GENERAL NOTES :-

1. ALL LUGS SHALL BE OF HIGH STRENGTH DEFORMED BARS OF GRADE Fe500/Fe500D CONFORMING TO IS 1786 (WITH GUARANTEED WELDABILITY) AND SHALL BE CONNECTED TO METAL INSERT PLATES BY 6 mm FILLET WELDS AS SHOWN IN SKETCHES.
2. METAL INSERT PLATES SHALL BE OF GRADE E250, CONFORMING TO IS 2062 (GR-A/BR/BO).
3. METAL INSERT PLATES MARKED ON DRAWING REFER AS UNDER

   IP-(A) @ (C)

   IP = INSERT PLATE

   A = TYPE OF INSERT PLATE

   C = ELEVATION OF INSERT PLATE (TOP EDGE)

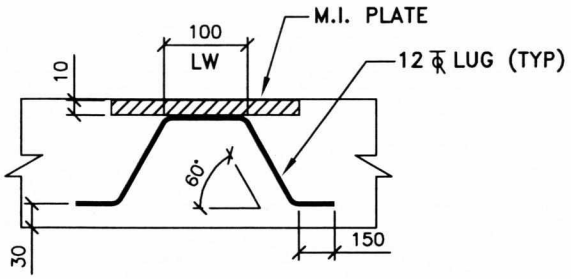
   e.g IP-R9a @ EL.110.300 MEANS INSERT PLATE TYPE R9a AT EL.110.300.
4. METAL INSERT PLATES SHALL BE KEPT FLUSH WITH CONCRETE SURFACE.
5. THE LONGER SIDE OF METAL INSERT PLATE SHALL BE KEPT VERTICAL UNLESS SHOWN OTHERWISE.
6. METAL INSERT PLATE ON COLUMN OR BEAM SHALL BE KEPT SYMMETRICAL ABOUT ℄ OF COLUMN OR BEAM, UNLESS SHOWN OTHERWISE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
8	14.03.24	REVISED AND ISSUED AS STANDARD	EMMANUEL	SUDIP PAUL	ANURAG SINHA	MAINAK NANDI
7	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R SRIVASTAVA	RK TRIVEDI

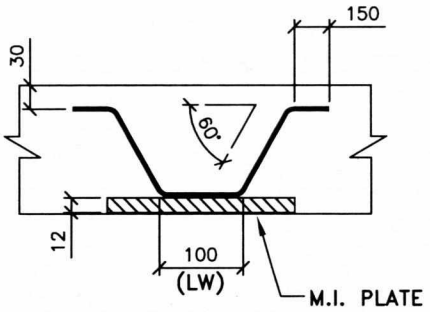
Approved by

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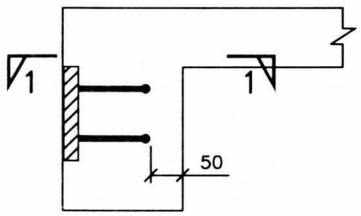
LUG BENDING DETAILS



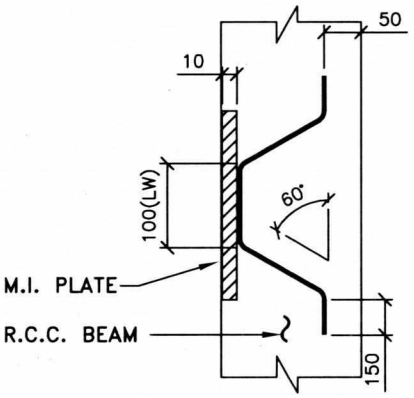
METAL INSERT DETAIL
ON TOP OF SLAB



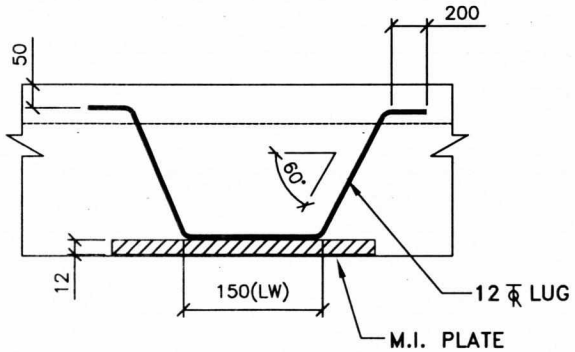
METAL INSERT DETAIL
ON BOTTOM OF SLAB



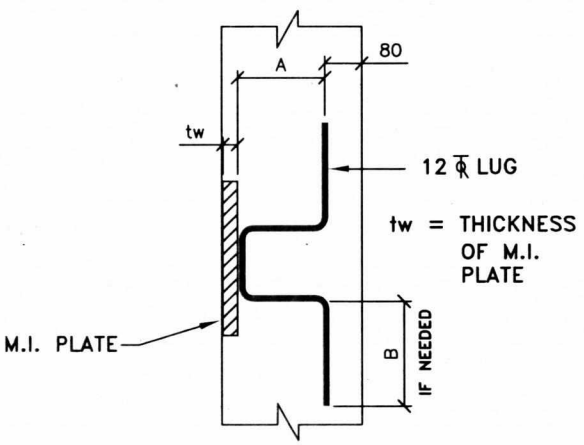
METAL INSERT DETAIL
ON SIDE OF BEAM



VIEW 1–1



METAL INSERT DETAIL
ON BOTTOM OF BEAM
(FOR ALTERNATE DETAIL REF. SHT. 7 OF 7)

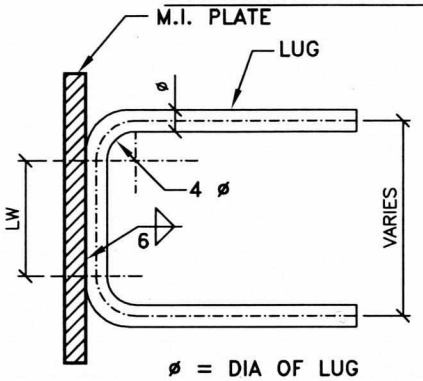


METAL INSERT DETAIL
ON COLUMNS

A+B = LUG EMBEDMENT REQUIRED AS PER SHT. 4,5,6 OF 7

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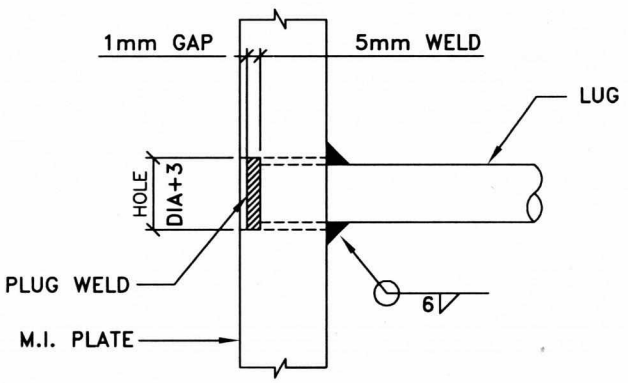
LUG BENDING DETAILS



ø = DIA OF LUG
LW = WELD LENGTH AVAILABLE

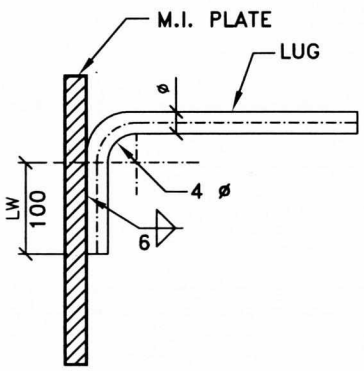
BENDING DIMENSIONS FOR 12ϕ & 16ϕ LUGS

(FOR SPACING OF LUGS ⩾ 190)
(NOT APPLICABLE FOR S1, S2, R1 & PS1)



WELD DETAIL OF 12ϕ & 16ϕ LUGS WITH M.I. PLATE

(FOR SPACING OF LUGS < 190)
(VALID FOR S1, S2 R1 & PS1)

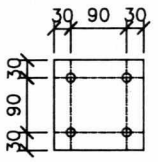
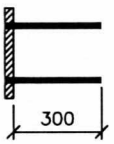
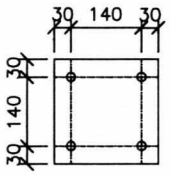
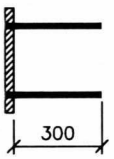
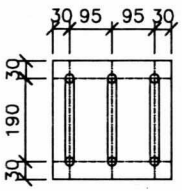
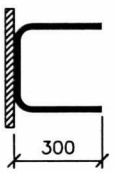
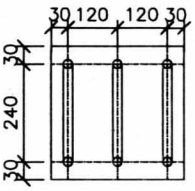
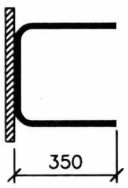
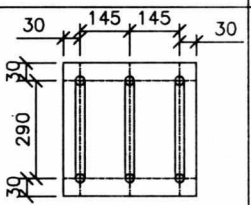
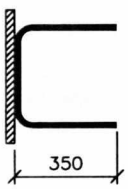
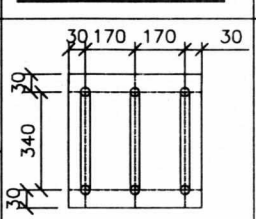
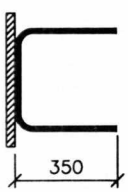


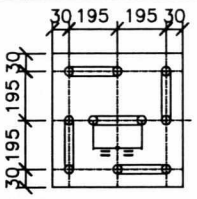
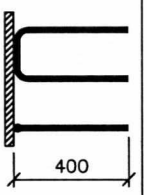
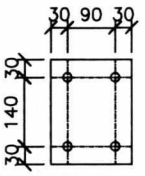
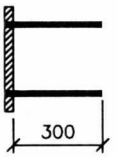
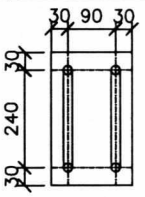
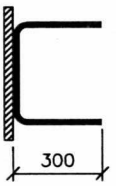
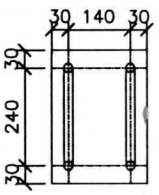
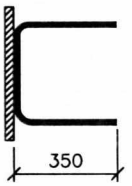
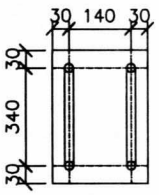
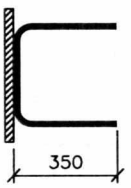
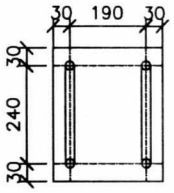
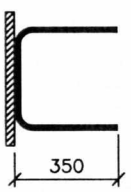
BENDING DIMENSIONS FOR 12ϕ & 16ϕ LUGS

(VALID FOR R9, R10, R12, R13, R14, PS11, & PS12)

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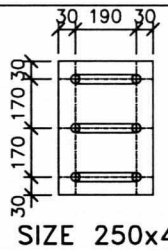
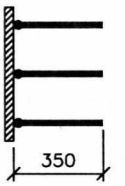
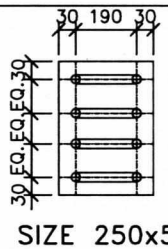
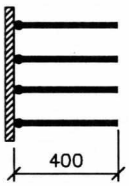
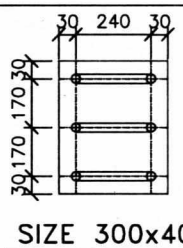
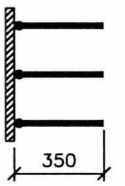
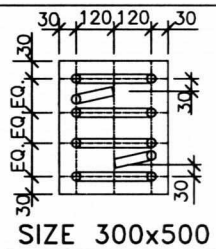
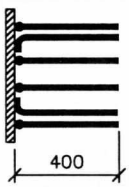
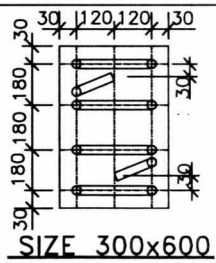
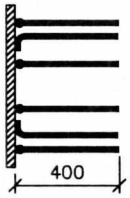
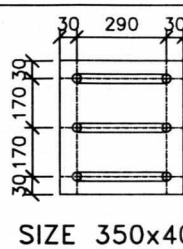
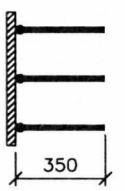
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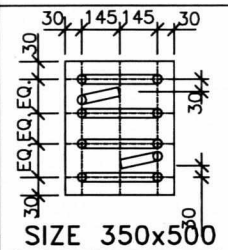
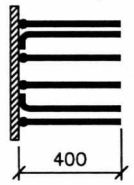
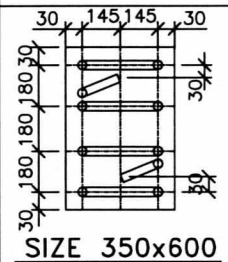
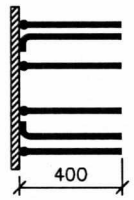
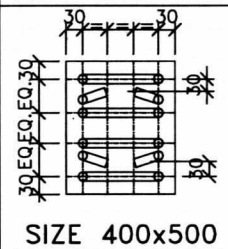
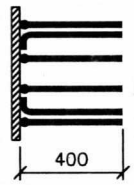
S. NO.	TYPE OF INSERT	DIA OF LUGS	THK. OF INSERT	DETAILS OF INSERT PLATE	
				PLAN	CROSS SECTION
1.	S1a	12	12	 SIZE 150x150	
	S1b	16	16		
2.	S2a	12	12	 SIZE 200x200	
	S2b	16	16		
3.	S3a	12	12	 SIZE 250x250	
	S3b	16	16		
4.	S4a	12	12	 SIZE 300x300	
	S4b	16	16		
5.	S5a	12	12	 SIZE 350x350	
	S5b	16	16		
6.	S6a	12	12	 SIZE 400x400	
	S6b	16	16		

S. NO.	TYPE OF INSERT	DIA OF LUGS	THK. OF INSERT	DETAILS OF INSERT PLATE	
				PLAN	CROSS SECTION
7.	S7a	12	12	 SIZE 450x450	
	S7b	16	16		
8.	R1a	12	12	 SIZE 150x200	
	R1b	16	16		
9.	R2a	12	12	 SIZE 150x300	
	R2b	16	16		
10.	R3a	12	12	 SIZE 200x300	
	R3b	16	16		
11.	R4a	12	12	 SIZE 200x400	
	R4b	16	16		
12.	R5a	12	12	 SIZE 250x300	
	R5b	16	16		

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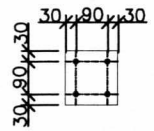
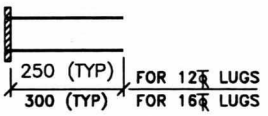
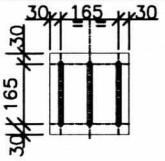
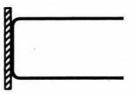
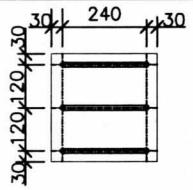
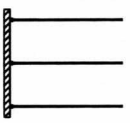
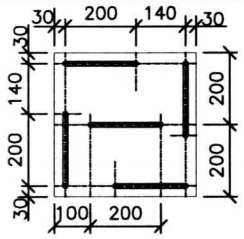
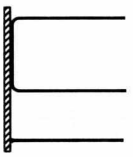
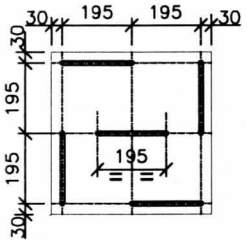
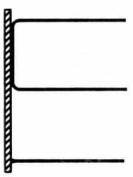
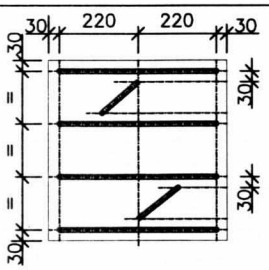
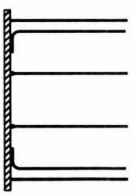
R DESIGNATES

S. NO.	TYPE OF INSERT	DIA OF LUGS	THK. OF INSERT	DETAILS OF INSERT PLATE	
				PLAN	CROSS SECTION
13.	R6a	12	12		
	R6b	16	16		
14.	R7a	12	12		
	R7b	16	16		
15.	R8a	12	12		
	R8b	16	16		
16.	R9a	12	12		
	R9b	16	16		
17.	R10a	12	12		
	R10b	16	16		
18.	R11a	12	12		
	R11b	16	16		

S. NO.	TYPE OF INSERT	DIA OF LUGS	THK. OF INSERT	DETAILS OF INSERT PLATE	
				PLAN	CROSS SECTION
19.	R12a	12	12		
	R12b	16	16		
20.	R13a	12	12		
	R13b	16	16		
21.	R14a	12	12		
	R14b	16	16		

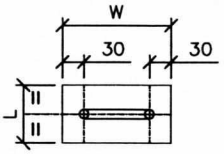
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PS DESIGNATES

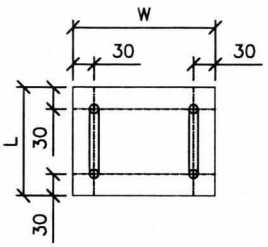
S.NO.	TYPE OF INSERT	DIA OF LUGS	THK. OF INSERT	DETAILS OF INSERT PLATE	
				PLAN	CROSS SECTION
1.	PS1	12	12	 SIZE 150x150	
	PS2	16	16		
2.	PS3	12	12	 SIZE 225x225	
	PS4	16	16		
3.	PS5	12	12	 SIZE 300x300	
	PS6	16	16		
4.	PS7	12	12	 SIZE 400x400	
	PS8	16	16		
5.	PS9	12	12	 SIZE 450x450	
	PS10	16	16		
6.	PS11	12	12	 SIZE 500x500	
	PS12	16	16		

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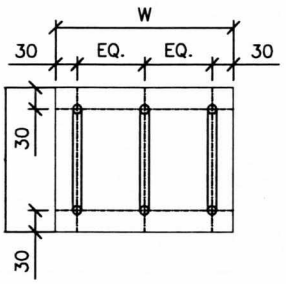
T DESIGNATES



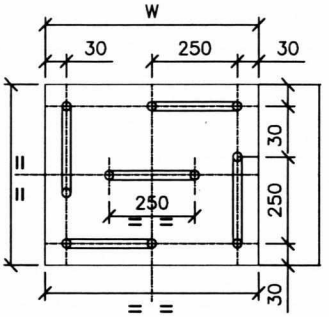
TYPE T1



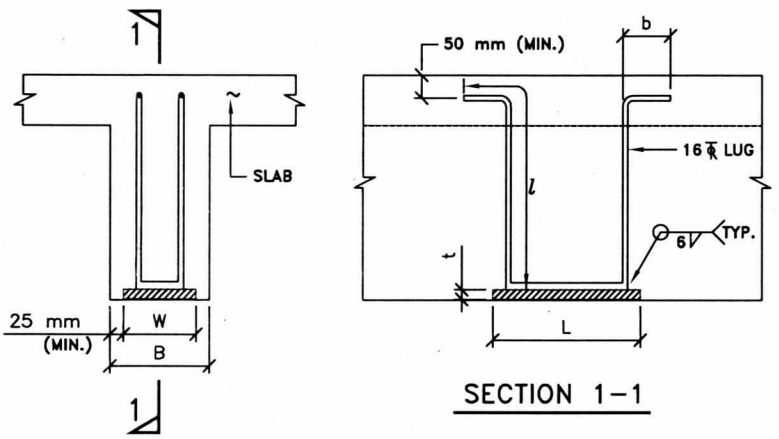
TYPE T2, T3 & T4



TYPE T5 & T6



TYPE T7



SECTION 1–1

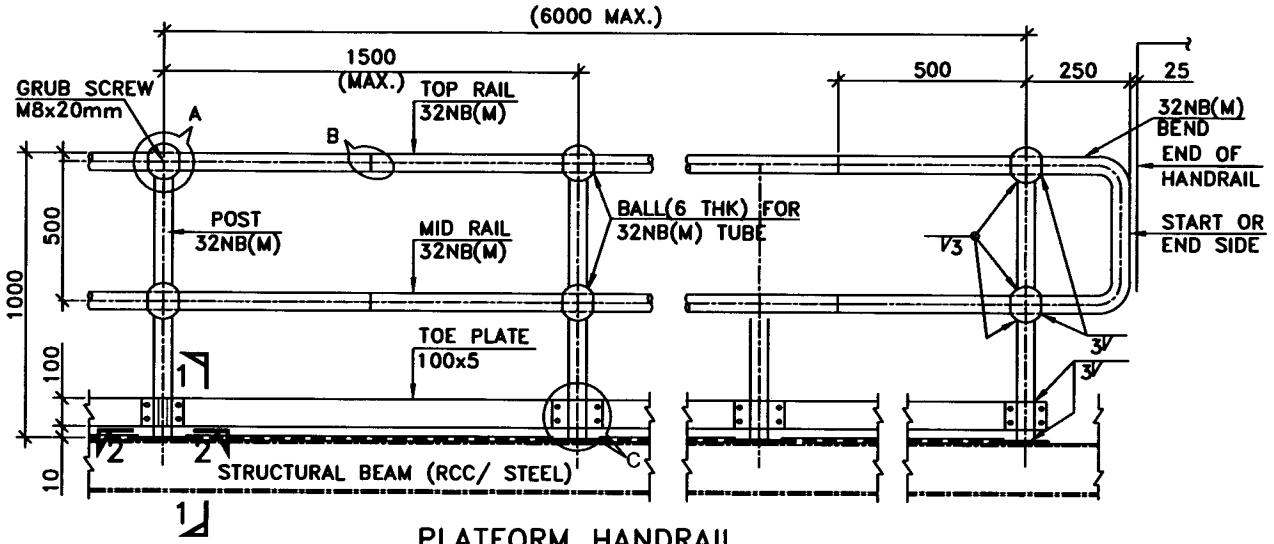
TYPICAL FIXING DETAIL

S.NO.	TYPE OF INSERT	WIDTH OF BEAM 'B' (mm)	MAXIMUM WIDTH OF PLATE 'W' (mm)	LENGTH OF PLATE 'L' (mm)	MAXIMUM 'b' (mm)	THICKNESS OF PLATE 't' (mm)	TOTAL ANCHORAGE LENGTH 'l' (mm)
1.	T1	230	180	180	110	16	350
2.	T2	300	220	250	110	20	350
3.	T3	350	270	250	110	20	350
4.	T4	400	320	250	110	20	350
5.	T5	450	370	300	110	32	350
6.	T6	500	420	300	110	32	350
7.	T7	500	420	400	110	32	350

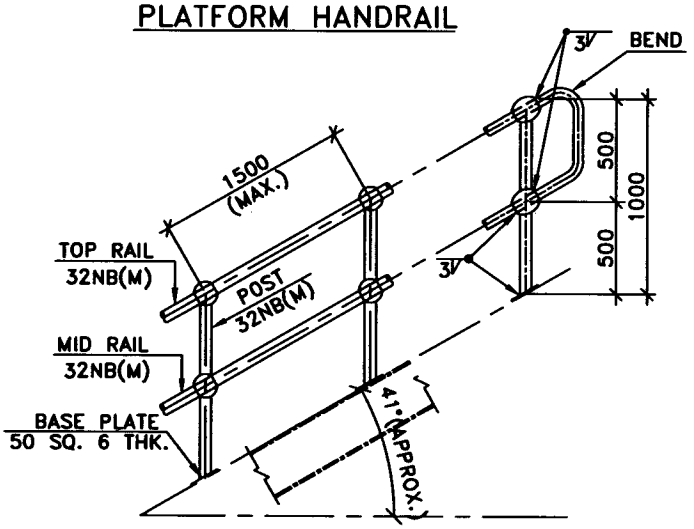
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NOTES :-

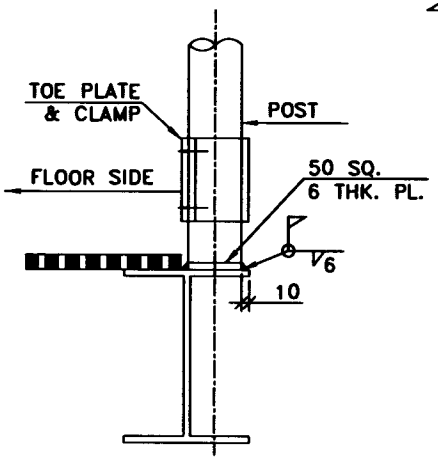
1. ALL DIMENSIONS ARE IN mm.
2. ALL M.S. TUBES SHALL CONFIRM TO IS : 1161/1239 & PLATE SHALL CONFIRM TO IS:2062.
3. PAINTING AND GALVANIZATION OF HANDRAIL SHALL BE AS PER JOB SPECIFICATION.



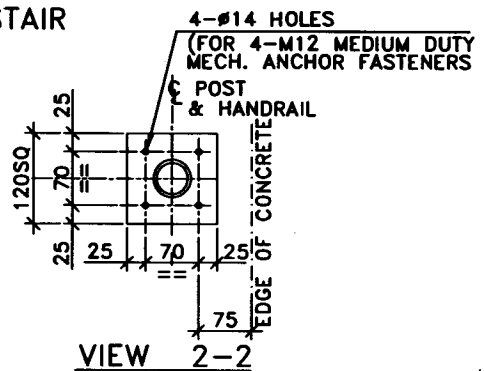
PLATFORM HANDRAIL



STAIR HANDRAIL
INCLINED RAILING
ON STEEL STAIR



VIEW 1-1
HORIZONTAL RAILING
ON STEEL PLATFORM

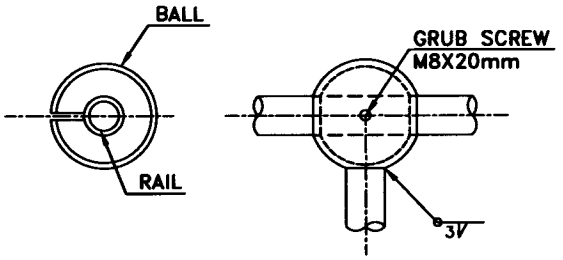


VIEW 2-2
BASE PLATE DETAIL
FOR VERTICAL POST
ON RCC BEAM/SLAB

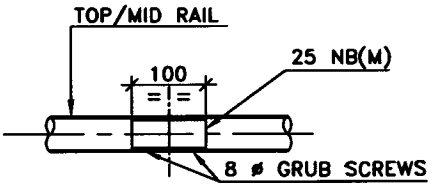
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
1	23.02.2021	REAFFIRMED & REISSUED AS STANDARD	AK	SG/AS	RS	S.MAZUMDAR
0	15.10.2015	ISSUED AS STANDARD	KKS	SG/AS	RS	SC

Approved by

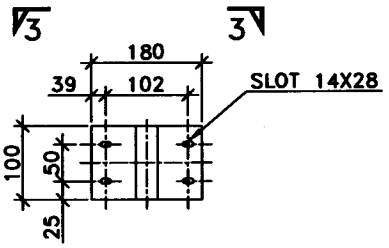
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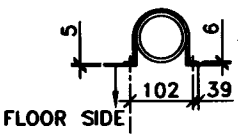
DETAIL– Ⓐ



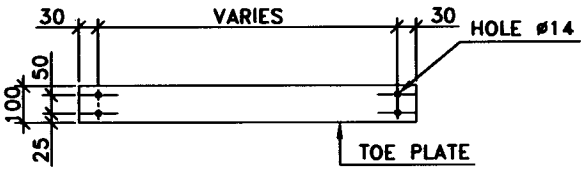
DETAIL – Ⓑ
DETAIL OF SPLICE



DETAIL – Ⓒ



VIEW 3–3
TOE PLATE CLAMP



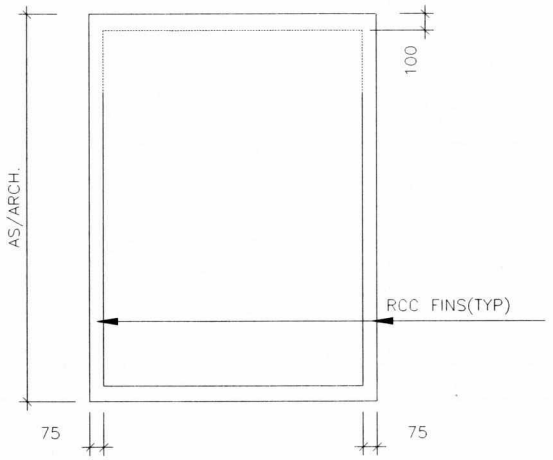
TOE PLATE DETAIL

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
1	23.02.2021	REAFFIRMED & REISSUED AS STANDARD	AK	RBS	AS	S.MAZUMDAR
0	15.10.2015	ISSUED AS STANDARD	KKS	SG/AS	RS	SC

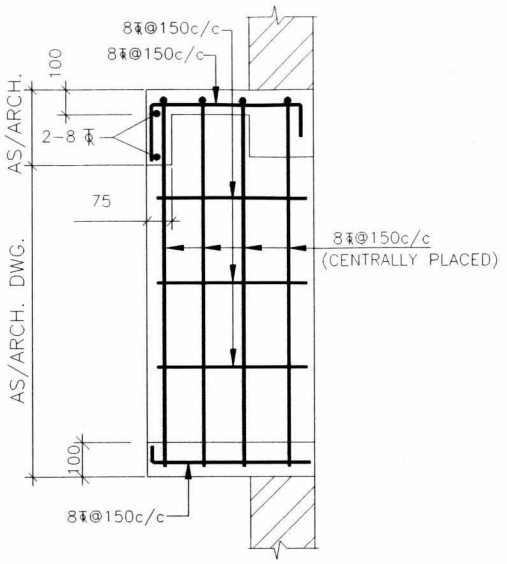
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NOTES :-

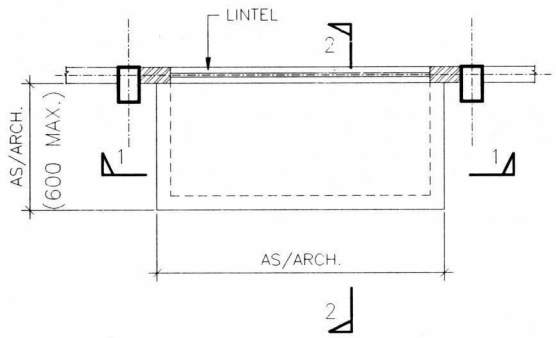
1. FOLLOWING DETAILS ARE COVERED IN THIS STANDARD.
   - A. WINDOW FINS
   - B. RAIN WATER PIPE ENCASEMENT.
   - C. BRICK WORK FROM PLINTH BEAM.
   - D. STAIR PEDESTAL.
   - E. RAMP DETAILS
   - F. GUTTER DETAILS
   - G. PARAPET DETAILS
   - H. SLANTING RCC FACIA FOR WINDOW
   - I . RCC FACIA AT ROOF
   - J. SLANTING RCC FACIA AT ROOF
   - K. EXHAUST FAN HOOD
2. CONCRETE & REINF. BARS SHALL BE OF SAME GRADE AS THAT OF MAIN STRUCTRE.
3. LAPS FOR REINFORCEMENT SHALL CONFORM TO 7-68-0106 SUBJECTED TO MIN. OF 300mm.
4. DESIGN IS BASED ON IS:456.
5. ANCHORAGE LENGTH SHALL BE LAP LENGTH-4 TIMES THE DIAMETER OF BAR FOR EACH 45° BEND.



SECTION 1-1

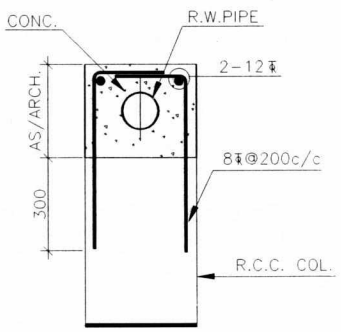


SECTION 2-2

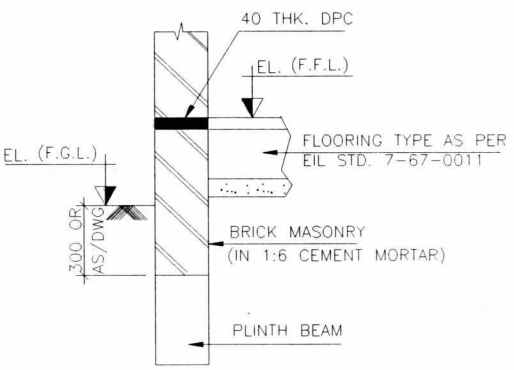


PLAN

A R/F DETAIL OF WINDOW FINS
(LOCATION & ORIENTATION AS/ARCH. DWG.)



B TYP. DET. OF R.W.P. ENCASEMENT
(LOCATION & ORIENTATION AS PER ARCH.)

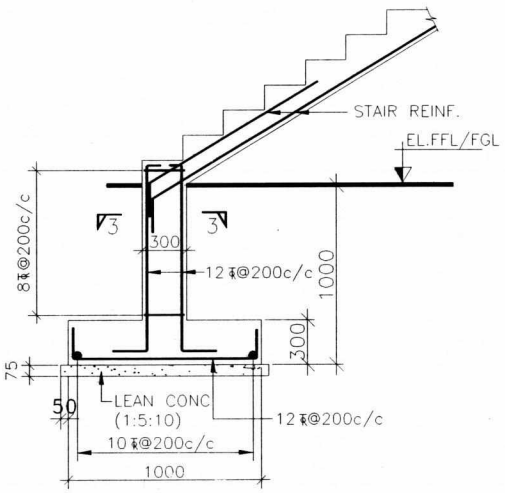


C DETS. OF B/W FROM PLINTH BEAM
(FOR LOCATION & EXTENT OF BRICK MASONRY REFER ARCH. DRG.)

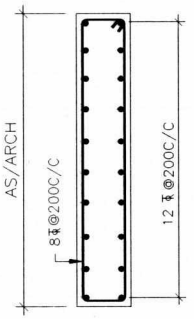
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	08.12.2022	REVISED & ISSUED AS STANDARD	JITENDER	ALPANA SRIVASTAVA	ANURAG SINHA	S. MAZUMDAR
1	15.04.2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA

Approved by

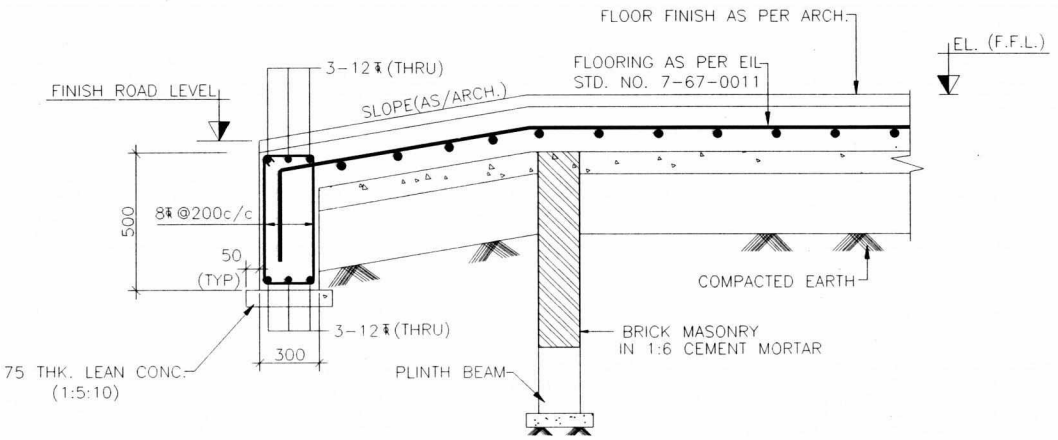
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D TYPICAL DETAIL OF STAIR PEDESTAL



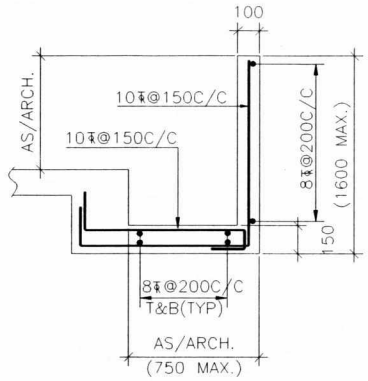
SEC. 3-3



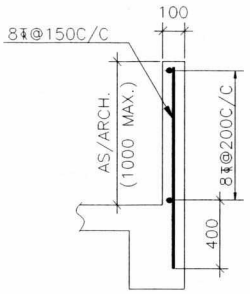
E TYPICAL DETAIL OF RAMP
(FOR ORIENTATION AND LOCATION REFER ARCH. DRAWING)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	08.12.2022	REVISED & ISSUED AS STANDARD	JITENDER	ALPANA SRIVASTAVA	ANURAG SINHA	S. MAZUMDAR
1	15.04.2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA

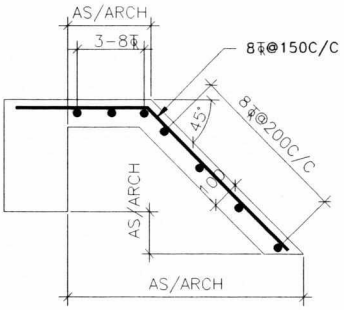
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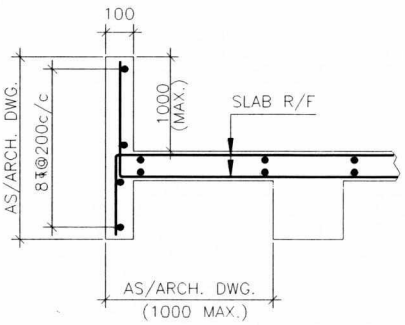
F RCC GUTTER DETAIL



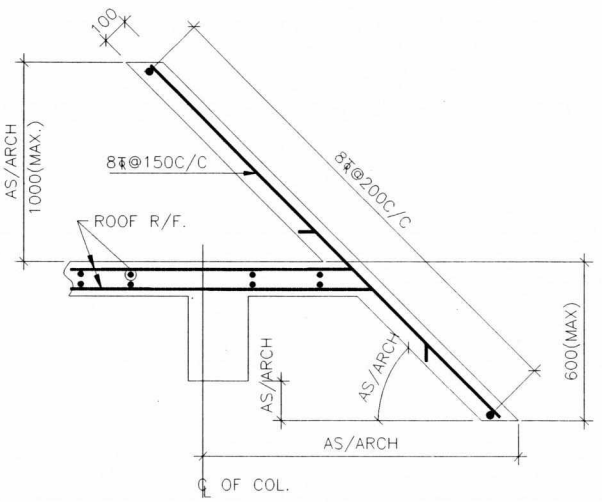
G RCC PARAPET WALL DETAIL



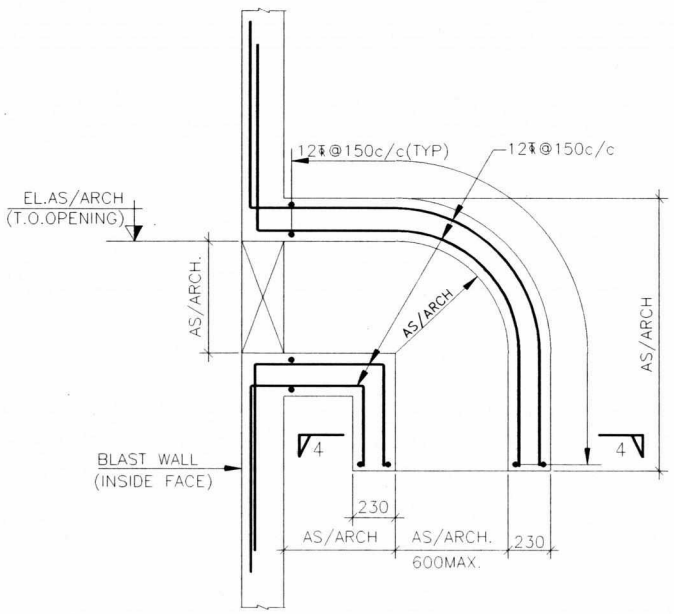
H SLANTING FACIA DETAIL ON WINDOW

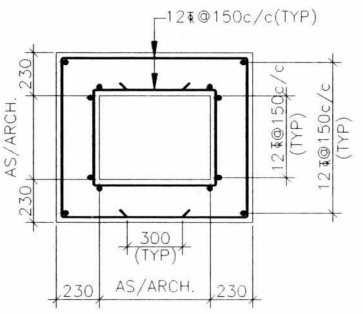


I RCC FACIA DETAIL AT ROOF



J SLANTING RCC FACIA DETAIL AT ROOF





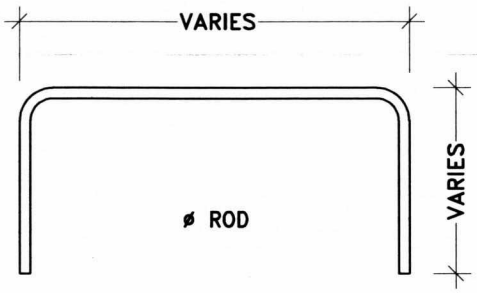
SECTION 4-4

K DETAIL OF EXHAUST FAN HOOD IN RCC BLAST PROOF WALL

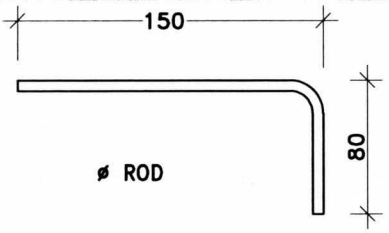
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1	15.04.2017	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA

Approved by

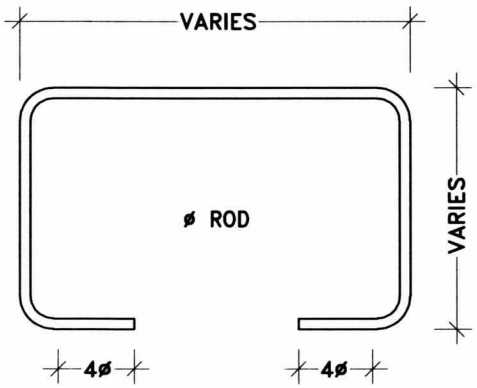
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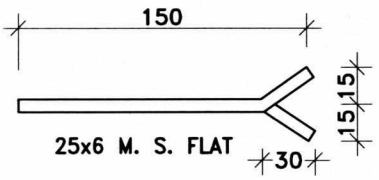
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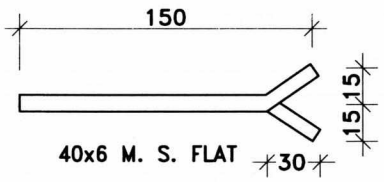
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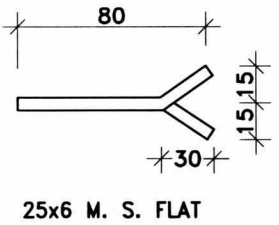
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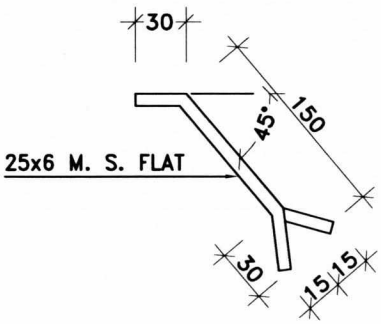
TYPE–'C1'



TYPE–'C2'



TYPE–'C3'

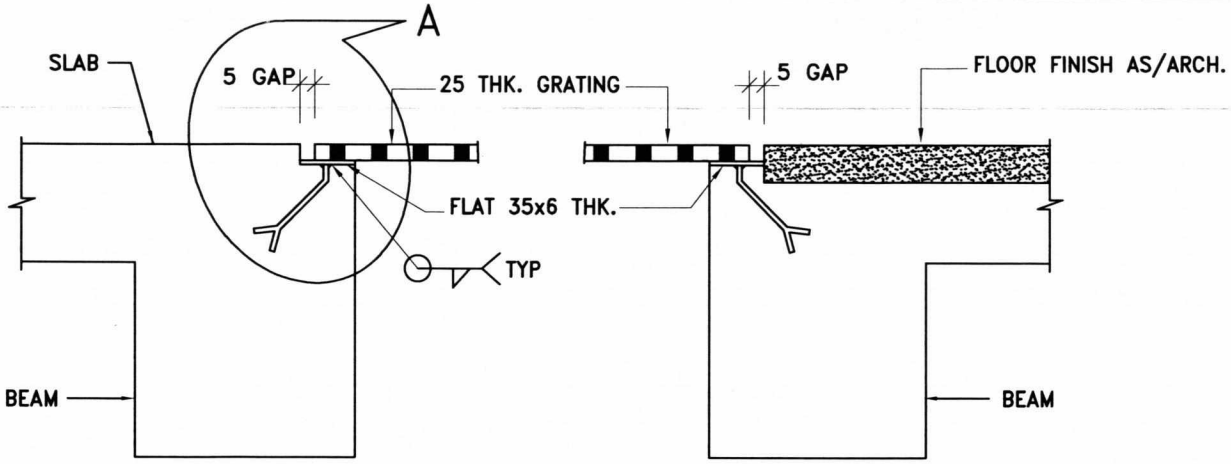


TYPE–'C4'

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	12.12.23	REAFFIRMED AND ISSUED AS STANDARD	SN	AD/MM	ANURAG SINHA	MAINAK NANDI
6	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

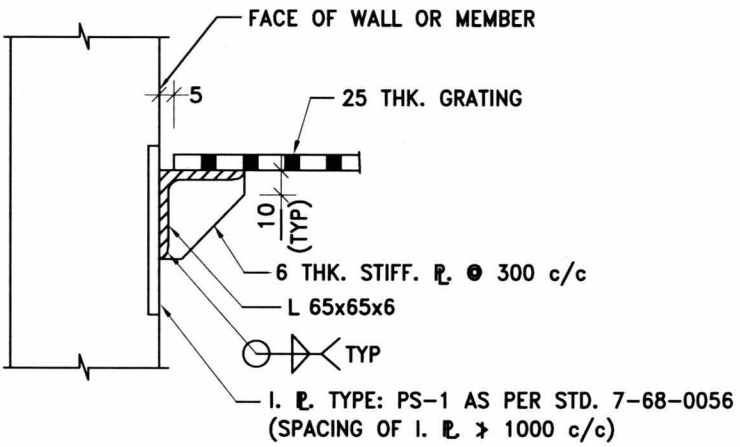
Approved by

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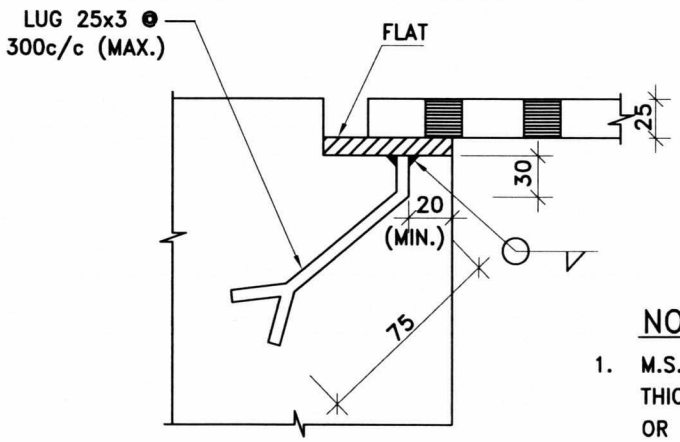


GRATING SUPPORT OVER BEAM WITHOUT FLOOR FINISH

GRATING SUPPORT OVER BEAM WITH FLOOR FINISH



GRATING SUPPORT ON WALL/COLUMN



DETAIL-'A'

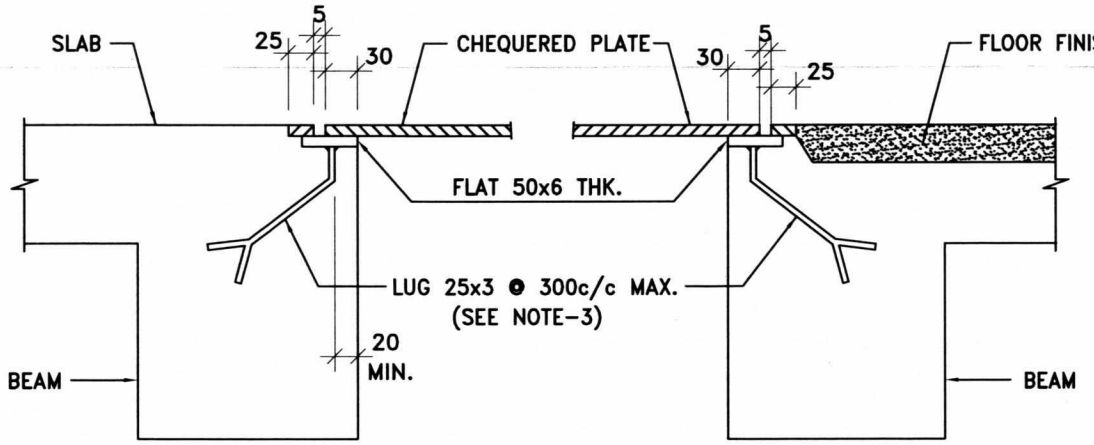
NOTES:

1. M.S. LUGS SHALL BE SUITABLY BENT IF CONCRETE THICKNESS IS LESS THAN THE LENGTH OF LUGS OR LUGS INTERFERE WITH R/F BARS.
2. ALL DIMENSIONS ARE IN mm.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
8	12.12.23	REVISED AND ISSUED AS STANDARD	SN	AD/MM	ANURAG SINHA	MAINAK NANDI
7	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

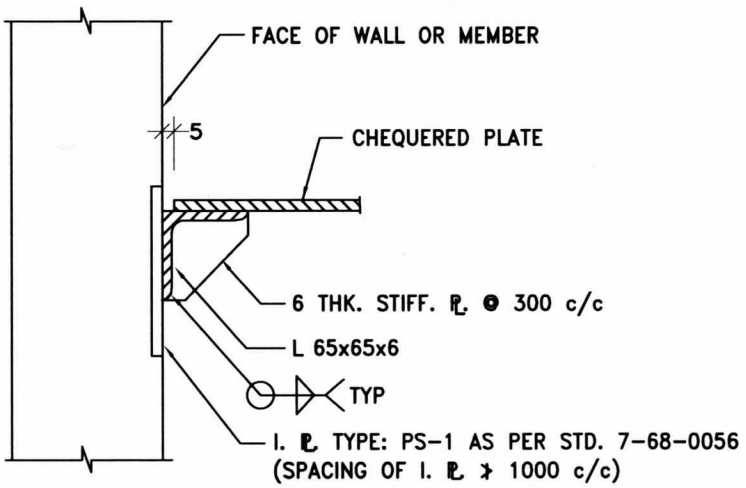
Approved by

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CHQD. PL SUPPORT OVER BEAM WITHOUT FLOOR FINISH

CHQD. PL SUPPORT OVER BEAM WITH FLOOR FINISH



CHQD. PL SUPPORT ON WALL/COLUMN

NOTES:

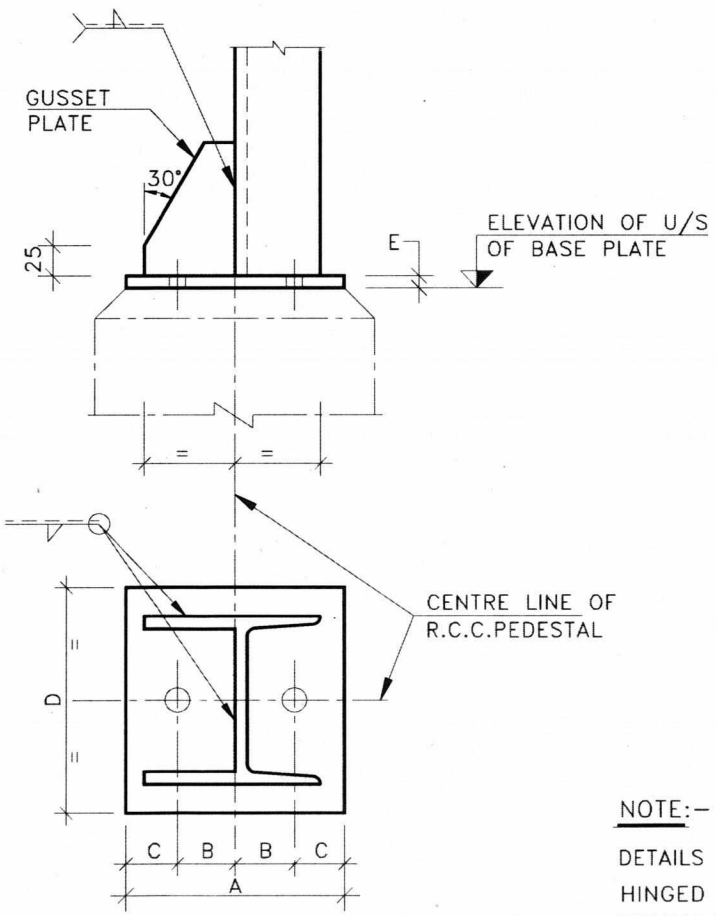
1. M.S. LUGS SHALL BE SUITABLY BENT IF CONC. THICKNESS IS LESS THAN THE LENGTH OF LUGS OR LUGS INTERFERE WITH R/F BARS
2. ALL DIMENSIONS ARE IN mm.
3. DETAILS OF LUGS SHALL BE SAME AS GIVEN IN 7-68-0202.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
8	12.12.23	REVISED AND ISSUED AS STANDARD	SN	AD/MM	ANURAG SINHA	MAINAK NANDI
7	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

Approved by

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	A	B	C	D	E	HOLE ø	BOLT M	AREA OF BASE PL cm^2	RESISTING AREA FOR 2 BOLTS cm^2	ALLOWABLE TENSION (kg)	ALLOWABLE SHEAR (kg)	WEIGHT (kg)
ISMC 100	150	40	35	140	12	19	16	210	3.14	3690	2460	1.98
ISMC 125	150	40	35	170	12	19	16	255	3.14	3690	2460	2.41
ISMC 150	180	50	40	190	12	21	18	342	3.84	4510	3010	3.23
ISMC 175	180	50	40	220	16	23	20	396	4.90	5750	3840	4.98
ISMC 200	180	50	40	240	16	23	20	432	4.90	5750	3840	5.43
ISMC 225	210	60	45	270	16	25	22	567	6.06	7120	4750	7.13
ISMC 250	210	60	45	290	16	25	22	609	6.06	7120	4750	7.64
ISMC 300	230	60	55	340	20	27	24	782	7.06	8290	5540	12.28
ISMC 350	240	65	55	390	20	32	27	936	9.18	10790	7200	14.70
ISMC 400	240	65	55	440	20	32	27	1056	9.18	10790	7200	16.58



GUSSET PLATE	STEEL SHAPES	THK
	ISMC 100 TO 150	6
	ISMC 175 TO 225	8
	ISMC 250 TO 400	10

NOTE:-

DETAILS IN THIS STANDARD SHALL BE ADOPTED FOR HINGED BASE ONLY, WHEN SO REFERRED IN THE DESIGN DRAWING.

ISMC 100 TO ISMC 400

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	08-12-22	REAFFIRMED & ISSUED AS STANDARD	JITENDER	ALPANA SRIVASTAVA	ANURAG SINHA	S. MAZUMDAR
6	15-04-17	REAFFIRMED & ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA

Approved by

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TABLE–1 (FOR CABLE DUCT)

W \ L	4500	5000	6000	7000	8000
1200	MC200	MC200	MC250	MC250*	MC300*
1000	MC150	MC200	MC200*	MC250*	MC250*
800	MC150	MC150	MC200	MC200*	MC250*
600	MC150	MC150	MC150	MC150*	MC250*
400	MC150	MC150	MC150	MC150*	MC250*

TABLE–2 (FOR CABLE/ LADDER TRAY)

W \ L	4500	5000	6000	7000	8000
1000	MC125	MC125	MC125*	MC150*	MC150*
600	MC125	MC125	MC125*	MC125*	MC150*
400	MC125	MC125	MC125*	MC125*	MC125*

* REFER NOTE–5

LEGEND:–

L : c/c SPACING OF PIPE RACK PORTALS/PIPE SLEEPERS.

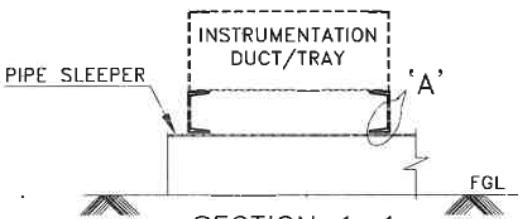
W : WIDTH OF INSTRUMENTATION CABLE DUCT AS/RELEVANT PIPING/INSTRUMENTATION DRG.

NOTES :–

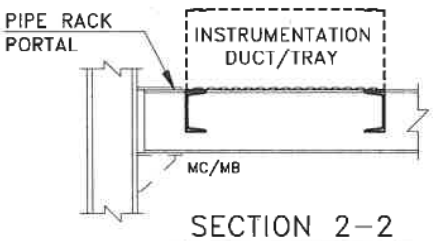
1. ALL DIMENSIONS ARE IN mm.
2. THE MATERIAL OF CONSTRUCTION SHALL BE STRUCTURAL STEEL CONFORMING TO IS:2062 GRADE 350 BR/BO.
3. THE CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS AS PER SPECIFICATION NO. 6–68–0006.
4. A GAP OF MIN. 200MM SHALL BE MAINTAINED BETWEEN EDGE OF CABLE DUCT AND THAT OF WALKWAY.
5. COMPRESSION FLANGE OF CABLE/ DUCT TRAY SUPPORTING MEMBER SHALL BE RESTRAINED BY USING ANGLE 50X50X6 AT A SPACING OF 3M FOR DUCTS AND 1.5M FOR CABLE/ LADDER TRAY.
6. SPLICE PLATE SHALL BE PROVIDED ON BOTTOM FACE OF TOP FLANGE OF CHANNEL.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	06.06.24	REVISED & REISSUED AS STANDARD	ANNU AHUJA	VIKRAM GUPTA	ANURAG SINHA	MAINAK NANDI
3	28.03.19	REVISED & REISSUED AS STANDARD	JC	AJS	RAJANJI SRIVASTAVA	R.K. TRIVEDI

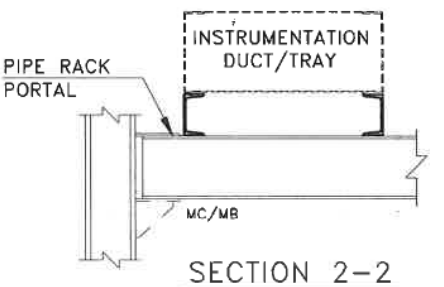
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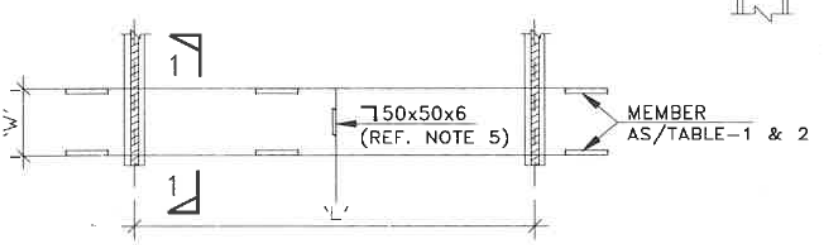
SECTION 1–1



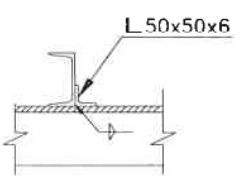
SECTION 2–2
(OPTION–1)



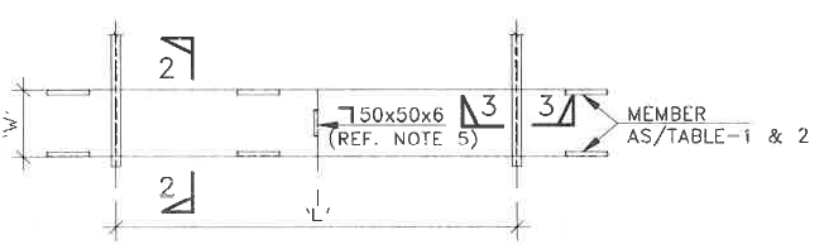
SECTION 2–2
(OPTION–2)



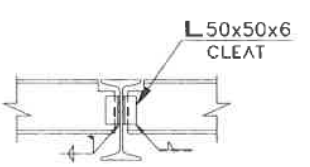
TYPICAL ARRANGEMENT SHOWING INSTRUMENTATION CABLE DUCT/TRAY SUPPORTS ON PIPE SLEEPERS



DETAIL 'A'



TYPICAL ARRANGEMENT SHOWING INSTRUMENTATION CABLE DUCT/TRAY SUPPORTS ON PIPE RACKS



SECTION 3–3
(OPTION–1)

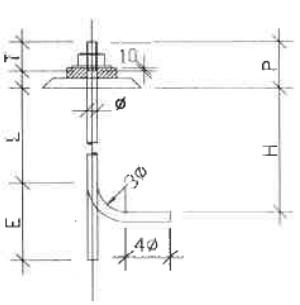
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GRADE OF CONC.	BOLT TYPE	DIMENSIONS MM		BOLT DIA (ø) IN MM											
				10	12	16	18	20	22	24	27	30	33	36	39
M20	I & III	L		250	300	450	450	550	600	650	750	850	950	1000	1100
		E		95	115	155	170	190	210	230	255	285	315	345	370
		H	TYPE–I	280	336	498	504	610	666	722	831	940	1049	1108	1217
			TYPE–III	430	486	648	654	910	966	1022	1281	1390	1499	1558	1667
	II & IV	L		200	200	300	350	400	450	450	550	600	700	700	800
		E		150	180	240	270	300	330	380	405	450	495	540	585
		H	TYPE–II	230	236	348	404	460	516	522	631	690	799	808	917
			TYPE–IV	380	386	498	554	760	816	822	1081	1140	1249	1258	1367
M25	I & III	L		200	250	400	400	450	550	550	650	700	800	850	950
		E		95	115	155	170	190	210	230	255	285	315	345	370
		H	TYPE–I	230	286	448	454	510	616	622	731	790	899	958	1067
			TYPE–III	380	436	598	604	810	916	922	1181	1240	1349	1408	1517
	II & IV	L		150	150	250	250	300	350	350	450	500	550	600	650
		E		150	180	240	270	300	330	360	405	450	495	540	585
		H	TYPE II	180	186	298	304	360	416	422	531	590	649	708	767
			TYPE–IV	330	336	440	454	660	716	722	981	1040	1099	1158	1217
M30	I & III	L		180	220	315	335	390	445	470	550	600	680	735	815
		E		95	115	155	170	190	210	230	255	285	315	345	370
		H	TYPE–I	210	260	365	390	450	515	545	635	690	780	845	935
			TYPE–III	360	410	515	540	750	815	845	1085	1140	1230	1295	1385
	II & IV	L		150	150	200	200	250	275	300	350	375	425	450	500
		E		150	180	240	270	300	330	360	405	450	495	540	585
		H	TYPE–II	180	190	250	255	310	345	375	435	465	525	560	620
			TYPE–IV	330	340	400	405	610	645	675	885	915	975	1010	1070

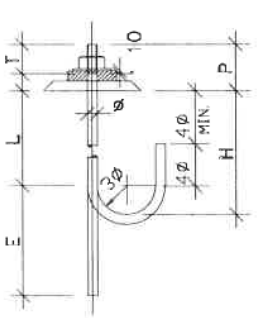
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
9	06.06.24	REVISED AND ISSUED AS STANDARD	ANNU AHUJA	VIKRAM GUPTA	ANURAG SINHA	MAINAK NANDI
8	27.03.19	REVISED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET	RAJANJI SRIVASTAVA	R.K.TRIVEDI
7	26.11.13	REVISED AND ISSUED AS STANDARD	A.K. SHARMA	AMARJEET	P.K.MITTAL	S.CHANDA

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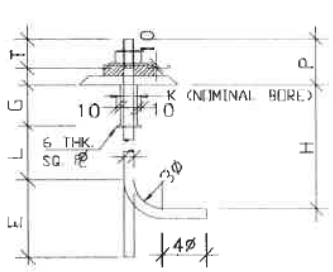
GRADE OF CONC.	BOLT TYPE	DIMENSIONS MM		BOLT DIA (ø) IN MM											
				10	12	16	18	20	22	24	27	30	33	36	39
M35	I & III	L		160	190	275	295	340	390	410	480	525	595	640	710
		E		95	115	155	170	190	210	230	255	285	315	345	370
		H	TYPE-I	190	230	325	350	400	460	485	565	615	695	750	830
			TYPE-III	340	380	475	500	700	760	785	1015	1065	1145	1200	1280
	II & IV	L		150	150	150	150	180	225	225	275	300	350	350	400
		E		150	180	240	270	300	330	360	405	450	495	540	585
		H	TYPE-II	180	190	200	205	240	290	300	360	390	450	460	520
			TYPE-IV	330	340	350	355	540	590	600	810	840	900	910	970
M40	I & III	L		150	170	240	255	300	340	360	425	460	525	565	625
		E		95	115	155	170	190	210	230	255	285	315	345	370
		H	TYPE-I	180	210	290	310	360	410	435	510	550	625	675	745
			TYPE-III	330	360	440	460	660	710	735	960	1000	1075	1125	1195
	II & IV	L		150	150	150	150	175	200	200	225	250	275	300	325
		E		150	180	240	270	300	330	360	405	450	495	540	585
		H	TYPE-II	180	190	200	205	235	270	275	310	340	375	410	445
			TYPE-IV	330	340	350	355	535	570	575	760	790	825	860	895



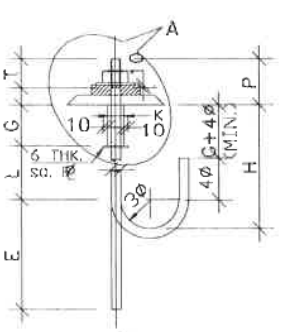
TYPE – I



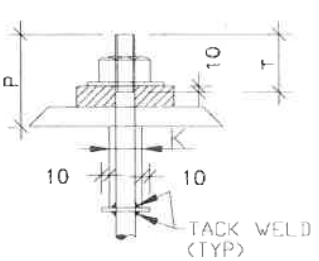
TYPE – II



TYPE – III



TYPE – IV



DETAIL-A (TYP)

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GRADE OF CONC.	BOLT TYPE	DIMENSIONS MM			BOLT DIA (ø) IN MM																										
					10	12	16	18	20	22	24	27	30	33	36	39	42	45	48	52	56	60	64								
M20,M25, M30,M35 & M40	III & IV	SLEEVE	G		150	150	150	150	300	300	300	450	450	450	450	450															
			K		50	50	50	50	50	80	80	80	80	80	80	100															
	I TO IV IX & XII	THREADED (T) LENGTH	SINGLE NUT		40	45	55	60	60	65	70	75	80	90	95	100															
			DOUBLE NUT		50	60	70	75	80	90	95	105	110	120	130	140															
M20 & M25	V		G		150	150	150	200	300	300	300	450	450	450	450	550	600	650	700	750	800	900	900								
			H		210	222	234	291	398	410	417	580	585	598	608	722	786	841	905	975	1035	1150	1171								
	V & VI		W		80	80	90	100	100	130	130	140	150	170	180	200	210	220	230	260	270	290	320								
			t3		10	12	16	16	20	20	25	25	25	28	32	36	36	36	40	45	45	50	56								
	VII		L						350	400	400	500	550	600	750	950	1050	1100	1200	1350	1500	1750	1900								
	VIII		L												350	400	450	500	550	600	650	700	750								
			C												160	200	200	200	240	240	240	260	280								
M30	V		G		150	150	150	200	300	300	300	450	450	450	450	500	500	550	600	650	750	800	800								
			H		210	225	235	290	400	410	415	580	585	600	610	675	690	745	805	875	985	1050	1075								
	V & VI		W		80	80	90	100	100	100	100	110	110	140	160	200	210	220	230	260	270	290	320								
			t3		10	12	16	16	20	20	20	25	25	28	32	36	36	36	40	45	45	50	56								
	VII		L						275	325	325	375	425	500	600	750	850	975	1000	1075	1225	1375	1525								
	VIII		L												300	350	400	450	500	550	600	650	700								
			C												125	160	160	160	185	185	200	240	240								

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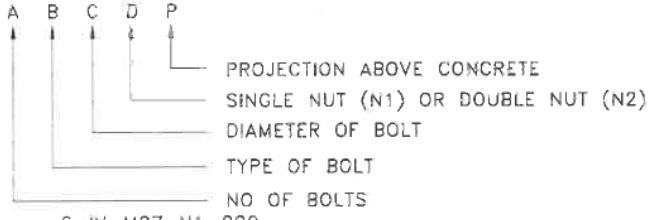
Format No. 8-00-0001-F4 Rev.0

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GRADE OF CONC.	BOLT TYPE	DIMENSIONS MM		BOLT DIA (ø) IN MM																		
				10	12	16	18	20	22	24	27	30	33	36	39	42	45	48	52	56	60	64
M35 & M40	V	G		150	150	150	200	300	300	300	450	450	450	450	450	500	550	600	600	700	750	750
		H		210	225	235	290	400	410	415	580	585	600	610	625	690	745	805	825	935	1000	1025
	V & VI	W		80	80	90	100	100	100	100	110	110	140	160	200	210	220	230	260	270	290	320
		t3		10	12	16	16	20	20	20	25	25	28	32	36	36	36	40	45	45	50	56
	VII	L						250	275	300	350	400	450	550	675	775	875	900	975	1100	1250	1375
	VIII	L												300	350	400	450	500	550	600	650	700
		C												125	160	160	160	185	185	200	240	240
M20, M25, M30, M35, & M40	V & VI	E		50	60	70	75	80	90	95	105	110	120	130	140	150	155	165	180	190	200	215
	V , VI , VII & VIII	K		50	50	50	50	50	80	80	80	80	80	80	100	100	100	100	125	125	125	150
		THREADED (T) LENGTH	SINGLE NUT	40	45	55	60	60	65	70	75	80	90	95	100	105	110	120	125	135	140	150
			DOUBLE NUT	50	60	70	75	80	90	95	105	110	120	130	140	150	155	165	180	190	200	215
	VII	t3						16	16	16	16	16	16	16	16	16	16	20	20	20	20	20
	VIII	t3												16	20	20	20	25	25	25	28	32
	VII & VIII	G		150	150	150	150	300	300	300	450	450	450	450	450	450	450	450	450	450	450	600
	IX	L		80	100	150	170	200														
M20&25	XII	L		185	220	310	335	385	435	460	535	590	660	720								
M30		L		150	150	200	225	250	275	300	350	375	425	450								
M35&M40		L		150	150	175	200	225	250	275	300	350	375	400								

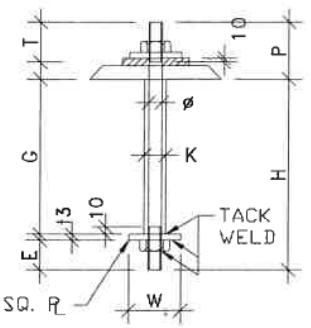
NOTES :-

1. BOLTS SHALL BE MARKED ON THE DRAWING AS UNDER :

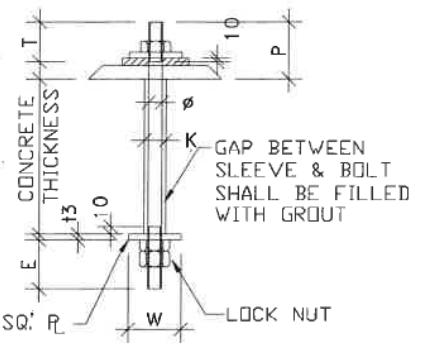


e.g.6-IV-M27-N1-200

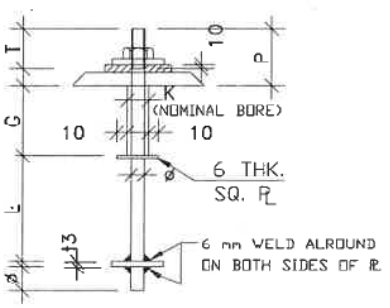
2. BOLTS SHALL BE TURNED FROM M.S. ROUNDS CONFORMING TO IS:2062 GRADE-E250 QUALITY A/BR/BO.
3. NUTS AND WASHERS SHALL CONFORM TO IS:1363.
4. THREADING SHALL BE COARSE CONFORMING TO IS:1367 AND IS:4218.
5. ANCHOR BOLTS SHALL BE SET ACCURATELY AND HELD IN POSITION BY TEMPLATE BEFORE CONCRETING.
6. 6 THK. SQ. PLATE AT THE BOTTOM OF SLEEVE SHALL BE TACK WELDED WITH BOLT AND SLEEVE FOR BOLT TYPE III, IV, VII AND VIII.
7. SLEEVE SHALL BE M.S. TUBES (MEDIUM) AS PER IS:1239.
8. REFER DESIGN DRAWINGS FOR PROJECTION (P) OF BOLT ABOVE TOP OF ROUGH CONCRETE AND NUMBER (A) OF BOLTS.
9. ANCHOR BOLTS SHALL BE TEMPERED BEFORE MACHINING IF MADE BY FORGING. THE FORGING TEMPERATURE SHALL BE ABOVE 900° C BUT LOWER THAN SUPER HEATING TEMPERATURE.

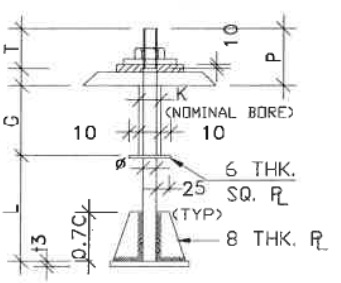


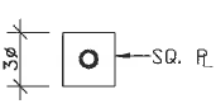
TYPE – V



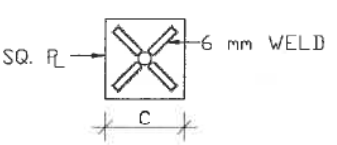
TYPE – VI



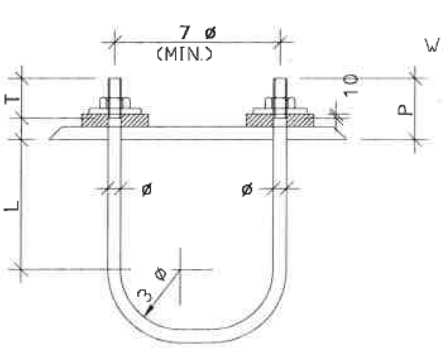




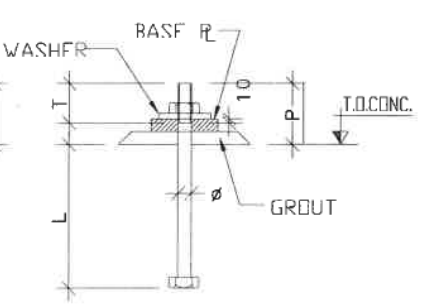
TYPE – VII



TYPE – VIII



TYPE – IX

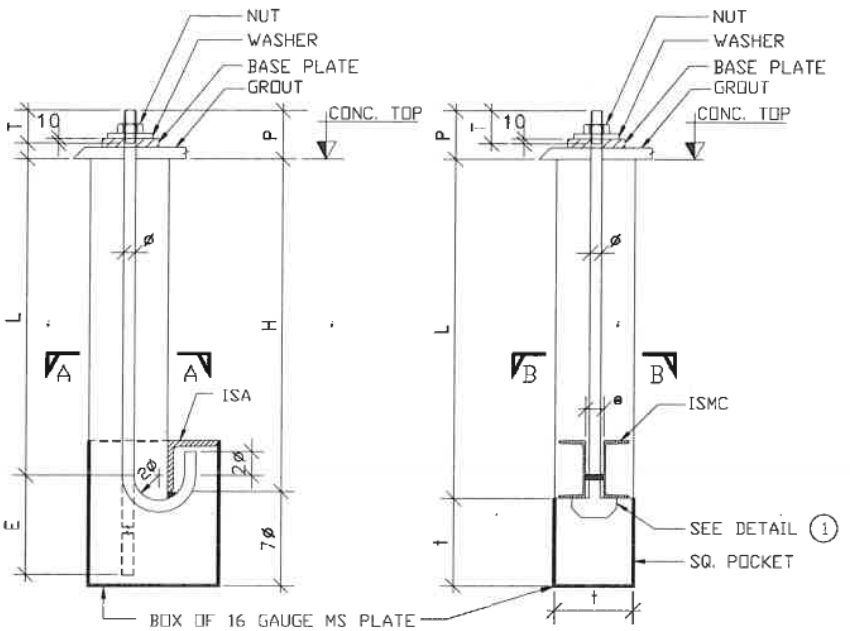


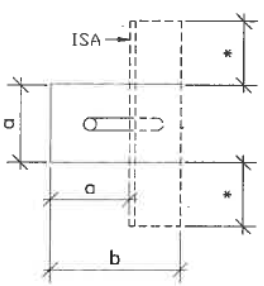
TYPE – XII

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GRADE OF CONC.	BOLT TYPE	DIMENSIONS MM		BOLT DIA (ø) IN MM																				
				20	22	24	27	30	33	36	39	42	45	48	52	56	60	64						
M20, M25, M30, M35 & M40	X	a		150	160	180	200	220	240	260	280	300												
		b		250	290	310	330	370	390	460	480	500												
		L		600	700	800	900	1000	1100	1200	1300	1400												
		E		220	220	240	270	300	330	360	390	420												
		H		640	744	848	954	1060	1166	1272	1378	1484												
		ISA		100x100 X10	130X130X10			150X150X12		200X200X16														
		THREADED LENGTH (T)	SINGLE NUT	60	65	70	75	80	90	95	100	105												
			DOUBLE NUT	80	90	95	105	110	120	130	140	150												
	XI	h				18		20		25		30		30		30		30						
		k				18		22		25		30		35		40		50						
		c				24		30		36		42		48		56		64						
		q				65		75		85		95		110		125		140						
		r				1.6		1.6		2.0		2.0		2.0		3.0		3.0						
		f				140		150		170		190		210		220		240						
		e				30		35		42		50		58		65		75						
		L				800		1000		1200		1400		1600		1800		2000						
		ISMC				75x40		75x40		100x50		125x65		150x75		150x75		175x75						
		THREADED LENGTH (T)	SINGLE NUT			70		80		95		105		120		135		150						
			DOUBLE NUT			95		110		130		150		165		190		215						

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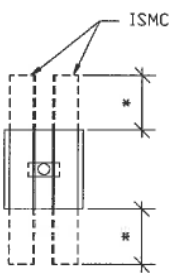




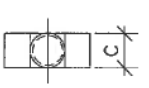
VIEW A – A

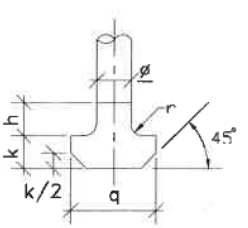
TYPE – X

(* AS PER DESIGN REQUIREMENT)



VIEW B – B





DETAIL – (1)

(FOR FORGED BOLT HEAD)

TYPE – XI

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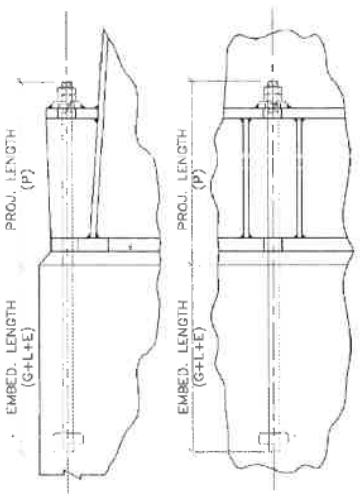


FIGURE 1: ANCHOR BOLT WITH ANCHOR CHAIR
(VERTICAL VESSELS ON SKIRT, STORAGE TANKS, ETC.)

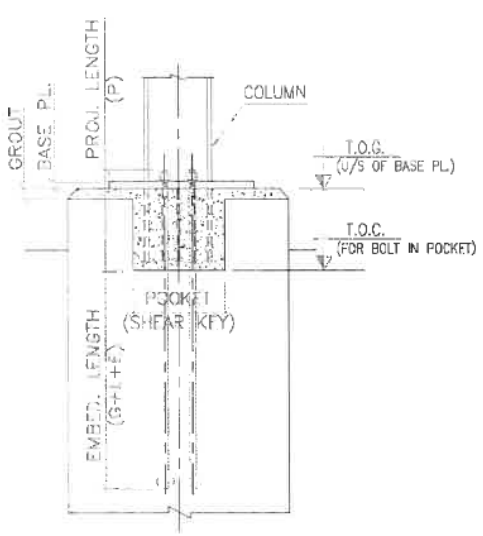


FIGURE 2: ANCHOR BOLT WITH POCKET IN PEDESTAL

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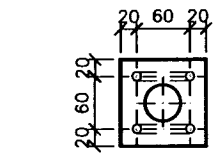
NOTES:–

1. ALL HANDRAILS AND UPRIGHT SHALL BE AS PER RESPECTIVE TYPE.
2. ALL FILLET WELDS OF 3mm (MINIMUM) THICKNESS SHALL BE CONTINUOUS UNLESS NOTED OTHERWISE.
3. JOINTS IN HANDRAILS SHALL BE PROVIDED AT SUITABLE LOCATIONS, WELDED AND GROUND FLUSH.
4. FOR ADDITIONAL TYPE OF UPRIGHT FIXING DETAILS REFER EIL STD. 7–68–0061.
5. ALL M.S. TUBES SHALL CONFORM TO IS:1239.
6. FABRICATION OF TOP RAIL, INTERMEDIATE FLAT AND TOE PLATE SHALL ONLY BE STARTED AFTER TAKING ACTUAL DIMENSIONS AT SITE.
7. ADJUSTMENT IN SPACING OF VERTICAL POST SHALL BE DONE AT EITHER END OF PLATFORM.

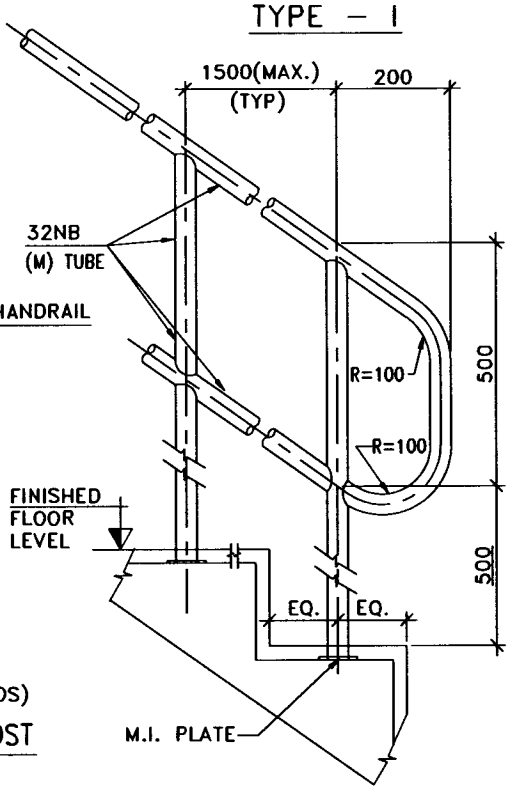
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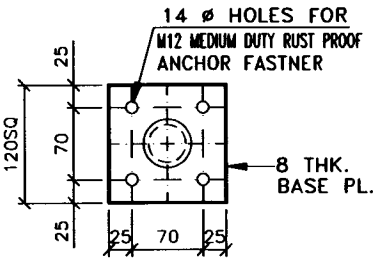
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TYPE – I

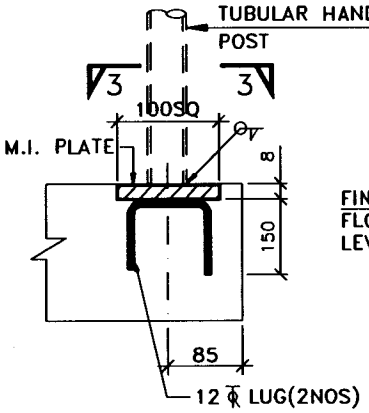


VIEW 3–3

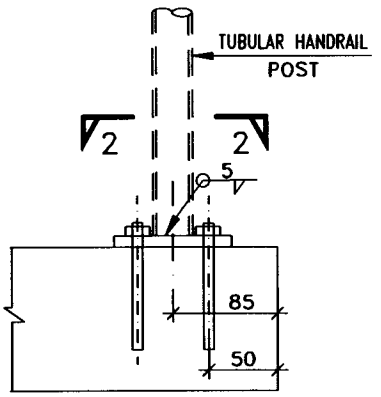




VIEW 2–2

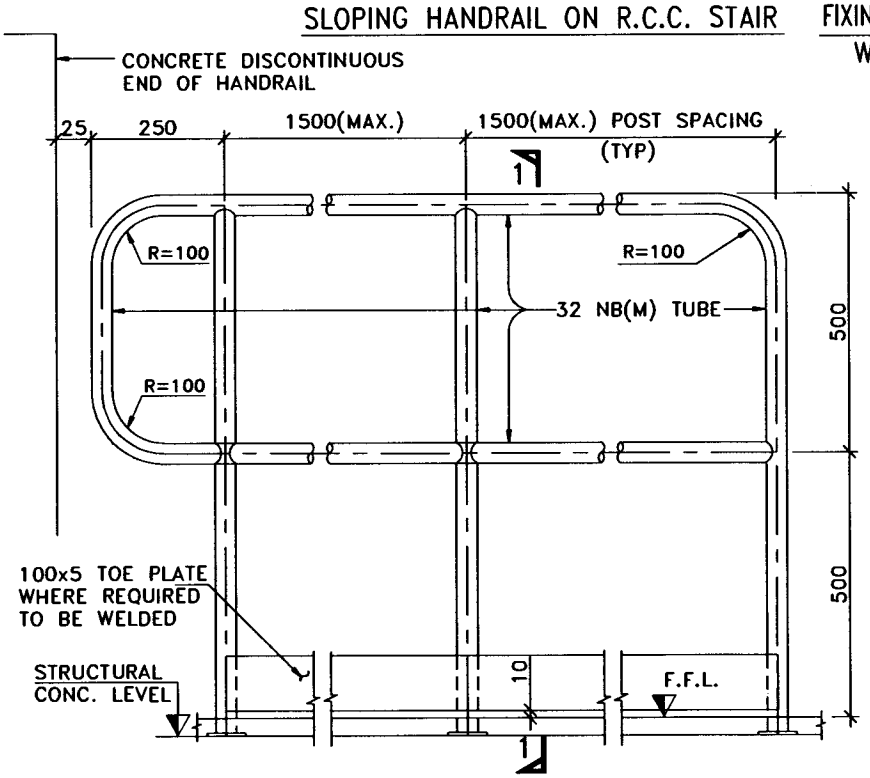


FIXING DET OF TUB. POST
WITH M.I.PLATE (ALT–I)

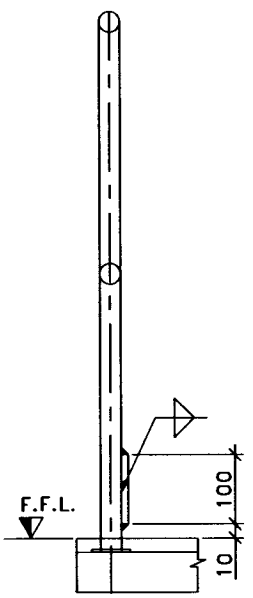


FIXING DET OF TUBULAR POST
WITH ANCHOR FASTNER
ALT–II

SLOPING HANDRAIL ON R.C.C. STAIR



HORIZONTAL HANDRAIL ON R.C.C. PLATFORM

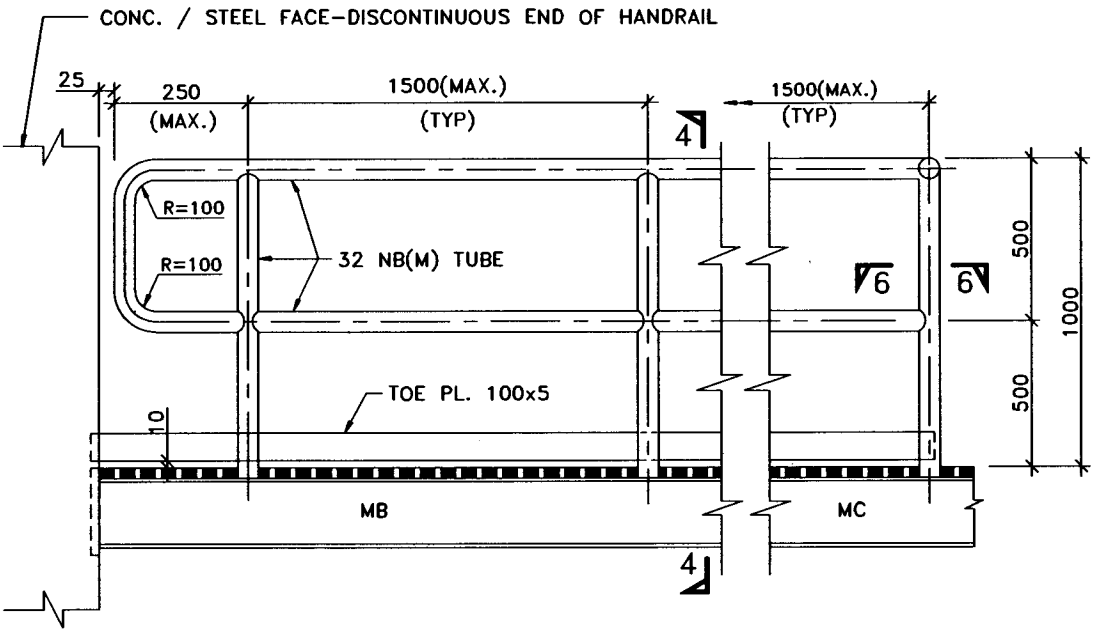


SEC. 1–1

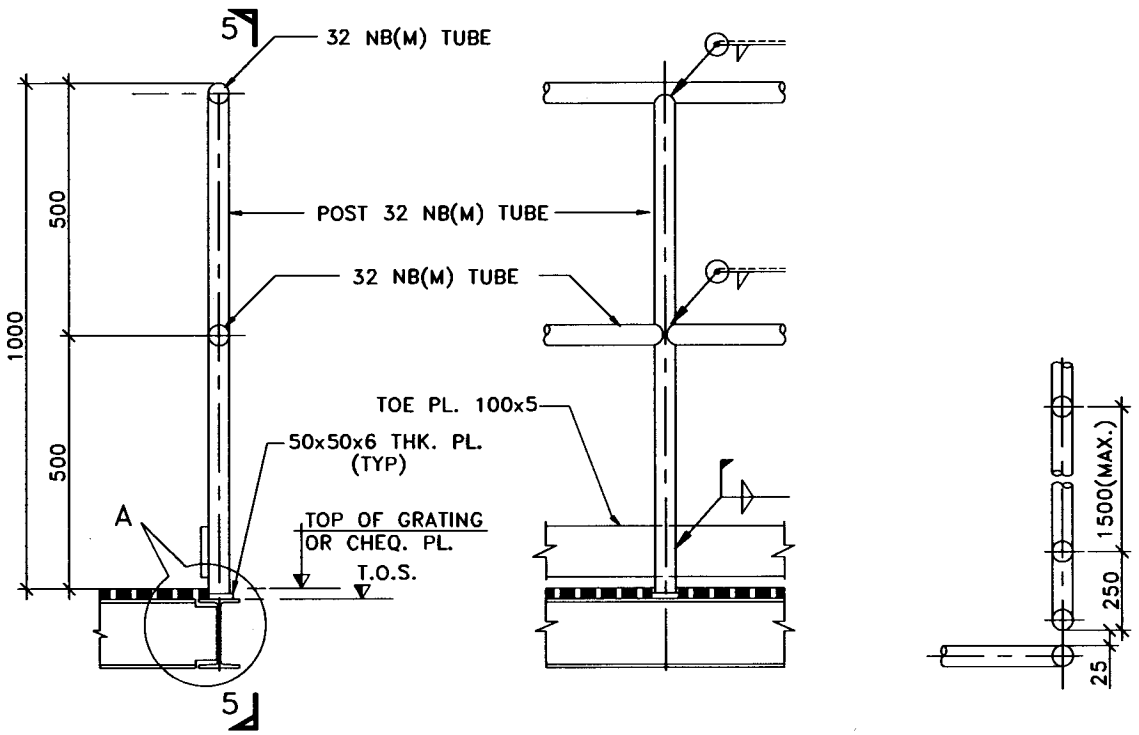
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TYPE – II



HORIZONTAL HANDRAIL ON STEEL PLATFORM



SECTION 4–4
(FOR DETAIL (A) REFER PAGE 8 OF 8)

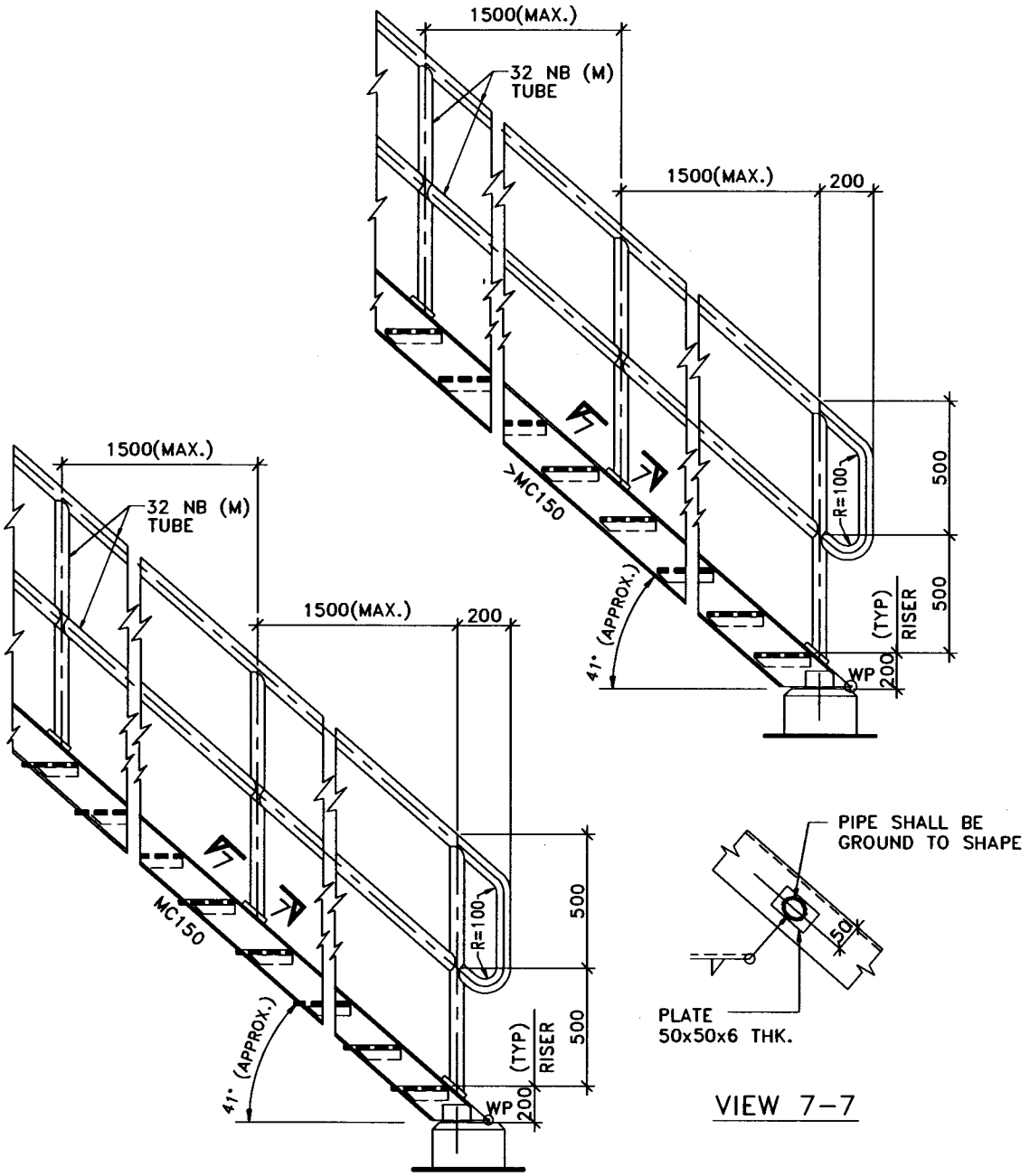
VIEW 5–5

VIEW 6–6
(AT CORNER)

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TYPE – II



VIEW 7–7

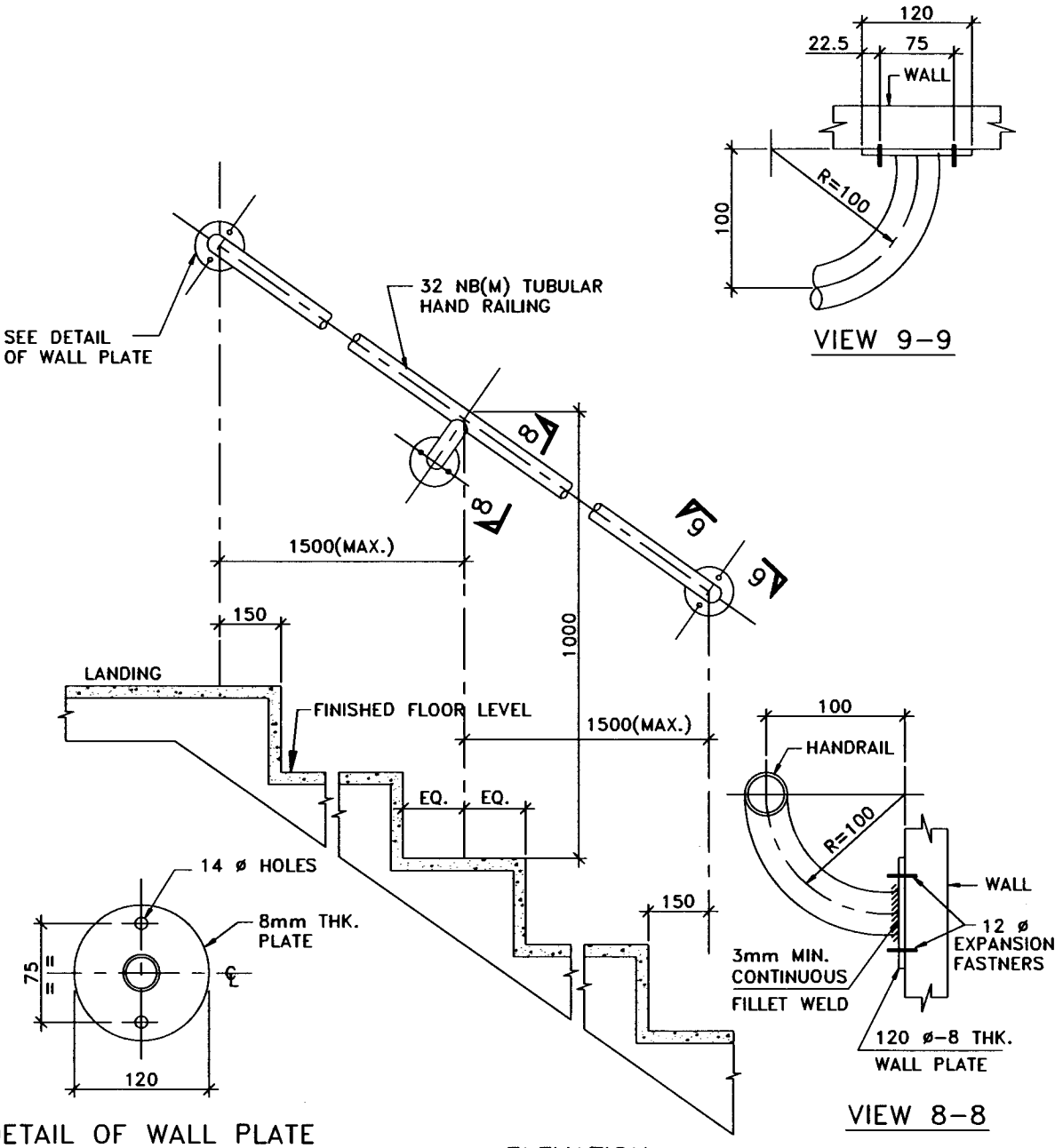
SLOPING HANDRAIL ON STEEL STAIR

WHEREVER HIGHER SIZE OF STRINGER BEAMS ARE REQUIRED AS PER DESIGN SIMILAR G.A. BE FOLLOWED FOR THE SAME.

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TYPE – III

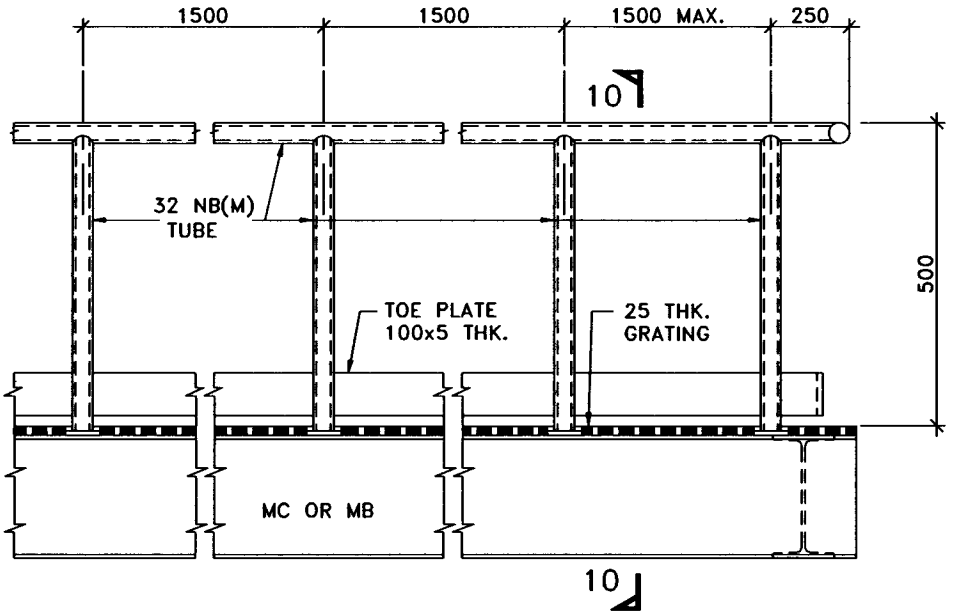


HANDRAIL FIXED TO WALL DIRECT

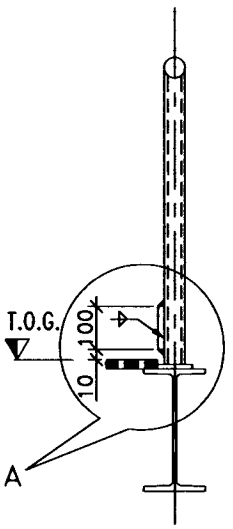
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TYPE – IV



HANDRAIL ON HORIZONTAL PLATFORM (STEEL)



SEC. 10–10

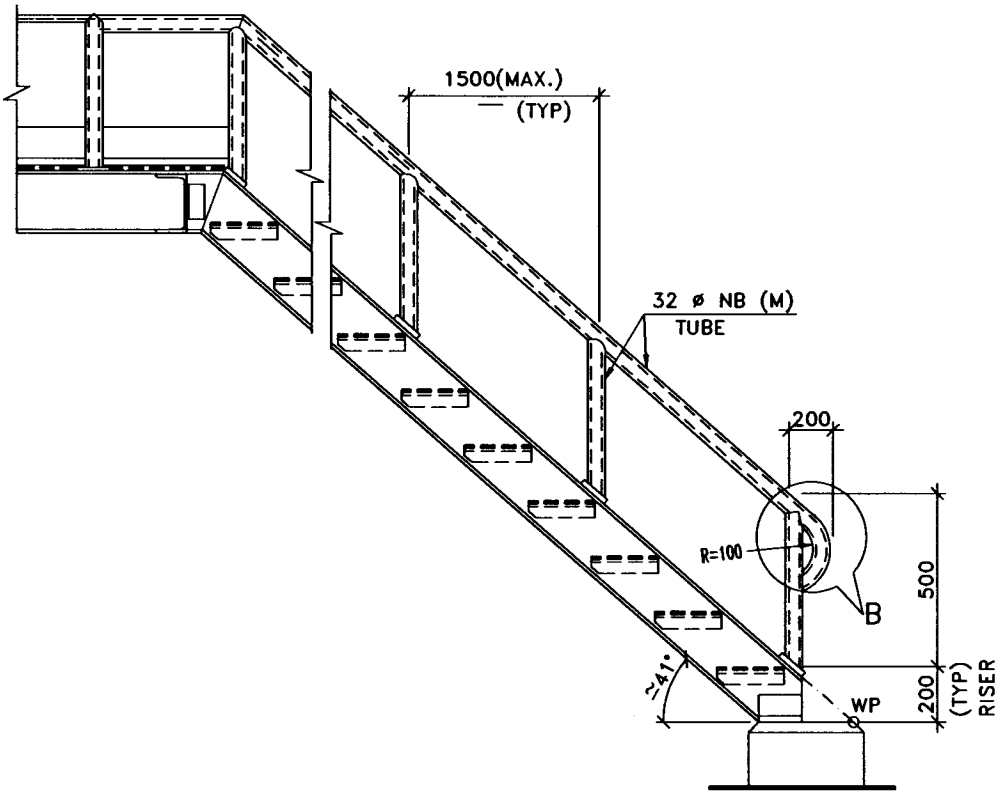
NOTE : HANDRAIL TYPE–IV SHALL BE USED OVER PIPE CROSS OVER AND LOW LEVEL PLATFORMS SUCH AS FOR VALVE OPERATION ETC. AS MENTIONED IN STD 7–68–0562 & 0563.

(FOR DETAILS Ⓐ REFER PAGE 8 OF 8)

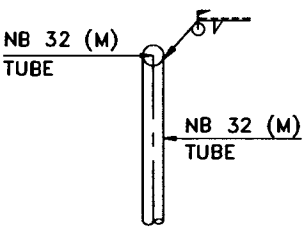
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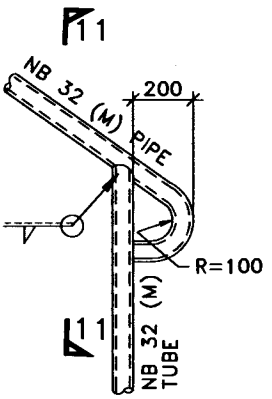
TYPE – IV



SLOPING HALF HANDRAIL ON STEEL STAIR



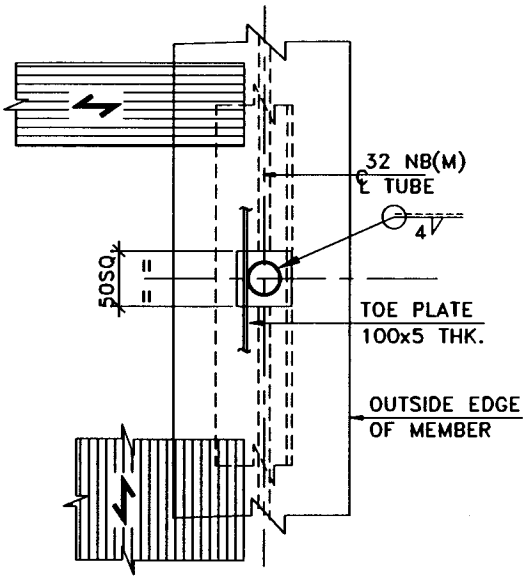
SEC. 11–11



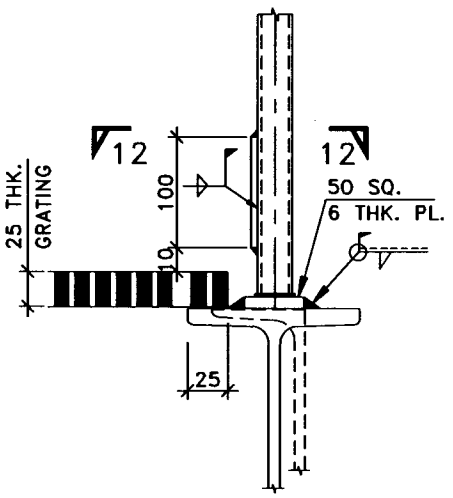
DETAIL – (B)

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VIEW 12–12



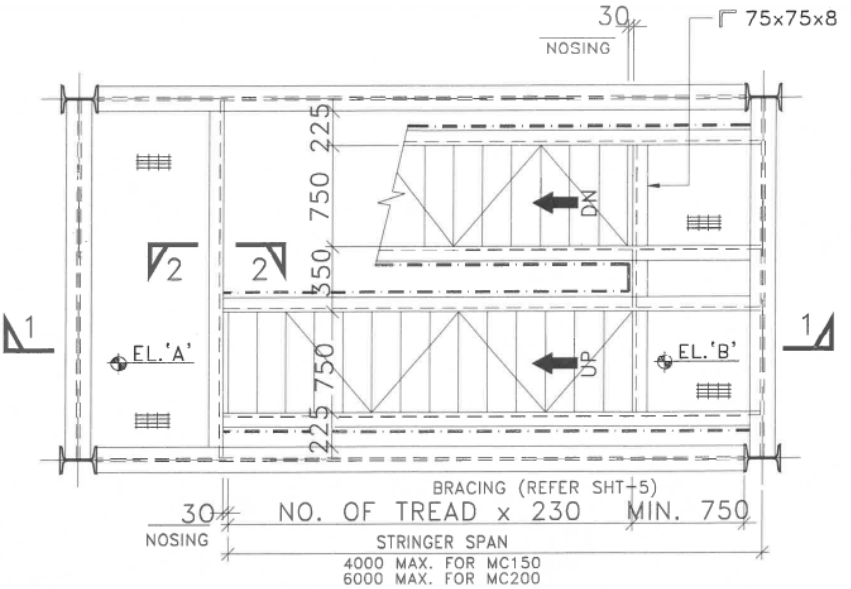
DETAIL – (A)

CONNECTION DETAILS
(FOR TYPE II & IV)

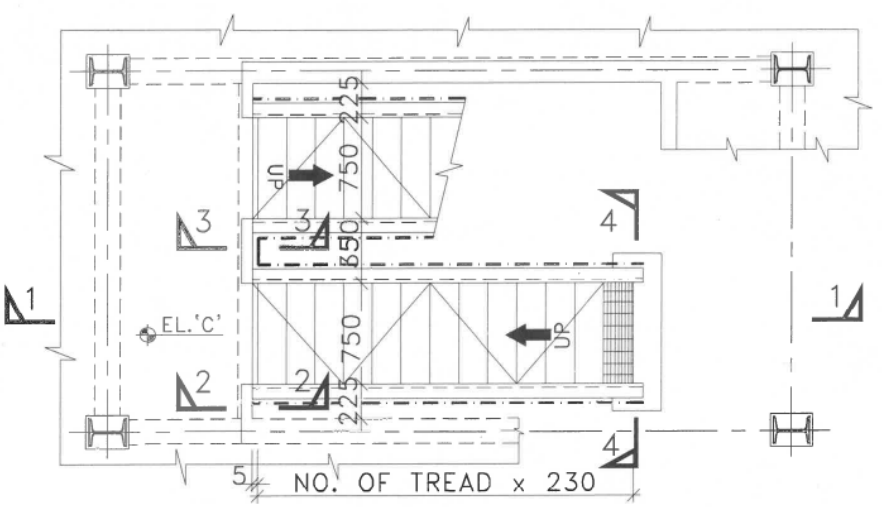
NOTE : CHEQUERED PLATES / GRATINGS SHALL BE SUITABLY NOTCHED TO ACCOMMODATE THE TUBE IN CASE OF BEAM MC100 OR MC125.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
8	28.09.2020	REAFFIRMED & ISSUED AS STANDARD	JG	AVM	AS	SM
7	16.12.2014	REVISED & ISSUED AS STANDARD	V.P.SINGH	V GOEL	PK MITTAL	S CHANDA

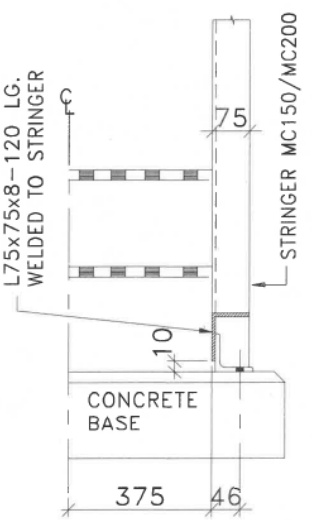
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PLAN AT EL. 'A'



PLAN AT EL. 'C'



SECTION 4-4

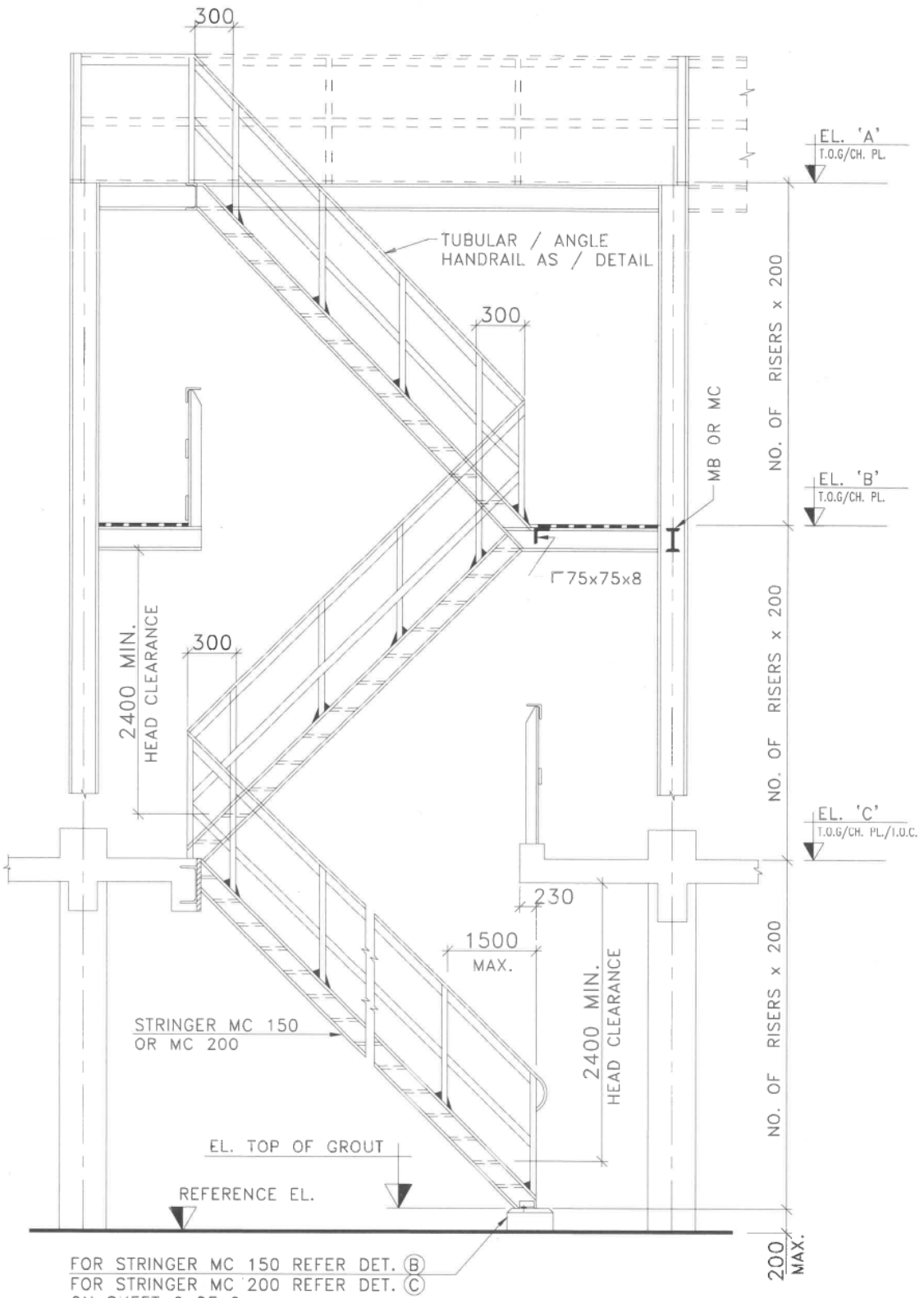
NOTES :-

1. FOR STAIRWAY/TREAD USE ELECTROFORGED GRATING TYPE-II AS PER EIL STD NO 7-68-0697.
2. FOR CONNECTION DETAILS REFER SHEETS 3, 4, 5 AND 6.
3. STRINGER SHALL BE SUITABLY DESIGNED FOR OFFICE BUILDING, WARE HOUSES AND WORKSHOP.
4. FOR DETAIL OF INSERT PLATE 'R1a' REFER EIL STD. NO. 7-68-0056.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
8	03.04.25	REAFFIRMED AND ISSUED AS STANDARD	SHUBHAM	SUDIP PAUL	ANURAG SINHA	MAINAK NANDI
7	01.08.19	REAFFIRMED AND ISSUED AS STANDARD	JS	AVM	RAJANJI SRIVASTAVA	R.K. TRIVEDI

Approved by

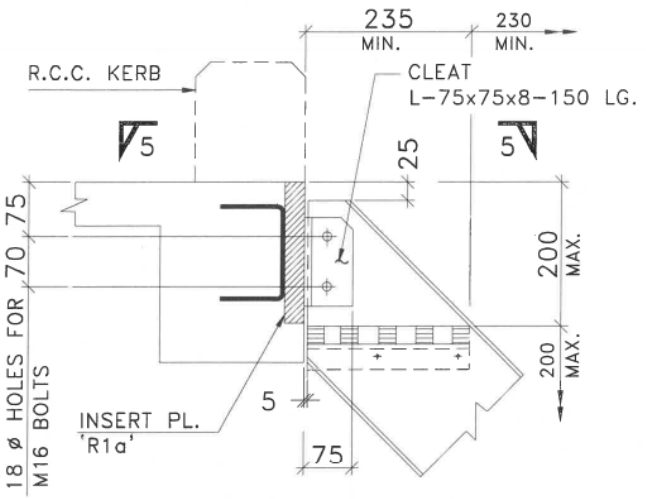
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SECTION 1–1

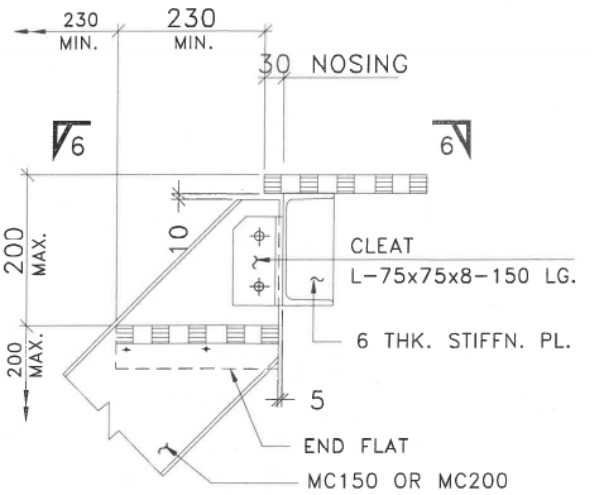
MAXIMUM RISER IS 200 HOWEVER IT MAY BE REDUCED AND ADJUSTED AS REQUIRED.

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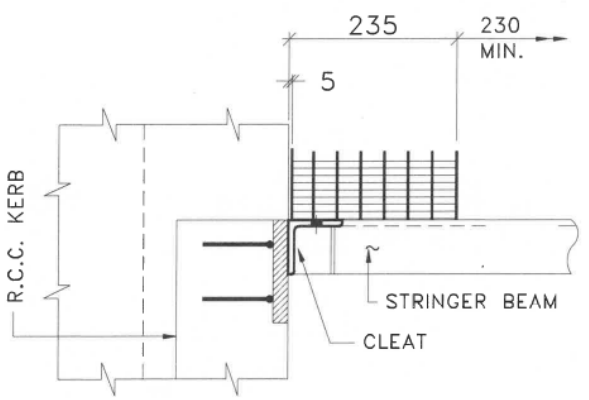
SECTION 2-2

(CONNECTION WITH CONCRETE BEAM)

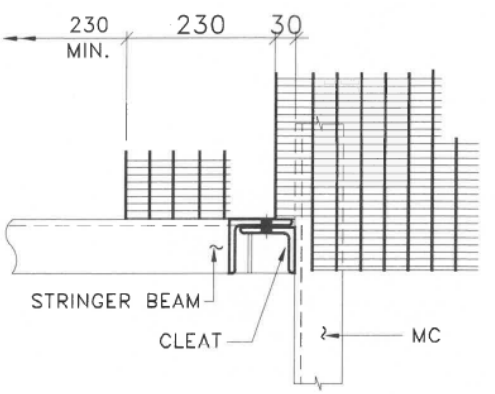


SECTION 2-2

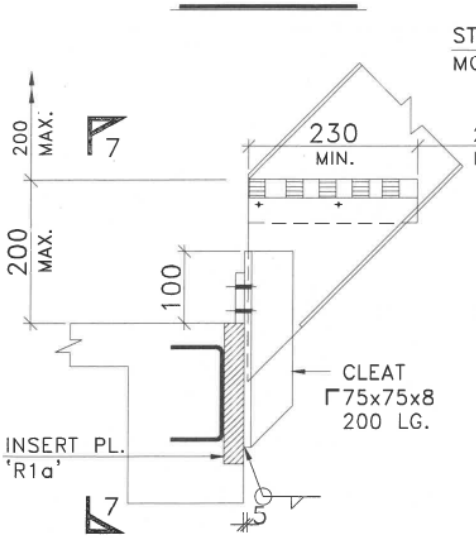
(CONNECTION WITH STEEL BEAM MC)



VIEW 5-5

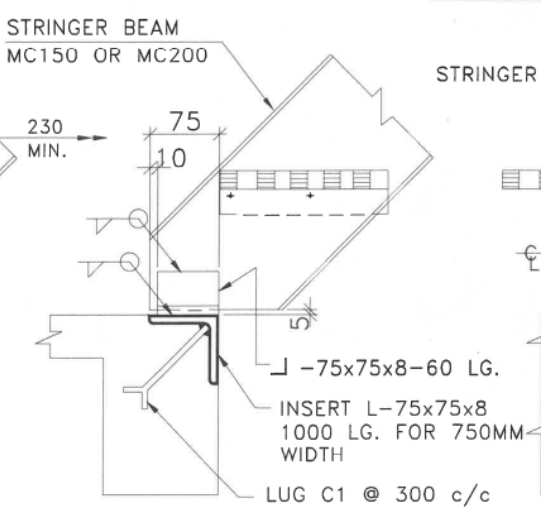


VIEW 6-6



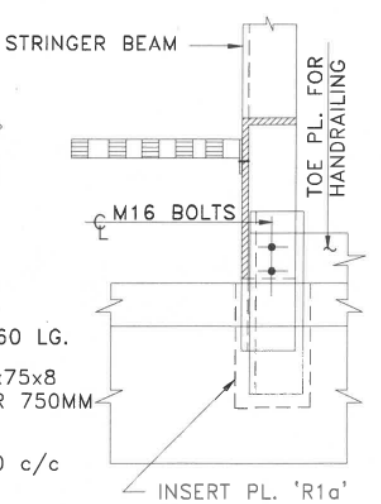
SECTION 3-3

(CONNECTION WITH CONCRETE BEAM)
(R.C.C. KERB NOT SHOWN FOR CLARITY)



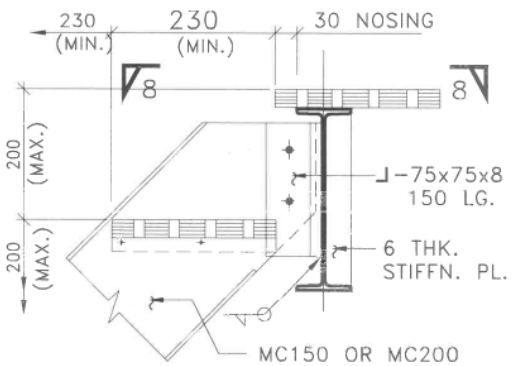
SECTION 3-3 (ALT.)

(CONNECTION WITH CONCRETE BEAM)
(R.C.C. KERB NOT SHOWN FOR CLARITY)

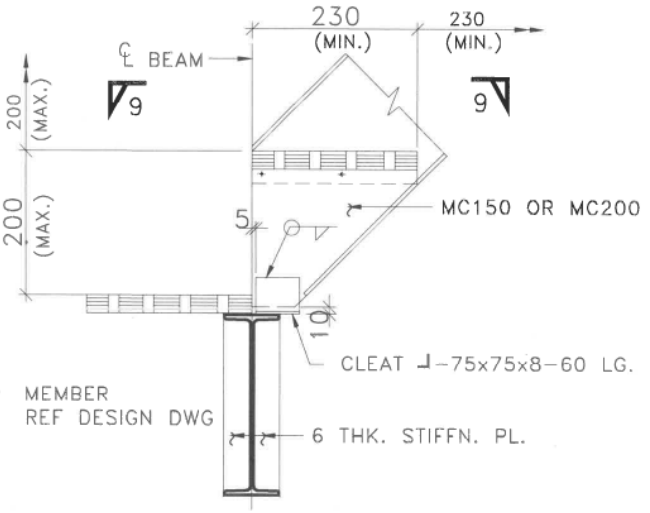


VIEW 7-7

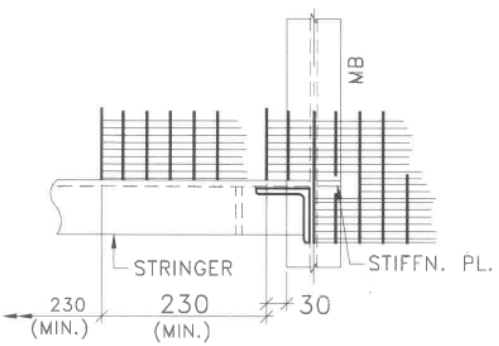
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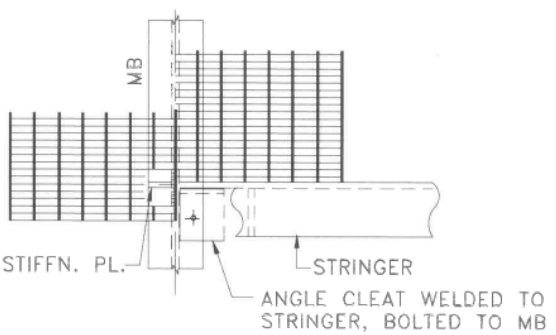
SECTION 2–2
(CONNECTION WITH STEEL BEAM ISMB)



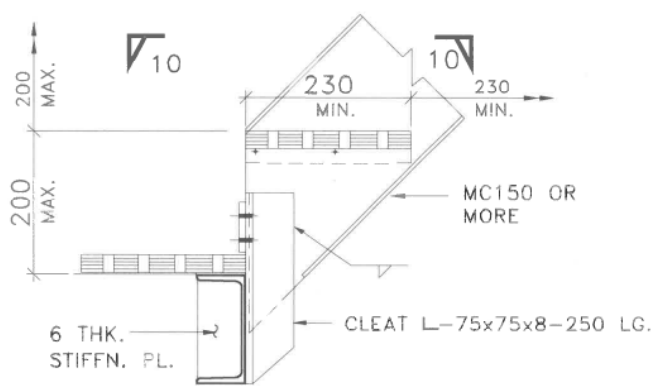
SECTION 3–3
(CONNECTION WITH STEEL BEAM ISMB)



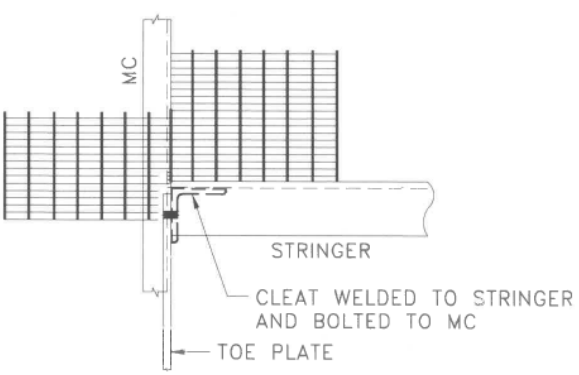
VIEW 8–8



VIEW 9–9

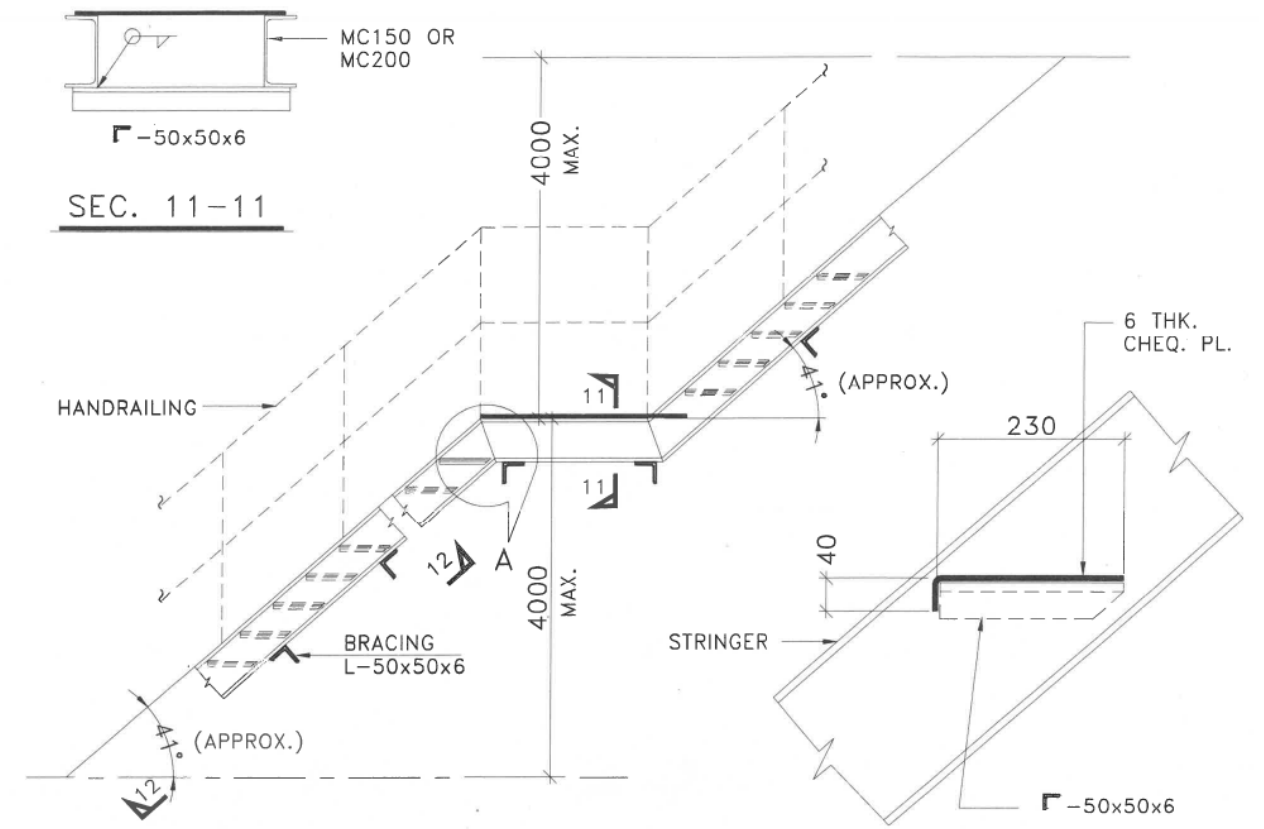


SECTION 3–3
(CONNECTION WITH STEEL BEAM ISMC)



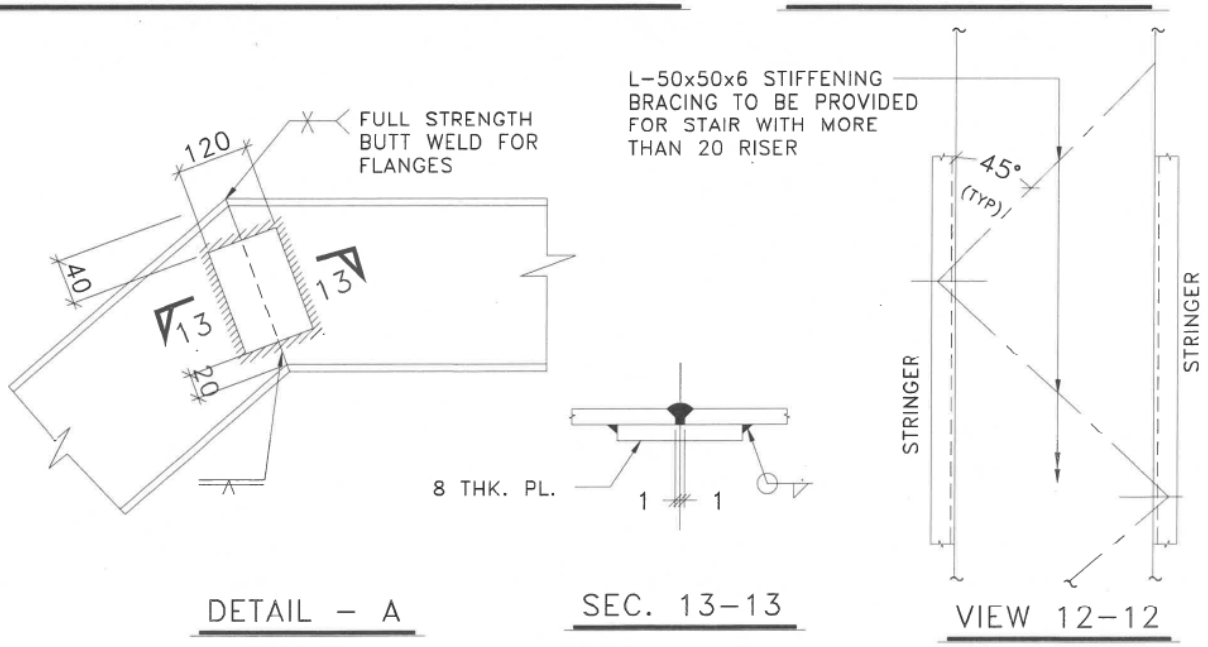
VIEW 10–10

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ELEVATION SHOWING STRINGER BRACINGS

TYP. DET. OF CHEQ. PL. STEP



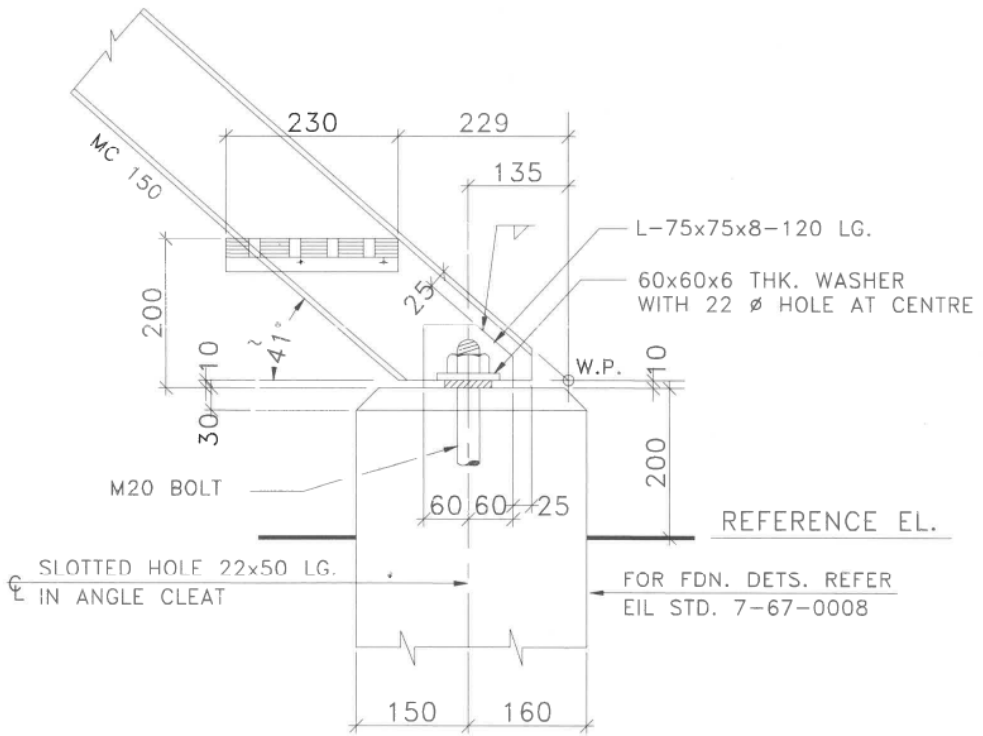
DETAIL − A

SEC. 13−13

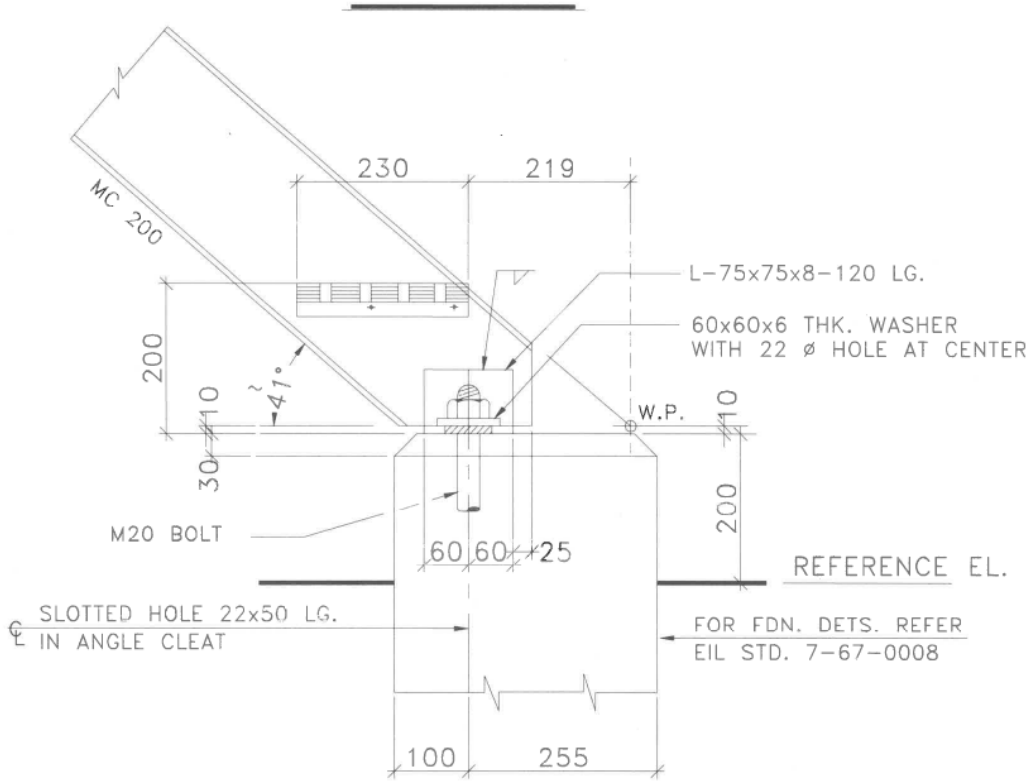
VIEW 12−12

STAIR DETS WITH CHEQURED PLATE STEPS

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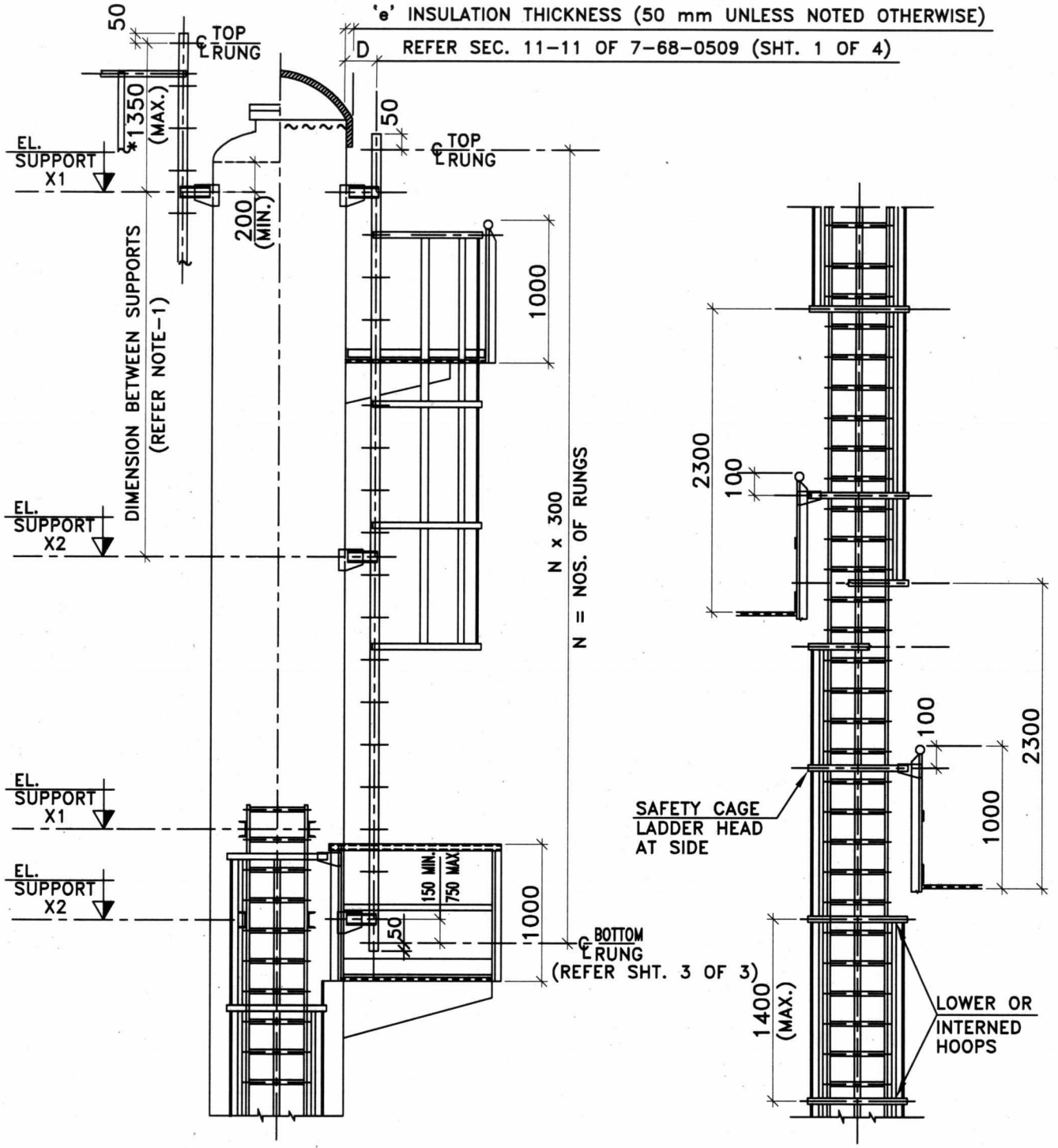
DETAIL – B



DETAIL – C

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DETAILS OF STEEL LADDER



LADDER FOR SIDE ENTRY

LADDER FOR SIDE ENTRY

VESSEL DIA (mm)	DISTANCE 'D' (mm)
UPTO 800	200 + e
> 800 ⩽ 3200	260 + e
> 3200 ⩽ 8000	275 + e

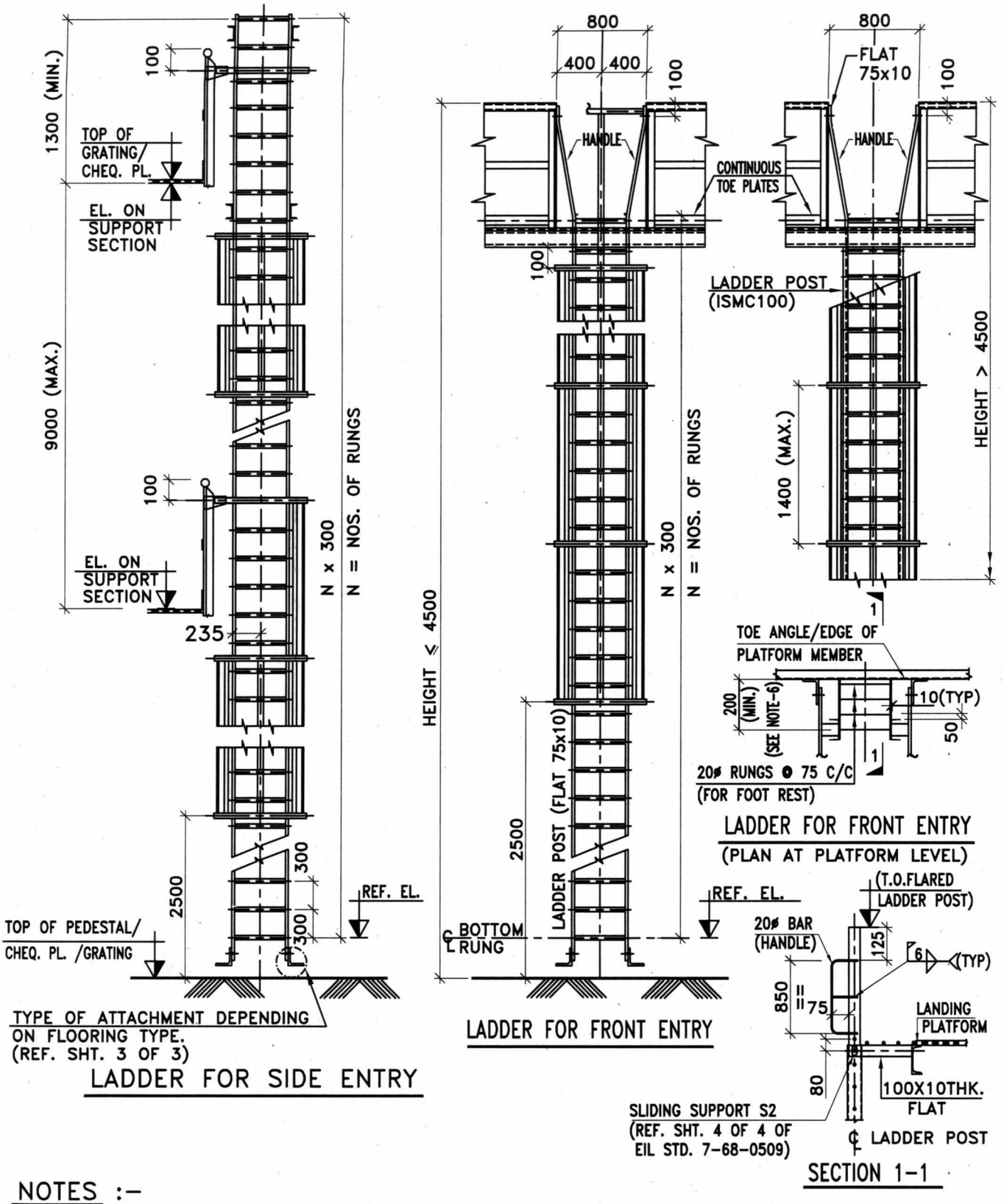
* MC100 SHALL BE ADOPTED FOR DISTANCE MORE THAN 1350 UPTO 2000

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
9	14.12.23	REVISED AND ISSUED AS STANDARD	JITENDER GUPTA	AMARJEET	ANURAG SINHA	MAINAK NANDI
8	01.08.19	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	RAJANJI SRIVASTAVA	S.CHANDA

Approved by

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DETAILS OF STEEL LADDER

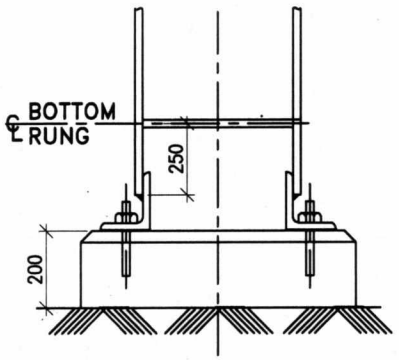


NOTES :-

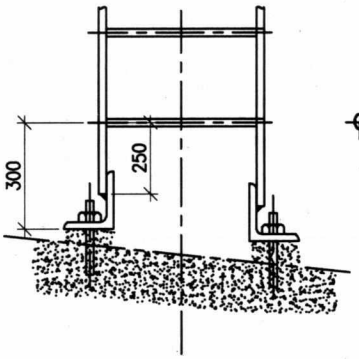
1. LADDER POSTS SHALL BE OF FLAT (75x10) UPTO 3.60m (MAX.) BETWEEN SUPPORTS AND ISMC 100 UPTO 7.0m (MAX.) BETWEEN SUPPORTS.
2. RUNGS SHALL BE 20 ø. FOR STEEL LADDER JOINT DETAILS, REFER EIL STD. 7-68-0509.
3. SUPPORT TYPE 'X1' CORRESPONDS TO FIXED SUPPORT AND 'S2/X2' CORRESPONDS TO SLIDING SUPPORT. FOR EACH LADDER, ONLY ONE FIXED SUPPORT SHALL BE PROVIDED. REMAINING SUPPORT(S) SHALL BE OF SLIDING TYPE.
4. SUPPORT ELEVATION X1, X2 CORRESPOND TO ℄ OF BOLT HOLES.
5. SUPPORTS 'X1' IS CAPABLE TO SUSTAIN A LOAD FOR 9000 mm LONG LADDER ONLY.
6. LADDER SHALL BE GIVEN SUITABLE SLOPE (MAX.6°),IF NECESSARY,TO AVOID FOULING WITH ANCHOR CHAIRS.

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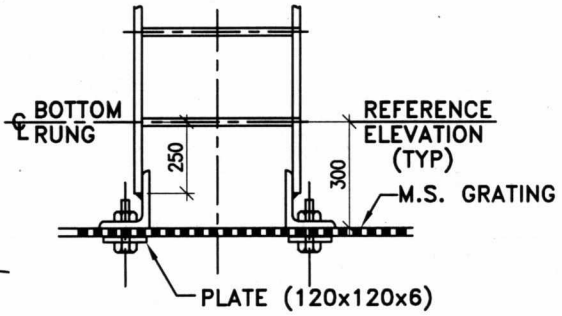
TYPE OF ATTACHMENT	NATURE OF SUPPORT SECTION	REMARKS
A1, A2	SITE WITHOUT PAVING	
B1, B2	CONCRETE FLOOR	A1, B1, C1, D1 : FIXED TYPE
C1, C2, D1, D2	CHEQUERED PLATE / GRATING FLOORING	A2, B2, C2, D2 : SLIDING TYPE



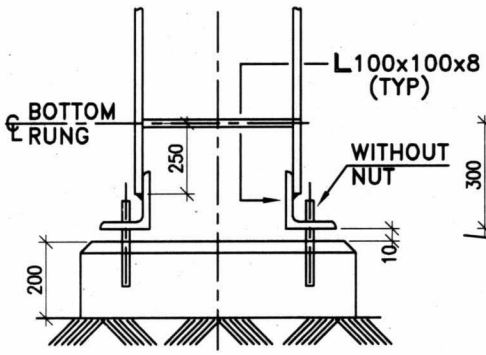
TYPE – A1



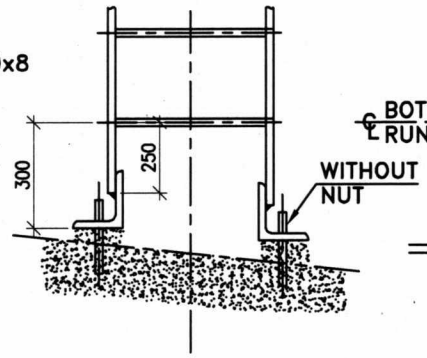
TYPE – B1



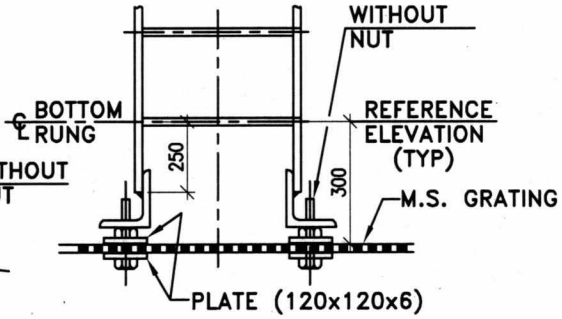
TYPE – C1



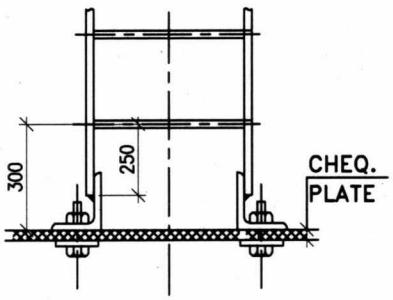
TYPE – A2



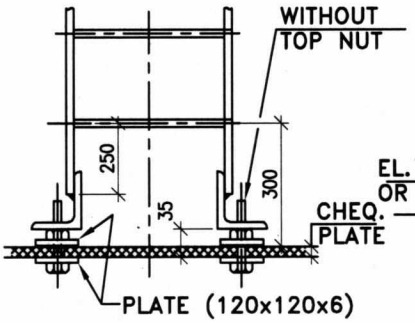
TYPE – B2



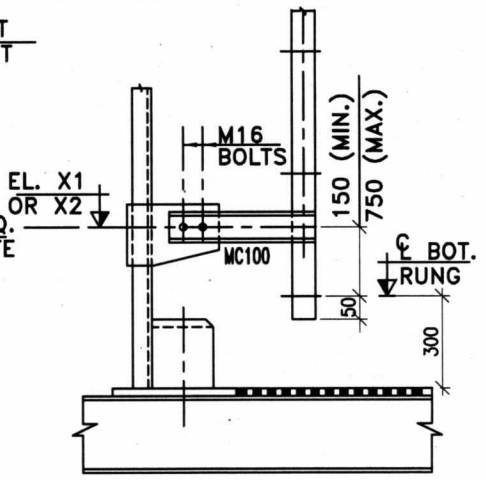
TYPE – C2



TYPE – D1

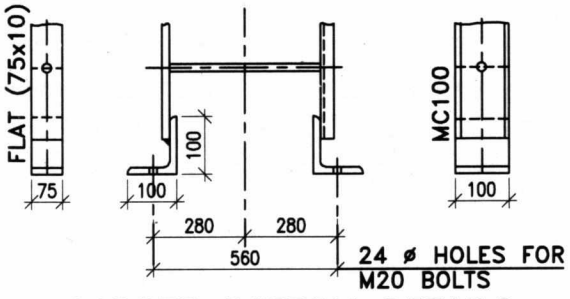


TYPE – D2



TYPE – E

(FREE)



LADDER BOTTOM DETAILS

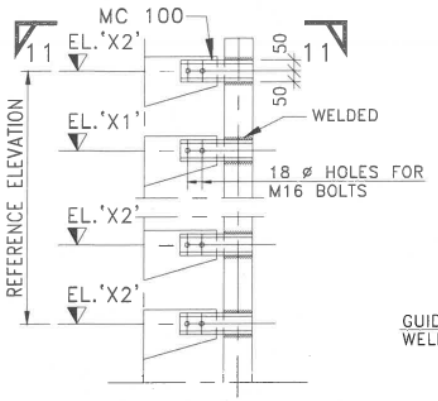
NOTE :-

IN CASE OF TOWERS BOTTOM RUNG SHALL BE 300 mm FROM FGL /HPP.

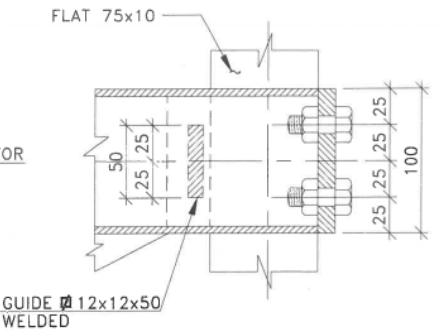
TYPE OF ATTACHMENT AT BASE

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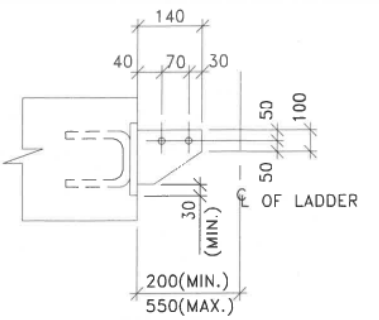
STEEL LADDER JOINT DETAILS



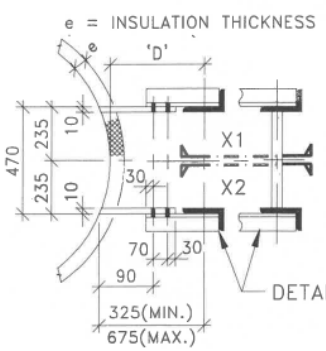
LADDER ATTACHMENT TO VESSELS



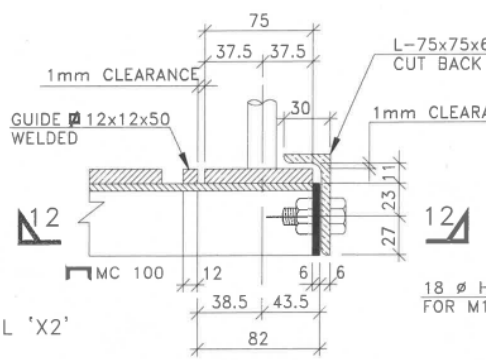
SECTION 12–12



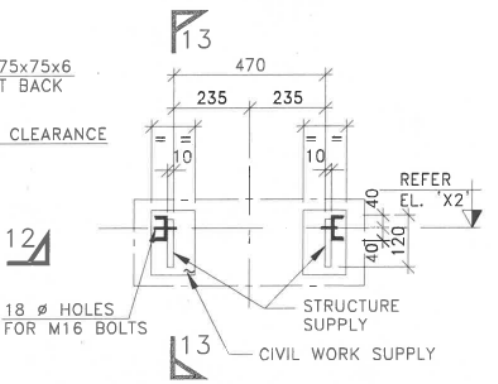
SECTION 13–13



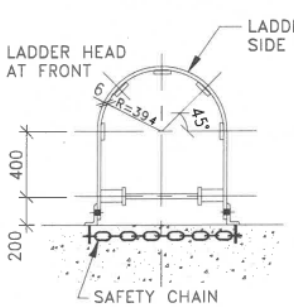
SECTION 11–11

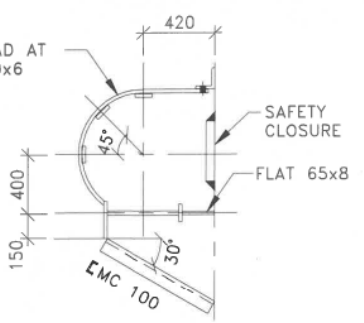


DETAIL 'X2'
(FOR LADDER POST FLAT 75x10)

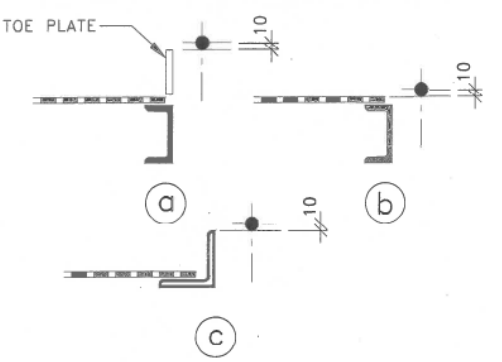


LADDER ATTACHMENT TO CONCRETE

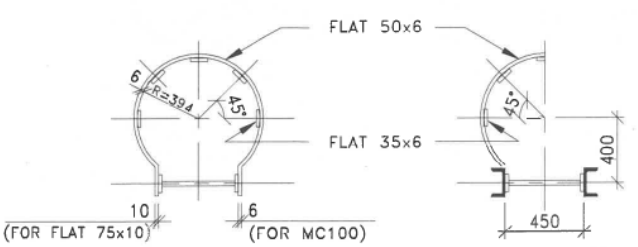




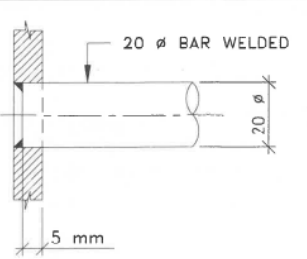
SAFETY CAGE HOOP DETAILS



LOCATION OF RUNG FOR LADDER



LOWER AND INTERMEDIATE CAGE

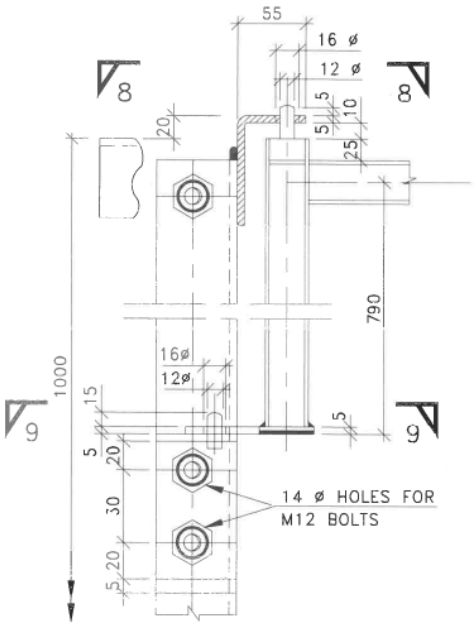


ATTACHMENT OF BAR

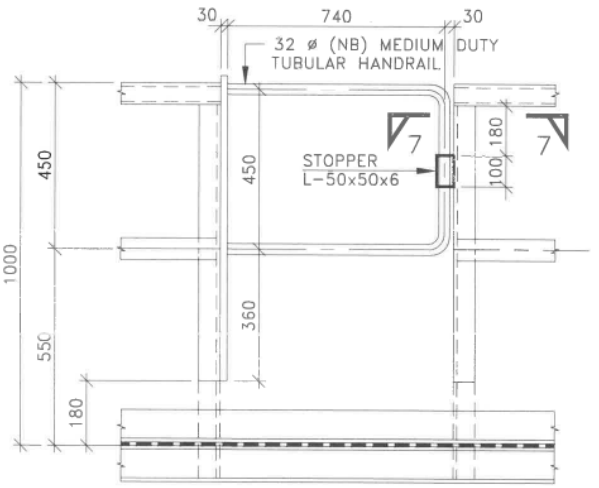
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
8	03.04.25	REAFFIRMED AND ISSUED AS STANDARD	SHUBHAM	SUDIP PAUL	ANURAG SINHA	MAINAK NANDI
7	01.08.19	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	RAJANJI SRIVASTAVA	R.K.TRIVEDI

Approved by

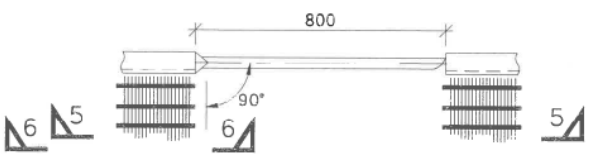
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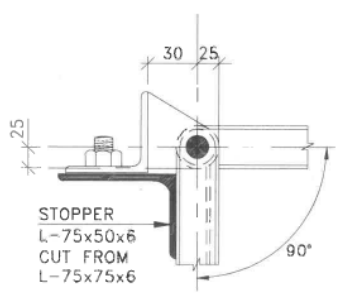
SECTION 6-6



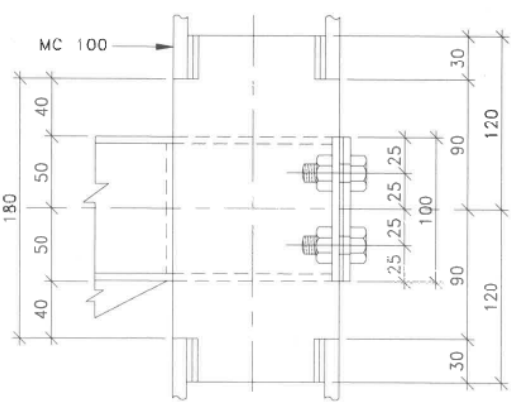
SECTION 5-5



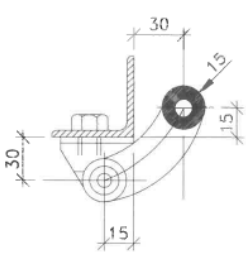
AUTOMATIC BARRIER



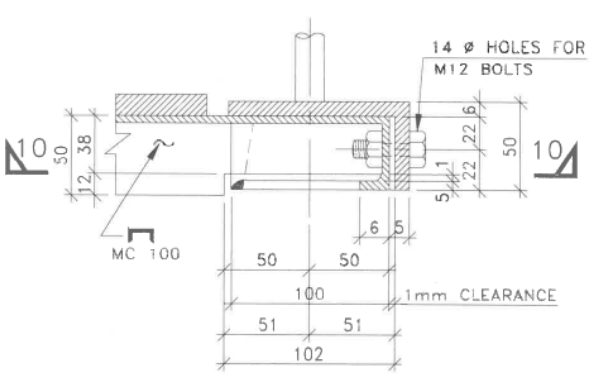
SECTION 8-8



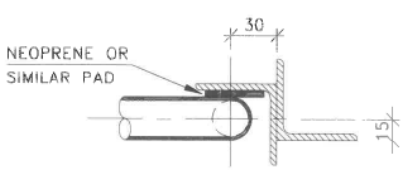
SECTION 10-10



SECTION 9-9

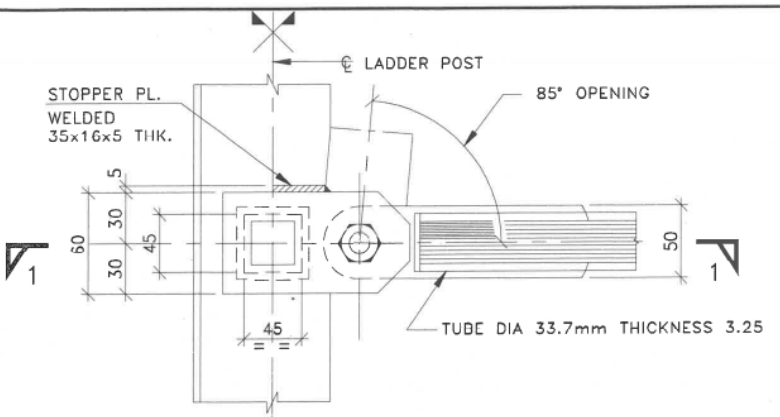


DETAIL 'X2'
(FOR LADDER POST MC 100)

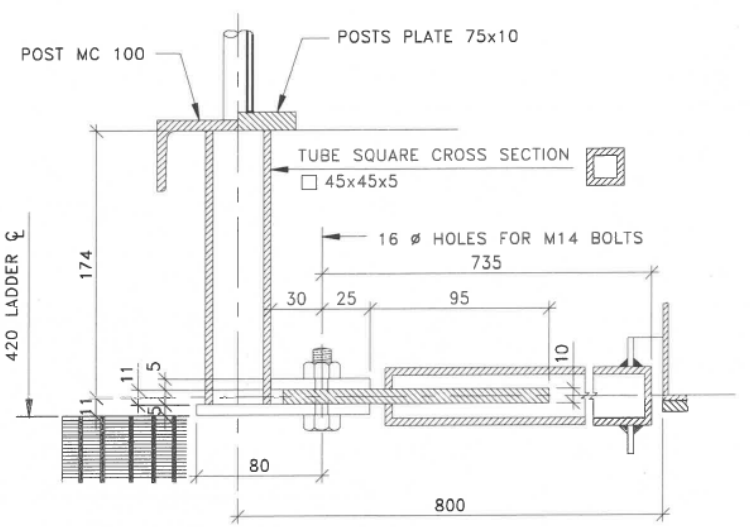


SECTION 7-7

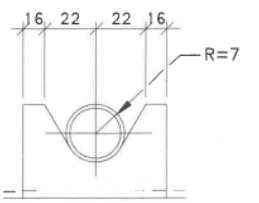
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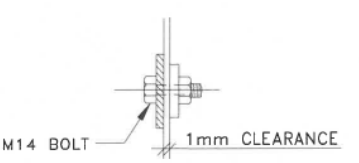
SAFETY BAR INSTALLATION ON LADDER POSTS



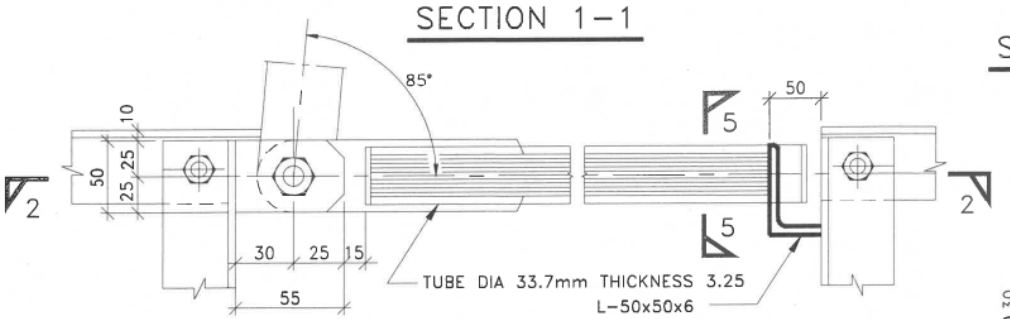
SECTION 1–1



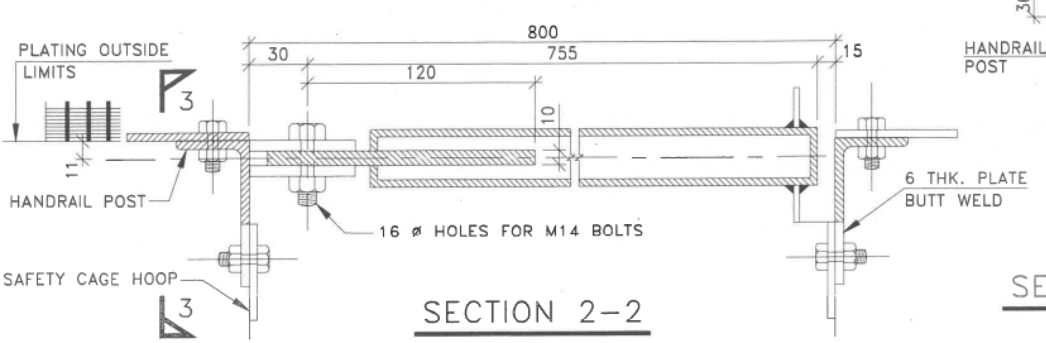
SECTION 5–5



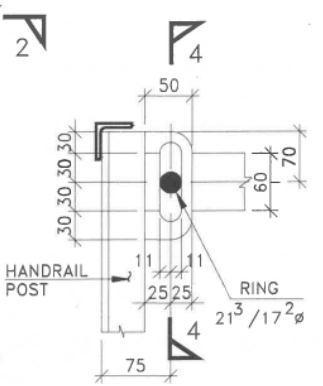
SECTION 4–4



SAFETY BAR INSTALLATION ON HANDRAIL POSTS



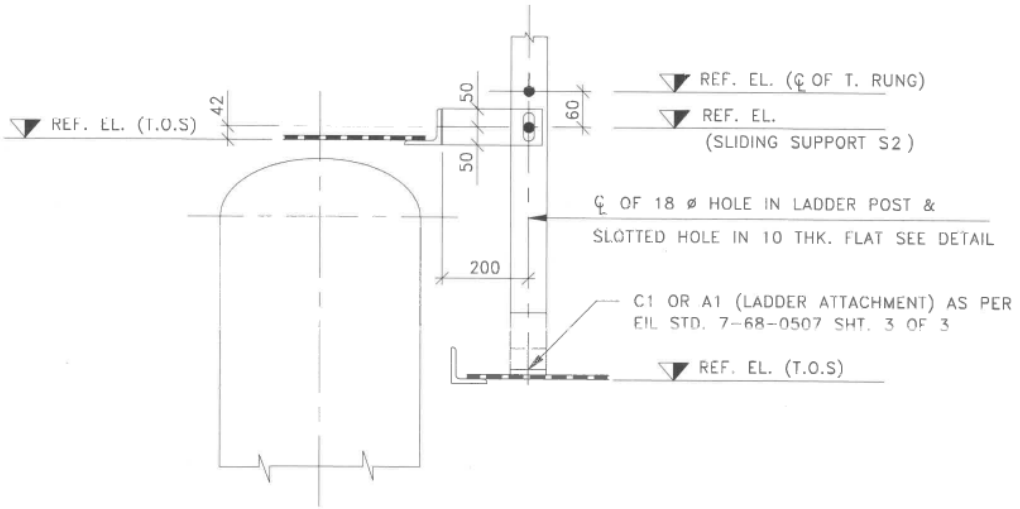
SECTION 2–2



SAFETY CAGE HOOP ATTACHMENT TO HANDRAIL POST

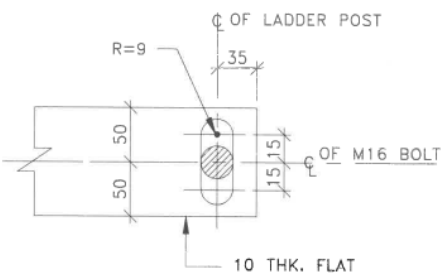
SECTION 3–3

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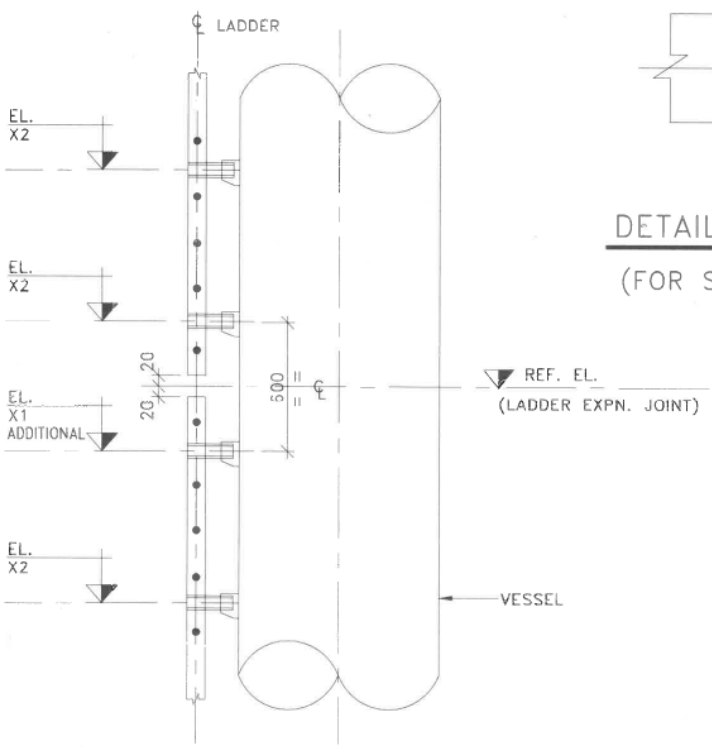
SLIDING CONN. DET. OF LADDER

(WITH TOE ANGLE OF PLATFORM ON THE HEAD OF VESSEL)



DETAIL OF SLOTTED HOLE

(FOR SLIDING SUPPORT S2)



DET. OF LADDER EXPANSION JOINT

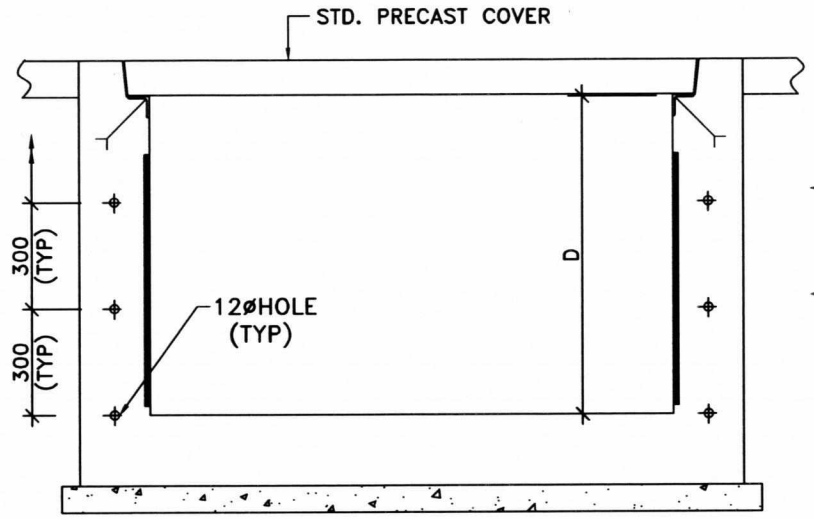
(WHEN DISTANCE BETWEEN TOP AND BOT. MOST SUPPORT ⩾ 9000)

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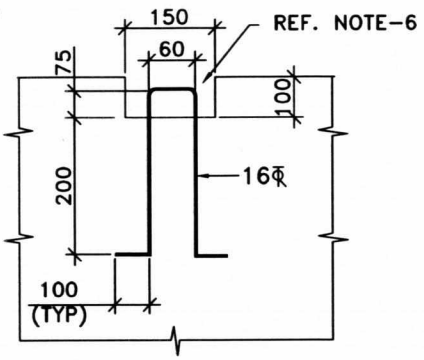
NOTES :

1. ALL DIMENSIONS ARE IN mm & LEVELS IN METRES.
2. MAX. WEIGHT OF EACH PRECAST TRENCH IS 5T.
3. THIS STANDARD IS SHOWING JOINT DETAILS AND LIFTING LUG OF PRECAST ELEMENTS ONLY.
4. FOR THICKNESS, R/F DETAILS OF WALL AND PRECAST COVER REFER STD.NO. 7-68-0625, 7-68-0626 & 7-68-0655.
5. LEAN CONCRETE TO BE SUITABLY ALIGNED/LEVEL TO ENSURE MATCHING OF WALL WITH FGL/HPP.
6. LIFTING POCKET SHALL BE FILLED WITH CONCRETE AFTER ERECTION/ALIGNMENT.

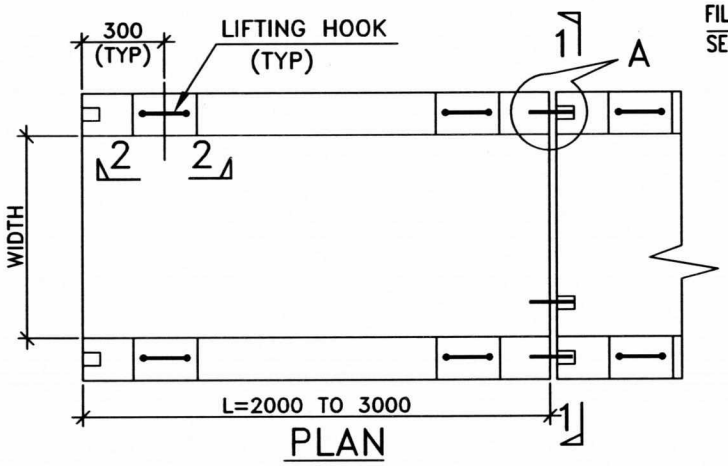
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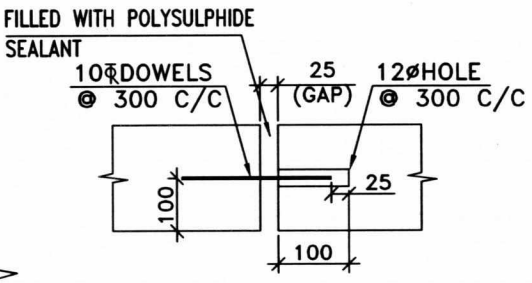
SECTION 1-1



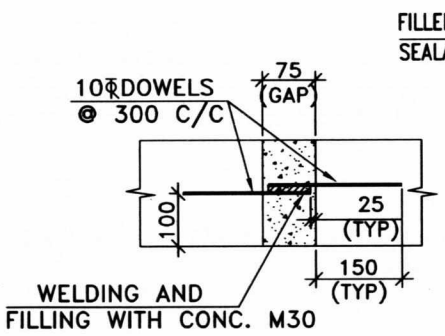
VIEW 2-2
(LIFTING HOOK DET.)



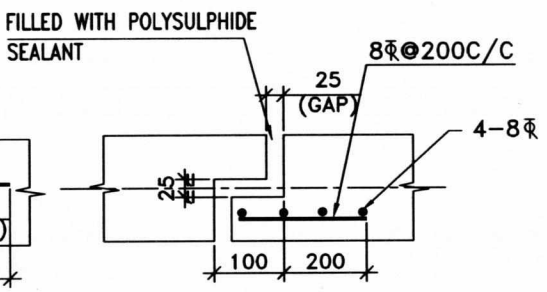
PLAN



DET.-A (ALT.-I)
(REFER ALT-II & ALT-III ALSO)



ALT.-II



ALT.-III

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	20-06-2022	REAFFIRMED AND ISSUED AS STANDARD	ANURAG KR. SINHA	S.C.MAITY	ANURAG SINHA	SANJAY MAZUMDAR
1	29-09-2016	REAFFIRMED AND ISSUED AS STANDARD	JITENDER	ALPANA	RAJANJI SRIVASTAVA	R. NANDA

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GENERAL NOTES :

1. THIS STANDARD IS APPLICABLE FOR CONE ROOF OF DIA 2.5m TO 40m OF NON-PRESSURISED STORAGE TANKS FOR HYDROCARBONS.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SPECIFIED OTHERWISE.
3. FOLLOWING LOADS HAVE BEEN CONSIDERED FOR DESIGN OF ROOF SUPPORTING STRUCTURE.
   a) LIVE LOAD @ 125 kg/m^2 AS PER IS: 803 (THIS INCLUDES SUCTION OF 50 kg/m^2)
   b) WEIGHT OF 8MM THICK ROOF PLATES
   c) SELF WEIGHT OF SUPPORTING STRUCTURE
4. TEMPERATURE DIFFERENCE UPTO ±20°C FROM THE CYLINDRICAL SHELL TEMPERATURE HAS BEEN CONSIDERED FOR THE DESIGN OF ROOF STRUCTURE.
5. ROOF PLATES ARE CONSIDERED TO BE FREELY RESTING OVER THE RAFTERS AND WELDED TO THE TOP RING OF THE TANK.
6. ALL STRUCTURAL STEEL SHALL BE OF GRADE E250, QUALITY BR/BO CONFORMING TO IS:2062.
7. ROOF PLATES FOR TANKS WITH DIAMETER LESS THAN 2.5m SHALL BE SELF SUPPORTING (DESIGN BY STATIC & MACHINERY EQUIPMENT DEPTT.)
8. ALL CONNECTIONS SHALL HAVE STRENGTH NOT LESS THAN 75% OF THE FULL MEMBER STRENGTH UNLESS SPECIFIED OTHERWISE.
9. WELDING OF ROOF STRUCTURE TO BE COMPLETED BEFORE INSULATION OF ROOF PLATE.
10. WHEREVER THREE SECONDARY RAFTERS ARE SUPPORTED ON A CROSS GIRDER, SUITABLE PACK PLATE SHALL BE PROVIDED UNDER THE MIDDLE RAFTER.
11. WEIGHT INDICATED DOES NOT INCLUDE THE ROOF SHELL AND CURB ANGLE BUT INCLUDES THE ALLOWANCE FOR GUSSETS.
12. CURB ANGLE TO BE PROVIDED INSIDE OR OUTSIDE THE TANK SHELL AS PER EQUIPMENT DATA SHEET.
13. FOR GENERAL NOTES ON STEEL STRUCTURES REFER DWG. FOR GENERAL NOTES OF PROJECT.
14. GUSSET PLATES TO BE 10 mm THICK FOR TANKS WITH DIA > 10 m.
15. OVERALL ORIENTATION OF THE ROOF STRUCTURE TO BE DECIDED BY FABRICATOR AVOIDING FOULING BETWEEN NOZZLES AND RADIAL RAFTERS.
16. ALL BOX SECTIONS SHALL BE FULLY WELDED TO AVOID CONDENSATION OF LIQUID VAPOUR ON INTERNAL FACES.

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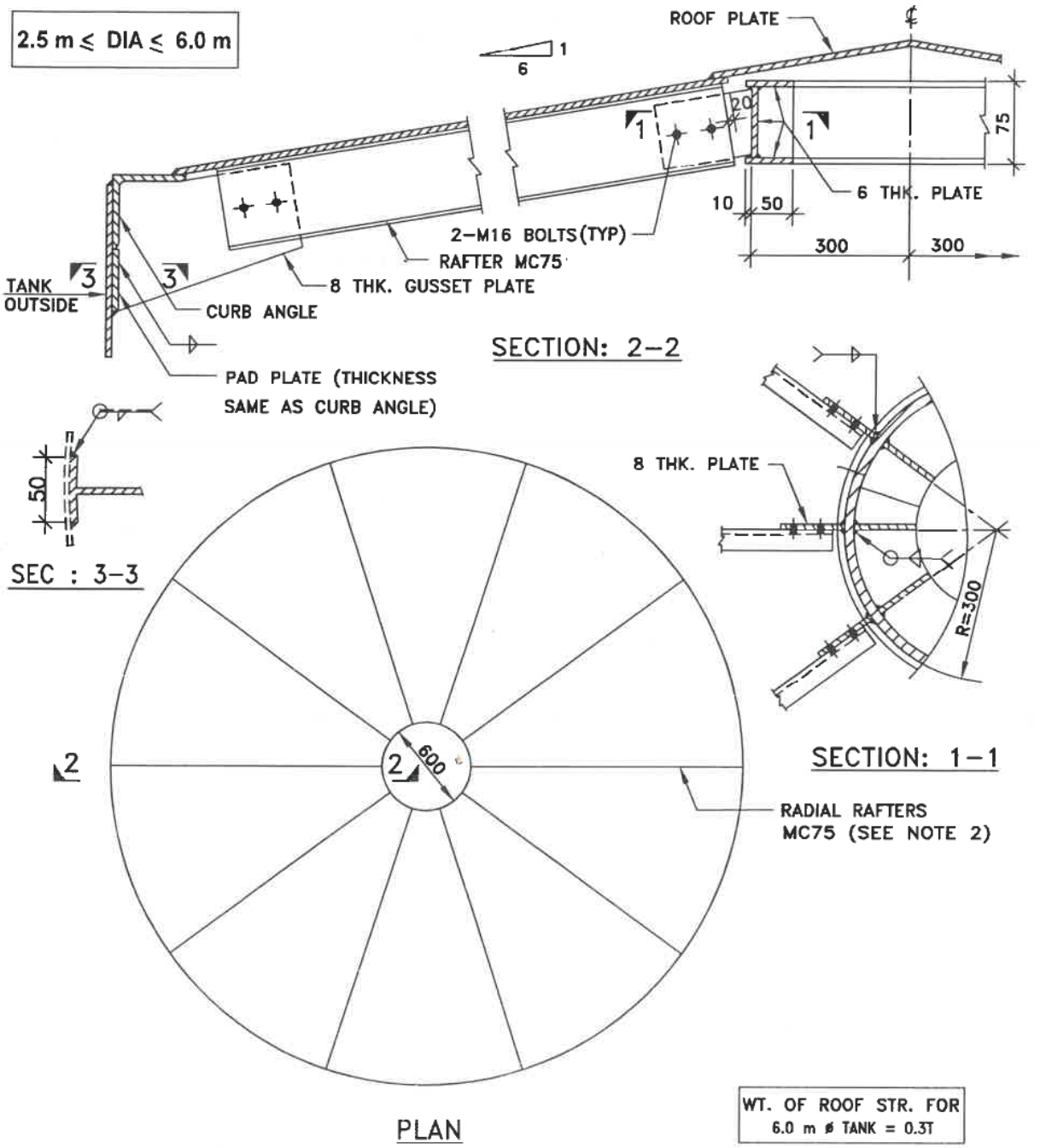
TABLE FOR FORCES

S.NO.	TANK DIA.(m)	MAIN RAFTER REACTIONS		CURB ANGLE			REMARKS
		VERT. (T)	HORZ. (T)	AXIAL FORCE(T)	B.M. IN HORZ. PLANE (Tcm)	B.M. IN VERT. PLANE (Tcm)	
1	2.5 ≤ DIA. ≤ 4.50	0.30	0.60	2.0	–	2.38	
2	4.5 < DIA. ≤ 6.00	0.43	0.84	2.6	–	3.20	
3	6.0 < DIA. ≤ 8.00	0.77	2.14	5.3	0.83	3.91	
4	8.0 < DIA. ≤ 10.00	0.98	3.30	6.3	0.88	4.41	
5	10.0 < DIA. ≤ 12.00	1.90	1.20	3.4	0.69	0.79	
6	12.0 < DIA. ≤ 15.00	3.20	1.20	3.9	2.43	1.91	
7	15.0 < DIA. ≤ 17.00	4.70	1.20	4.4	1.34	0.83	
8	17.0 < DIA. ≤ 20.00	5.30	1.20	5.1	3.13	1.33	
9	20.0 < DIA. ≤ 23.00	6.90	1.20	4.0	2.01	1.60	
10	23.0 < DIA. ≤ 25.00	8.10	1.30	4.6	2.97	1.57	
11	25.0 < DIA. ≤ 28.00	8.90	1.30	6.5	4.56	1.89	
12	28.0 < DIA. ≤ 31.00	9.60	1.30	6.4	5.30	0.94	
13	31.0 < DIA. ≤ 35.00	12.20	1.40	8.0	4.71	1.77	
14	35.0 < DIA. ≤ 40.00	14.60	1.40	10.5	12.52	2.76	

NOTES:

1. MAIN RAFTER SUPPORTS TO BE SUITABLY DESIGNED FOR THE FORCES LISTED ABOVE.
2. CURB ANGLE FORCES LISTED ABOVE ARE BASED ON THE ANALYSIS OF ROOF SUPPORTING STRUCTURE. STATIC & MACHINERY EQUIPMENT DEPTT. TO CONSIDER THESE FORCES FOR FINALISING THE CURB ANGLE SIZE.

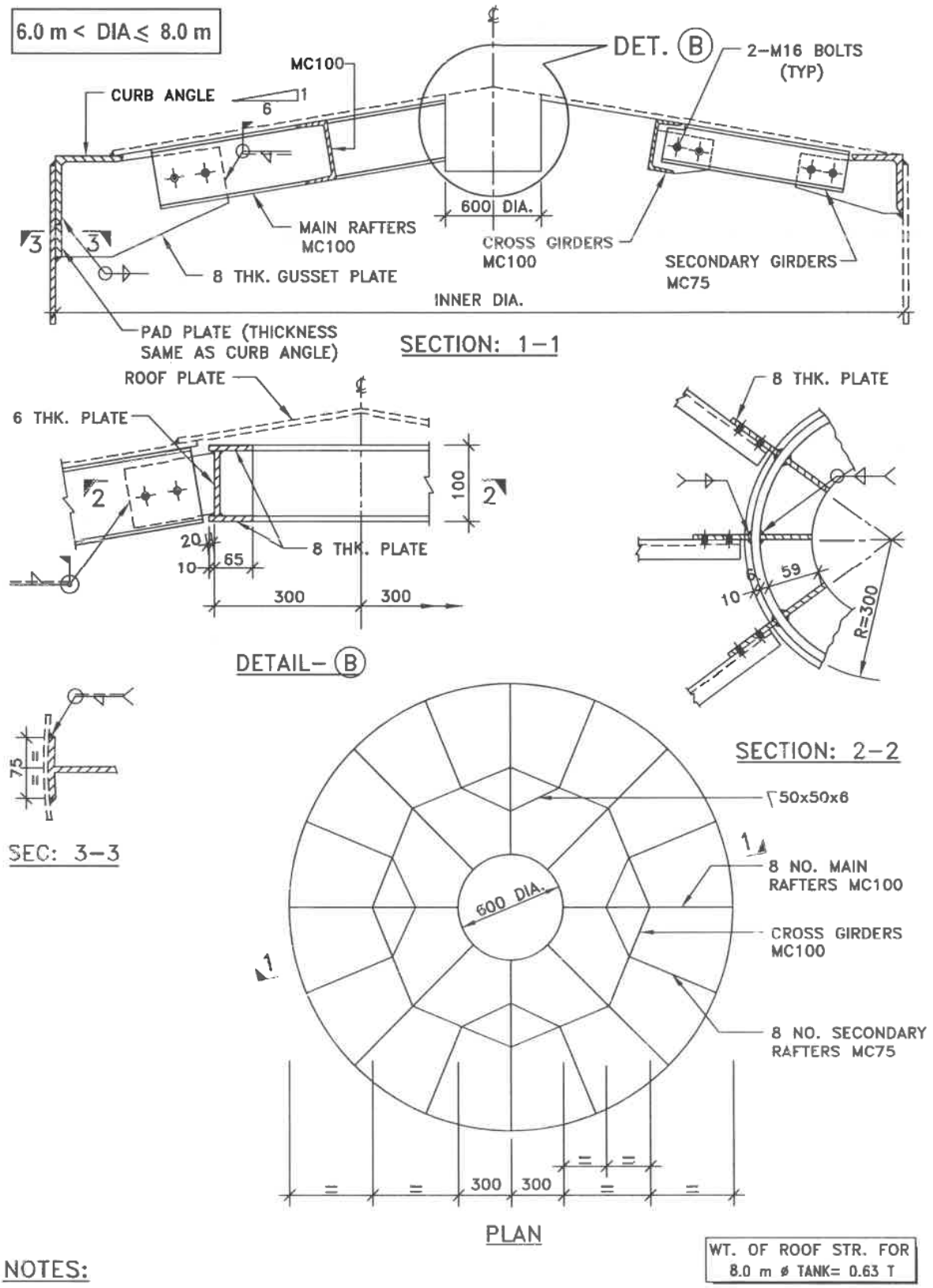
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NOTES:

1. FOR 2.5m DIA. 6 NOS. RAFTERS & 6.0m DIA. 12 NOS. RAFTERS SHALL BE PROVIDED; FOR TANKS OF INTERMEDIATE DIAMETERS THE NO. OF RAFTERS SHALL BE WORKED OUT BY LINEAR INTERPOLATION.
2. FOR CURB ANGLE SIZE STATIC EQUIPMENT DRAWING TO BE REFERRED.

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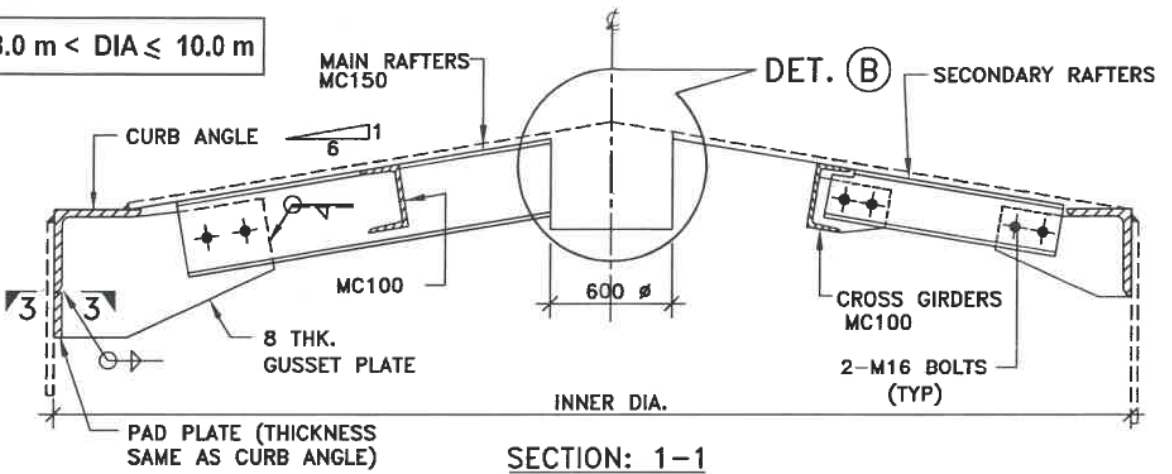
WT. OF ROOF STR. FOR 8.0 m ø TANK= 0.63 T

NOTES:

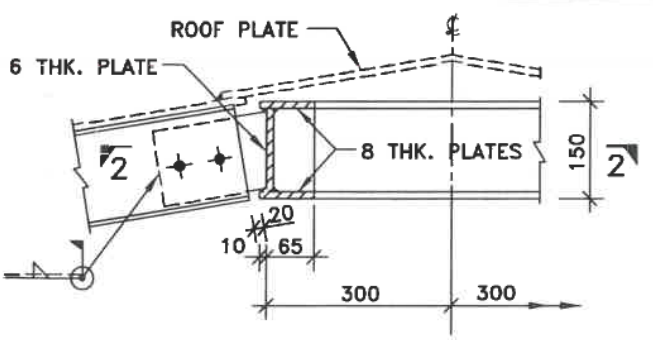
1. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRAWING TO BE REFERRED.

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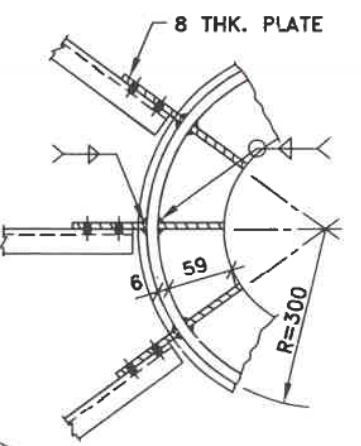
8.0 m < DIA ≤ 10.0 m



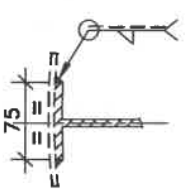
SECTION: 1-1



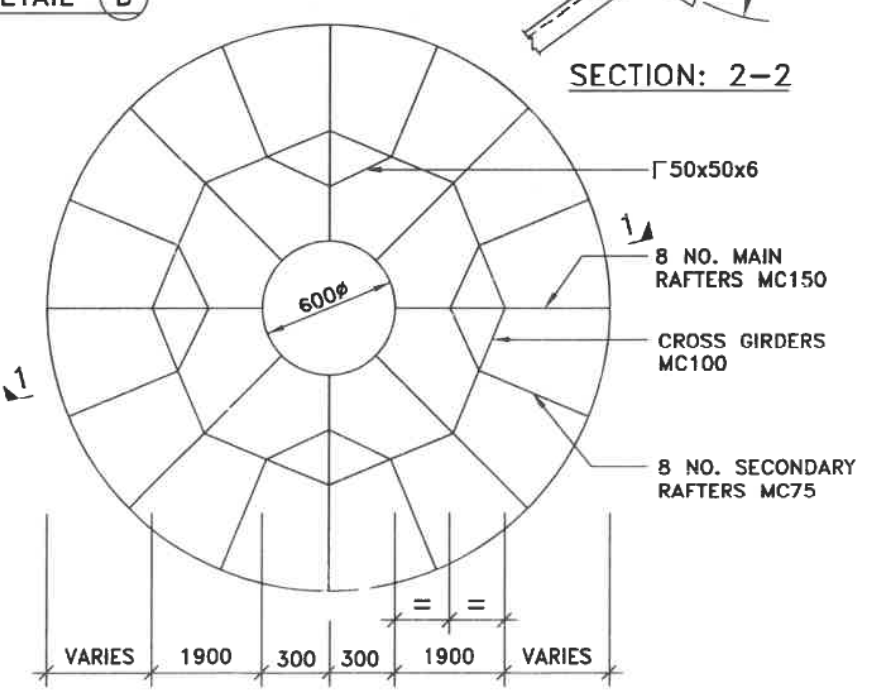
DETAIL-(B)



SECTION: 2-2



SECTION: 3-3



PLAN

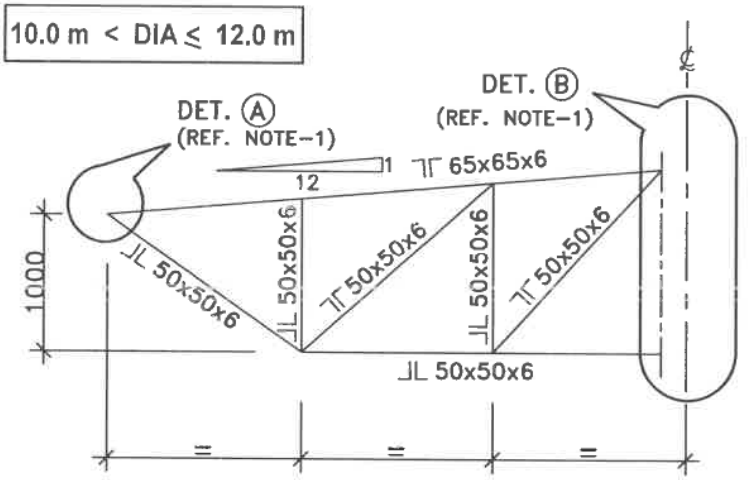
WT. OF ROOF STR. FOR 10.0 m ø TANK= 1.03 T

NOTES:

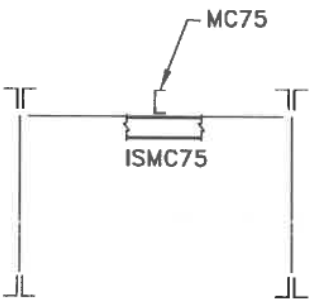
1. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRAWING TO BE REFERRED.

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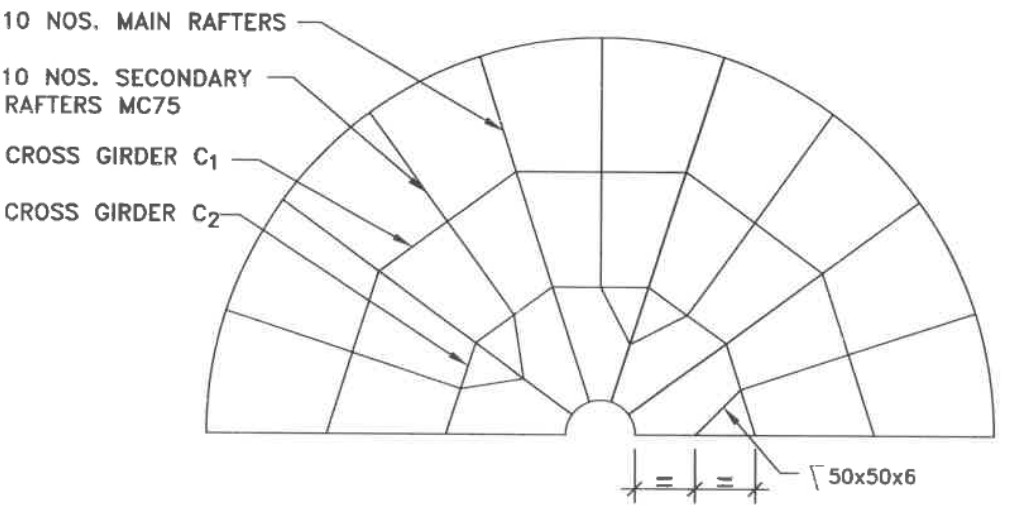
10.0 m < DIA ≤ 12.0 m



DETAILS OF MAIN RAFTER



DETAILS OF CROSS GIRDER C_1 AND C_2



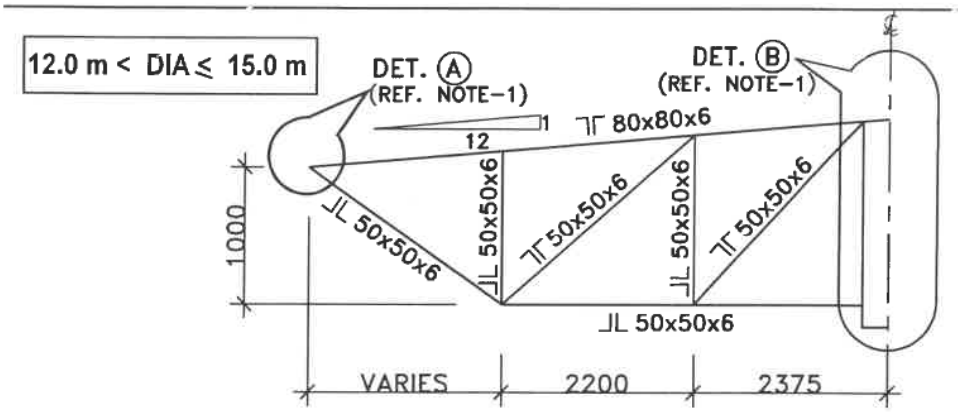
HALF PLAN

NOTES:

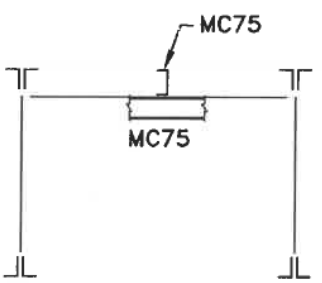
1. FOR DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 7-68-0681.
2. FOR CURB ANGLE SIZE STATIC EQUIPMENT DRAWING TO BE REFERRED.

WT. OF ROOF STR. FOR 12.0 m ϕ TANK= 2.71 T

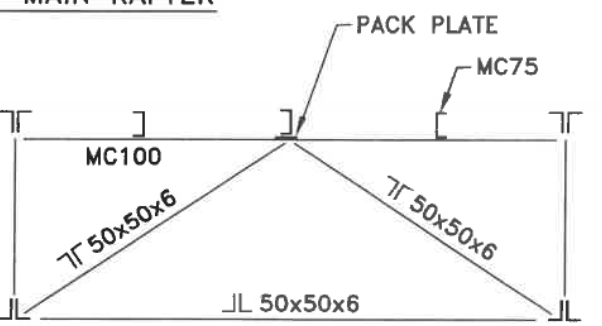
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DETAILS OF MAIN RAFTER

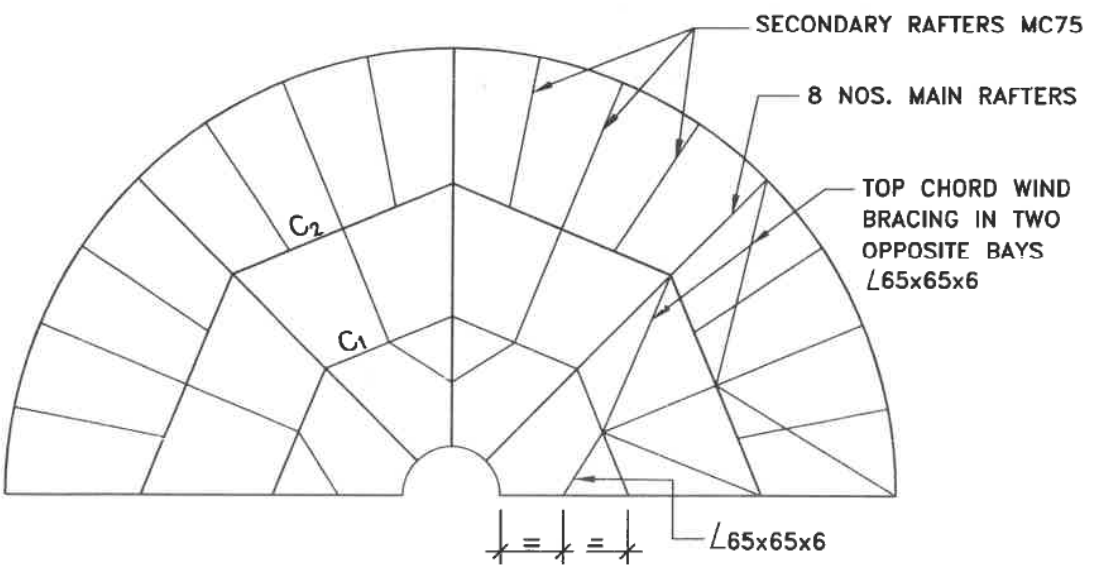


TYPE C_1



TYPE C_2

DETAILS OF CROSS GIRDER



HALF PLAN

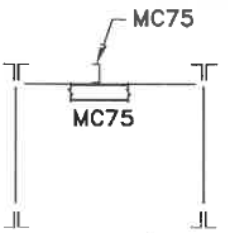
WT. OF ROOF STR. FOR 15.0 m ø TANK= 4.14 T

NOTES:

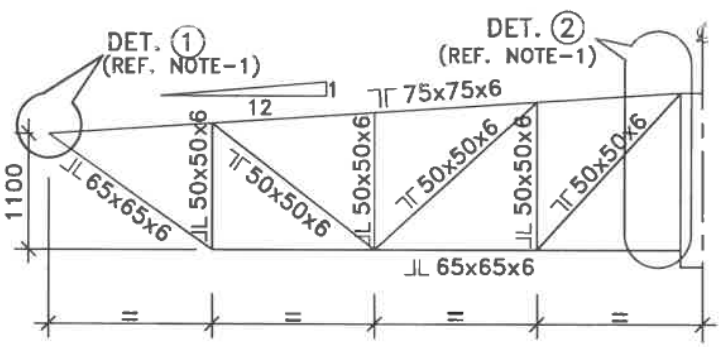
1. FOR DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRG. TO BE REFERRED.

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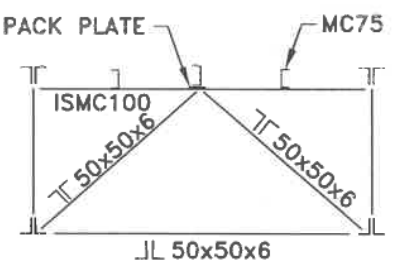
15.0 m < DIA ≤ 17.0 m



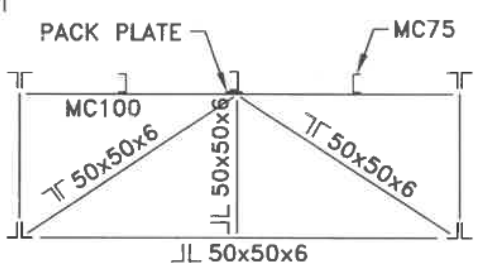
TYPE C_1



DETAILS OF MAIN RAFTER

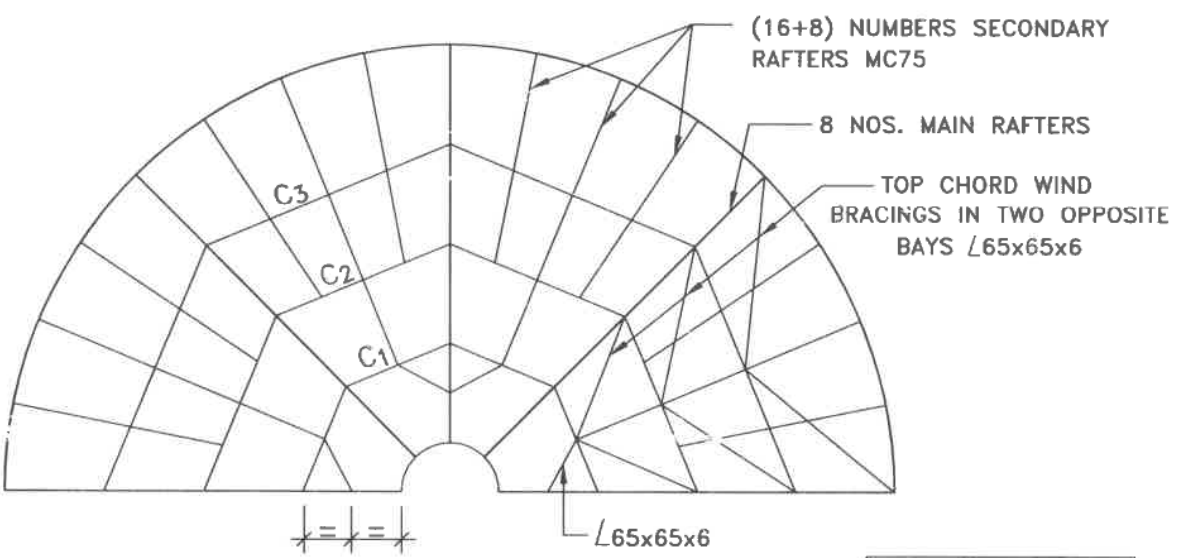


TYPE C_2



TYPE C_3

DETAILS OF CROSS GIRDER



HALF PLAN

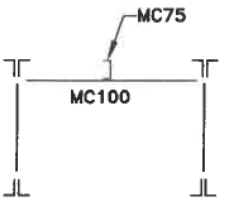
WT. OF ROOF STR. FOR 17.0 m ø TANK= 6.50 T

NOTES:

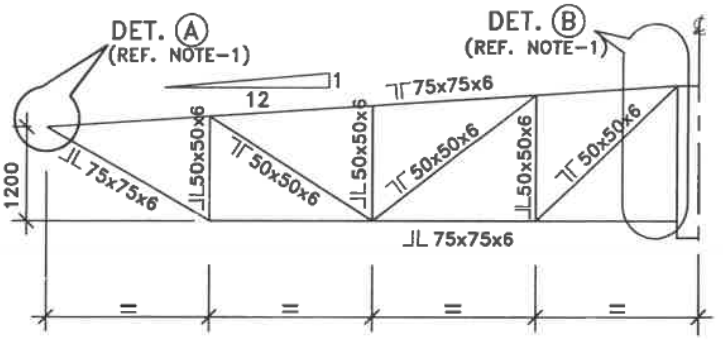
1. FOR CONNECTION DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681.
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRG. TO BE REFERRED.

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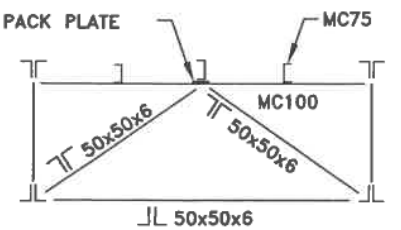
17.0 m < DIA ≤ 20.0 m



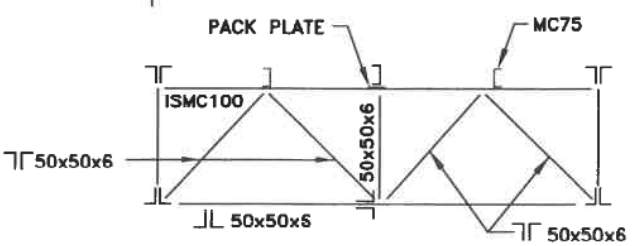
TYPE C_1



DETAILS OF MAIN RAFTER

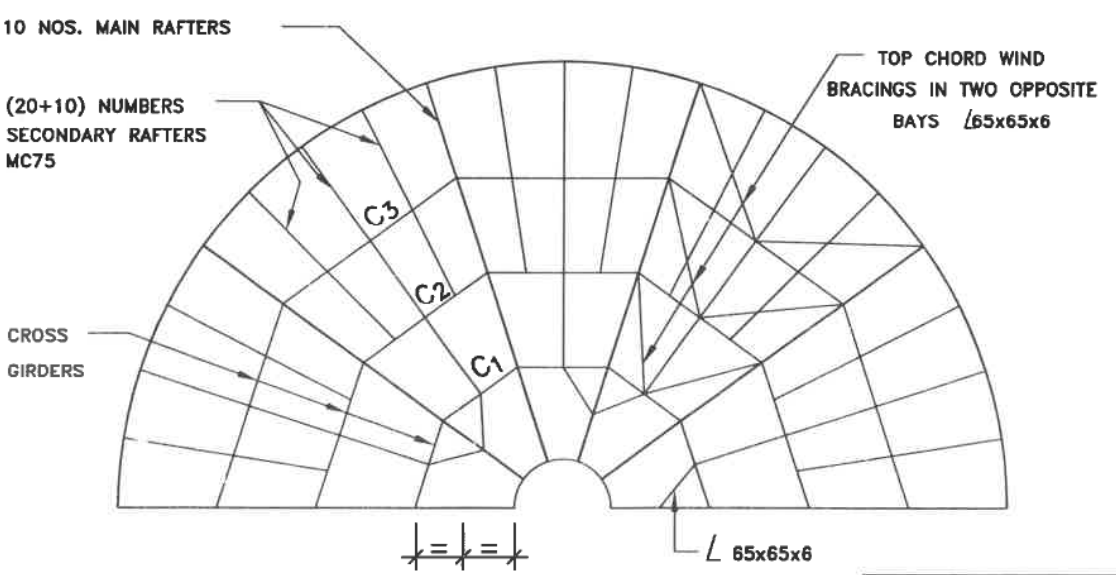


TYPE C_2



TYPE C_3

DETAILS OF CROSS GIRDER



HALF PLAN

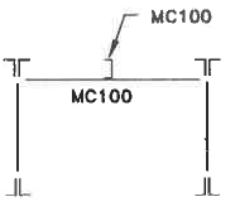
WT. OF ROOF STR. FOR 20.0 m ϕ TANK= 8.78 T

NOTES:

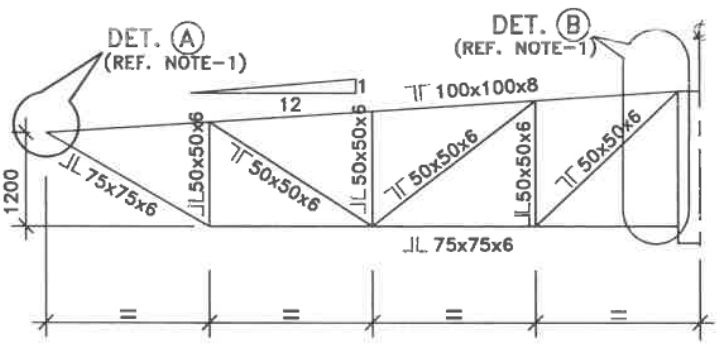
1. FOR CONNECTION DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681.
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRG. TO BE REFERRED.

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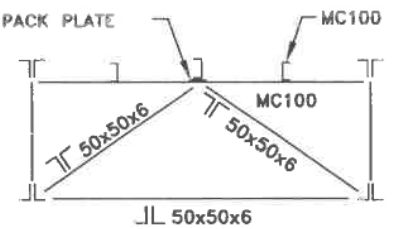
20.0 m < DIA ≤ 23.0 m



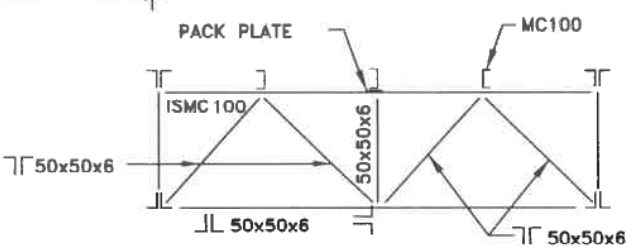
TYPE C_1



DETAILS OF MAIN RAFTER

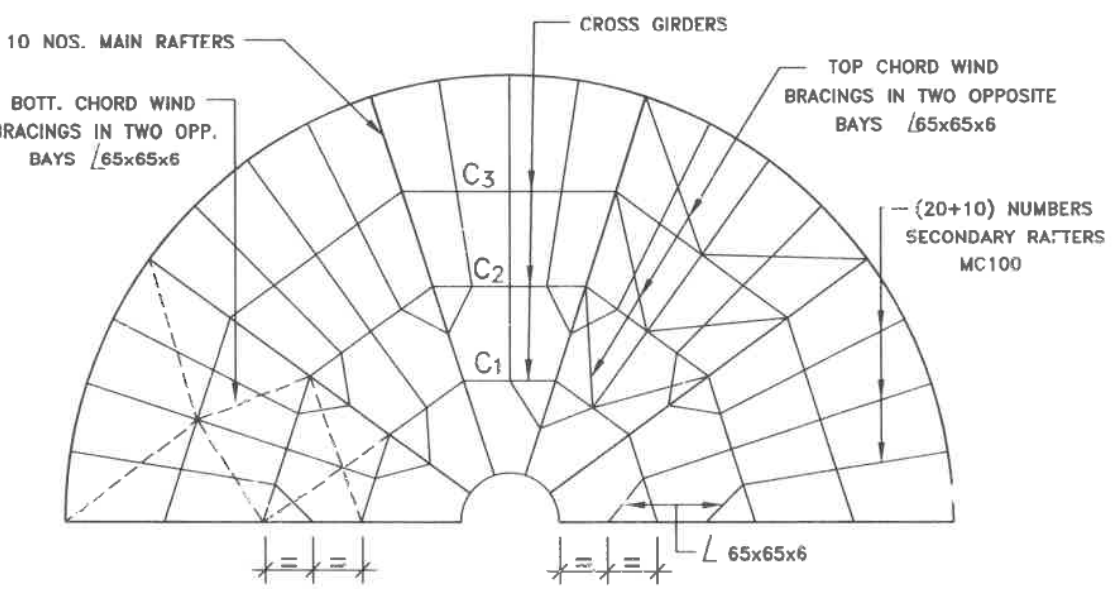


TYPE C_2



TYPE C_3

DETAILS OF CROSS GIRDER



HALF PLAN

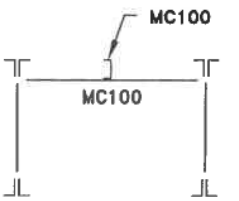
WT. OF ROOF STR. FOR 23.0 m ϕ TANK=15.02 T

NOTES:

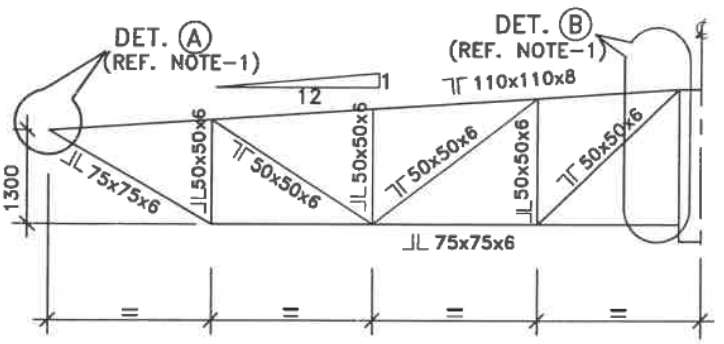
1. FOR CONNECTION DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681.
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRG. TO BE REFERRED.

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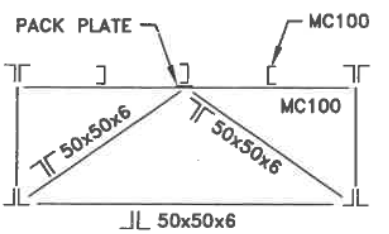
23.0 m < DIA ≤ 25.0 m



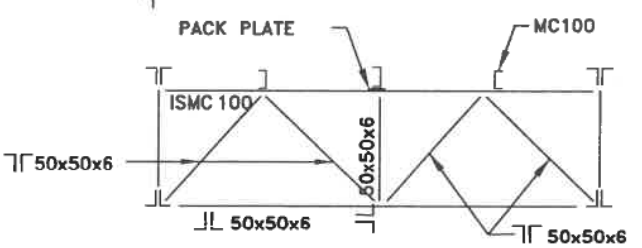
TYPE C_1



DETAILS OF MAIN RAFTER

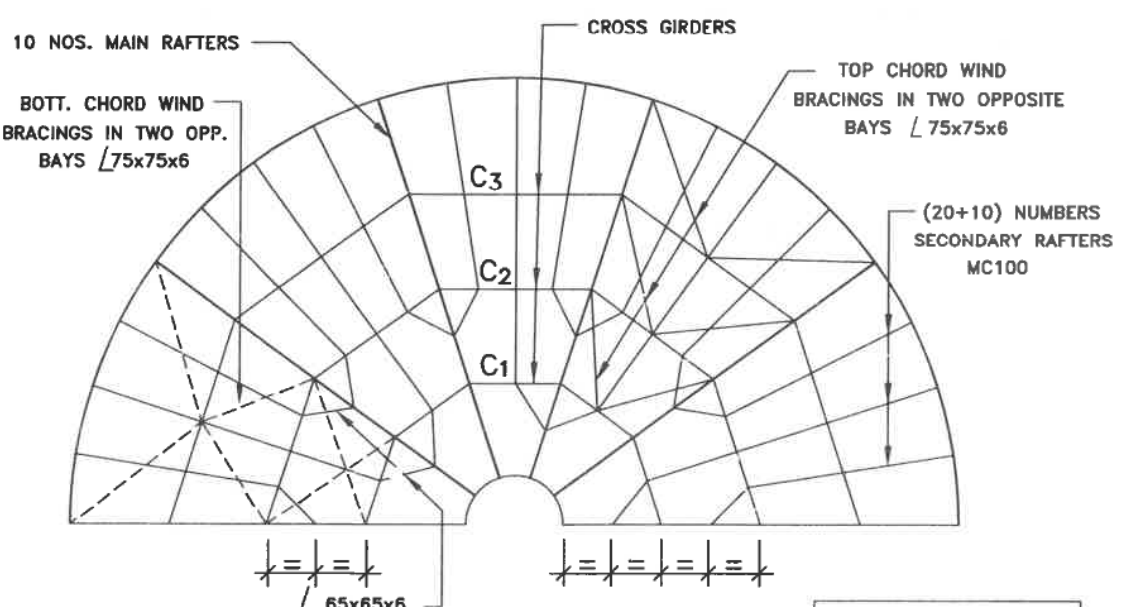


TYPE C_2



TYPE C_3

DETAILS OF CROSS GIRDER



HALF PLAN

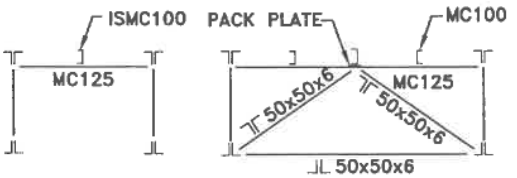
WT. OF ROOF STR. FOR 25.0 m ϕ TANK=14.67 T

NOTES:

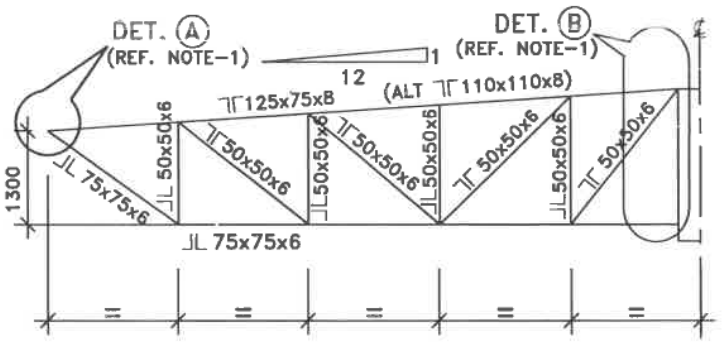
1. FOR CONNECTION DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681.
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRG. TO BE REFERRED.

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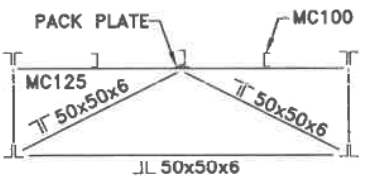
25.0 m < DIA ≤ 28.0 m



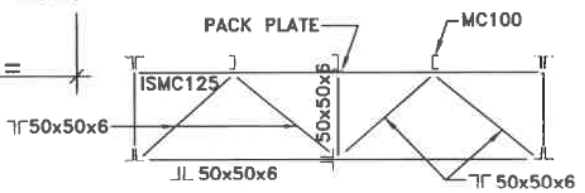
TYPE C_1 TYPE C_2



DETAILS OF MAIN RAFTERS

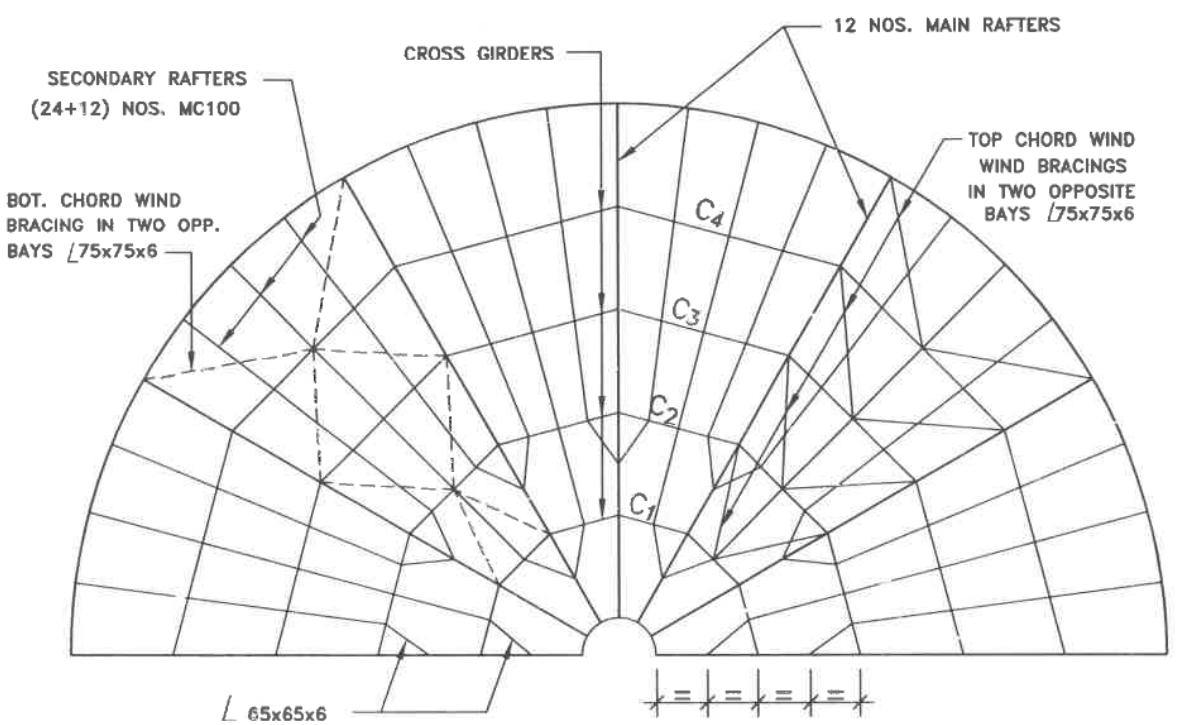


TYPE C_3



TYPE C_4

DETAILS OF CROSS GIRDERS



HALF PLAN

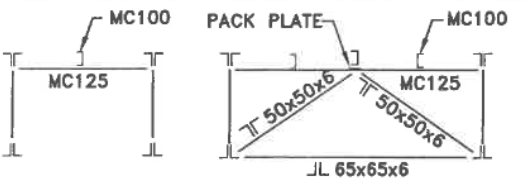
WT. OF ROOF STR. FOR 28.0 m ϕ TANK=21.20 T

NOTES:

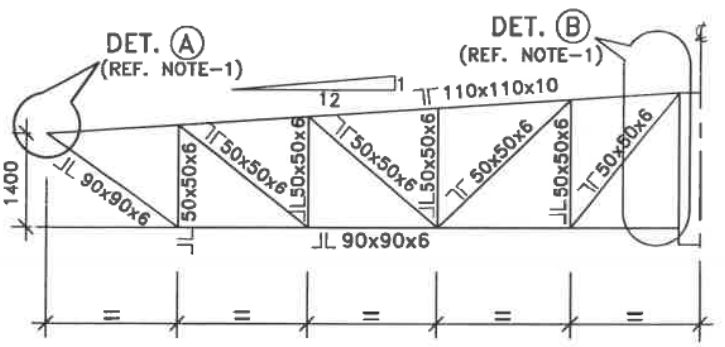
1. FOR CONNECTION DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681.
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRAWING TO BE REFERRED.

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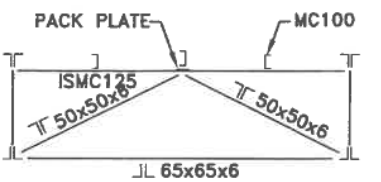
28.0 m < DIA ≤ 31.0 m



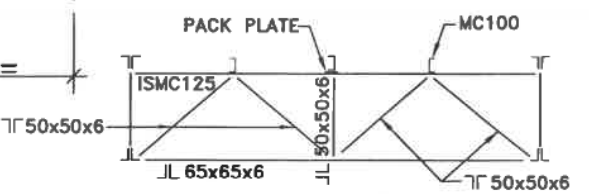
TYPE C_1 TYPE C_2



DETAILS OF MAIN RAFTERS

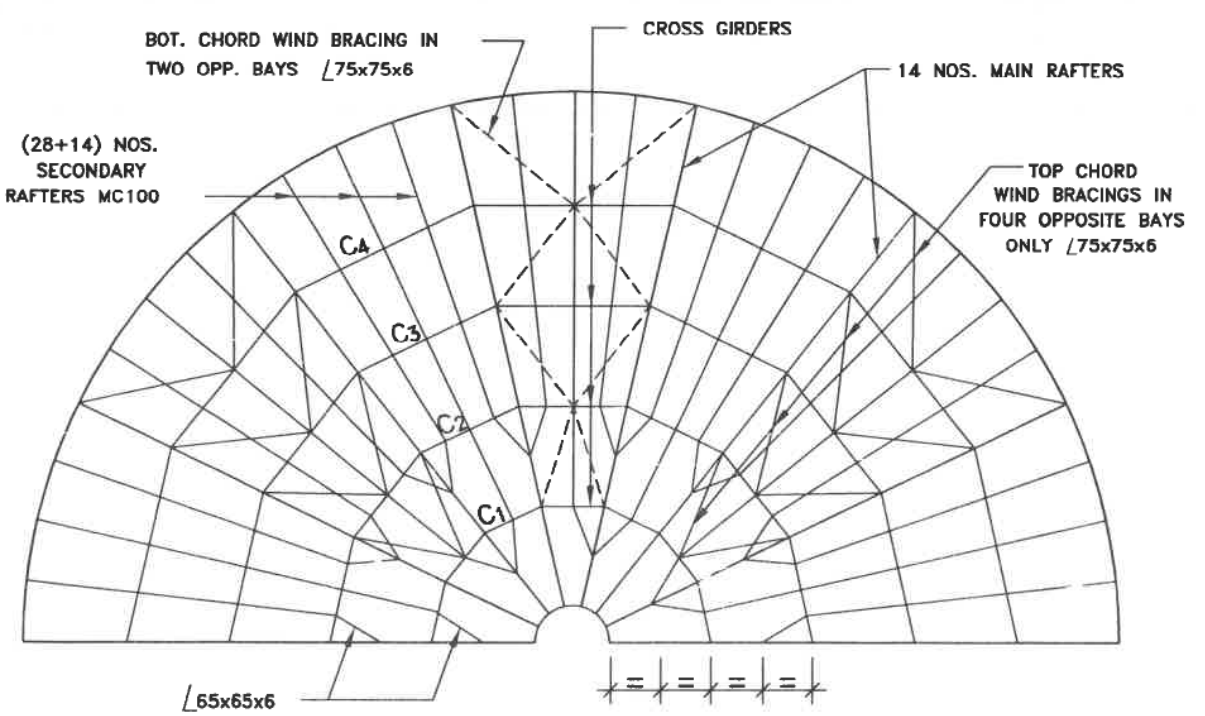


TYPE C_3



TYPE C_4

DETAILS OF CROSS GIRDERS



HALF PLAN

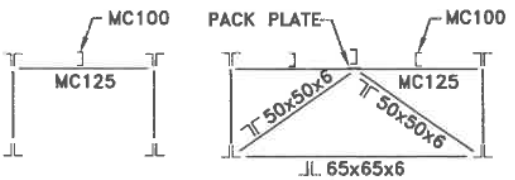
WT. OF ROOF STR. FOR 31.0 m ϕ TANK=29.30 T

NOTES:

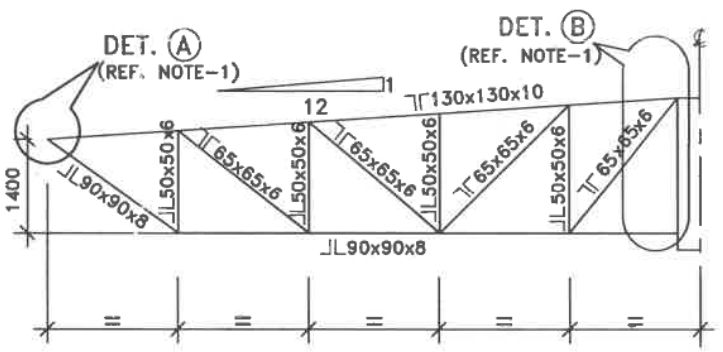
1. FOR CONNECTION DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRG. TO BE REFERRED.

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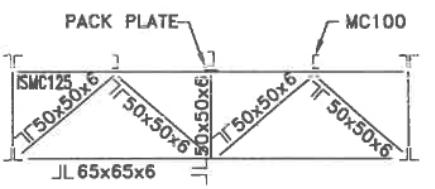
31.0 m < DIA ≤ 35.0 m



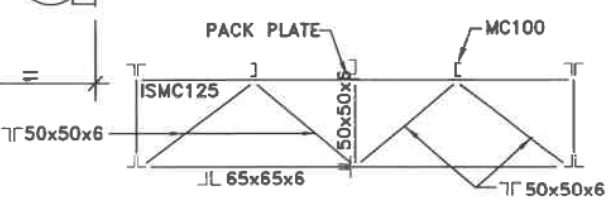
TYPE C_1 TYPE C_2



DETAILS OF MAIN RAFTERS

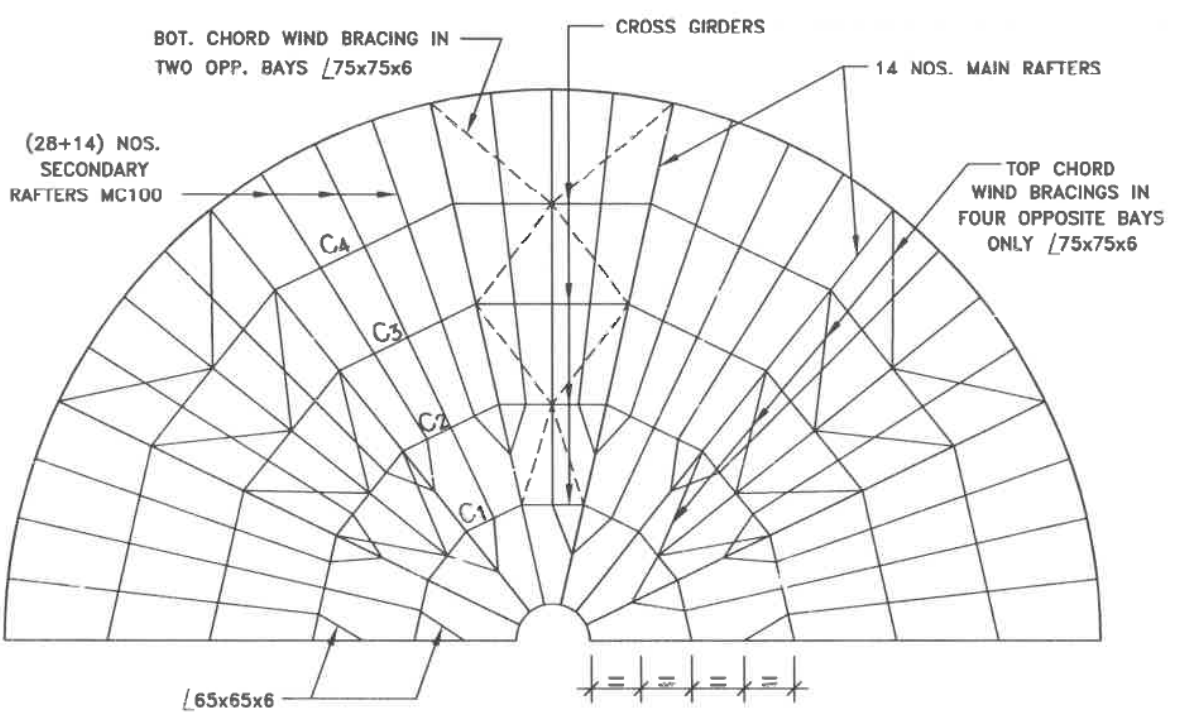


TYPE C_3



TYPE C_4

DETAILS OF CROSS GIRDERS



HALF PLAN

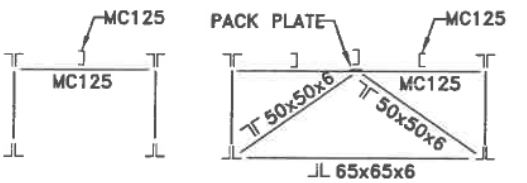
WT. OF ROOF STR. FOR 35.0 m ϕ TANK=38.70 T

NOTES:

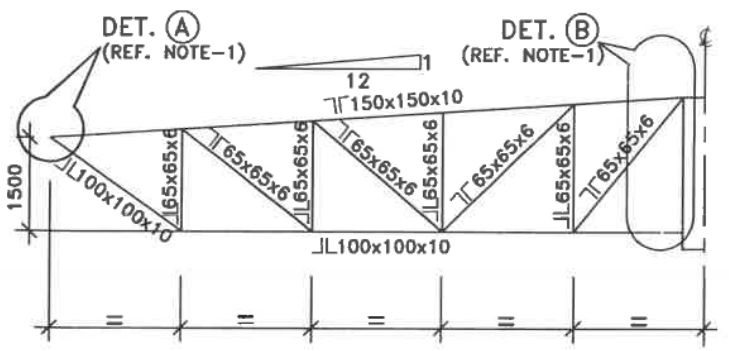
1. FOR CONNECTION DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681.
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRG. TO BE REFERRED.

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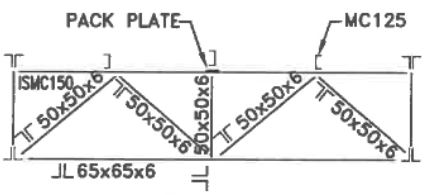
35.0 m < DIA ≤ 40.0 m



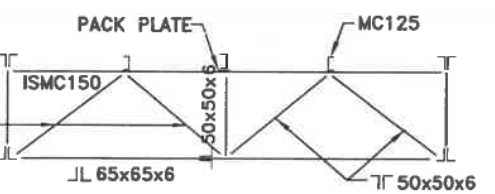
TYPE C_1 TYPE C_2



DETAILS OF MAIN RAFTERS

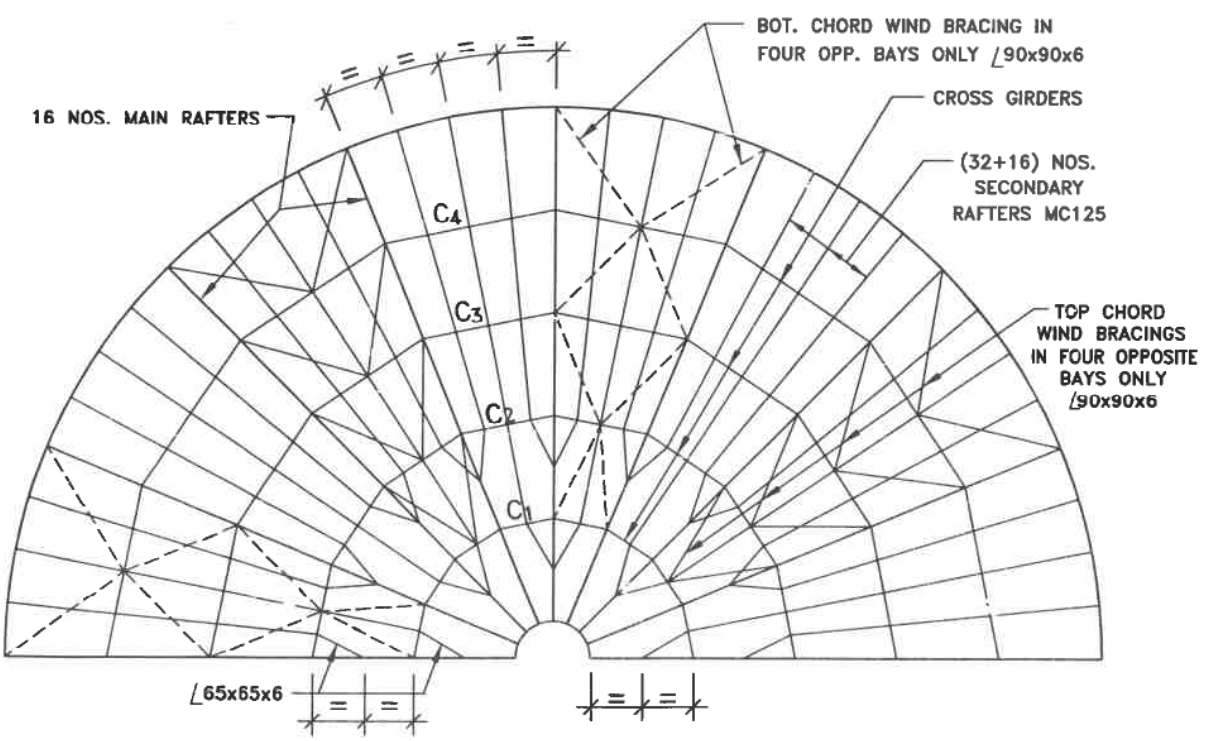


TYPE C_3



TYPE C_4

DETAILS OF CROSS GIRDERS



HALF PLAN

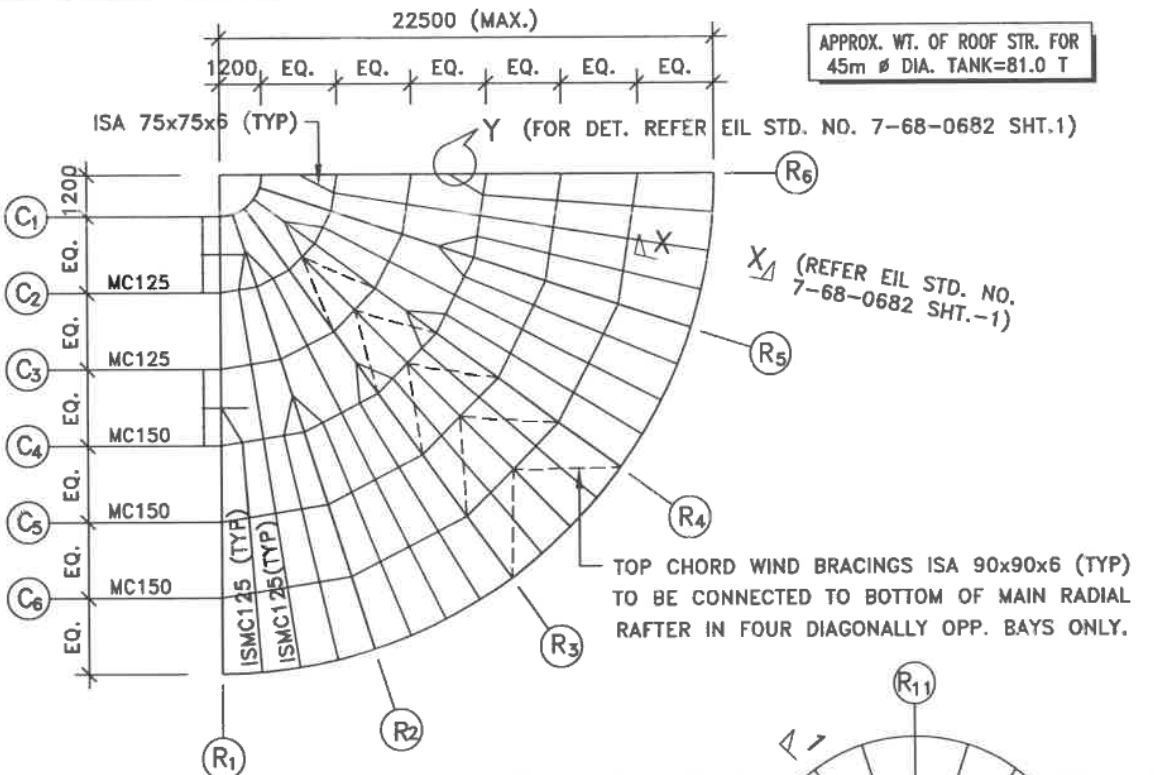
WT. OF ROOF STR. FOR 40.0 m ϕ TANK = 59.71 T

NOTES:

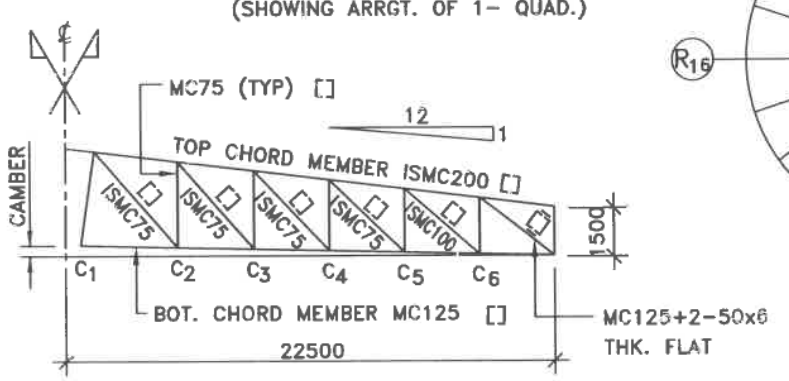
1. FOR CONNECTION DETAILS 'A' & 'B' REFER STANDARD NO. 7-68-0680 & 0681.
2. FOR CURB ANGLE SIZE, STATIC EQUIPMENT DRG. TO BE REFERRED.

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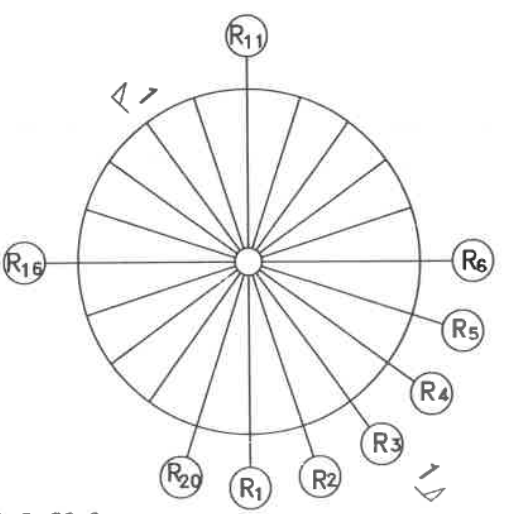
40.0 m < DIA ≤ 45.0 M



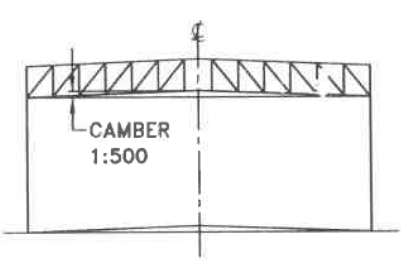
PART TOP CHORD PLAN
(SHOWING ARRGT. OF 1- QUAD.)



TYP. DET. OF MAIN RADIAL RAFTERS
(20 NOS. REQUIRED THUS)



ROOF PLAN
(SEE NOTE)



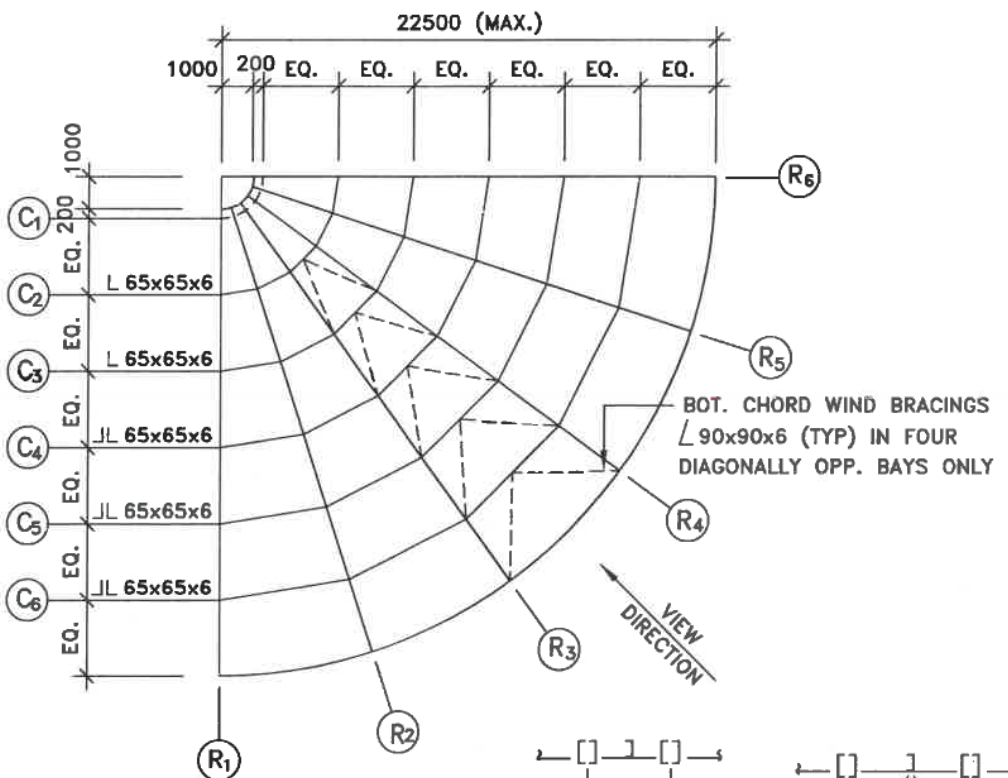
SECTION: 1-1

NOTES:

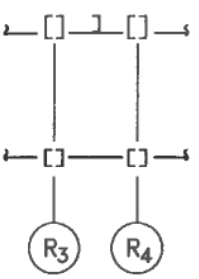
1. IN ROOF PLAN, ONLY MAIN RADIAL RAFTERS SHOWN; OTHER MEMBERS NOT SHOWN FOR CLARITY.
2. FOR FURTHER NOTES & M.T.O REFER EIL STD. No. 7-68-0682 SHT.-5
3. ALL VIEWS ARE TOWARDS THE CENTRE OF TANK AND ARE IN BETWEEN TWO CONSECUTIVE MAIN RADIAL RAFTERS.
4. FOR CONNECTION DETAILS REFER EIL STD. No. 7-68-0682 SHT. 1 TO 4

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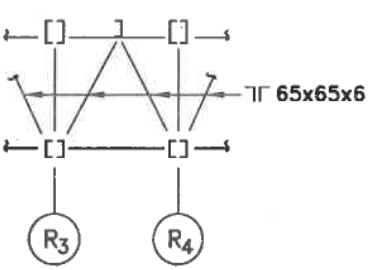
40.0 m < DIA ≤ 45.0 m



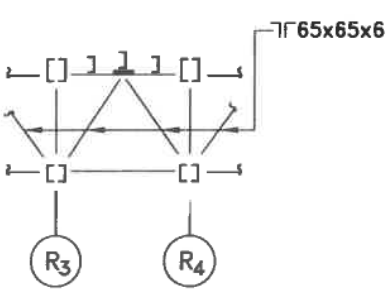
PART BOT. CHORD PLAN
(SHOWING ARRGT. OF 1– QUAD.)



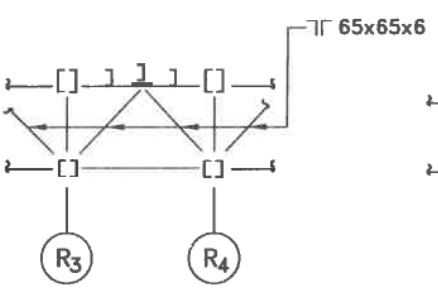
VIEW ON C2



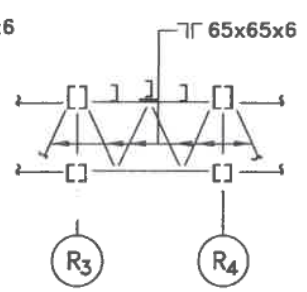
VIEW ON C3



VIEW ON C4



VIEW ON C5

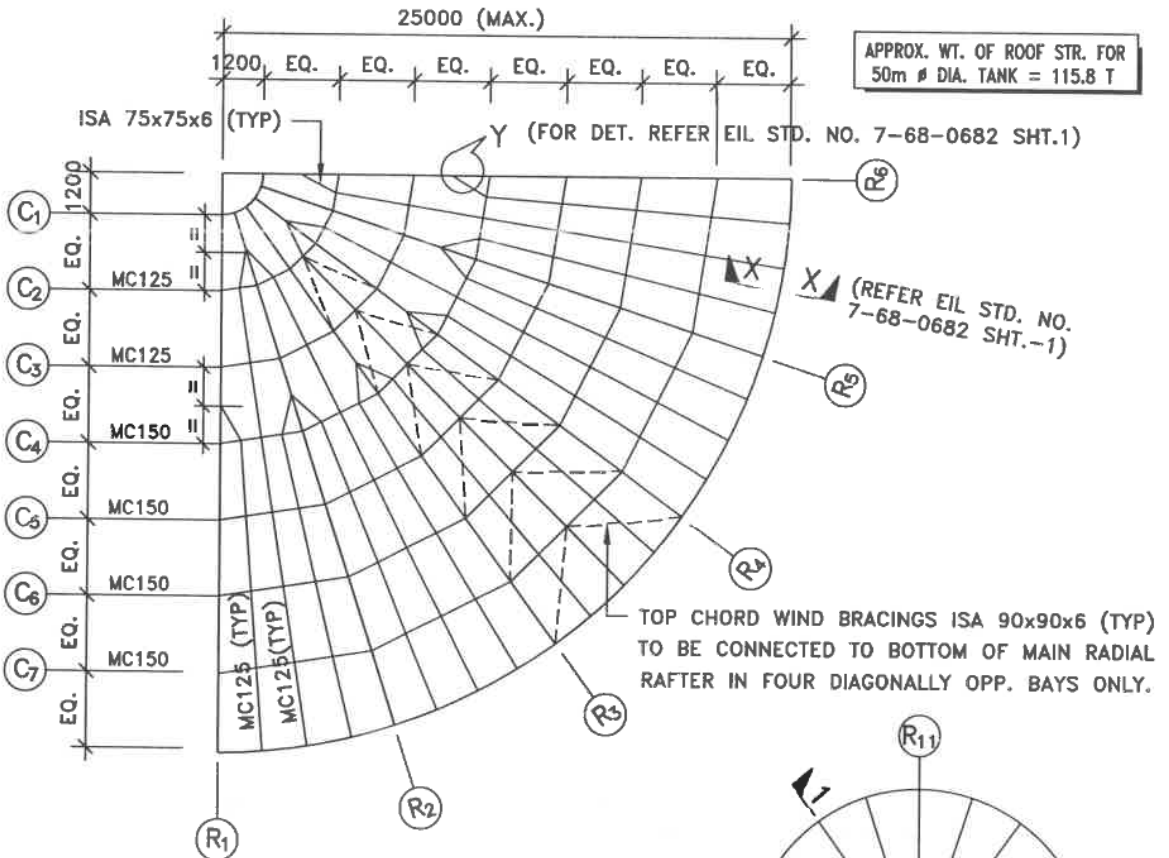


VIEW ON C6

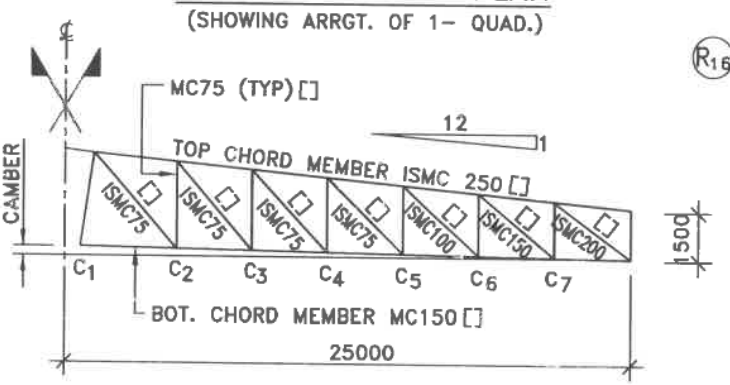
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45.0 m < DIA ≤ 50.0 m

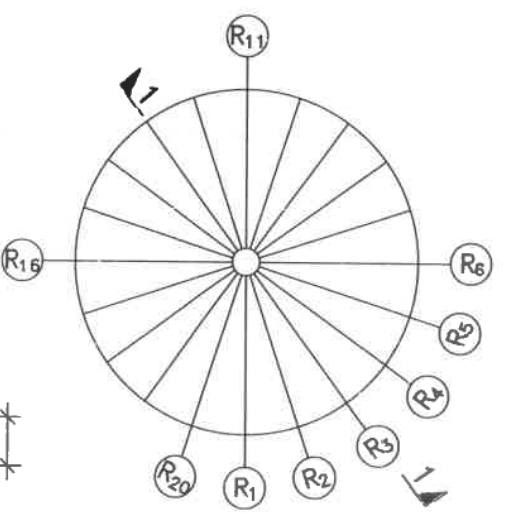
APPROX. WT. OF ROOF STR. FOR 50m ø DIA. TANK = 115.8 T



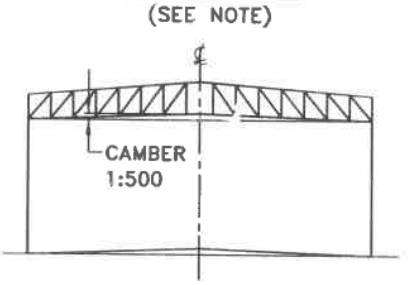
PART TOP CHORD PLAN
(SHOWING ARRGT. OF 1- QUAD.)



TYP. DET. OF MAIN RADIAL RAFTER
(20 NOS. REQUIRED THUS)



ROOF PLAN
(SEE NOTE)



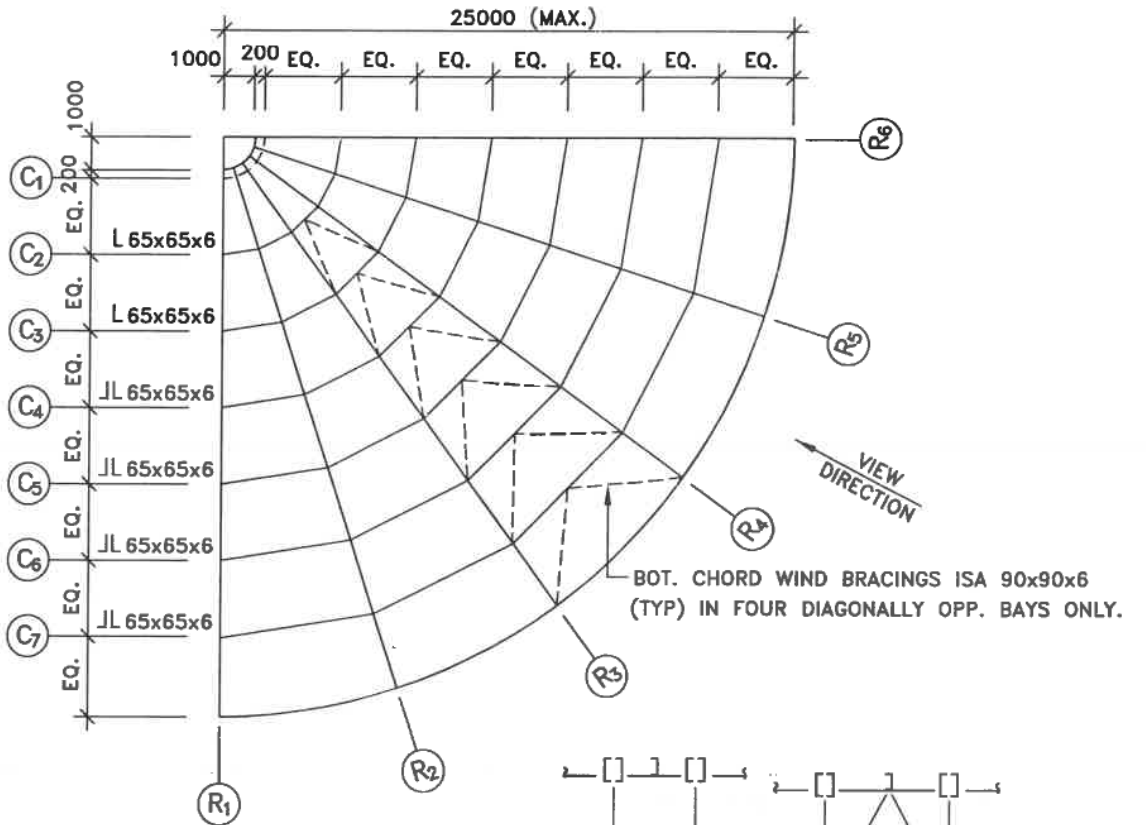
SECTION: 1-1

NOTES:

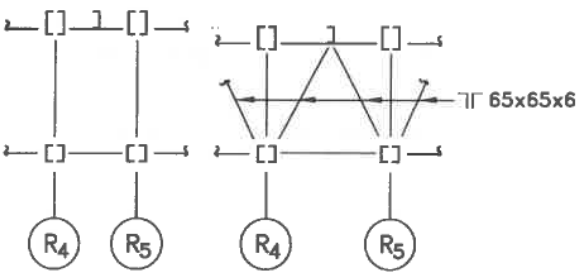
1. IN ROOF PLAN, ONLY MAIN RADIAL RAFTERS SHOWN; OTHER MEMBERS NOT SHOWN FOR CLARITY.
2. FOR FURTHER NOTES & M.T.O REFER EIL STD. No. 7-68-0682 SHT.-5
3. ALL VIEWS ARE TOWARDS THE CENTRE OF TANK AND ARE IN BETWEEN TWO CONSECUTIVE MAIN RADIAL RAFTERS.
4. FOR CONNECTION DETAILS REFER EIL STD. No. 7-68-0682 SHT. 1 TO 4

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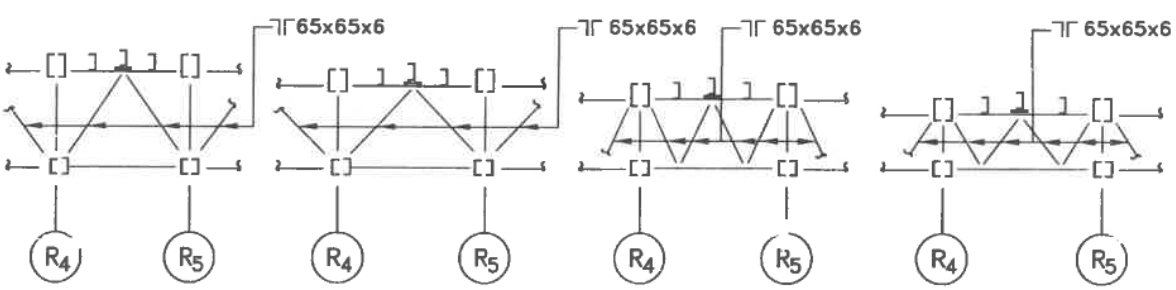
45.0 m < DIA ≤ 50.0 m



PART BOT. CHORD PLAN
(SHOWING ARRGT. OF 1– QUAD.)



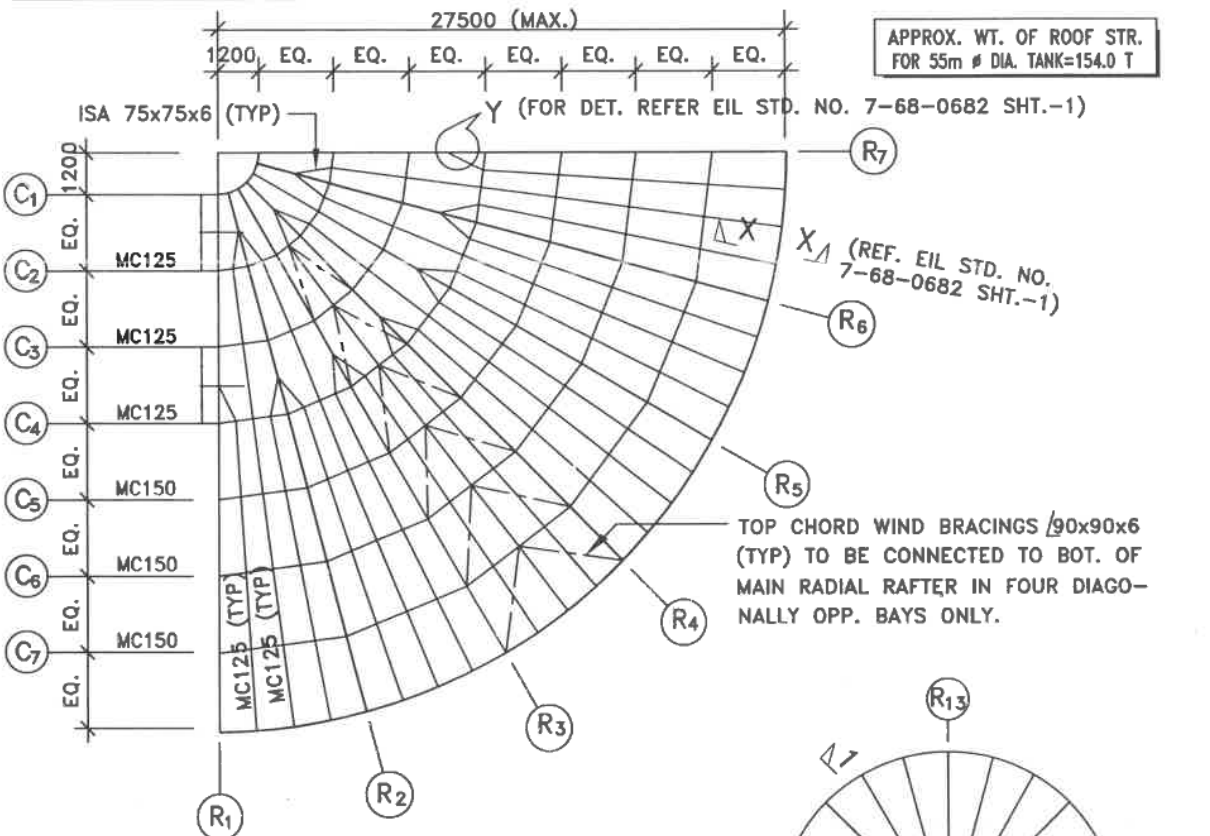
VIEW ON C2 VIEW ON C3



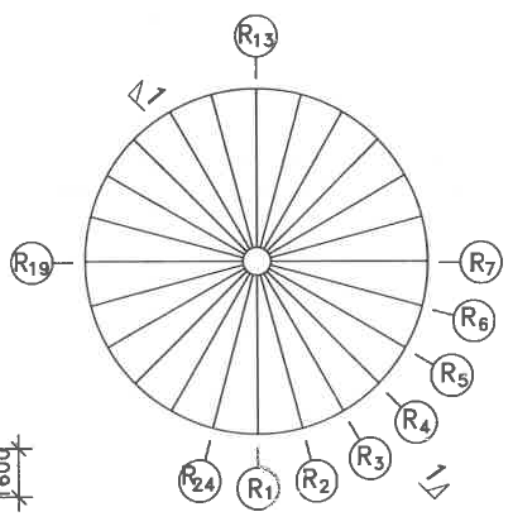
VIEW ON C4 VIEW ON C5 VIEW ON C6 VIEW ON C7

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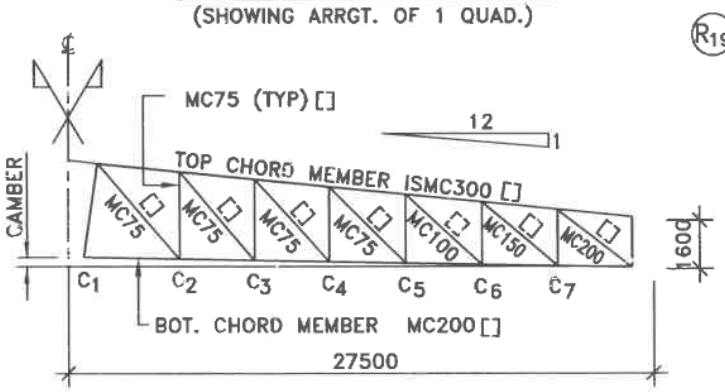
50.0 M < DIA ≤ 55.0 M



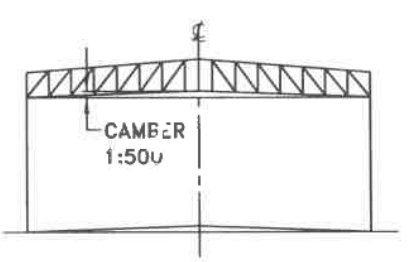
PART TOP CHORD PLAN
(SHOWING ARRGT. OF 1 QUAD.)



ROOF PLAN
(SEE NOTE 1)



TYP. DET. OF MAIN RADIAL RAFTER
(24 NOS. REQUIRED THUS)



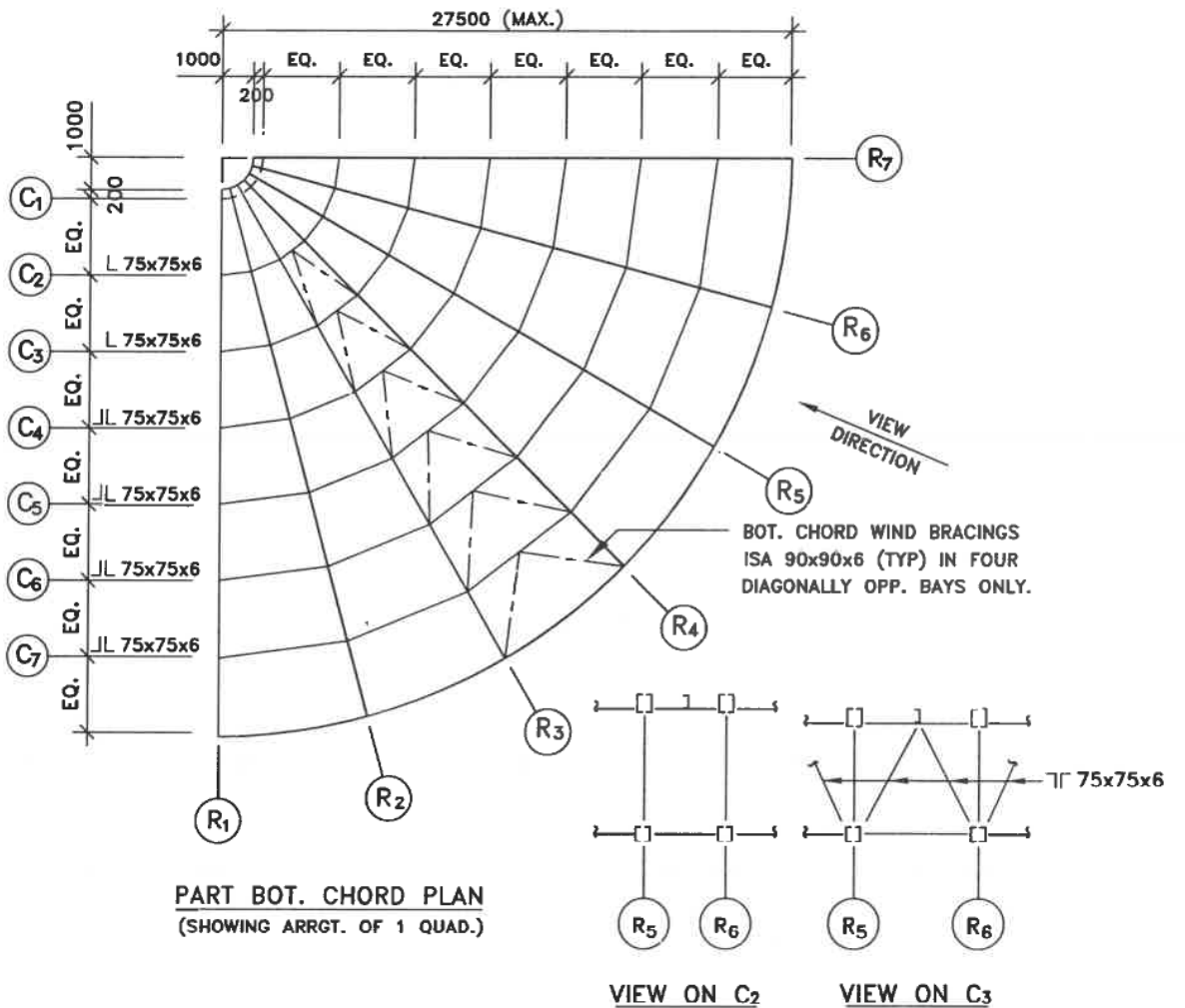
SECTION: 1-1

NOTES:

1. IN ROOF PLAN, ONLY MAIN RADIAL RAFTERS SHOWN; OTHER MEMBERS NOT SHOWN FOR CLARITY.
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4. FOR CONNECTION DETAILS REFER EIL STD. No. 7-68-0682 SHT. 1 TO 4

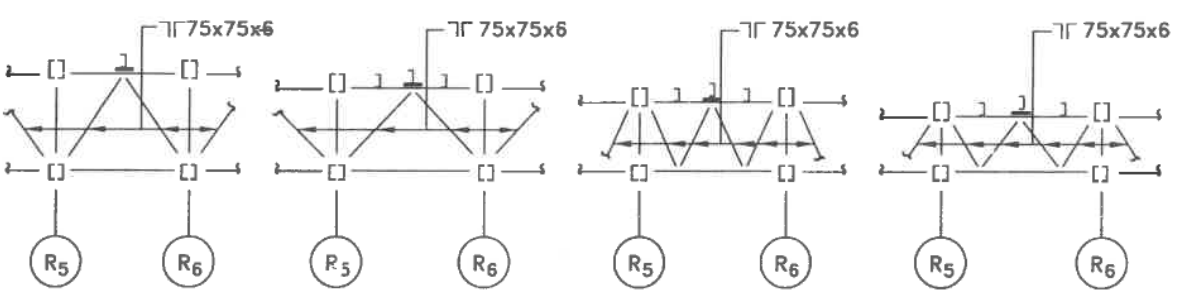
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50.0 M < DIA ≤ 55.0 M



PART BOT. CHORD PLAN
(SHOWING ARRGT. OF 1 QUAD.)

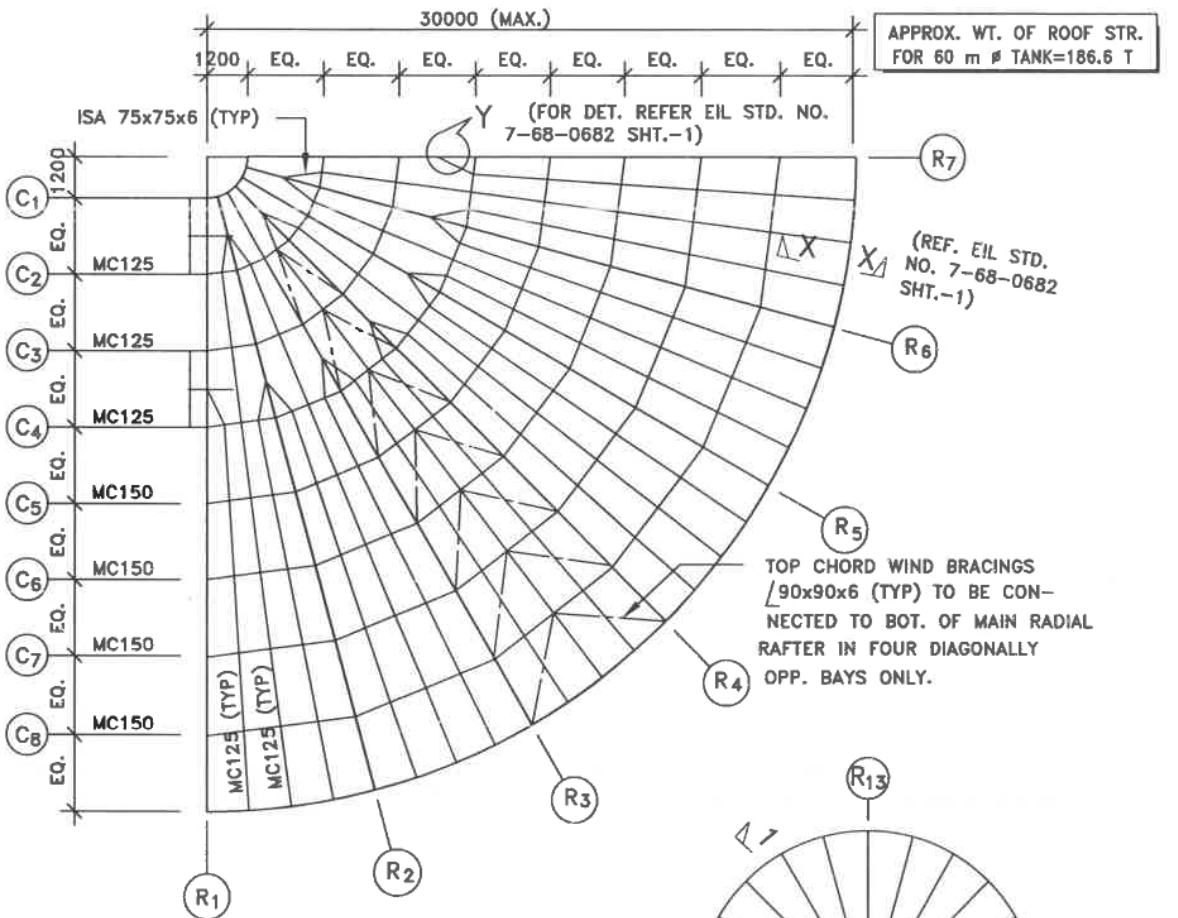
VIEW ON C2 VIEW ON C3



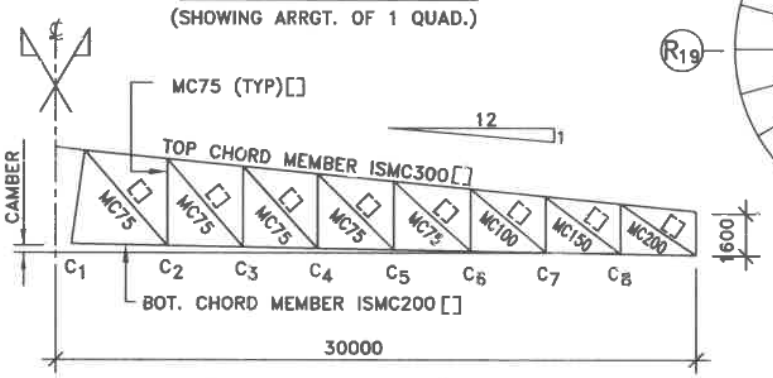
VIEW ON C4 VIEW ON C5 VIEW ON C6 VIEW ON C7

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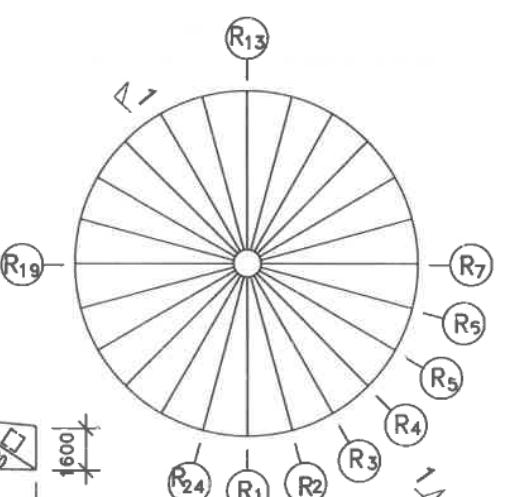
55.0 m < DIA ≤ 60.0 m



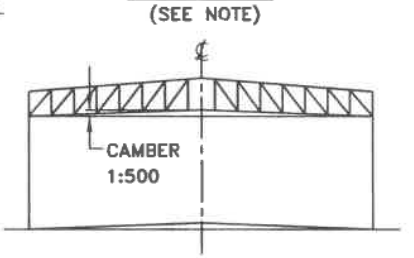
PART TOP CHORD PLAN
(SHOWING ARRGT. OF 1 QUAD.)



TYP. DET. OF MAIN RADIAL RAFTER
(24 NOS. REQUIRED THUS)



ROOF PLAN
(SEE NOTE)



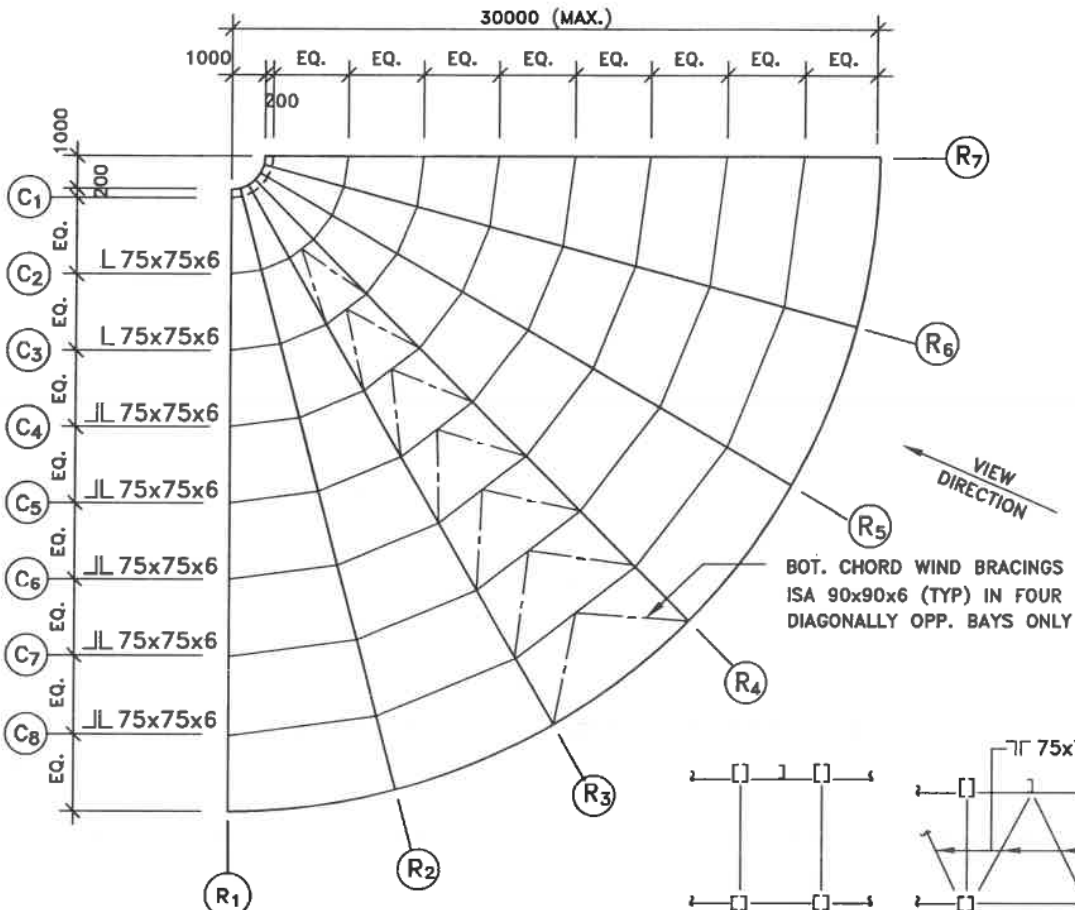
SECTION 1-1

NOTES:

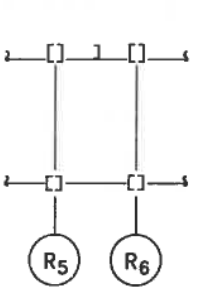
1. IN ROOF PLAN, ONLY MAIN RADIAL RAFTER SHOWN; OTHER MEMBERS NOT SHOWN FOR CLARITY.
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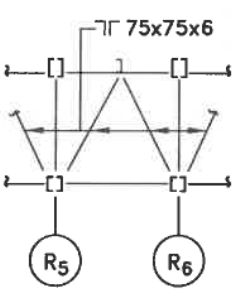
55.0 m < DIA ≤ 60.0 m



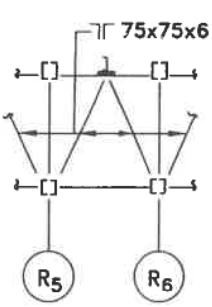
PART BOT. CHORD PLAN
(SHOWING ARRGT. OF 1 QUAD.)



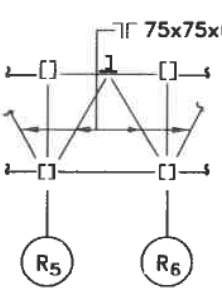
VIEW ON C2



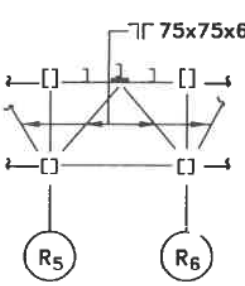
VIEW ON C3



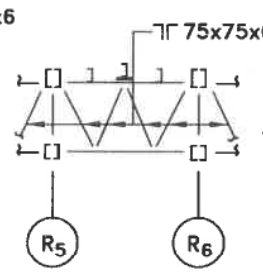
VIEW ON C4



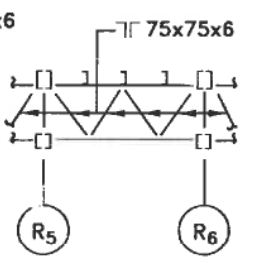
VIEW ON C5



VIEW ON C6

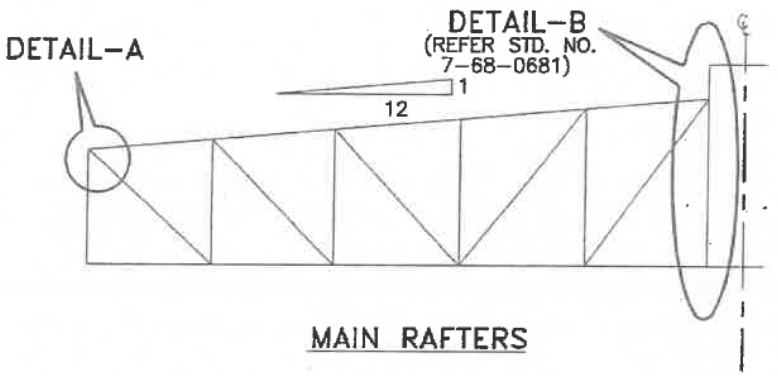


VIEW ON C7

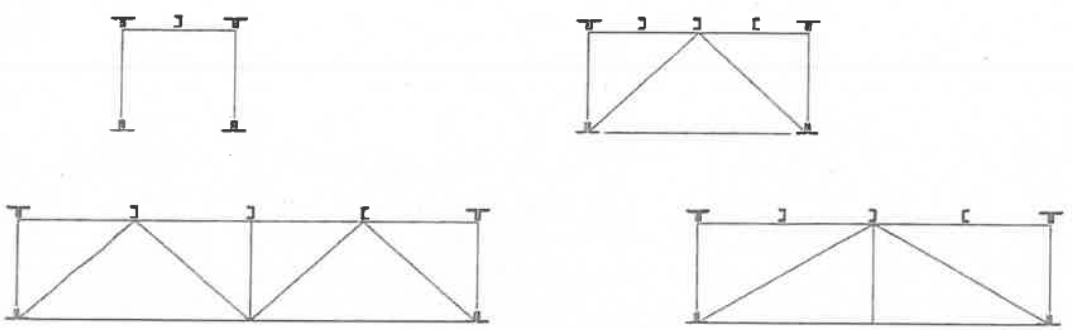


VIEW ON C8

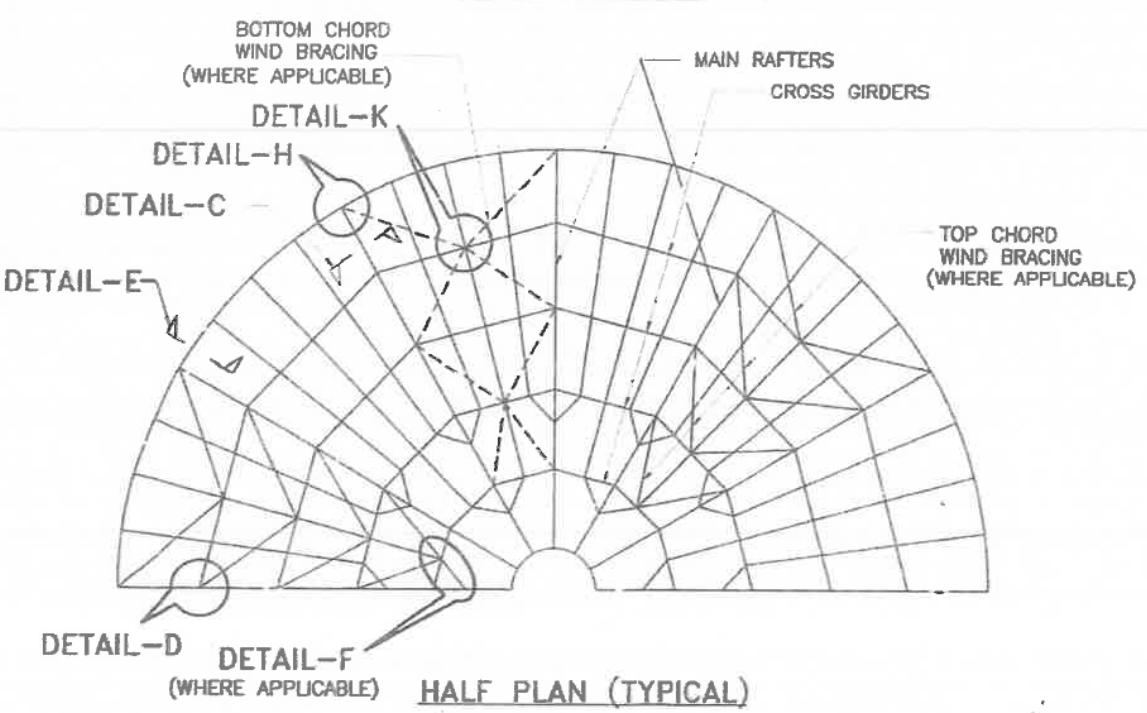
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MAIN RAFTERS



CROSS GIRDERS



HALF PLAN (TYPICAL)

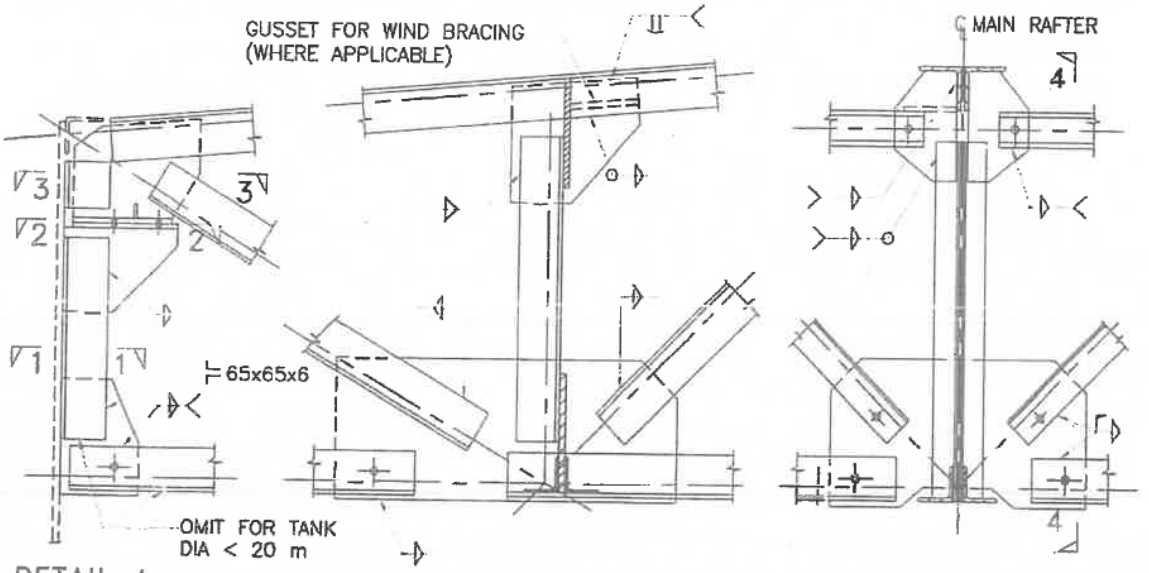
NOTE:–

1. THIS STANDARD SHALL BE READ IN CONJUNCTION WITH STD. Nos. 7–68–0661 SHT. 6 TO 15 OF 23.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	29.03.24	REVISED AND ISSUED AS STANDARD	KML	DP	ANURAG SINHA	MANAK MANDI
3	06.09.18	REAFFIRMED AND ISSUED AS STANDARD	CHHOTE LAL	R.B.SHARMA	RAJNISH SRIVASTAVA	R.K.TRIVEDI

Approved by

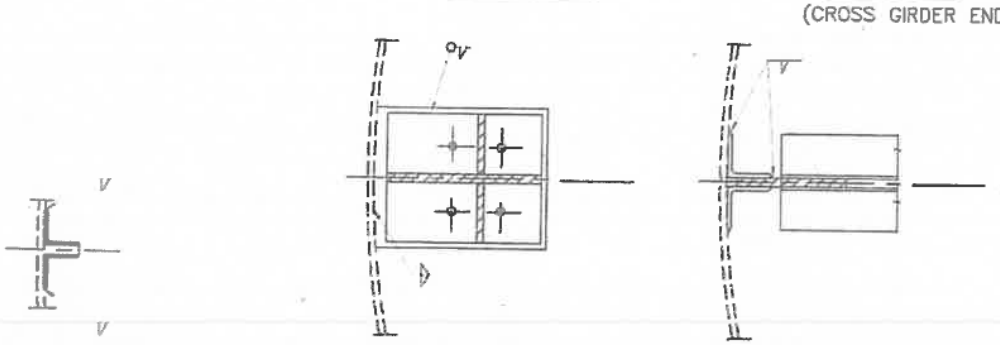
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DETAIL A

VIEW 4–4

DETAIL C
(CROSS GIRDER END)



SECTION 1–1

SECTION 2–2

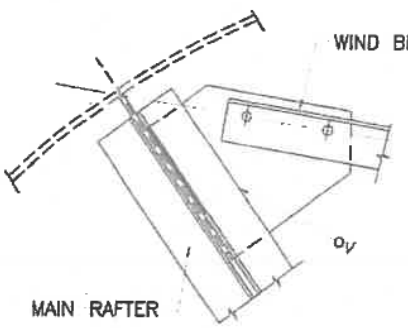
SECTION 3–3



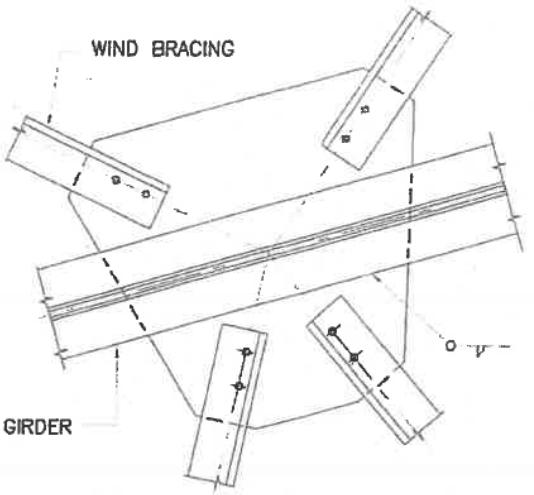
DETAIL D

DETAIL E

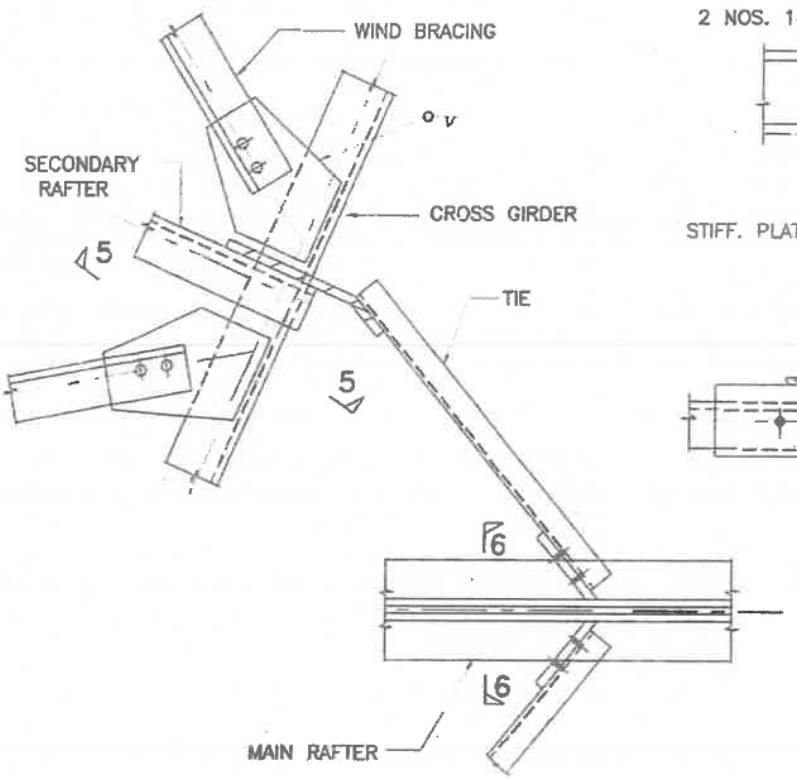
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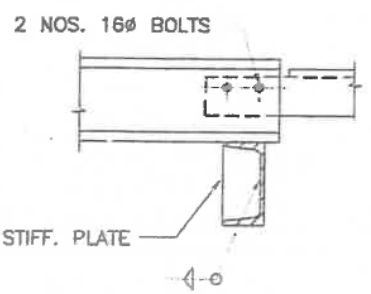
DETAIL H



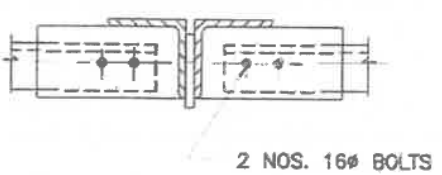
DETAIL K



DETAIL F



VIEW 5–5



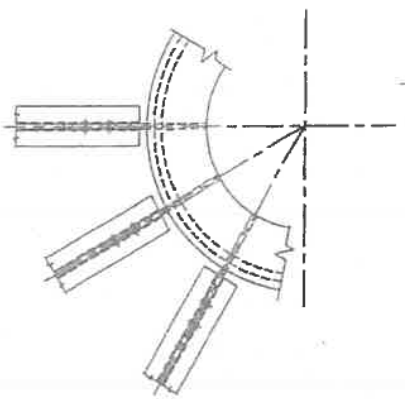
SECTION 6–6

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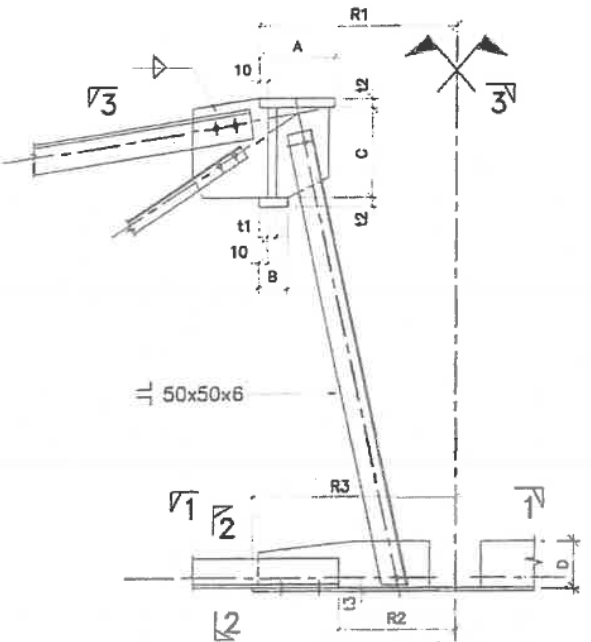
इंजीनियर्स इंडिया लिमिटेड ENGINEERS INDIA LIMITED
(A Govt. of India Undertaking)

ROOF STRUCTURE FOR CONE ROOF TANKS CENTRAL DRUM (DETAIL B)

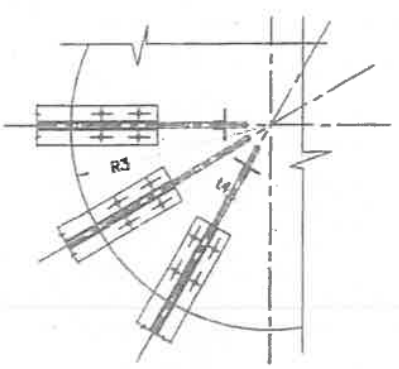
STANDARD No.
7-68-0681 Rev. 4
SHT.1 of 1



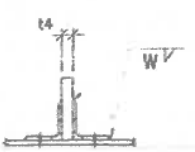
VIEW 3-3



DETAIL 'B'
(REFER STD. NO. 7-68-0680)



VIEW 1-1



SECTION 2-2

SL.NO.	TANK DIA IN m.	ALL DIMENSIONS IN mm												REMARKS
		R1	R2	R3	t1	t2	t3	t4	A	B	C	D	W	
1	10<DIA ≤12	250	210	400	8	8	8	10	90	50	150	75	5	
2	12<DIA ≤15	250	170	360	8	8	8	10	100	50	175	75	5	
3	15<DIA ≤17	250	200	390	8	10	8	10	100	50	200	100	5	
4	17<DIA ≤20	310	290	560	10	10	10	10	110	50	200	115	5	
5	20<DIA ≤23	360	290	560	10	10	10	10	110	50	250	115	5	
6	23<DIA ≤25	400	290	560	10	12	10	10	110	60	300	115	5	
7	25<DIA ≤28	500	350	620	12	16	12	10	160	60	450	115	5	
8	28<DIA ≤31	560	470	800	16	16	16	12	160	110	450	135	5	
9	31<DIA ≤35	650	470	840	16	16	16	12	210	110	450	135	6	
10	35<DIA ≤40	840	590	980	16	20	20	12	210	110	600	150	6	

NOTE:-

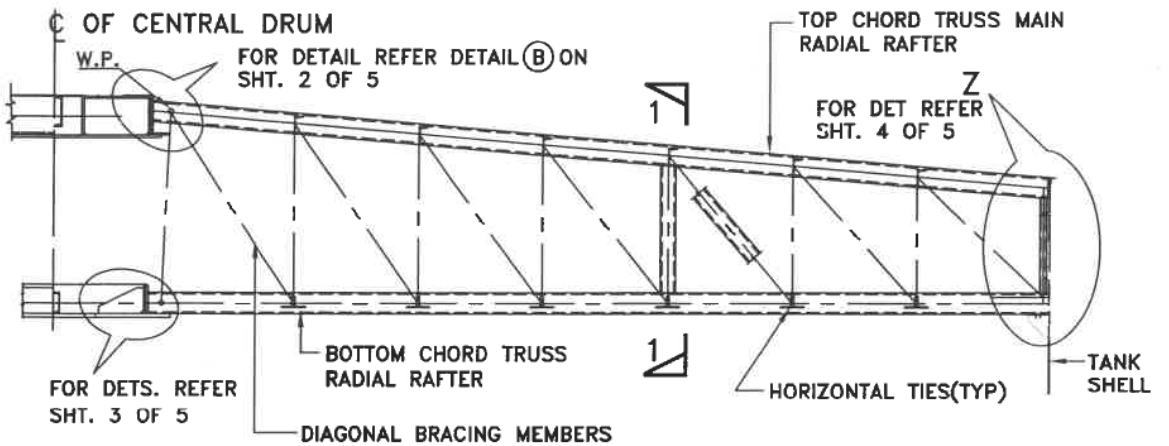
1. THIS STANDARD SHALL BE READ IN CONJUNCTION WITH STD. Nos. 7-68-0661 SHT. 6 TO 15 OF 23.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	29.03.24	REVISED AND ISSUED AS STANDARD	KML		ANURAG SINHA	MANAK MANDI
3	06.09.18	REAFFIRMED AND ISSUED AS STANDARD	CHHOTE LAL	R.B.SHARMA	RAJNISH SRIVASTAVA	R.K.TRIVEDI

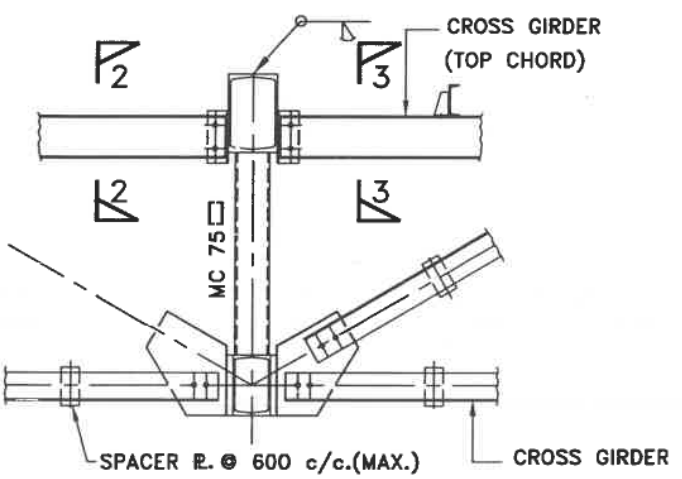
Approved by

Format No. 8-00-0001-F4 Rev.0

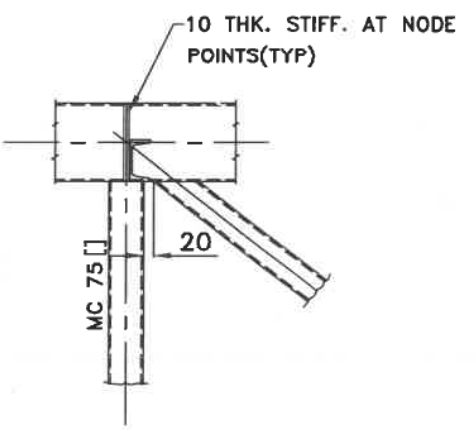
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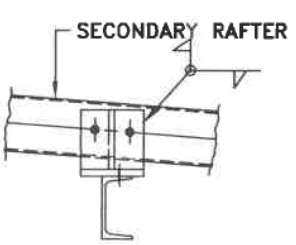
TYP DETAIL OF RADIAL TRUSS



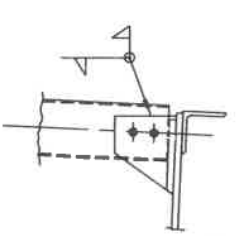
VIEW 1–1



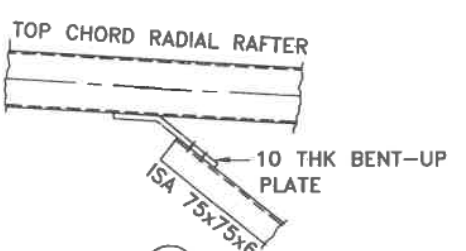
VIEW 2–2



VIEW:3–3



VIEW:X–X



DETAIL (Y*)

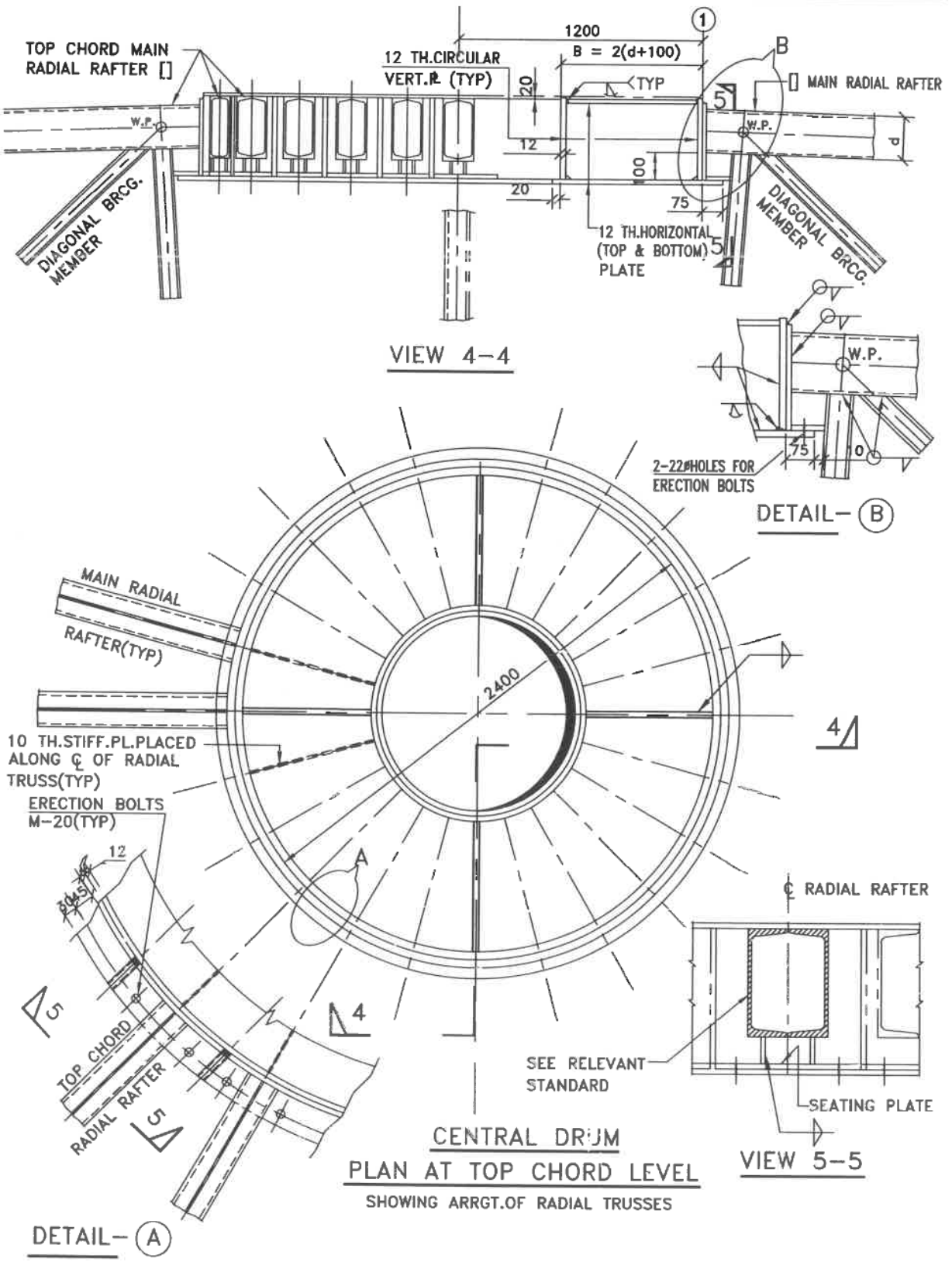
NOTES:–

1. READ THIS STANDARD IN CONJUNCTION WITH STD. NO. 7–68–0661 SHT. 16 TO 23 OF 23. 7–68–0682 SHT. 2 OF 5.
2. VIEW X–X ; DET. (Y) (MKD.*) ARE FROM SHT. 16, 18, 20 & 22 OF 23 OF STD. NO. 7–68–0661.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	29.03.24	REVISED AND ISSUED AS STANDARD	KML		ANURAG SINHA	MAINAK NANDI
3	06.09.18	REAFFIRMED AND ISSUED AS STANDARD	CHHOTE LAL	R.B.SHARMA	RAJANJI SRIVASTAVA	R.K.TRIVEDI

Approved by

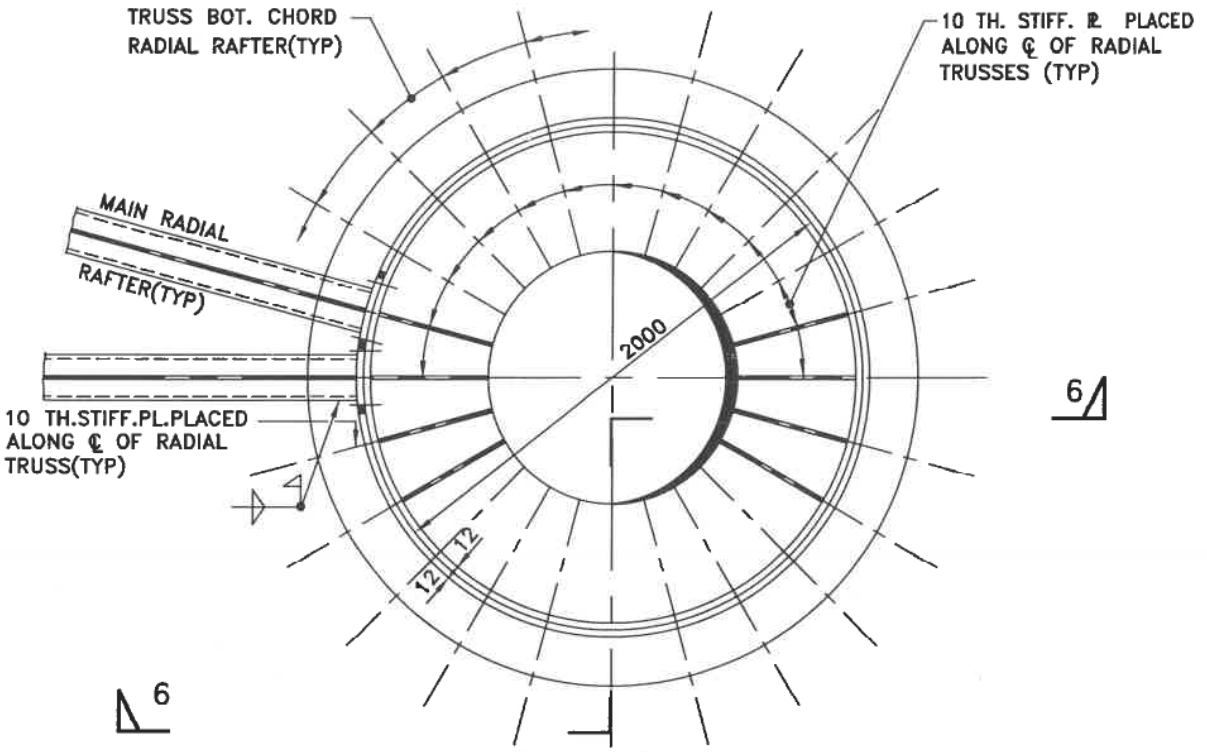
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NOTES:-

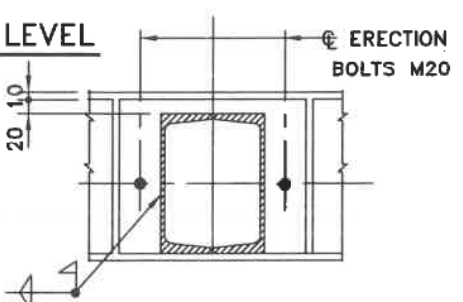
1. ALL STIFFNER & SEATING CLEATS ARE 10 THK. UNLESS NOTED OTHERWISE
2. ALL TOP CHORD AND BRACING MEMBERS ARE NOT SHOWN FOR CLARITY.

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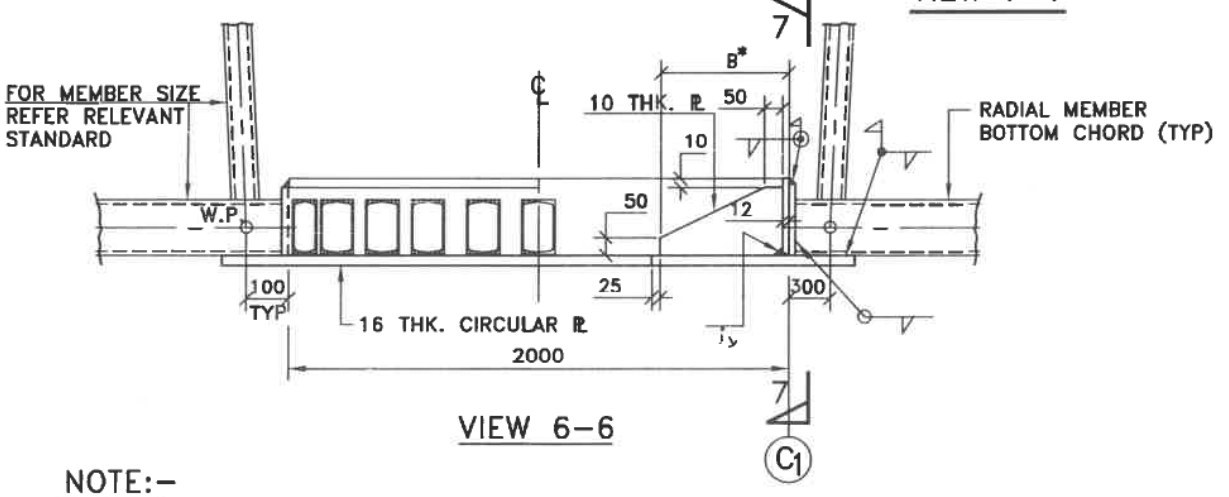


* FOR DIMENSION 'B' REFER SHT. 2 OF 5

CENTRAL DRUM
PLAN AT BOT. CHORD LEVEL



VIEW 7–7

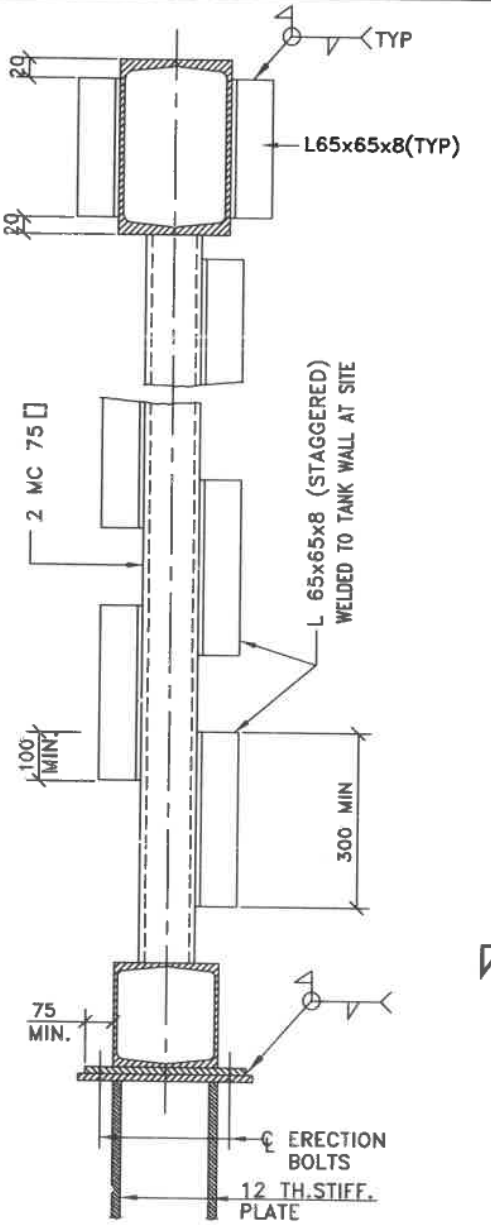


VIEW 6–6

NOTE:–

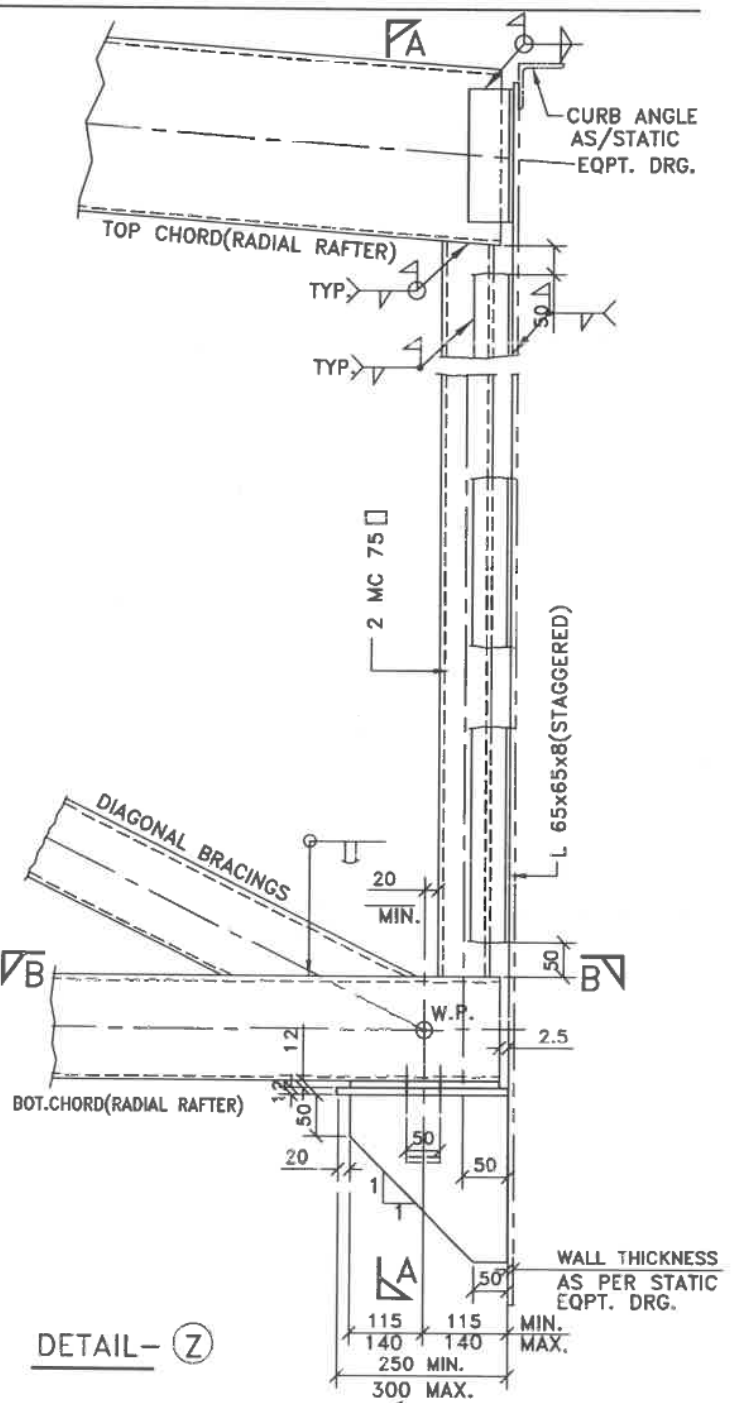
1. ALL BOTTOM CHORD & BRACING MEMBERS ARE NOT SHOWN FOR CLARITY.

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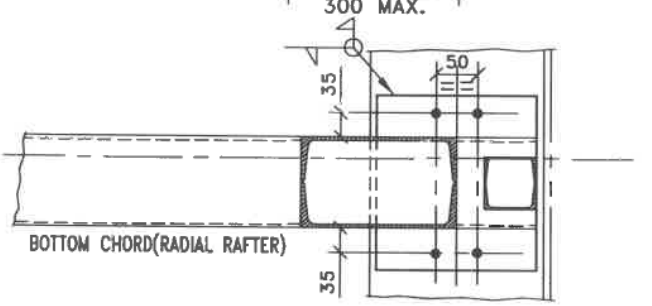


SECTION A–A

TANK WALL NOT SHOWN FOR CLARITY



DETAIL– (Z)



SECTION B–B

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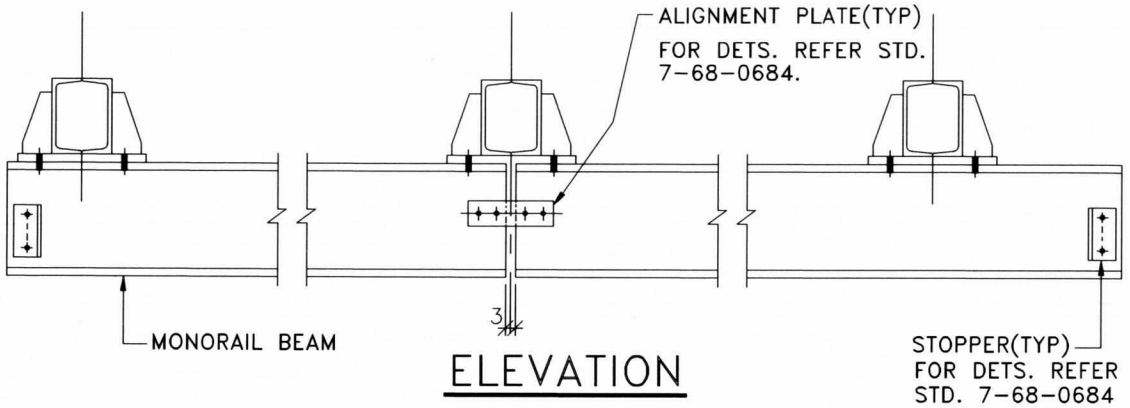
MATERIAL TAKE-OFF (M.T.O.) IN M.T.

SECTION	45.0m DIA.	50.0m DIA.	55.0m DIA.	60.0m DIA.	REMARKS
MC 300			44.0	50.0	
MC 250		29.0			
MC 200	18.0	3.4	32.0	35.0	
MC 150	4.4	24.7	9.0	12.0	
MC 125	24.0	15.0	17.0	21.0	
MC 100	1.5	1.5	2.0	2.0	
MC 75	9.5	10.4	12.0	17.0	
ISA 90x90x6	1.4	3.3	3.5	4.0	
ISA 75x75x6	5.4	7.0	10.0	26.0	
ISA 65x65x6	7.0	8.7			
PLATE 6 THK.	0.4				
PLATE 12 THK.	1.4	1.67	1.95	1.95	CENTRAL RING MEMBERS
PLATE 16 THK.	0.6	0.63	0.65	0.65	
TOTAL	73.6	105.30	140.00	169.60	
ADD 10%	7.4	10.5	14.00	17.00	INCLUDING 10 THK.R.S.
GRAND TOTAL	81.0	115.8	154.00	186.60	

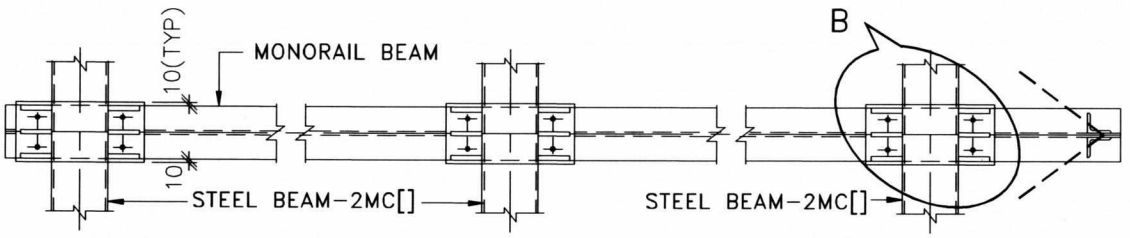
NOTES:-

1. THESE NOTES ARE ONLY APPLICABLE FOR 45.0 m TO 60.0 m DIAMETER TANKS.
2. FOR CONNECTION DETAILS REFER STANDARD NO. 7-68-0682 SHT. 1 TO 4.
3. ALL CONNECTIONS SHALL BE DESIGNED FOR FULL STRENGTH OF THE MEMBERS.
4. FOR FURTHER NOTES REFER STANDARD NO. 7-68-0661.
5. ALL BOX SECTIONS SHALL BE FULLY WELDED TO AVOID CONDENSATION OF LIQUID VAPOUR ON INTERNAL FACES.

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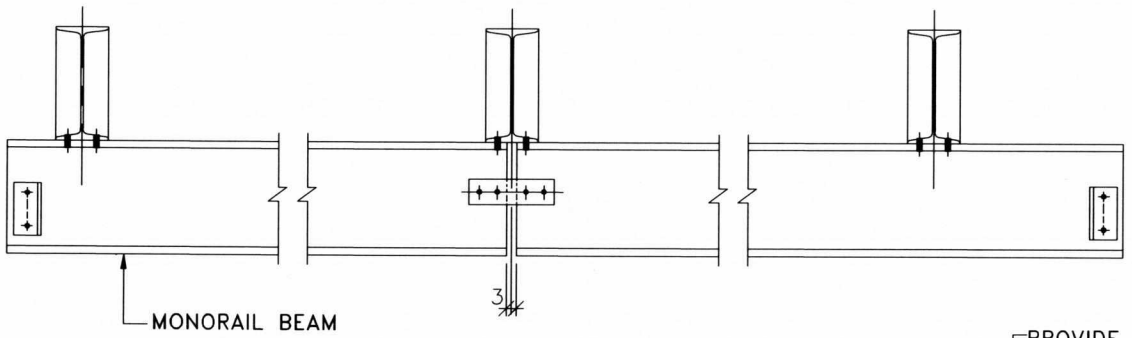


ELEVATION

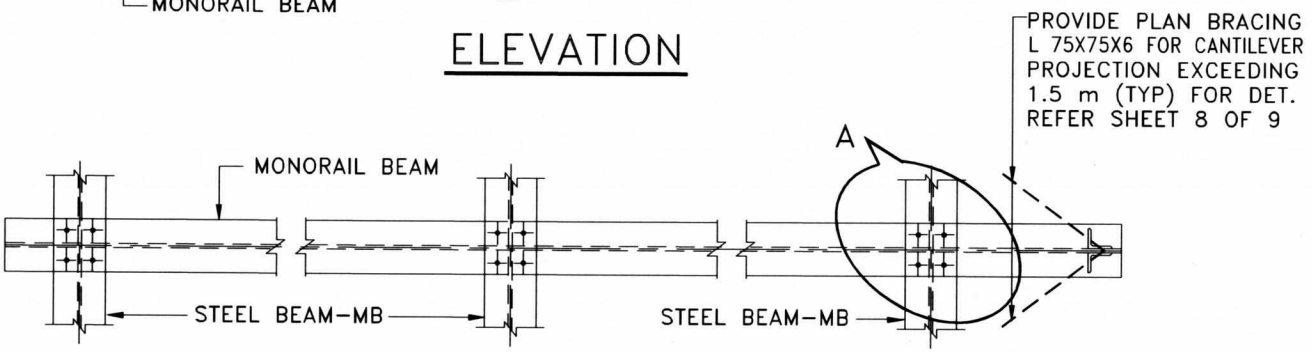


PLAN

MONORAIL CONNECTION WITH 2 MC[]



ELEVATION



PLAN

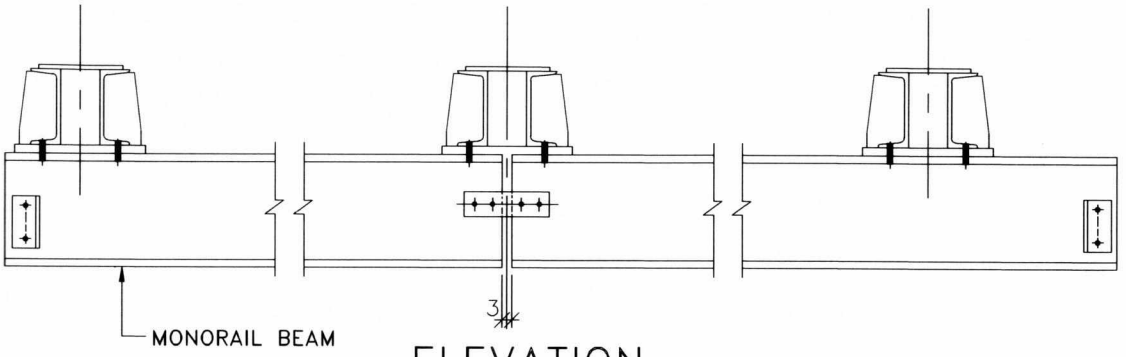
MONORAIL CONNECTION WITH MB

APPLICABLE FOR LIFT CAPACITY UPTO 4.0 T

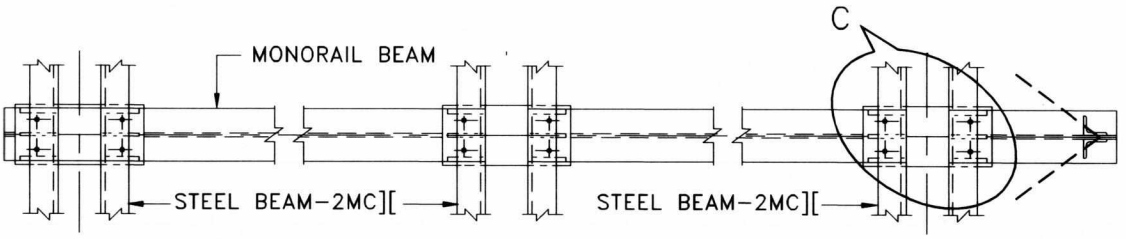
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	14-12-23	REVISED AND ISSUED AS STANDARD	AV	RM	ANURAG SINHA	MAINAK NANDI
4	06-06-18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

Approved by

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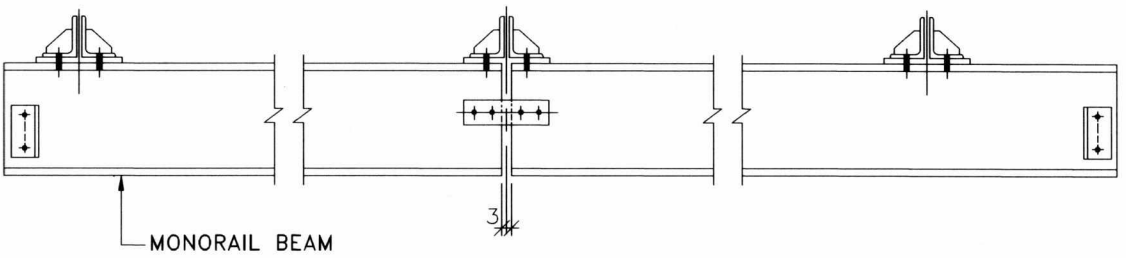


ELEVATION

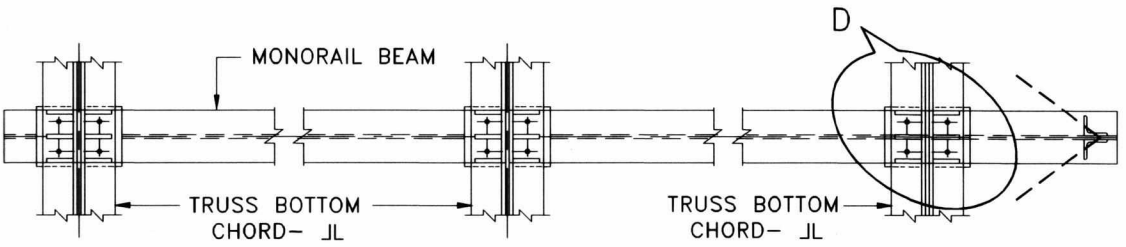


PLAN

MONORAIL CONNECTION WITH 2 MC][



ELEVATION

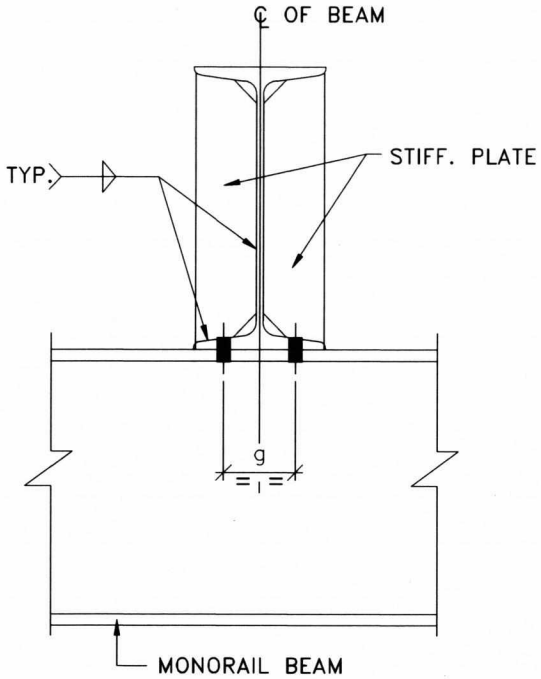


PLAN

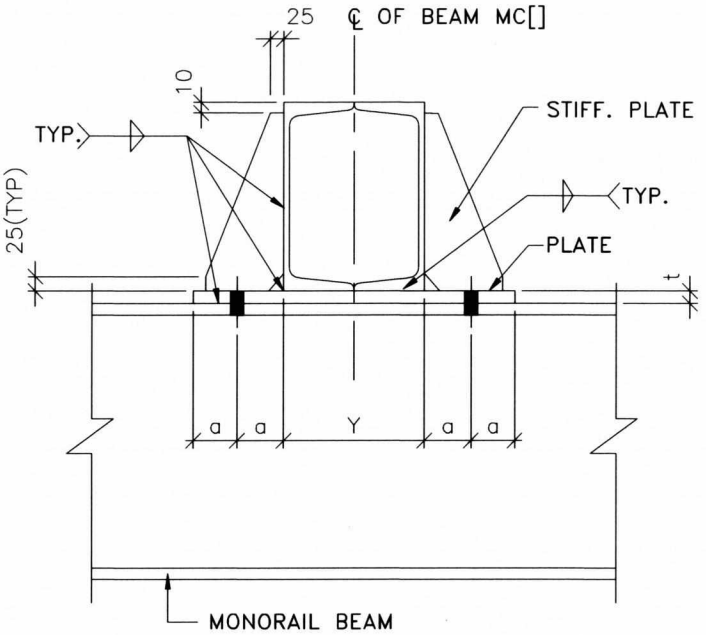
MONORAIL CONNECTION WITH 2 ISA ⊥L

APPLICABLE FOR LIFT CAPACITY UPTO 4.0 T

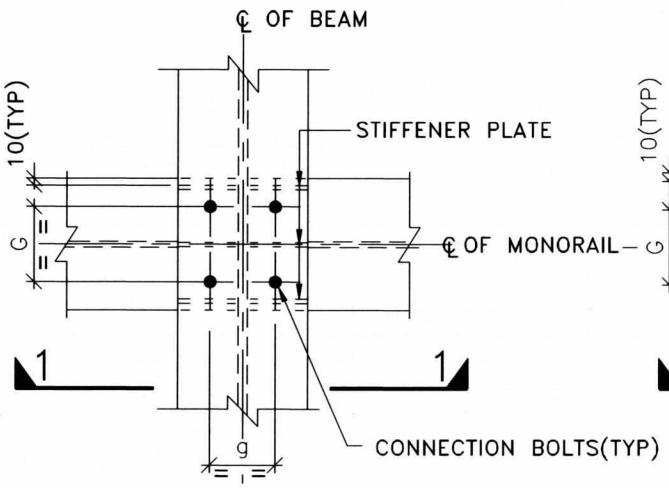
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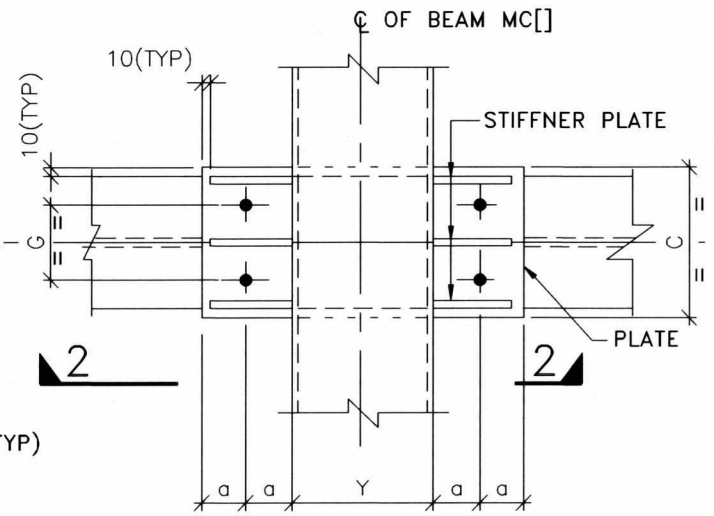
VIEW 1–1



VIEW 2–2



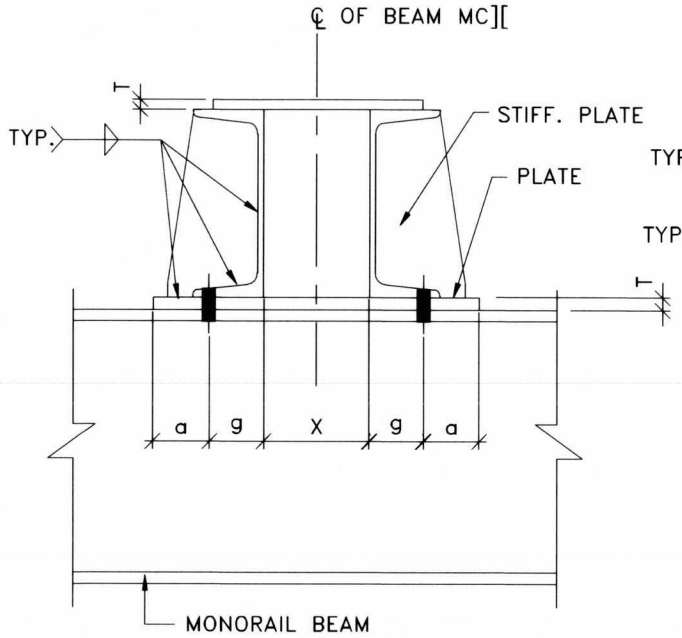
DETAIL–A



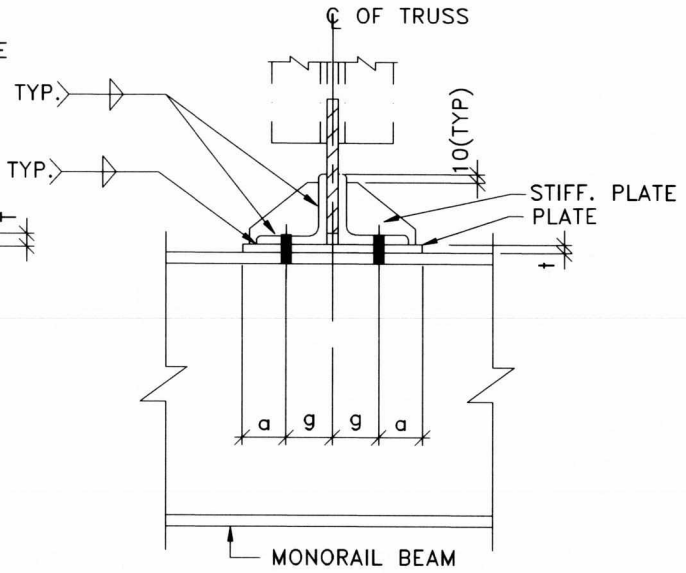
DETAIL–B

APPLICABLE FOR LIFT CAPACITY UPTO 4.0 T

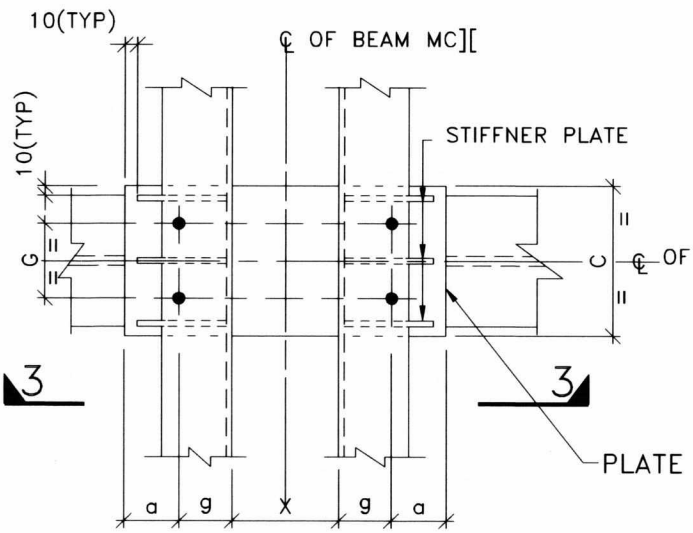
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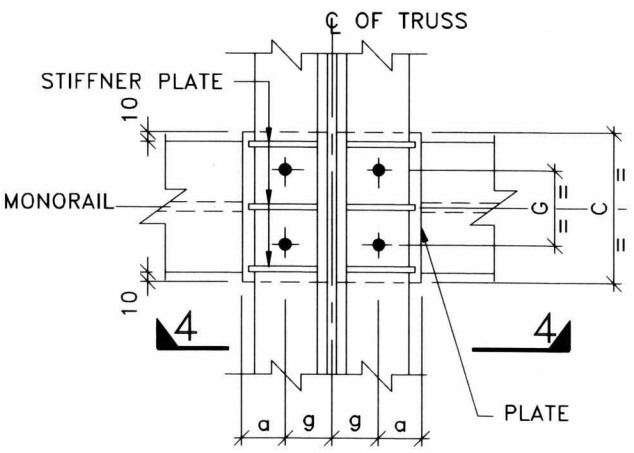
VIEW 3–3



VIEW 4–4



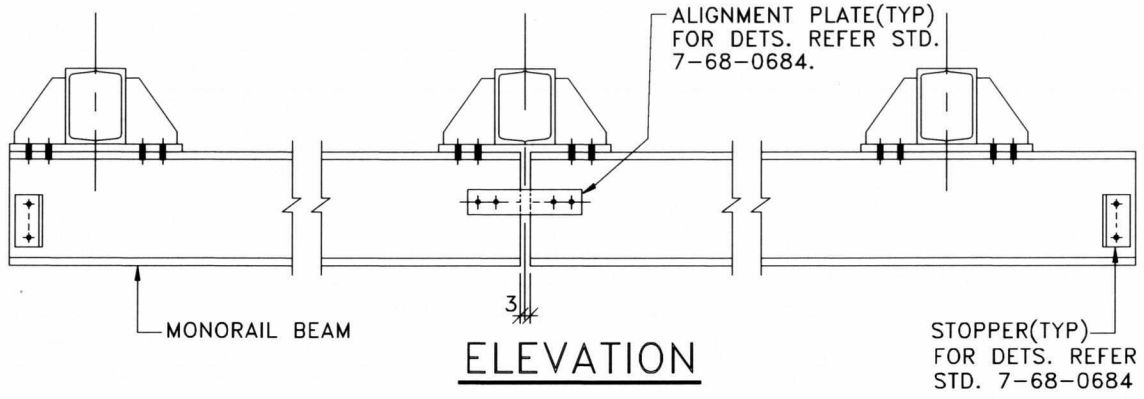
DETAIL–C



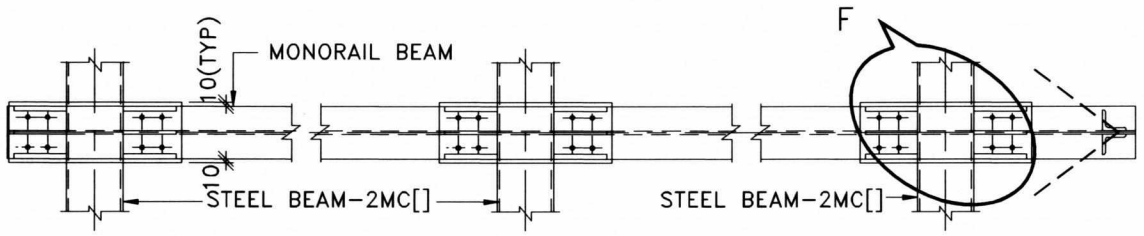
DETAIL–D

APPLICABLE FOR LIFT CAPACITY UPTO 4.0 T

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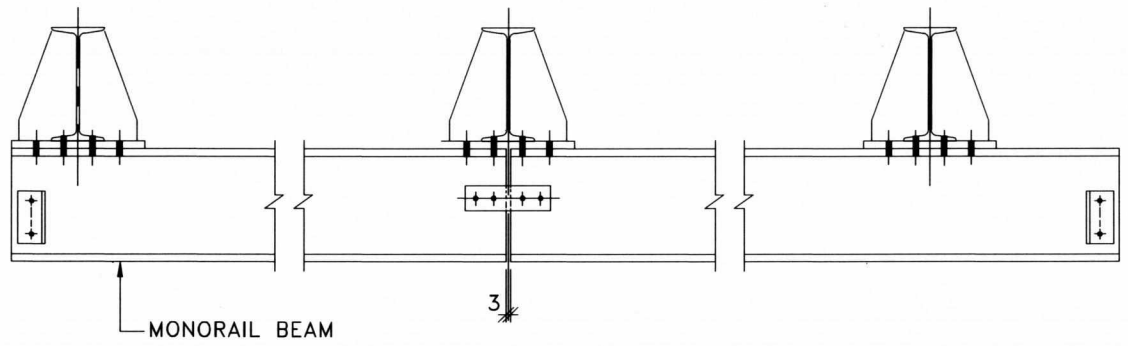


ELEVATION

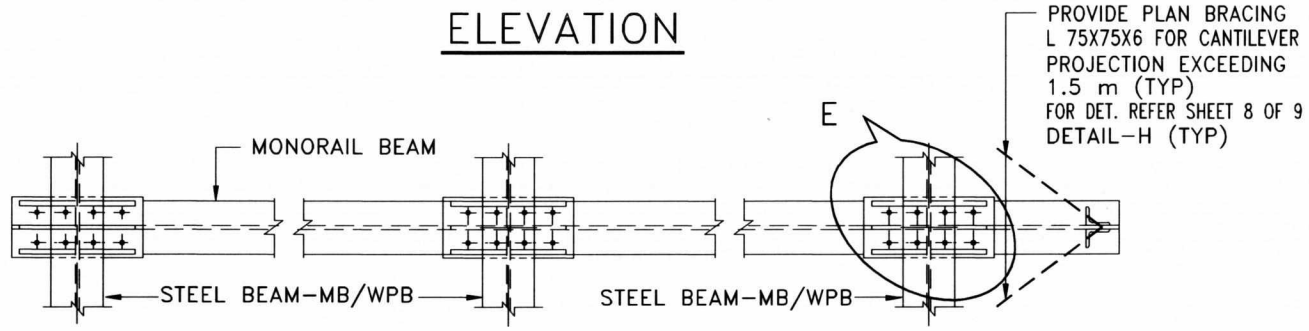


PLAN

MONORAIL CONNECTION WITH 2 MC[]

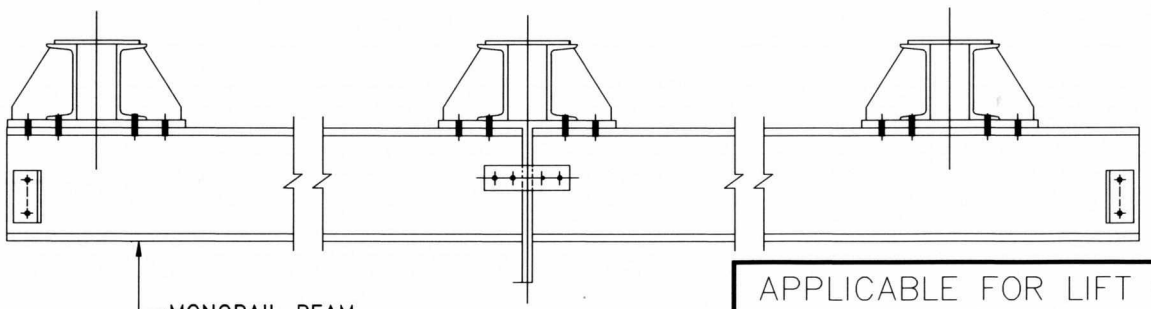


ELEVATION



PLAN

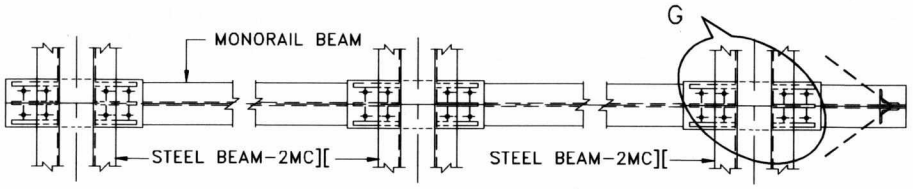
MONORAIL CONNECTION WITH MB/WPB



ELEVATION

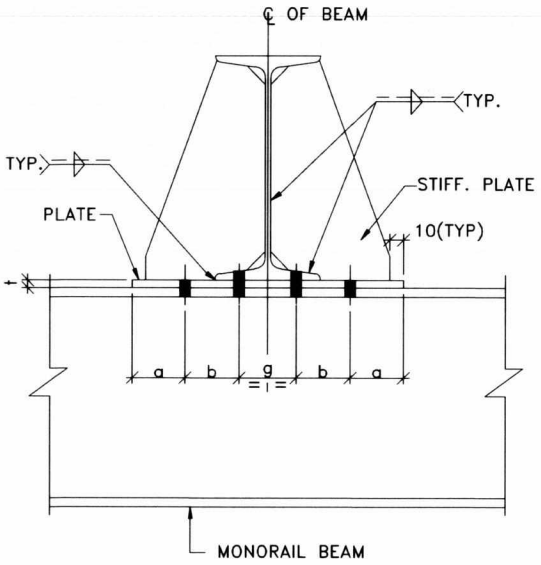
APPLICABLE FOR LIFT CAPACITY ABOVE 4.0 T TO 20.0 T

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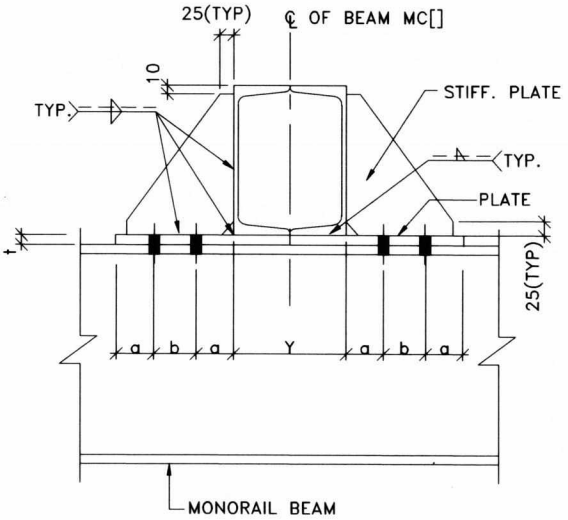


PLAN

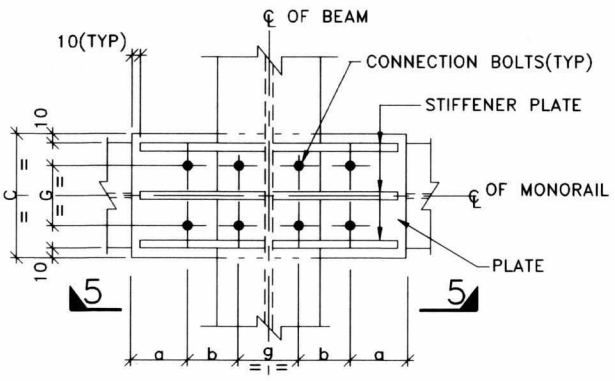
MONORAIL CONNECTION WITH 2 MC][



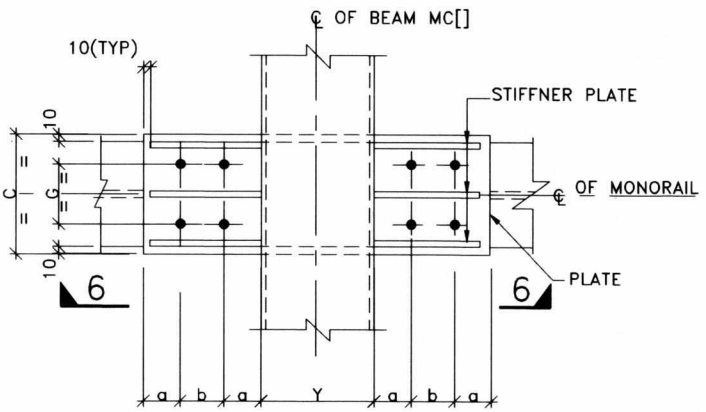
VIEW 5-5



VIEW 6-6



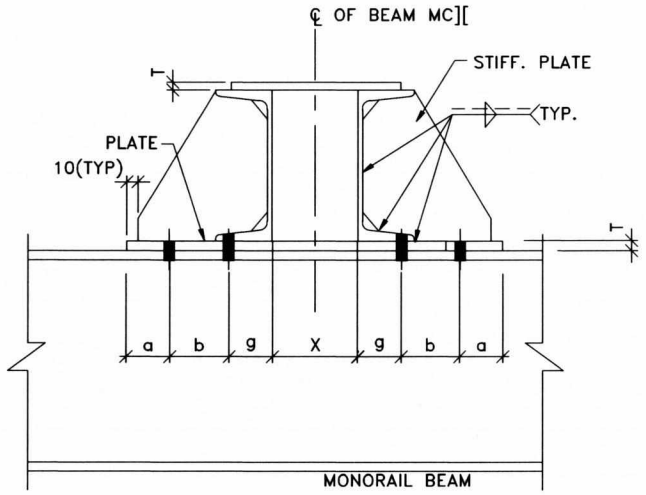
DETAIL-E



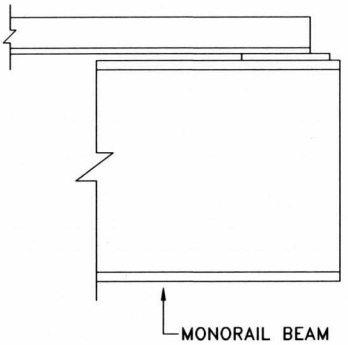
DETAIL-F

APPLICABLE FOR LIFT CAPACITY ABOVE 4.0 T TO 20.0 T

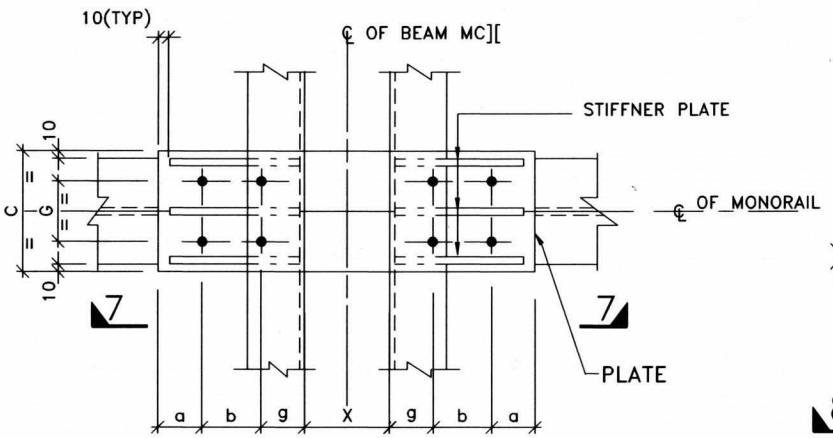
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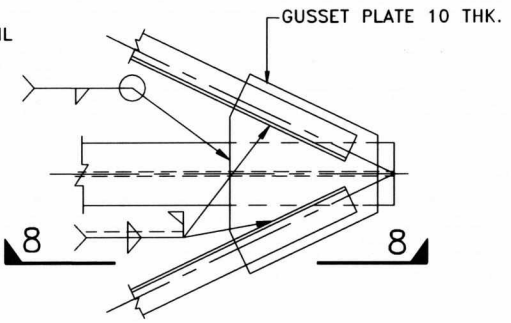
VIEW 7–7



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

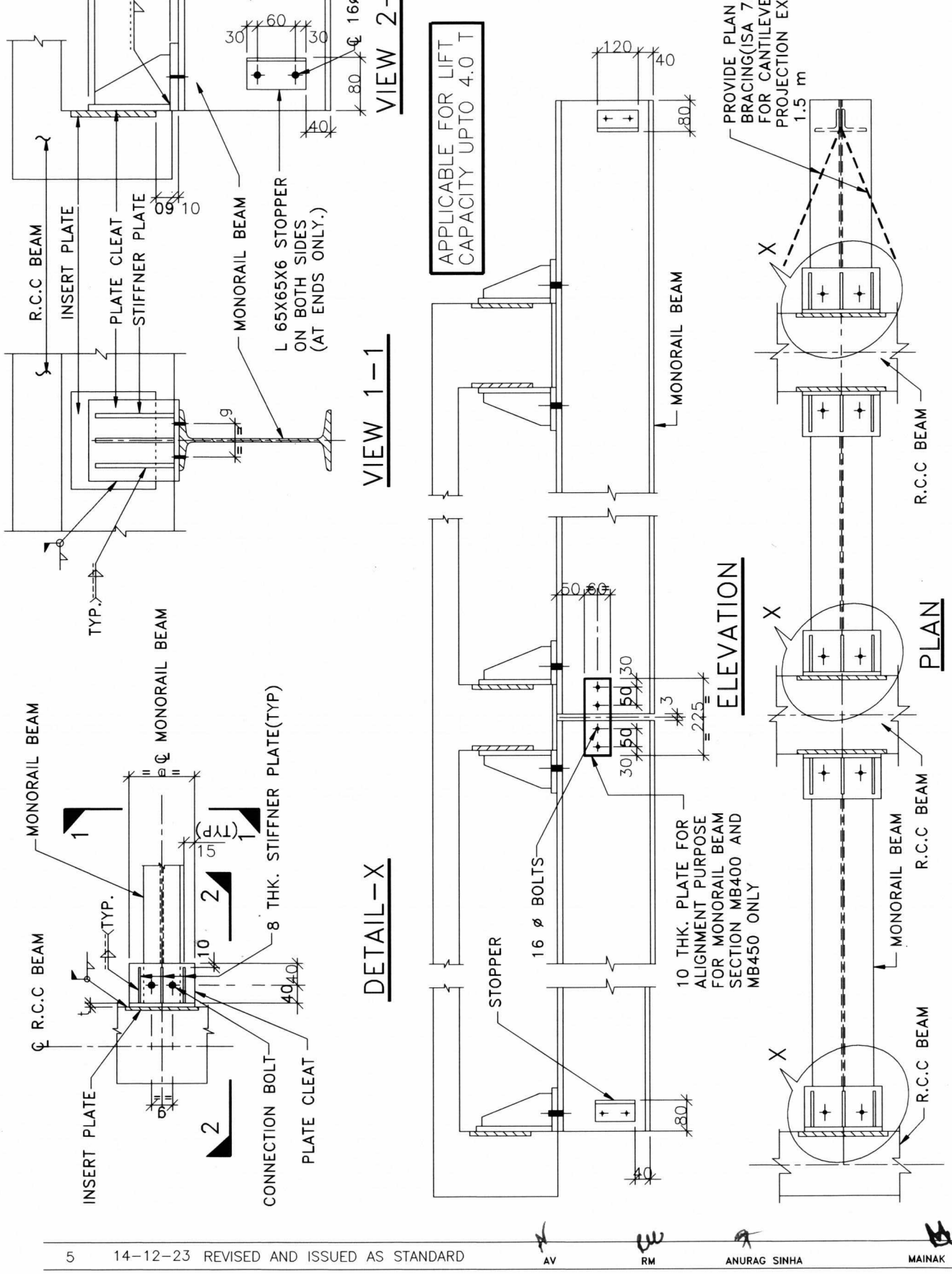
– DIMENSIONS ENCLOSED BY DOTTED LINES ARE APPLICABLE TO 8 BOLT CONNECTIONS ONLY (REFER SHEETS 6 AND 7.)

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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



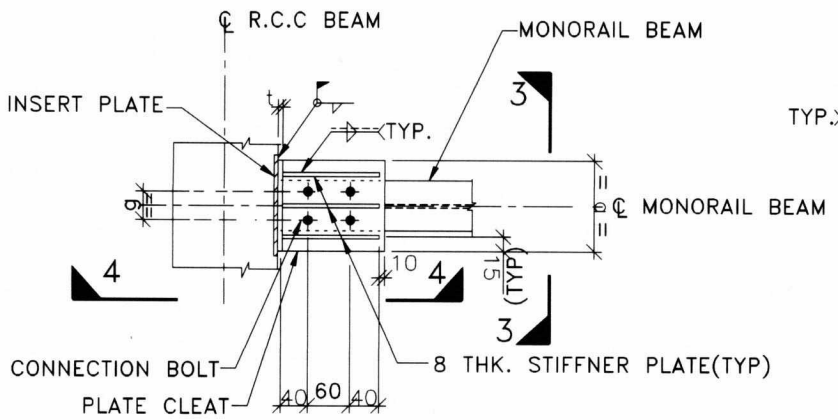
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	14-12-23	REVISED AND ISSUED AS STANDARD	AV	RM	ANURAG SINHA	MAINAK NANDI
4	06-06-18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

Approved by

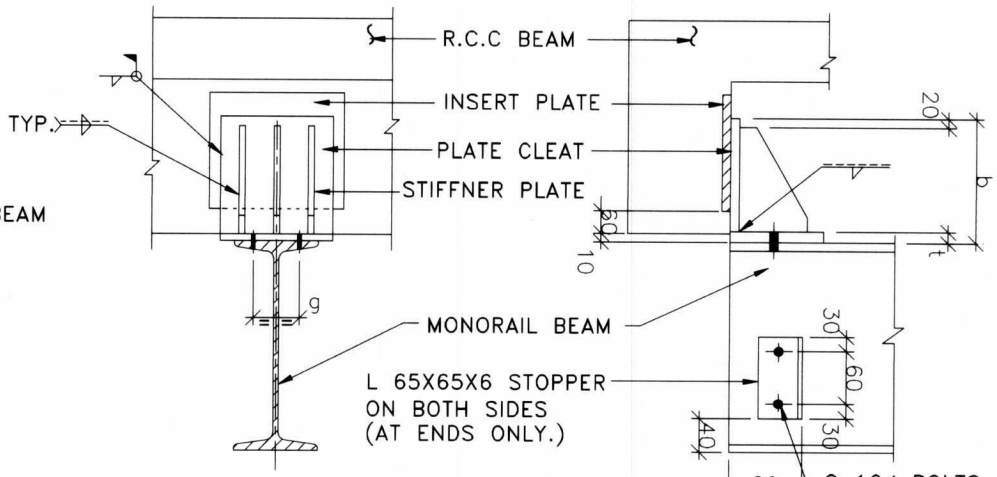
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Page 5309 of 5436 : C050-TENDER DOC-C050-1U68-81-45-PB-T-8010 : Rev. A

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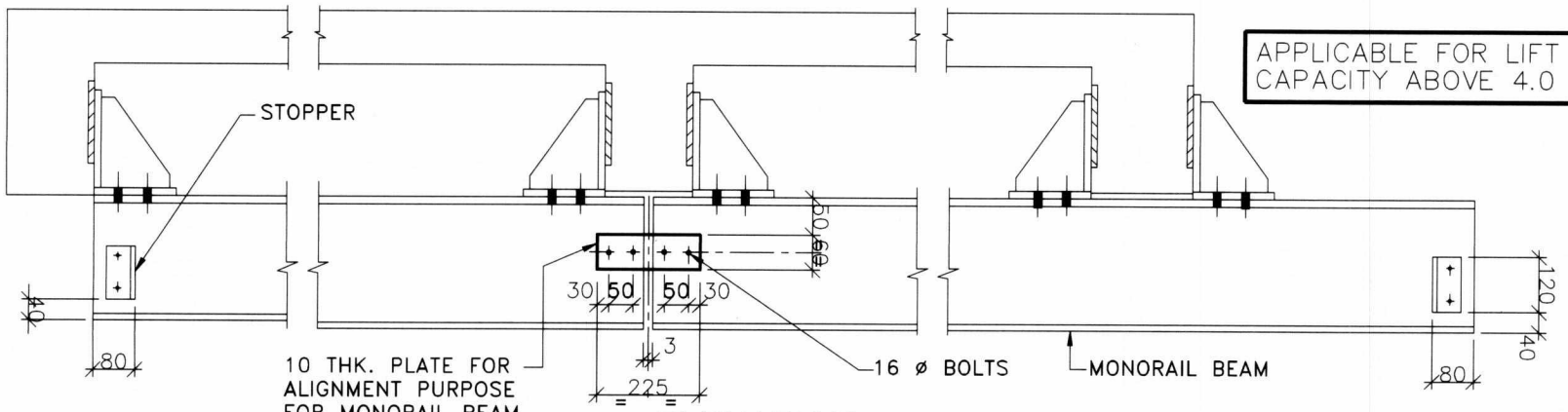
DETAIL–Y



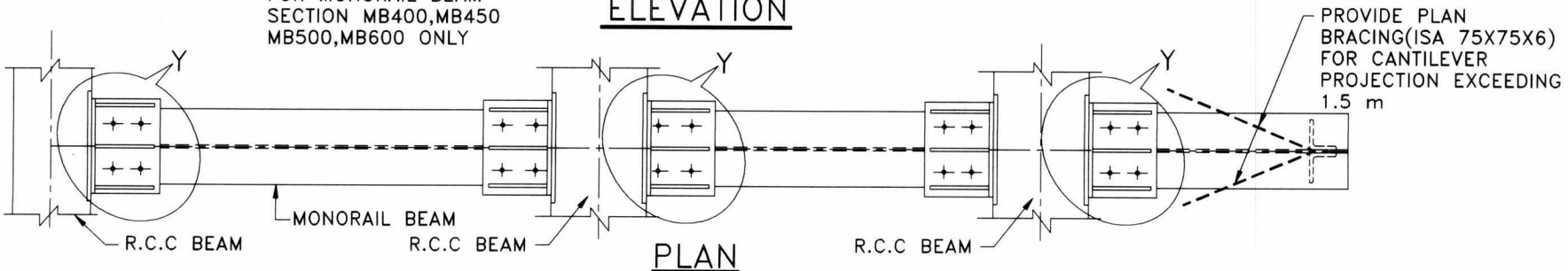
VIEW 3–3

VIEW 4–4

APPLICABLE FOR LIFT CAPACITY ABOVE 4.0 T



ELEVATION



PLAN

ENGINEERS INDIA LIMITED
(A Govt. of India Undertaking)

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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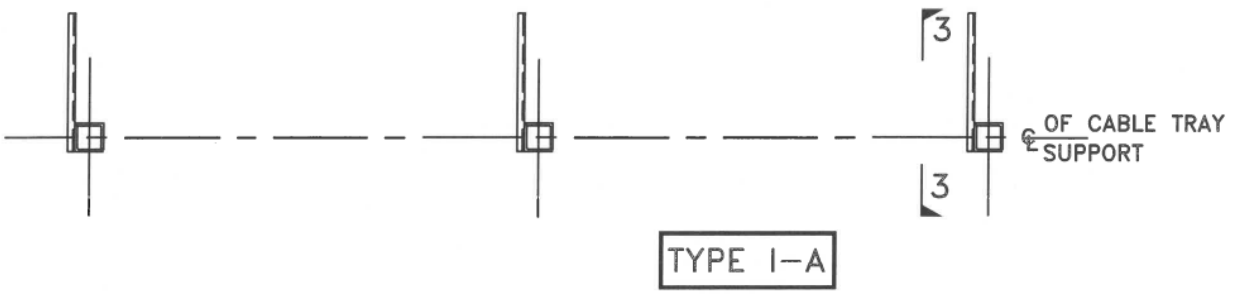
NOTES:

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.

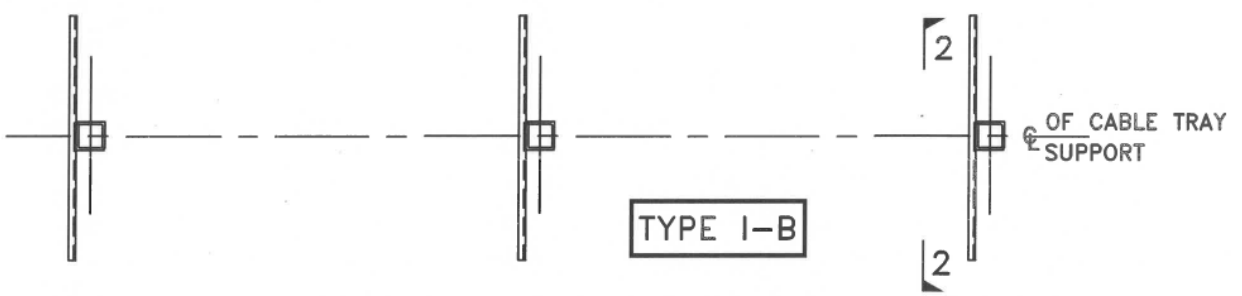
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	13.03.25	REAFFIRMED AND ISSUED AS STANDARD	JITENDER	AMARJEET	ANURAG SINHA	MAINAK NANDI
3	15.07.19	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	RAJANJI SRIVASTAVA	R.K.TRIVEDI

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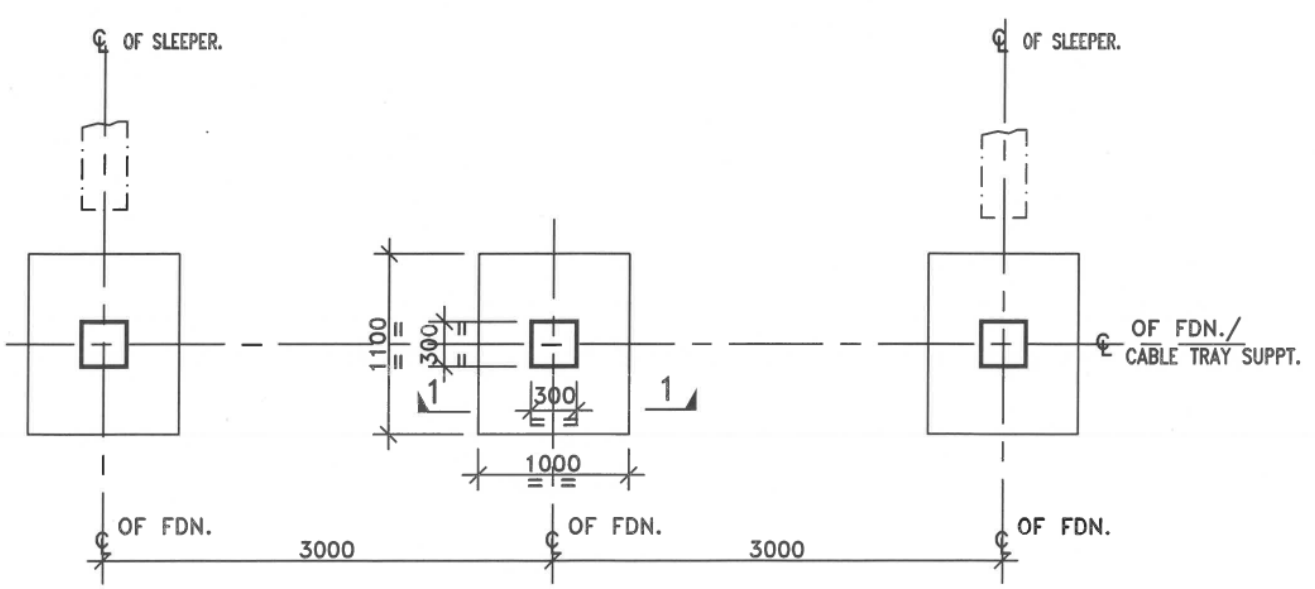
(A) 600mm WIDE TWO TIERED CABLE TRAY SUPPORTS TYPE-1



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

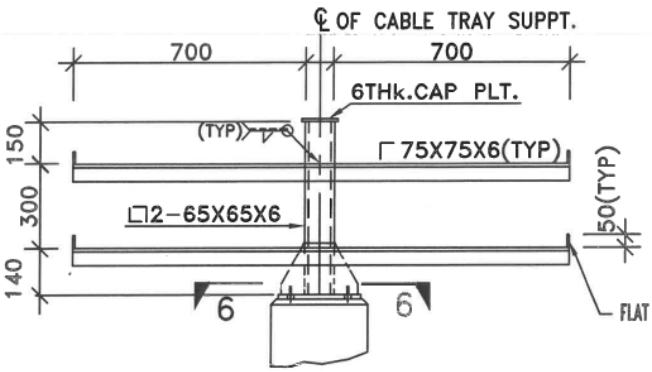


TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 2 SIDE CABLE TRAY)

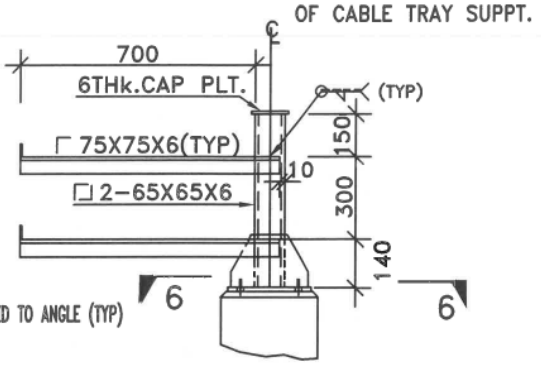


TYPICAL FDN. LAYOUT
(FOR 1 SIDE & 2 SIDE CABLE TRAY SUPPT.)

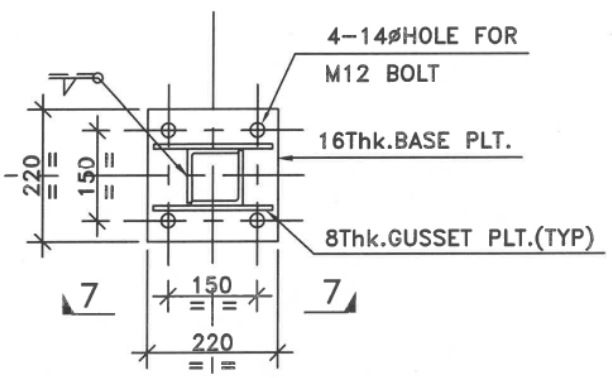
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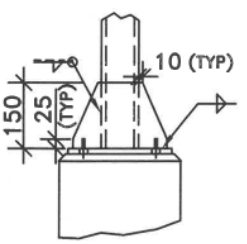
VIEW 2-2
(FOR 2 SIDE CABLE TRAY STR.)



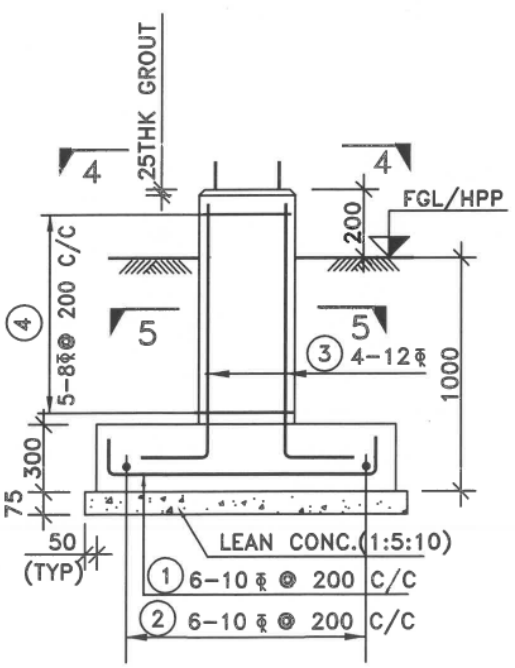
VIEW 3-3
(FOR 1 SIDE CABLE TRAY STR.)



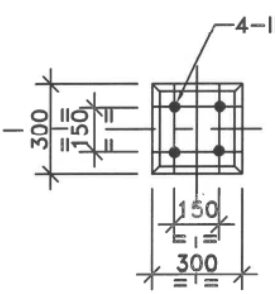
VIEW 6-6



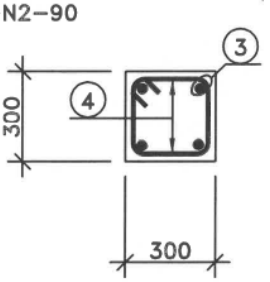
VIEW 7-7



SECTION 1-1



VIEW 4-4



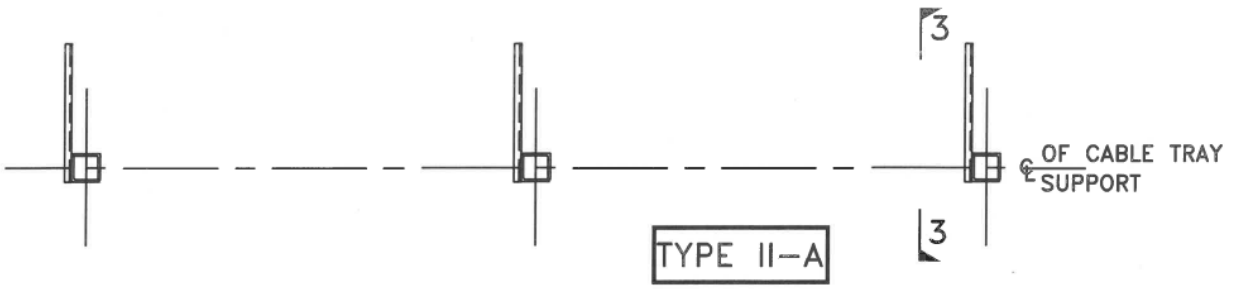
SEC. 5-5

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.)

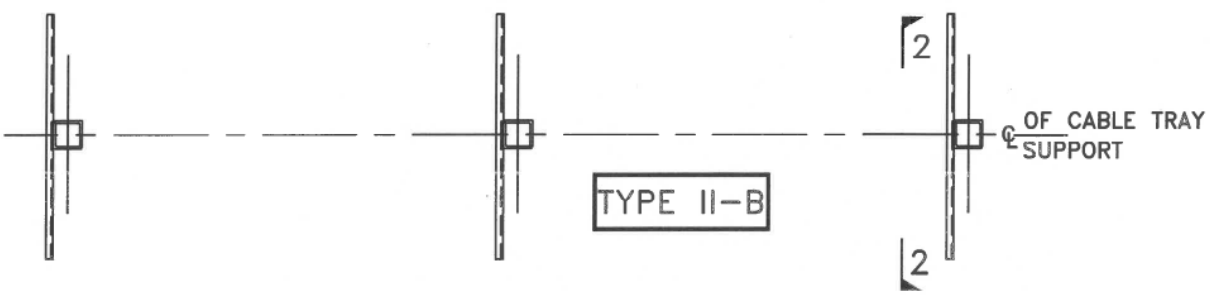
(* GRADE OF CONC. SHALL BE AS PER GENERAL NOTES OF PROJECT.)

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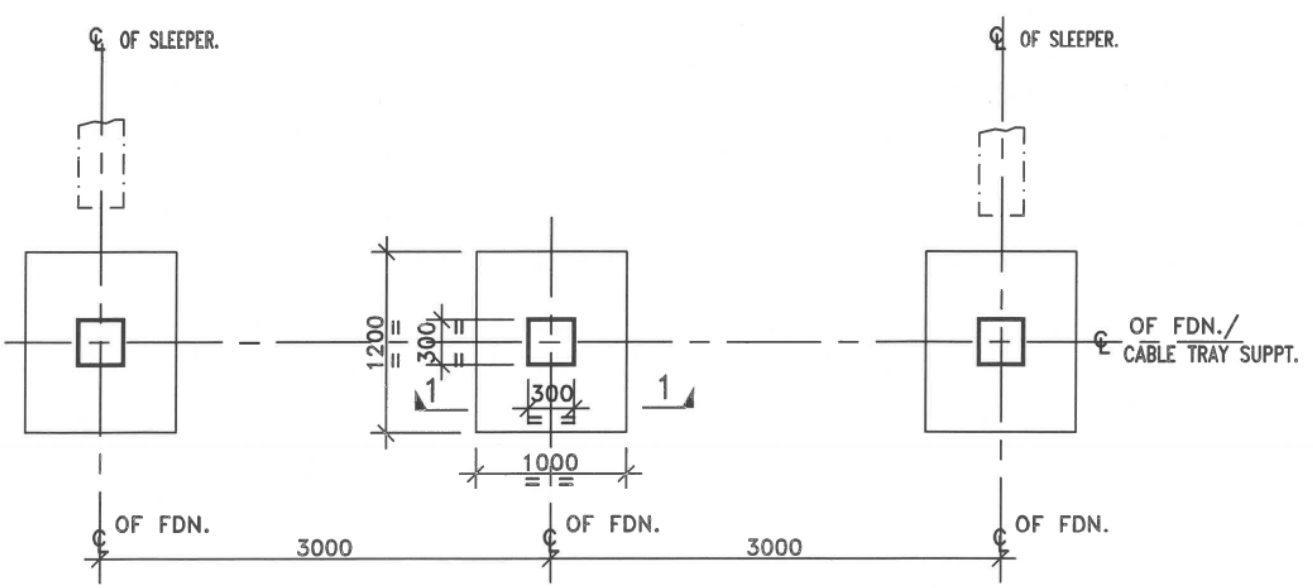
(B) 750mm WIDE TWO TIERED CABLE TRAY SUPPORTS TYPE–II



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

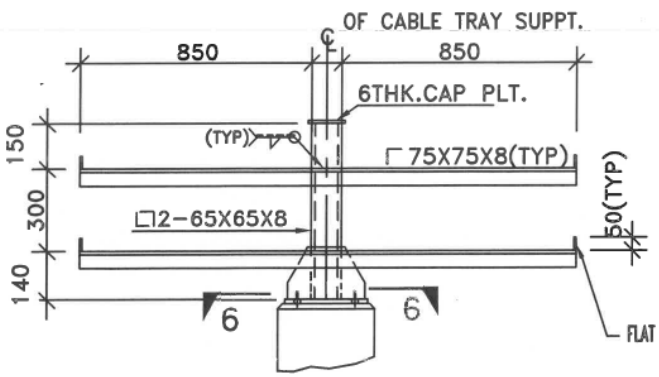


TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 2 SIDE CABLE TRAY)

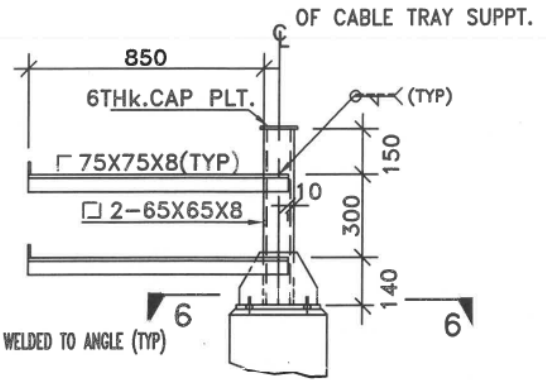


TYPICAL FDN. LAYOUT
(FOR 1 SIDE & 2 SIDE CABLE TRAY SUPPT.)

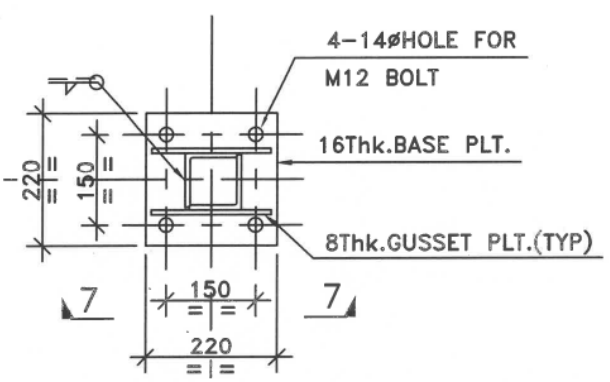
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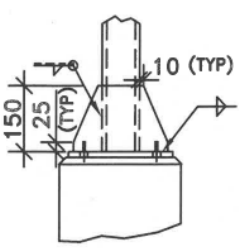
VIEW 2-2
(FOR 2 SIDE CABLE TRAY STR.)



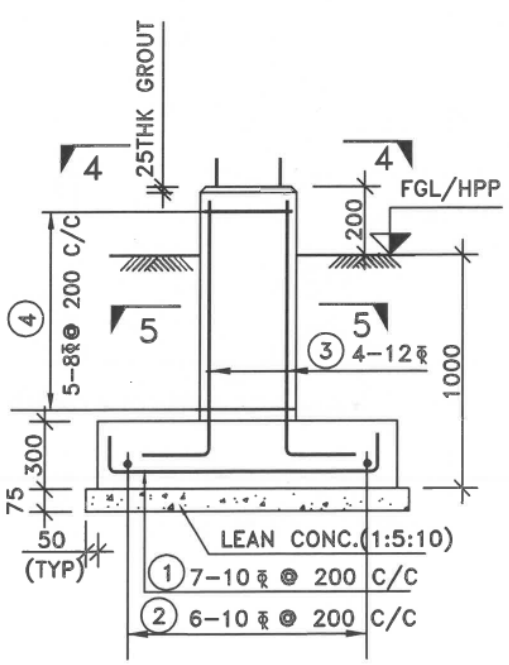
VIEW 3-3
(FOR 1 SIDE CABLE TRAY STR.)



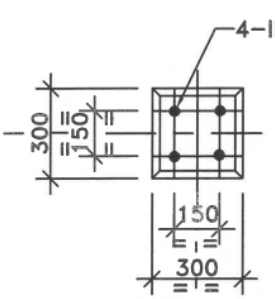
VIEW 6-6



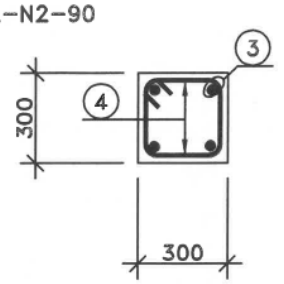
VIEW 7-7



SECTION 1-1



VIEW 4-4



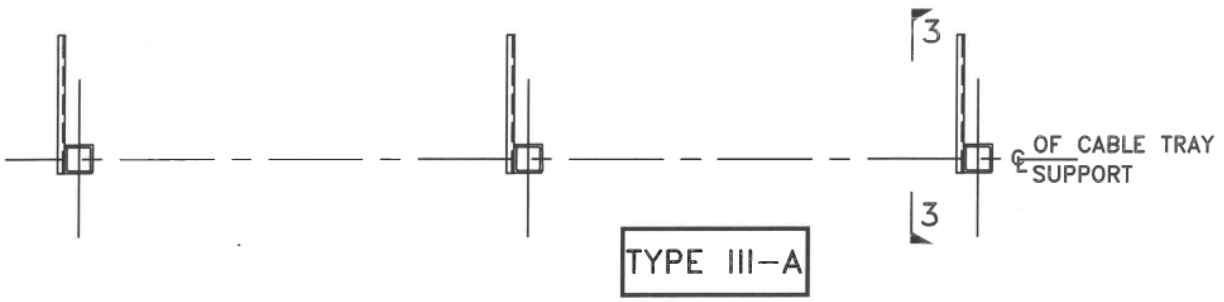
SEC. 5-5

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.)

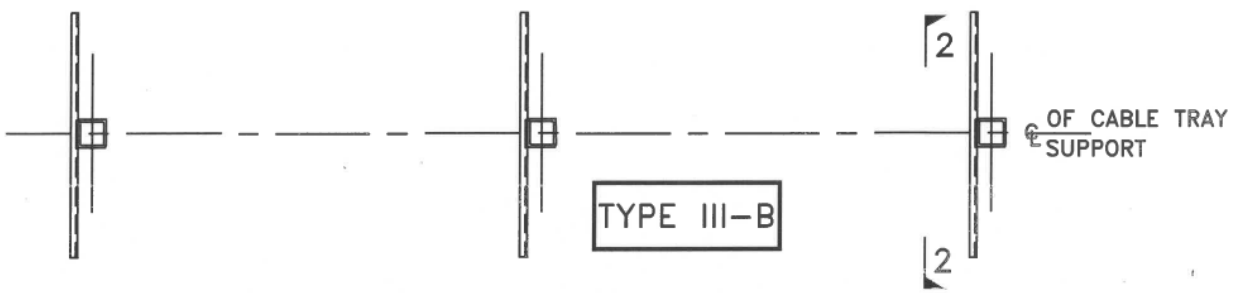
(* GRADE OF CONC. SHALL BE AS PER GENERAL NOTES OF PROJECT.)

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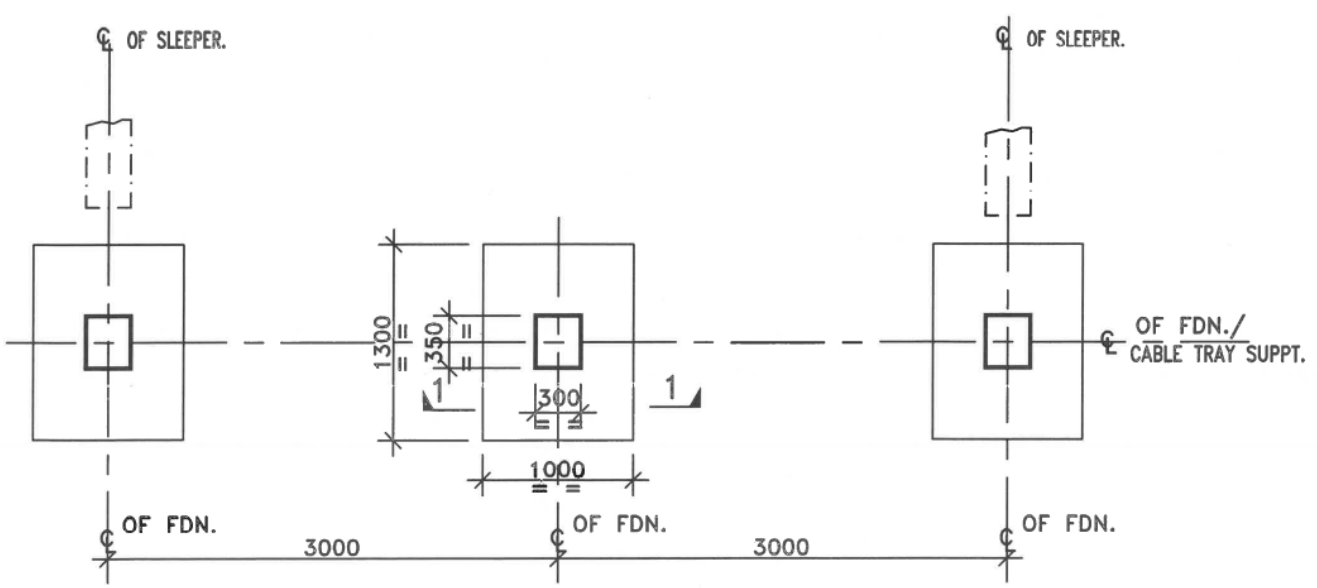
(C) 600mm WIDE THREE TIERED CABLE TRAY SUPPORTS TYPE–III



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

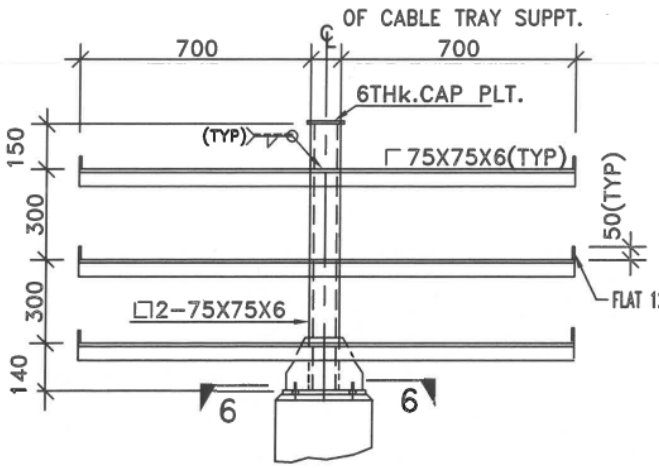


TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 2 SIDE CABLE TRAY)



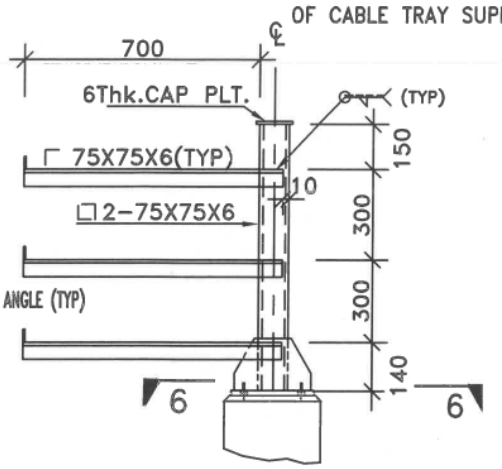
TYPICAL FDN. LAYOUT
(FOR 1 SIDE & 2 SIDE CABLE TRAY SUPPT.)

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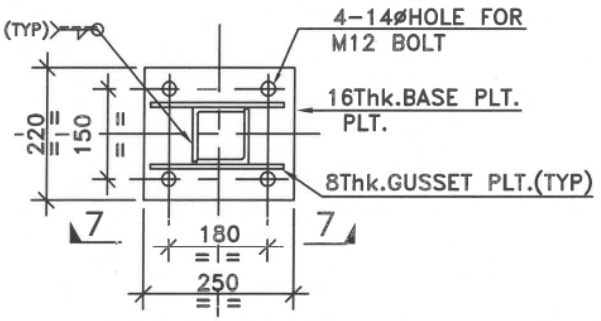
VIEW 2-2

(FOR 2 SIDE CABLE TRAY STR.)

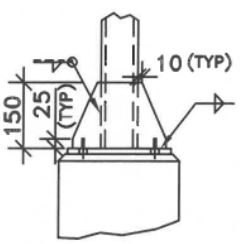


VIEW 3-3

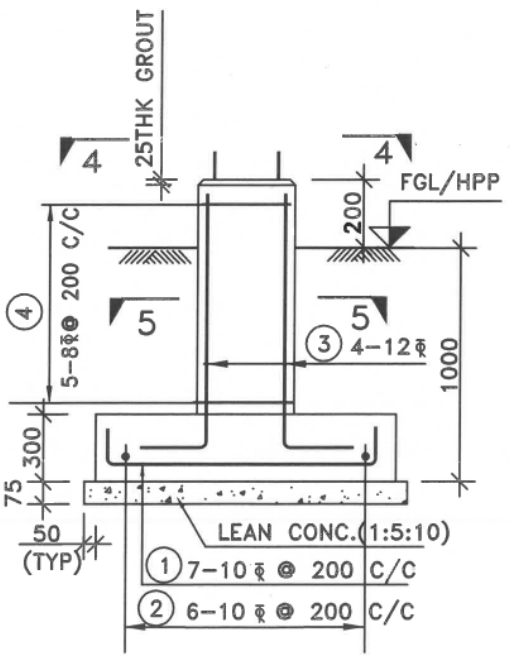
(FOR 1 SIDE CABLE TRAY STR.)



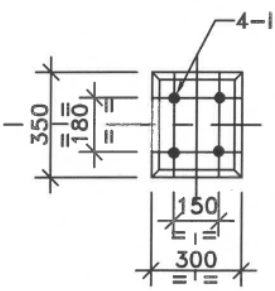
VIEW 6-6



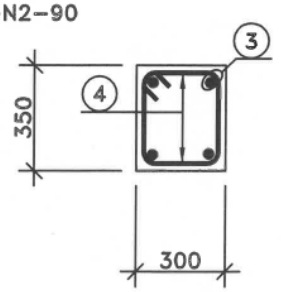
VIEW 7-7



SECTION 1-1



VIEW 4-4



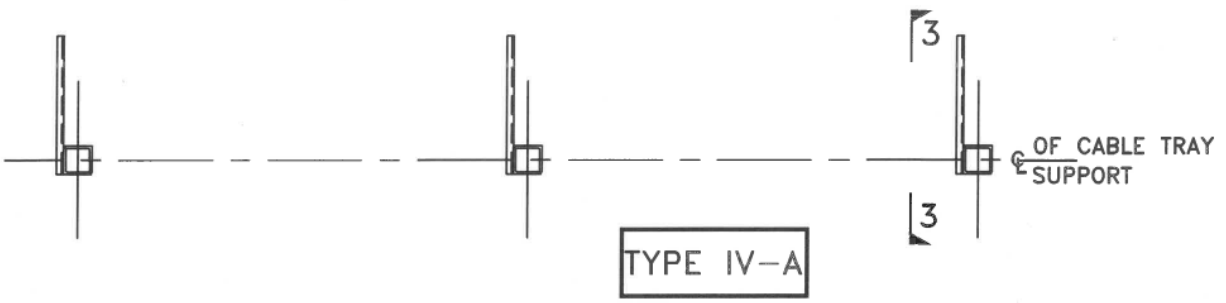
SEC. 5-5

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.)

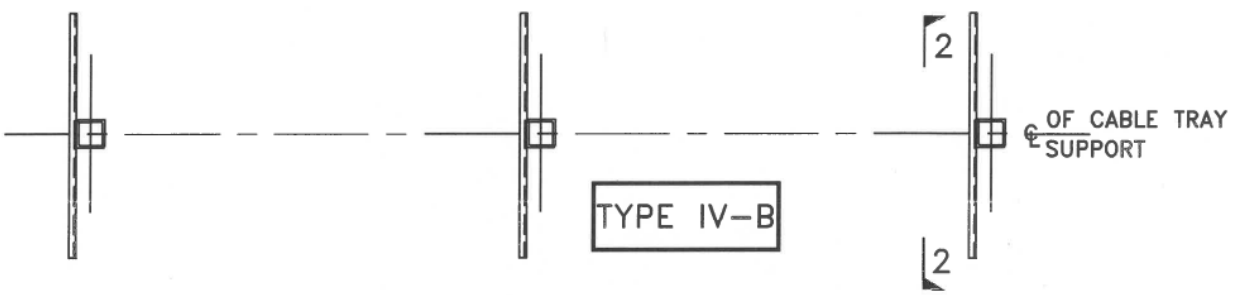
(* GRADE OF CONC. SHALL BE AS PER GENERAL NOTES OF PROJECT.)

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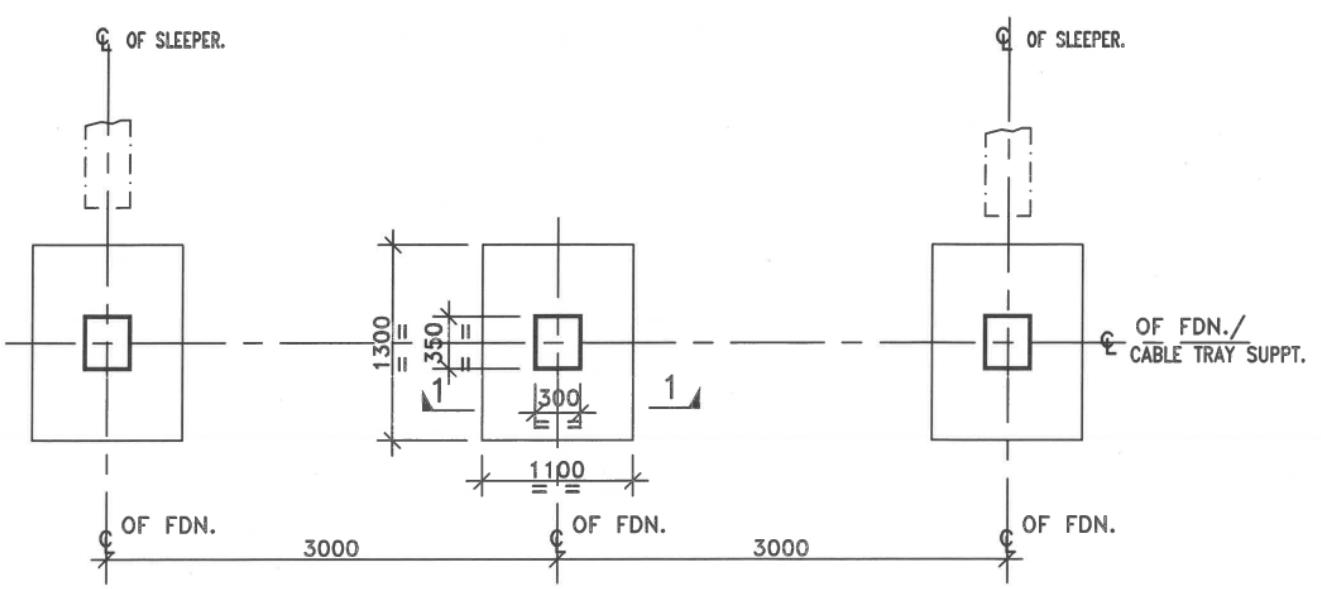
(D) 750mm WIDE THREE TIERED CABLE TRAY SUPPORTS TYPE–IV



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

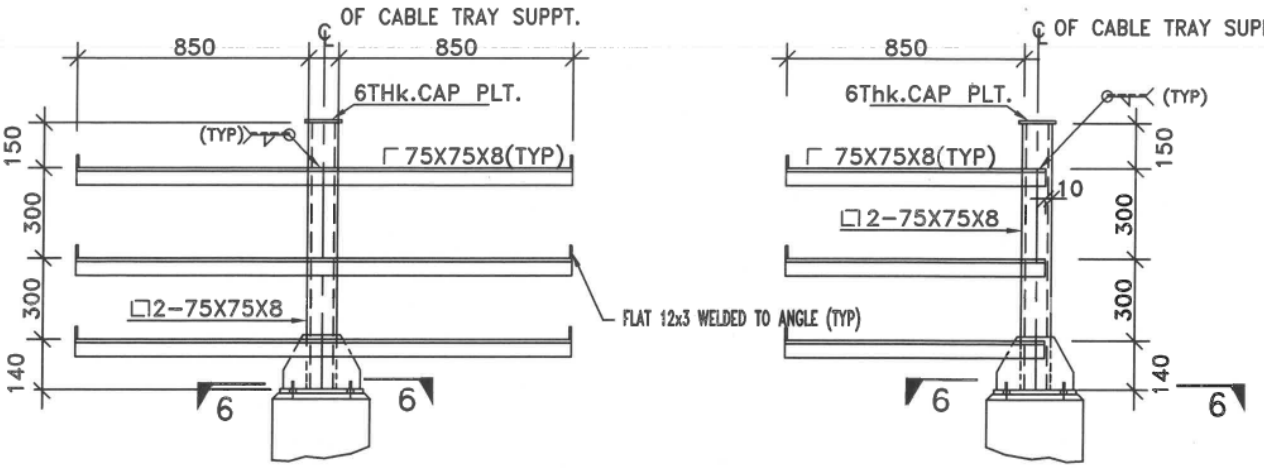


TYPICAL G.A.OF CABLE TRAY SUPPT.
(FOR 2 SIDE CABLE TRAY)



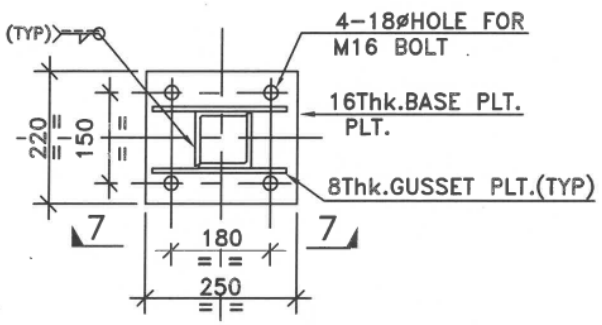
TYPICAL FDN. LAYOUT
(FOR 1 SIDE & 2 SIDE CABLE TRAY SUPPT.)

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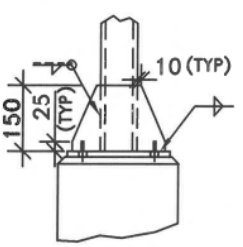


VIEW 2-2
(FOR 2 SIDE CABLE TRAY STR.)

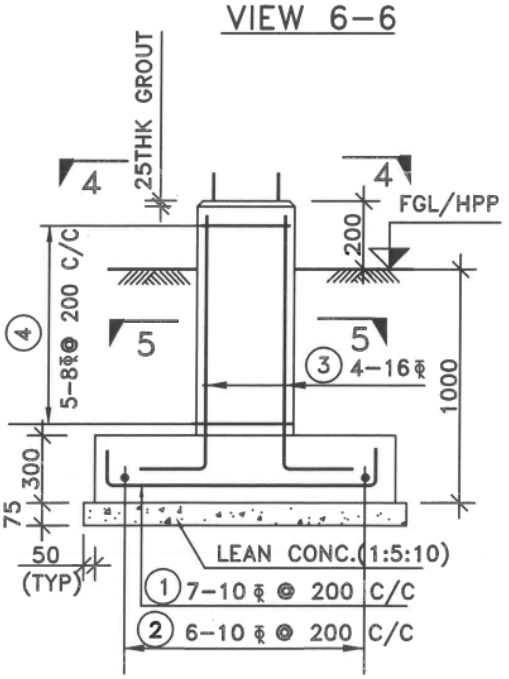
VIEW 3-3
(FOR 1 SIDE CABLE TRAY STR.)



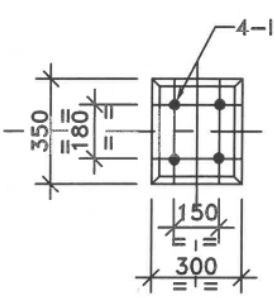
VIEW 6-6



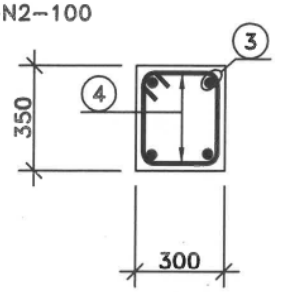
VIEW 7-7



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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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.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
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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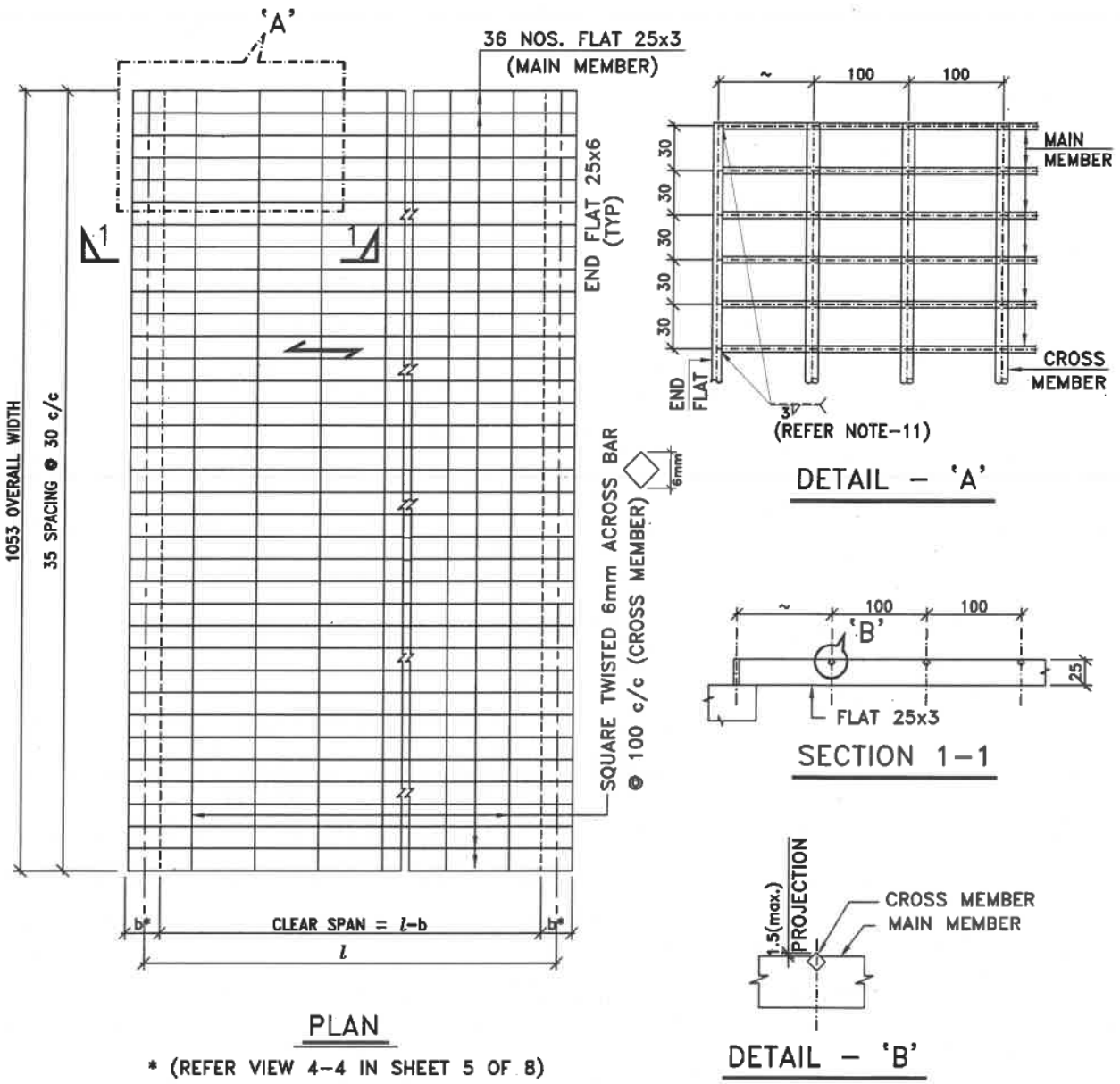


TABLE-2

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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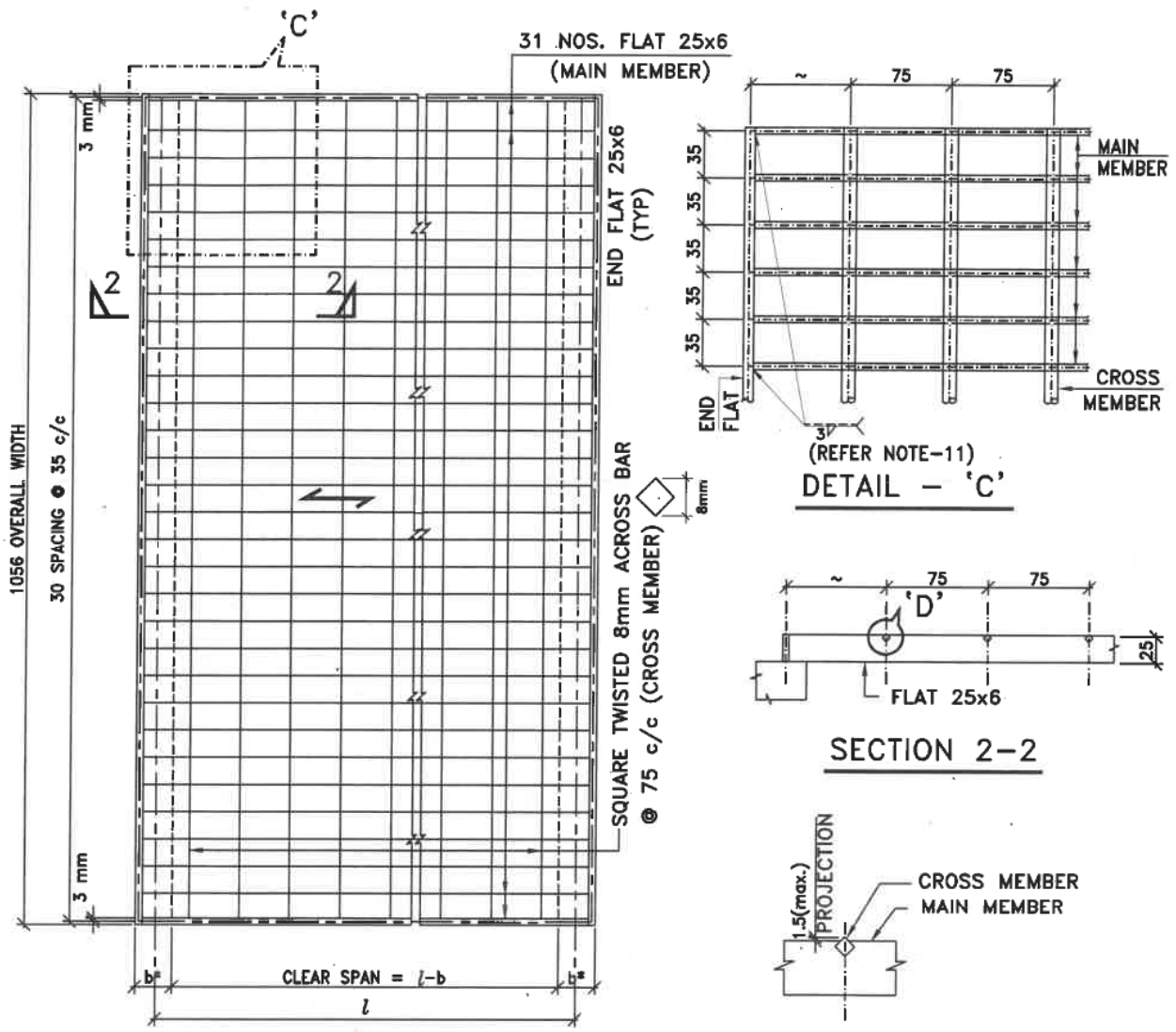
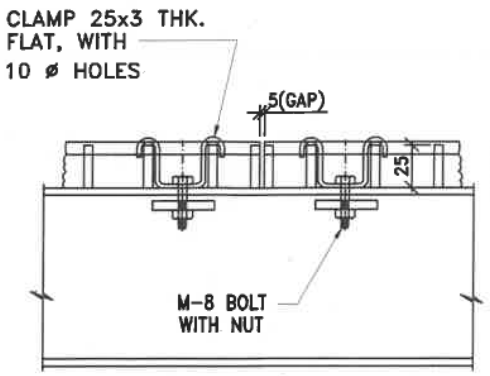


TABLE-3

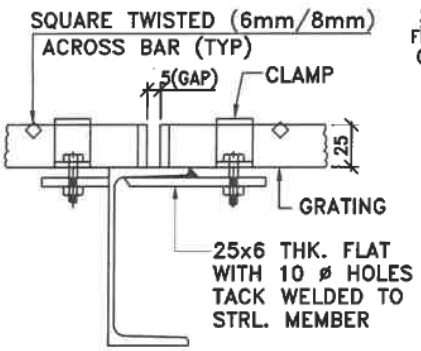
WT. OF GRATING IN kg/sqm (INDICATIVE ONLY, NOT FOR PAYMENT)			PROPERTIES WIDTH = 1056mm			REMARKS
FLAT 25x6	SQUARE TWISTED 8mm ACROSS BAR	TOTAL	Ixx cm^4	Zxx cm^3	MR kgm	WEIGHT OF WELD, CLAMPS/DISC, GALVANISATION, ETC. NOT CONSIDERED
36.49	3.23	39.72	24.2	19.4	319.69	

GRATING TYPE – II

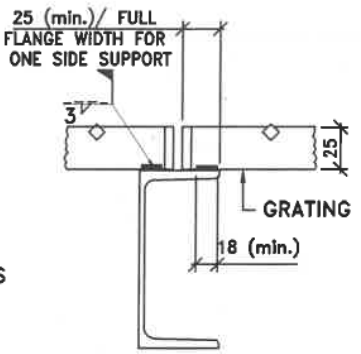
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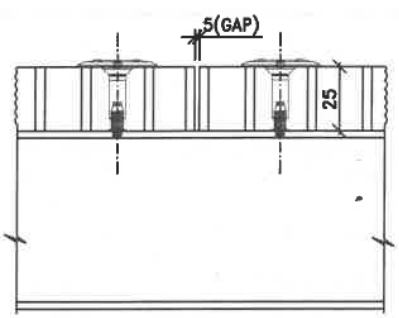
VIEW 3-3
GRATING FIXED WITH CLAMP



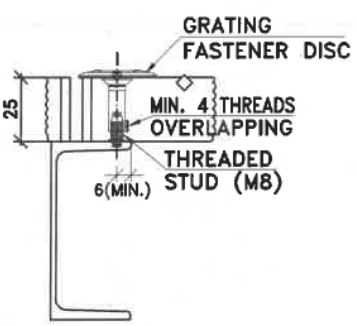
VIEW 4-4
GRATING FIXED WITH CLAMP
(REFER NOTE-8, 13 & 16)



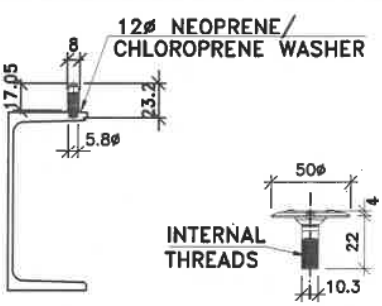
VIEW 4-4/VIEW 4B-4B
GRATING FIXED WITH WELDING
(REFER NOTE-8, 13 & 16)



VIEW 4A-4A
GRATING FIXED WITH DISC

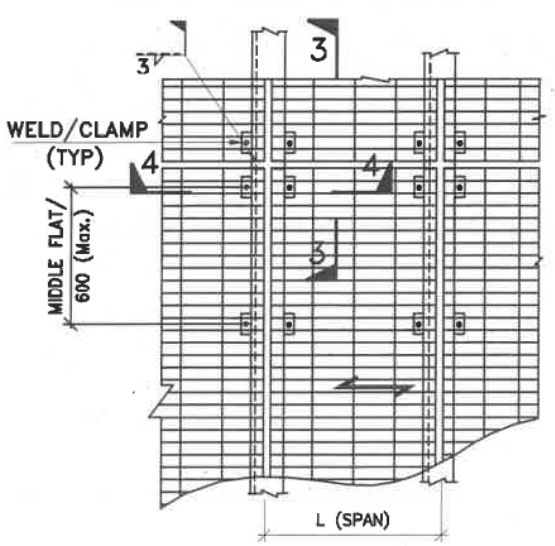


VIEW 4B-4B
GRATING FIXED WITH DISC
(REFER NOTE-8, 13, 15 & 16)

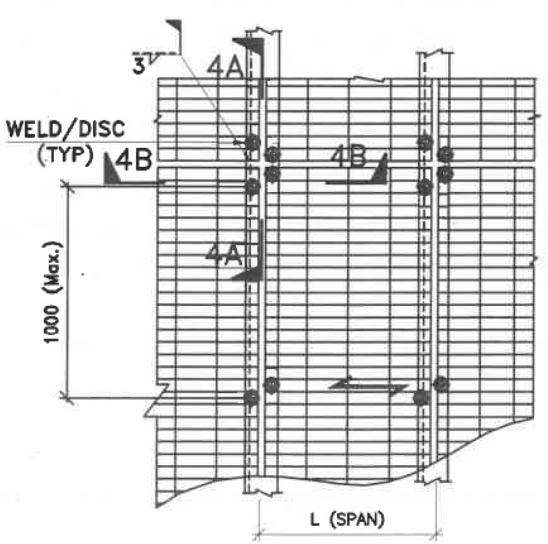


THREADED STUD FIXING DETAILS
(REFER NOTE-15)

GRATING FASTENER DISC DETAILS
(REFER NOTE-15)



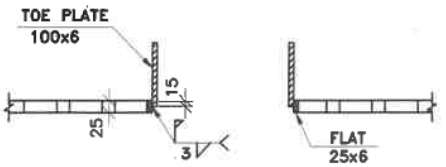
OPTION-1
(WITH CLAMP)



OPTION-2
(WITH DISC)

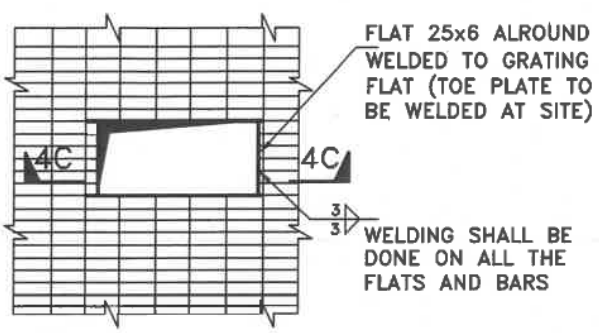
FIXING DETAIL OF GRATING PANELS

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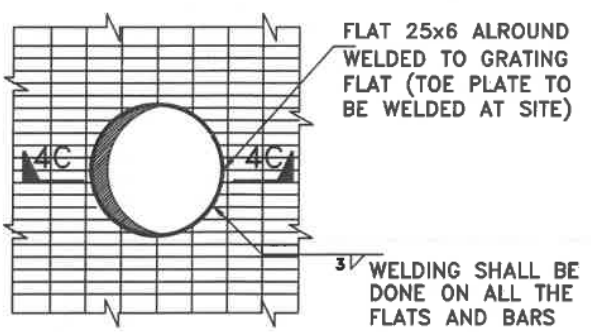


SEC. 4C–4C

(REFER NOTE–5, 13 & 16)



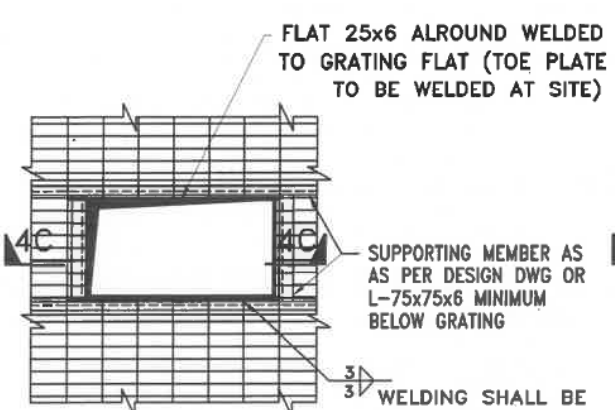
RECTANGULAR



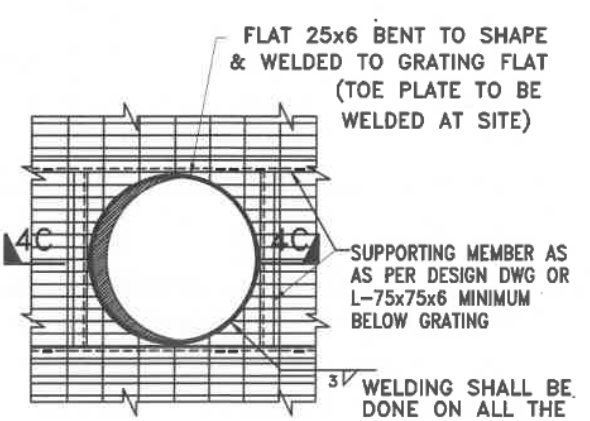
CIRCULAR

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

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



RECTANGULAR



CIRCULAR

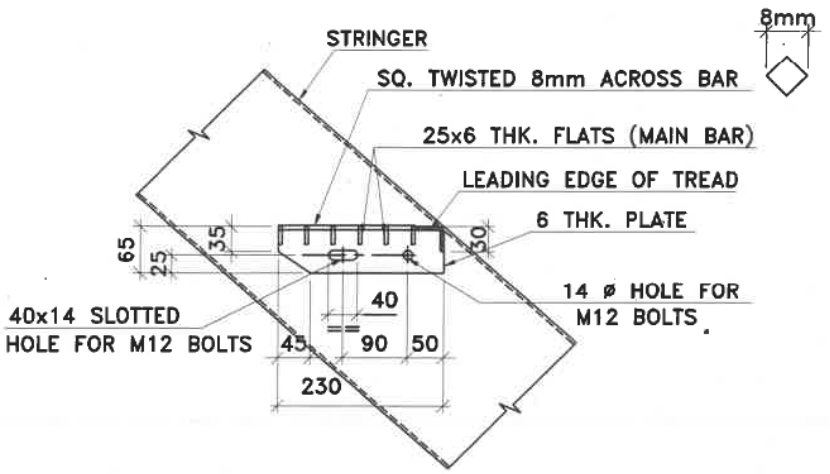
SIZE OF OPENING GREATER THAN 400 mm

TYPICAL DETAIL OF GRATING STRENGTHENING AT OPENINGS

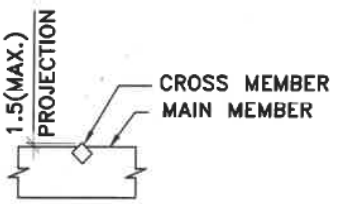
(REFER NOTE–9)

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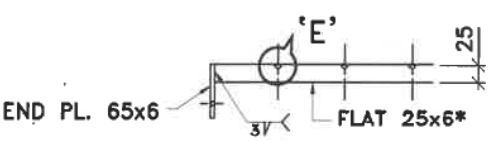
DET. OF 25 THK. GRATING STAIRCASE TREAD FOR 750 & 1000 WIDE STAIR



VIEW 6–6

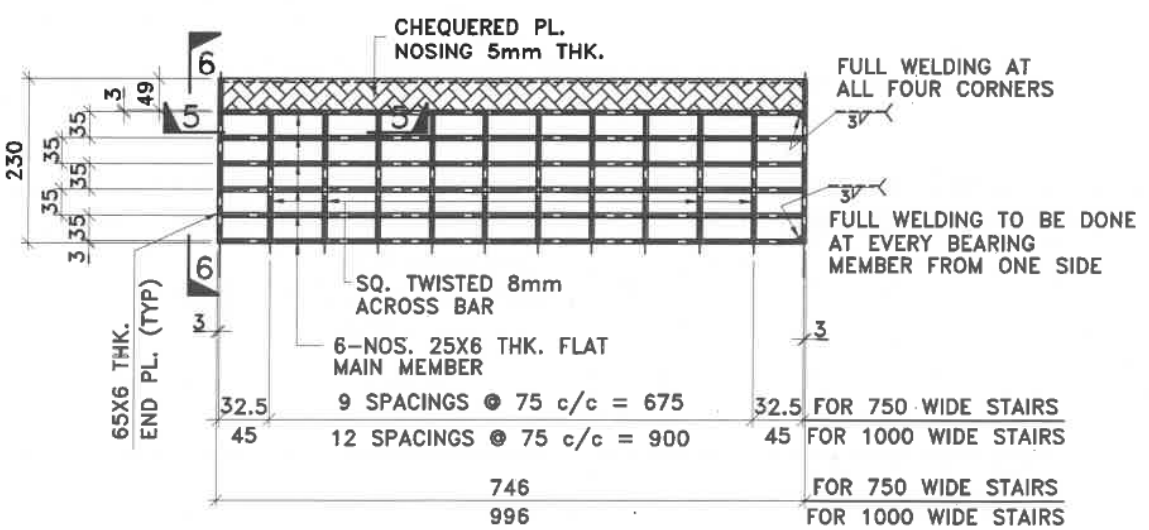


DETAIL– 'E'



SECTION 5–5

*ALL THE FLATS TO BE WELDED TO THE END FLATS

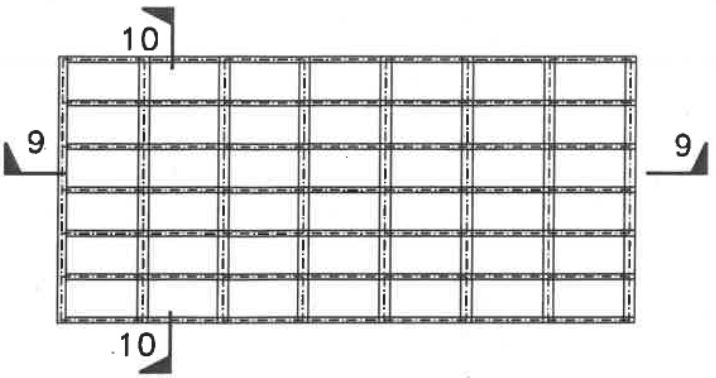


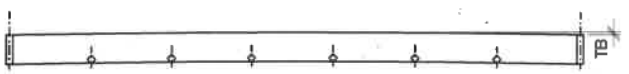
PLAN

(REFER NOTE–13 & 16)

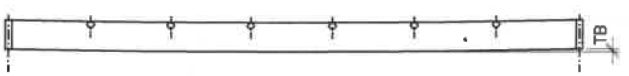
TYP. DETAIL OF GRATING TO BE USED AS TREAD FOR 750/1000 WIDE STAIRS

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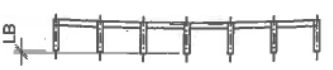
OR



SECTION 9–9
(TB=TRANSVERSE BOW)



OR



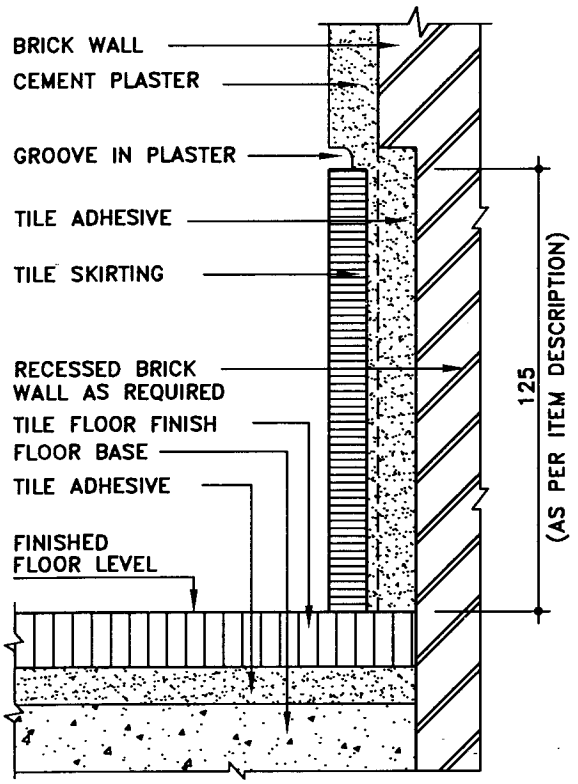
SECTION 10–10
(LB=LONGITUDINAL BOW)

TABLE–4 (PERMISSIBLE AND MANUFACTURER TOLERANCES)

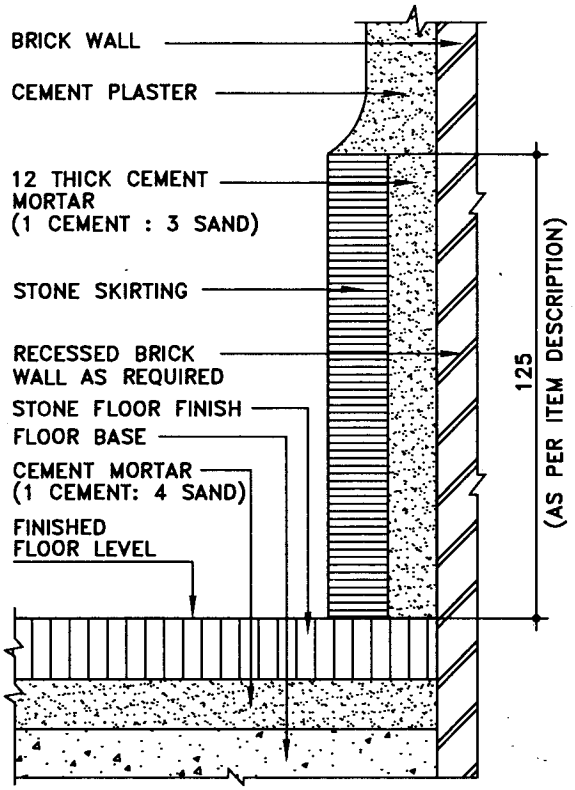
PERMISSIBLE TOLERANCES LOCATION	TOLERANCE (MM)
LENGTH OF GRATING PANEL OR INDIVIDUAL BEARING BAR	+0 / –5
WIDTH OF GRATING	+0 / –5
DEPTH OF BEARING BAR: FOR 25MM	+1 / –0.5
THICKNESS OF BEARING BAR:	±0.4
BINDING: TOP OF CROSS BAR ABOVE MAIN BAR	+0.5 / –0.5
MANUFACTURING TOLERANCES LOCATION	TOLERANCE (MM)
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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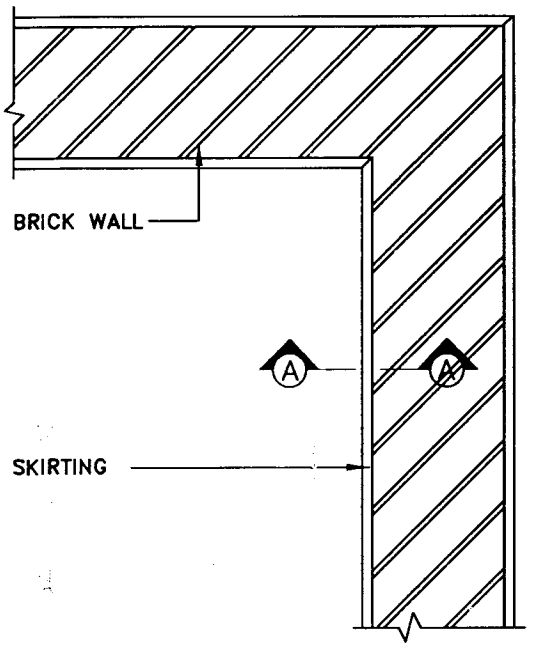
SKIRTING DETAIL (WITH BRICK WALL)



SECTION A–A
(TILE FLOORING–FLUSH SKIRTING)

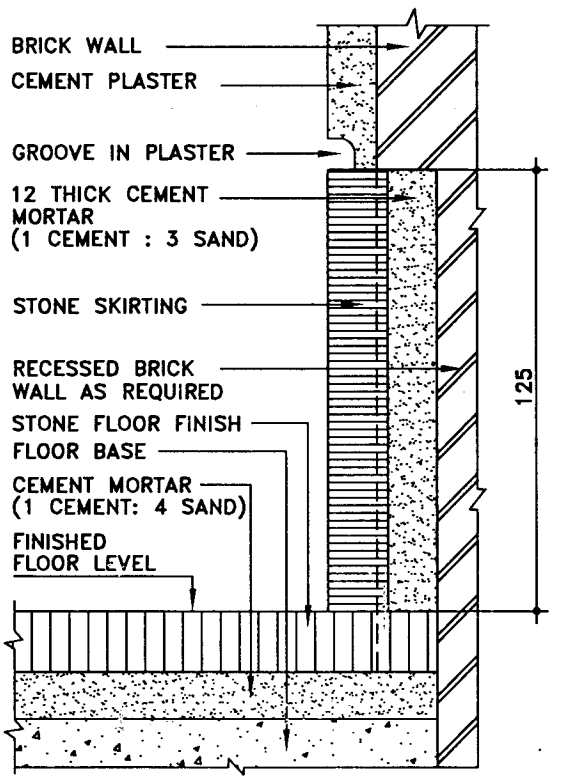


SECTION A–A
(STONE FLOORING–RAISED SKIRTING)



PLAN

NOTE: ALL DIMENSIONS ARE IN MM

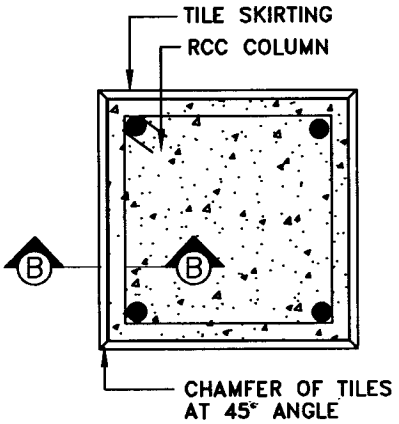


SECTION A–A
(STONE FLOORING–FLUSH SKIRTING)

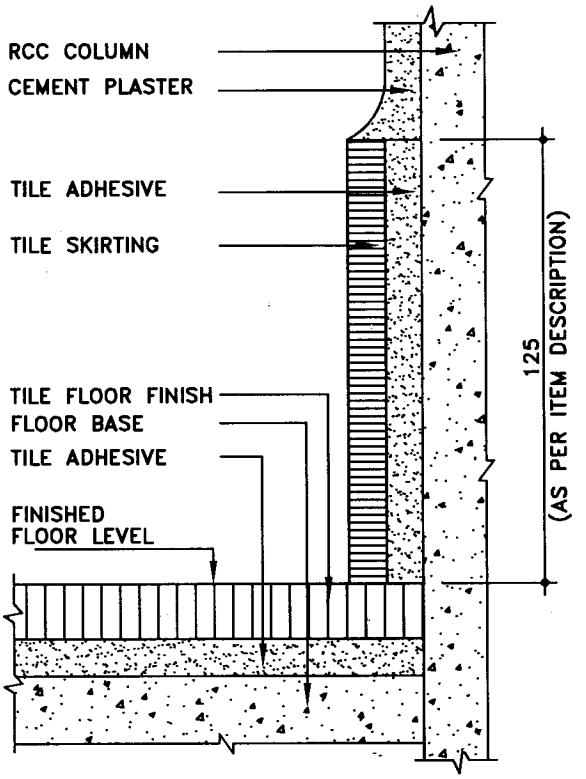
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	11.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	ANISH MAHALA	SAMIR DAS	SANJAY MAZUMDAR
5	07.11.16	REAFFIRMED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

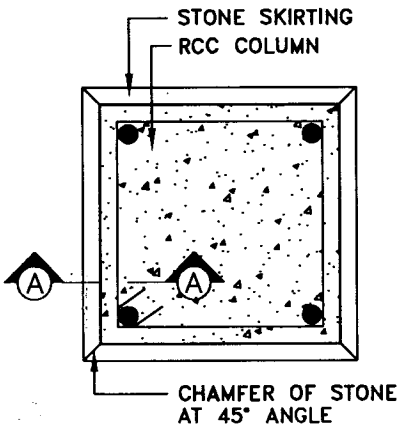
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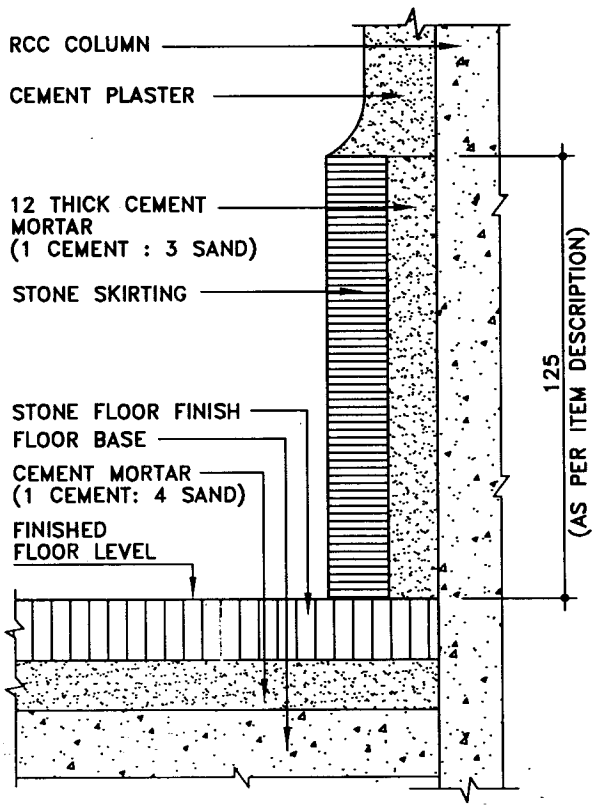
PLAN
(TILE SKIRTING)



SECTION B–B



PLAN
(STONE SKIRTING)



SECTION A–A

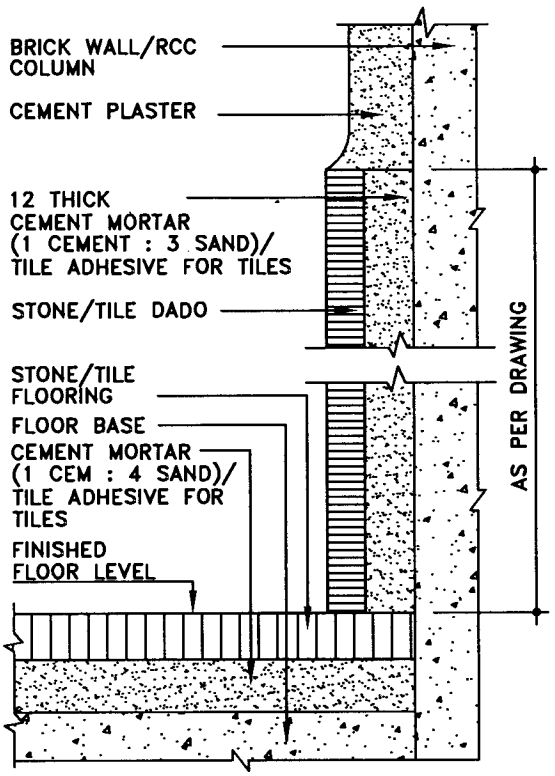
NOTE: ALL DIMENSIONS ARE IN MM

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

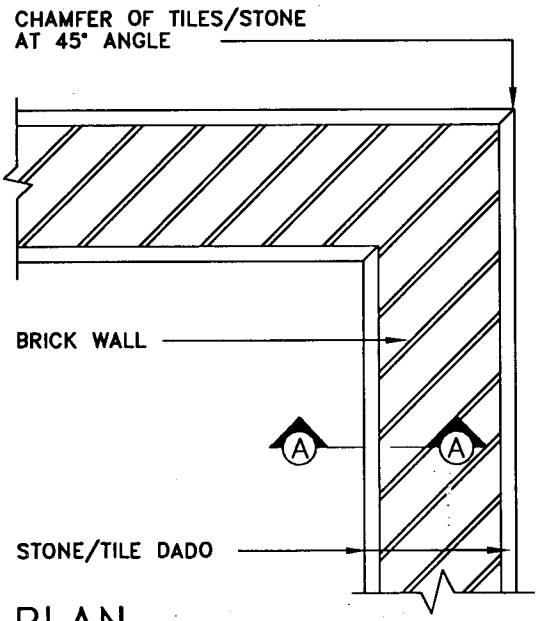
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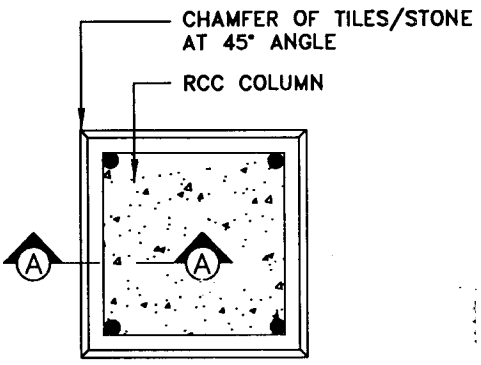
DADO DETAIL (WITH BRICK WALL AND RCC COLUMN)



SECTION A–A



PLAN
(DADO ON BRICK WALL)



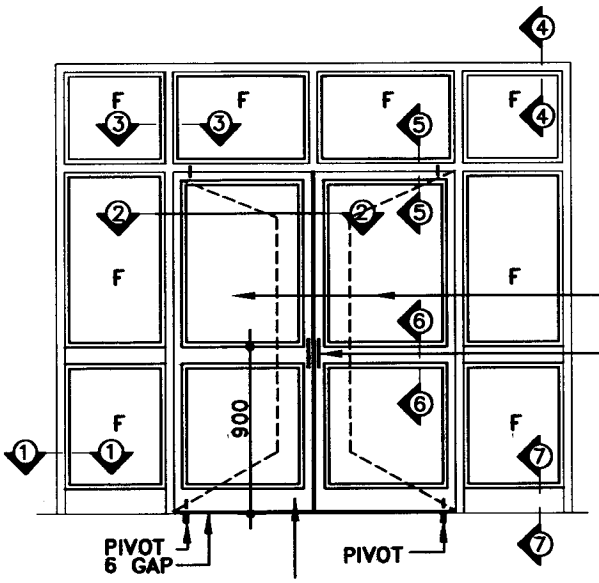
PLAN
(DADO ON RCC COLUMN)

NOTE: ALL DIMENSIONS ARE IN MM

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
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

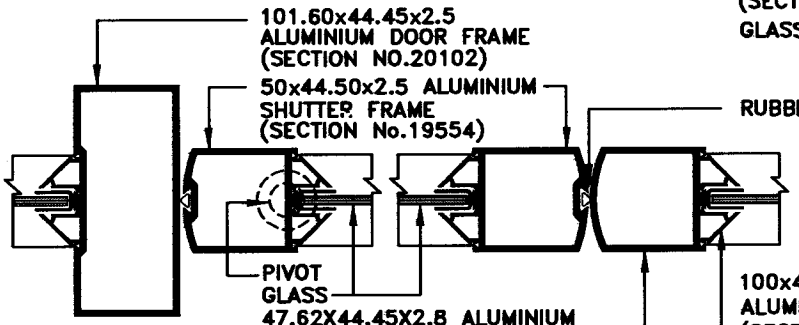
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GLAZED ALUMINIUM DOOR

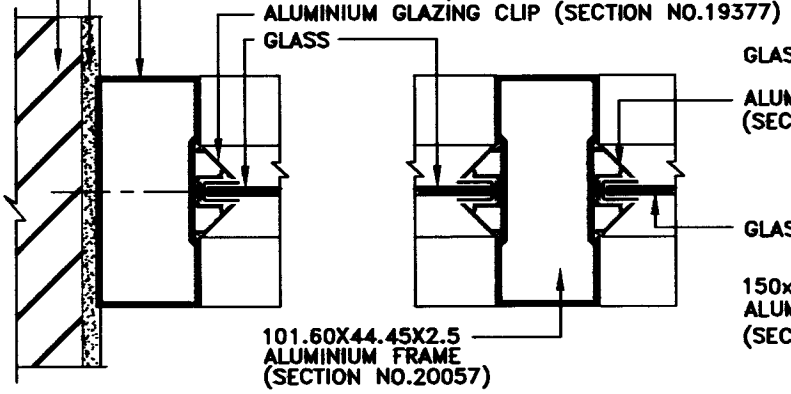


ELEVATION
(F-FIXED GLAZING)

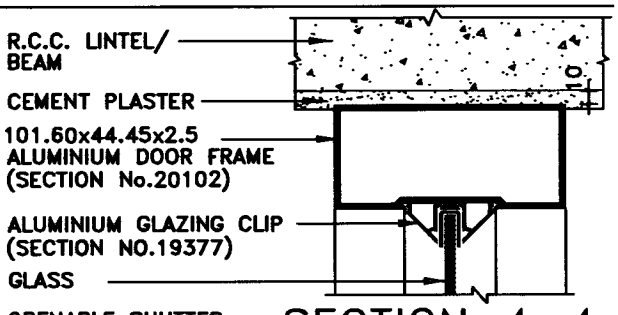
ALUMINIUM BOTTOM RAIL
(SECTION NO.19584)



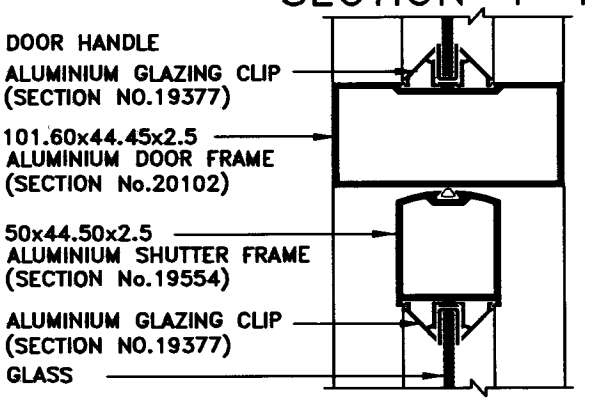
SECTION 2-2



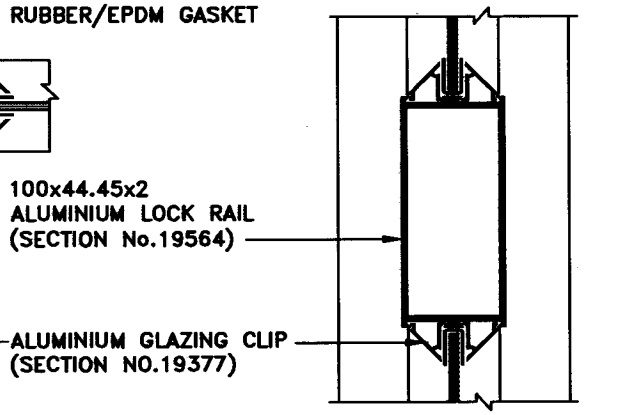
SECTION 1-1 SECTION 3-3



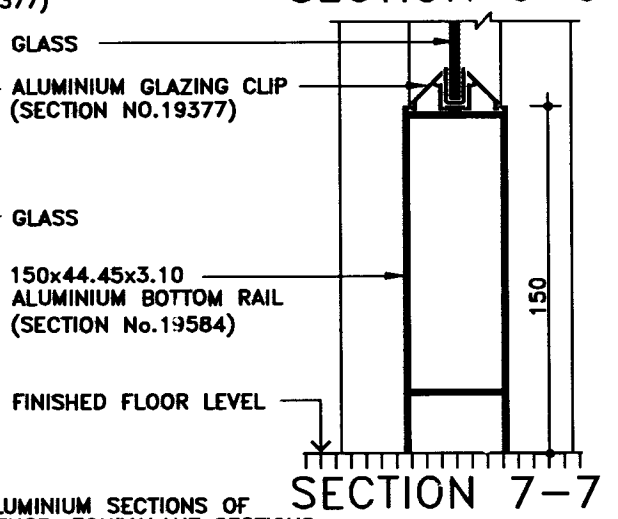
SECTION 4-4



SECTION 5-5



SECTION 6-6



SECTION 7-7

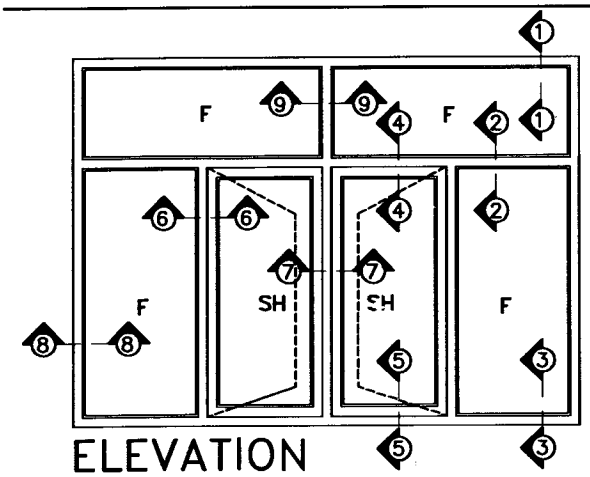
NOTES:

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.

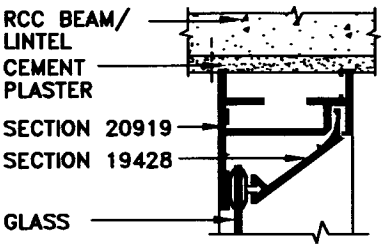
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	ANISH MAHALA	SAMIR DAS	SANJAY MAZUMDAR
5	21.03.17	REAFFIRMED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

Approved by

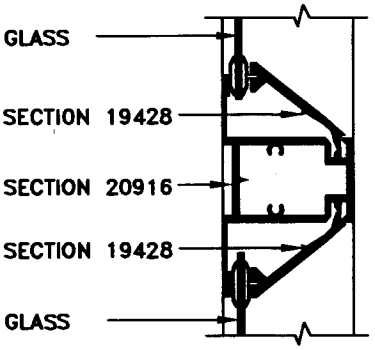
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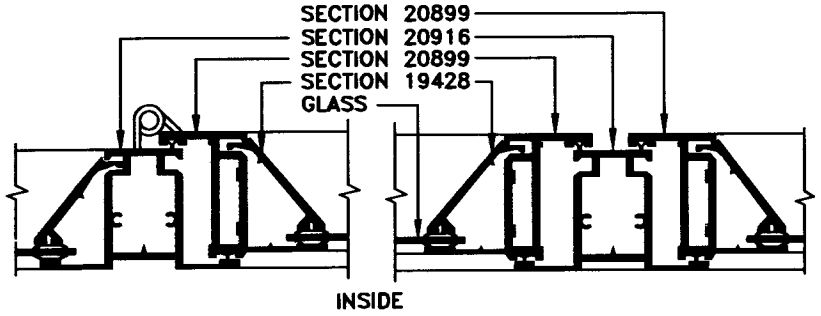
ELEVATION
(F–FIXED GLAZING)
(SH–SIDE HUNG SHUTTER)



SECTION 1–1

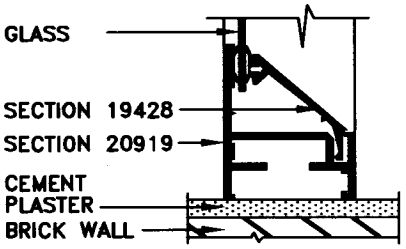


SECTION 2–2

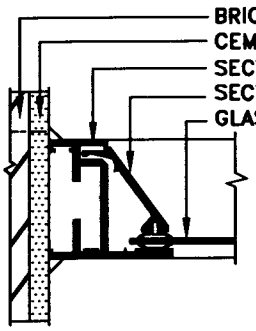


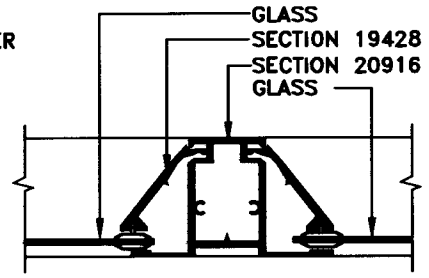
SECTION 6–6

SECTION 7–7



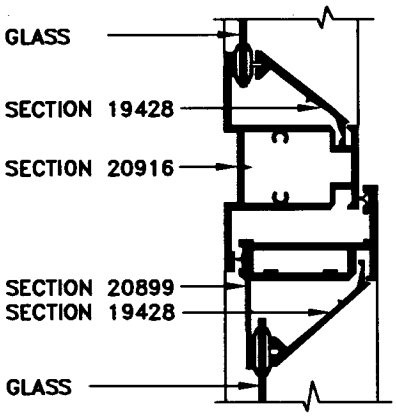
SECTION 3–3



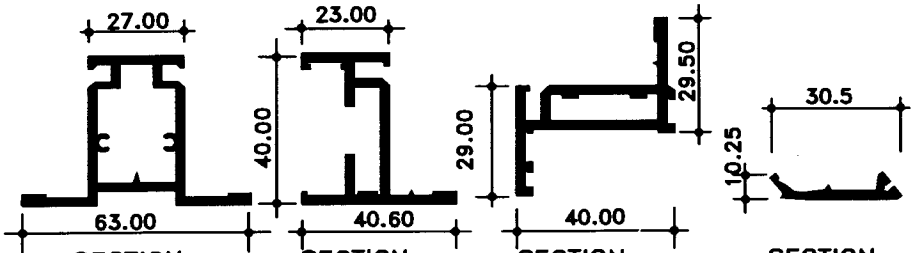


SECTION 8–8

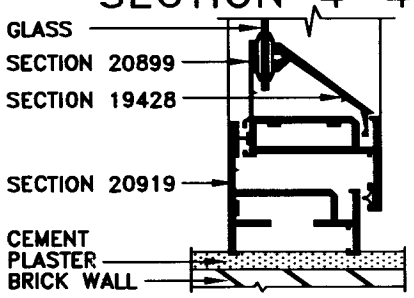
SECTION 9–9



SECTION 4–4



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



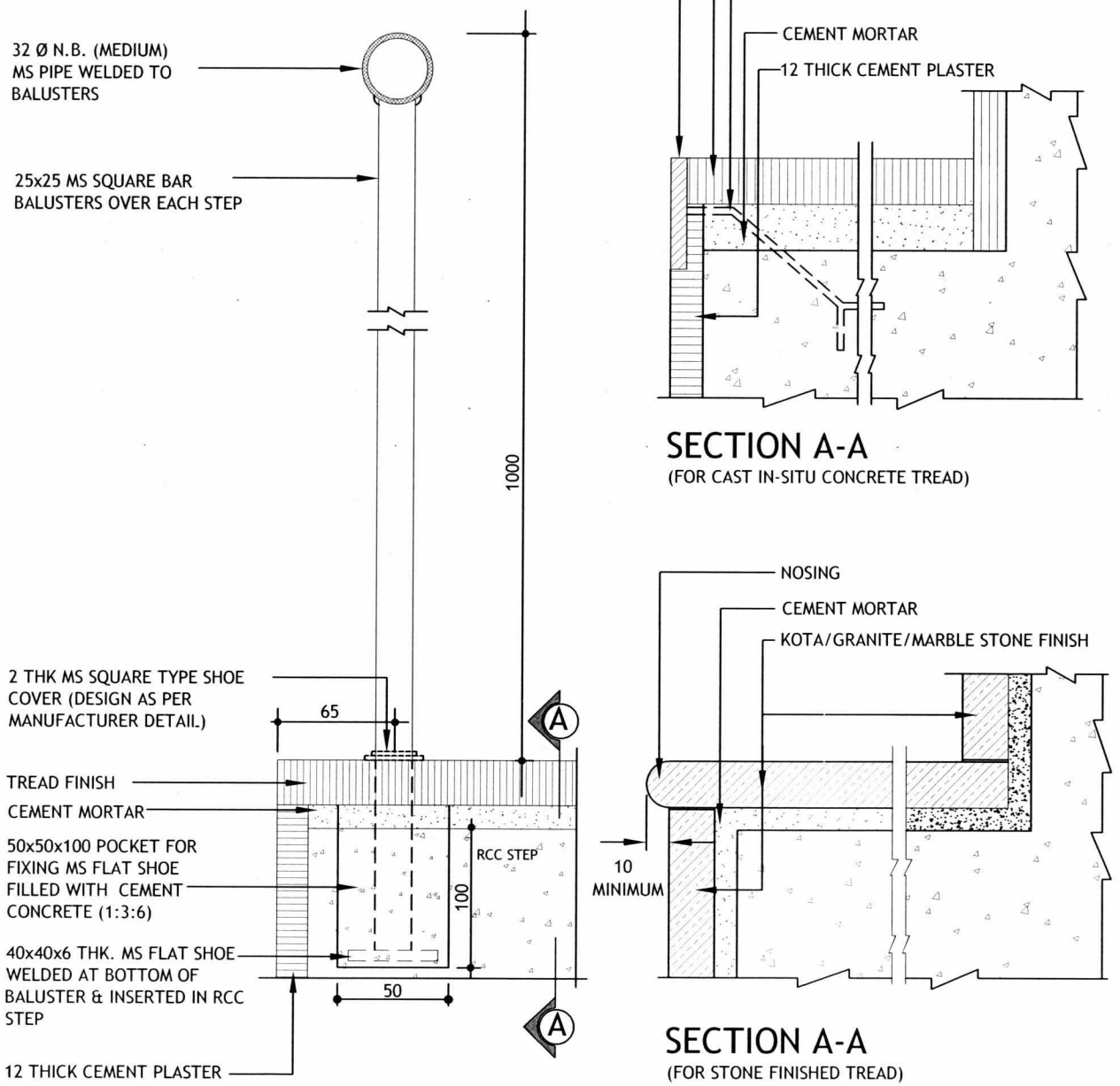
SECTION 5–5

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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SECTION A-A
(FOR CAST IN-SITU CONCRETE TREAD)

SECTION A-A
(FOR STONE FINISHED TREAD)

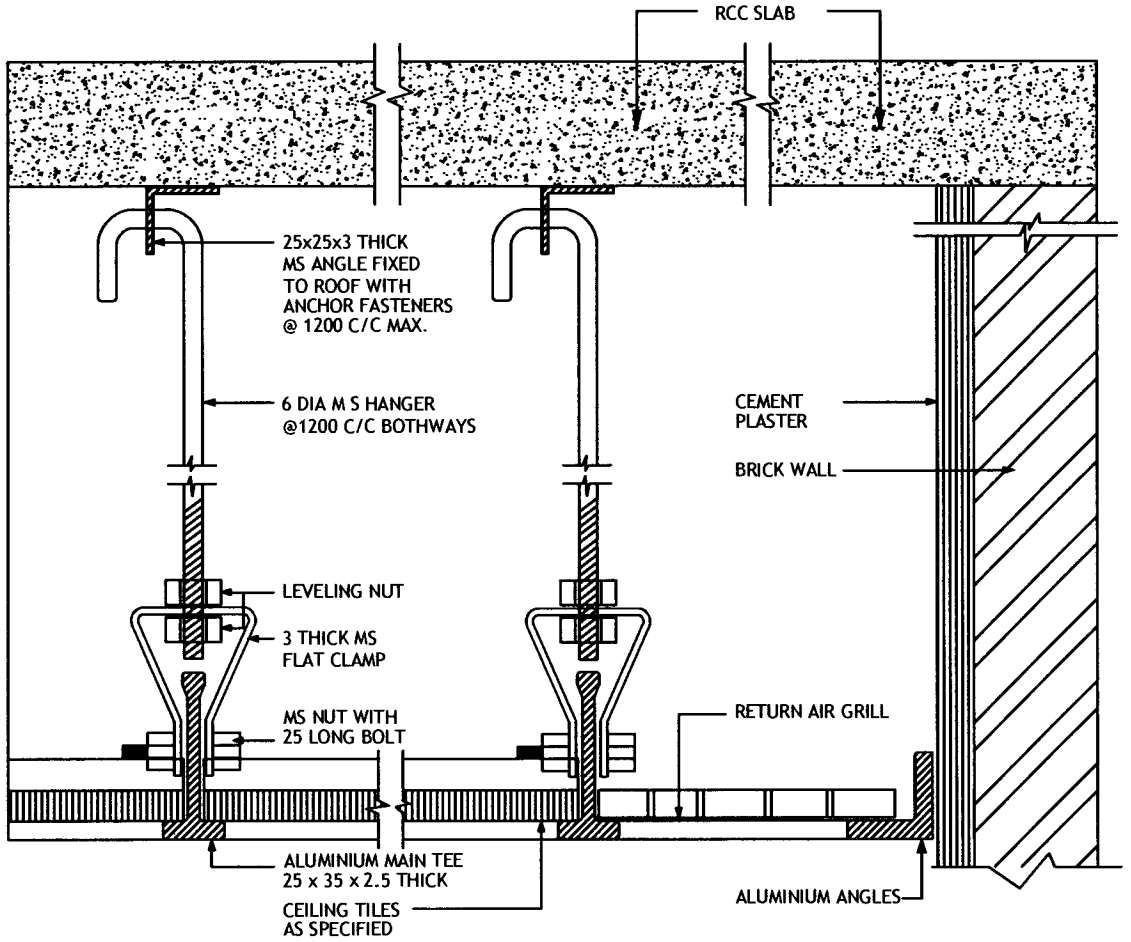
DETAIL OF HANDRAIL

NOTE: 1. ALL DIMENSIONS ARE IN MM.
2. RISER, TREAD AND SKIRTING SHALL BE OF SAME FINISH

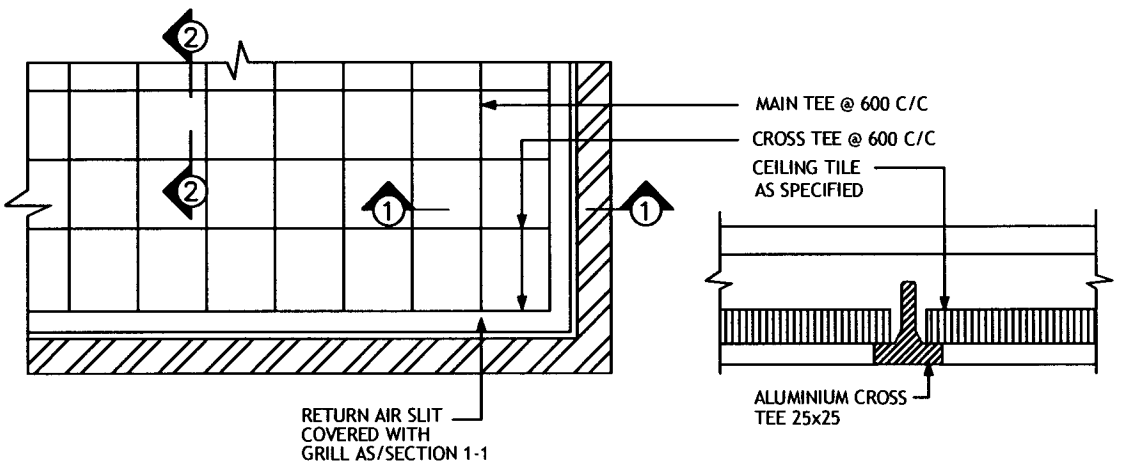
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	16.10.23	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SANDEEP	SAMIR DAS	SANJAY MAZUMDAR
6	02.01.19	ISSUED AS STANDARD	SG	SD	RS	R K TRIVEDI

Approved by

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SECTION AT 1-1



PLAN (PART)

SECTION AT 2-2

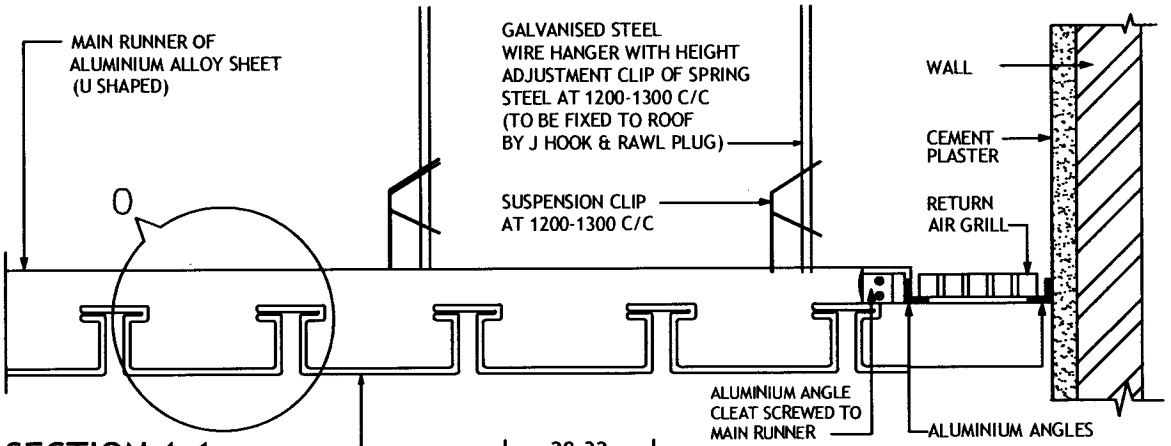
(ELECTRICAL, A/C FIXTURE LOCATIONS SHALL BE AS PER DETAIL DRAWING)
NOTE: ALL DIMENSIONS ARE IN MILLIMETRES.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	30.03.21	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR
5	02.03.16	REVISED & ISSUED AS STANDARD	DK	SD/JKB	RAJANJI SRIVASTAVA	S. CHANDA

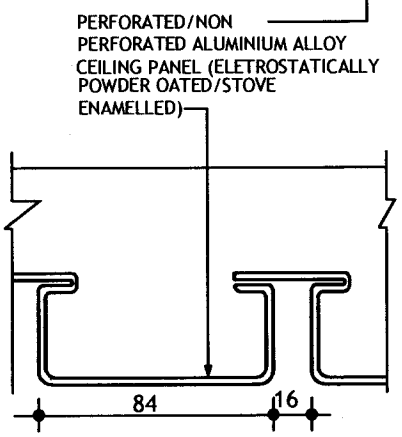
Approved by

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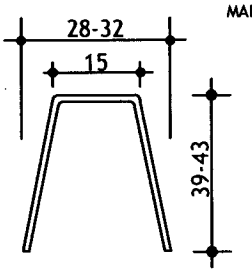
ALUMINIUM PANEL FALSE CEILING (84C SYSTEM)



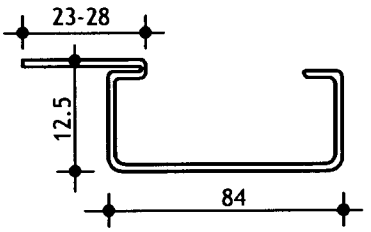
SECTION 1-1



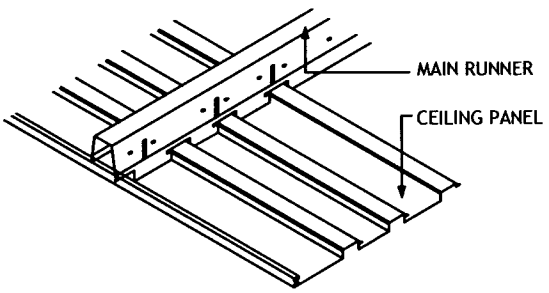
DETAIL AT 'O'



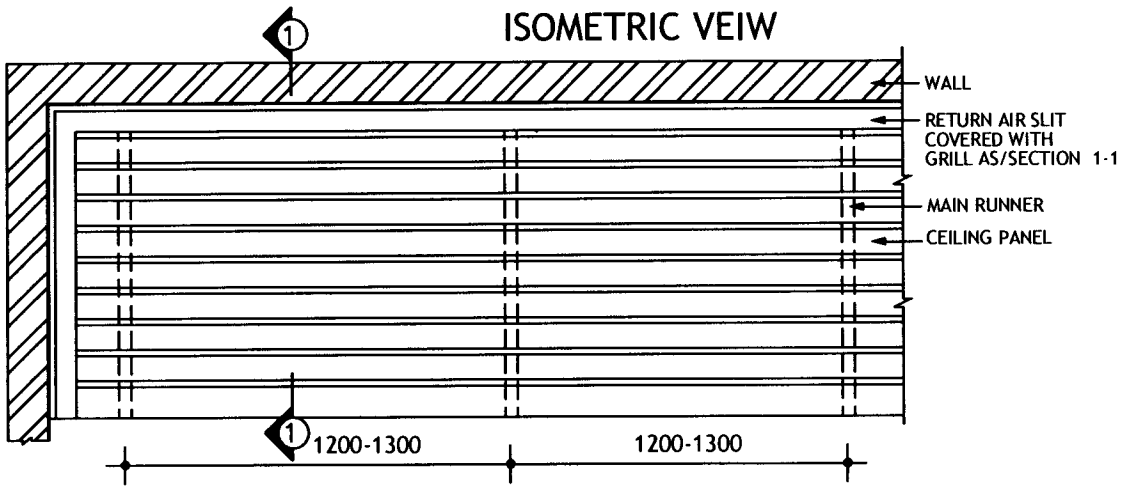
SECTION
(MAIN RUNNER)



SECTION
(PANEL)



ISOMETRIC VEIW



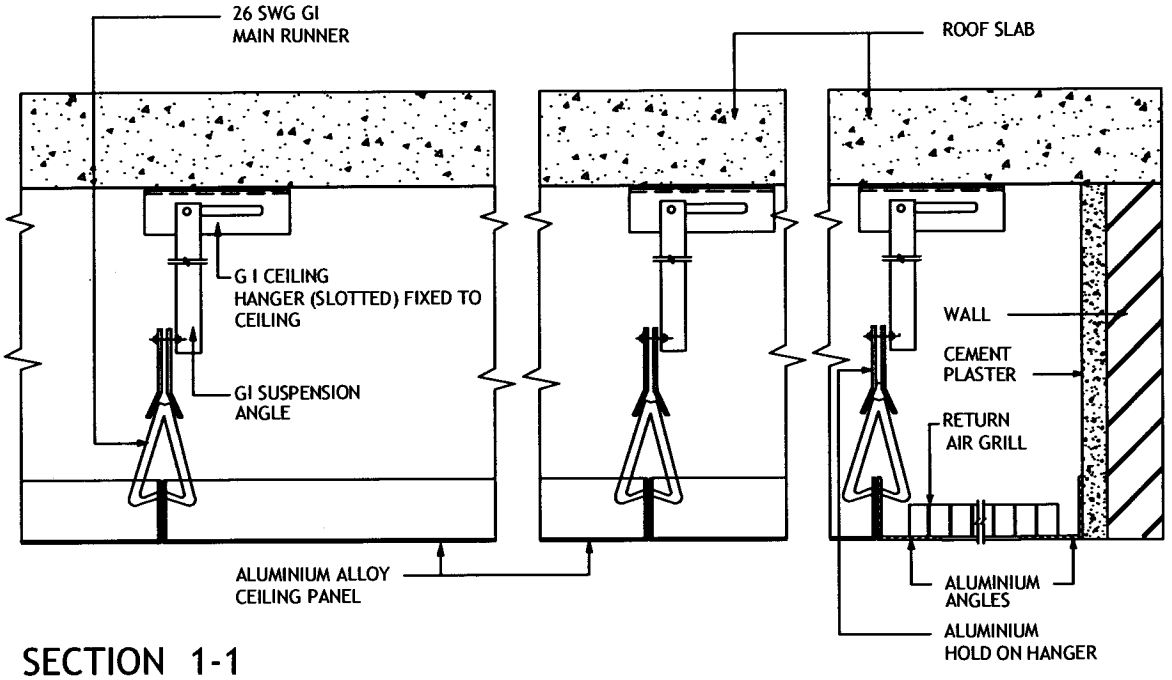
REFLECTED CEILING PLAN (PART)

(ELECTRICAL, A/C FIXTURE LOCATIONS SHALL BE AS PER DETAIL DRAWING)

NOTE: ALL DIMENSIONS ARE IN MILLIMETRES.

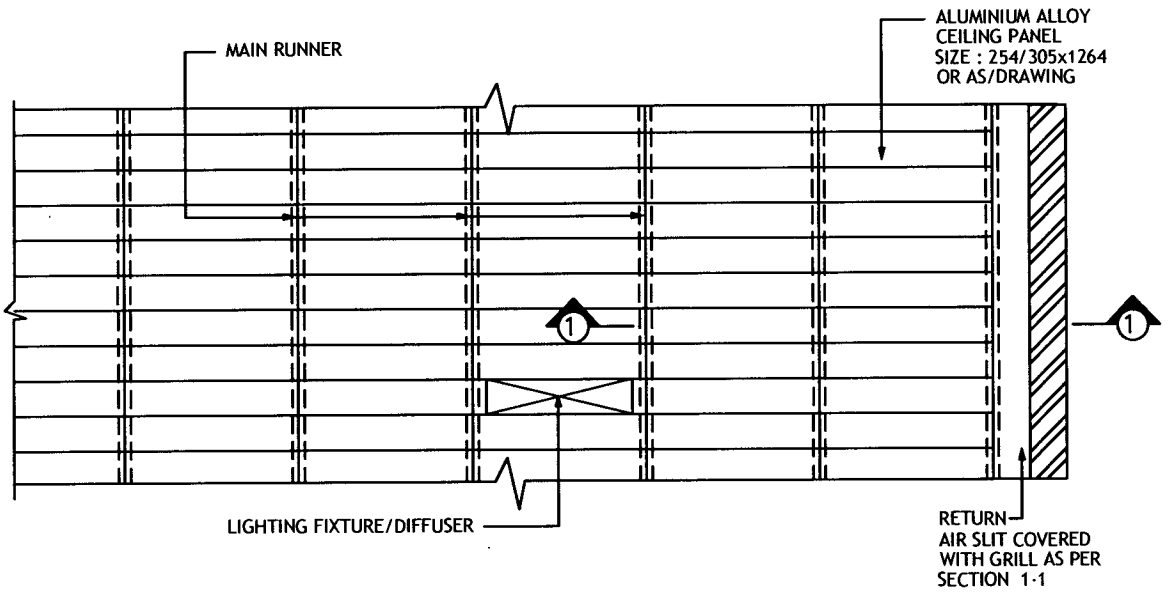
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	30.03.21	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR
5	02.03.16	REVISED & ISSUED AS STANDARD	DK	SD/JKB	RAJANJI SRIVASTAVA	S. CHANDA

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SECTION 1-1

(HANGING/SUSPENSION ARRANGEMENT CAN VARY FROM VENDOR TO VENDOR)

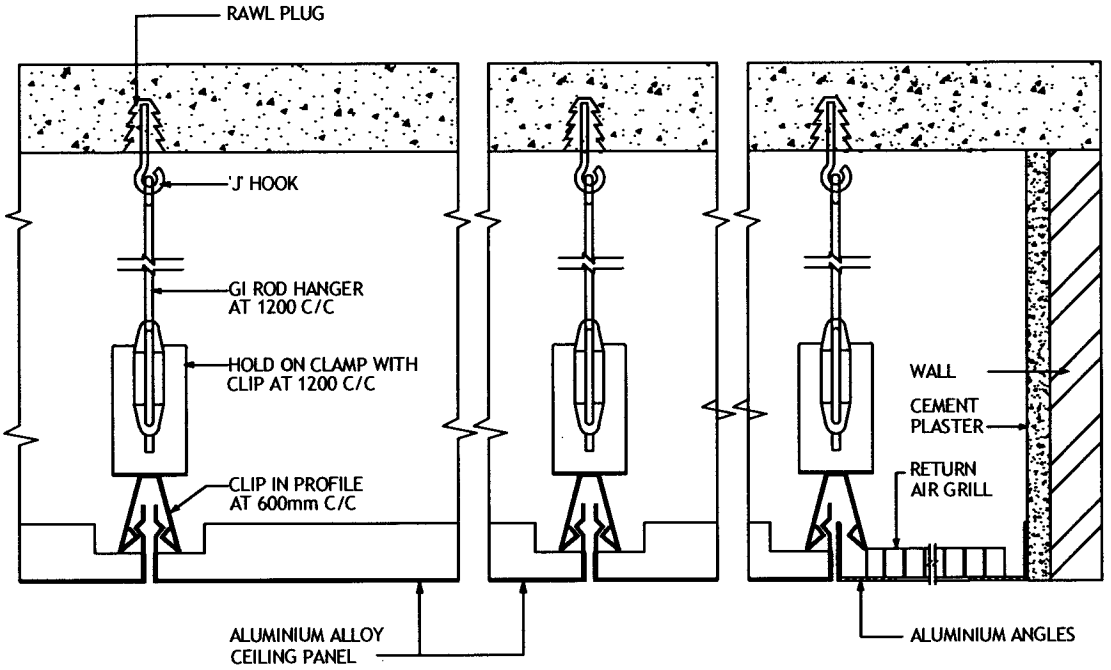


REFLECTED CEILING PLAN (PART) (LINEAR PANEL)

(ELECTRICAL, A/C FIXTURE LOCATIONS SHALL BE AS PER DETAIL DRAWING)
NOTE: ALL DIMENSIONS ARE IN MILLIMETRES.

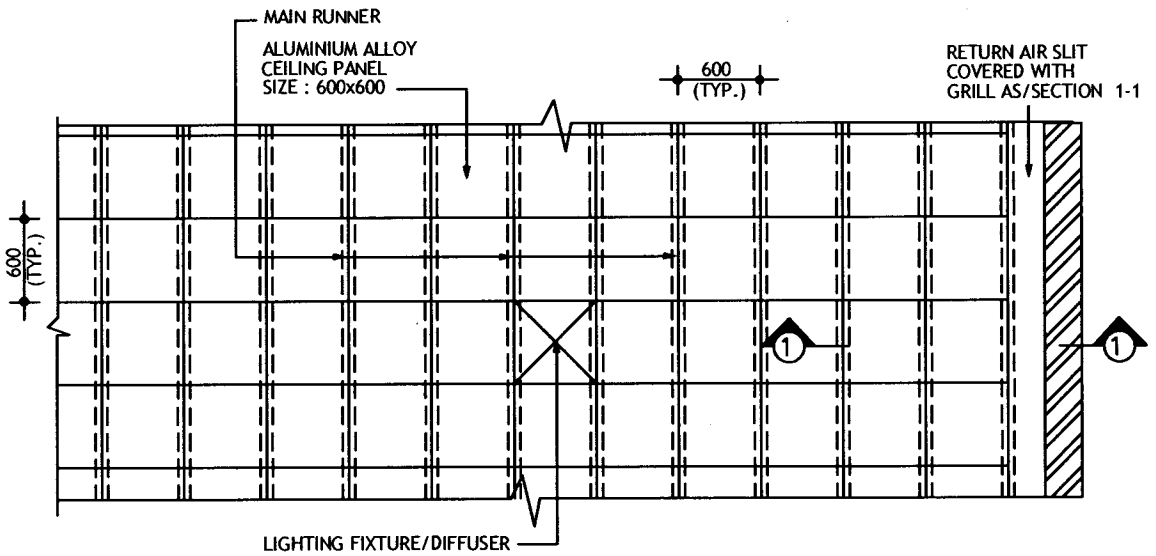
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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6	30.03.21	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR
5	02.03.16	REVISED & ISSUED AS STANDARD	DK	SD/JKB	RAJANJI SRIVASTAVA	S. CHANDA

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SECTION 1-1

(HANGING/SUSPENSION ARRANGEMENT CAN VARY FROM VENDOR TO VENDOR)



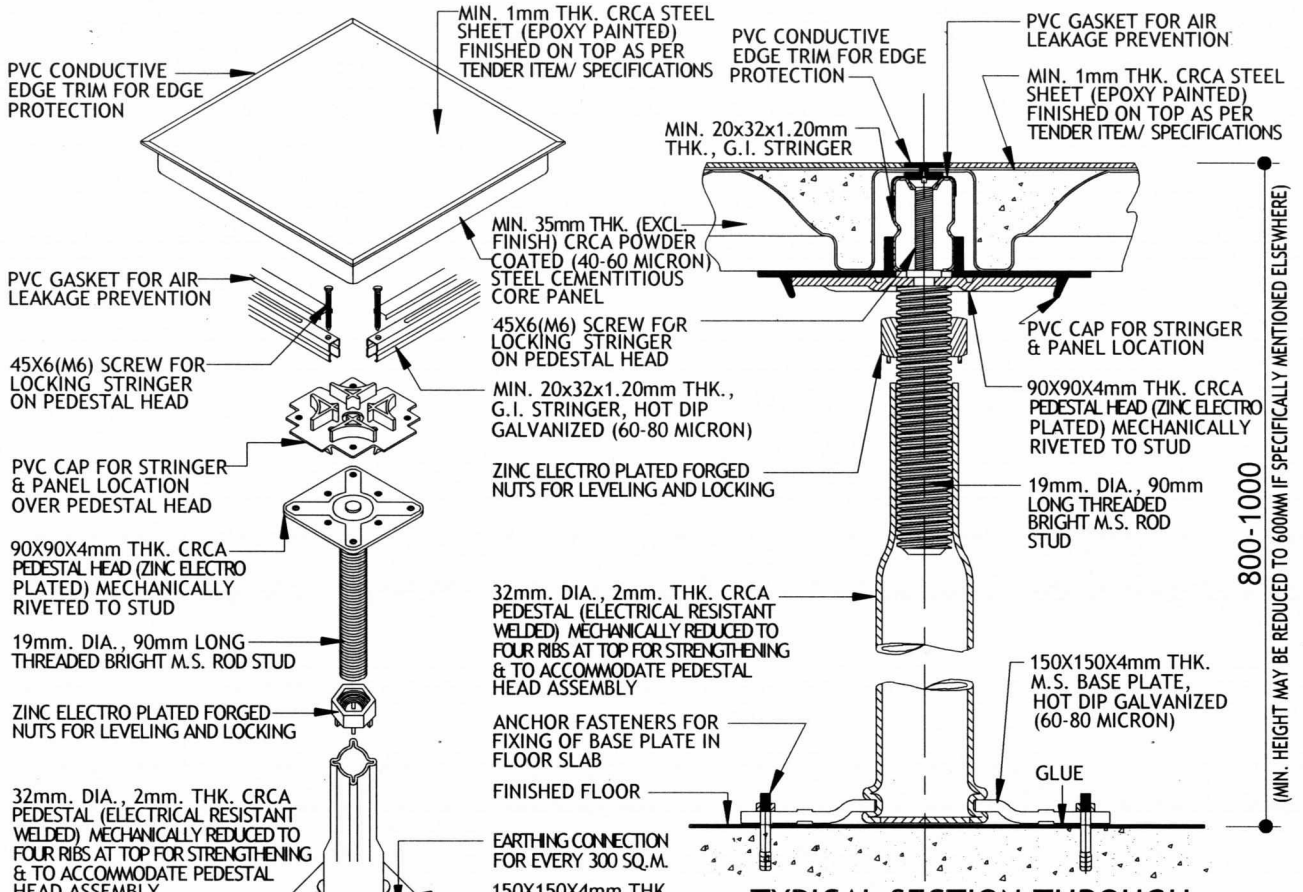
REFLECTED CEILING PLAN (PART) (600mm X 600mm PANELS)

(ELECTRICAL, A/C FIXTURE LOCATIONS SHALL BE AS PER DETAIL DRAWING)

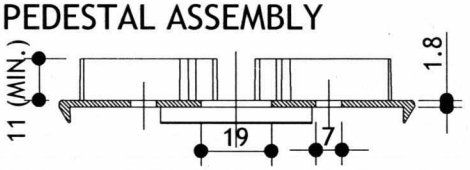
NOTE: ALL DIMENSIONS ARE IN MILLIMETRES.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	30.03.21	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR
5	02.03.16	REVISED & ISSUED AS STANDARD	DK	SD/JKB	RAJANJI SRIVASTAVA	S. CHANDA

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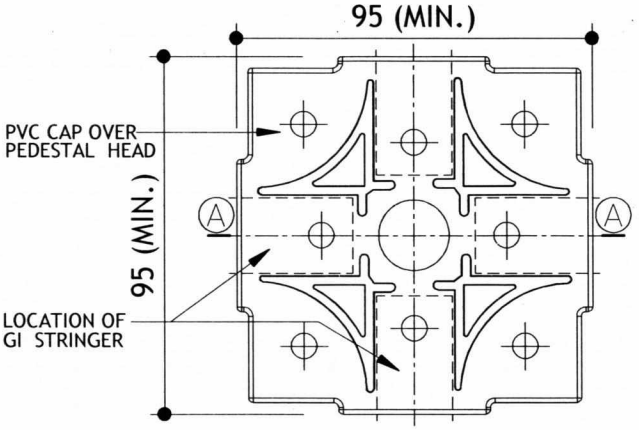


TYPICAL SECTION THROUGH PEDESTAL ASSEMBLY

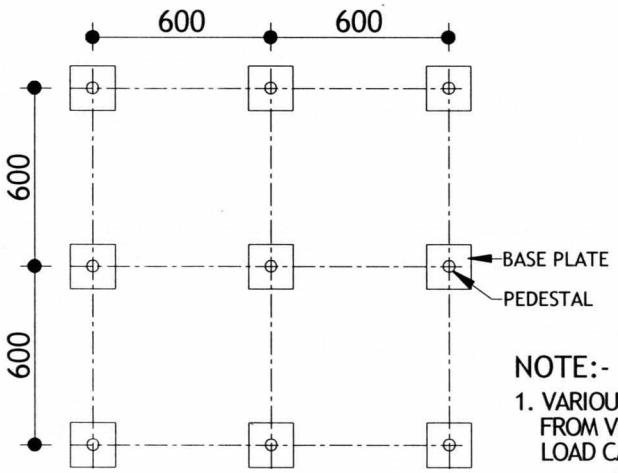


SECTION A-A

ISOMETRIC VIEW OF PEDESTAL ASSEMBLY



TOP VIEW OF CAP FOR PEDESTAL HEAD



PART GRID PLAN (PEDESTALS)

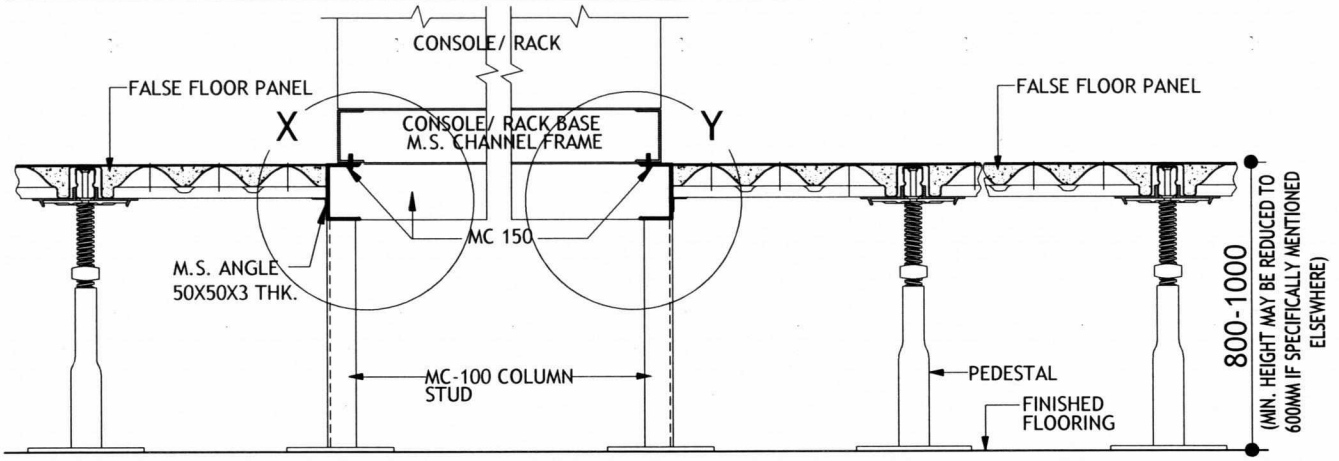
NOTE:-

1. VARIOUS COMPONENTS' DIMENSIONS, SHAPES ETC. MAY VARY SLIGHTLY FROM VENDOR TO VENDOR. HOWEVER THE SYSTEM SHALL HAVE THE LOAD CARRYING CAPACITY AS PER ITEM DESCRIPTION & SPECIFICATIONS.
2. THE BASE FLOOR AND WALL PORTION UNDERNEATH THE FALSE FLOOR SHALL BE PROVIDED ONE COMPONENT POLYURETHANE COATING.

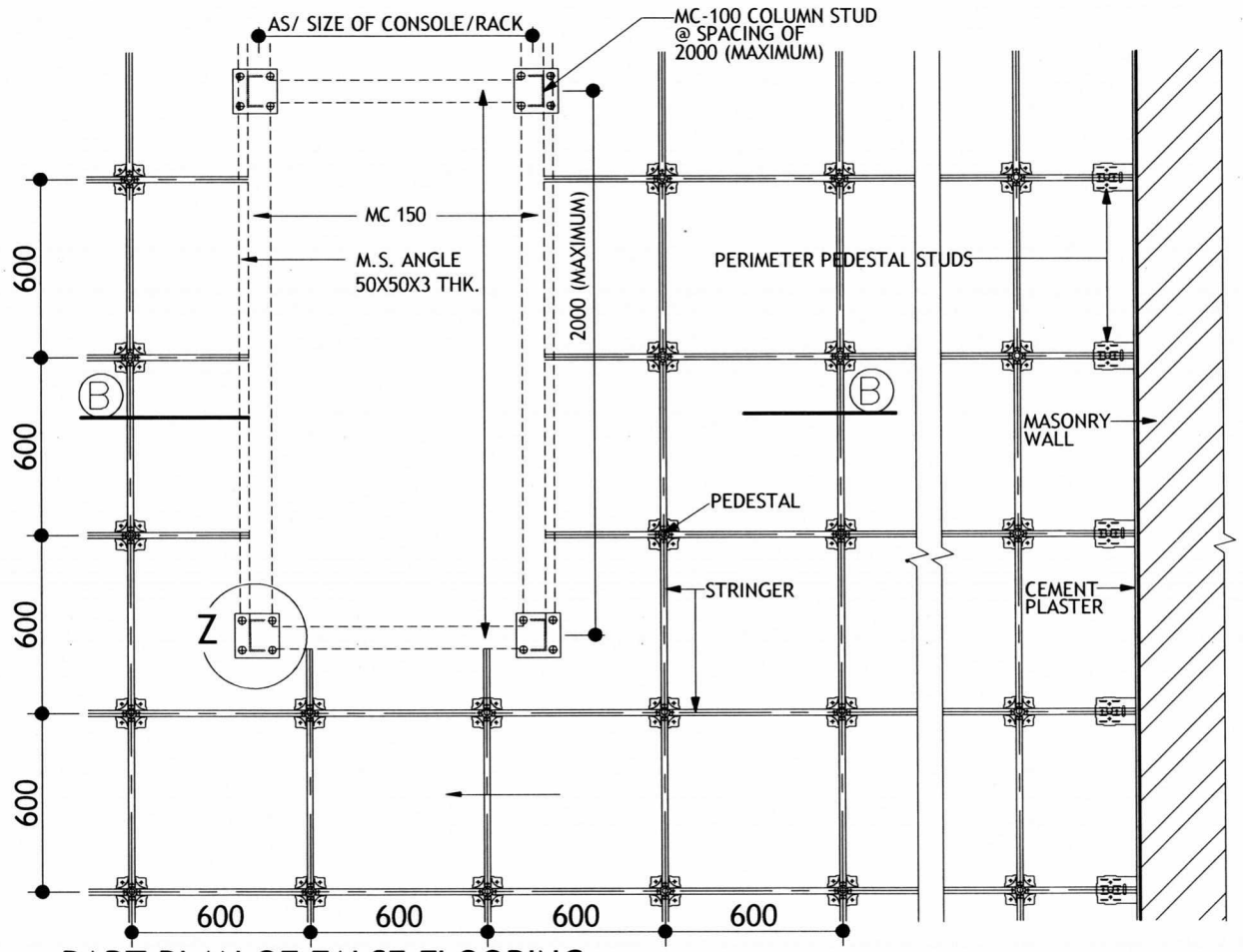
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
3	22.09.22	REVISED & ISSUED AS STANDARD	BABITA SHARMA	ATUL GUPTA	SAMIR DAS	SANJAY MAZUMDAR
2	11.02.22	REAFFIRMED & ISSUED AS STANDARD	ATUL GUPTA	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR

Approved by

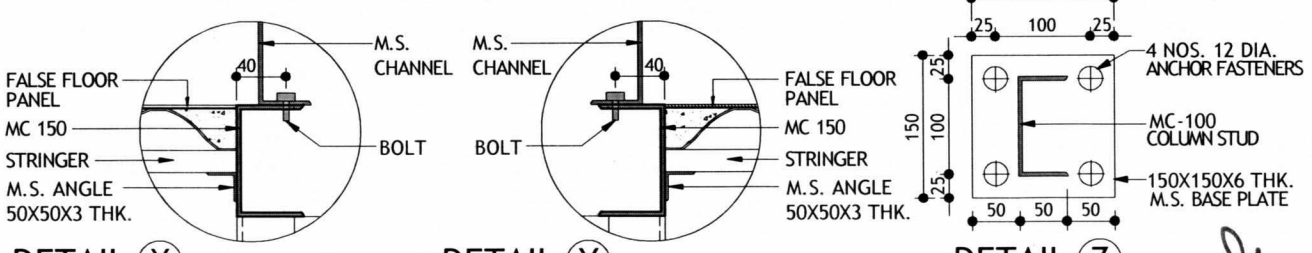
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SECTION B-B — AS/ SIZE OF CONSOLE/ RACK



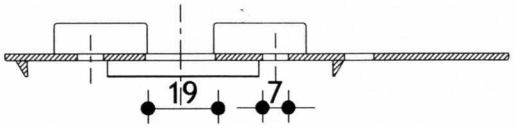
PART PLAN OF FALSE FLOORING



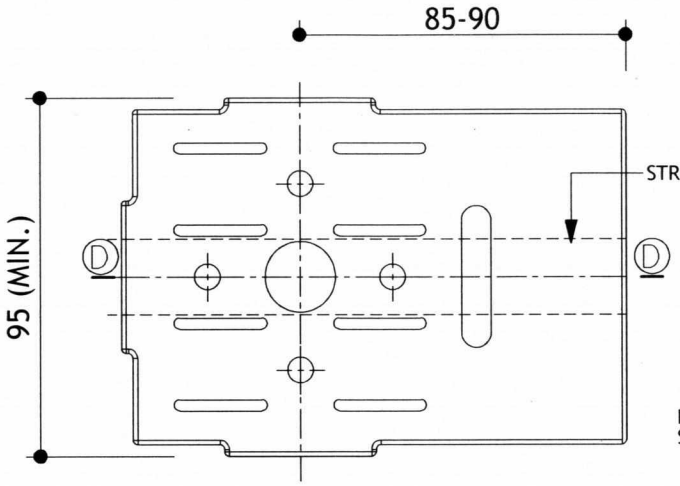
DETAIL (X) DETAIL (Y) DETAIL (Z)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
3	22.09.22	REVISED & ISSUED AS STANDARD	BABITA SHARMA	ATUL GUPTA	SAMIR DAS	SANJAY MAZUMDAR
2	11.02.22	REAFFIRMED & ISSUED AS STANDARD	BABITA SHARMA	ATUL GUPTA	SAMIR DAS	SANJAY MAZUMDAR

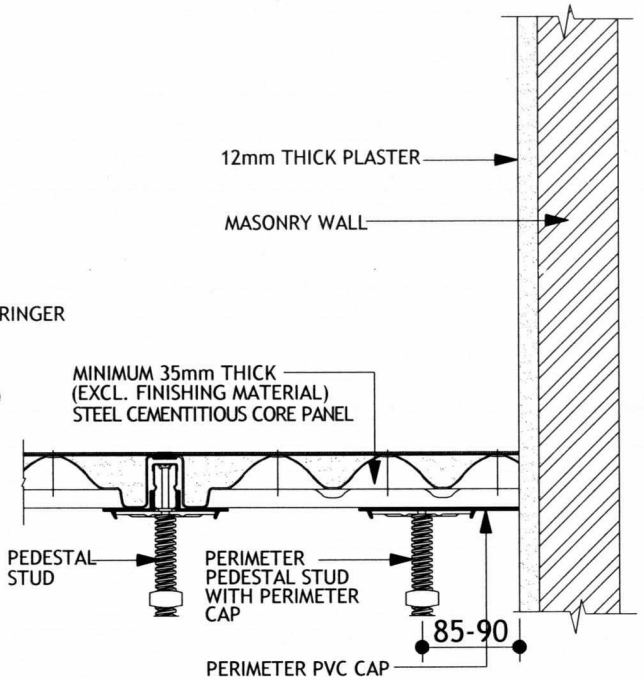
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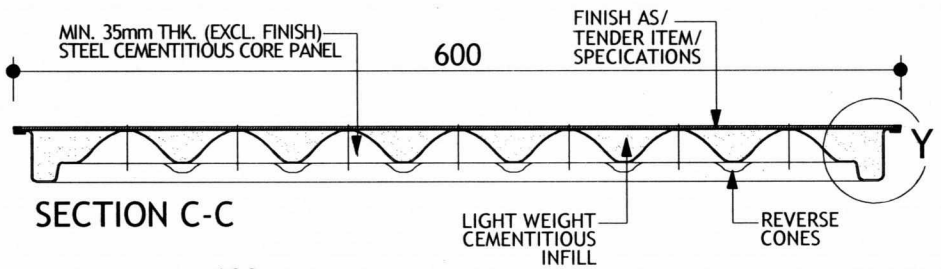
SECTION D-D



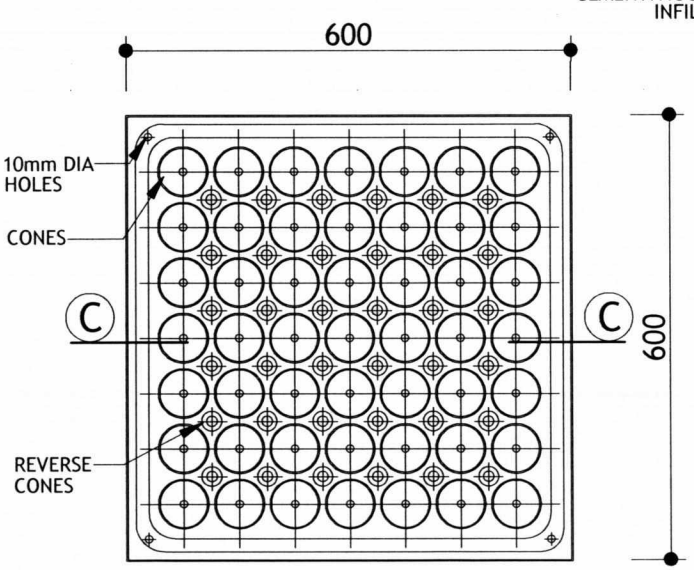
TOP VIEW OF PERIMETER PVC CAP



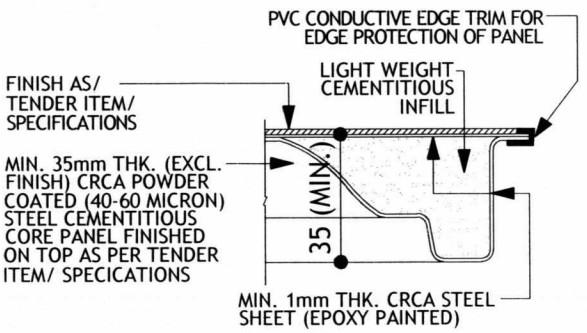
DETAIL OF JUNCTION WITH WALL



SECTION C-C



PLAN OF FALSE FLOOR PANEL
(UPSIDE DOWN)

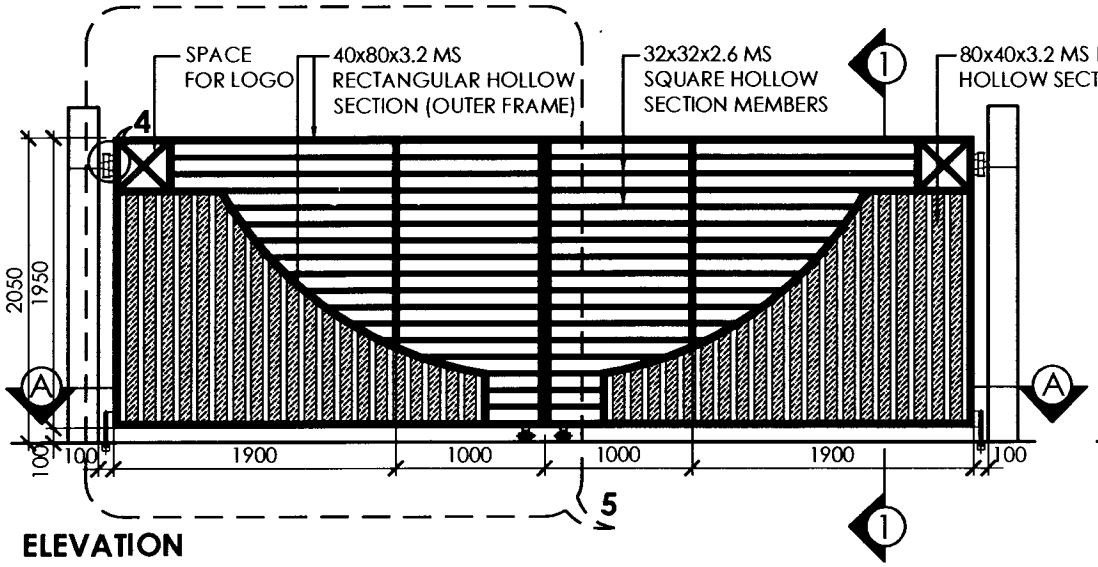


DETAIL (Y)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
3	22.09.22	REVISED & ISSUED AS STANDARD	BABITA SHARMA	ATUL GUPTA	SAMIR DAS	SANJAY MAZUMDAR
2	11.02.22	REAFFIRMED & ISSUED AS STANDARD	ATUL GUPTA	SAMIR DAS	ANURAG SINHA	SANJAY MAZUMDAR

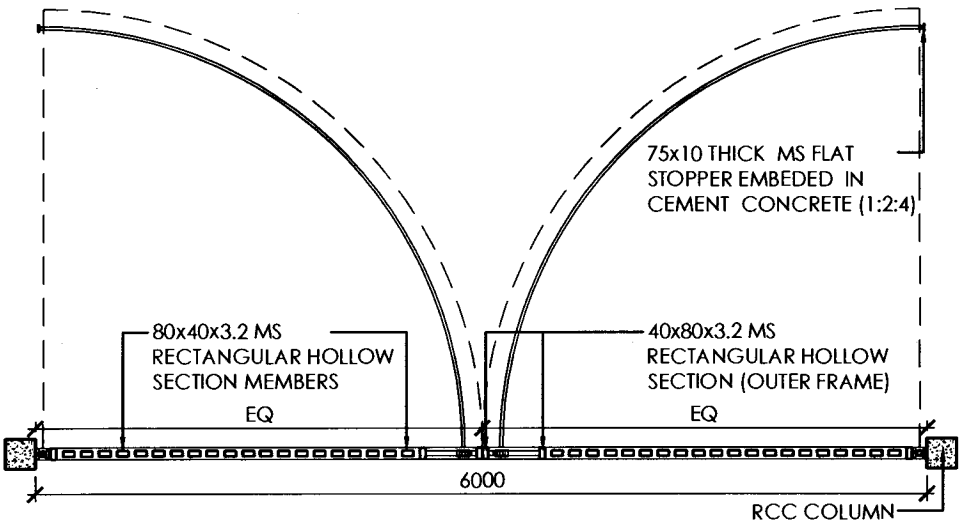
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STEEL GATE
(FOR ENTRANCES UPTO 6.0M WIDTH)

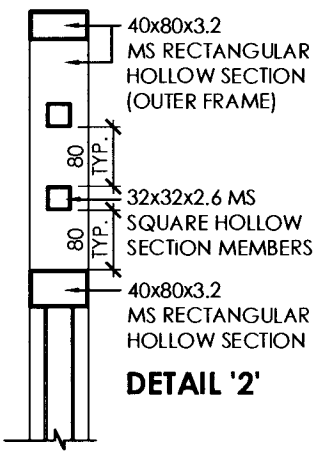


ELEVATION

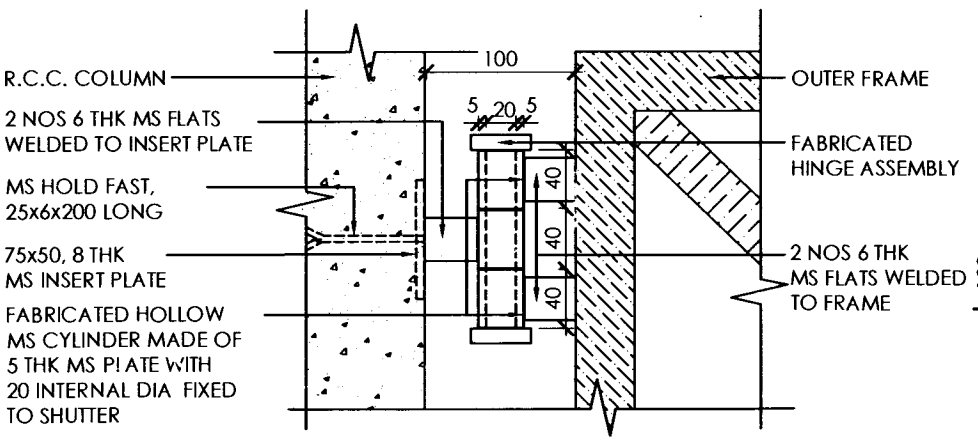
SECTION '1-1'



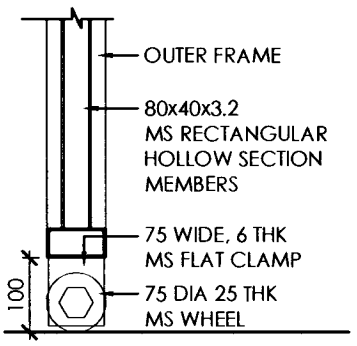
PLAN AT 'A'



DETAIL '2'



DETAIL AT '4'



DETAIL '3'

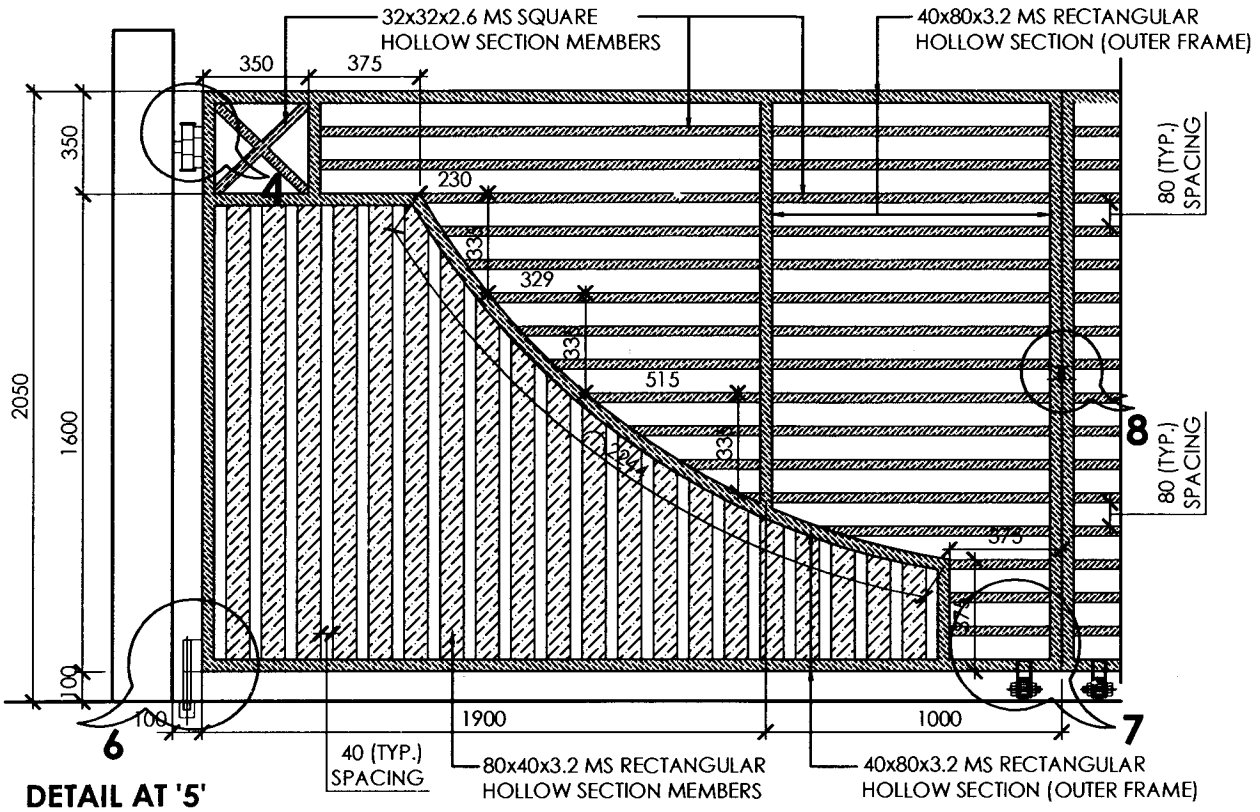
NOTE:
1. ALL DIMENSIONS ARE IN MM.
2. ALL STEEL MEMBERS SHALL CONFORM TO RELEVANT B.I.S. CODES AS APPLICABLE.

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

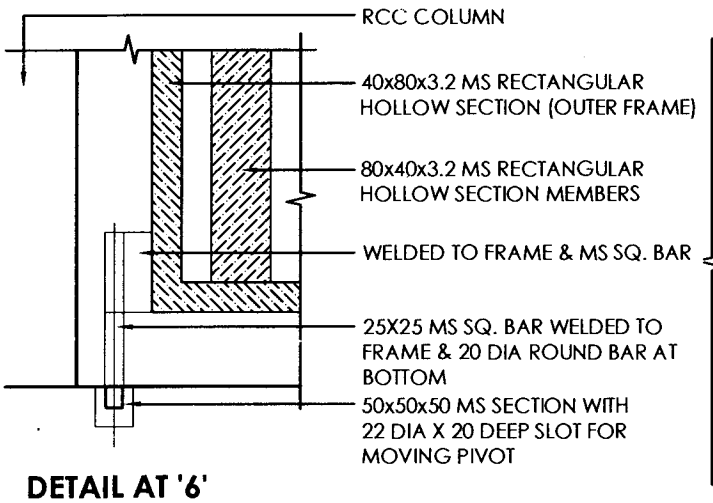
Approved by

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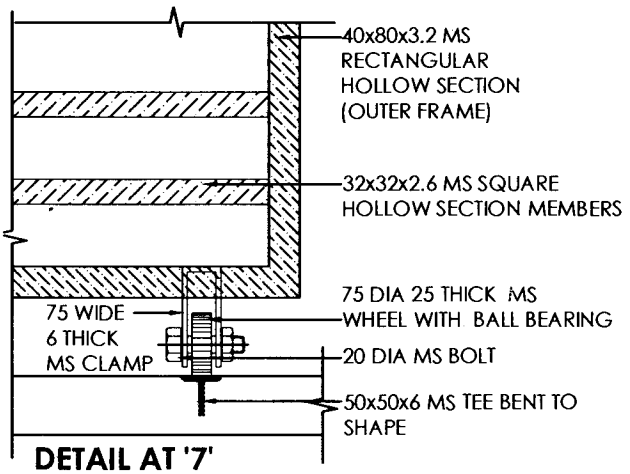
STEEL GATE
(FOR ENTRANCES UPTO 6.0M WIDTH)



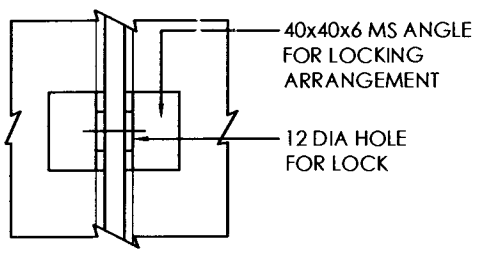
DETAIL AT '5'



DETAIL AT '6'



DETAIL AT '7'



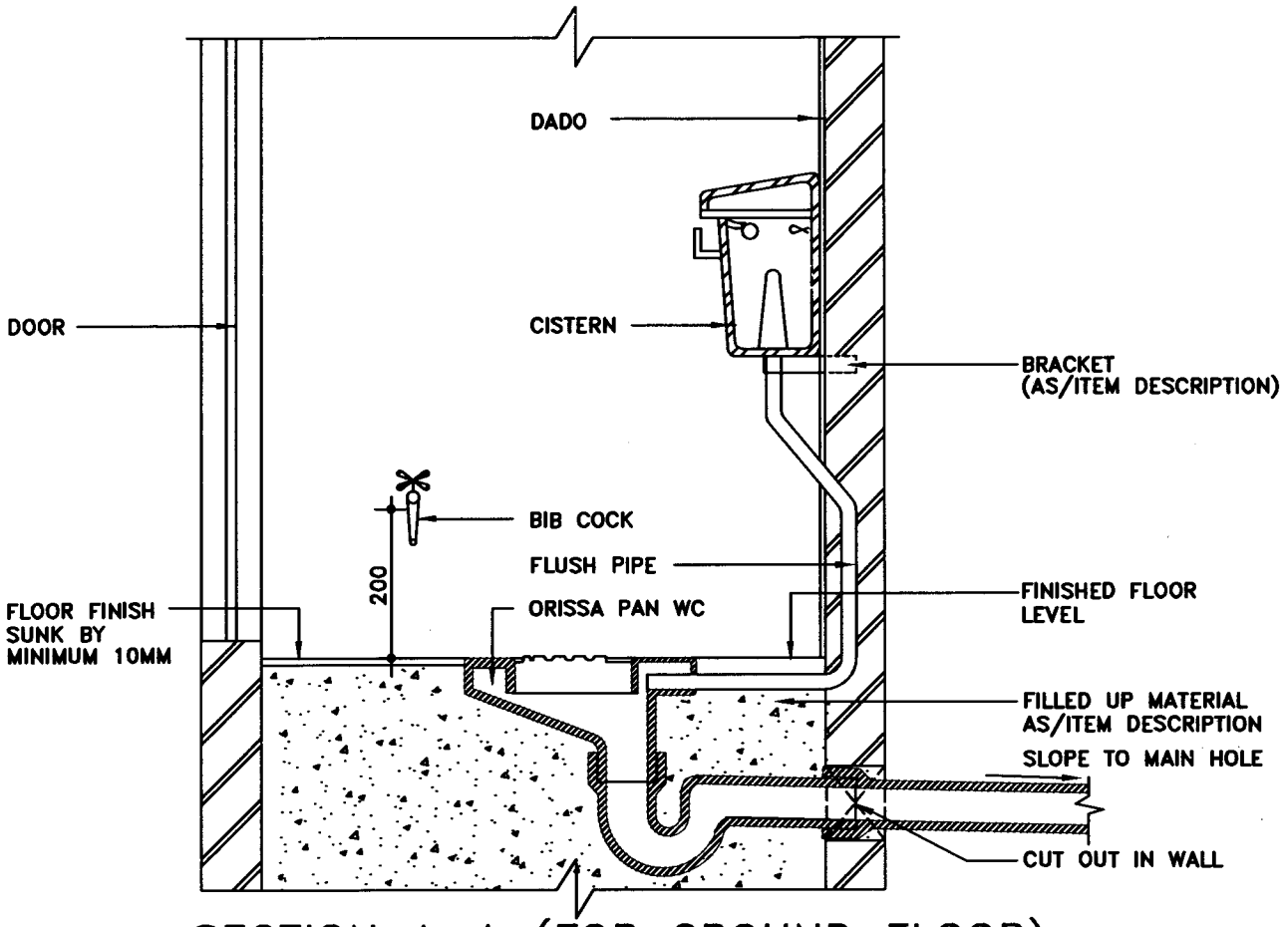
DETAIL AT '8'

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

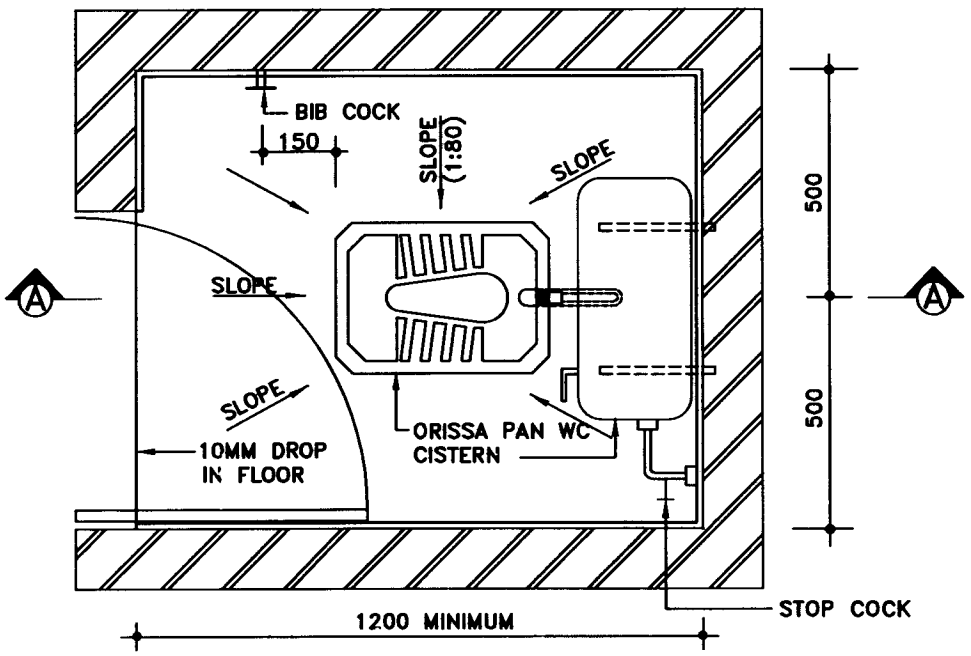
Approved by

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SECTION A–A (FOR GROUND FLOOR)

(REFER SHEET 2 OF 2 FOR SECTION A–A APPLICABLE TO UPPER FLOORS WITH SUNK SLAB)



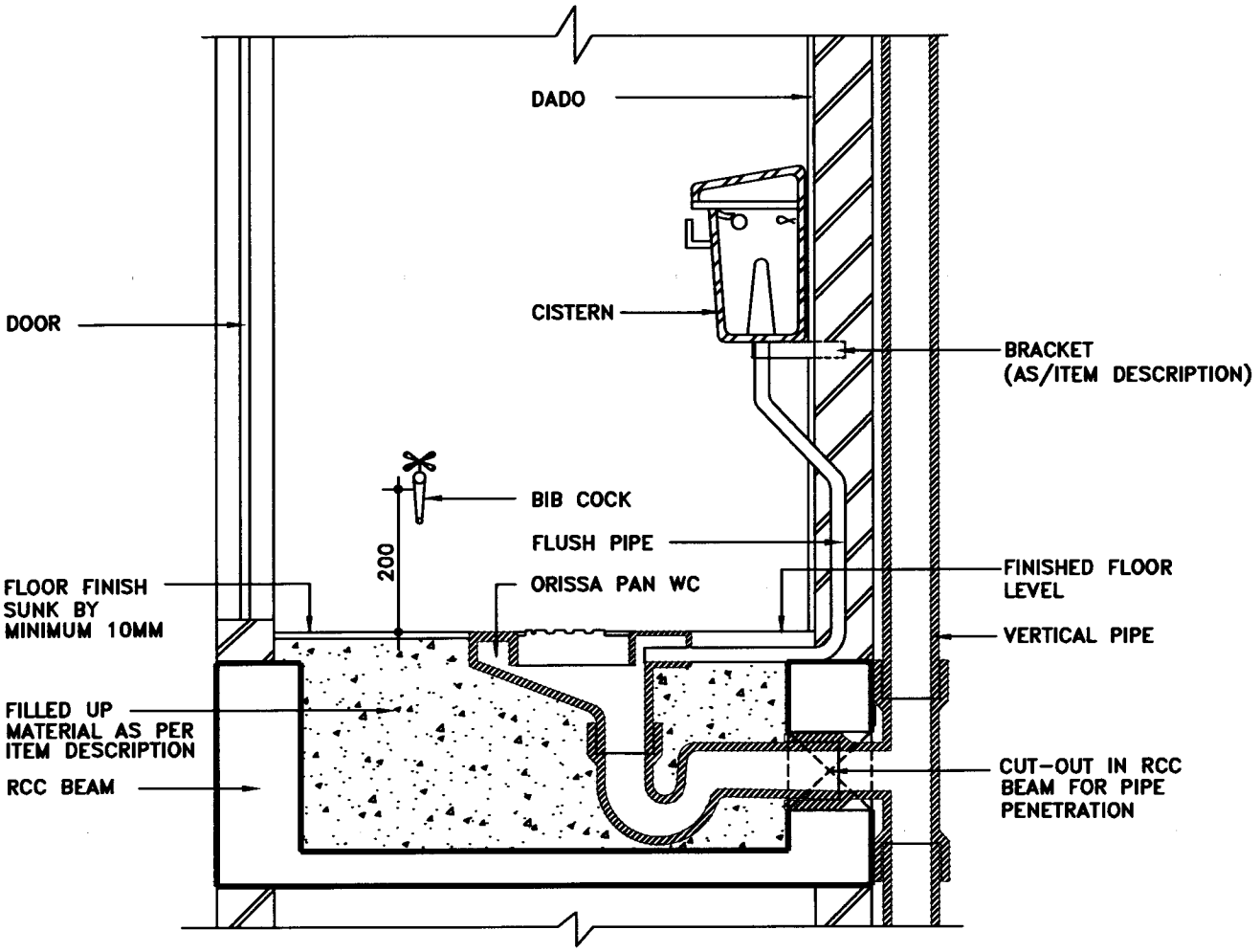
PLAN

NOTE: REFER SHEET 2 OF 2.

Rev. No.	Date	Description	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & REISSUED AS STANDARD	NAVEEN	AKHILESH	SAMIR DAS	SANJAY MAZUMDAR
5	07.11.16	REVISED & REISSUED AS STANDARD	DK	SD/JKB	RAJANJI SRIVASTAVA	R. NANDA
4	09.11.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

Approved by

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SECTION A-A
(FOR UPPER FLOOR WITH SUNK SLAB)

(REFER SHEET 1 OF 2 FOR SECTION A-A APPLICABLE TO GROUND FLOOR)

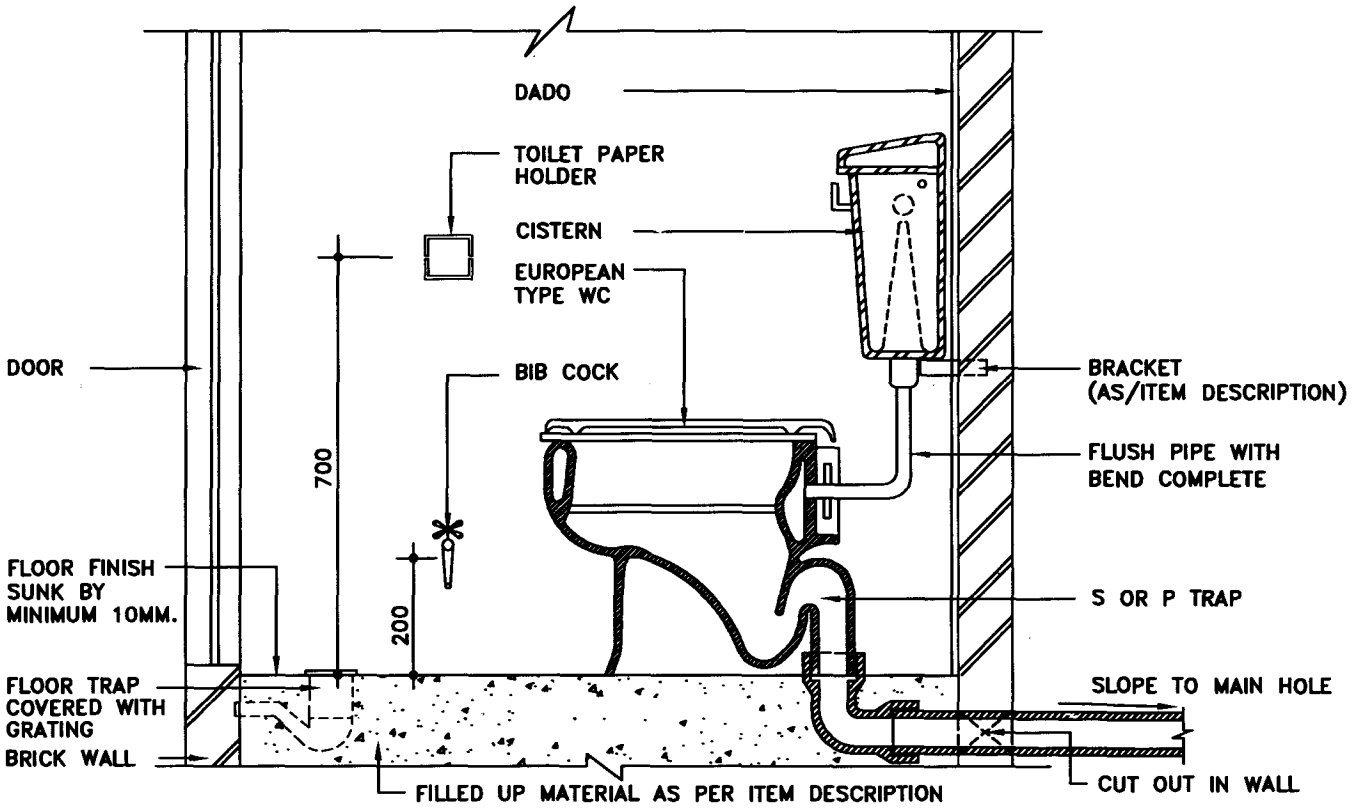
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL FLOOR FINISH LEVEL INSIDE THE W.C. CUBICLE SHALL BE 10 TO 15MM LOWER THAN OUTSIDE.
3. PROVISION FOR NECCESSARY CUT-OUT IN THE R.C.C. STRUCTURAL BEAM SHALL BE KEPT (FOR DISPOSAL PIPE PENETRATION). THE LOCATION ANGLE, GRADIENT ETC. OF THE CUT-OUT SHALL BE AS PER SITE REQUIREMENTS.
4. REFER RELEVANT ARCHITECTURAL DRAWINGS FOR ACTUAL SIZE OF THE CUBICLE.

Rev. No.			Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	02.02.22	REAFFIRMED & REISSUED AS STANDARD	NAVEEN	AKHILESH	SAMIR DAS	SANJAY MAZUMDAR
5	07.11.16	REVISED & REISSUED AS STANDARD	DK	SD/JKB	RAJANJI SRIVASTAVA	R. NANDA
4	09.11.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

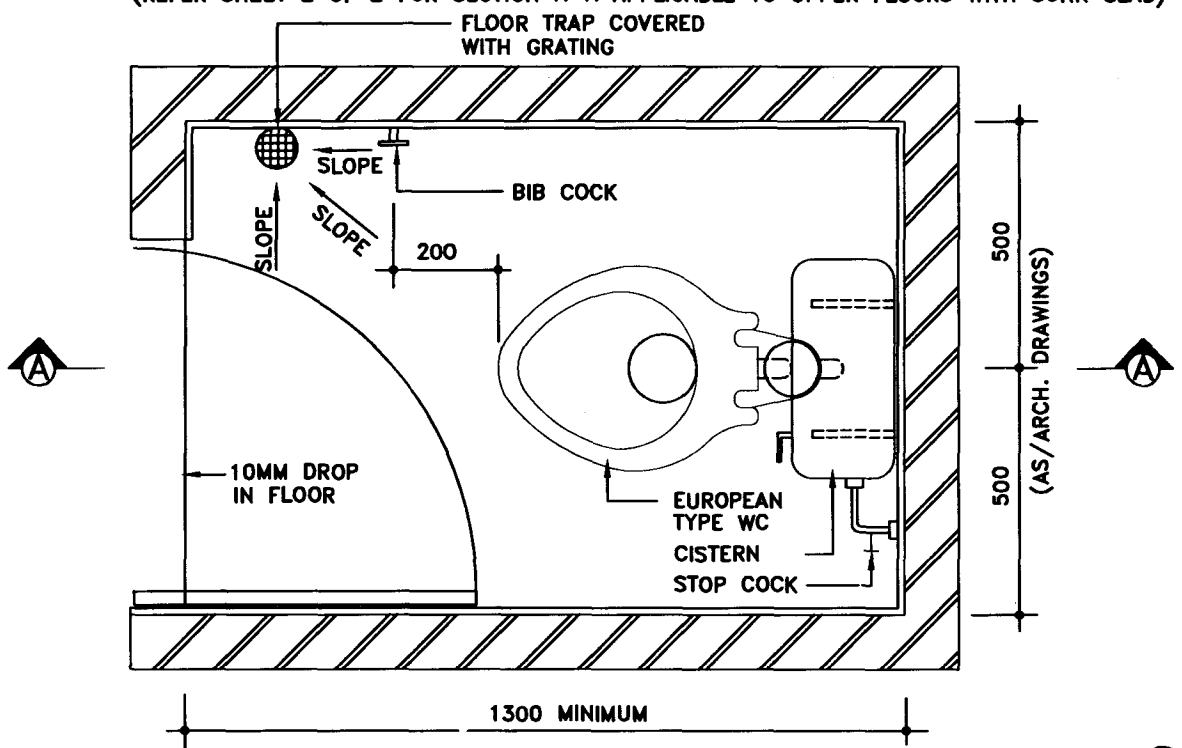
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EUROPEAN TYPE WC (FIXING DETAIL)



SECTION A–A (FOR GROUND FLOOR)

(REFER SHEET 2 OF 2 FOR SECTION A–A APPLICABLE TO UPPER FLOORS WITH SUNK SLAB)



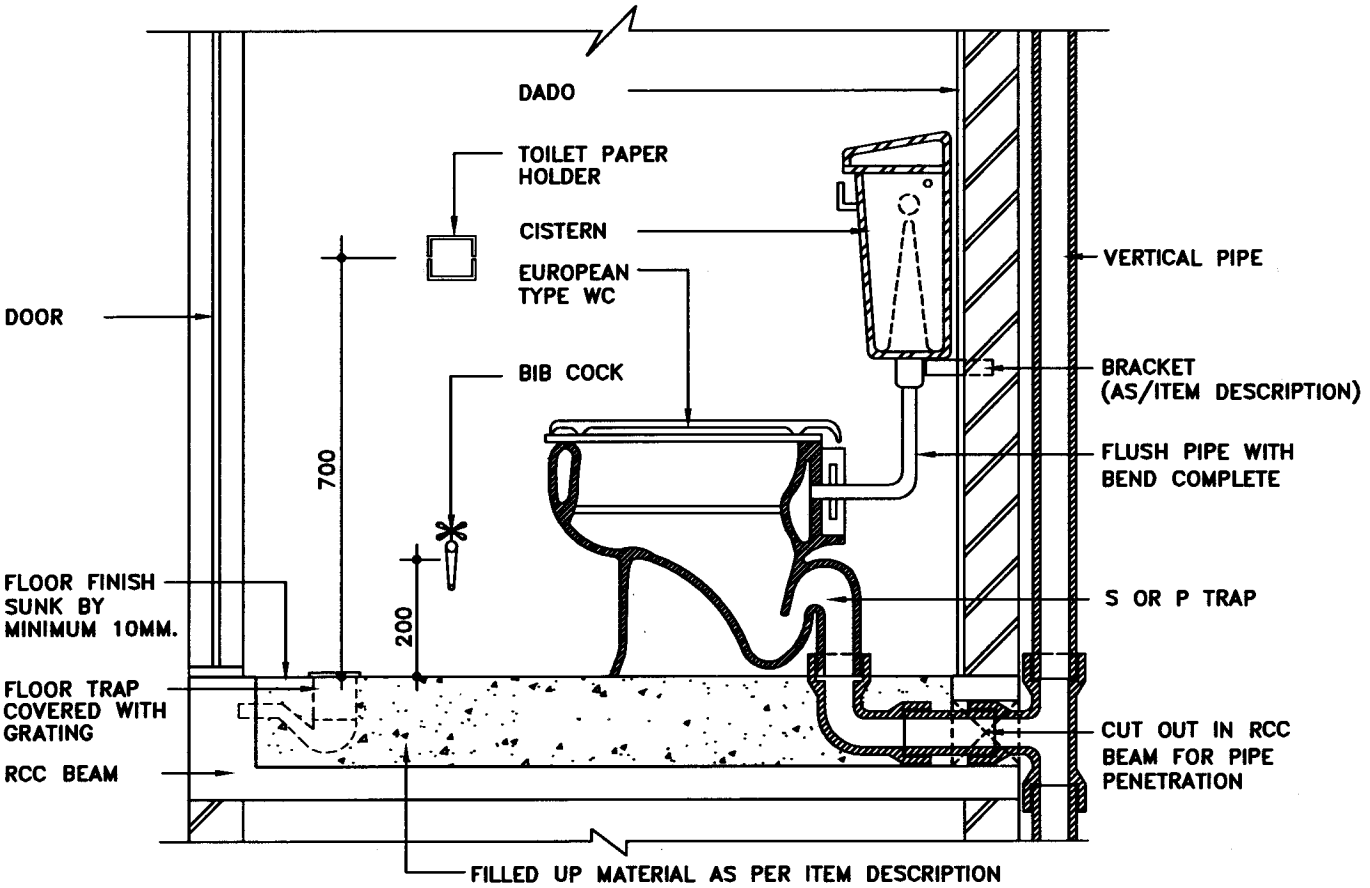
PLAN

NOTE: REFER SHEET 2 OF 2.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & REISSUED AS STANDARD	NAVEEN	AKHILESH	SAMIR DAS	SANJAY MAZUMDAR
5	07.11.16	REVISED & REISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA
4	09.11.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

Approved by

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SECTION A–A
(FOR UPPER FLOOR WITH SUNK SLAB)

(REFER SHEET 1 OF 2 FOR SECTION A–A APPLICABLE TO GROUND FLOOR)

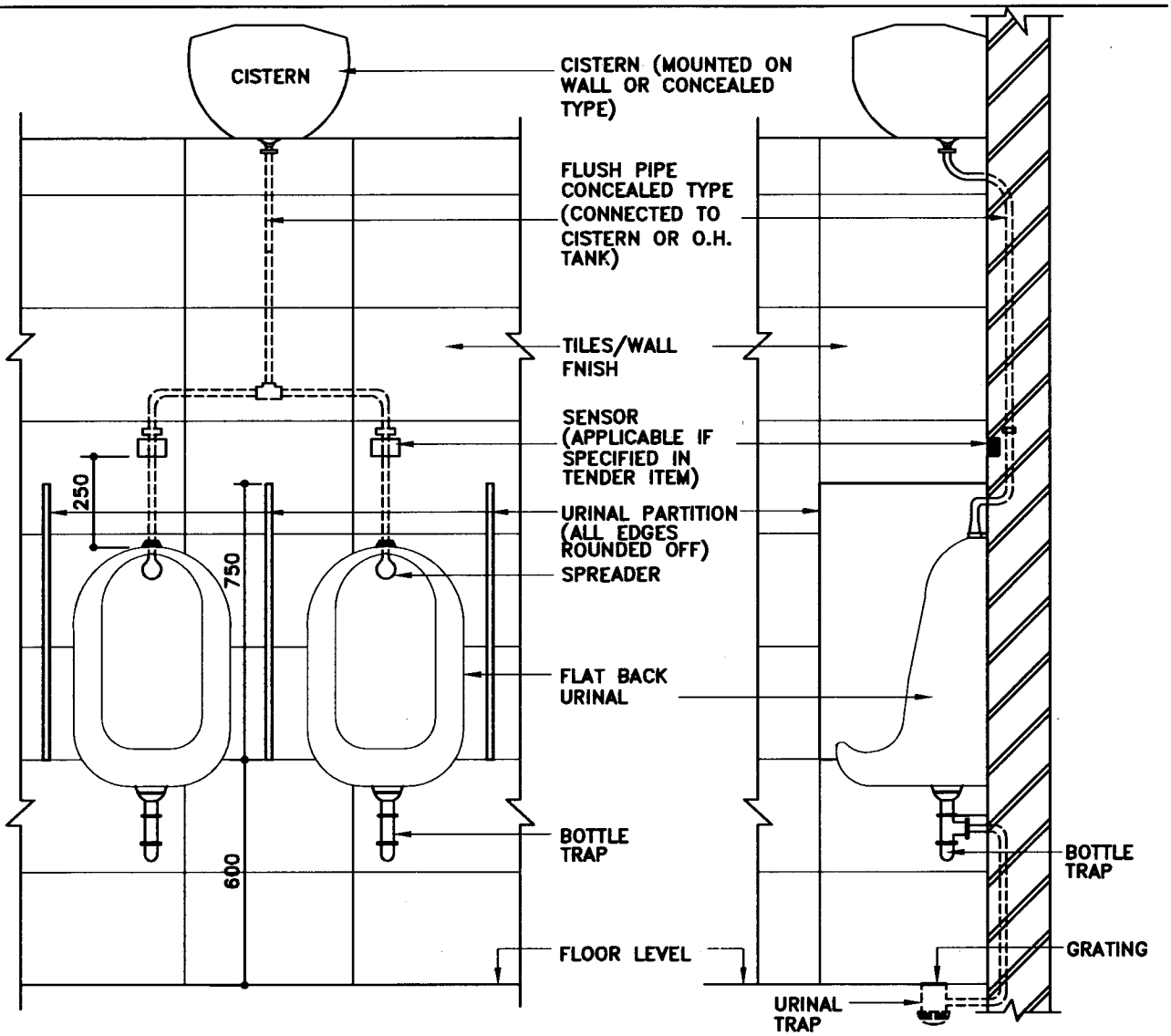
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. ALL FLOOR FINISH LEVEL INSIDE THE W.C. CUBICLE SHALL BE 10 TO 15MM LOWER THAN OUTSIDE.
3. PROVISION FOR NECCESSARY CUT–OUT IN THE R.C.C. STRUCTURAL BEAM SHALL BE KEPT (FOR DISPOSAL PIPE PENETRATION). THE LOCATION ANGLE, GRADIENT ETC. OF THE CUT–OUT SHALL BE AS PER SITE REQUIREMENTS.
4. REFER RELEVANT ARCHITECTURAL DRAWINGS FOR ACTUAL SIZE OF THE CUBICLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	18.01.22	REAFFIRMED & REISSUED AS STANDARD	NAVEEN	AKHILESH	SAMIR DAS	SANJAY MAZUMDAR
5	07.11.16	REVISED & REISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA
4	09.11.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

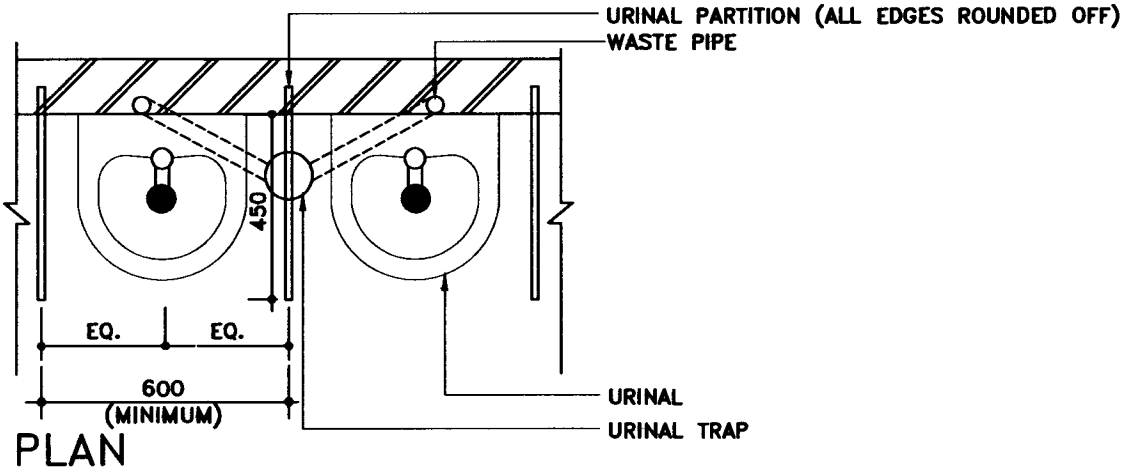
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URINALS FIXING DETAIL



ELEVATION

SIDE ELEVATION



PLAN

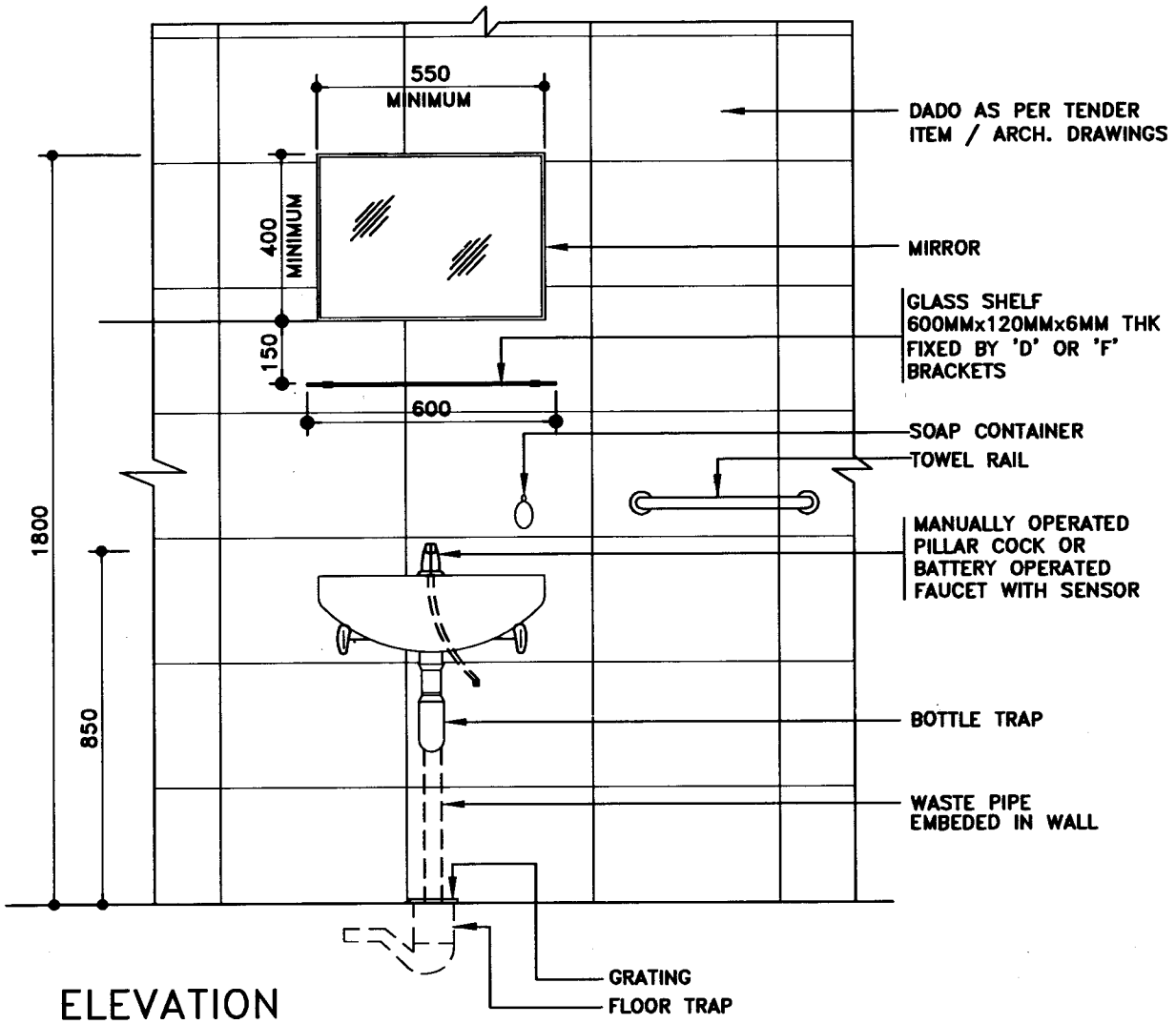
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. THIS STANDARD IS INDICATIVE. TYPE AND NO. OF URINAL FIXTURES, FLUSHING ARRANGENT ETC. SHALL BE AS PER ARCHITECTURAL DRAWINGS & TENDER ITEM.
3. SENSORS SHOWN SHALL BE PROVIDED ONLY IN CASE THE SAME ARE SPECIFIED IN TENDER ITEM.

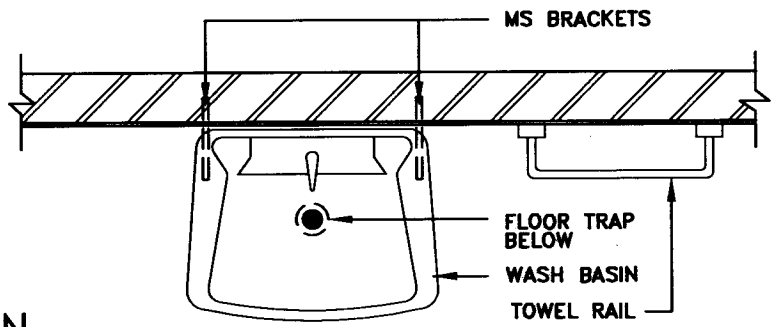
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	02.02.22	REVISED & REISSUED AS STANDARD	NAVEEN	AKHILESH	SAMIR DAS	SANJAY MAZUMDAR
5	01.12.16	REVISED & REISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA
4	09.11.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

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WASH BASIN FIXING DETAIL



ELEVATION



PLAN
(FOR WALL HUNG TYPE WASH BASIN)

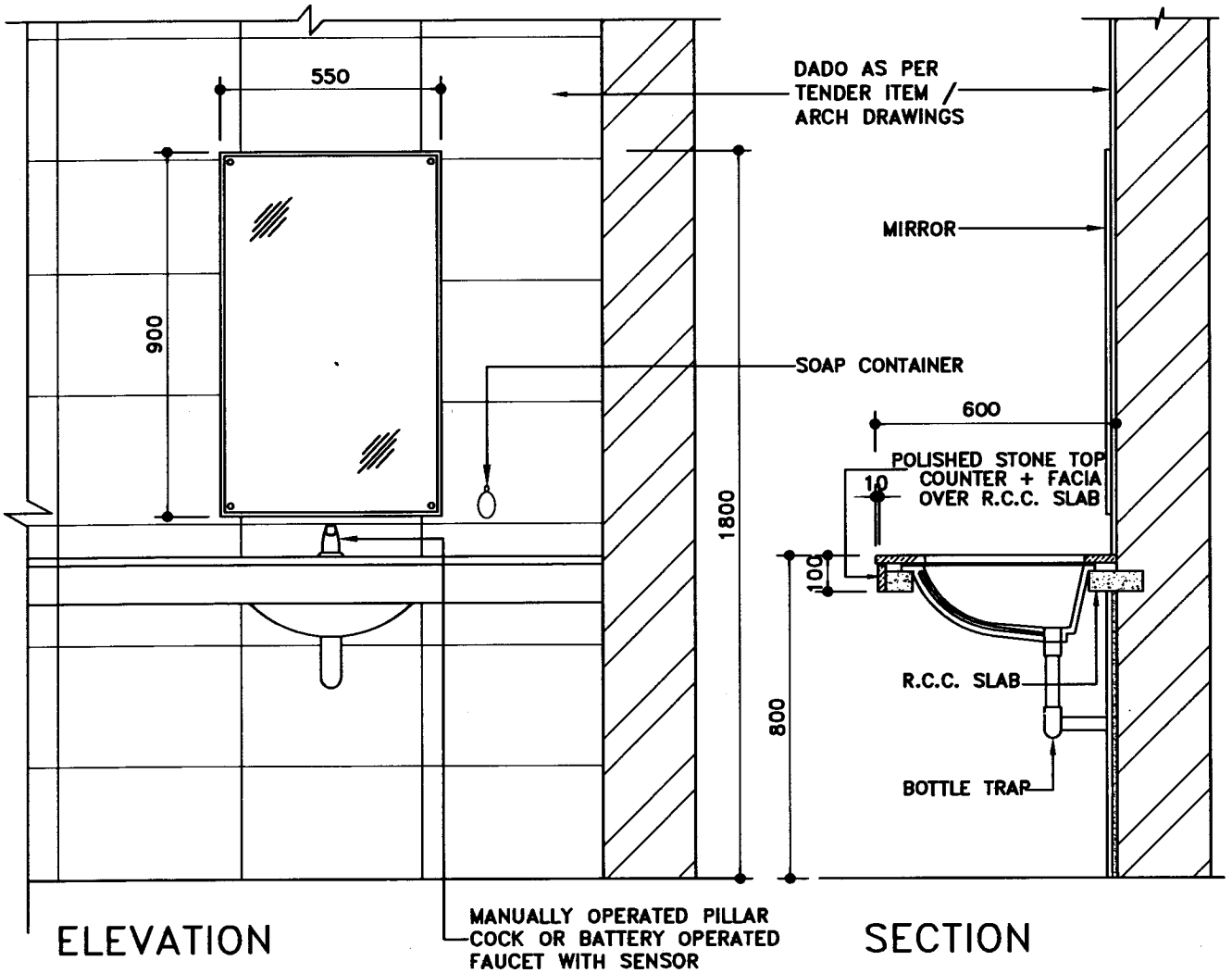
NOTES:–

1. ALL DIMENSIONS IN MILLIMETRES.
2. THE SIZE OF MIRROR SHOWN IS INDICATIVE. ACTUAL SIZE SHALL BE AS PER ARCHITECTURAL DRAWINGS/ ITEMS DESCRIPTION.
3. THE ARRANGEMENT AND DETAIL OF WASH BASIN SHOWN (HERE AND IN SHEET–2) IS TYPICAL. FOR 2 OR MORE WASH BASIN, REFER RELEVANT ARCHITECTURAL DRAWING (FOR LOCATION & CONFIGURATION) WHICH SHALL BE READ IN CONJUNCTION WITH THIS STANDARD.
4. LOCATION & TOWEL RAIL IS INDICATIVE. REFER RELEVANT ARCHITECTURAL DRAWING FOR EXACT LOCATION.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & REISSUED AS STANDARD	NAVEEN	AKHILESH	SAMIR DAS	SANJAY MAZUMDAR
5	21.11.16	REVISED & REISSUED AS STANDARD	MLT	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA
4	09.11.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

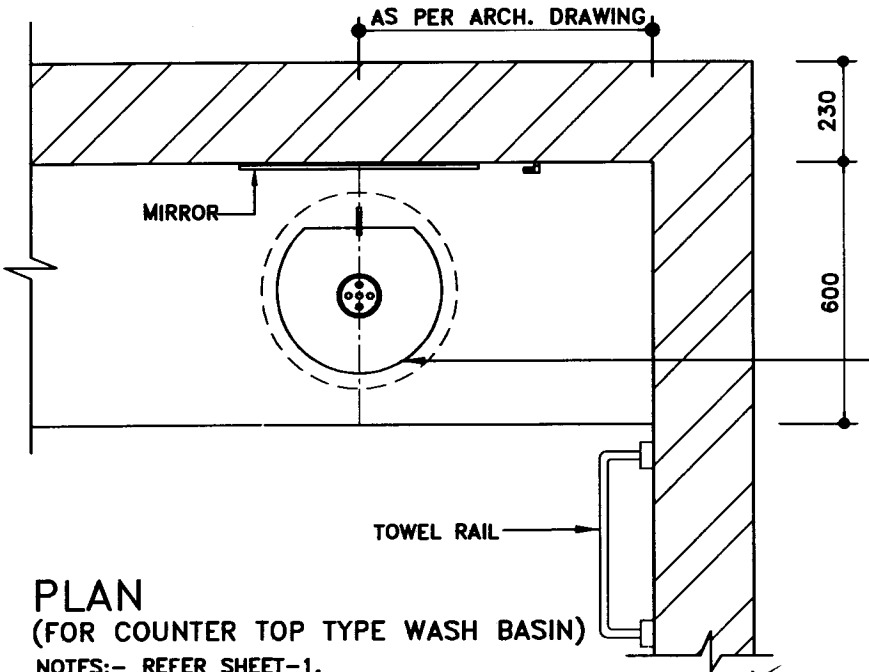
Approved by

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ELEVATION

SECTION



PLAN
(FOR COUNTER TOP TYPE WASH BASIN)

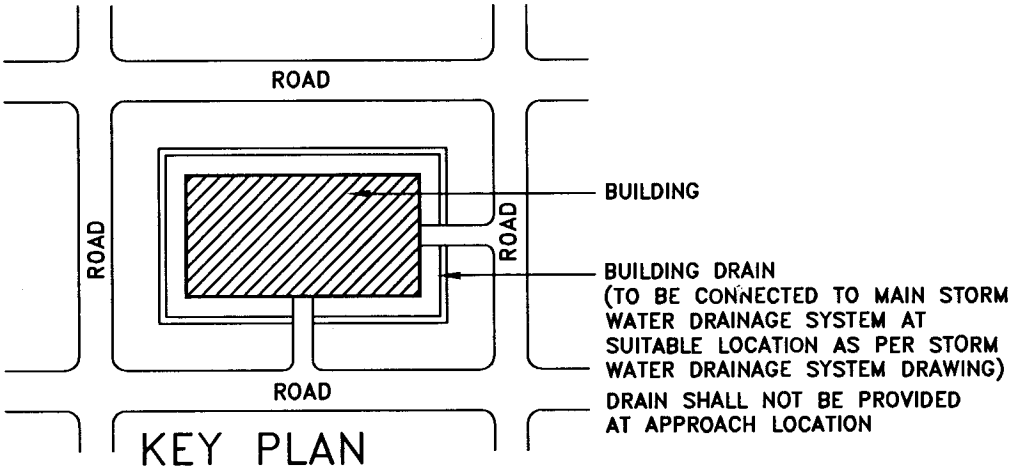
NOTES:- REFER SHEET-1.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	02.02.22	REAFFIRMED & REISSUED AS STANDARD	NAVEEN	AKHILESH	SAMIR DAS	SANJAY MAZUMDAR
5	21.11.16	REVISED & REISSUED AS STANDARD	MLT	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA
4	09.11.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

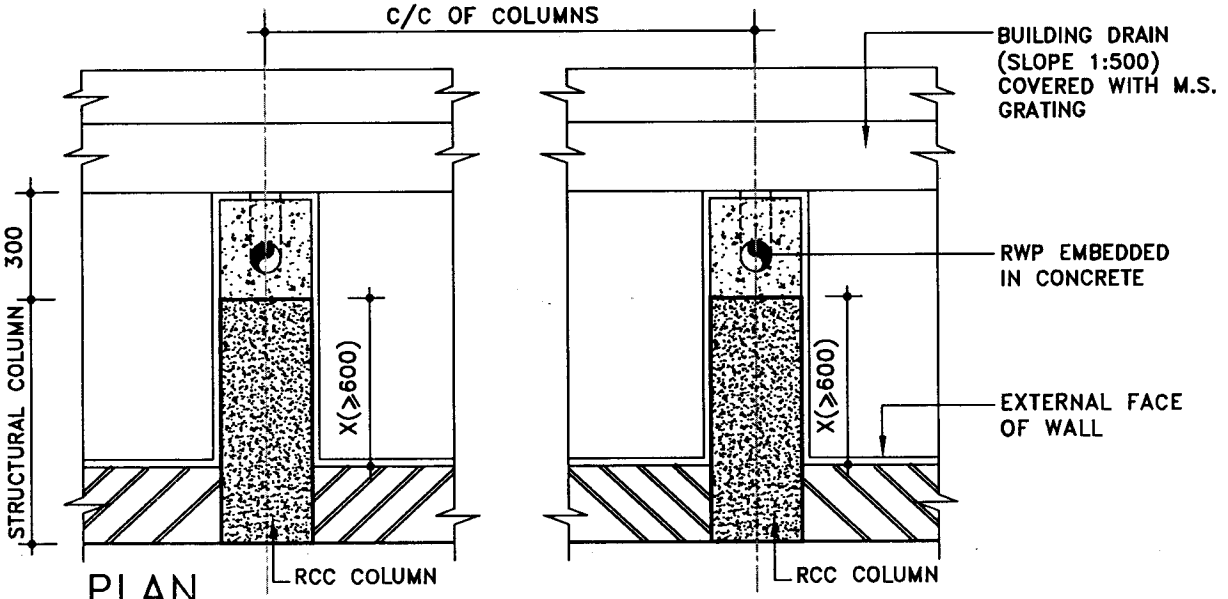
Approved by

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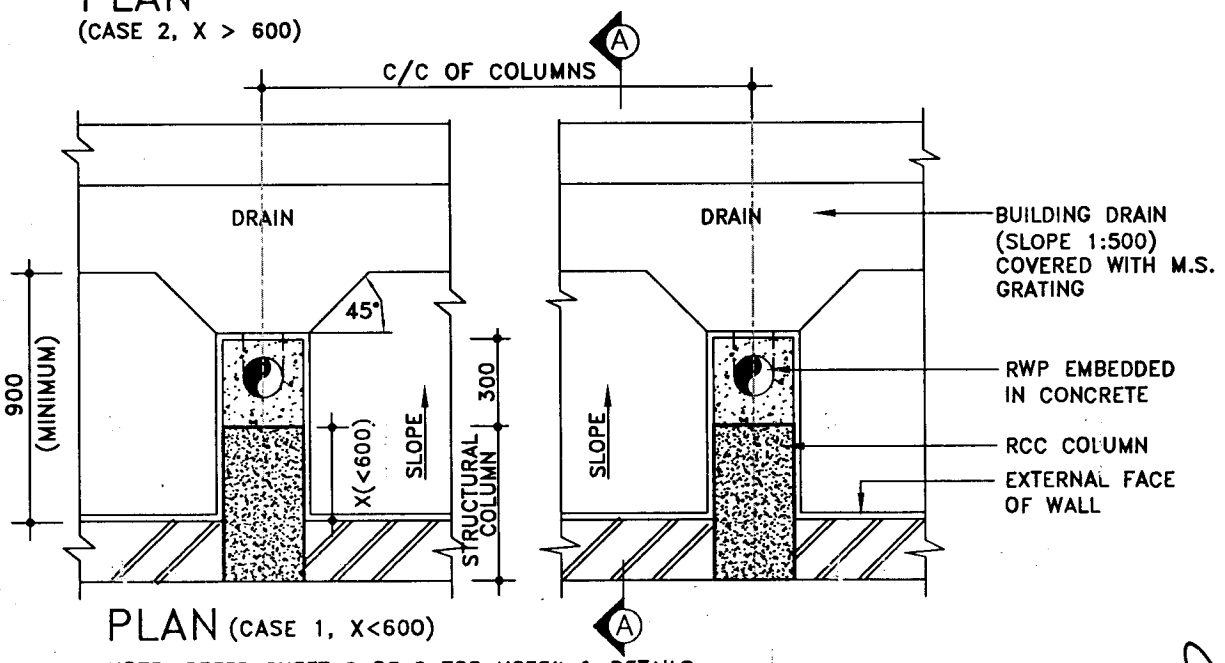
PLINTH PROTECTION
(WITH BUILDING DRAIN)



KEY PLAN



PLAN
(CASE 2, X > 600)



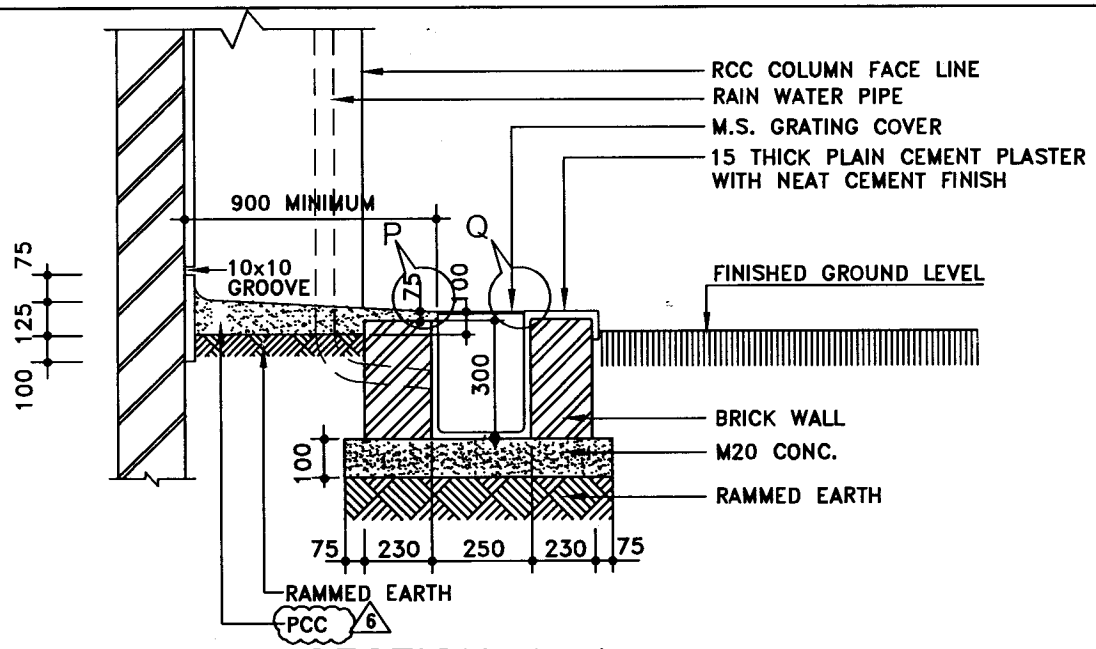
PLAN (CASE 1, X<600)

NOTE: REFER SHEET 2 OF 2 FOR NOTES & DETAILS

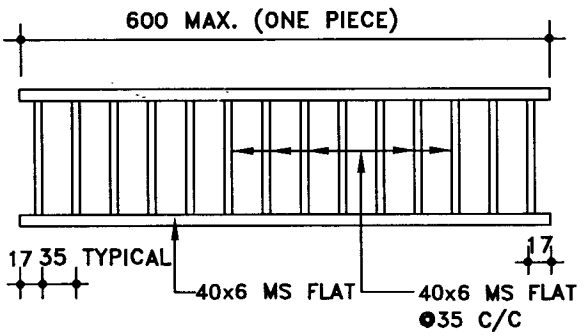
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	11.02.22	REVISED AND REISSUED AS STANDARD	NG	JS	SAMIR DAS	SANJAY MAZUMDAR
5	09.11.16	REVISED AND REISSUED AS STANDARD	BR	JS/JKB	RAJANJI SRIVASTAVA	R.NANDA
4	25.10.11	REVISED & REISSUED	DK	SD	JKB	D.MALHOTRA

Approved by

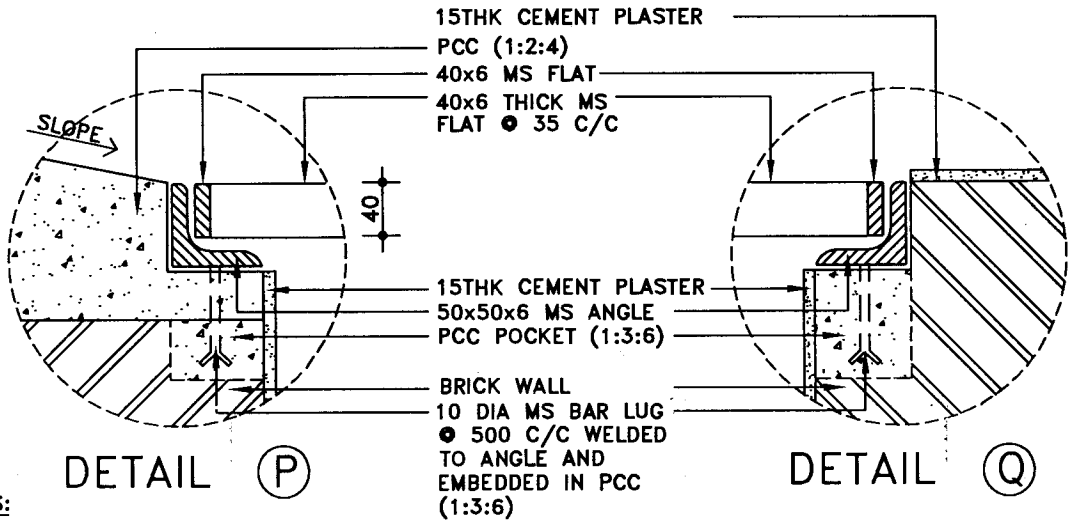
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SECTION A–A



M.S. GRATING DETAIL



DETAIL (P) DETAIL (Q)

NOTES:

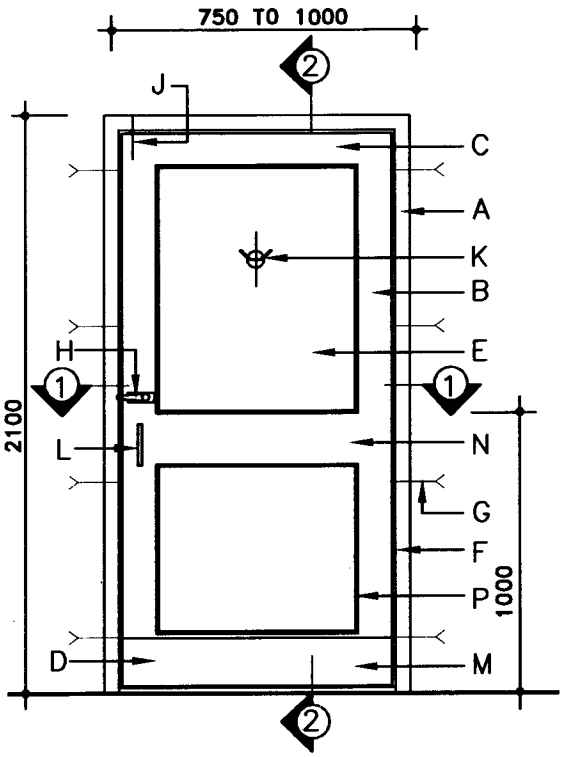
1. ALL DIMENSIONS ARE IN MM.
2. WIDTH OF THE PLINTH PROTECTION SHALL BE MINIMUM 900mm AND X+300 MAXIMUM UNLESS OTHERWISE MENTIONED IN BUILDING DRAWING.
3. PLINTH PROTECTION ALONG ANY PARTICULAR SIDE OF THE BUILDING SHALL BE OF CONSTANT WIDTH FOLLOWING THE EXTERNAL WALL ALIGNEMENT IF NOT SPECIFICALLY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

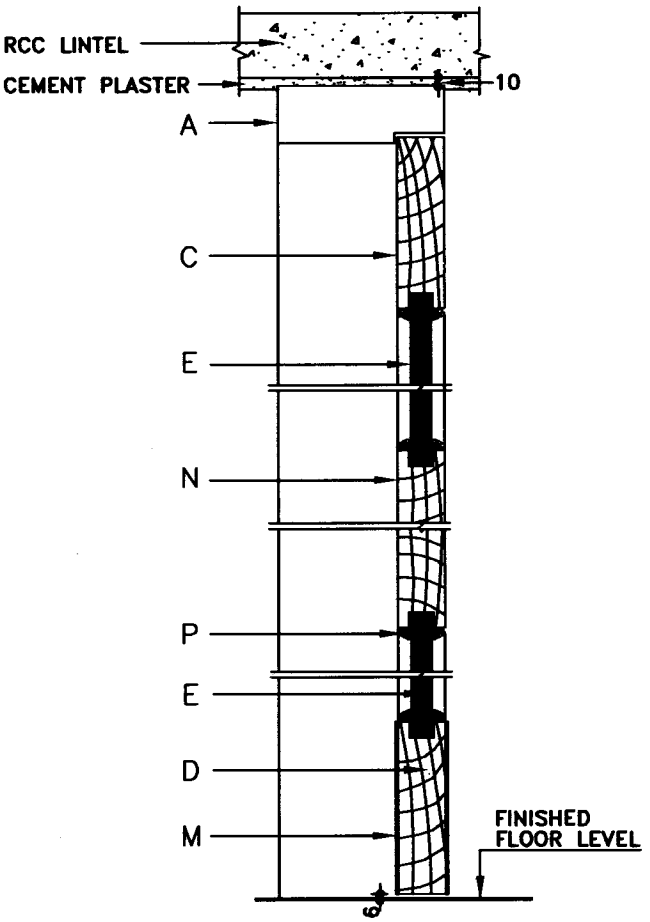
Approved by

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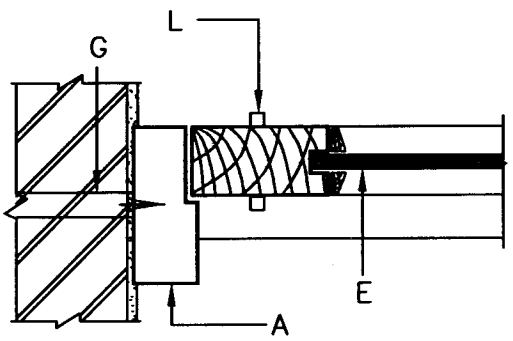
WOODEN PANEL DOOR (TOILET DOOR)



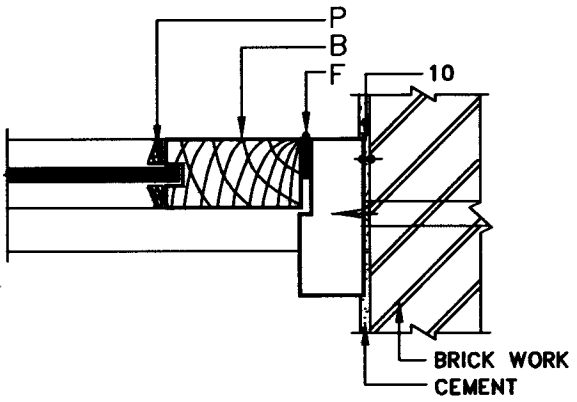
ELEVATION



SECTION 2–2



SECTIONAL PLAN 1–1



LEGEND:

- A: DOOR FRAME AS SPECIFIED
- B: TEAK WOOD STYLE 100x35
- C: TEAK WOOD TOP RAIL 100x35
- D: TEAK WOOD BOTTOM RAIL 200x35
- E: 12 THK. PARTICLE BOARD/MARINE PLY INFILL PANEL WITH SPECIFIED FACING.
- F: 150 LONG BUTT HINGES @ MAX. 600 C/C.
- G: MS HOLD FAST EMBEDDED IN CONCRETE/FASTENER
- H: TOILET DOOR LATCH
- J: TOWER BOLT
- K: COAT AND HAT HOOK

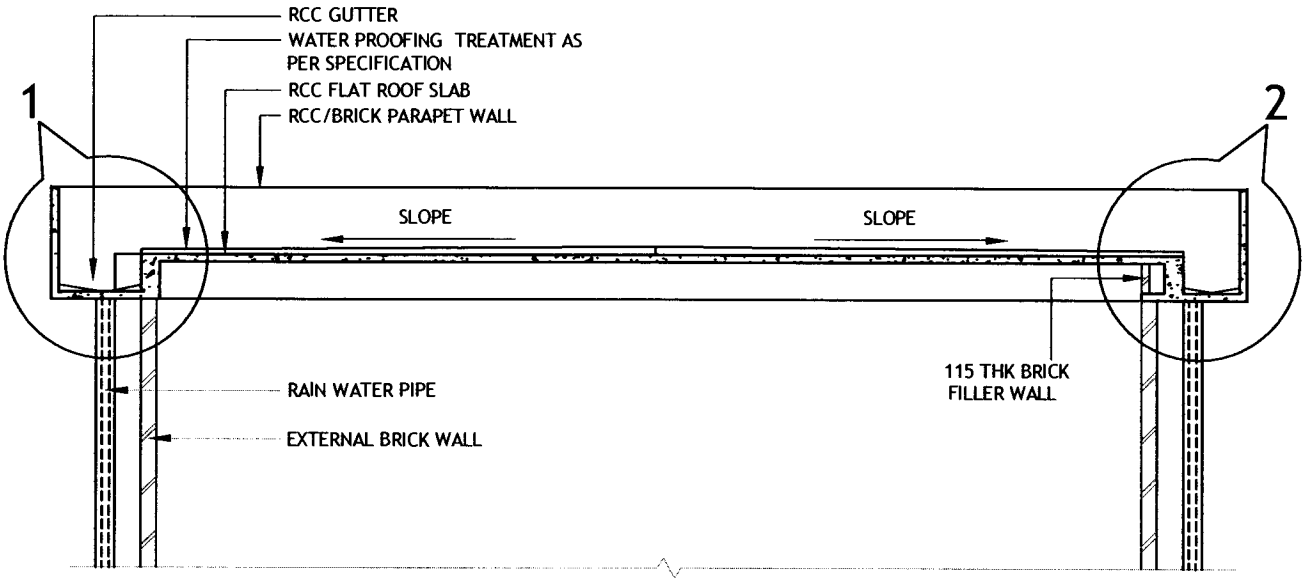
(INTERNAL SIDE OF THE DOOR)

- L: DOOR HANDLE (BOTH SIDE OF THE DOOR)
- M: ACRYLIC KICK PLATE 200X3 THICK.
- N: TEAK WOOD LOCK RAIL 150x35
- P: TEAK WOOD BEADING

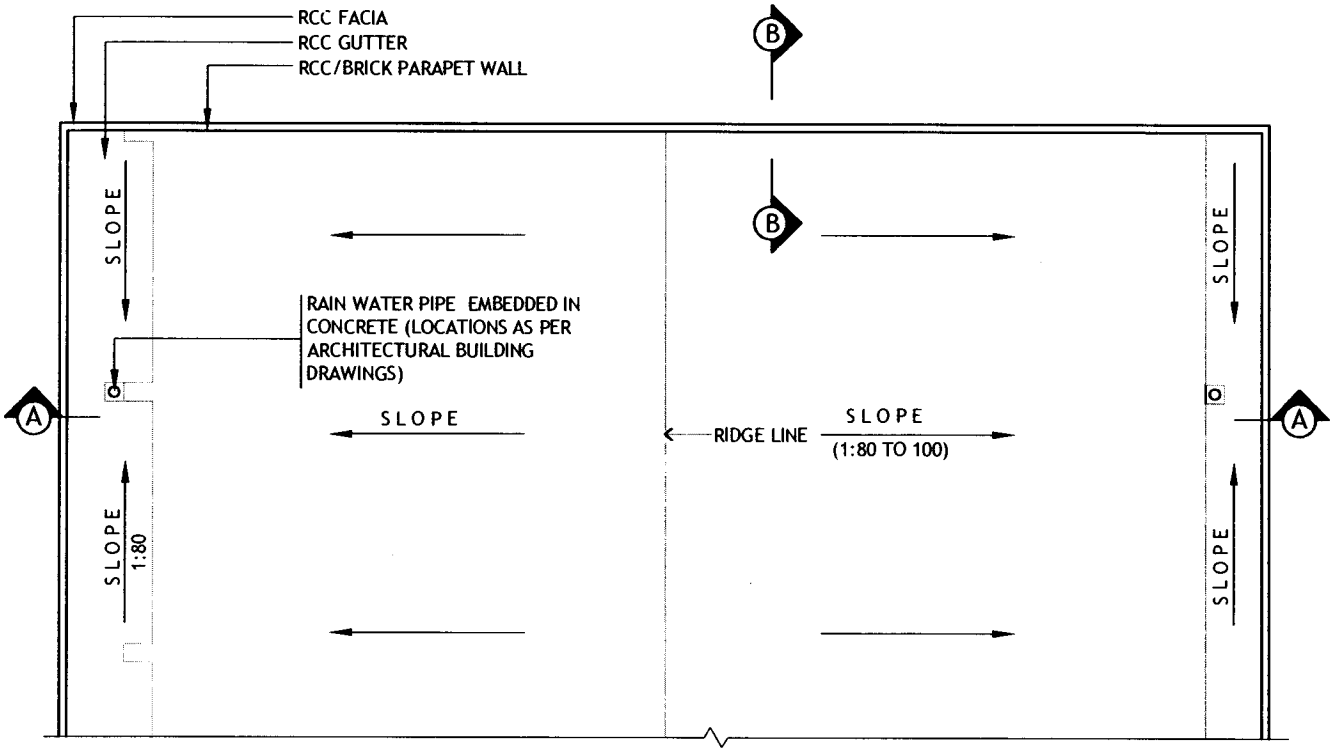
NOTE: ALL DIMENSIONS ARE IN MM

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	02.02.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	ANISH MAHALA	SAMIR DAS	SANJAY MAZUMDAR
5	21.11.16	REAFFIRMED & ISSUED AS STANDARD	DK	JS/JKB	RAJANJI SRIVASTAVA	R. NANDA

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SECTION A-A



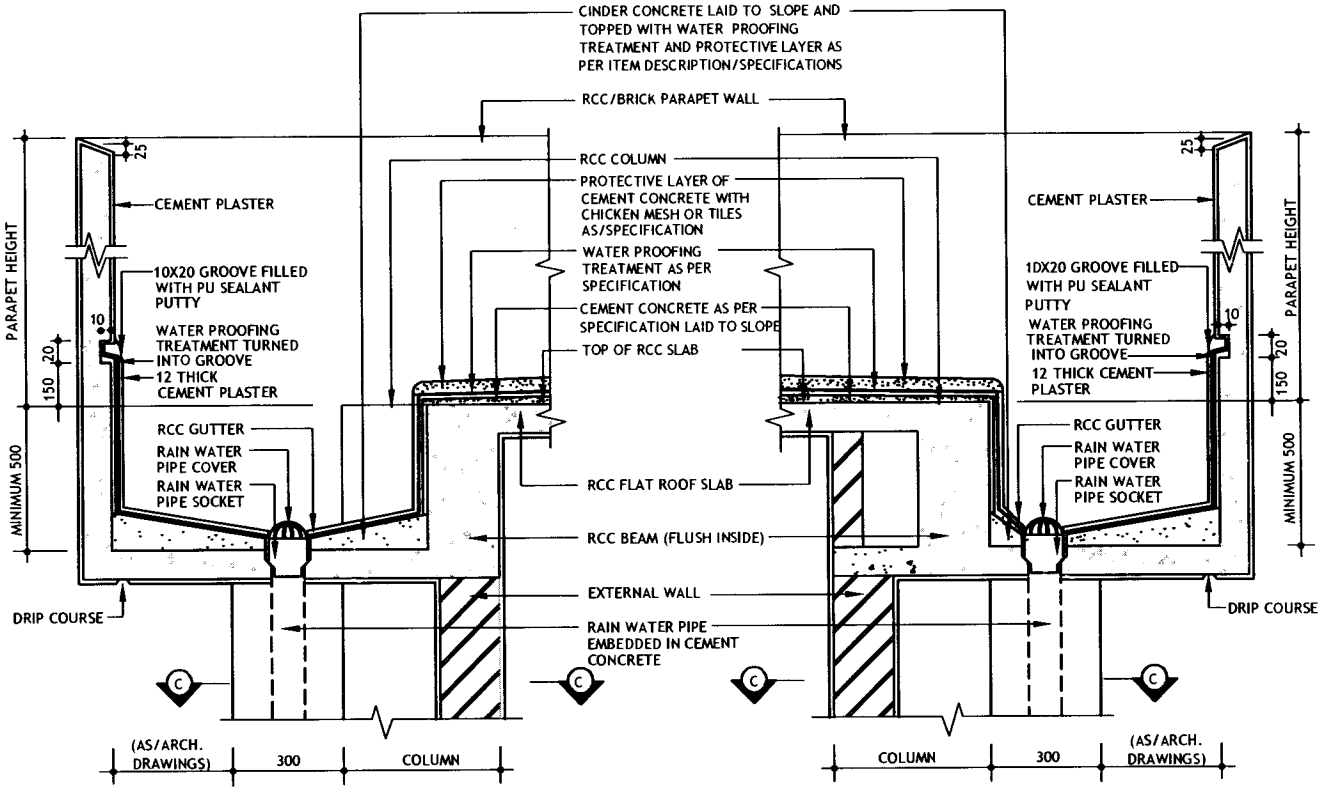
PART TERRACE PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MM
2. SECTION A-A INDICATES RCC BEAM INSIDE ON ONE SIDE AND FLUSH OUTSIDE ON OTHER SIDE. THE LOCATION OF BEAM SHALL BE AS PER ARCHITECTURAL AND STRUCTURAL DRAWINGS.

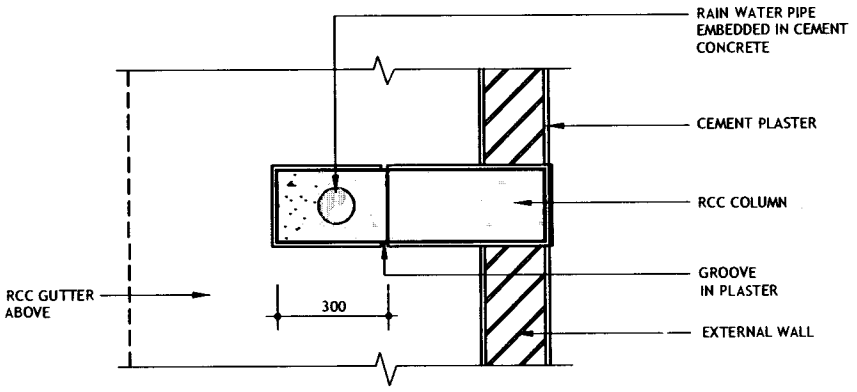
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	07.03.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	PIYALEE DAS	SAMIR DAS	SANJAY MAZUMDAR
5	07.03.17	REAFFIRMED & ISSUED AS STANDARD	VK/DK	JKB	RAJANJI SRIVASTAVA	R. NANDA

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DETAIL - 1

DETAIL - 2

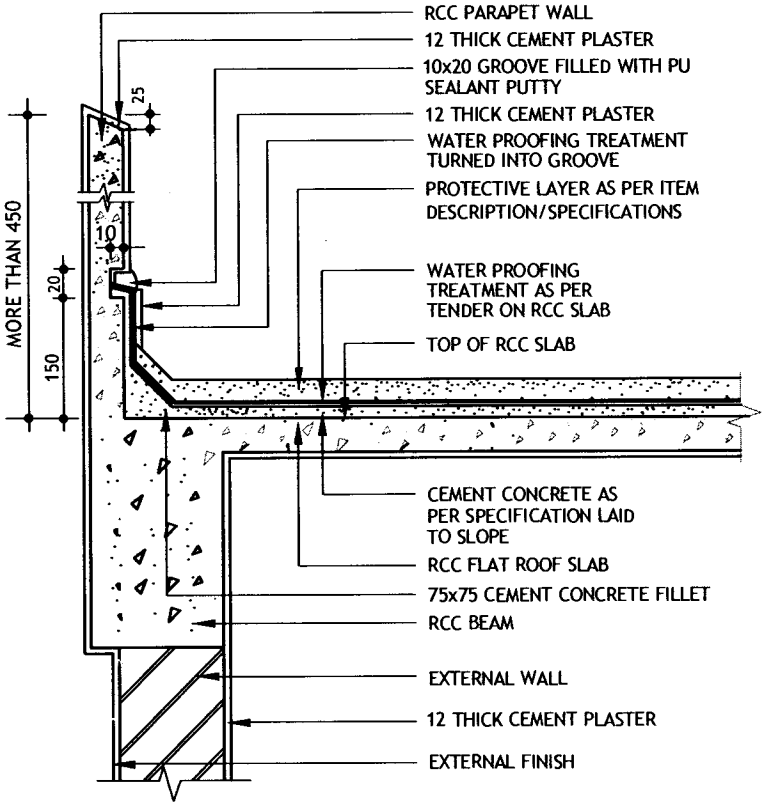


SECTIONAL PLAN C-C

NOTE: REFER SHEET 1 OF 3

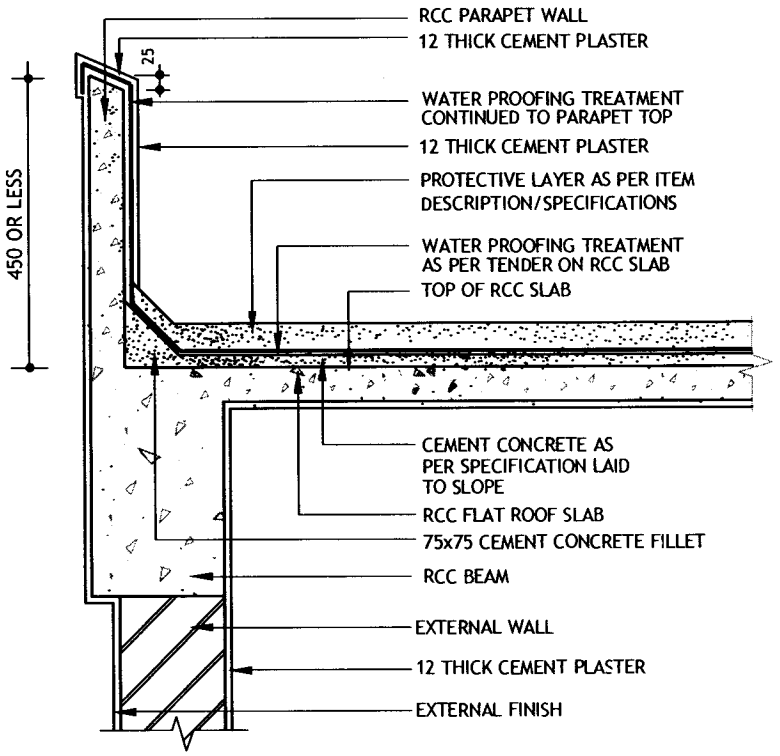
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	07.03.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	PIYALEE DAS	SAMIR DAS	SANJAY MAZUMDAR
5	07.03.17	REAFFIRMED & ISSUED AS STANDARD	VK/DK	JKB	RAJANJI SRIVASTAVA	R. NANDA

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SECTION B-B

(PARAPET HEIGHT MORE THAN 450)



SECTION B-B

(PARAPET HEIGHT UP TO 450)

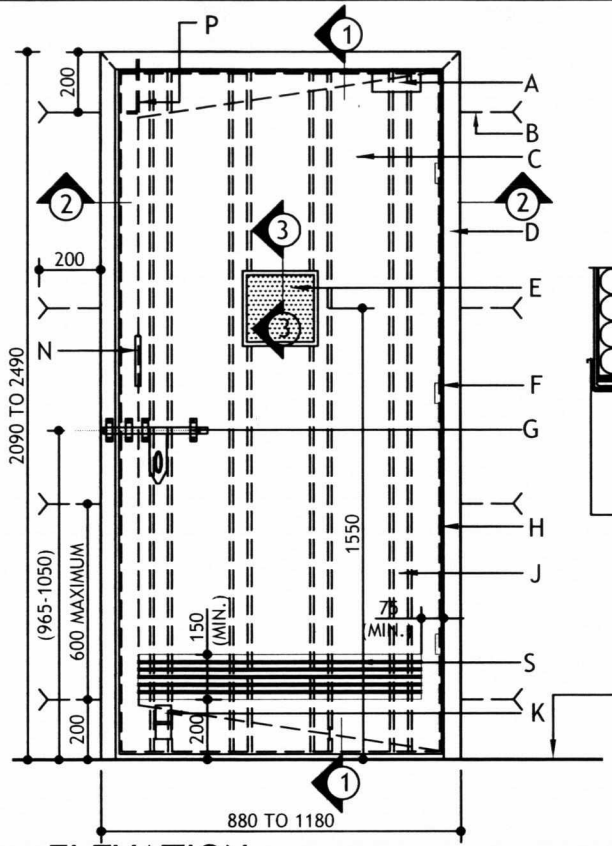
NOTE : ALL DIMENSIONS ARE IN MM

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	07.03.22	REAFFIRMED & ISSUED AS STANDARD	M L THAKUR	PIYALEE DAS	SAMIR DAS	SANJAY MAZUMDAR
5	07.03.17	REAFFIRMED & ISSUED AS STANDARD	VK/DK	JKB	RAJANJI SRIVASTAVA	R. NANDA

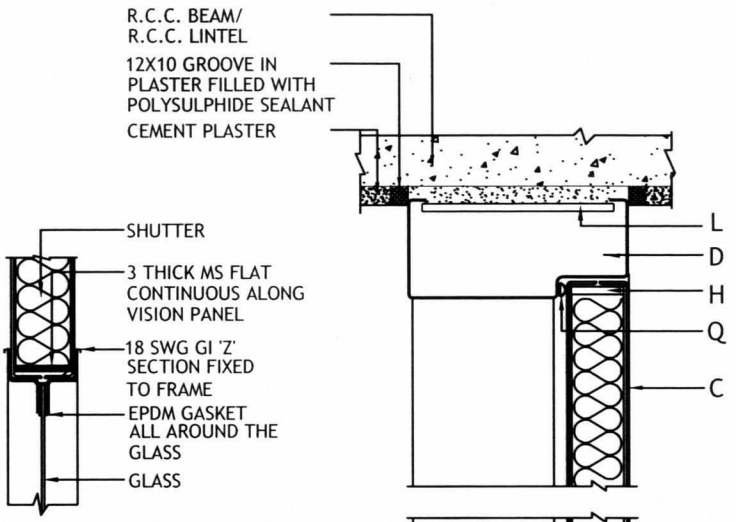
Approved by

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STEEL DOOR (PRESSED STEEL) SINGLE SHUTTER



ELEVATION

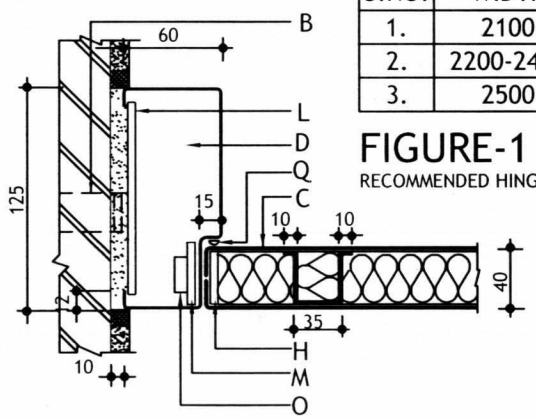


SECTION 1-1

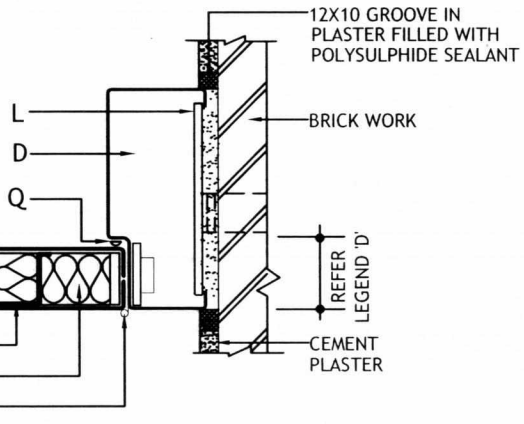
SECTION 3-3

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

FIGURE-1
RECOMMENDED HINGE LOCATION



SECTION 2-2



LEGEND :

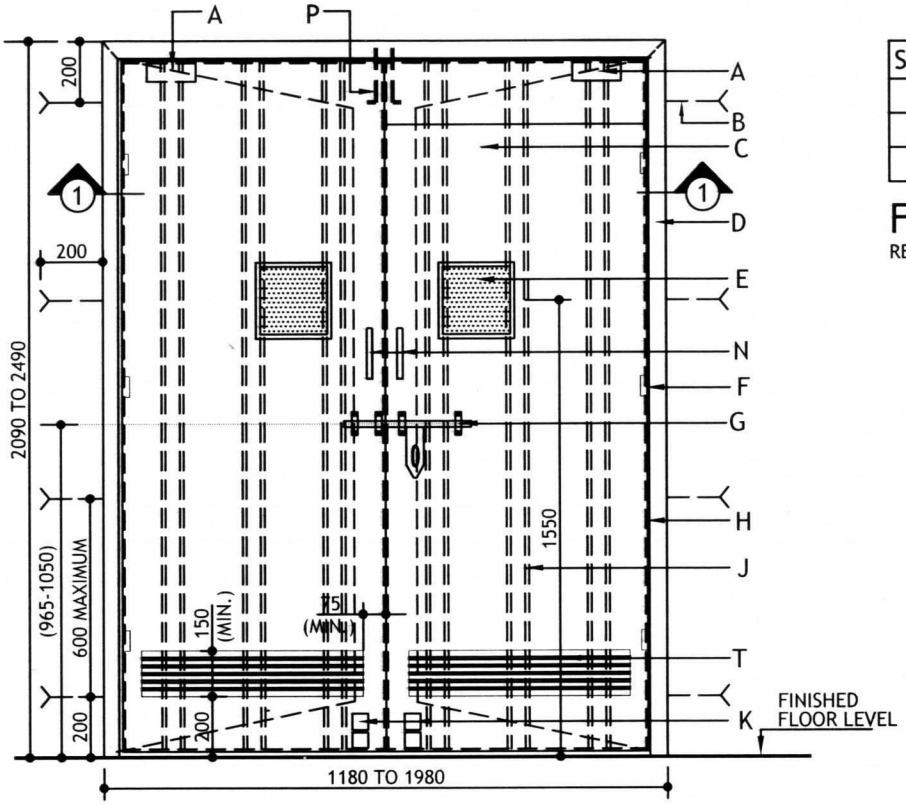
A. OVER HEAD HYDRAULIC DOOR CLOSER (HEAVY DUTY).
B. MS HOLDFAST 200x25x6 THICK @ MAXIMUM 600 C/C WELDED TO FRAME SPACER (L).
C. 40 THICK (OVER ALL) 18 SWG GALVANIZED PRESSED STEEL SHUTTER FILLED WITH MINERAL WOOL (48Kg/cum).
D. 16 SWG GALVANIZED PRESSED STEEL FRAME OUT OF 125X60 PROFILE FILLED WITH CONCRETE (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

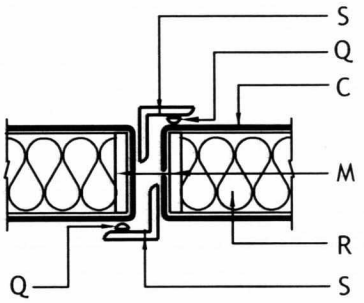
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ELEVATION

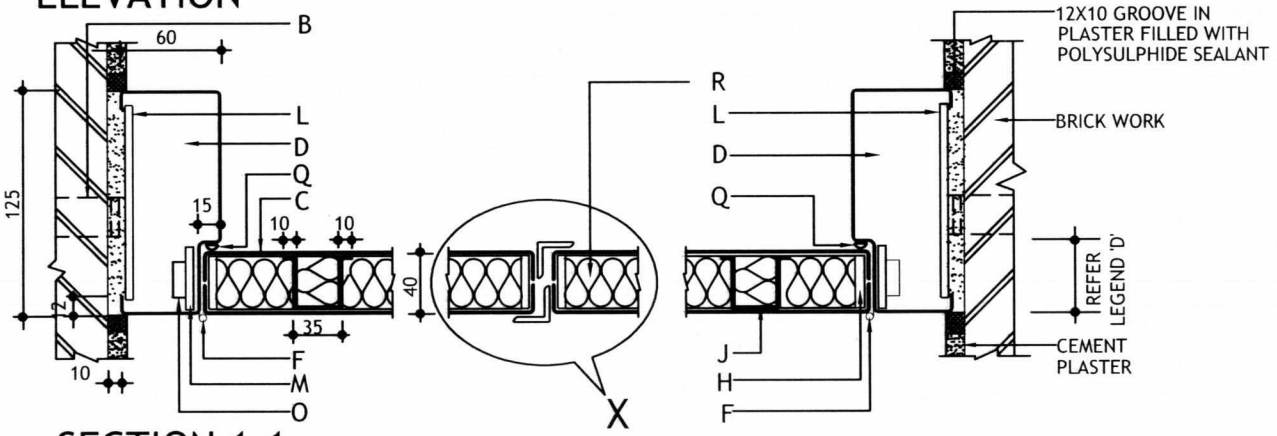
S.NO.	WIDTH	HINGE
1.	2100	3
2.	2200-2400	4
3.	2500	5

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 :

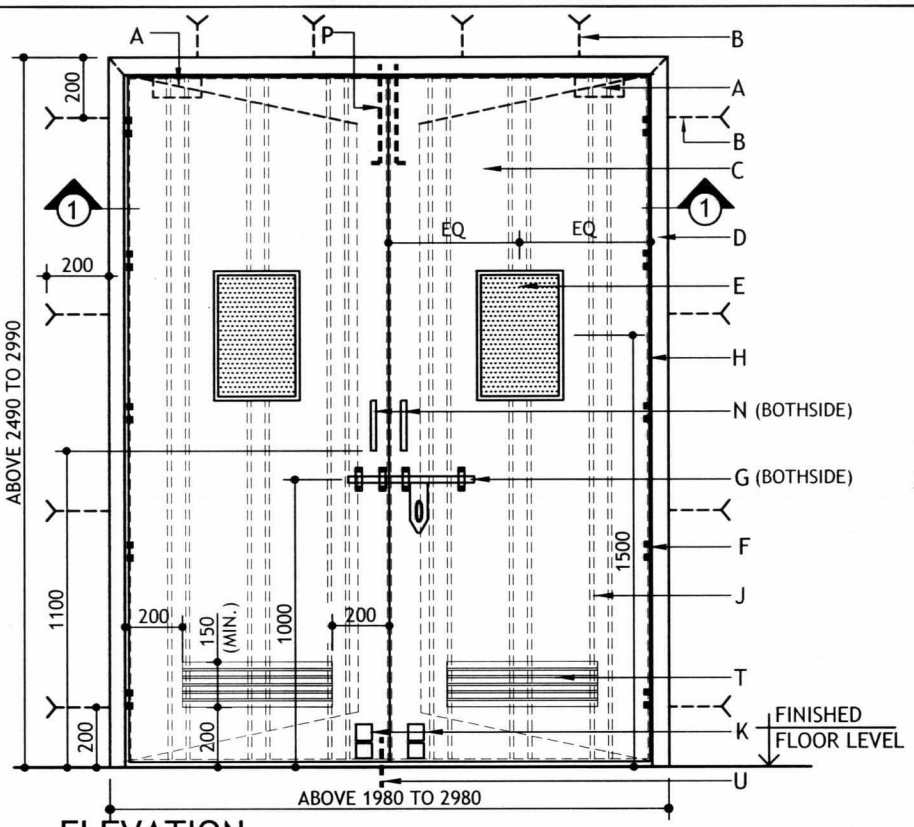
A. OVER HEAD HYDRAULIC DOOR CLOSER (HEAVY DUTY).
B. MS HOLDFAST 200x25x6 THICK @ MAXIMUM 600 C/C WELDED TO FRAME SPACER (L).
C. 40 THICK (OVER ALL) 18 SWG GALVANIZED PRESSED STEEL SHUTTER FILLED WITH MINERAL WOOL (48Kg/cum).
D. 16 SWG GALVANIZED PRESSED STEEL FRAME OUT OF 125X60 PROFILE FILLED WITH CONCRETE (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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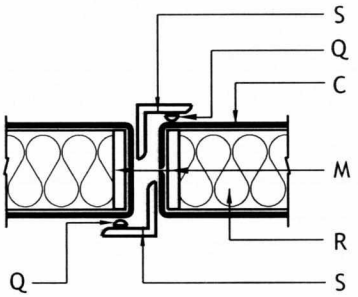
STEEL DOOR
(PRESSED STEEL LARGE DOOR)
DOUBLE SHUTTER



ELEVATION

S.NO.	WIDTH	HINGES
1.	2500-2700	5
2.	2800-3000	6

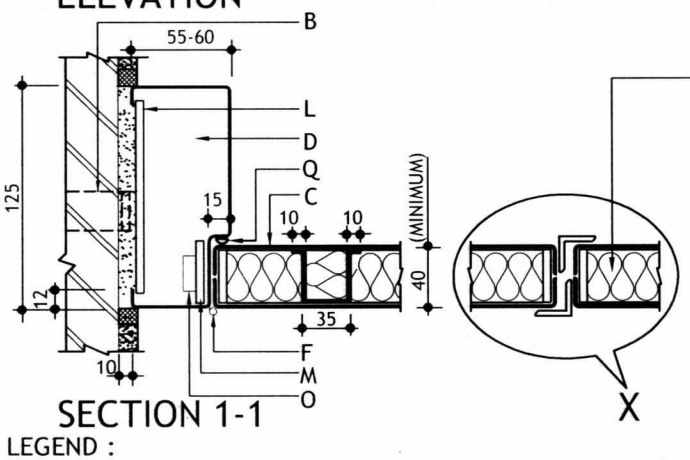
FIGURE-1
RECOMMENDED HINGE NUMBERS (MINIMUM)



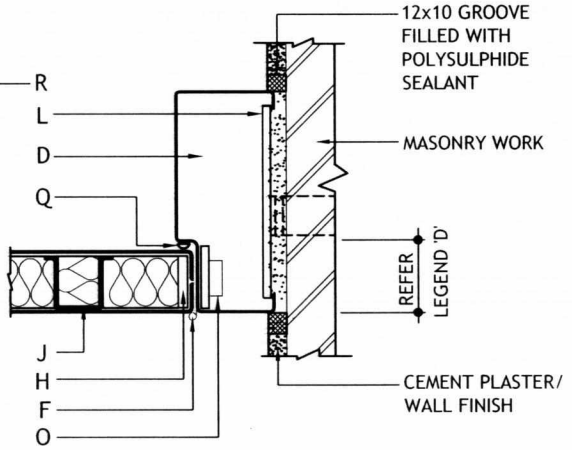
DETAIL X

NOTE :

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



SECTION 1-1



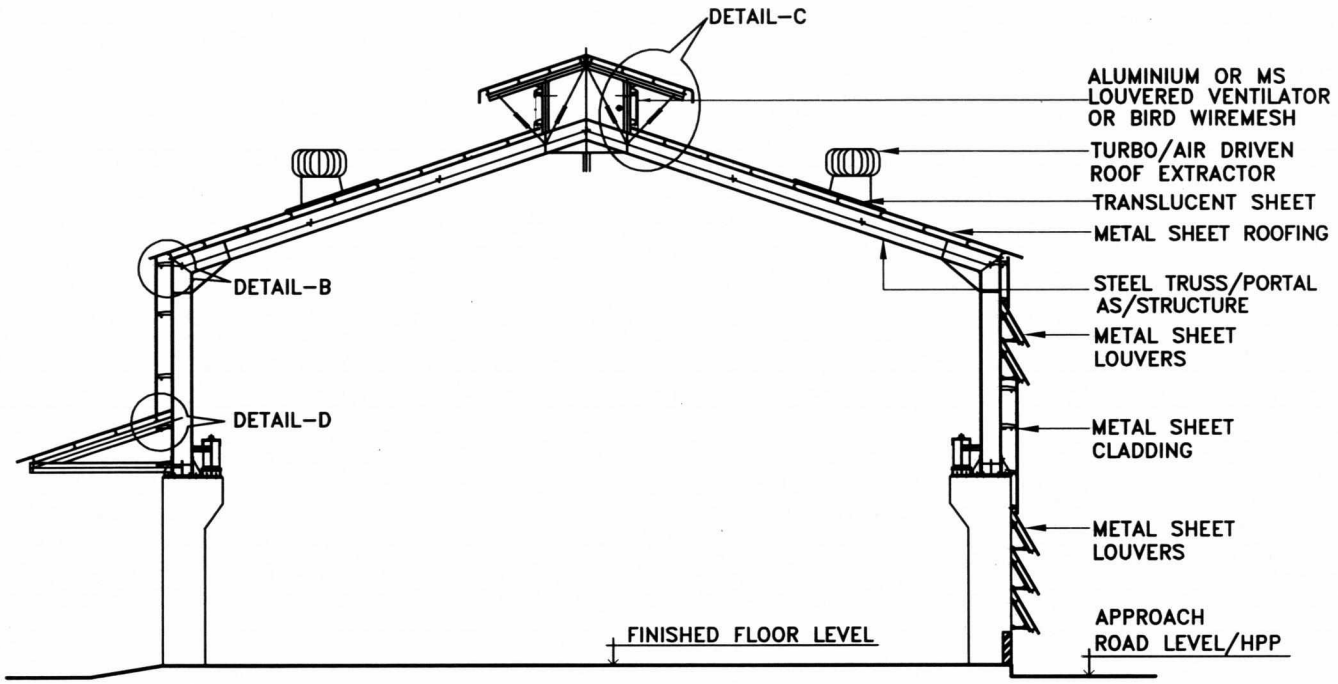
LEGEND :

A. OVER HEAD HYDRAULIC DOOR CLOSER (HEAVY DUTY) ON BOTH SHUTTERS.
B. MS HOLDFAST 200X25X6 THICK OR 10X100 FRAME ANCHOR FASTENERS @ MAXIMUM 600 C/C WELDED TO FRAME SPACER (L).
C. 18 SWG GALVANIZED PRESSED STEEL SHUTTER FILLED WITH MINERAL WOOL (48KG/CUM) OR OTHER APPROVED MATERIAL SUCH AS HONEY COMB.
D. 16 SWG GALVANIZED PRESSED STEEL FRAME OUT OF (MIN) 125X55-60 PROFILE FILLED WITH CONCRETE (REBATE DIMENSION TO BE SUITABLY ADJUSTED FOR ACCOMODATING GASKET FOR AIR TIGHT DOOR).
E. VISION PANEL (300X450).
F. 100 LONG SS 304 GRADE HEAVY DUTY SS BALL BEARING HINGE AS PER FIGURE 1.
G. SS 304 GRADE 16 DIA 400 LONG SS ALDROP ON BOTH SIDES.
H. 3 THICK MS FLAT CONTINUOUS ALONG PERIMETER OF SHUTTER.
J. 18 SWG GI VERTICAL STIFFNER @ 200 C/C (SPACING TO BE ADJUSTED FOR VISION PANEL / LOUVERS).
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, 300 LONG SS HANDLE ON BOTH SIDES (THE HANDLES SHALL NOT BE INTERCONNECTED BY THROUGH BOLTING).
O. 18 SWG GI MORTAR GUARD AT THE BACK OF HINGES & LOCK.
P. SS-304 GRADE, SURFACE MOUNTED OR CONCEALED SS FLUSH BOLT, LENGTH UPTO 1400MM ON OUTER SIDE.
Q. 'D' PROFILE EPDM GASKET ALONG FRAME REBATE (FOR AIR TIGHT DOOR ONLY).
R. SHUTTER FILLER (REFER 'C').
S. 2 THICK 25X25 GI ANGLE (VERTICAL) WELDED TO EACH SHUTTER.
T. LOUVER MADE 18 SWG GI (NOT REQUIRED FOR AC AND PRESSURIZED AREA.
U. SS 304, 300 LONG SURFACE MOUNTED OR CONCEALED FLUSH BOLT ON INACTIVE LEAF.

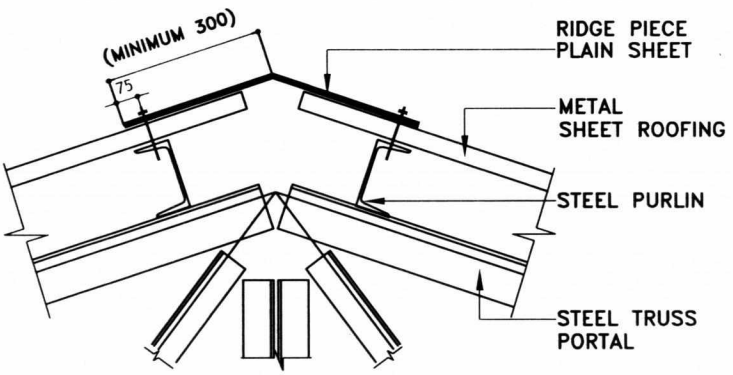
NOTE: 1. ALL DIMENSIONS ARE IN MM.
2. FOR OTHER DETAILS REFER STANDARD NO. 7-75-0070, 7-75-0071

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
1	17.01.23	REVISED & ISSUED AS STANDARD	BABITA SHARMA	PIYALEE DAS	SAMIR DAS	SANJAY MAZUMDAR
0	01.06.20	ISSUED AS STANDARD	M L THAKUR	SAMIR DAS	RAJANJI SRIVASTAVA	S K SAXENA

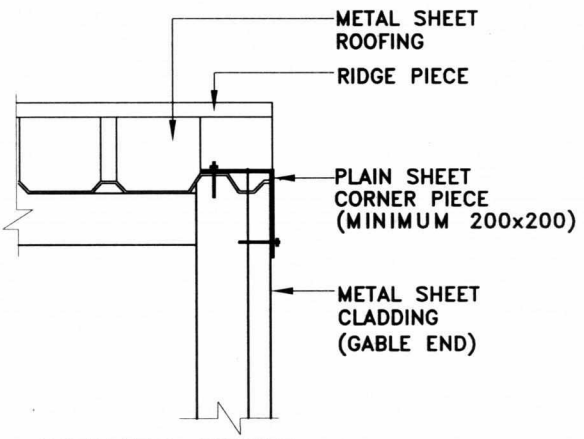
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TYPICAL SECTION



DETAIL–A
(RIDGE FLASHING DETAIL)



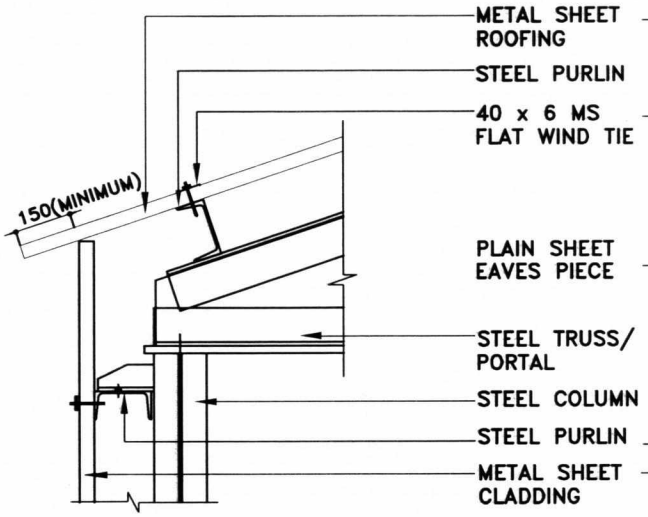
CORNER PIECE
FLASHING DETAIL
(ROOF AND GABLE END CLADDING)

NOTES:

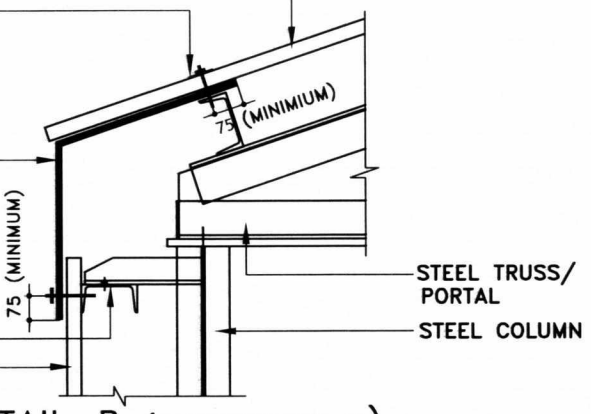
1. ALL DIMENSIONS ARE IN MM.
2. THIS STANDARD INDICATES VARIOUS ARCHITECTURAL FEATURES AND FLASHING DETAILS OF SHEDS. PROVISION OF FEATURES (ROOF MONITOR, ROOF EXTRACTOR, TRANSLUCENT SHEET, LOUVERS) AND THEIR SIZES, LOCATION ETC SHALL BE AS PER PROJECT DRAWINGS.
3. MATERIAL, THICKNESS AND OTHER DETAILS 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

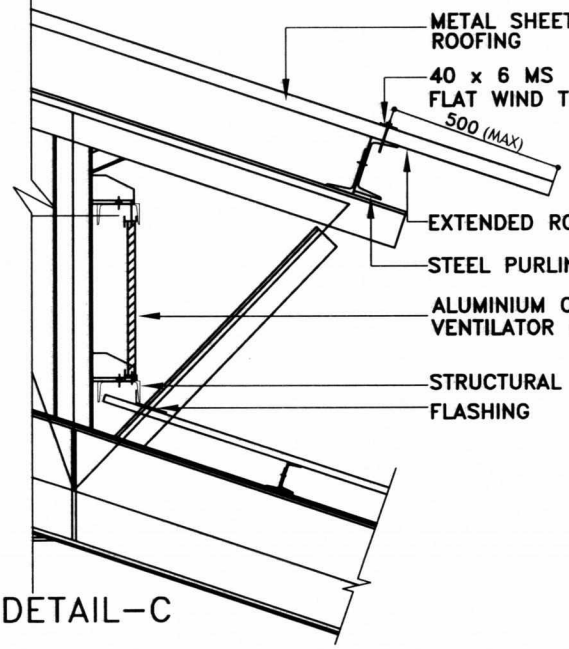
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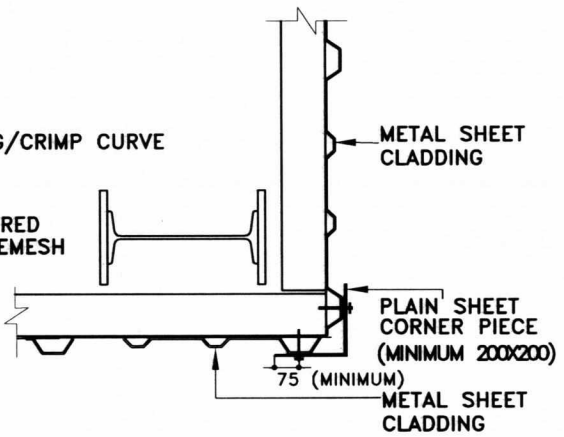
DETAIL–B (ALTERNATIVE–1)



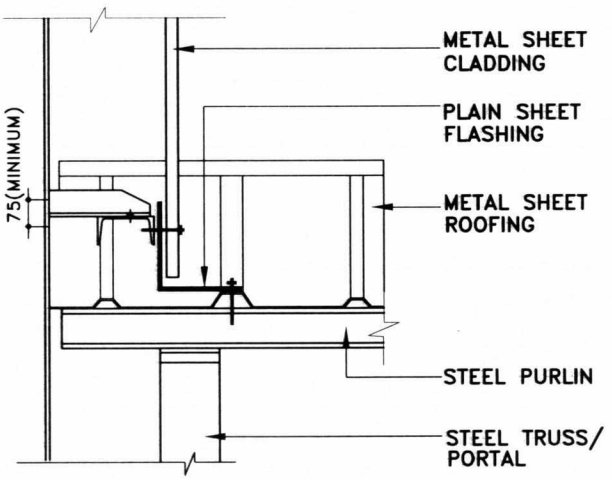
DETAIL–B (ALTERNATIVE–2)
EAVES FLASHING DETAIL



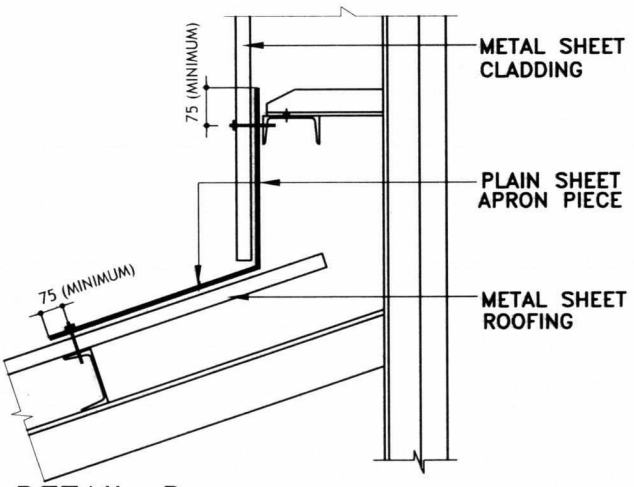
DETAIL–C



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	Sids. Committee Convenor	Stds. Bureau Chairman
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 L NANDA

Approved by

Signature Not Verified
Digitally signed by MD MAZHER ALI
Date: 2026.04.09 18:13:00 IST
Location: eProcure-EPROC

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