENDER.
4. RUBBER/EPDM GASKET SHALL BE USED FOR FIXING OF GLASS.
5. HARDWARE SHALL BE AS PER BID/TENDER.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	ANISH MAHALA	SAMIR DAS	SANJAY MAZUMDAR
5	21.03.17	REAFFIRMED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

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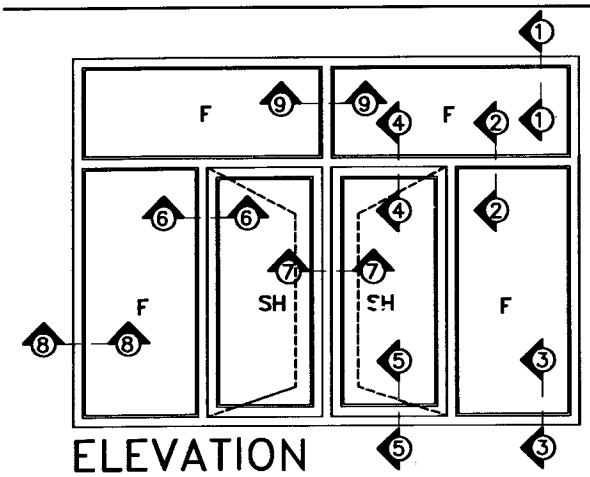
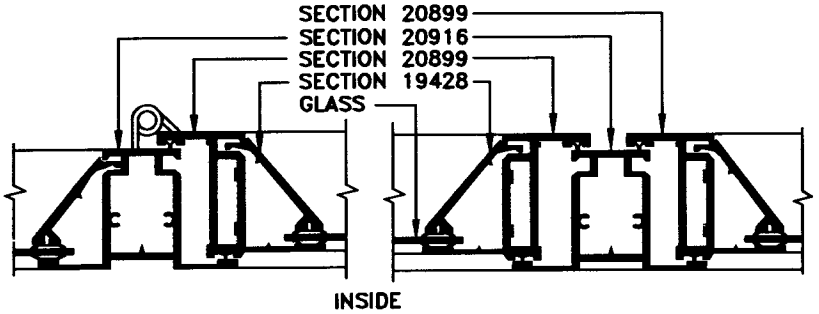
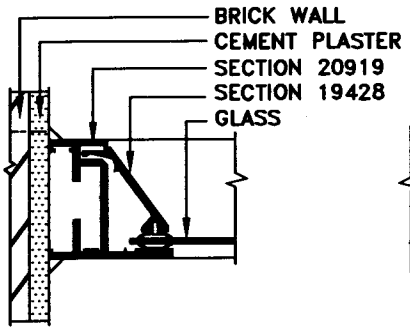


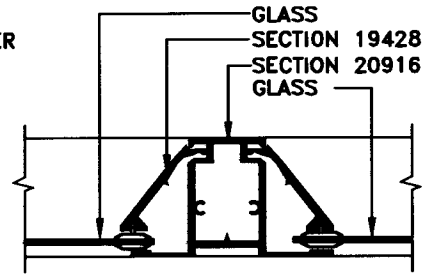
ELEVATION
(F–FIXED GLAZING)
(SH–SIDE HUNG SHUTTER)



SECTION 6–6

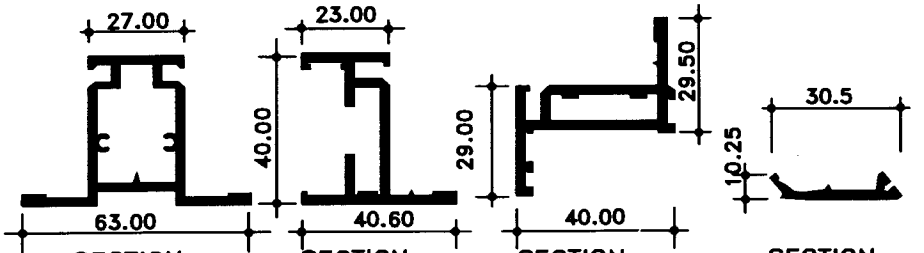
SECTION 7–7



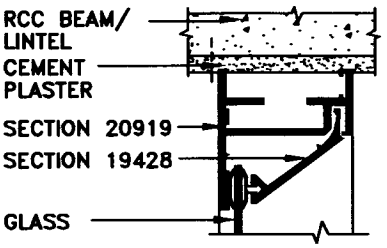


SECTION 8–8

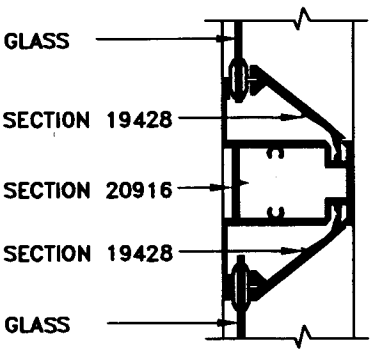
SECTION 9–9



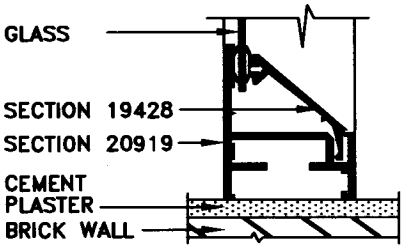
SECTION. NO.–20916 | SECTION. NO–20919 | SECTION. NO.–20899 | SECTION. NO.–19428



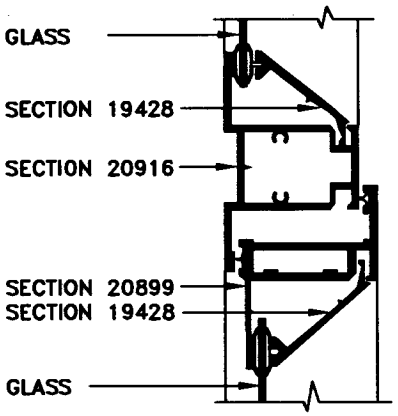
SECTION 1–1



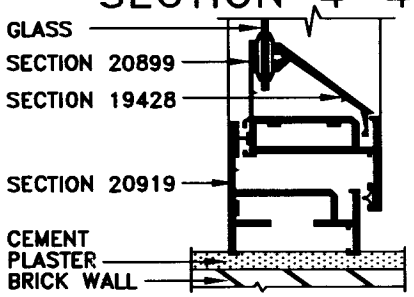
SECTION 2–2



SECTION 3–3



SECTION 4–4



SECTION 5–5

NOTE:
1. ALL DIMENSIONS ARE IN MM.
2. THE SECTION DESIGNATION NOS. PERTAIN TO EXTRUDED ALUMINIUM SECTIONS OF "JINDAL ALUMINIUM LTD." AND ARE INDICATED FOR REFERENCE. EQUIVALANT SECTIONS OF OTHER APPROVED MANUFACTURERS CAN ALSO BE USED.
3. FOR FINISHING OF ALUMINIUM SECTION (ANODISED/POWDER COATING REFER BID/TENDER.
4. RUBBER/EPDM GASKET SHALL BE USED FOR FIXING OF GLASS.
5. HARDWARE AND GLASS SHALL BE AS PER BID/TENDER.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	ANISH MAHALA	SAMIR DAS	SANJAY MAZUMDAR
5	21.03.17	REAFFIRMED & ISSUED AS STANDARD	DK	JS/JRB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

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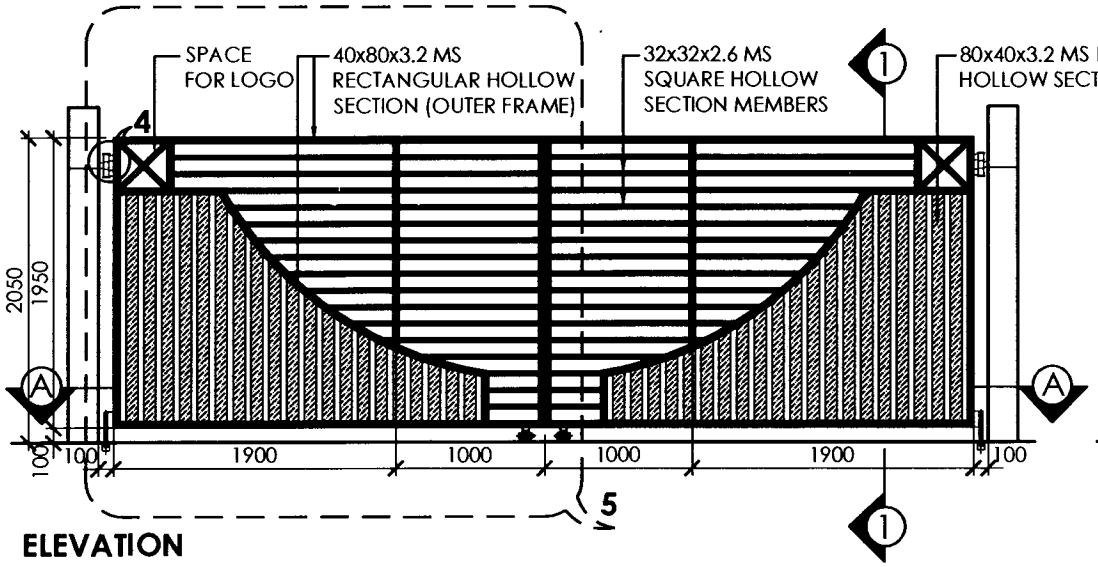
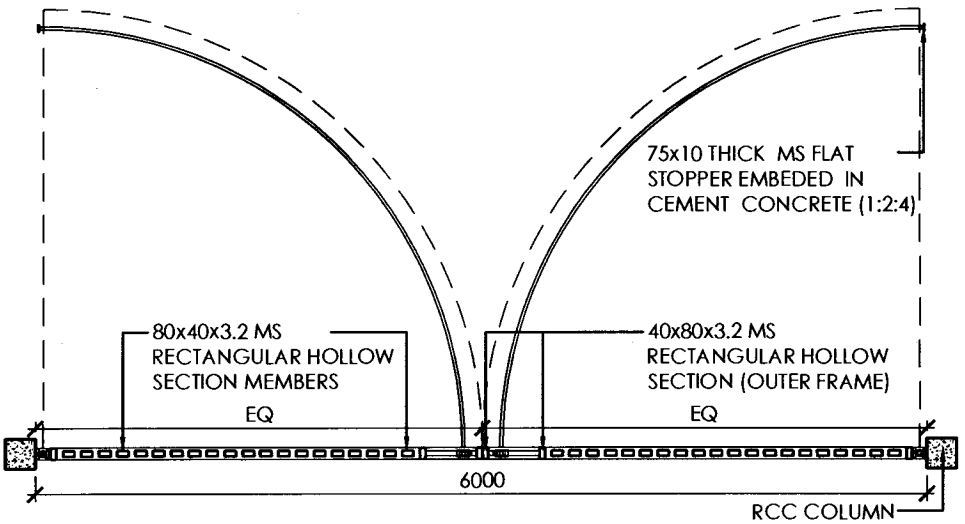
STEEL GATE
(FOR ENTRANCES UPTO 6.0M WIDTH)

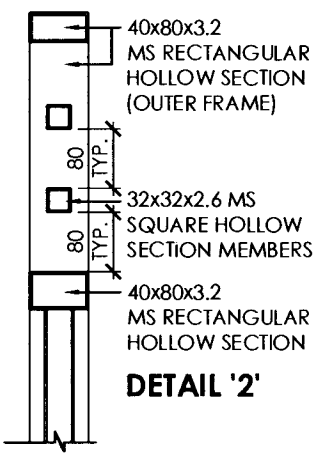


ELEVATION

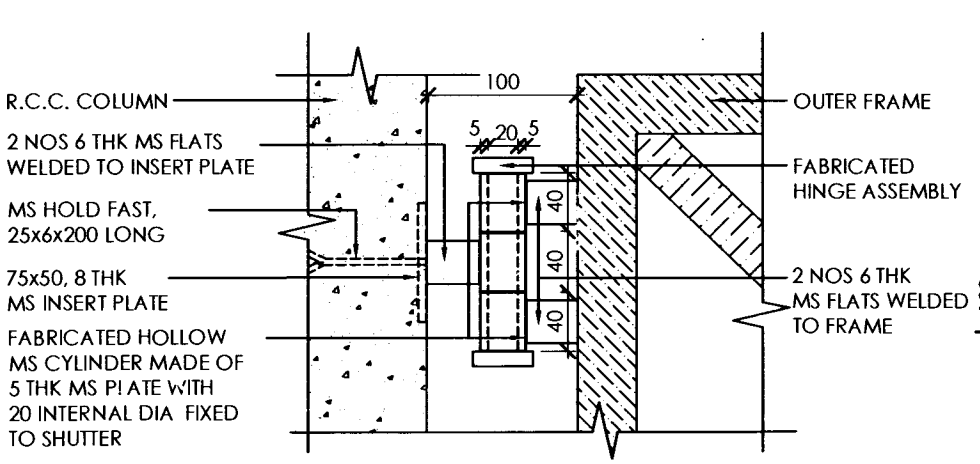
SECTION '1-1'



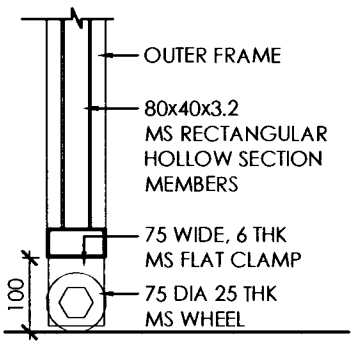
PLAN AT 'A'



DETAIL '2'



DETAIL AT '4'



DETAIL '3'

NOTE:
1. ALL DIMENSIONS ARE IN MM.
2. ALL STEEL MEMBERS SHALL CONFORM TO RELEVANT B.I.S. CODES AS APPLICABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SUMEDHA	SAMIR DAS	SANJAY MAZUMDAR
5	20.02.17	UPDATED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

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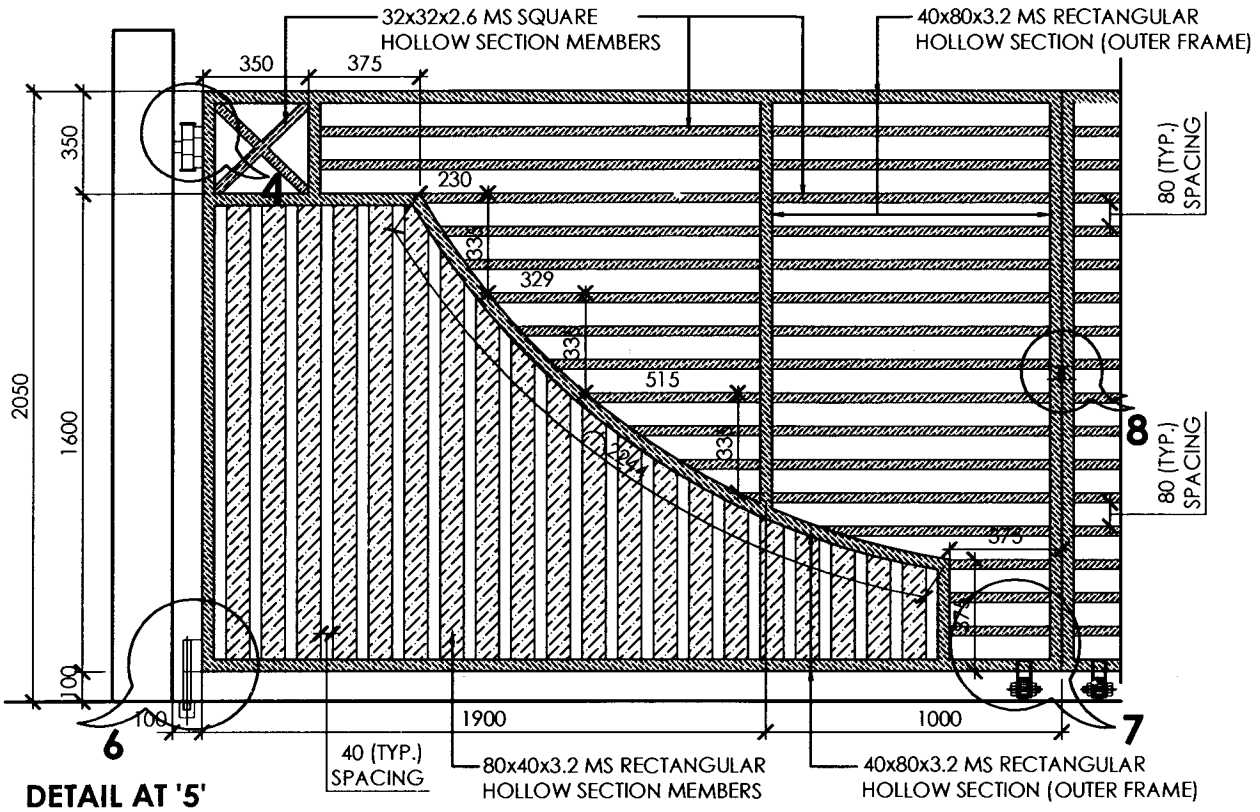
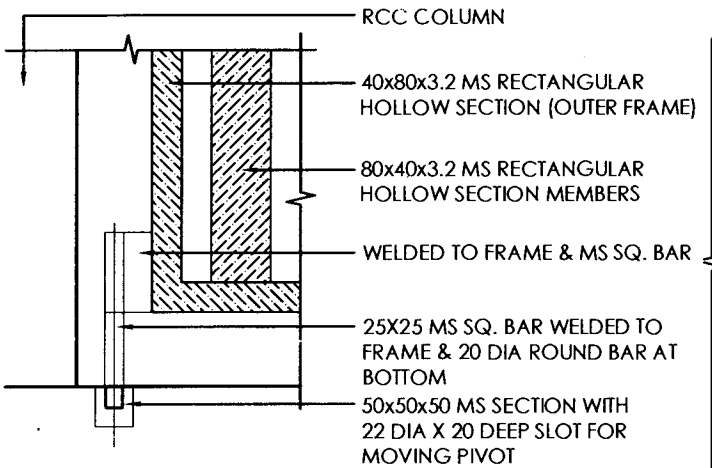
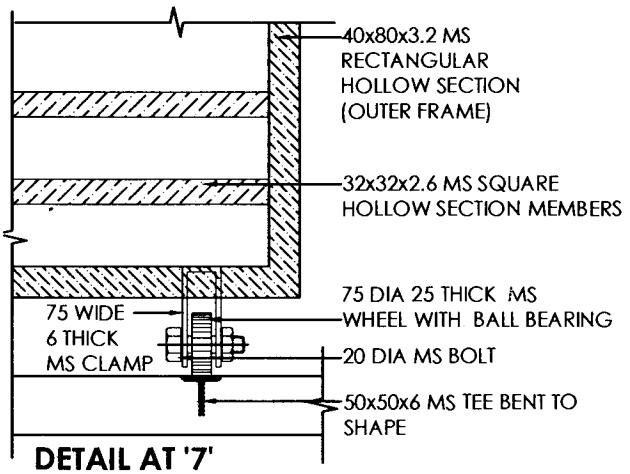


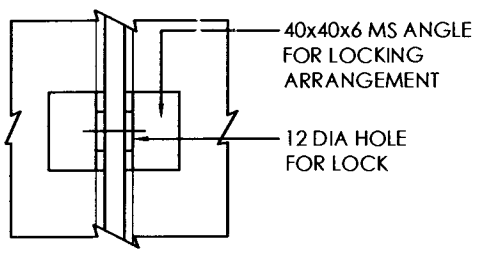
DETAIL AT '5'



DETAIL AT '6'



DETAIL AT '7'



DETAIL AT '8'

NOTE:
1. ALL DIMENSIONS ARE IN MM.
2. ALL STEEL MEMBERS SHALL CONFORM TO RELEVANT B.I.S. CODES AS APPLICABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SUMEDHA	SAMIR DAS	SANJAY MAZUMDAR
5	20.02.17	UPDATED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

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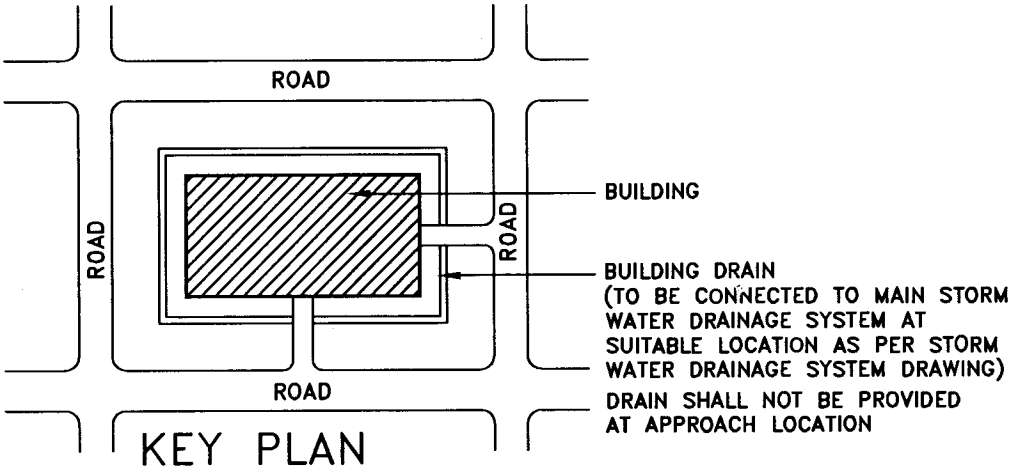
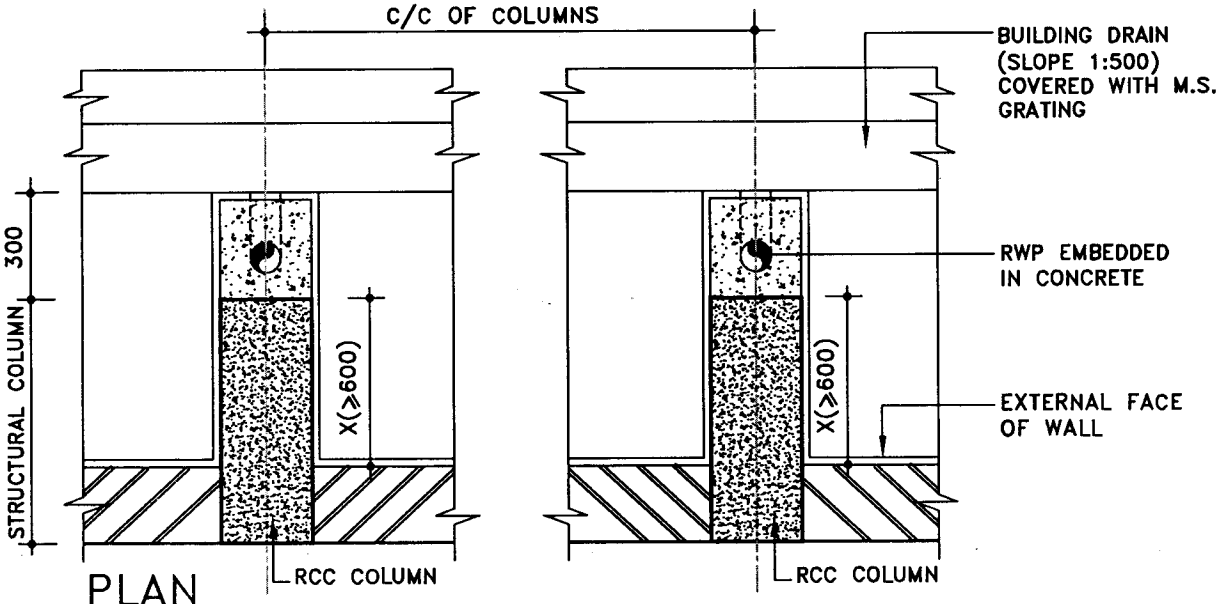
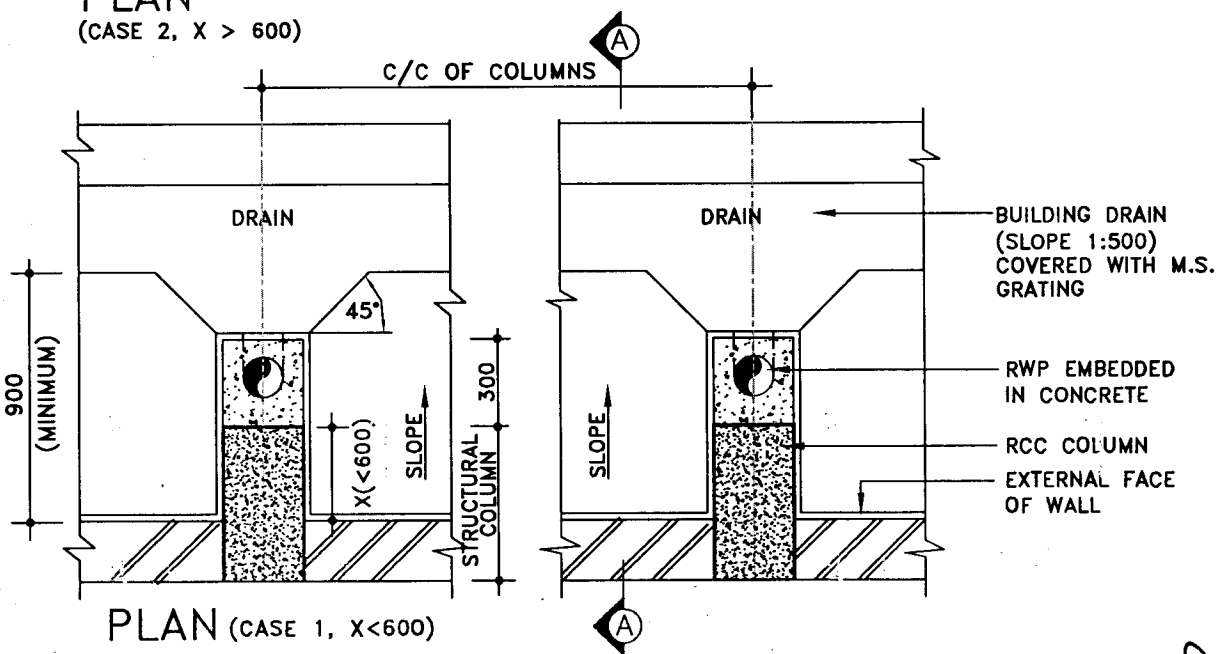
PLINTH PROTECTION
(WITH BUILDING DRAIN)



KEY PLAN



PLAN
(CASE 2, X > 600)



PLAN (CASE 1, X<600)

NOTE: REFER SHEET 2 OF 2 FOR NOTES & DETAILS

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	11.02.22	REVISED AND REISSUED AS STANDARD	NG	JS	SAMIR DAS	SANJAY MAZUMDAR
5	09.11.16	REVISED AND REISSUED AS STANDARD	BR	JS/JKB	RAJANJI SRIVASTAVA	R.NANDA
4	25.10.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

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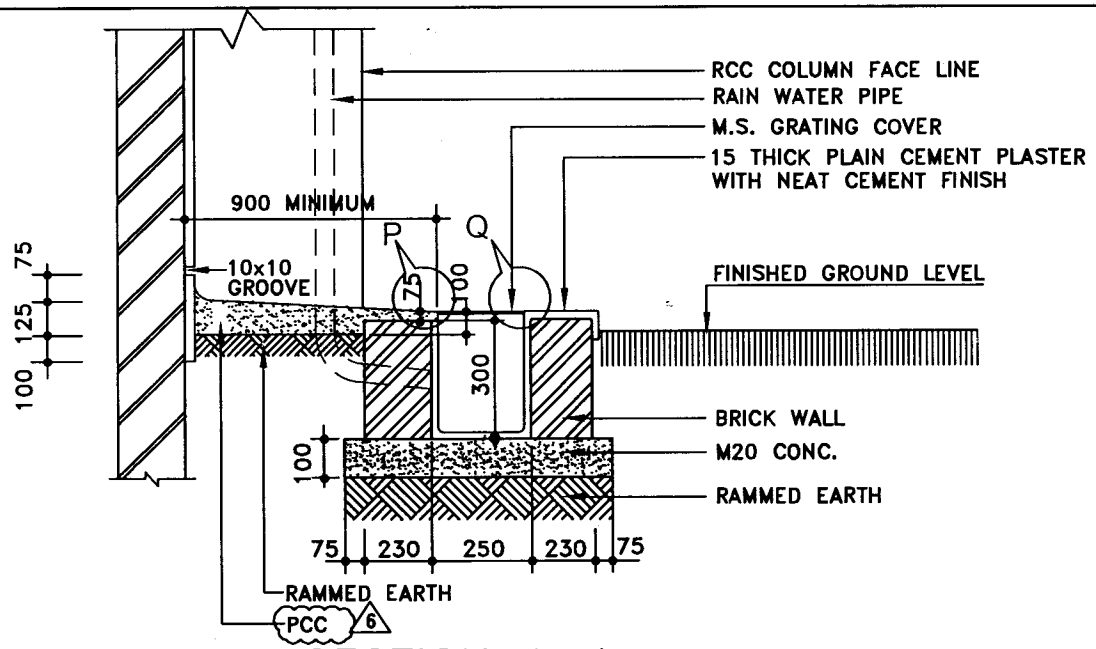
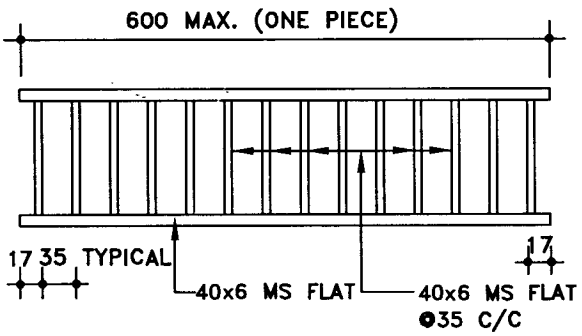
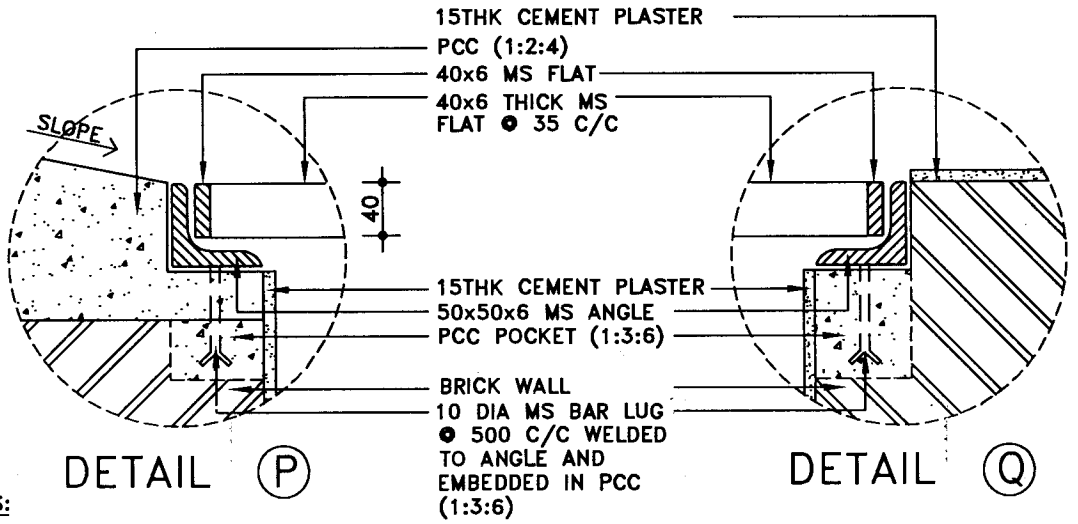


SECTION A–A



M.S. GRATING DETAIL



DETAIL (P) DETAIL (Q)

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. WIDTH OF THE PLINTH PROTECTION SHALL BE MINIMUM 900mm AND X+300 MAXIMUM UNLESS OTHERWISE MENTIONED IN BUILDING DRAWING.
3. PLINTH PROTECTION ALONG ANY PARTICULAR SIDE OF THE BUILDING SHALL BE OF CONSTANT WIDTH FOLLOWING THE EXTERNAL WALL ALIGNEMENT IF NOT SPECIFICALLY MENTIONED/INDICATED IN BUILDING DRAWING.
4. M.S. DRAIN COVER GRATING SHALL BE PROVIDED OVER BUILDING DRAIN UNLESS OTHERWISE MENTIONED/ INDICATED IN BUILDING DRAWING.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	11.02.22	REVISED AND REISSUED AS STANDARD	NG	JS	SAMIR DAS	SANJAY MAZUMDAR
5	09.11.16	REVISED AND REISSUED AS STANDARD	BR	JS/JKB	RAJANJI SRIVASTAVA	R.NANDA
4	25.10.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

Approved by

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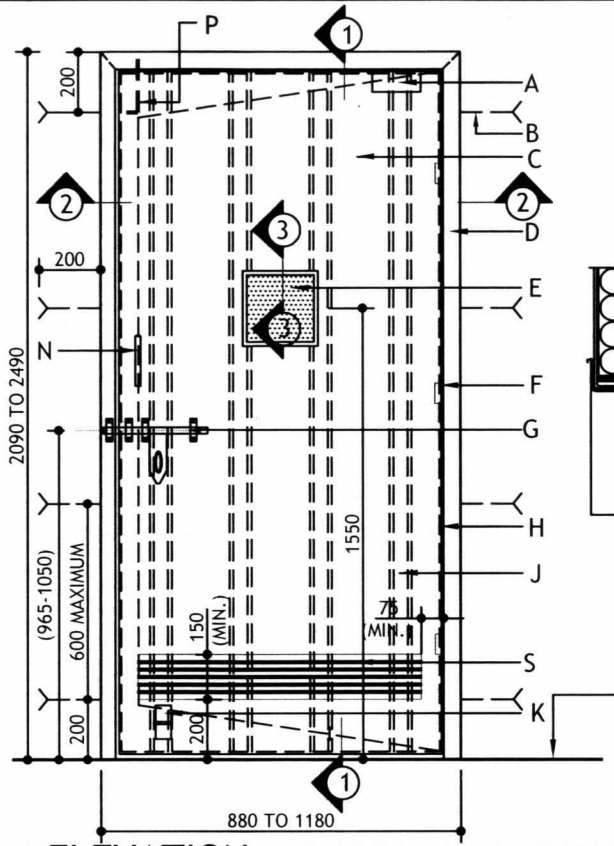
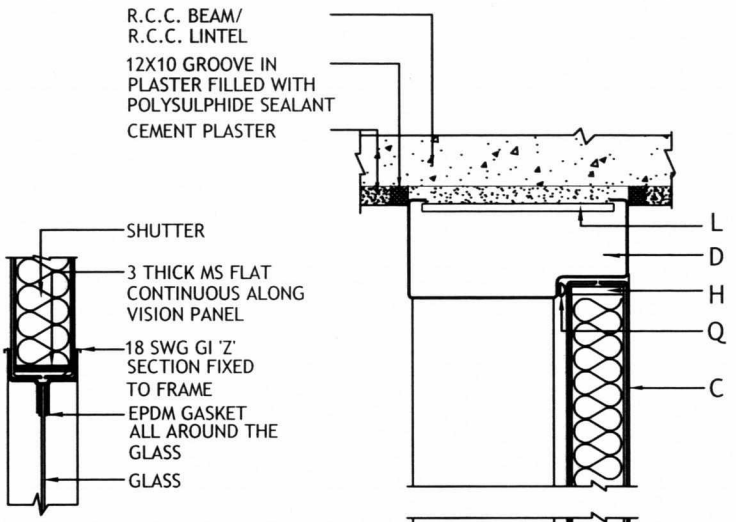
STEEL DOOR (PRESSED STEEL) SINGLE SHUTTER



ELEVATION

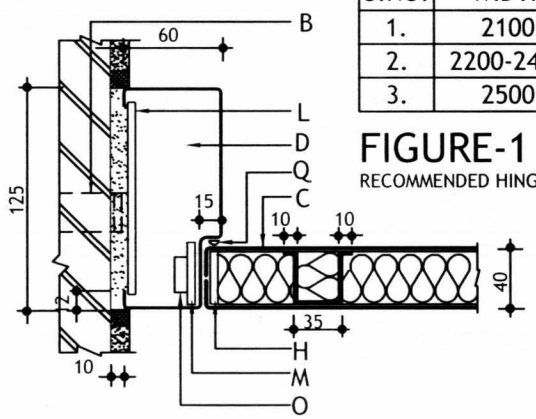


SECTION 1-1

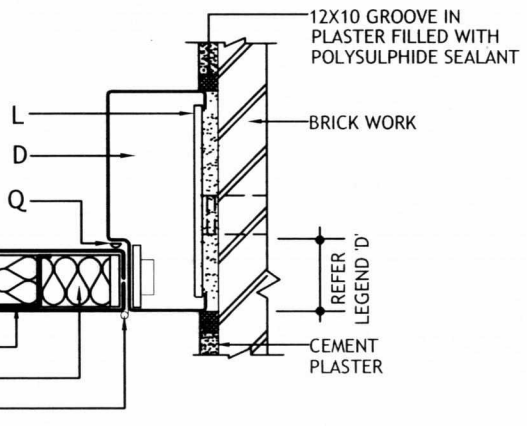
SECTION 3-3

S.NO.	WIDTH	HINGE
1.	2100	3
2.	2200-2400	4
3.	2500	5

FIGURE-1
RECOMMENDED HINGE LOCATION



SECTION 2-2



LEGEND :

A. OVER HEAD HYDRAULIC DOOR CLOSER (HEAVY DUTY).
B. MS HOLDFAST 200x25x6 THICK @ MAXIMUM 600 C/C WELDED TO FRAME SPACER (L).
C. 40 THICK (OVER ALL) 18 SWG GALVANIZED PRESSED STEEL SHUTTER FILLED WITH MINERAL WOOL (48Kg/cum).
D. 16 SWG GALVANIZED PRESSED STEEL FRAME OUT OF 125X60 PROFILE FILLED WITH CONCRETE (REBATE DIMENSION TO BE SUITABLY ADJUSTED FOR ACCOMMODATING GASKET FOR AIR TIGHT DOOR).
E. VISION PANEL (AS PER PROJECT DRAWING).
F. 100 LONG SS 304 GRADE HEAVY DUTY BALL BEARING HINGE AS PER FIGURE 1.
G. SS 304 GRADE 16 DIA 300 LONG ALDROP ON BOTH SIDES.
H. 3 THICK MS FLAT CONTINUOUS ALONG PERIMETER OF OF SHUTTER.
J. 18 SWG GI VERTICAL STIFFNER @ 200 C/C (SPACING TO BE ADJUSTED FOR VISION PANEL).
K. SPRING LOADED HEAVY DUTY DOOR STOPPER.
L. 3 THICK MS FLAT SPACER WELDED TO FRAME AT @ 500 C/C.
M. 40x150x3 THICK MS PAD WELDED TO FRAME AT ALL HINGE & LOCK LOCATIONS.
N. SS 304 GRADE 19 DIA, 200 LONG HANDLE ON BOTH SIDES.
O. 18 SWG GI MORTAR GUARD AT THE BACK OF HINGES & LOCK.
P. 10 DIA SS 304 TOWER BOLT (250 LONG FOR 2100 HT. & 600 LONG FOR 2500 HT.).
Q. 'D' PROFILE EPDM GASKET ALONG FRAME REBATE (FOR AIR TIGHT DOOR ONLY).
R. INSULATION AS PER ITEM DESCRIPTION.
S. LOUVER (SIZE AS PER PROJECT DRAWING) MADE 18 SWG GI (NOT REQUIRED FOR AC AND PRESSURISED AREA

NOTE: 1. ALL DIMENSIONS ARE IN MM

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	17.01.23	REVISED & ISSUED AS STANDARD	BABITA SHARMA	PIYALEE DAS	SAMIR DAS	SANJAY MAZUMDAR
5	24.04.17	REVISED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

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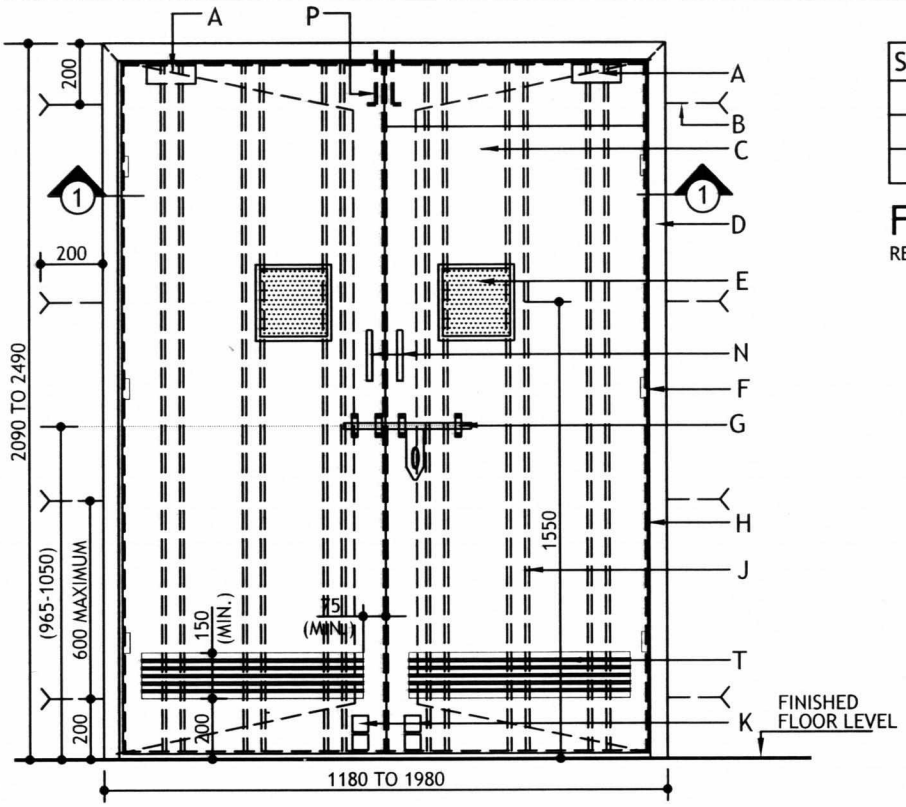
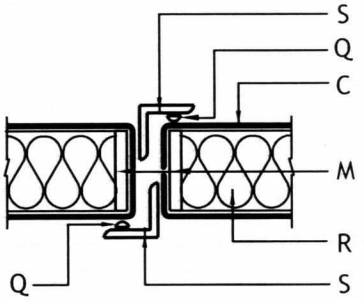


ELEVATION

S.NO.	WIDTH	HINGE
1.	2100	3
2.	2200-2400	4
3.	2500	5

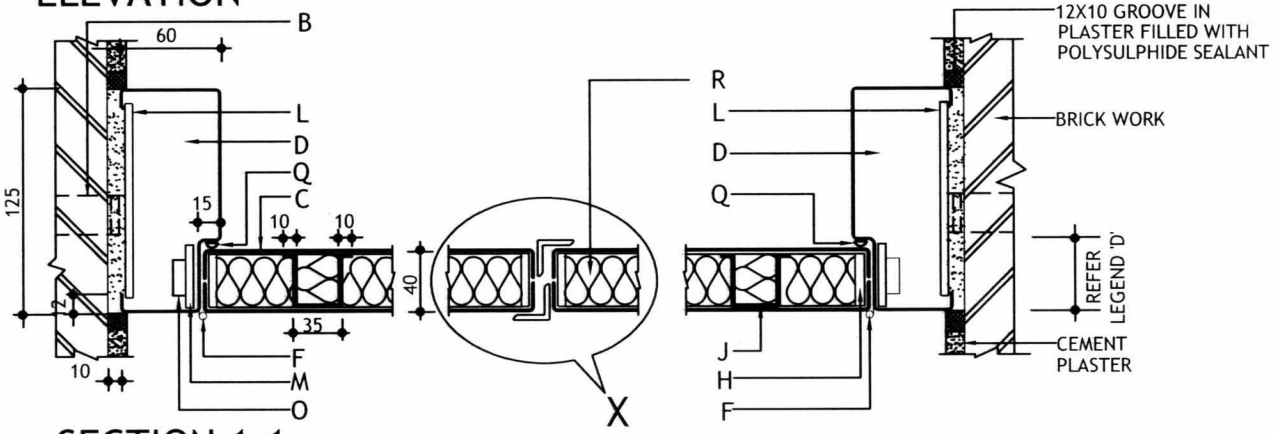
FIGURE-1

RECOMMENDED HINGE LOCATION



DETAIL X

NOTE: IN PLACE OF GI ANGLES (S) SUITABLE PROFILING/ DETAILING FOR CLOSURE OF SHUTTERS IS ALSO ACCEPTABLE.



SECTION 1-1

LEGEND :

A. OVER HEAD HYDRAULIC DOOR CLOSER (HEAVY DUTY).
B. MS HOLDFAST 200x25x6 THICK @ MAXIMUM 600 C/C WELDED TO FRAME SPACER (L).
C. 40 THICK (OVER ALL) 18 SWG GALVANIZED PRESSED STEEL SHUTTER FILLED WITH MINERAL WOOL (48Kg/cum).
D. 16 SWG GALVANIZED PRESSED STEEL FRAME OUT OF 125X60 PROFILE FILLED WITH CONCRETE (REBATE DIMENSION TO BE SUITABLY ADJUSTED FOR ACCOMMODATING GASKET FOR AIR TIGHT DOOR).
E. VISION PANEL (AS PER PROJECT DRAWING).
F. 100 LONG SS 304 GRADE HEAVY DUTY BALL BEARING HINGE AS PER FIGURE 1.
G. SS 304 GRADE 16 DIA 300 LONG ALDROP ON BOTH SIDES.
H. 3 THICK MS FLAT CONTINUOUS ALONG PERIMETER OF OF SHUTTER.
J. 18 SWG GI VERTICAL STIFFNER @ 200 C/C (SPACING TO BE ADJUSTED FOR VISION PANEL).
K. SPRING LOADED HEAVY DUTY DOOR STOPPER.
L. 3 THICK MS FLAT SPACER WELDED TO FRAME AT @ 500 C/C.
M. 40x150x3 THICK MS PAD WELDED TO FRAME AT ALL HINGE & LOCK LOCATIONS.
N. SS 304 GRADE 19 DIA, 200 LONG HANDLE ON BOTH SIDES.
O. 18 SWG GI MORTAR GUARD AT THE BACK OF HINGES & LOCK.
P. 10 DIA SS 304 TOWER BOLT (250 LONG FOR 2100 HT. & 600 LONG FOR 2500 HT.).
Q. 'D' PROFILE EPDM GASKET ALONG FRAME REBATE (FOR AIR TIGHT DOOR ONLY).
R. INSULATION AS PER ITEM DESCRIPTION.
S. 2 THICK 25X25 GI ANGLE (VERTICAL) EACH WELDED TO ONE SHUTTER.
T. LOUVER (SIZE AS PER PROJECT DRAWING) MADE 18 SWG GI (NOT REQUIRED FOR AC AND PRESSURISED AREA

NOTE: 1. ALL DIMENSIONS ARE IN MM.
2. FOR OTHER DETAILS REFER STANDARD NO. 7-75-0070.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	17.01.23	REVISED & ISSUED AS STANDARD	BABITA SHARMA	PIYALEE DAS	SAMIR DAS	SANJAY MAZUMDAR
5	24.04.17	REVISED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

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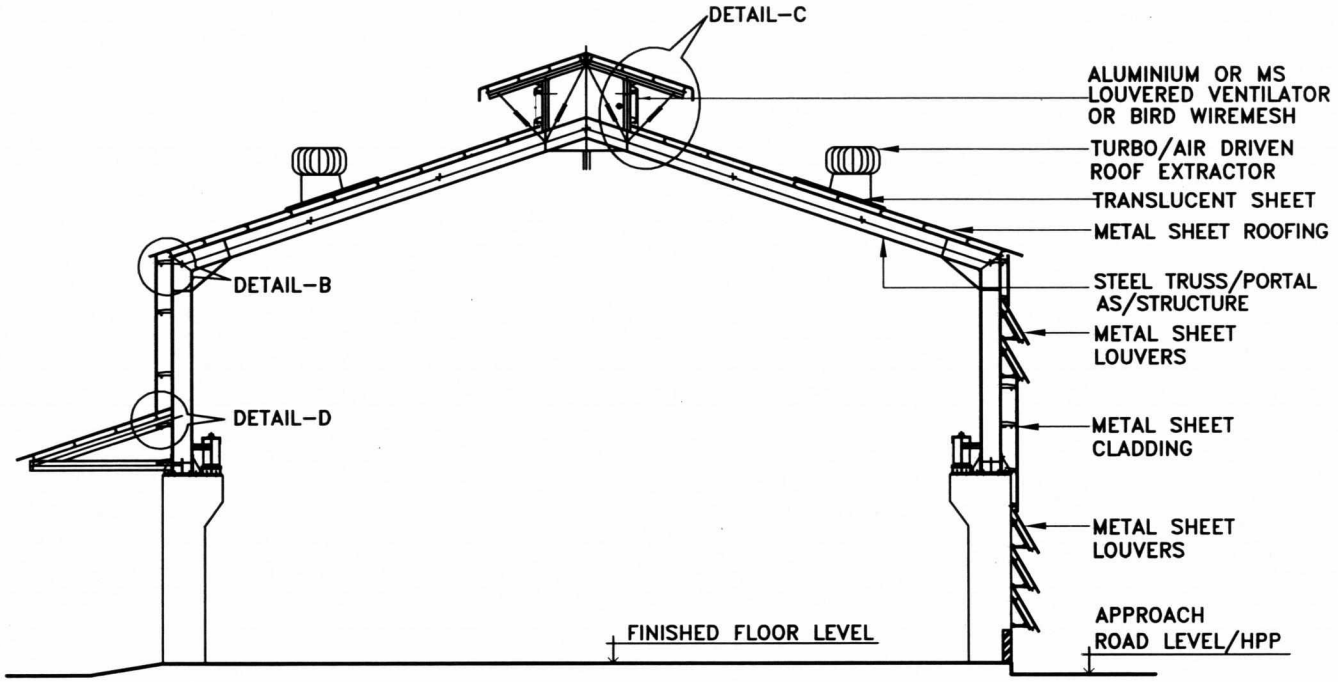
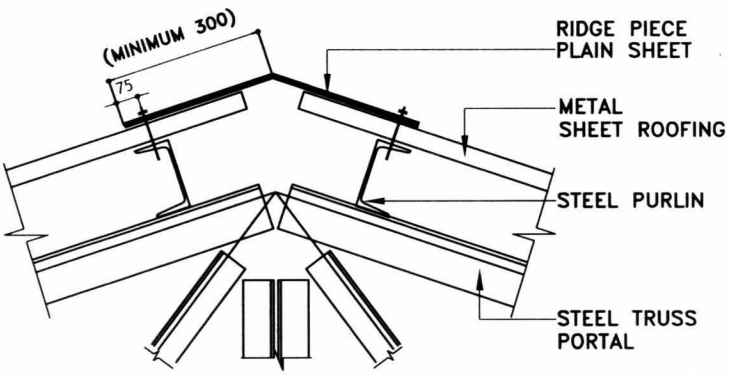
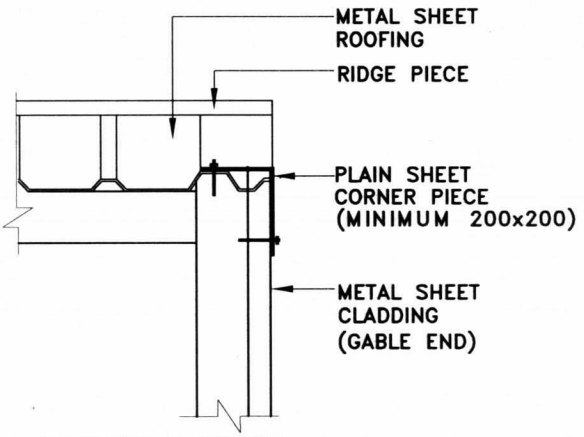


TYPICAL SECTION



DETAIL–A
(RIDGE FLASHING DETAIL)



CORNER PIECE
FLASHING DETAIL
(ROOF AND GABLE END CLADDING)

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. THIS STANDARD INDICATES VARIOUS ARCHITECTURAL FEATURES AND FLASHING DETAILS OF SHEDS. PROVISION OF FEATURES (ROOF MONITOR, ROOF EXTRACTOR, TRANSLUCENT SHEET, LOUVERS) AND THEIR SIZES, LOCATION ETC SHALL BE AS PER PROJECT DRAWINGS.
3. MATERIAL, THICKNESS AND OTHER DETAILS OF ROOFING, CLADDING, ACCESORIES (RIDGE FLASHING, CORNER PIECE, EAVES PIECE, APRON PIECE AND OTHER FLASHING) AND BIRD MESH SHALL BE AS PER PROJECT SPECIFICATION.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	17.01.23	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	PIYALEE DAS	SAMIR DAS	SANJAY MAZUMDAR
1	16.01.18	REVISED & REISSUED AS STANDARD	RS	JS/SD	R. SRIVASTAVA	R. NANDA

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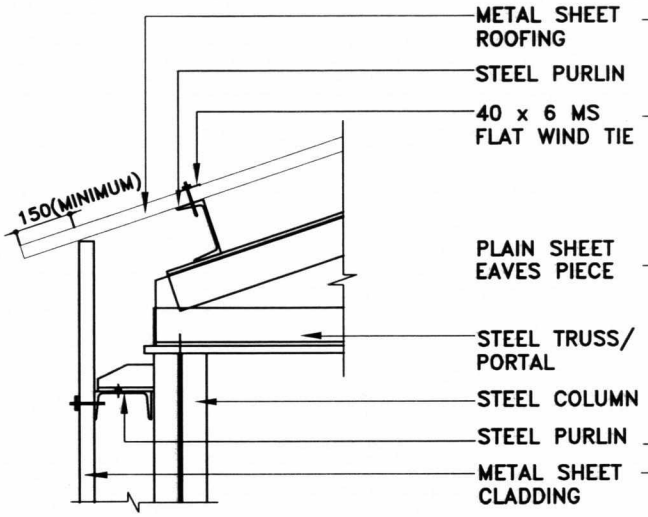
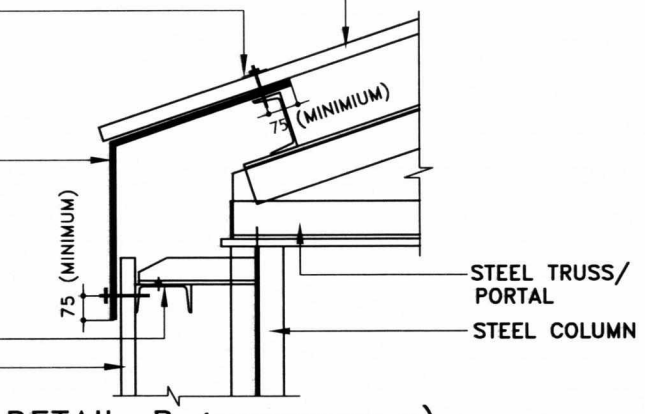
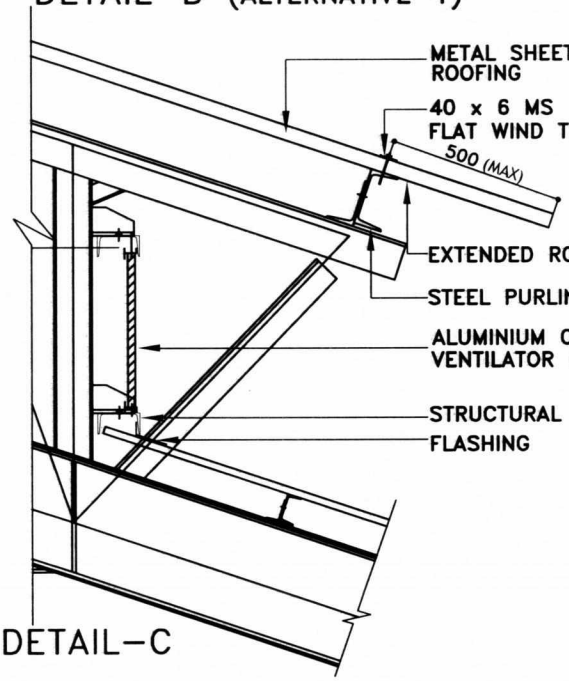


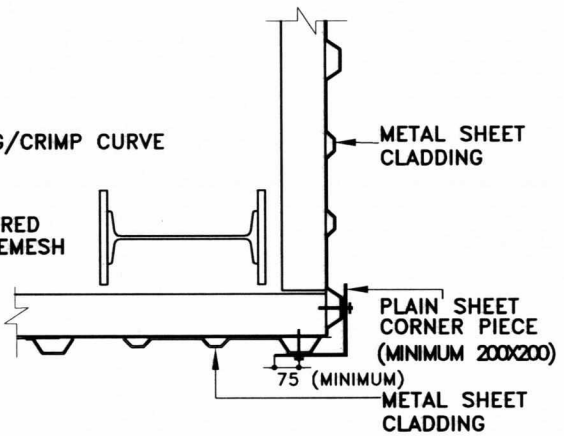
DETAIL–B (ALTERNATIVE–1)



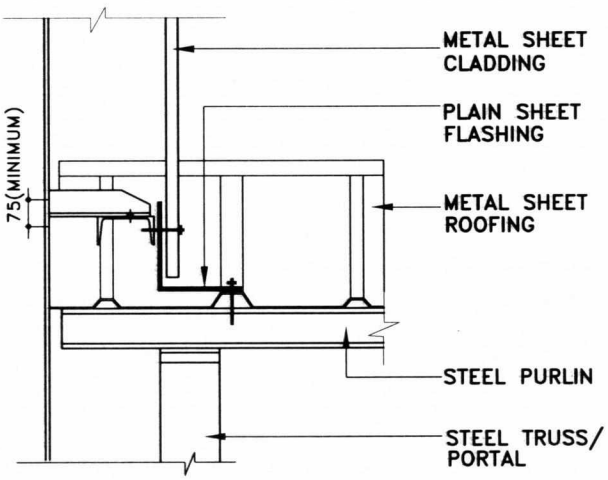
DETAIL–B (ALTERNATIVE–2)
EAVES FLASHING DETAIL



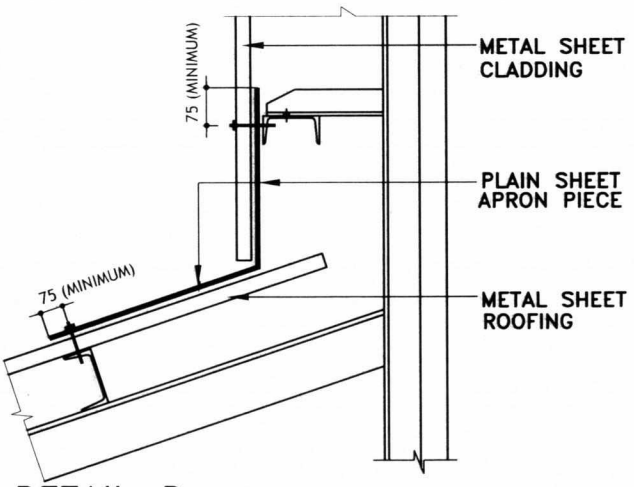
DETAIL–C



CORNER PIECE FLASHING DETAIL
(SIDE AND GABLE END CLADDING)



FLASHING DETAIL
(VERTICAL CLADDING AND ROOF)



DETAIL–D
(APRON FLASHING DETAIL)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	17.01.23	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	PIYALEE DAS	SAMIR DAS	SANJAY MAZUMDAR
1	16.01.18	REVISED & REISSUED AS STANDARD	RS	JS/SD	R. SRIVASTAVA	R. NANDA

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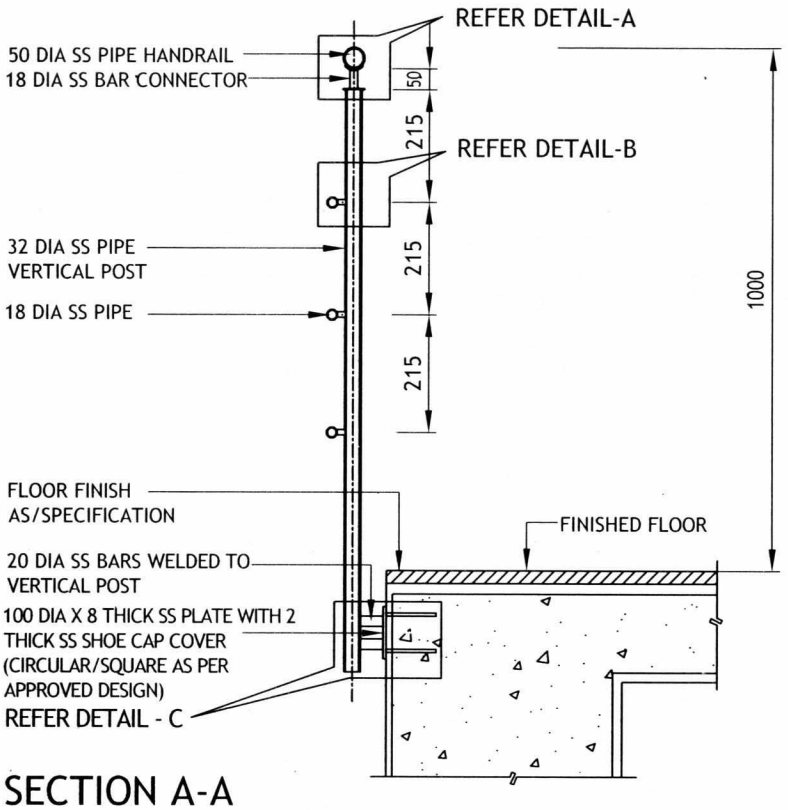
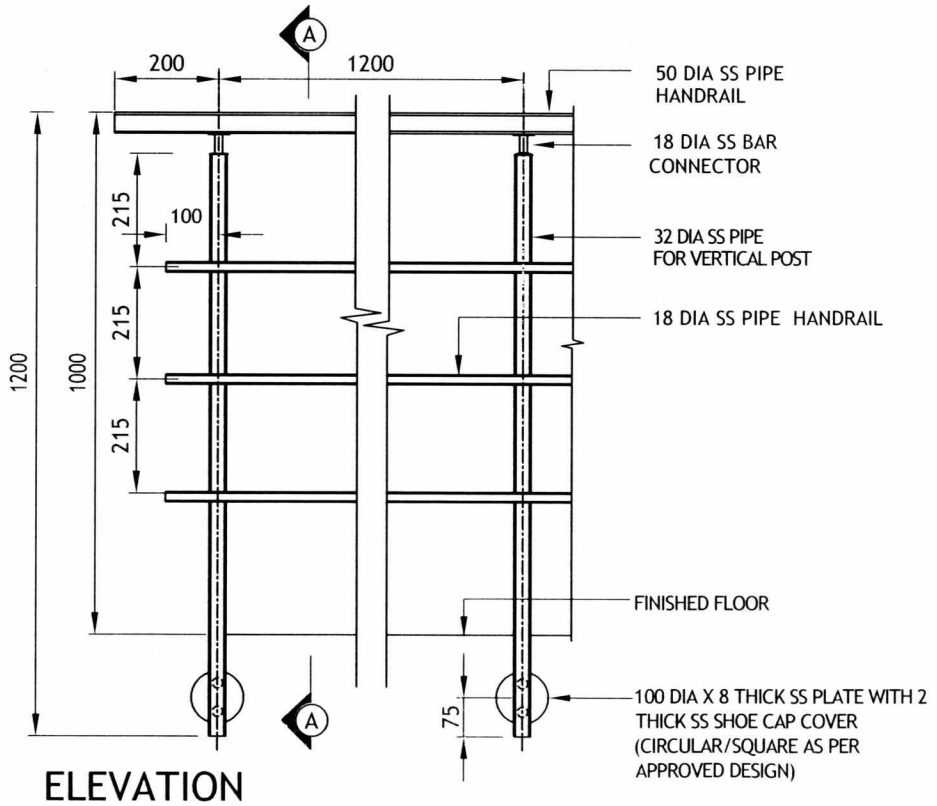


SECTION A-A



ELEVATION

STAINLESS STEEL HANDRAIL FIXED ON SIDE OF SLAB & STAIRS (TYPE-A)

NOTE: 1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. 50 & 32 DIA (OUTER) PIPES SHALL BE OF 16 GAUGE. ALL OTHER MEMBERS SHALL BE OF 18 GUAGE/ APPLICABLE.
3. GRADE OF STEEL IS S/S 304 (SATIN FINISH).

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	16.10.23	REVISED & ISSUED AS STANDARD	M L THAKUR	SANDEEP	SAMIR DAS	SANJAY MAZUMDAR
1	30.03.21	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR

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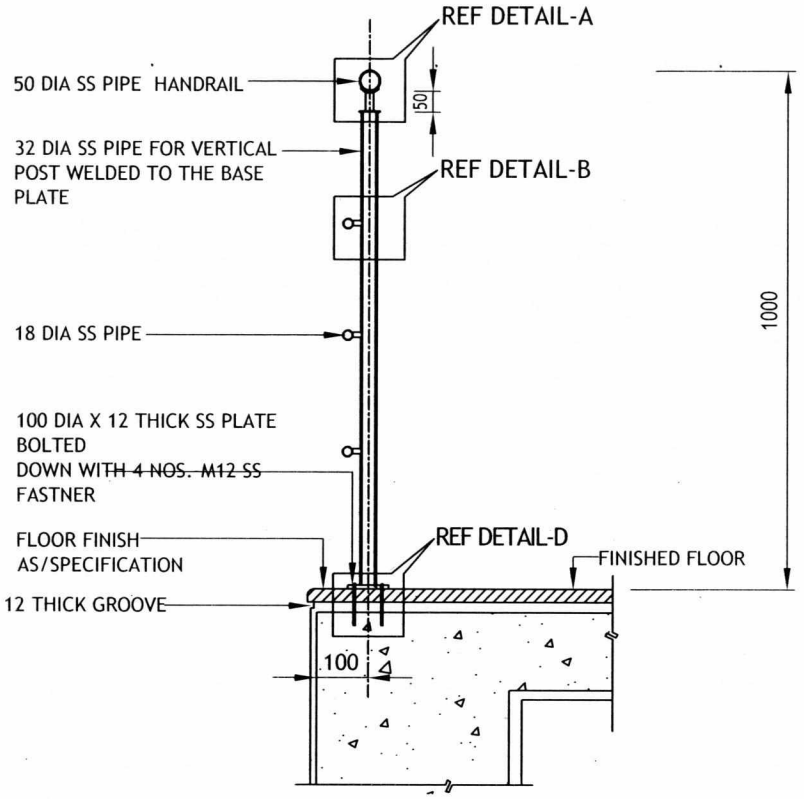
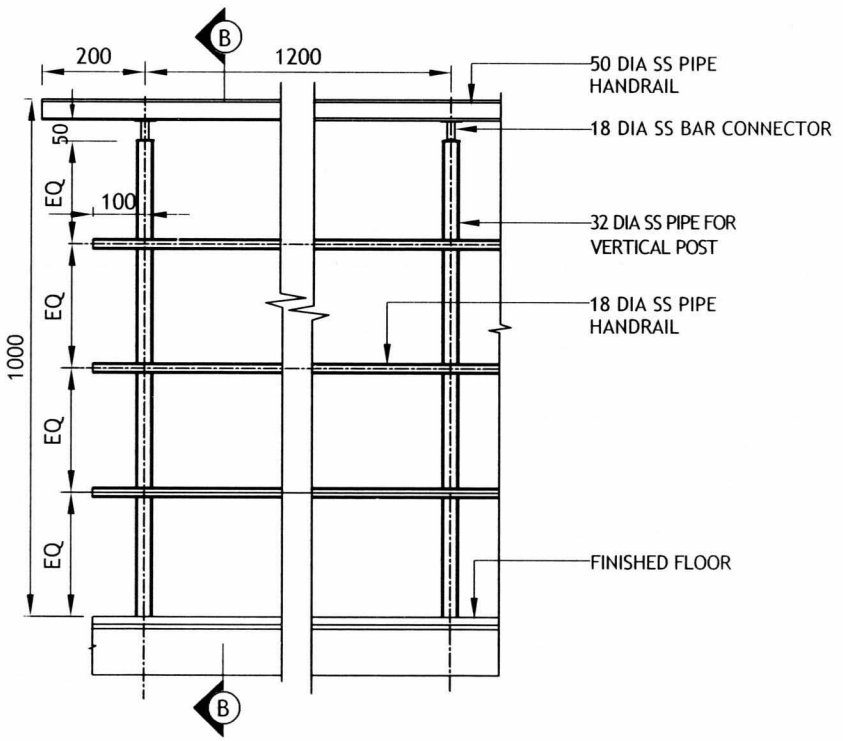


SECTION B-B



ELEVATION

STAINLESS STEEL HANDRAIL FIXED OVER THE SLAB & STAIRS (TYPE-B)

NOTE: 1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. GRADE OF STEEL IS S/S 304 (SATIN FINISH).

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	16.10.23	REVISED & ISSUED AS STANDARD	M L THAKUR	SANDEEP	SAMIR DAS	SANJAY MAZUMDAR
1	30.03.21	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR

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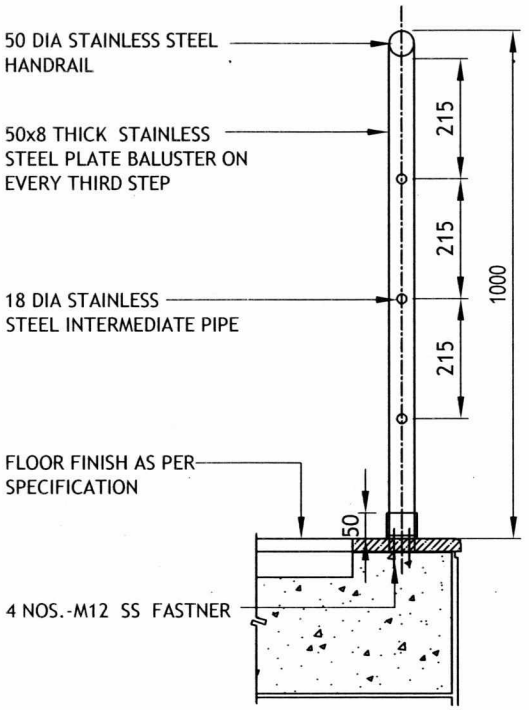
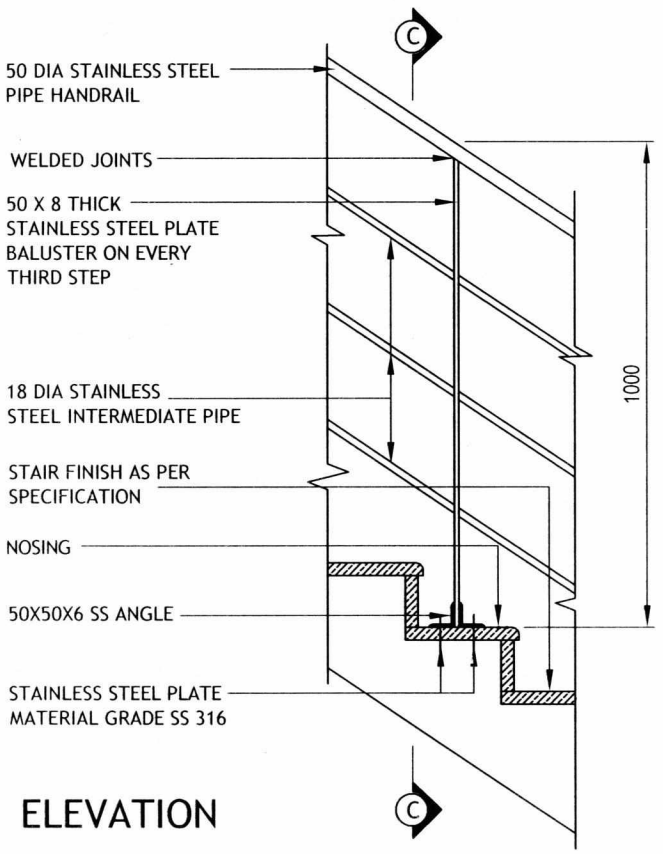


SECTION C-C



ELEVATION

STAINLESS STEEL HANDRAIL FOR SLAB & STAIRS (TYPE-C)

NOTE: 1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. GRADE OF STEEL IS S/S 304 (SATIN FINISH).

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	16.10.23	REVISED & ISSUED AS STANDARD	M L THAKUR	SANDEEP	SAMIR DAS	SANJAY MAZUMDAR
1	30.03.21	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	ANURAG-SINHA	SANJAY MAZUMDAR

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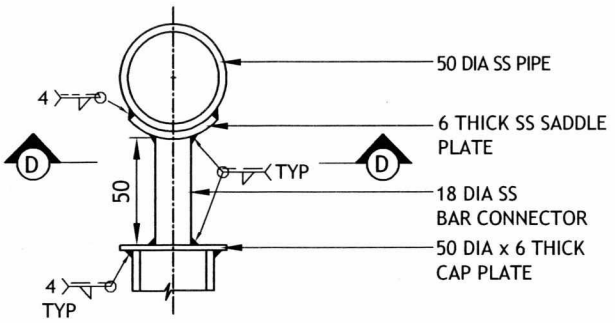
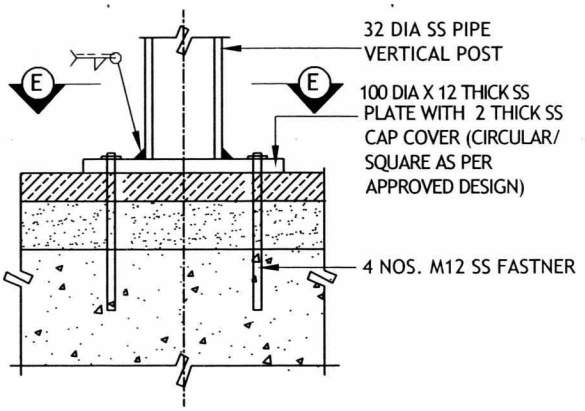
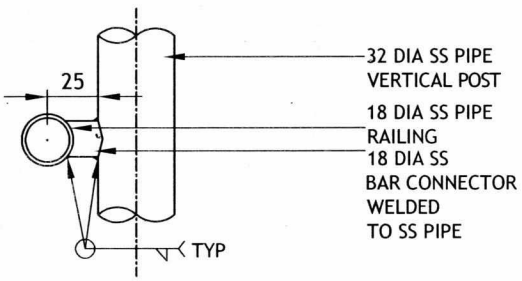


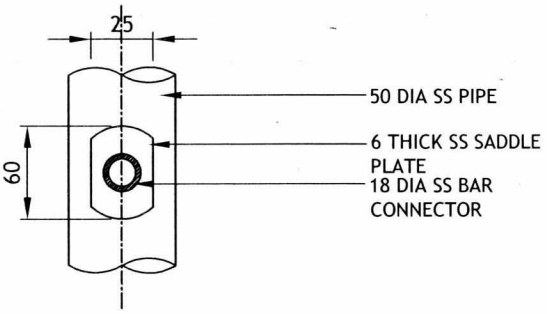
DETAIL A



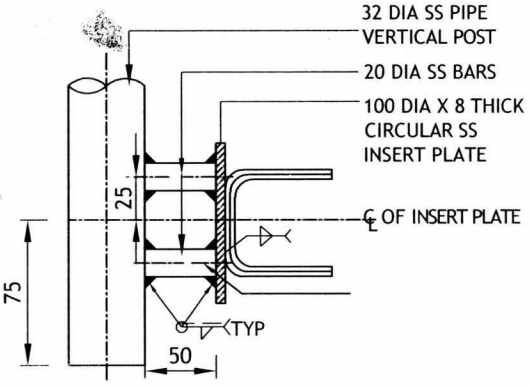
DETAIL D



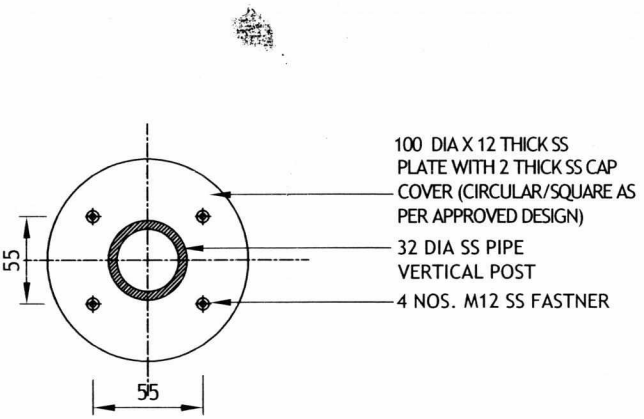
DETAIL B



SECTION D-D



DETAIL C
(TYPICAL DETAILS)



SECTION E-E

NOTE: 1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. GRADE OF STEEL IS S/S 304 (SATIN FINISH).

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	16.10.23	REVISED & ISSUED AS STANDARD	M L THAKUR	SANDEEP	SAMIR DAS	SANJAY MAZUMDAR
1	30.03.21	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR

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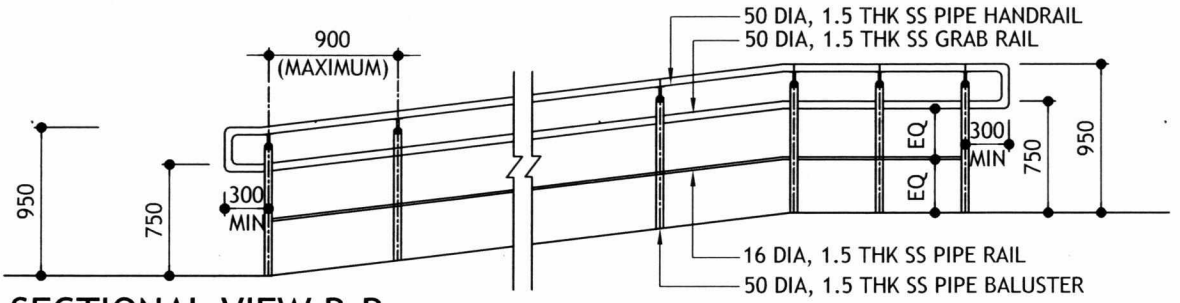
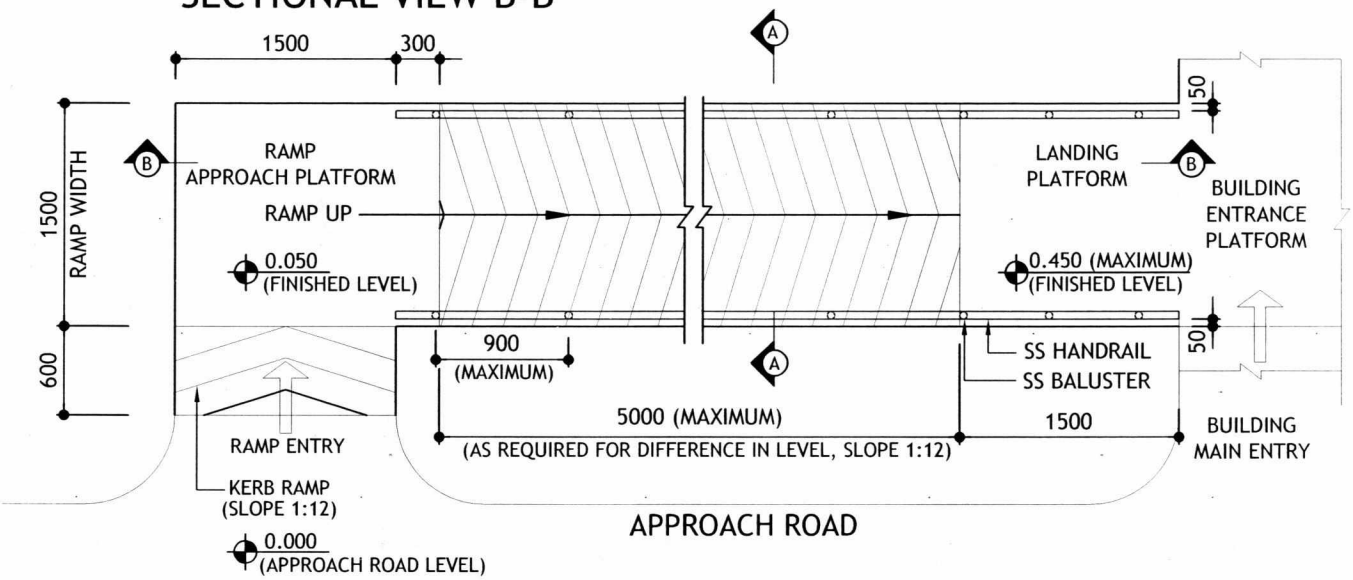
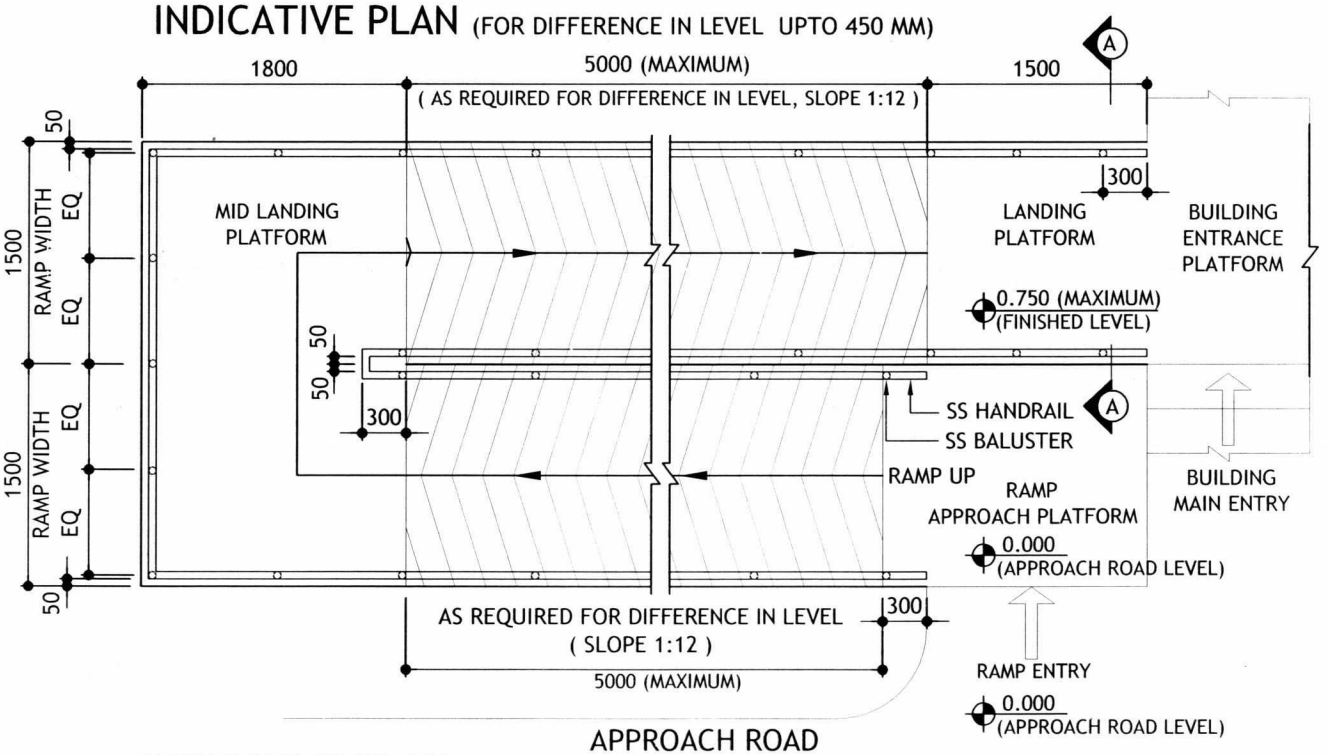
RAMP DETAIL
(FOR WHEEL CHAIR USERS)



SECTIONAL VIEW B-B



INDICATIVE PLAN (FOR DIFFERENCE IN LEVEL UPTO 450 MM)



INDICATIVE PLAN (FOR DIFFERENCE IN LEVEL 451 TO 750 MM)

NOTE :

1. ALL DIMENSIONS ARE IN MM
2. SS - STAINLESS STEEL (GRADE-304)
3. ALL SS MEMBERS/FITTING SHALL BE OF SATIN FINISH.
4. THE RAMP ARRANGEMENT IS INDICATIVE. THE ARRANGEMENT SHALL BE AS PER ARCHITECTURAL DWG. BUT RAILING, LANDING DETAILS SHALL BE AS PER THIS STANDARD.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
1	16.10.23	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SANDEEP	SAMIR DAS	SANJAY MAZUMDAR
0	04.06.18	ISSUED AS STANDARD	MLT	SD	RS	R K TRIVEDI

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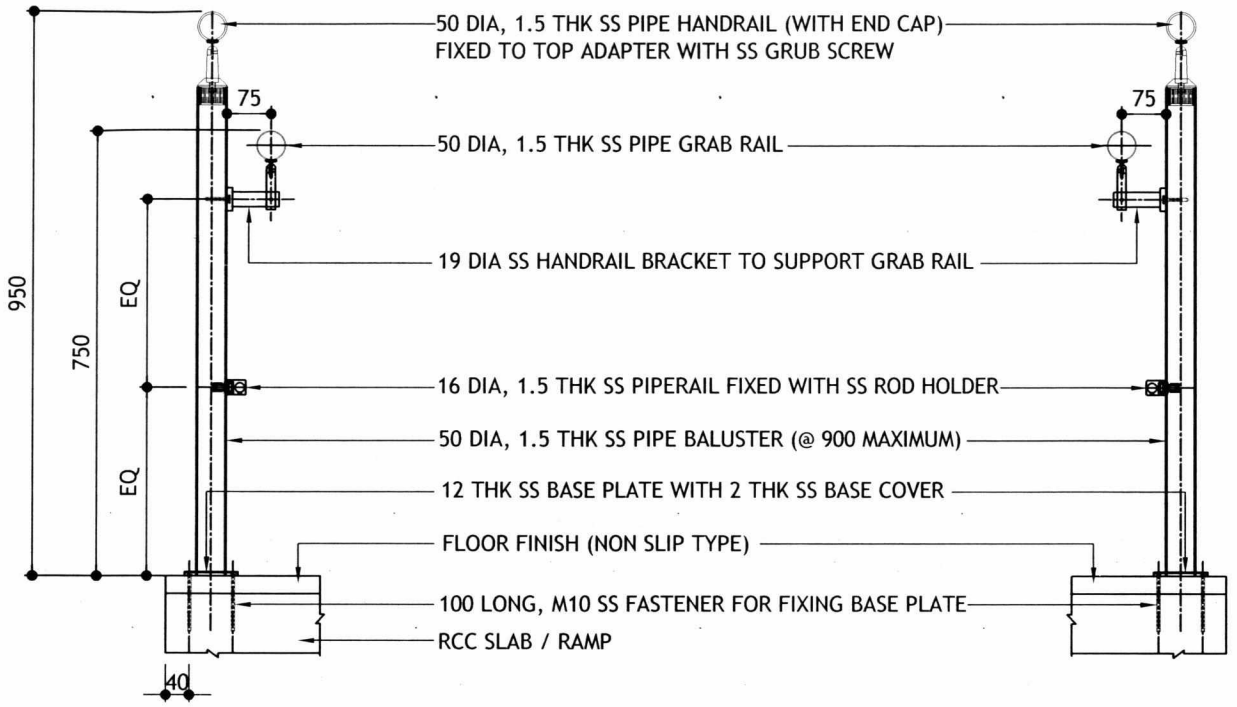
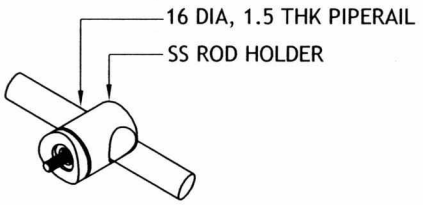
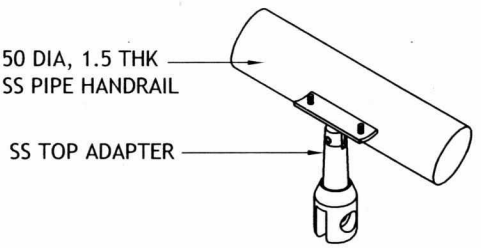


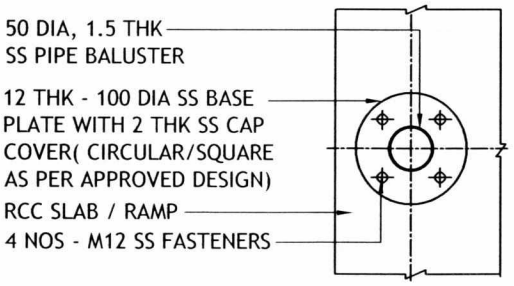
SECTION A-A



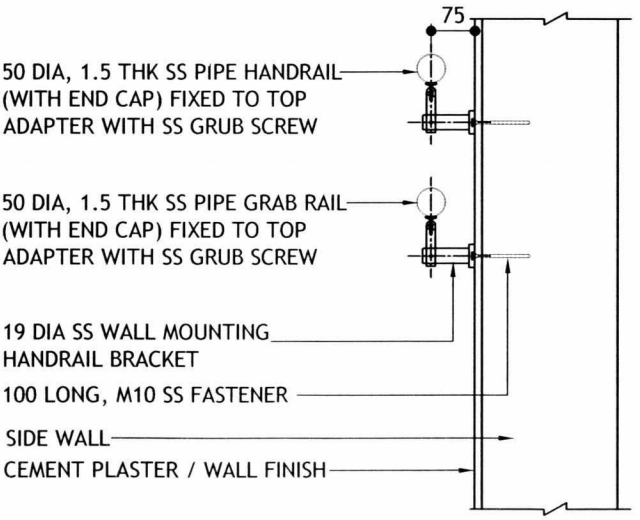
ROD HOLDER
(INDICATIVE VIEW)



TOP ADAPTER
(INDICATIVE VIEW)



BASE PLATE DETAIL (PLAN)



DETAIL OF GRAB RAIL
(ALONG WALL)

NOTE :
5. IN PLACE OF TOP ADAPTER & GRUB SCREW, WELDING USING SUITABLE SS MEMBER IS ACCEPTABLE IF SPECIFIED.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
1	16.10.23	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SANDEEP	SAMIR DAS	SANJAY MAZUMDAR
0	04.06.18	ISSUED AS STANDARD	MLT	SD	RS	R K TRIVEDI

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प्रस्तुत आरेख एवं इसमें निहित डिज़ाइन इंजीनियर्स इंडिया लिमिटेड की संपत्ति है। ये मात्र उधार दिए गए है और उधारकर्ता ने यह स्पष्ट समझौता किया है कि न तो इन्हें पुनः मुद्रित किया जाएगा, न नकल की जाएगी, न उधार दिए जाएंगे, न प्रदर्शित किए जाएंगे और न ही सीमित और लिखित रूप में दी गई सहमति के बिना किसी प्रयोग के अलावा इनका कोई अन्य प्रयोग होगा और यह प्रयोग उधार देने वाले द्वारा उधारकर्ता को लिखित रूप में दी गई सहमति के द्वारा।

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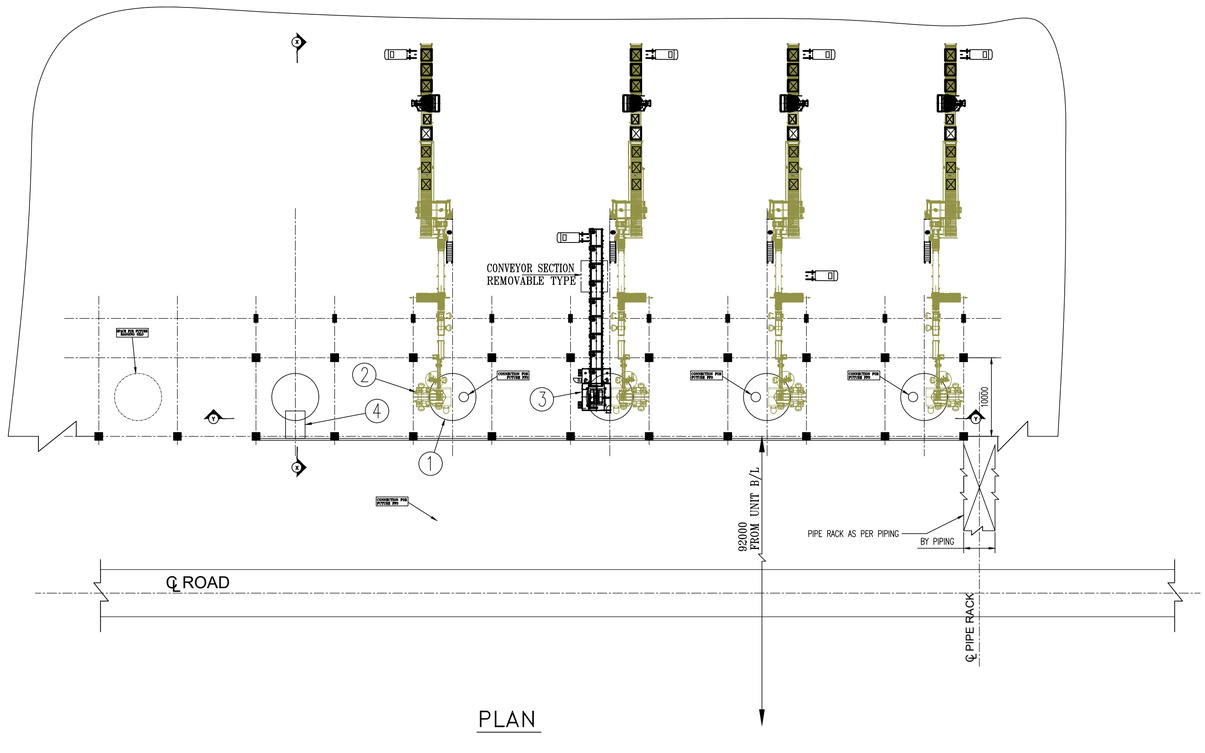
B957-540-80-42-10001

ITEM	DESCRIPTION	TAG NO.	QTY.	REMARKS
1.	BAGGING SILOS	–	5	SUPPLY & ERECTION BY PPU LSTK CONTRACTOR
2.	BAGGING & PALLETIZATION LINES	540-LZ-101 to 104	4	SUPPLY BY BAGGING AND PALLETIZATION PACKAGE VENDOR / ERECTION BY OTHERS
3.	BIG BAG FILLING MACHINE	540-LZ-105	1	
4.	BULK LOADING MACHINE	540-LZ-106	1	

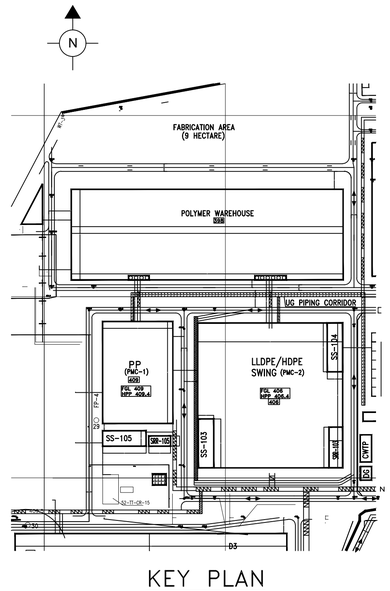


PLAN

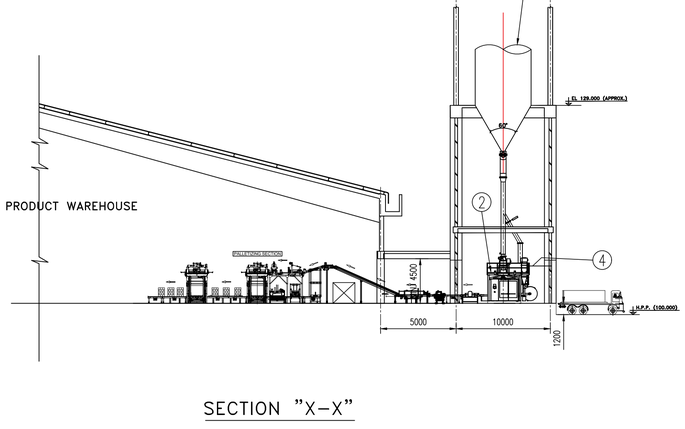
REFERENCE DRAWINGS	DRAWING NO.
OVERALL PLOT PLAN	B957-000-81-45-00001
EQUIPMENT LAYOUT- PP UNIT	B925-310-16-43-00001

NOTES :-

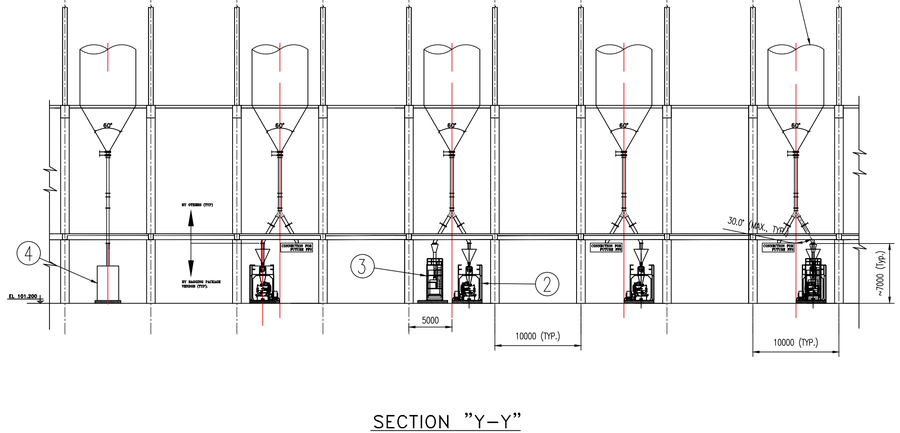
1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
2. REFERENCE LEVEL 100.000 CORRESPONDS TO H.P.P.
3. FINISHED FLOOR OF WAREHOUSE AND BAGGING AREA BUILDING SHALL BE 1200 MM ABOVE ROAD/PAVEMENT LEVEL.
4. DETAILS OF WALLS/DOORS/WINDOWS SHALL BE AS PER STRUCTURAL/ ARCHITECTURAL DRAWINGS/SPECIFICATIONS.
5. OTHER DETAILS SUCH AS BUILDING EXPANSION JOINTS ETC. SHALL BE AS PER STRUCTURAL/ARCHITECTURAL DRAWINGS/SPECIFICATIONS.
6. BAGGING / BIG BAG / BULK LOADING MACHINE INLET LEVEL IS APPROX. 7.0M ABOVE FINISHED FLOOR LEVEL. PP UNIT LSTK CONTRACTOR'S SCOPE SHALL INCLUDE ALL GRAVITY PIPING, INSTRUMENTS AND FACILITIES UPTO THE AFORESAID LEVEL.
7. BAGGING SILO SHALL BE SUPPORTED ON CONCRETE (RCC) STRUCTURE.



KEY PLAN



SECTION "X-X"



SECTION "Y-Y"

REV.	DATE	REVISIONS	BY	CHKD	APPD	PEM/PC
A	27.11.2025	ISSUED WITH MR	DK	VMG	PD	

इंजीनियर्स इंडिया लिमिटेड ENGINEERS INDIA LIMITED (भारत सरकार का उपक्रम) (A Govt. of India Undertaking)

BHARAT PETROLEUM CORP. LTD.
भारत पेट्रोलियम कॉरपोरेशन लिमिटेड

बीना पेट्रोकेमिकल एवं रिफाईनरी एक्सपेन्शन परियोजना (बी.पी.आर.ई.पी.)

BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT (BPREP)

POLYPROPYLENE UNIT BAGGING AREA LAYOUT IN PRODUCT WAREHOUSE

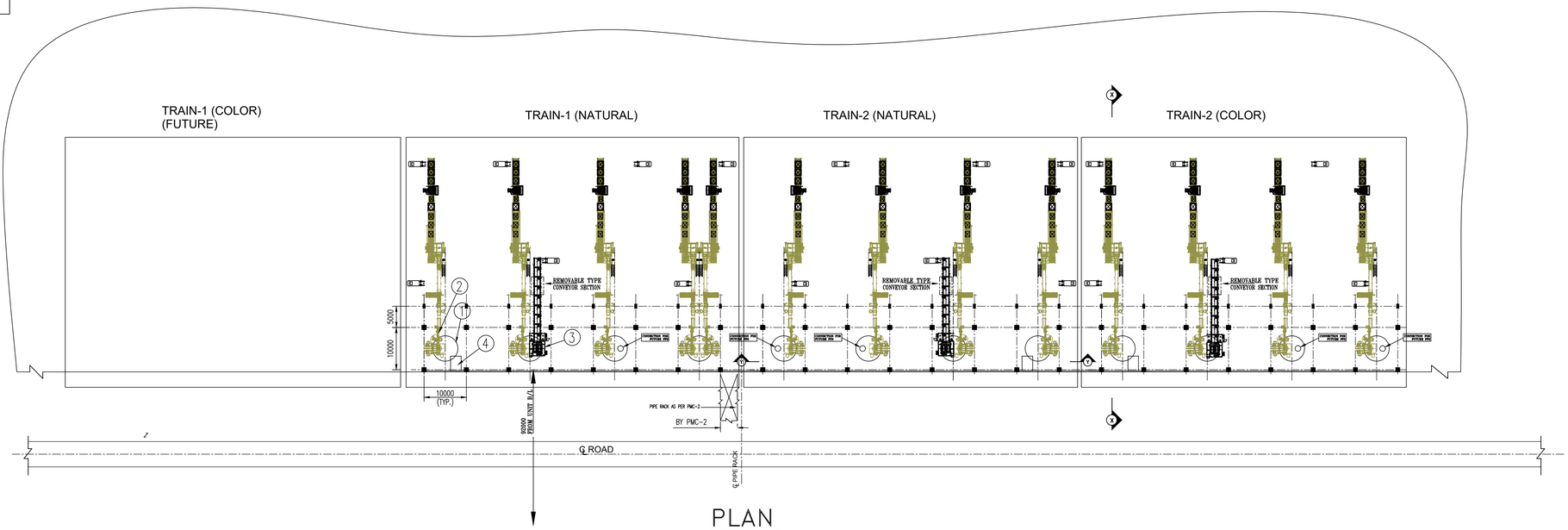
SCALE	JOB NO.	UNIT	DIVN.	DEPT.	DWG. NO.	REV.
NTS	B 9 5 7	5 4 0	8 0	4 2	10001	A

3-1641-0501 REV.2 A1-841x594

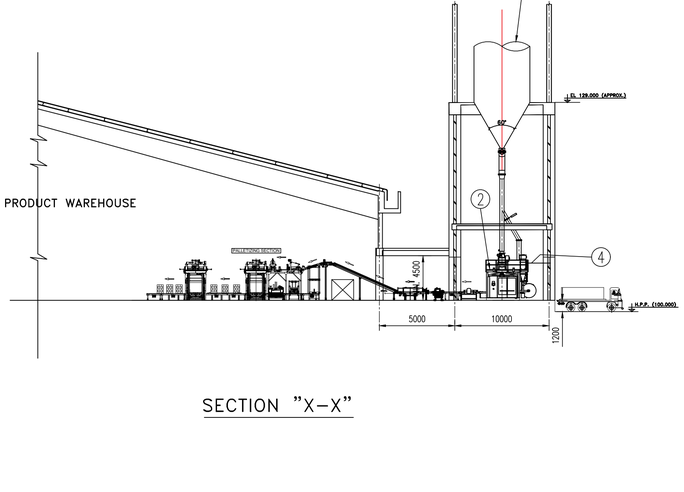
Page 5320 of 5448 : B957-TENDER DOC-B957-999-69-41-PK-T-9501 : Rev. A

B957-540-80-42-10002

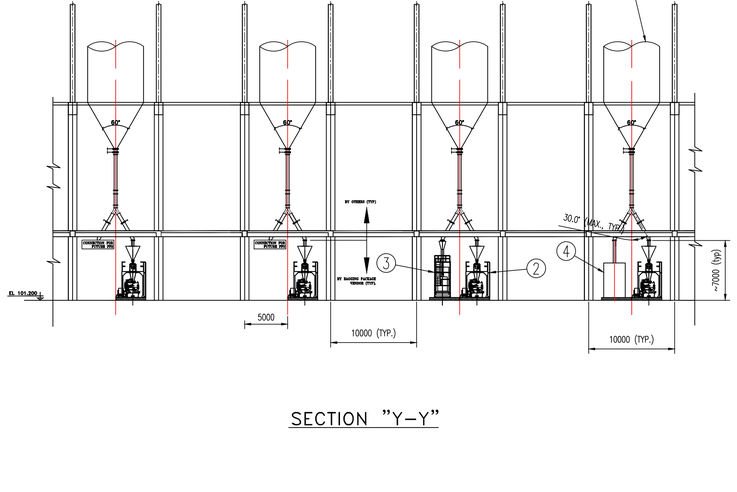
ITEM	DESCRIPTION	TAG NO.	QTY.	REMARKS
1.	BAGGING SILOS	–	12	SUPPLY & ERECTION BY LLDPE/HDPE SWING UNIT LSTK CONTRACTOR
2.	FFS BAGGING & PACKING LINES	540-LZ-107 to 119	13	SUPPLY BY BAGGING AND PALLETIZATION PACKAGE VENDOR / ERECTION BY OTHERS
3.	BIG BAG FILLING MACHINE	540-LZ-120 to 122	3	
4.	BULK LOADING MACHINE	540-LZ-123 to 125	3	



PLAN



SECTION "X-X"

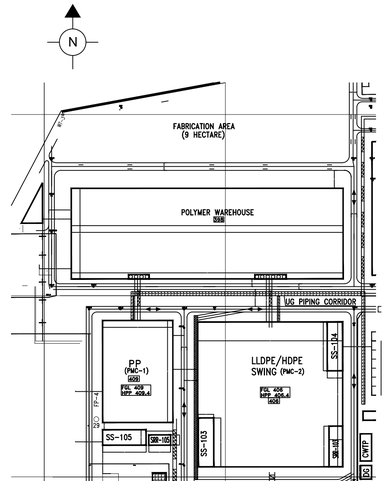


SECTION "Y-Y"

REFERENCE DRAWINGS	DRAWING NO.
OVERALL PLOT PLAN	B957-999-81-45-00001
EQUIPMENT LAYOUT- LLDPE/HDPE SWING UNIT	6469-999-16-43-SK-00001

NOTES :-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
2. REFERENCE LEVEL 100.000 CORRESPONDS TO H.P.P.
3. FINISHED FLOOR OF WAREHOUSE AND BAGGING AREA BUILDING SHALL BE 1200 MM ABOVE ROAD/PAVEMENT LEVEL.
4. DETAILS OF WALLS/DOORS/WINDOWS SHALL BE AS PER STRUCTURAL/ ARCHITECTURAL DRAWINGS/SPECIFICATIONS.
5. OTHER DETAILS SUCH AS BUILDING EXPANSION JOINTS ETC. SHALL BE AS PER STRUCTURAL/ARCHITECTURAL DRAWINGS/SPECIFICATIONS.
6. BAGGING / BIG BAG / BULK LOADING MACHINE INLET LEVEL IS APPROX. 7.0M ABOVE FINISHED FLOOR LEVEL. LLDPE / HDPE SWING UNIT LSTK CONTRACTOR'S SCOPE SHALL INCLUDE ALL GRAVITY PIPING, INSTRUMENTS AND FACILITIES UPTO THE AFORESAID LEVEL.
7. BAGGING SILO SHALL BE SUPPORTED ON CONCRETE (RCC) STRUCTURE.



KEY PLAN

REV.	DATE	REVISIONS	BY	CHKD	APPD	PEM/PC
A	27.11.2025	ISSUED WITH MR	DK	VMG	PD	

इंजीनियर्स इंडिया लिमिटेड (भारत सरकार का उपक्रम) ENGINEERS INDIA LIMITED (A Govt. of India Undertaking)

BHARAT PETROLEUM CORP. LTD.
भारत पेट्रोलियम कॉरपोरेशन लिमिटेड

बीना पेट्रोकेमिकल एवं रिफाईनरी एक्सपैन्शन परियोजना (बी.पी.आर.ई.पी.)

BINA PETROCHEMICAL & REFINERY EXPANSION PROJECT (BPREP)

LLDPE / HDPE SWING UNIT BAGGING AREA LAYOUT IN PRODUCT WAREHOUSE

SCALE	JOB NO.	UNIT	DIVN.	DEPT.	DWG. NO.	REV.
NTS	B 9 5 7	5 4 0	8 0	4 2	10002	A

प्रस्तुत आरेख एवं इसमें निहित डिज़ाइन इंजीनियर्स इंडिया लिमिटेड की संपत्ति है। ये मात्र उधार दिए गए है और उधारकर्ता ने यह स्पष्ट समझौता किया है कि न तो इन्हें पुनः मुद्रित किया जाएगा, न नकल की जाएगी, न उधार दिए जाएंगे, न प्रदर्शित किए जाएंगे और न ही सीमित और किसी प्रयोग के अलावा इनका कोई अन्य प्रयोग होगा और यह प्रयोग उधार देने वाले द्वारा उधारकर्ता को लिखित रूप में दी गई सहमति से होगा ।

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Page 5381 of 5448 : B957-TENDER DOC-B957-999-69-41-PK-T-9501 : Rev. A

TECHNICAL COMPLIANCE FOR INSULATION OF ELECTRICLA HEAT TRACED AND HP, MP AND LP STEAM LINE (SMMS)

PROJECT : BINA PETCHEM & REFINERY EXPANTION PROJECT, (BPREP)

OWNER : M/s BHARAT PETROLEUM CORPORATION LIMITED

PMC : ENGINEERS INDIA LIMITED

JOB NO. : B957

Rev. No	Date	Purpose	Prepared by	Checked by	Approved by
A	27/02/2026	ISSUED FOR TENDER	VT	PP	PS

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TECHNICAL COMPLIANCE: INSULATION OF ELECTRICAL HEAT TRACED AND HP,MP AND LP STEAM LINE

Sl No.	COMPLIANCE STATEMENT/QUERY	BIDDER'S REPLY
1.	Please CONFIRM that insulation design, selection of insulation and ancillaries' items, installation, quality control, testing, and any other activities associated to Insulation of electrical heat traced lines and HP, MP and LP steam lined shall be carried out as per EIL job specification B957-999-06-43-IL01 and B957-999-06-43-IL02.	
2.	Please CONFIRM that bidder shall submit all deliverables as per EIL document number B957-999-06-43-IL01 and B957-999-06-43-IL02 and as per the sequence mentioned in EIL VDR B957-999-06-43-VDR-0001	
3.	Please CONFIRM all requirements mentioned in EIL specification B957-999-06-43-IL01 and B957-999-06-43-IL02 to carry out the job have been fully understood by bidder and will be met.	

NOTE: DEVIATIONS APPEARING ELSEWHERE IN THE OFFER SHALL NOT BE CONSIDERED.

BIDDER'S NAME:

BIDDER'S SIGNATURE
AND SEAL / STAMP

DATE:

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वाष्प अनुमार्गन हेतु मानक विनिर्देश

STANDARD SPECIFICATION FOR STEAM TRACING

Rev. No	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
6	29.09.22	REVISED AND ISSUED AS STANDARD SPECIFICATION	PK	SH	GB	SM
5	13.07.17	REAFFIRMED AND ISSUED AS STANDARD SPECIFICATION	PK	SH	MI	RN
4	11.08.10	REVISED AND ISSUED AS STANDARD SPECIFICATION	SH	VKB	SC DM	ND
3	31.03.09	REVISED AND ISSUED AS STANDARD SPECIFICATION	RN	VKB	SC	ND
2	13.02.04	REVISED AND ISSUED AS STANDARD SPECIFICATION	PKG	BRB	BN	SKG
1	15.03.99	REVISED AND ISSUED AS STANDARD SPECIFICATION	SH	BRB	NS	AS

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Abbreviations:

A/G	-	Above Ground
B/L	-	Battery Limit
BOP	-	Bottom of Pipe
GAD	-	General Arrangement Drawing
IBR	-	Indian Boiler Regulations
NB	-	Nominal Bore
P&ID	-	Piping and Instrumentation Diagram
PSIG	-	Pounds Per Square Inch
PVC	-	Poly Vinyl Chloride
SH	-	Steam High Pressure
SL	-	Steam Low Pressure
SM	-	Steam Medium Pressure
SWG	-	Standard Wire Gauge

Piping Standards Committee

Convenor : Mr. G. Balaji

Members : Mr. UdayanChakravarty
Mr. R. Giridhar
Mr K Anjaneyulu (SMED)
Mr. S. Ghoshal (SMMS)
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1.0 PURPOSE

The purpose of steam tracing is to prevent the fall in process fluid temperature and maintain the same throughout the length of the line. Constant temperature maintenance helps in the free flow of fluid and its pumpability. Generally the Piping requiring steam tracing are indicated in P&IDs and line schedule, while size and number of tracers shall be provided according to this specification.

2.0 SCOPE

This specification outlines the requirements to be met in the design and installation of steam tracers for piping.

- Type of Steam (i.e. SL, SM or SH etc.) for tracing shall be as specified in the line schedule. The steam temperature shall be saturation temperature of the steam at a given pressure.
- Requirement for condensate return (i.e. open system or closed system & pressure in case of closed system) shall be obtained from process package.
- Size of Bought-out supply and return manifolds with inbuilt piston valves shall be 1.5" unless otherwise specified. The condensate return manifold shall be with pipe line connector having inbuilt trap and glandless piston type drain valve for upstream isolation and trap bypass. The trap shall be thermostatic type.
- Site fabricated supply & return manifold header shall be 3" NB unless otherwise specified.
- Size of tracer shall be ½" NB unless specified otherwise in the process package.
- Size of supply sub-header from Steam header & return sub-header to Condensate header shall be 1½" NB.
- Size of tracer supply & return lead lines shall be ½" pre-insulated tubing with adapters at both ends unless specified otherwise in the Job Engineering Design Basis (Piping).

Exceptions or variations covered in the process package shall take precedence over requirements covered herein.

3.0 REFERENCES

Standard Specification for Hot Insulation of Vessels, Piping and Equipment 6-79-0026;
Latest editions of the specifications(s)referred shall be followed.

4.0 METHODOLOGY

4.1 Source of Steam Supply

Steam supply for tracing can be obtained from steam headers, independent steam supply sub-header or exhaust / bleed steam from other continuous steam users. In any case the steam tracers should always get steam even if process unit is out of operation. As far as practicable, steam supply manifold shall be laid such that lines requiring steam tracing are at minimum distance from the manifold.

4.2 Material

As per 'Piping Material Specification'.

4.3 Regulations

The IBR limit is shown in Annexure-1, Page 3 of 5 and Annexure-2, Page 3 of 6.

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4.4 Procedure for Preparation of Steam Tracing Installation Drawings & Use of Stream Tracing Standards:

Steam tracing installation drawings shall be prepared in accordance with the standards as per following procedure.

4.4.1 The numbering of steam supply and condensate return manifolds shall be as per Annexure -1, Page 3 of 5.

4.4.2 Steam supply sub-headers, steam supply manifolds, condensate sub-headers and condensate recovery manifolds shall be located on piping GADs of Units and Offsites.

4.4.3 Details of steam supply and condensate return manifolds shall be prepared. These details will indicate among other details, the size and number of various supply and return leads to and from the designated steam traced lines, as given in chart-I of Annexure-1, Page 3 of 5 and chart-I of Annexure-2, Page 3 of 6.

4.5 List of Specifications to be used for Steam Tracing

4.5.1 For Site Fabricated Manifolds

a)	Steam supply manifolds	Annexure-1 Page 1 of 5
b)	Condensate recovery manifolds	Annexure-1 Page 2 of 5
c)	Typical diagram	Annexure-1 Page 3 of 5
d)	Details of tracer arrangement	Annexure-3 Page 1 of 3
e)	Position of tracers w.r.t. pipes and tracer arrangement around valves & flanges	Annexure-3 Page 2 of 3
f)	Typical tracing arrangement in Offsites - plan	Annexure-1 Page 4 of 5
g)	Typical tracing arrangement in Offsites - elevation	Annexure-1 Page 5 of 5
h)	Typical tracing arrangement in Units.	Annexure-3 Page 3 of 3

4.5.2 For Bought-out Manifolds

a)	Steam supply manifolds	Annexure-2 Page 1 of 6
b)	Condensate recovery manifolds	Annexure-2 Page 2 of 6
c)	Typical diagram	Annexure-2 Page 3 of 6
d)	Typical diagram	Annexure-2 Page 4 of 6
e)	Details of tracer arrangement	Annexure-3 Page 1 of 3
f)	Position of tracers w.r.t. pipes and tracer arrangement around valves & flanges	Annexure-3 Page 2 of 3
g)	Typical tracing arrangement in Offsites - plan	Annexure-2 Page 5 of 6
h)	Typical tracing arrangement in Offsites - elevation	Annexure-2 Page 6 of 6
i)	Typical tracing arrangement in Units.	Annexure-3 Page 3 of 3

4.5.3 For Steam tracing insulation 6-79-0026

4.6 Design & Installation:

Design and installation of steam tracing system for piping shall be as detailed. Site fabricated bends shall be used in place of forged elbows except near steam supply and condensate return manifolds. However, in case of pre-insulated tubing, only site fabricated bends with approved bending tool shall be used. Bought-out manifolds with inbuilt glandless piston valves shall be used unless otherwise specified.

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4.6.1 **Steam Supply Sub Headers**

4.6.1.1 The layout of steam supply sub-header and supply manifold shall be arranged to minimize length of supply lead lines.

4.6.1.2 Isolation valve in the sub-headers shall be of Globe type.

4.6.1.3 Y-Type Strainer of 40 mesh size as per applicable piping class shall be provided in the steam supply sub header. Strainer shall be located between Isolation Valve and supply manifold.

4.6.1.4 Where single tracer is used directly from steam main, strainer in supply sub header shall not be provided.

4.6.2 **Steam Supply Manifold**

Location of manifolds shall be planned to minimize the length of the supply leads served by it. Manifold shall be provided when three or more tracers are required. Length of supply lead shall not exceed 15 mtrs. Supply manifold shall generally be located on pipe rack or technological structure.

4.6.3 **Supply & Return Leads**

The routing shall be by field for minimum length of run avoiding interferences. Clearances and maintenance joints shall be provided for operation & maintenance.

4.6.4 **Tracers**

4.6.4.1 **Sizing**:

Unless otherwise specified in the process package the size and number of tracers shall be as listed below:

Traced line size	**No. of ½" NB tracers**
4" NB & smaller	1
6" NB to 16" NB	2
18" NB & larger	3

4.6.4.2 Useful length of tracers: Following shall be used for maintaining length of ½"tracer in open and closed systems (excluding supply and return lead lines).

Operating pressure (PSIG)	20	50	100	150	200	250	300&above
Tracing Length (meters)	23.0	38.0	46.0	53.0	61.0	69.0	76.0

4.6.4.3 **Installation**

a) The tracers shall be held in position by three turns of 16 SWG soft annealed galvanized iron wire spaced every one meter.

b) Whenever there is a single line to be traced, steam supply and return manifolds need not be used. In such cases, the steam supply line maybe tapped from the nearby steam header/sub header and routed along the line to be traced. At the end of the tracer run, these tracers can be drained by separate steam trapping assembly, in case Condensate return manifold is not available.

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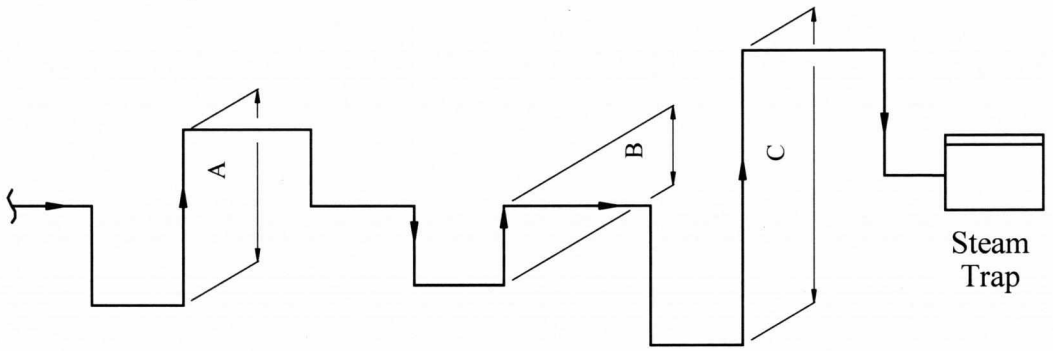
c) The position of tracers around traced pipe shall be as per Annexure-3, Page 1&2 of 3.

d) The tracers shall start at the highest point in a system in general. As far as possible tracers shall be routed with a continuous slope towards trap. Total pocket depth* shall not exceed 850mm for 1.0 kg/cm2 of differential pressure available (i.e. difference of pressure between upstream and down stream of the steam trap)

* Tracer pocket depth is the distance the tracer rises in the direction of flow from a low point to high point. The total depth of pockets is the sum of all the pockets on the tracer and must not exceed the above given figure. The pocket should be considered from the point where the tracer starts its run along the traced pipe, up to the steam trap.



Total Depth of Pocket = A + B + C

e) Branch tracers to paired equipment and instruments to be provided with isolation valves and each branch to have its own trap. (See Annexure -3, Page 3 of 3)

f) Tracer shall not be provided with low point drains.

g) The tracers shall be laid so as not to interfere with the normal working, operation and maintenance of plant machinery.

h) Wherever the traced piping is having flanged connections and traced piping needs to be disconnected for frequent maintenance, flushing etc., break flanges at suitable locations shall be provided on tracers. All flange connections provided on tracers shall be located outside the insulation.

i) The installation shall be done to take care that the valves and steam traps on supply and return manifolds are easily approachable. Maximum 12 nos. of supply leads/return lines (including spares) are permitted per supply manifold/condensate return manifold.

j) The steam supply lead lines should be routed together, as far as possible. In case of several tracers routed together, the spacing between individual tracers may be reduced to allow box type insulation. However the spacing will be adequate in all cases to permit good welding and individual clamping by U clamps, or other approved type of fastener.

k) The tracers shall be anchored at the middle point of the tracer run and adequate free space shall be provided for the expansion of tracers at the free ends as shown in Annexure -3, Page 1 of 3.

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4.6.5 **Steam Traps**

4.6.5.1 Each tracer or each branch of a tracer that is split, (i.e. a tracer on suction line of a parallel pump installation) shall be separately trapped at the outlet end.

4.6.5.2 Steam tracing installation shall be installed so as to facilitate rapid and easy removal and replacement of traps, rather than permit emergency hand operation of the tracers, should trap become inoperable.

4.6.5.3 The trap discharge line shall have a block valve only if tied into a system into which more than one trap discharge.

4.6.5.4 For an open condensate system, locate traps so that condensate gets drained to S.S. avoiding hazard to personnel.

4.6.5.5 Thermostatic traps shall be used for systems wherein tracer steam design pressure is less than 21 Kg/cm^2g. Traps shall be provided with inbuilt strainers.

4.6.5.6 The steam traps shall be hooked up as per Annexure -1, Page 2, 3, 4 & 5 of 5 and Annexure-2, Page 2, 3, 5 and 6 of 6. In case of Offsite piping, Annexure -1, Page 4 & 5 of 5 and Annexure-2, Page 5 & 6 of 6, give the typical arrangement for steam trap assemblies.

4.6.6 **Condensate Return System**

4.6.6.1 **For Units:**

Refer Process Design Basis(PDB). In case of recovery follow P&IDs / PDB and in case of non-recovery, route condensate to Storm Sewer outside B/L.

4.6.6.2 **For Offsites:**

Discharge to ditches or other suitable location so as to cause no personnel hazard or excessive maintenance problem. In case no ditch is nearby, discharge as per note 6 on Annexure-1, Page 1 of 5.

4.7 Supporting of Steam Tracing Systems

All the components of steam tracing system shall be adequately supported. One of the methods of supporting the supply and return manifolds has been indicated in Annexure-1, Page 5 of 5. The supply lead lines and condensate return lines should be routed together, as far as possible, with same BOP, so that they can be supported from common structural steel. In case of Pre-insulated tubing, the same shall be routed and supported as per recommendations of Supplier. To avoid undue deflection and vibration, the spacing of supports in horizontal or vertical runs should not exceed 2 meters. The tracer lines may be secured to structural members with U clamps.

4.8 Testing

All tracers shall preferably be tested along with the steam piping to which they are connected. In cases where tracers are not tested with the feed steam piping, separate hydrostatic test shall be performed with test pressure of twice the design pressure. Hydrostatic test pressure shall be same for tracers falling within / outside IBR scope.

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4.9 Insulation

Insulation thickness, material and method of application shall be as specified in insulation standard / specification or Process Design Basis.

Composite box type insulation may be provided on the steam supply lead lines, in case they are routed together. Similarly, this may be provided for the return lines to manifolds after the run of tracers.

4.10 Tracer Bonding With Heat Transfer Cement

In case of critical applications wherein medium pressure or high pressure steam is used for tracing, steam tracers shall be bonded using heat transfer cement.

Expansion loop shall be provided on long bonded tracer lines at 9 meter intervals and at 90° turn. This is accomplished by extending the tracer line through the heat transfer cement and insulation, making loop and returning back to traced line.

5.0 ATTACHMENTS

Annexure-1	Steam Tracing - Site Fabricated Manifolds (Typical Diagrams), 6-44-0007-A1
Annexure-2	Steam Tracing - Bought out Manifolds (Typical Diagrams), 6-44-0007-A2
Annexure-3	Steam Tracing – General Details (Typical Diagrams), 6-44-0007-A3

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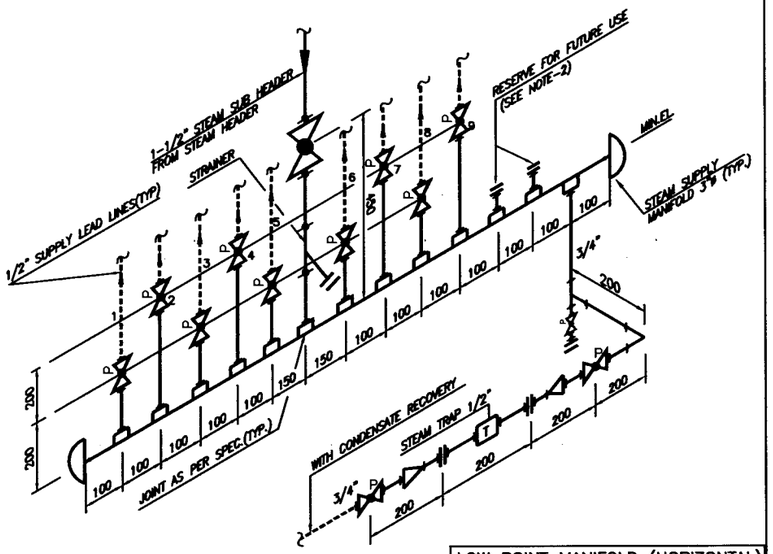
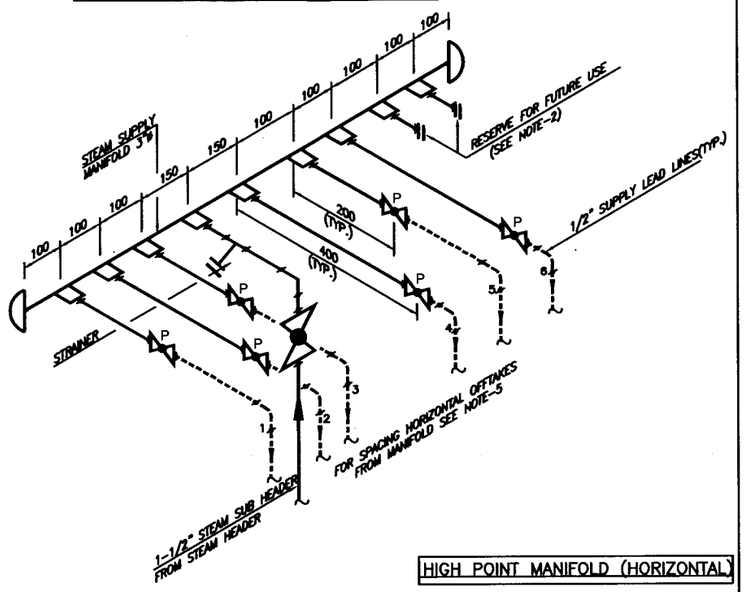
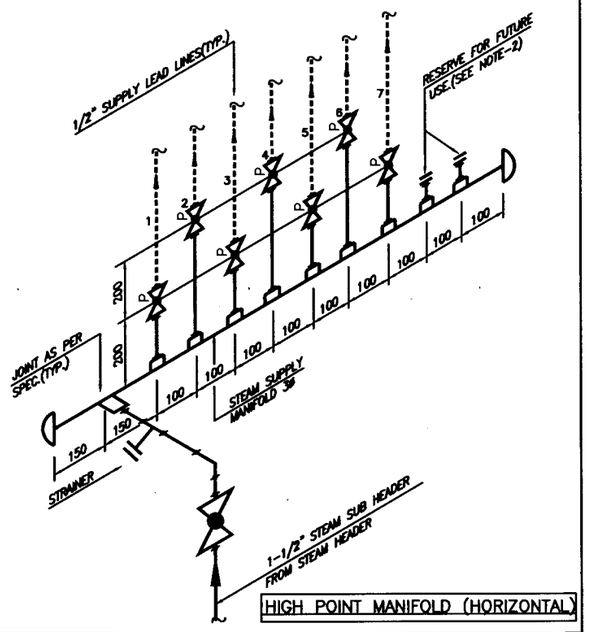
STEAM SUPPLY MANIFOLDS



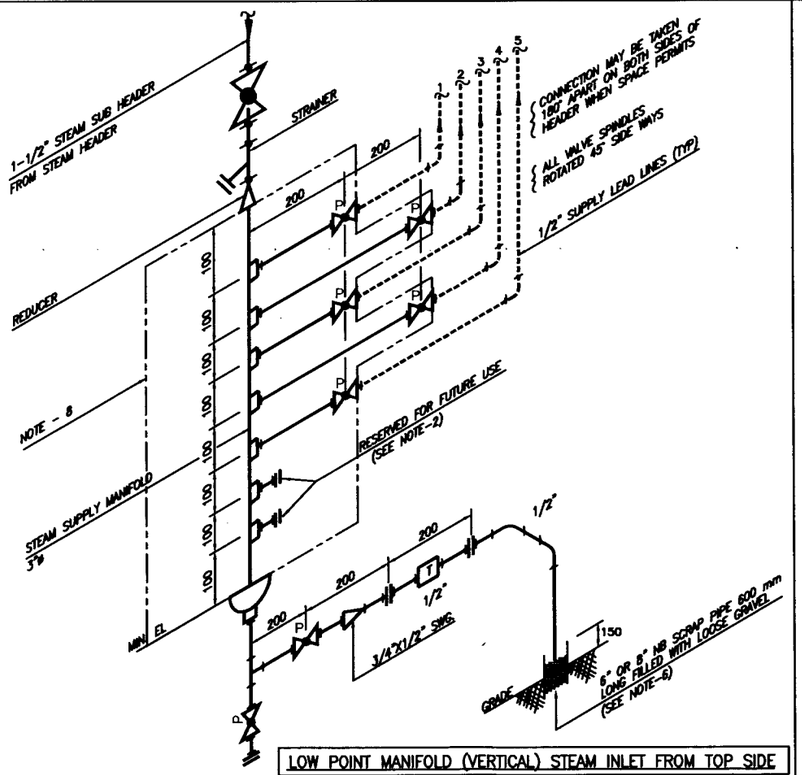
LOW POINT MANIFOLD (HORIZONTAL)



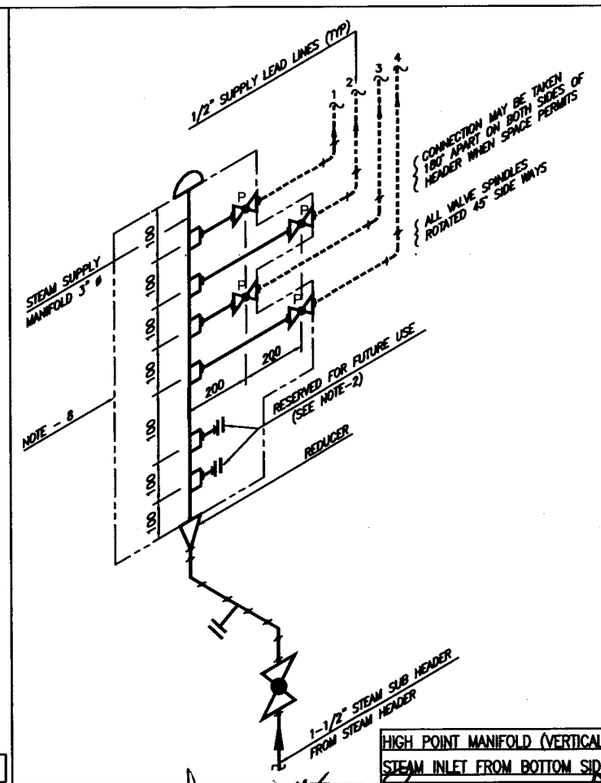
HIGH POINT MANIFOLD (HORIZONTAL)



HIGH POINT MANIFOLD (HORIZONTAL)



LOW POINT MANIFOLD (VERTICAL) STEAM INLET FROM TOP SIDE



HIGH POINT MANIFOLD (VERTICAL) STEAM INLET FROM BOTTOM SIDE

NOTES :

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED.
2. RESERVE APPROX. 20% OF TOTAL NUMBER OF TRACERS FOR FUTURE USE. (MINIMUM 2 NOS. OR AS DEFINED IN DESIGN BASIS)
3. SIZE OF STEAM SUPPLY LEAD LINES SHALL BE 1/2" & SUPPLY SUB HEADERS SHALL BE 1-1/2".
4. STEAM SUPPLY MANIFOLDS ARE TO BE NUMBERED. FOR DETAILS REFER PAGE 3 OF 5 OF THIS ANNEXURE.
5. FOR HORIZONTAL OFFTAKES, SUFFICIENT OPERATING SPACE SHALL BE GIVEN FOR OPERATION OF VALVES
6. SCRAP PIPE TO BE PROVIDED FOR OFFSITES FOR LOCATIONS WITH NO DITCHES NEARBY & AREAS WHICH ARE NOT PAVED. FOR UNITS & OTHER PAVED AREAS, PROVIDE DRAIN LINES TO CRWS / AG HEADER COLLECTING FUNNEL LOCATED NEAREST TO MANIFOLD.
7. MAXIMUM 12 NOS. OF SUPPLY LEAD LINES(INCLUDING SPARES) ARE PERMITTED PER SUPPLY MANIFOLD.
8. SITE FABRICATED MANIFOLD MAY BE SUBSTITUTED BY STANDARD BOUGHT OUT MANIFOLDS WITH GLANDLESS PISTON VALVES. MANIFOLDS CAN BE LOCATED IN HORIZONTAL ORIENTATION ALSO.
9. MANIFOLD ISOLATION VALVE SHALL BE GLOBE VALVE. ALL OTHER VALVES SHALL BE GLANDLESS PISTON VALVES.
10. MISSING DIMENSONS TO BE FINALIZED DURING DETAILED ENGINEERING.

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5	29.09.22	REVISED & ISSUED AS STANDARD SPECIFICATION	PK	SH	GB	SM
4	12.06.18	REAFFIRMED & ISSUED AS STANDARD SPECIFICATION	PK	SH	MI	DM
					Approved by	

ANNEXURE-1
STEAM TRACING-
SITE FABRICATED MANIFOLDS
(TYPICAL DIAGRAMS)

SPECIFICATION No.
6-44-0007-A1 Rev. 5
Page 1 of 5

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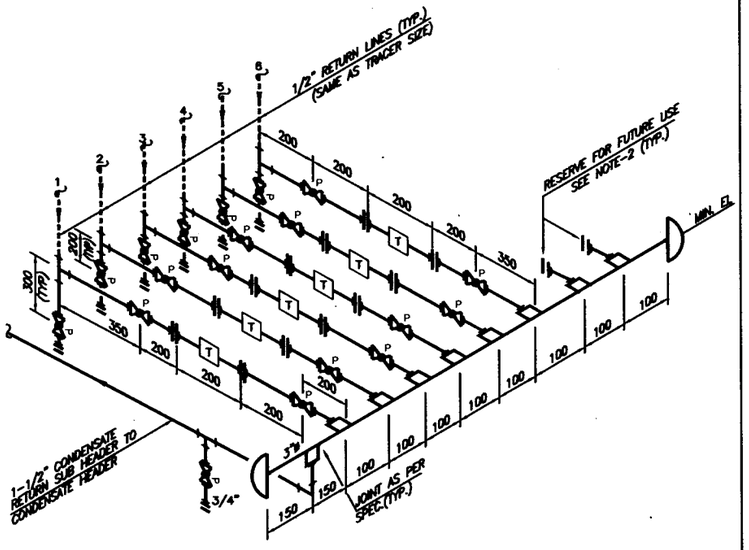
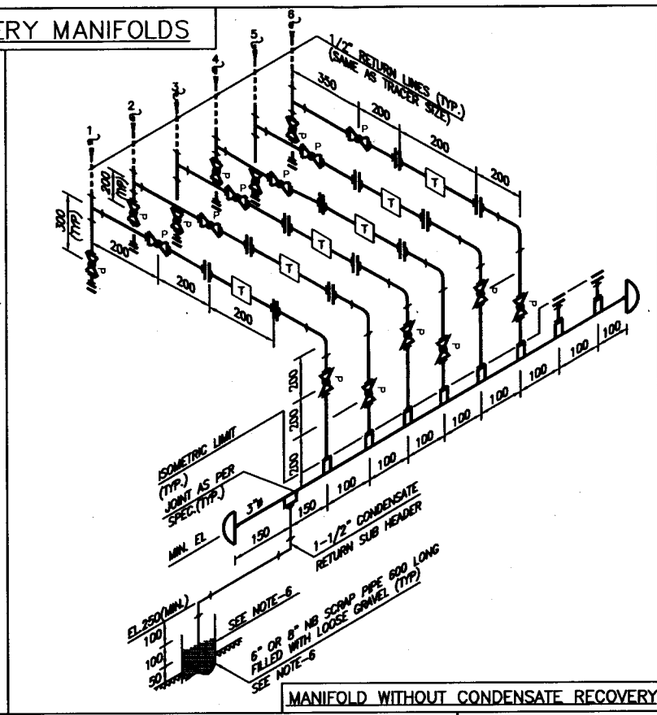
CONDENSATE RECOVERY MANIFOLDS



MANIFOLD WITH CONDENSATE RECOVERY



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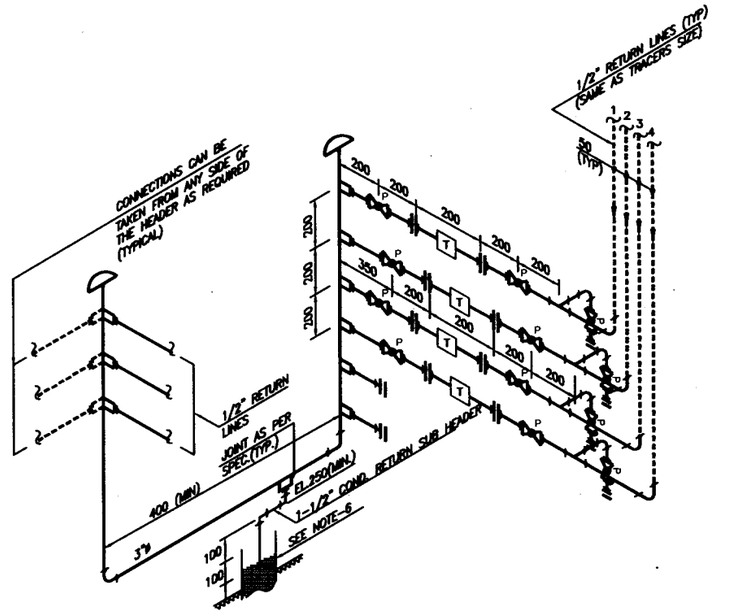

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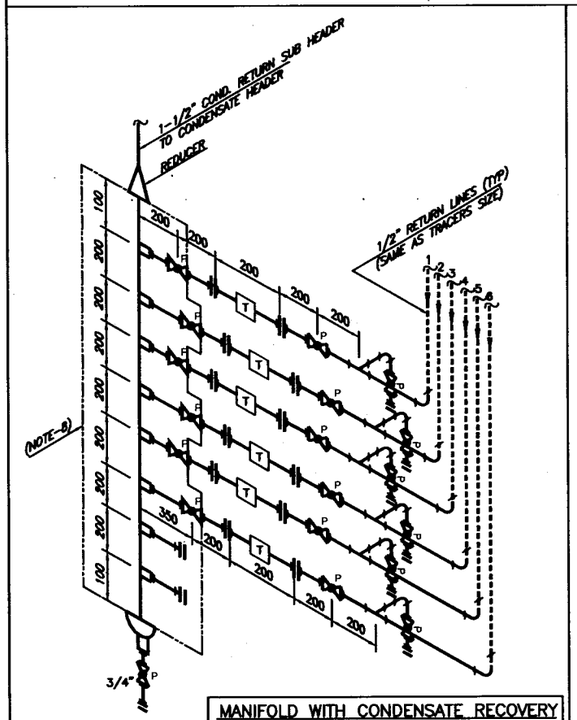
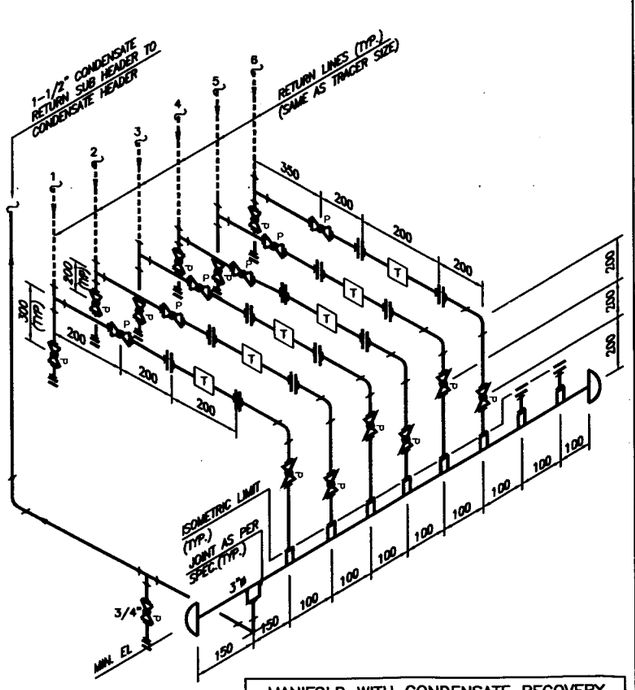
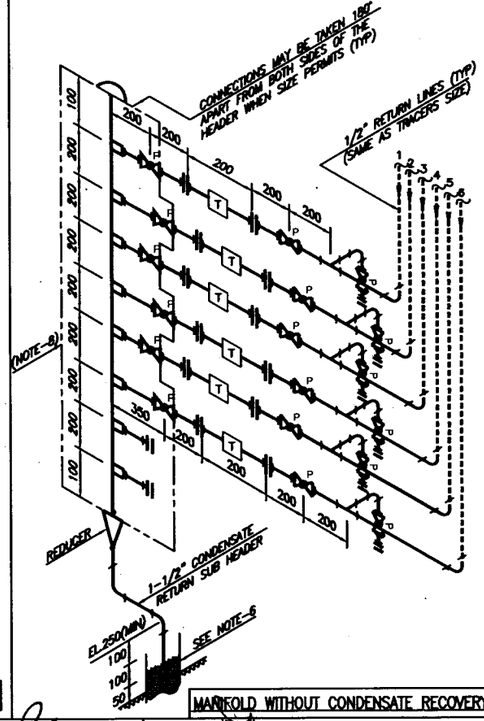


MANIFOLD WITH CONDENSATE RECOVERY



MANIFOLD WITH CONDENSATE RECOVERY



MANIFOLD WITHOUT CONDENSATE RECOVERY

NOTES :

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE NOTED.
2. RESERVE APPROX. 20% OF TOTAL NUMBER OF TRACERS FOR FUTURE USE (MINIMUM 2 NOS. OR AS DEFINED IN DESIGN BASIS)
3. SIZE OF RETURN LINES SHALL BE 1/2" & CONDENSATE SUB HEADERS SHALL BE 1½"
4. CONDENSATE RETURN MANIFOLDS ARE TO BE NUMBERED. FOR DETAILS REFER PAGE 3 OF 5 OF THIS ANNEXURE.
5. FOR HORIZONTAL OFFTAKES, SUFFICIENT OPERATING SPACE SHALL BE GIVEN FOR OPERATION OF VALVES
6. SCRAP PIPE TO BE PROVIDED FOR OFFSITES FOR LOCATIONS WITH NO DITCHES NEARBY & AREAS WHICH ARE NOT PAVED. FOR UNITS & OTHER PAVED AREAS, PROVIDE DRAIN LINES TO CRWS COLLECTING FUNNEL LOCATED NEAREST TO MANIFOLD.
7. MAXIMUM 12 NOS. OF RETURN LINES(INCLUDING SPARES) ARE PERMITTED PER CONDENSATE RETURN MANIFOLD.
8. SITE FABRICATED MANIFOLD MAY BE SUBSTITUTED BY STD. BOUGHT OUT MANIFOLDS WITH GLANDLESS PISTON VALVES. MANIFOLDS CAN BE LOCATED IN HORIZONTAL ORIENTATION ALSO.

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4	12.06.18	REAFFIRMED & ISSUED AS STANDARD SPECIFICATION	PK	SH	MI	RKT
					Approved by	

ANNEXURE-1
STEAM TRACING-
SITE FABRICATED MANIFOLDS
(TYPICAL DIAGRAMS)

SPECIFICATION No.
6-44-0007-A1 Rev. 5
Page 2 of 5

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ELEMENTARY DETAILS

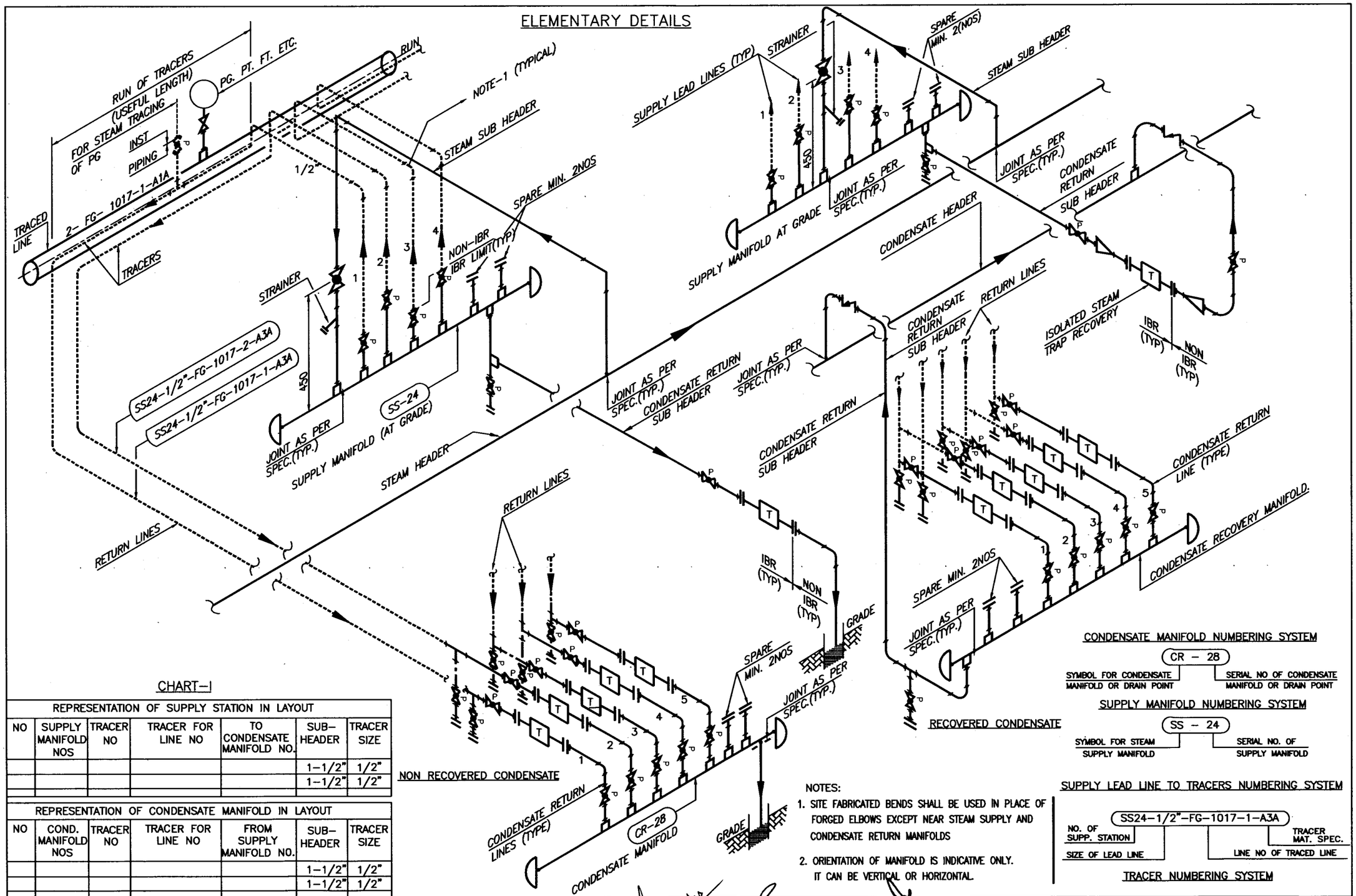

CHART-I

REPRESENTATION OF SUPPLY STATION IN LAYOUT						
NO	SUPPLY MANIFOLD NOS	TRACER NO	TRACER FOR LINE NO	TO CONDENSATE MANIFOLD NO.	SUB-HEADER	TRACER SIZE
					1-1/2"	1/2"
					1-1/2"	1/2"

REPRESENTATION OF CONDENSATE MANIFOLD IN LAYOUT						
NO	COND. MANIFOLD NOS	TRACER NO	TRACER FOR LINE NO	FROM SUPPLY MANIFOLD NO.	SUB-HEADER	TRACER SIZE
					1-1/2"	1/2"
					1-1/2"	1/2"

NOTES:

1. SITE FABRICATED BENDS SHALL BE USED IN PLACE OF FORGED ELBOWS EXCEPT NEAR STEAM SUPPLY AND CONDENSATE RETURN MANIFOLDS
2. ORIENTATION OF MANIFOLD IS INDICATIVE ONLY. IT CAN BE VERTICAL OR HORIZONTAL.

CONDENSATE MANIFOLD NUMBERING SYSTEM

CR - 28

SYMBOL FOR CONDENSATE MANIFOLD OR DRAIN POINT — SERIAL NO OF CONDENSATE MANIFOLD OR DRAIN POINT

SUPPLY MANIFOLD NUMBERING SYSTEM

SS - 24

SYMBOL FOR STEAM SUPPLY MANIFOLD — SERIAL NO. OF SUPPLY MANIFOLD

SUPPLY LEAD LINE TO TRACERS NUMBERING SYSTEM

SS24-1/2"-FG-1017-1-A3A

NO. OF SUPP. STATION — SIZE OF LEAD LINE — TRACER MAT. SPEC. — LINE NO OF TRACED LINE

TRACER NUMBERING SYSTEM

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	29.09.22	REVISED & ISSUED AS STANDARD SPECIFICATION	PK	SH	GB	SM
4	12.06.18	REAFFIRMED & ISSUED AS STANDARD SPECIFICATION	PK	SH	MI	RKT
					Approved by	

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ANNEXURE-1
STEAM TRACING-
SITE FABRICATED MANIFOLDS
(TYPICAL DIAGRAMS)

SPECIFICATION No.
6-44-0007-A1 Rev. 5
Page 3 of 5

Format No. 8-00-0001-F5 Rev. 0

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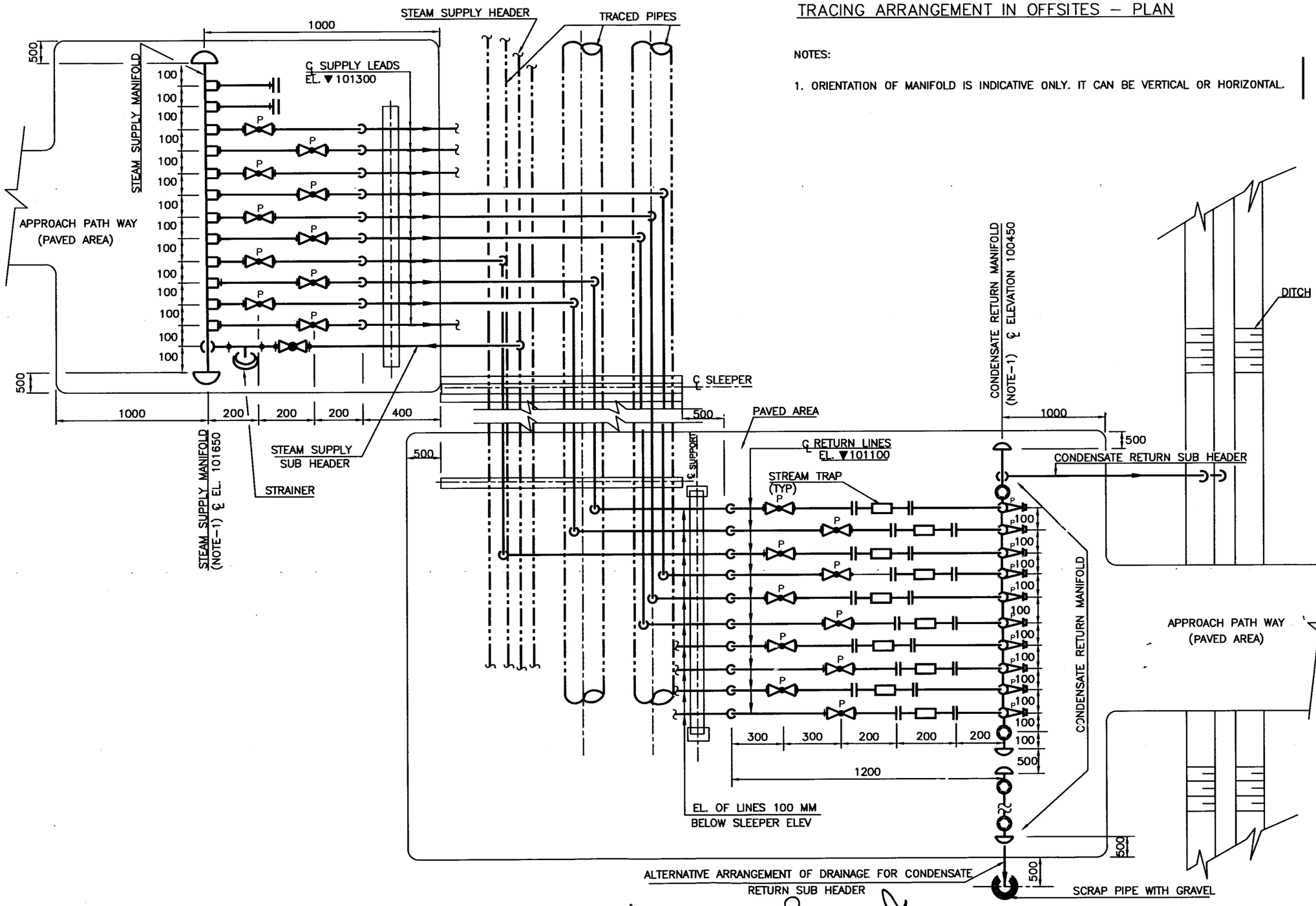
TRACING ARRANGEMENT IN OFFSITES – PLAN

NOTES:

1. ORIENTATION OF MANIFOLD IS INDICATIVE ONLY. IT CAN BE VERTICAL OR HORIZONTAL.



Rev. No.	Date	Purpose	Prepared by	Checked by	Approved by: GB / Stds. Committee Convenor	Approved by: SM / Stds. Bureau Chairman
5	29.09.22	REVISED & ISSUED AS STANDARD SPECIFICATION	PK	SH	GB	SM
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ANNEXURE-1
STEAM TRACING-
SITE FABRICATED MANIFOLDS
(TYPICAL DIAGRAMS)

SPECIFICATION No.
6-44-0007-A1 Rev. 5
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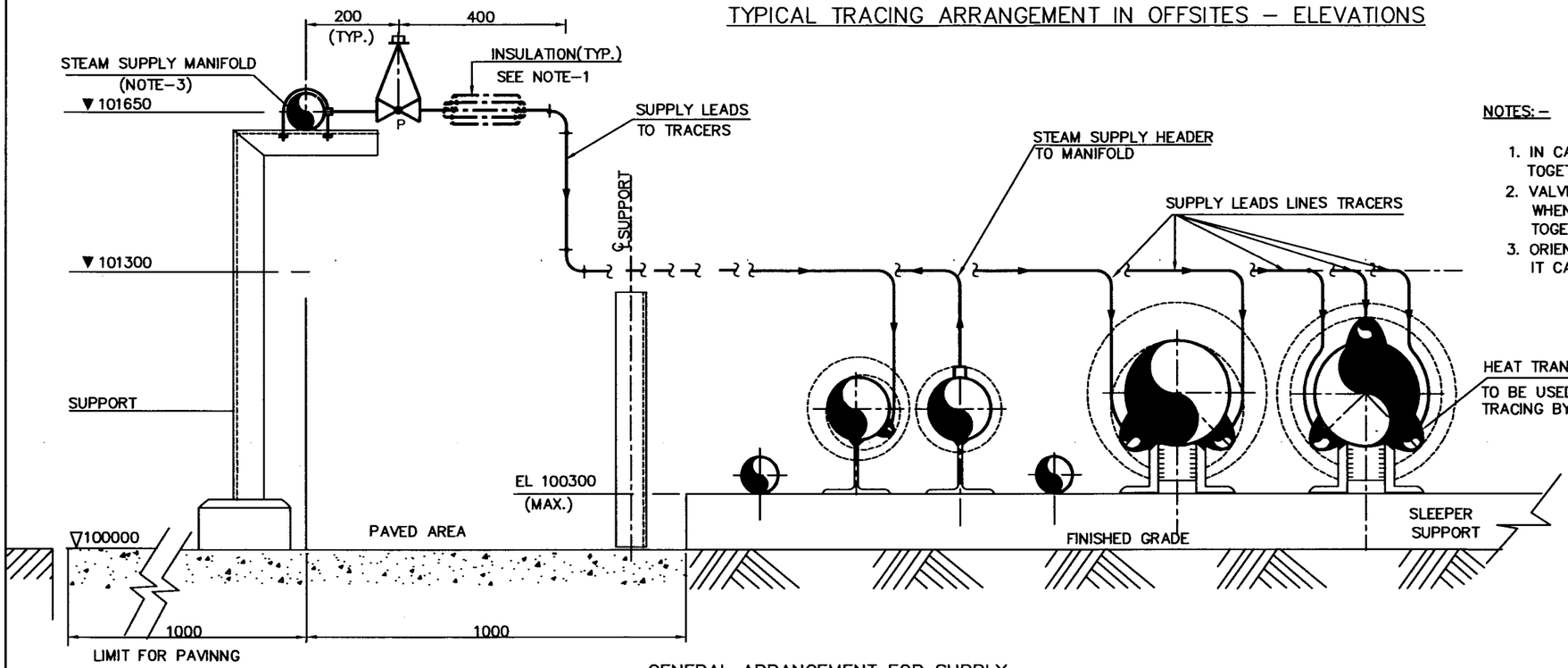
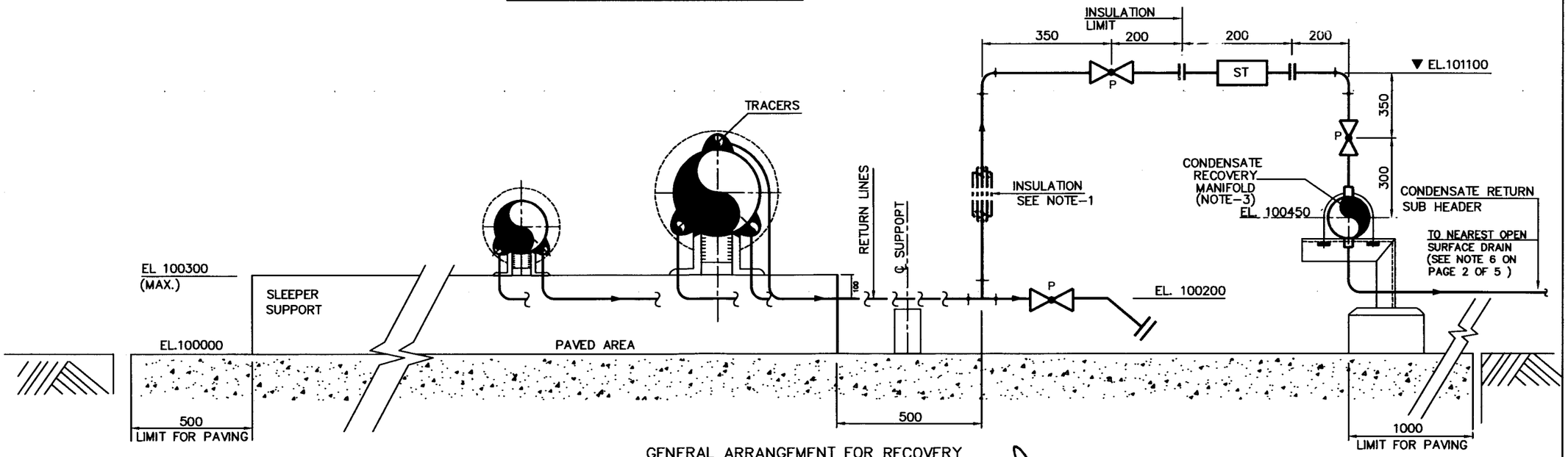
TYPICAL TRACING ARRANGEMENT IN OFFSITES – ELEVATIONS



NOTES:–

1. IN CASE OF SEVERAL TRACERS RUNNING TOGETHER BOX TYPE INSULATION IS PERMISSIBLE
2. VALVES & STEAM TRAPS SHALL BE STAGGERED WHENEVER TWO OR MORE TRACERS RUN TOGETHER AT THE MANIFOLDS
3. ORIENTATION OF MANIFOLD IS INDICATIVE ONLY. IT CAN BE VERTICAL OR HORIZONTAL.

GENERAL ARRANGEMENT FOR SUPPLY



GENERAL ARRANGEMENT FOR RECOVERY

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	29.09.22	REVISED & ISSUED AS STANDARD SPECIFICATION	PK	SH	GB	SM
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					Approved by	

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ANNEXURE-1
STEAM TRACING-
SITE FABRICATED MANIFOLDS
(TYPICAL DIAGRAMS)

SPECIFICATION No.
6-44-0007-A1 Rev. 5
Page 5 of 5

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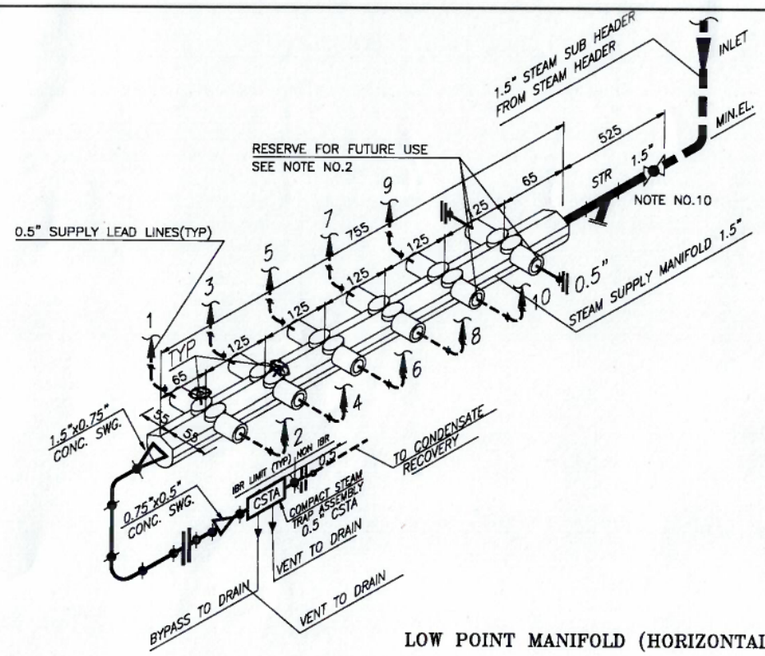
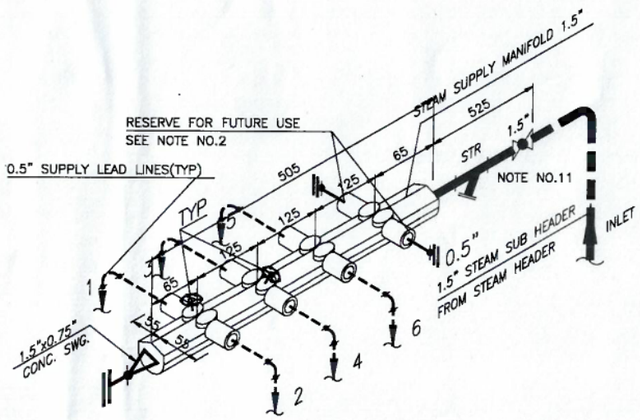
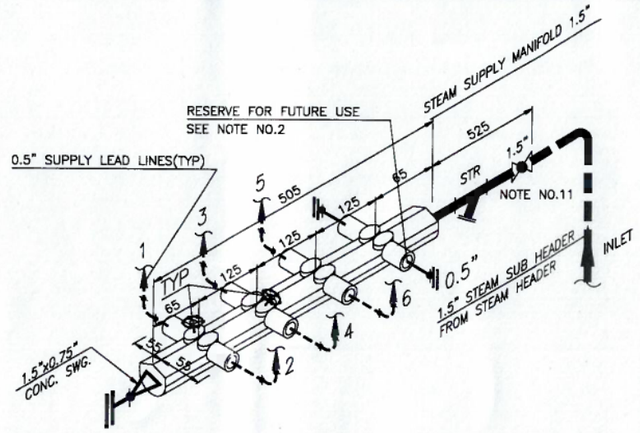
STEAM SUPPLY MANIFOLDS



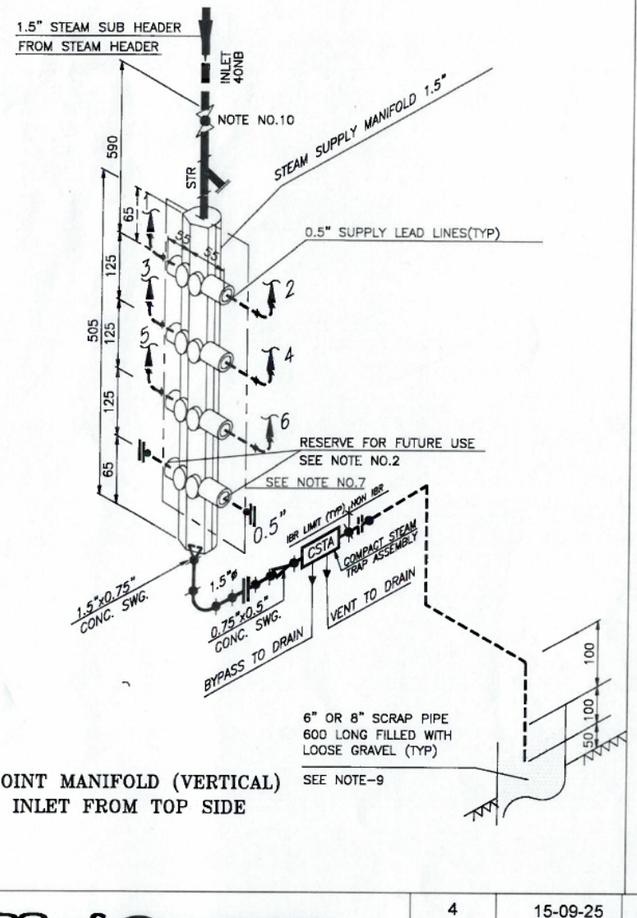
LOW POINT MANIFOLD (HORIZONTAL)



HIGH POINT MANIFOLD (HORIZONTAL)

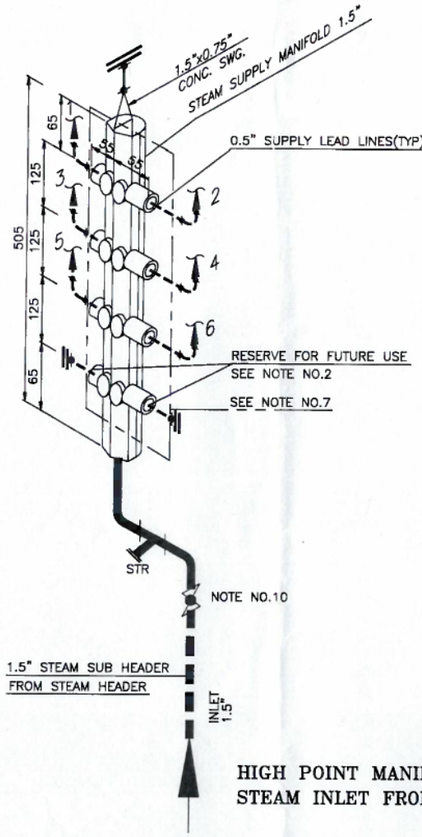


HIGH POINT MANIFOLD (HORIZONTAL)



LOW POINT MANIFOLD (VERTICAL)
STEAM INLET FROM TOP SIDE

PREFERRED CONFIGURATION



HIGH POINT MANIFOLD (VERTICAL)
STEAM INLET FROM BOTTOM SIDE

NOTES :-

1. ALL DIMNS ARE IN mm UNLESS OTHERWISE NOTED. THE DIMENSIONS FOR MANIFOLDS ARE INDICATIVE AND MAY VARY AS PER VENDOR SPECIFICATIONS.
2. RESERVE APPROX 20% OF TOTAL NUMBERS FOR FUTURE USE. (MINIMUM 2 NOS. OR AS DEFINED IN DESIGN BASIS)
3. SIZE OF STEAM SUPPLY LEAD LINES SHALL 0.5" & SUPPLY SUB HEADERS SHALL BE 1.5".
4. STEAM SUPPLY MANIFOLDS ARE TO BE NUMBERED. FOR DETAILS REF. PAGE 3 OF 6 OF THIS ANNEXURE.
5. MAXIMUM 12 NOS OF SUPPLY LEAD LINES (INCLUDING SPARES) ARE PERMITED PER SUPPLY MANIFOLD.
6. COMPACT PREFORGED MANIFOLDS WITH IN BUILT GLANDLESS PISTON VALVES SHALL BE USED.
7. FOR DRAIN TRAP ASSEMBLY, COMPACT STEAM TRAPPING ASSEMBLY CONSISTING UNIVERSAL THERMODYNAMIC TRAP CONNECTED TO PIPELINE CONNECTOR HAVING INBUILT GLANDLESS PISTON TYPE ISOLATION VALVES FOR UPSTREAM ISOLATION,DOWNSTREAM ISOLATION & TRAP BYPASS PURPOSE SHALL BE USED. TYPICAL ARRANGEMENT SHALL BE AS SHOWN IN THE DRAWINGS.
8. MISSING DIMENSIONS TO BE FINALIZED DURING DETAILED ENGINEERING.
9. SCRAP PIPE TO BE PROVIDED FOR OFFSITES FOR LOCATIONS WITH NO DITCHES NEARBY & AREAS WHICH ARE NOT PAVED. FOR UNITS & OTHER PAVED AREAS, PROVIDE DRAIN LINES TO CRWS/AG HEADER COLLECTING FUNNEL LOCATED NEAREST TO MANIFOLD.
10. MANIFOLD ISOLATION VALVE SHALL BE GLOBE VALVE. ALL OTHER VALVES SHALL BE GLANDLESS PISTON VALVES.

STR = STRAINER
P = PISTON VALVE

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	15-09-25	REVISED & ISSUED AS STANDARD SPECIFICATION	SRG	PK	SH	MN
3	29-09-22	REVISED & ISSUED AS STANDARD SPECIFICATION	PK	SH	GB	SM

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ANNEXURE-2
STEAM TRACING-
BOUGHT OUT MANIFOLDS
(TYPICAL DIAGRAMS)

STANDARD No.
6-44-0007-A2 Rev.4

Format No. 8-00-0001-F5 Rev. 0

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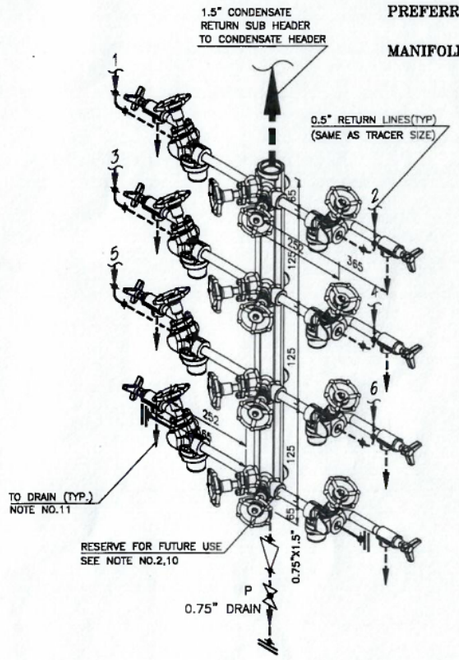
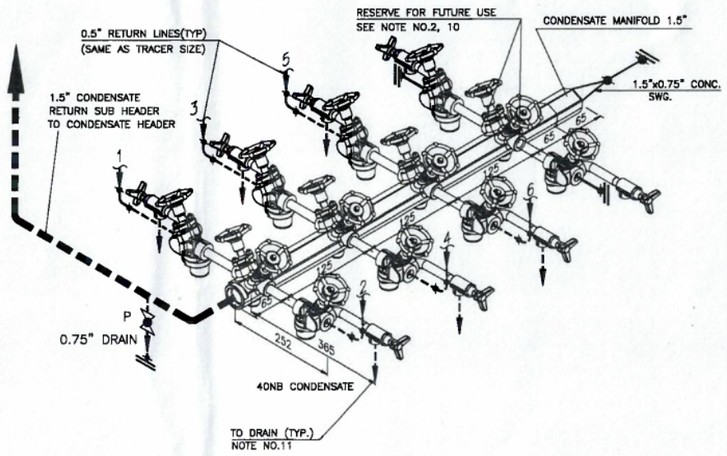
PREFERRED CONFIGURATION

MANIFOLD WITH CONDENSATE RECOVERY

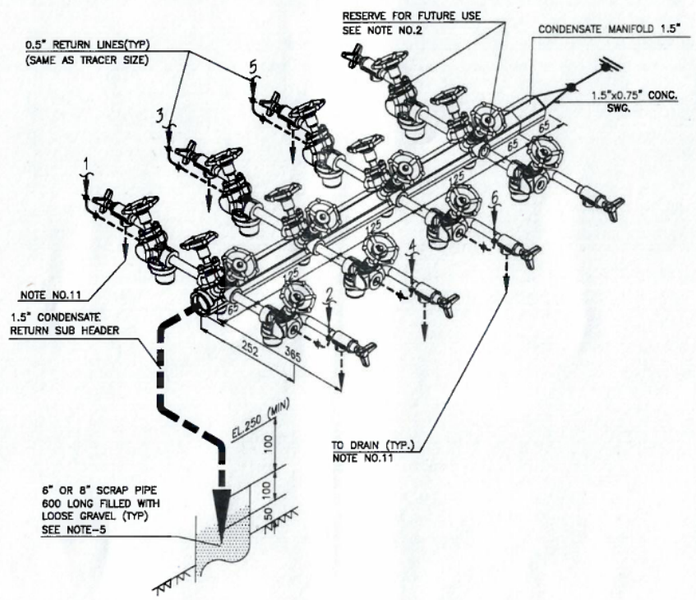


CONDENSATE RECOVERY MANIFOLDS

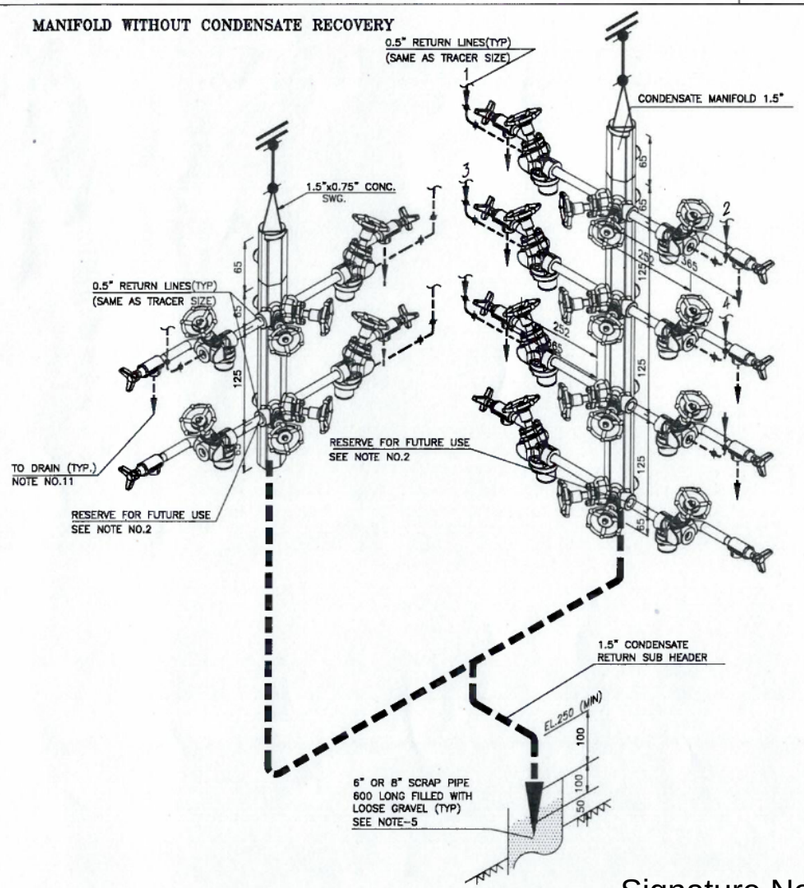
MANIFOLD WITH CONDENSATE RECOVERY



MANIFOLD WITHOUT CONDENSATE RECOVERY

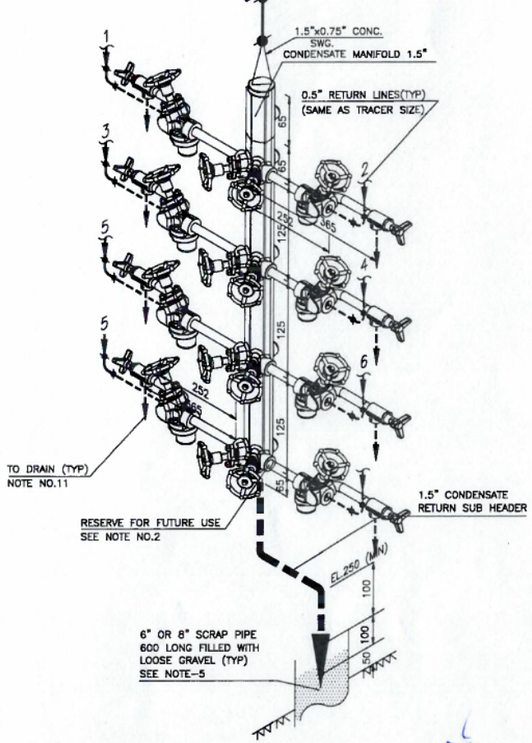


MANIFOLD WITHOUT CONDENSATE RECOVERY



PREFERRED CONFIGURATION

MANIFOLD WITHOUT CONDENSATE RECOVERY



NOTES :-

1. ALL DIMNS ARE IN mm UNLESS OTHERWISE NOTED. THE DIMENSIONS FOR MANIFOLDS ARE INDICATIVE AND MAY VARY AS PER VENDOR SPECIFICATIONS.
2. RESERVE APPROX 20% OF TOTAL NUMBERS FOR FUTURE USE. (MINIMUM 2 NOS. OR AS DEFINED IN DESIGN BASIS)
3. SIZE OF RETURN LINES SHALL 0.5" & CONDENSATE SUB HEADERS SHALL BE 1.5".
4. CONDENSATE RETURN MANIFOLDS ARE TO BE NUMBERED. FOR DETAILS REFER PAGE 3 OF 6 OF THIS ANNEXURE.
5. SCRAP PIPE TO BE PROVIDED FOR OFFSITES FOR LOCATIONS WITH NO DITCHES NEARBY & AREAS WHICH ARE NOT PAVED . FOR UNITS & OTHER PAVED AREAS . PROVIDE DRAIN LINES TO CRWS / AG HEADER COLLECTING FUNNEL LOCATED NEAREST TO MANIFOLD.
6. MAXIMUM 12 NOS OF RETURN LINES (INCLUDING SPARES) ARE PERMITED PER SUPPLY MANIFOLD.
7. COMPACT PREFORGED MANIFOLDS WITH IN BUILT GLANDLESS PISTON VALVES SHALL BE USED.
8. MISSING DIMENSIONS TO BE FINALIZED DURING DETAILED ENGINEERING.
9. 0.5" INLET POINTS IN CR MANIFILD SHALL BE SUITABLY STAGGERED FOR EASE OF PIPING.
10. SPARE RETURN LEADS SHALL BE BLINDED FOR MANIFOLDS WITH CONDENSATE RECOVERY.
11. TEMPORARY CONNECTION MAY BE PROVIDED TO ROUTE CONDENSATE RETURN BYPASS TO DRAIN DURING MAINTENANCE.

Signature Not Verified
Digitally signed by ARITRA DE
Date: 2026.05.18 17:56:06 IST
Location: eProcure-EPROC

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	15-09-25	REVISED & ISSUED AS STANDARD SPECIFICATION	SRG	PK	SH	
3	29-09-22	REVISED & ISSUED AS STANDARD SPECIFICATION	PK	SH	GB	SM

Approved by

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ANNEXURE-2
STEAM TRACING-
BOUGHT OUT MANIFOLDS
(TYPICAL DIAGRAMS)

STANDARD No.
6-44-0007-A2 Rev.4

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