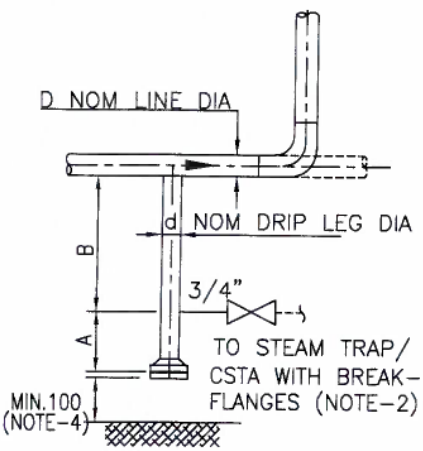
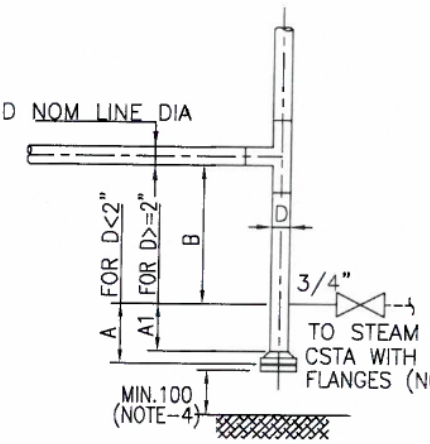
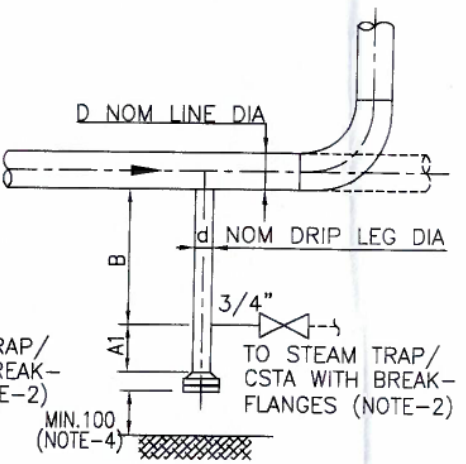


LINE SIZE 3/4" – 1 1/2"
DRIP LEG IN MAIN RUNS/RISERS



LINE SIZE 3/4" TO 6"
(NOTE 3)



LINE SIZE 2" AND ABOVE
DRIP LEG AT MAIN RUNS/RISERS

NOM LINE DIA D INCH	NOM DRIP LEG DIA d INCH	A MM	A1 MM	B MM
3/4"	3/4"	125		100
1"	1"	125		100
1 1/2"	1 1/2"	125		125
2"	2"		75	150
3"	3"		75	150
4"	4"		75	175
6"	4"		75	175
8"	4"		75	175
10"	6"		75	175
12"	6"		75	175
14"	8"		75	175
16"	8"		75	175
18"	10"		75	175
20"	10"		75	175
24" & ABOVE	12"		75	175

NOTES :–

1. DELETED
2. ALL PIPES, VALVES, FLANGES, FITTINGS, BRANCH–OFFS ETC. SHALL BE IN ACCORDANCE WITH PROJECT PIPING MATERIAL SPECIFICATIONS.
3. THIS ARRANGEMENT MAY BE USED ONLY IN CASE OF SPACE CONSTRAINT. SUPPORTING ARRANGEMENT SHALL BE REVIEWED IN DETAIL TO ENSURE THAT THERE IS NO FOULING BETWEEN SUPPORT PEDESTAL AND BLIND FLANGE ASSEMBLY.
4. BOTTOM OF PIPE ELEVATION SHALL BE MINIMUM 600MM FROM GRADE. IN CASE OF RATINGS BEYOND CLASS 600 AND SIZES BEYOND 8", BOTTOM OF PIPE SHALL BE FIXED TO ENSURE MINIMUM 100MM CLEARANCE FROM GRADE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	12.09.2025	REVISED & ISSUED AS STANDARD	SRG	PK	SH	MN
6	24.08.2021	REVISED & ISSUED AS STANDARD	SG	SH	GB	SM

Approved by

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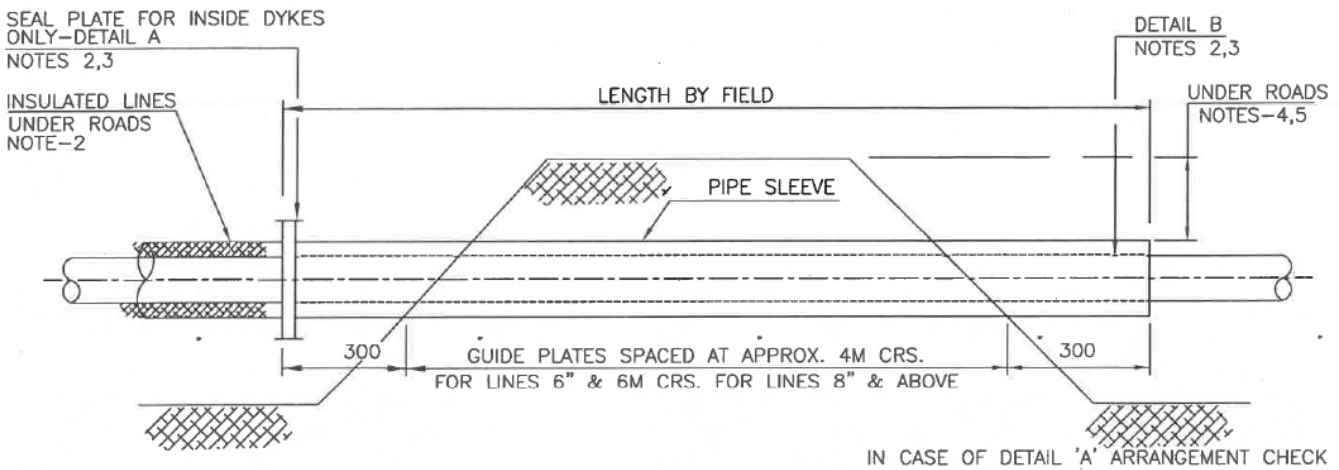
इंजीनियर्स इंडिया लिमिटेड (भारत सरकार का उपक्रम) ENGINEERS INDIA LIMITED (A Govt. of India Undertaking)

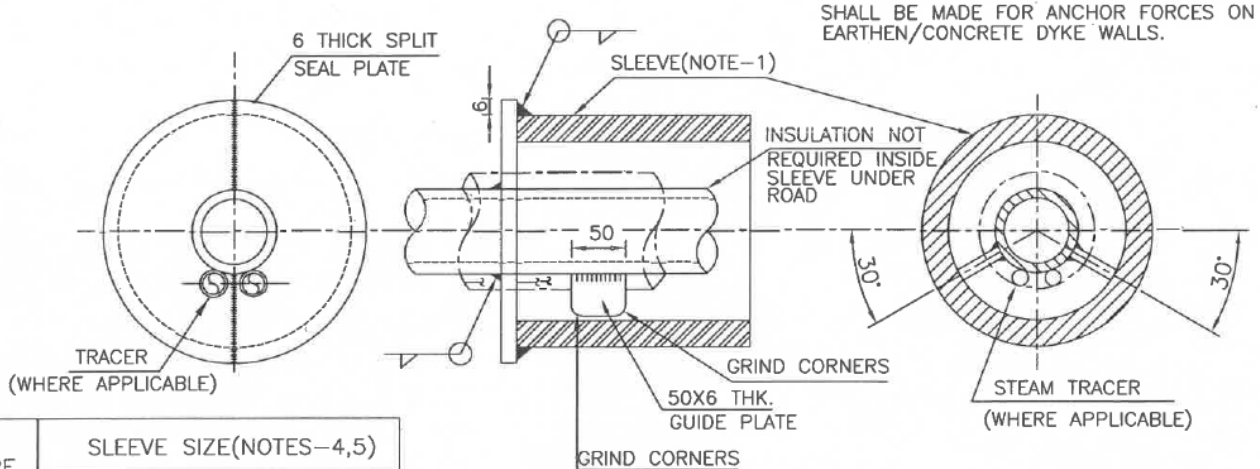
PIPE SLEEVE DETAILS FOR INSULATED LINES UNDER ROADS AND DYKES

STANDARD No.

7-44-0404 Rev. 6

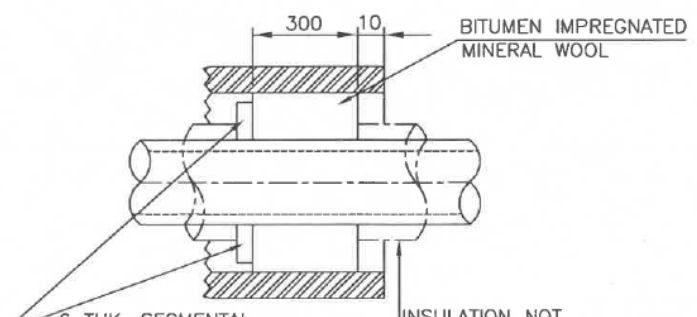


IN CASE OF DETAIL 'A' ARRANGEMENT CHECK SHALL BE MADE FOR ANCHOR FORCES ON EARTHEN/CONCRETE DYKE WALLS.



DETAIL–A

PIPE SIZE	SLEEVE SIZE(NOTES–4,5)		
	DYKE	SCH/ THK.	ROAD
1½"	6"	40	3"
2"	6"	40	3"
3"	8"	20	4"
4"	10"	20	6"
6"	12"	20	8"
8"	14"	10	10"
10"	16"	10	12"
12"	18"	10	14"
14"	20"	6.35mm	16"
16"	24"	6.35mm	18"
18"	24"	6.35mm	20"
20"	30"	6.35mm	22"
22"	30"	6.35mm	24"
24"	32"	6.35mm	26"
26"	36"		CULVERT IS PREFERRED
28"	36"		– do –
30"	40"		– do –
32"	40"		– do –
36"	44"		– do –
40"	48"		– do –
42"	50"		– do –
44"	52"		– do –
46"	54"		– do –
48"	56"		– do –



DETAIL–B
NOTE 2 & 3

NOTES:–

1. PIPE SLEEVE SHALL BE COATED & WRAPPED FROM OUTSIDE.
2. IT IS PREFERED THAT PIPES ARE NOT INSULATED BELOW ROADS AND DYKES AND FOR THIS DETAIL 'B' SHOULD BE PROVIDED AT BOTH ENDS OF PIPES.
3. IF INSULATION IS ESSENTIAL
   a) PIPES UNDER ROADS SHALL BE BELOW A CULVERT, AND
   b) PIPES UNDER DYKES SHALL BE PROVIDED WITH DETAIL 'A' FROM INSIDE AND DETAIL 'B' FROM OUTSIDE OF DYKES.
4. THE ROAD SLEEVES SHALL HAVE A MINIMUM COVER OF 300 FOR LIGHT TRAFFIC AND 600 FOR HEAVY TRAFFIC ROAD. IN CASE OF VERY HEAVY TRAFFIC ROADS THE SLEEVE SHALL BE ENCASED IN CONCRETE.
5. PIPE SPACING SHALL BE TO SUIT SLEEVE PLATE SIZES.
6. SLEEVE MAY BE FABRICATED OUT OF STEEL PLATE OF COMMERICAL QUALITY OF EQUIVALENT THICKNESS IN LIEU OF STANDARD PIPES GIVEN IN THE TABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	31.12.24	REAFFIRMED & ISSUED AS STANDARD	PK	SH	BB	MN
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	MI	RKT

Approved by

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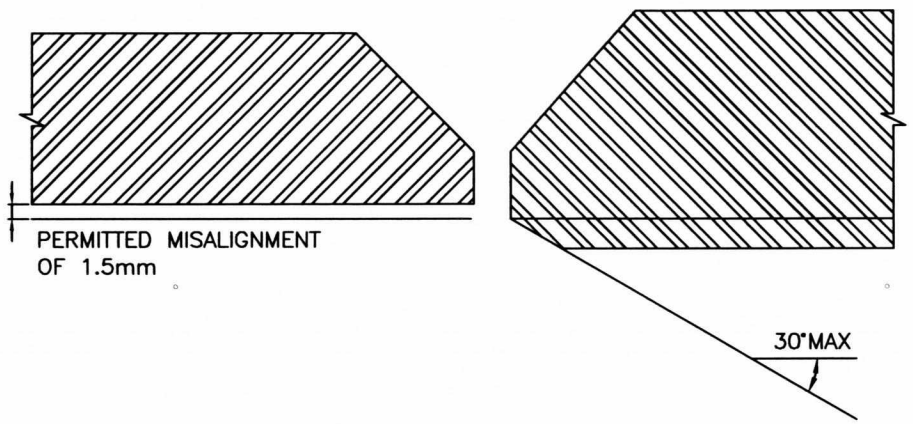

THICKER PIPE TAPER BORED TO ALIGN

(AS PER ASME B31.3)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	28.09.23	REAFFIRMED AND ISSUED AS STANDARD	ABA	SH	GB	SM
5	10.09.18	REAFFIRMED AND ISSUED AS STANDARD	PK	SH	MI	RKT

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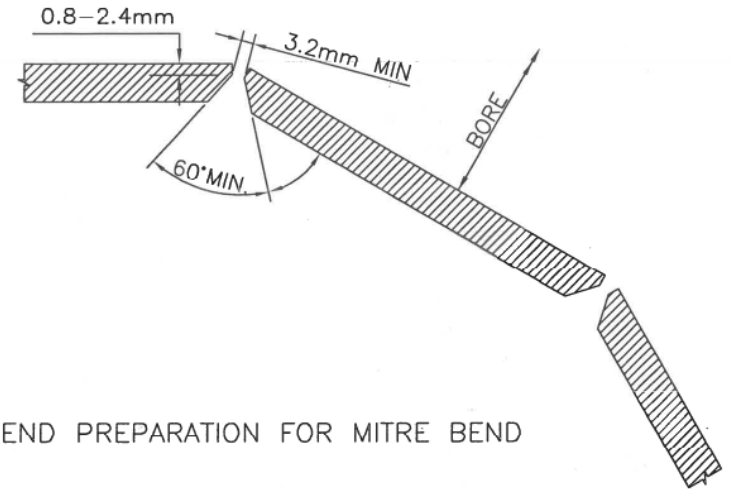
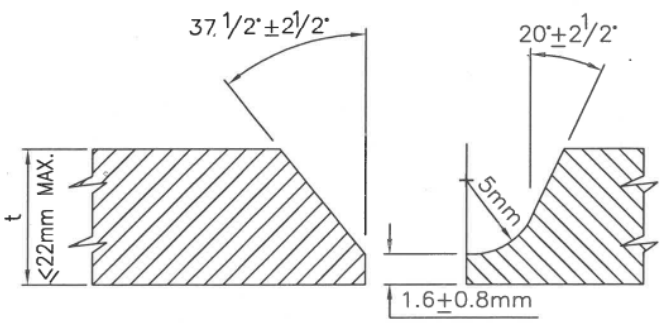
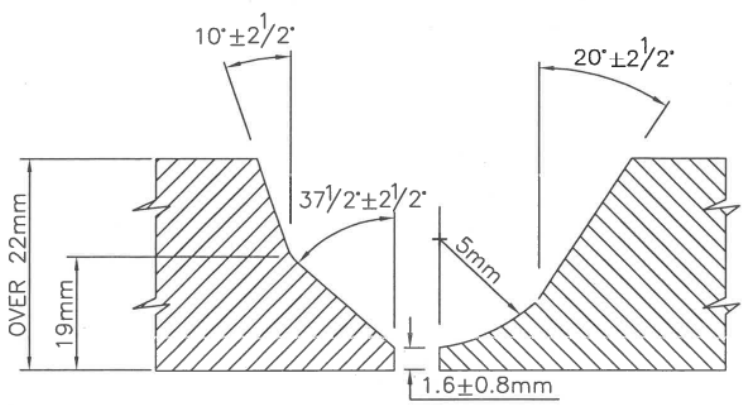


END PREPARATION FOR MITRE BEND



(A) WALL THICKNESS 5–22mm INCLUSIVE
(AS PER ASME B31.3)



(B) WALL THICKNESS OVER 22mm
(AS PER ASME B31.3)

NOTES :

1. SQUARE ENDS MAY BE USED FOR WALL THICKNESS LESS THAN 5mm
2. PIPE ENDS SUPPLIED WITH BEVEL ANGLE OF $30^{\circ}{}^{+5^{\circ}}_{0}$ NEED NOT BE BEVELED FURTHER.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	04.03.25	REAFFIRMED & ISSUED AS STANDARD	PK	SH	GB	MN
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	ML	RKT

Approved by

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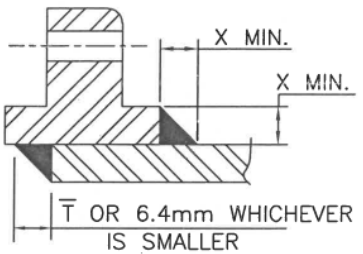
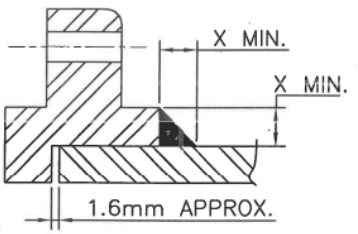


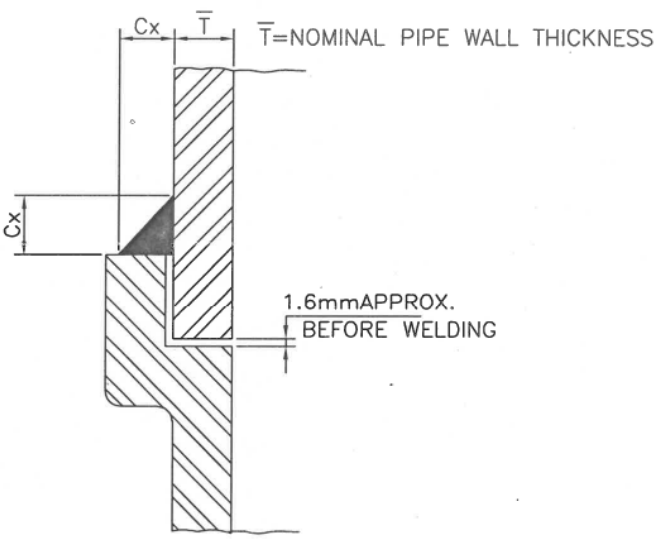
SLIP ON FLANGE



SOCKET WELDED FLANGE

X MIN. = 1.4T OR THE THICKNESS OF HUB, WHICHEVER IS SMALLER.

T = NOMINAL PIPE WALL THICKNESS



SOCKET WELDING FITTINGS

Cx (MIN)=1.09T BUT NOT LESS THAN 3.2mm

FILLET WELD DETAILS
(AS PER ASME B31.3)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	04.03.25	REVISED & ISSUED AS STANDARD	PK	SH	CB	MN
5	06.12.19	REAFFIRMED & ISSUED AS STANDARD	SG	SH	MI	RKT

Approved by

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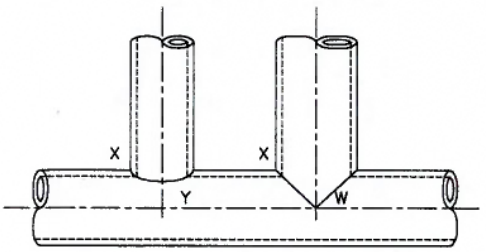
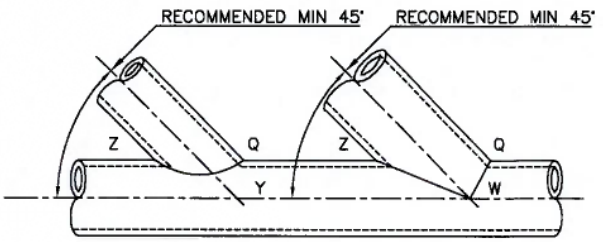
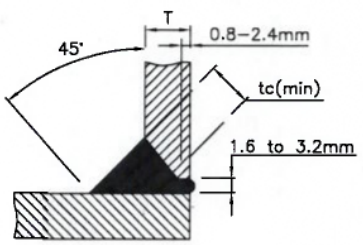
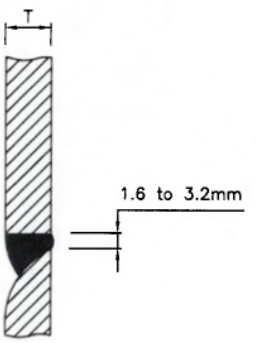




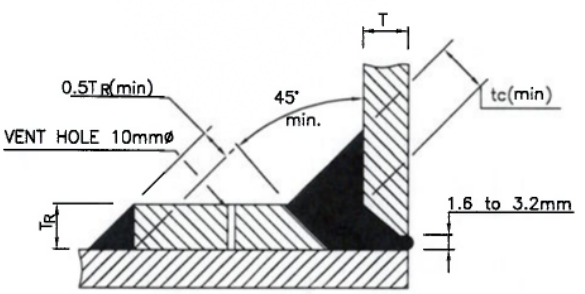


tc: MINIMUM OF 0.7T & 6.4mm

SECTION X AT CROTCH OF RIGHT ANGLE BRANCH

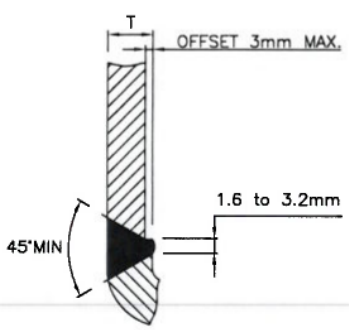


SECTION Y AT FLANK

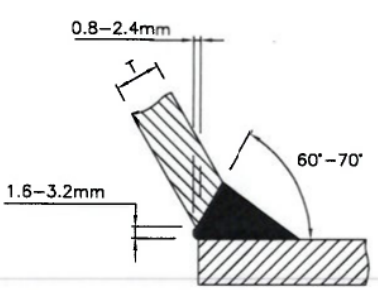


tc: MINIMUM OF 0.7T & 6.4mm

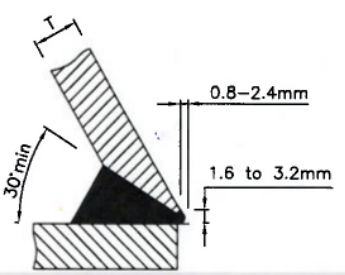
DETAIL FOR REINFORCED BRANCH



SECTION W AT FLANK OF EQUAL BRANCH



SECTION Q AT BACK OF SLOPING BRANCH



SECTION Z AT CROTCH OF SLOPING BRANCH

NOTES :–

1. THIS TYPE IS TO BE USED WHEN BRANCH IS EQUAL TO OR ONE SIZE SMALLER THAN MAIN PIPE.
2. REFER STANDARD 7–44–0484 FOR DIMENSIONAL DETAILS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	10.10.25	REAFFIRMED & ISSUED AS STANDARD	SRG	PK	SH	MN
5	23.09.20	REAFFIRMED & ISSUED AS STANDARD	SG	SH	GB	SM

Approved by

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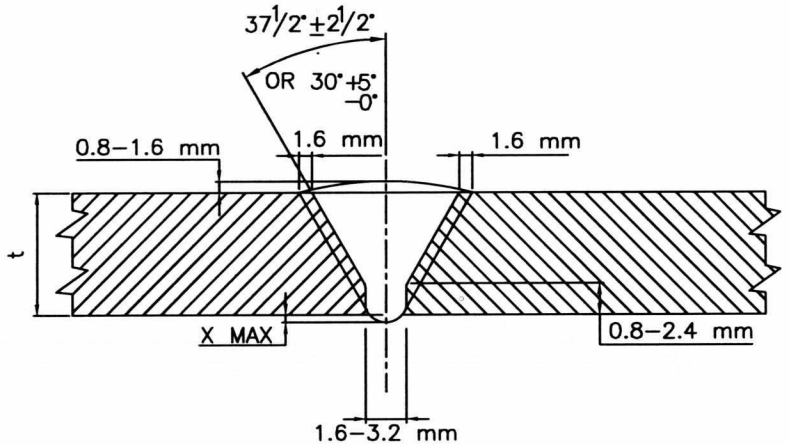

4.8 mm ≤ t ≤ 19.1 mm

X MAX = 1.5 mm FOR PIPES 2" AND BELOW
3.0 mm FOR PIPES ABOVE 2"

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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5	10.09.18	REAFFIRMED AND ISSUED AS STANDARD	PK	SH	MI	RKT

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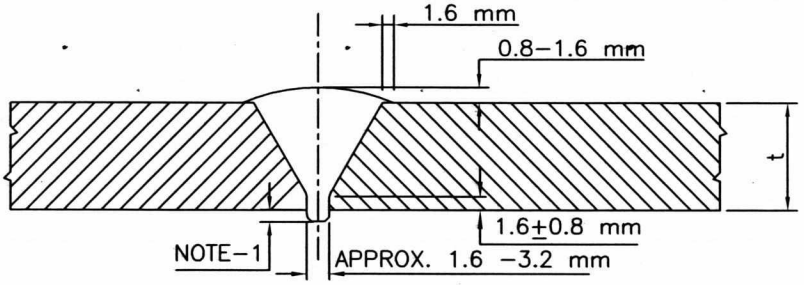
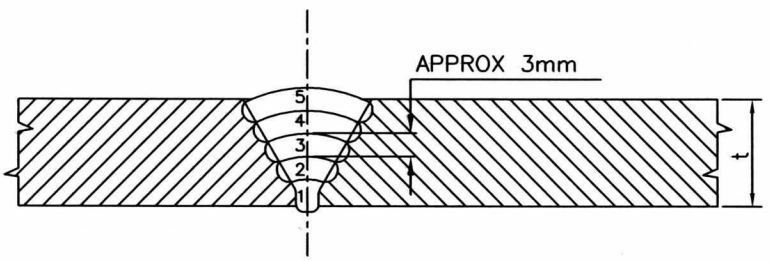


STANDARD 'V' BEVEL
BUTT JOINT



SEQUENCE OF WELDS

$4.8 \text{ mm} \leq t \leq 19.1 \text{ mm}$

NOTES :

1. MAXIMUM INTERNAL WELD PROTRUSION SHALL BE AS PER ASME B31.3

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	22.01.24	REAFFIRMED & ISSUED AS STANDARD	PK	SH	GB	MN
5	31.12.18	REVISED & ISSUED AS STANDARD	PK	SH	MI	RKT

Approved by

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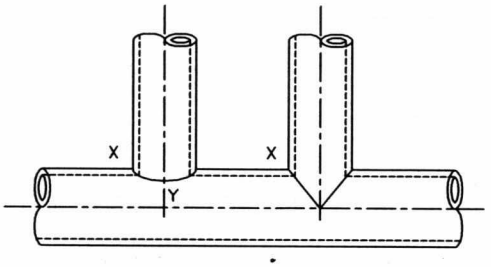
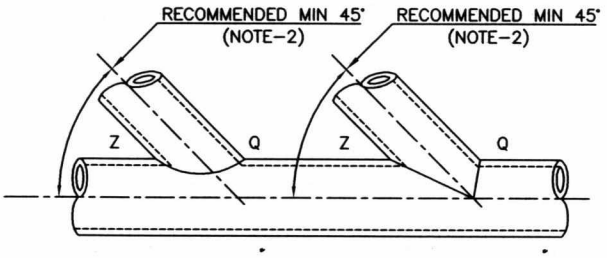
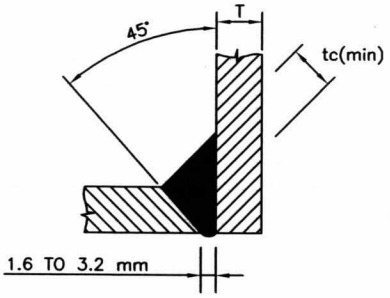
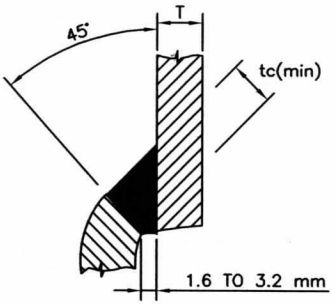






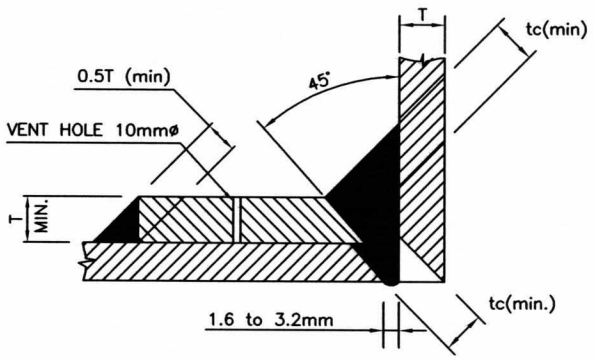
SECTION X AT CROTCH OF RIGHT ANGLE BRANCH



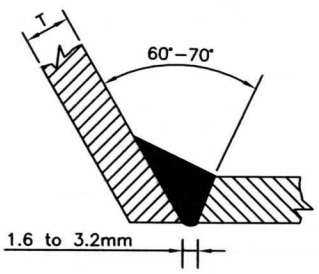
SECTION Y AT FLANK

NOTES :

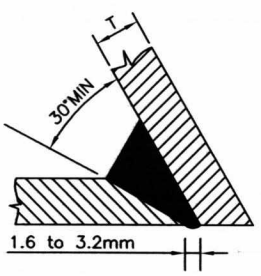
1. THIS STANDARD IS TO BE USED WHEN BRANCH IS MORE THAN ONE SIZE SMALLER OF MAIN PIPE.
2. FOR LINES COMING UNDER THE PURVIEW OF IBR RECOMMENDED MIN. ANGLE SHALL BE 60°.
3. MAXIMUM INTERNAL PROTRUSION OF WELD SHALL BE AS PER ASME B31.3



tc=MIN OF 0.7T & 6.4mm



SECTION Q AT BACK OF SLOPING BRANCH



SECTION Z AT CROTCH OF SLOPING BRANCH

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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6	22.01.24	REVISED & ISSUED AS STANDARD	PK	SH	GB	MN
5	31.12.18	REVISED & ISSUED AS STANDARD	PK	SH	MI	RKT

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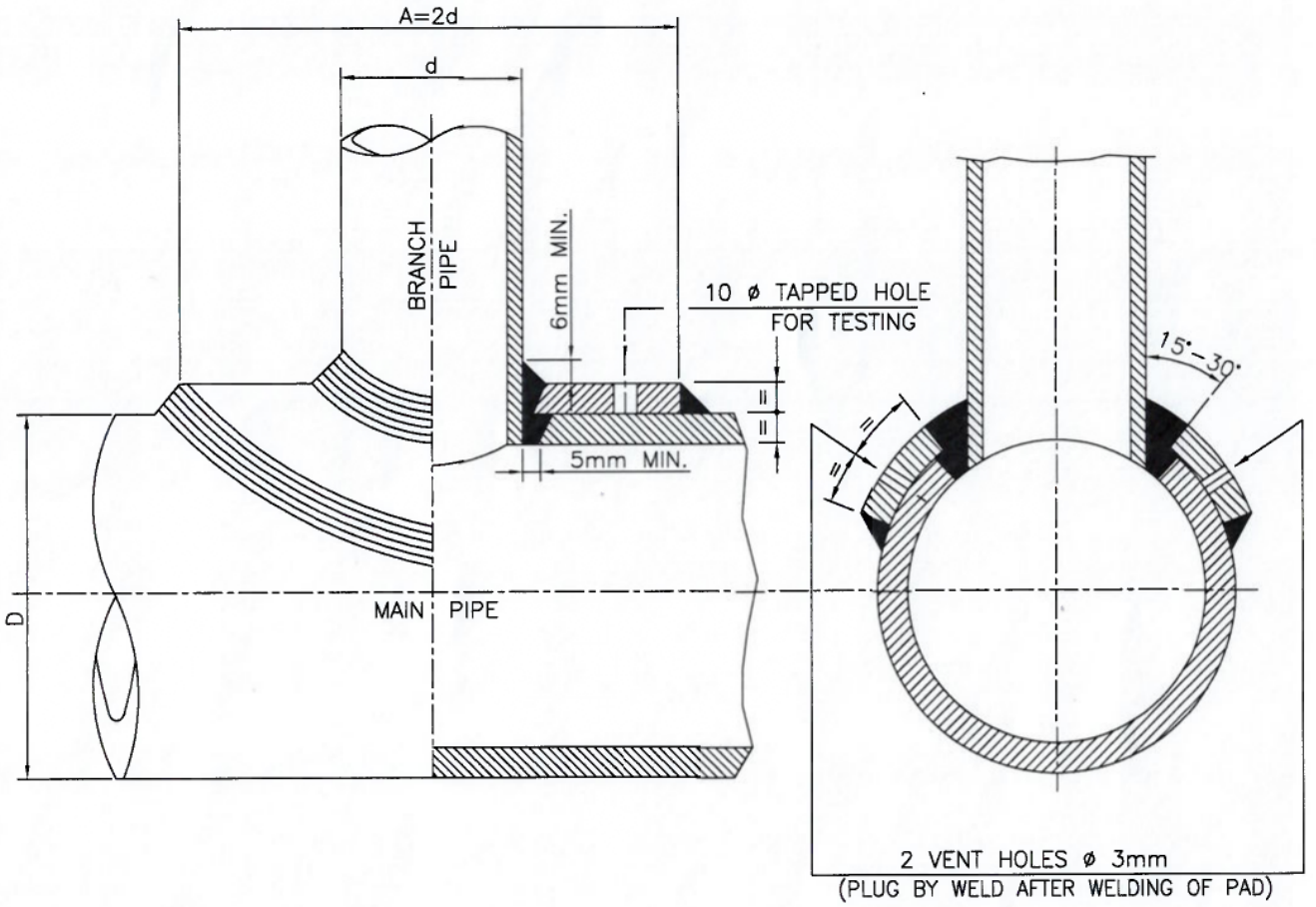
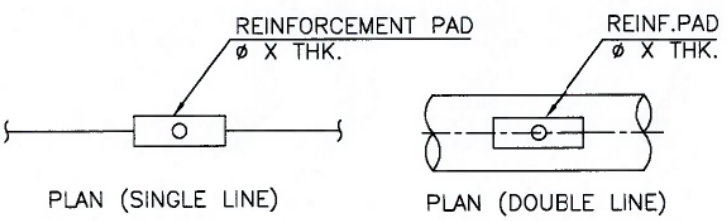
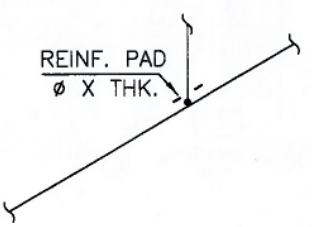
BRANCH CONNECTION (BREAKING INTO)



SYMBOL ON GADS



SYMBOL ON ISOMETRICS



NOTES :-

1. THIS TYPE IS TO BE USED WHEN BRANCH IS MORE THAN ONE SIZE SMALLER THAN MAIN PIPE
2. THE REINFORCING PLATE SHALL BE OBTAINED FROM PIPE SPOOL OF THE SAME SCHEDULE AND DIAMETER OF MAIN PIPE UNLESS OTHERWISE STATED
3. THE REINFORCEMENT PAD CALCULATIONS SHALL BE MADE IN ACCORDANCE WITH ASME B31.3 OR IBR AS APPLICABLE
4. ALSO SEE STANDARD 7-44-0484
5. REFER STANDARD 7-44-0482 FOR WELDING DETAILS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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6	10.10.25	REAFFIRMED & ISSUED AS STANDARD	SRG	PK	SH	MN
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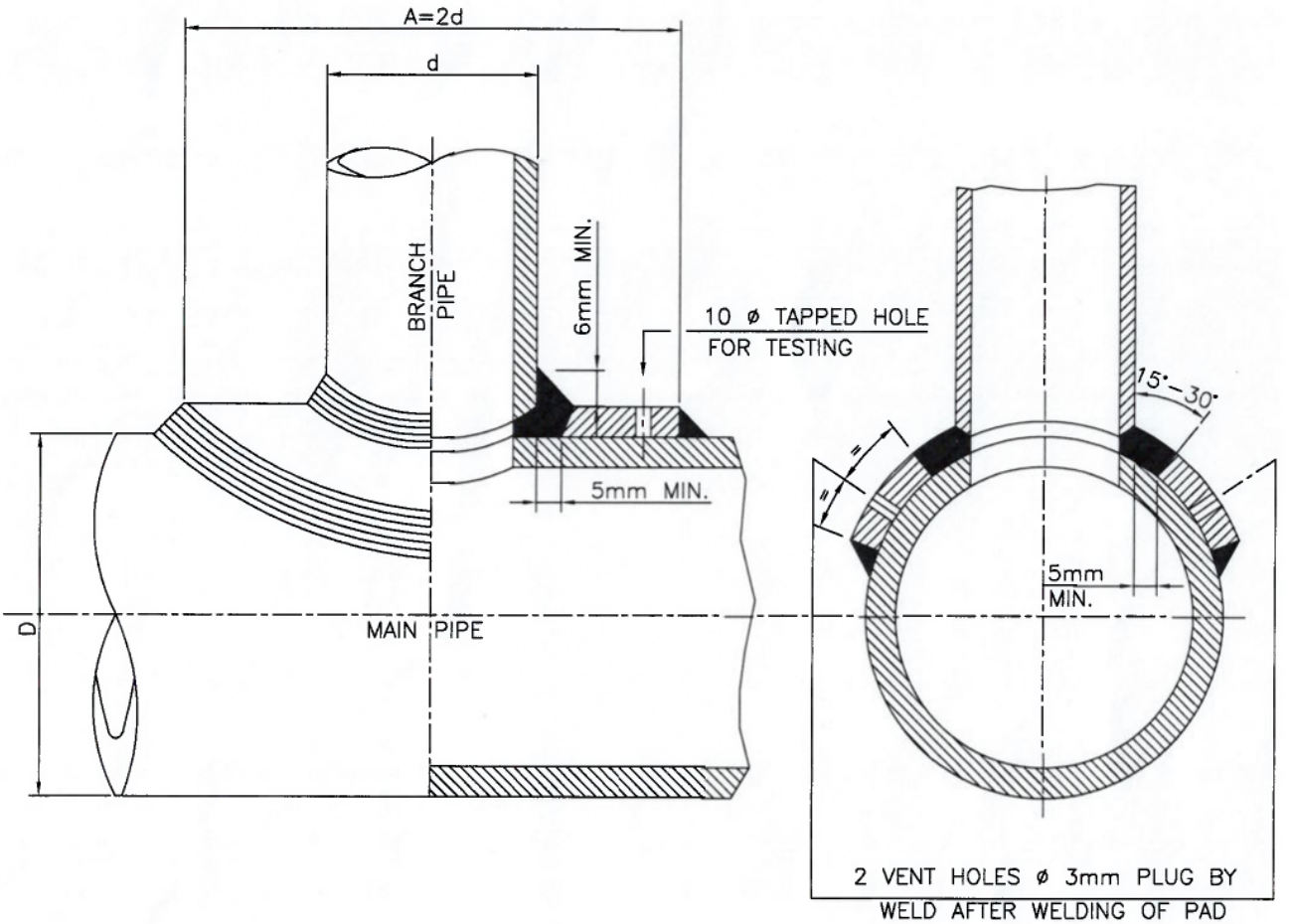

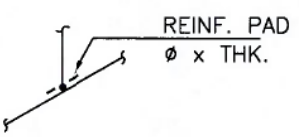

SYMBOL ON ISOMETRICS

NOTES :

1. THIS TYPE IS TO BE USED WHEN BRANCH IS EQUAL TO OR ONE SIZE SMALLER THAN MAIN PIPE
2. THE REINFORCEMENT PAD SHALL BE OBTAINED FROM PIPE SPOOL OF THE SAME SCHEDULE AND DIAMETER AS MAIN PIPE UNLESS OTHERWISE STATED.
3. THE REINFORCEMENT PAD CALCULATION SHALL BE MADE IN ACCORDANCE WITH ASME B31.3 OR IBR AS APPLICABLE.
4. ALSO SEE STANDARD 7-44-0483
5. REFER STANDARD 7-44-0479 FOR WELDING DETAILS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	10.10.25	REAFFIRMED & ISSUED AS STANDARD	SRG	PK	SH	MN
5	23.09.20	REAFFIRMED & ISSUED AS STANDARD	SG	SH	GB	SM

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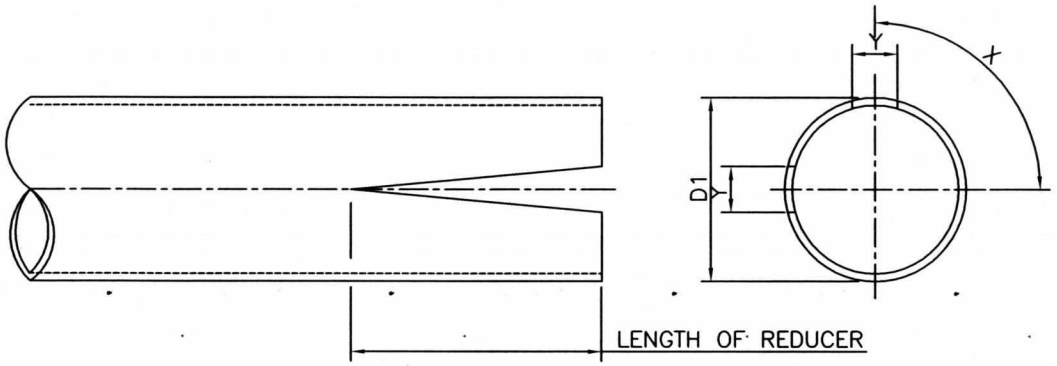

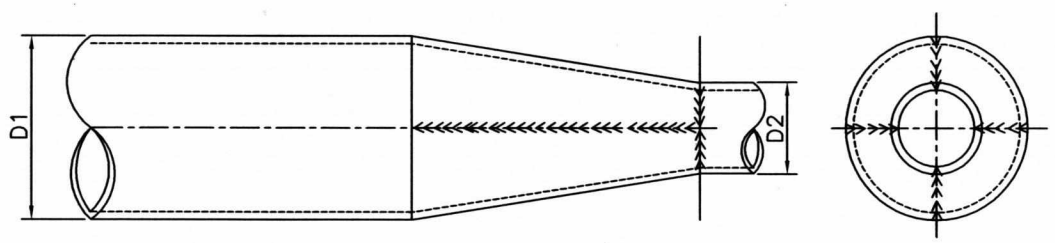

DIFFERENCE IN DIAMETER D1 – D2	NUMBER OF PIECES TO BE CUT OUT	ANGLE BETWEEN CUT OUTS X	SIZE OF CUT OUT Y	LENGTH OF REDUCER	CIRCUMFERENCE OF D1 MINUS CIRCUMFERENCE OF D2.
1"	2	180°	1 1/2"	D1	3 1/8"
2"	3	120°	2 1/4"	D1	6 1/4"
3"	3	120°	3"	D1	9 1/2"
4"	4	90°	3"	D1	12 1/2"
5"	4	90°	4"	D1	15 3/4"
6"	4	90°	4 3/4"	D1	18 3/4"
7"	6	60°	3 3/4"	D1	22"
8"	6	60°	4 1/4"	1.1XD1	25"
9"	6	60°	4 3/4"	1.1XD1	28 1/4"
10"	8	45°	4"	1.1XD1	31 1/2"
12"	8	45°	4 3/4"	1.1XD1	37 3/4"
14"	10	36°	4 1/2"	1.1XD1	44"
16"	12	30°	4 1/4"	1.1XD1	50 1/4"
18"	12	30°	4 3/4"	1.1XD1	56 1/2"
20"	12	30°	5 1/4"	1.1XD1	62 3/4"

NOTES:–

1. CUT OUT REQUIRED NUMBER OF PIECES IN ACCORDANCE WITH TABLE. HEAT & BEND ENDS OF PIPE TO CONFORM WITH DIAMETER D2. WELD ALL AROUND.
2. RADIOGRAPHY SHALL BE PERFORMED IN ACCORDANCE WITH REQUIREMENTS OF INDIVIDUAL PIPING CLASSES.

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6	22.01.24	REAFFIRMED & ISSUED AS STANDARD	PK	SH	MN
5	31.12.18	REAFFIRMED & ISSUED AS STANDARD	PK	SH	MI / RKT

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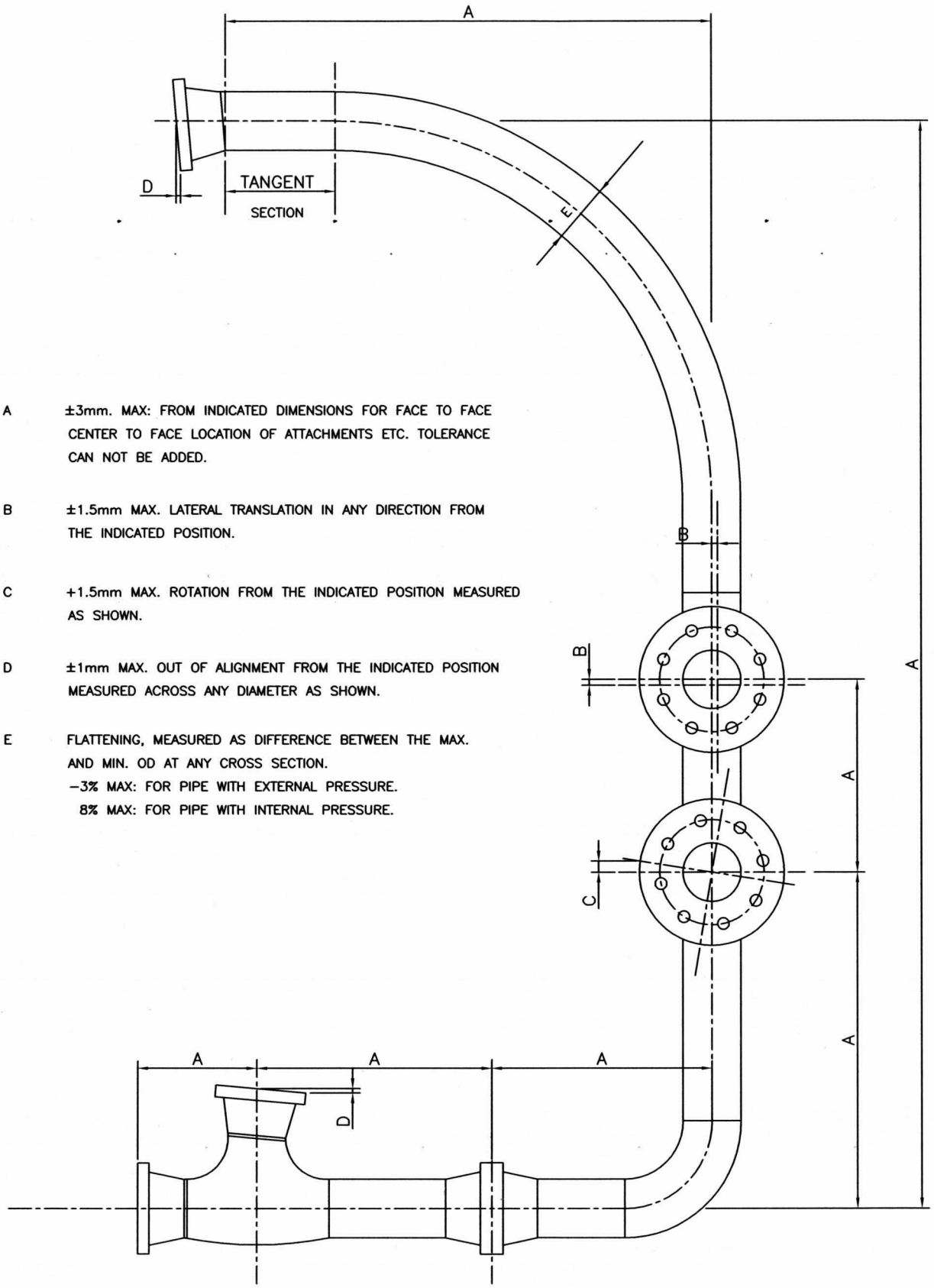

A ±3mm. MAX: FROM INDICATED DIMENSIONS FOR FACE TO FACE CENTER TO FACE LOCATION OF ATTACHMENTS ETC. TOLERANCE CAN NOT BE ADDED.

B ±1.5mm MAX. LATERAL TRANSLATION IN ANY DIRECTION FROM THE INDICATED POSITION.

C +1.5mm MAX. ROTATION FROM THE INDICATED POSITION MEASURED AS SHOWN.

D ±1mm MAX. OUT OF ALIGNMENT FROM THE INDICATED POSITION MEASURED ACROSS ANY DIAMETER AS SHOWN.

E FLATTENING, MEASURED AS DIFFERENCE BETWEEN THE MAX. AND MIN. OD AT ANY CROSS SECTION.
−3% MAX: FOR PIPE WITH EXTERNAL PRESSURE.
8% MAX: FOR PIPE WITH INTERNAL PRESSURE.

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5	31.12.18	REAFFIRMED & ISSUED AS STANDARD	PK	SH	MI	RKT

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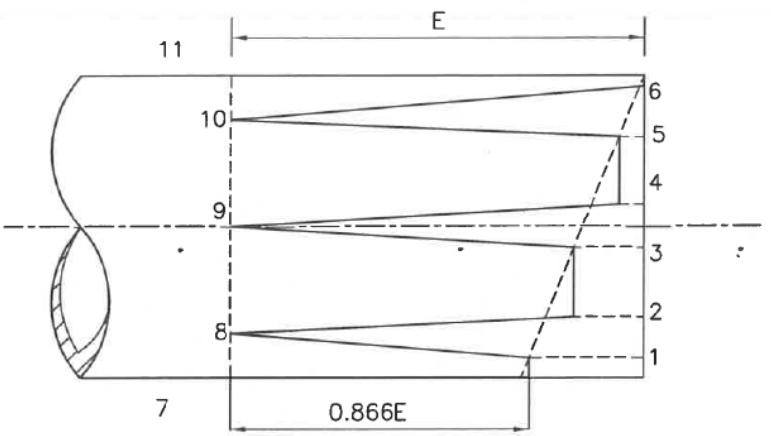
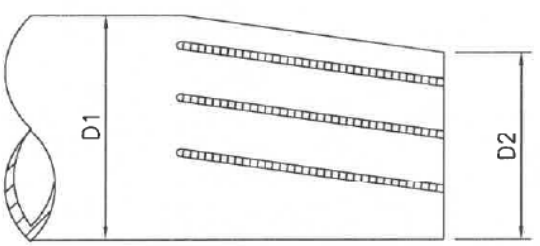
METHOD OF CUTTING AND DIMENSIONS OF FIELD MANUFACTURED ECC. REDUCERS



SIDE VIEW

END VIEW



COMPLETED REDUCER

A = 1/8 OF SMALL PIPE CIRCUMFERENCE.
B = 3/12 DIFFERENCE BETWEEN CIRCUMFERENCES.
C = 2/12 DIFFERENCE BETWEEN CIRCUMFERENCES.
D = 1/12 DIFFERENCE BETWEEN CIRCUMFERENCES.
E = 1.5 x O.D. OF LARGER PIPE.

NOTES :–

1. REDUCER SHALL BE FABRICATED OUT OF LINE PIPE.
2. ALL WELDS SHALL BE RADIOGRAPHED AS PER THE PIPING CLASS NDT REQUIREMENTS.
3. THE DIFFERENCE BETWEEN D1 & D2 SHALL NOT BE MORE THAN 20" NOMINAL BORE.

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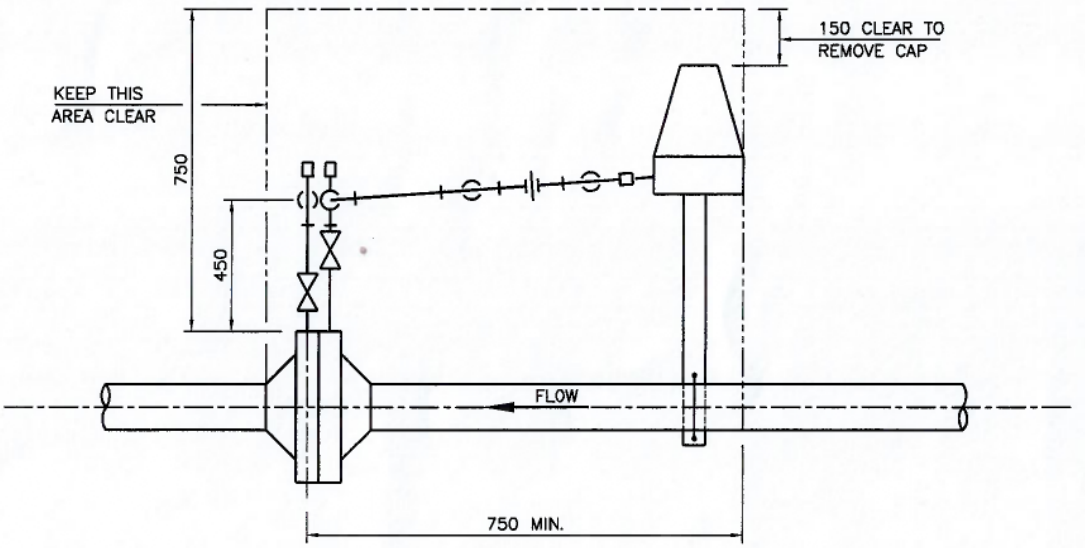
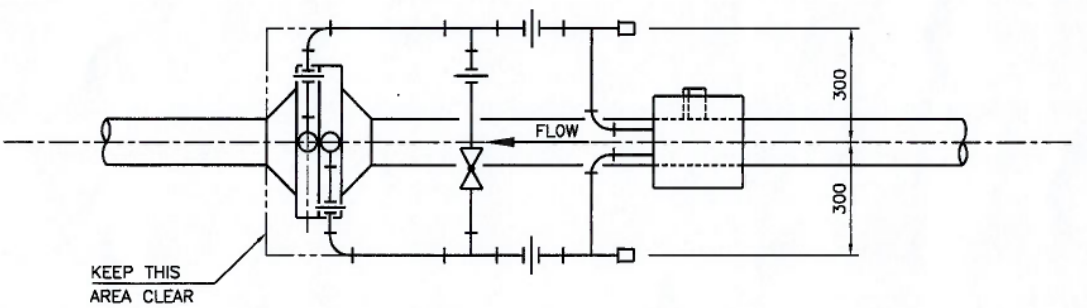


ELEVATION



PLAN

90° TOP TAPS – DRY GAS SERVICE / HF ACID

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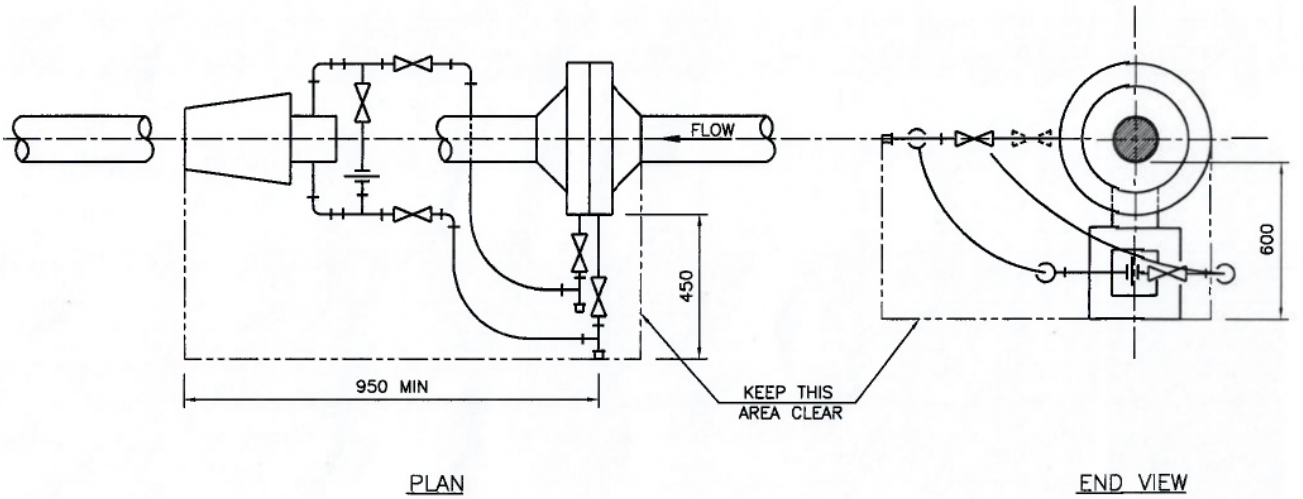
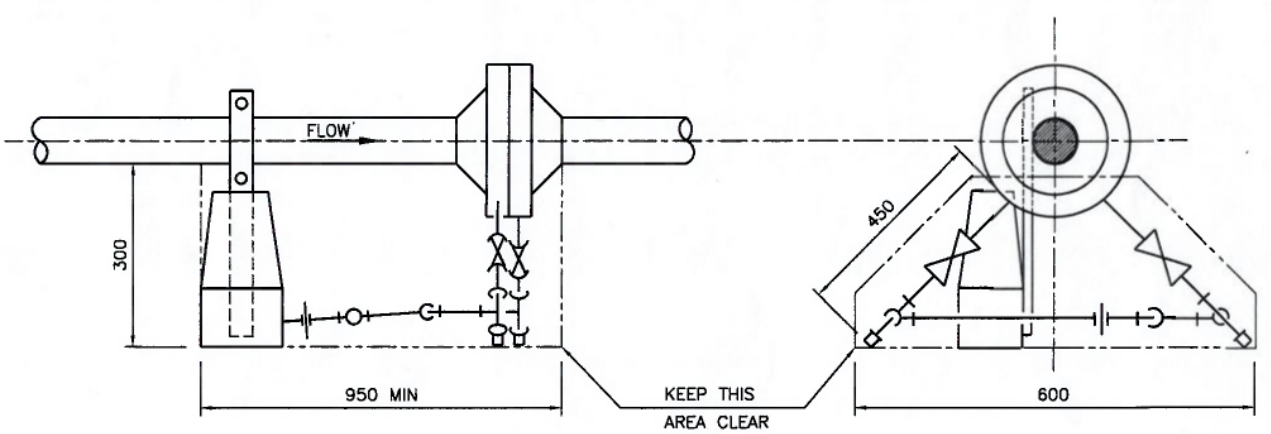


PLAN END VIEW

90° HORIZONTAL TAPS – LIQUID OR STEAM SERVICE



ELEVATION END VIEW

45° BOTTOM TAPS – HORIZONTAL LIQUID SERVICE

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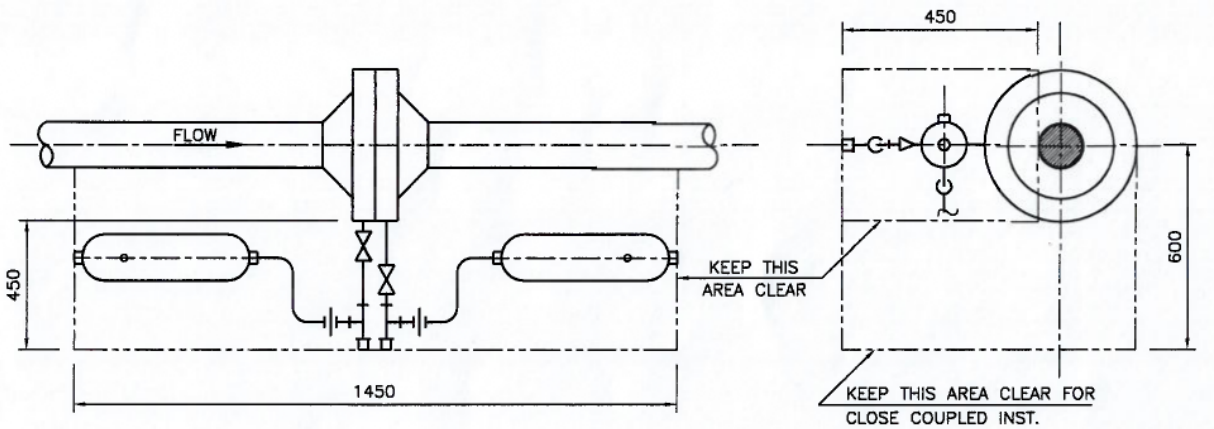
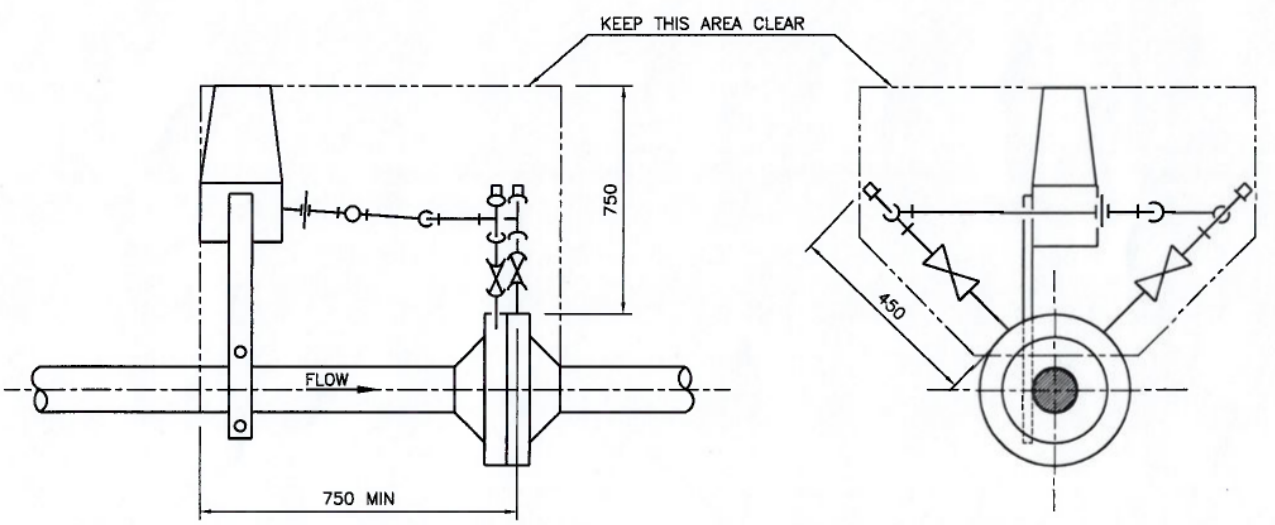


PLAN

END VIEW

90° HORIZONTAL TAPS STEAM SERVICE W/CONDENSATE POTS



ELEVATION

END VIEW

45° TOP TAPS – HORIZONTAL GAS SERVICE

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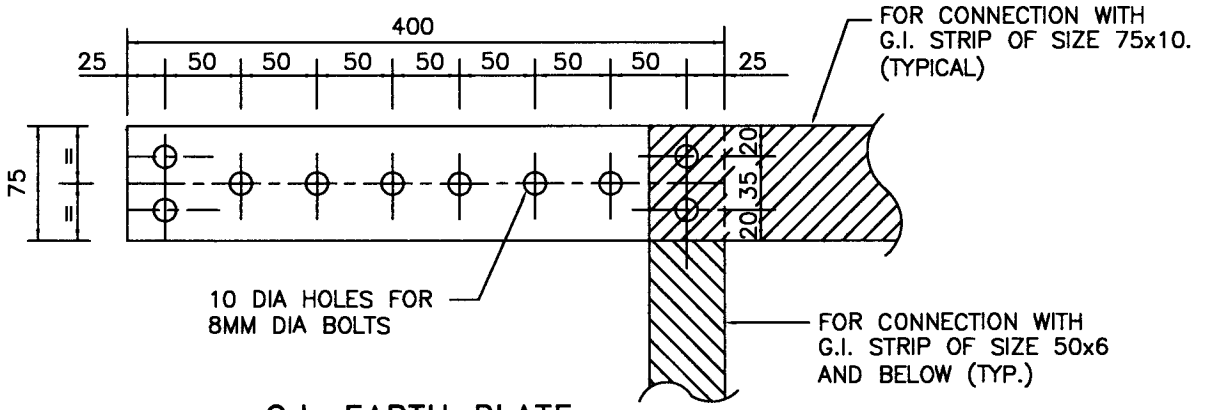
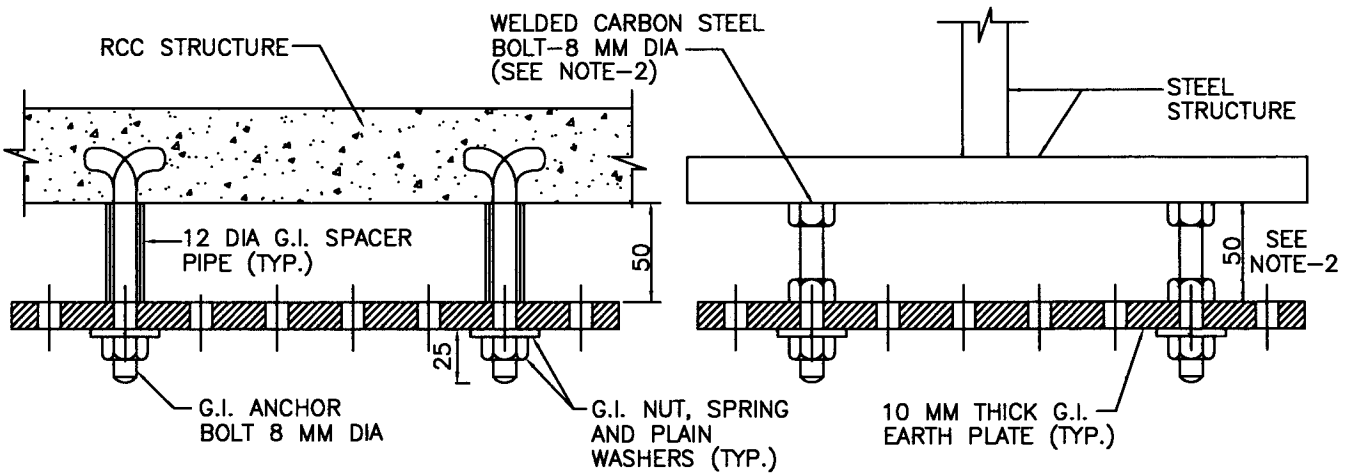
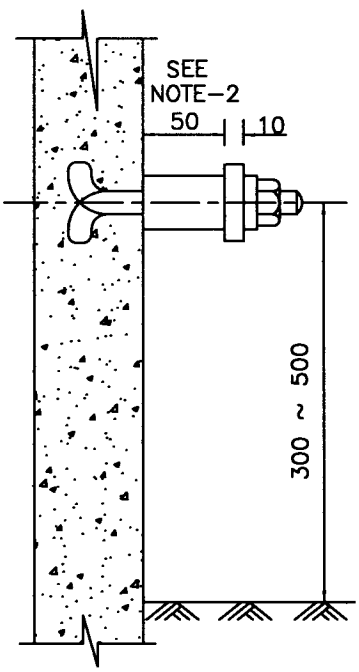
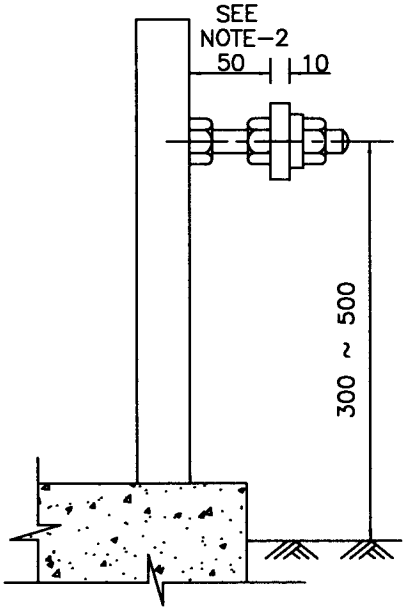


G.I. EARTH PLATE

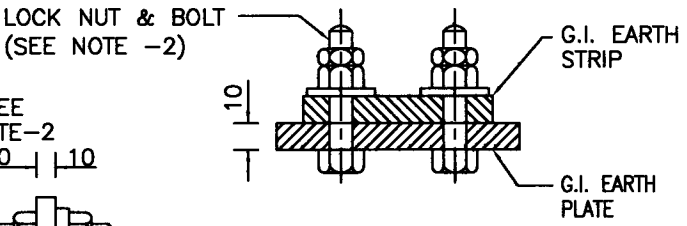




TYPICAL INSTALLATION OF EARTH PLATE ON R.C.C. STRUCTURES



TYPICAL INSTALLATION OF EARTH PLATE ON STEEL STRUCTURES



TYPICAL FIXING DETAIL OF G.I. EARTH STRIP TO EARTH PLATE

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. WHERE FIRE PROOFING OF STEEL STRUCTURES ARE ENCOUNTERED LENGTH OF CARBON STEEL BOLTS SHALL BE SUITABLY INCREASED FOR FIXING OF EARTH PLATE.
3. ALL CONNECTIONS WITH EARTH PLATE SHALL BE MADE WITH 8MM DIA. G.I. BOLT, NUT, SPRING AND PLAIN WASHERS.
4. CRIMP TYPE CABLE LUGS SHALL BE USED FOR CONNECTION WITH G.I. WIRE ROPE/CU/AL CABLES.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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7	01.11.21	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
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5	27.06.11	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP	DM

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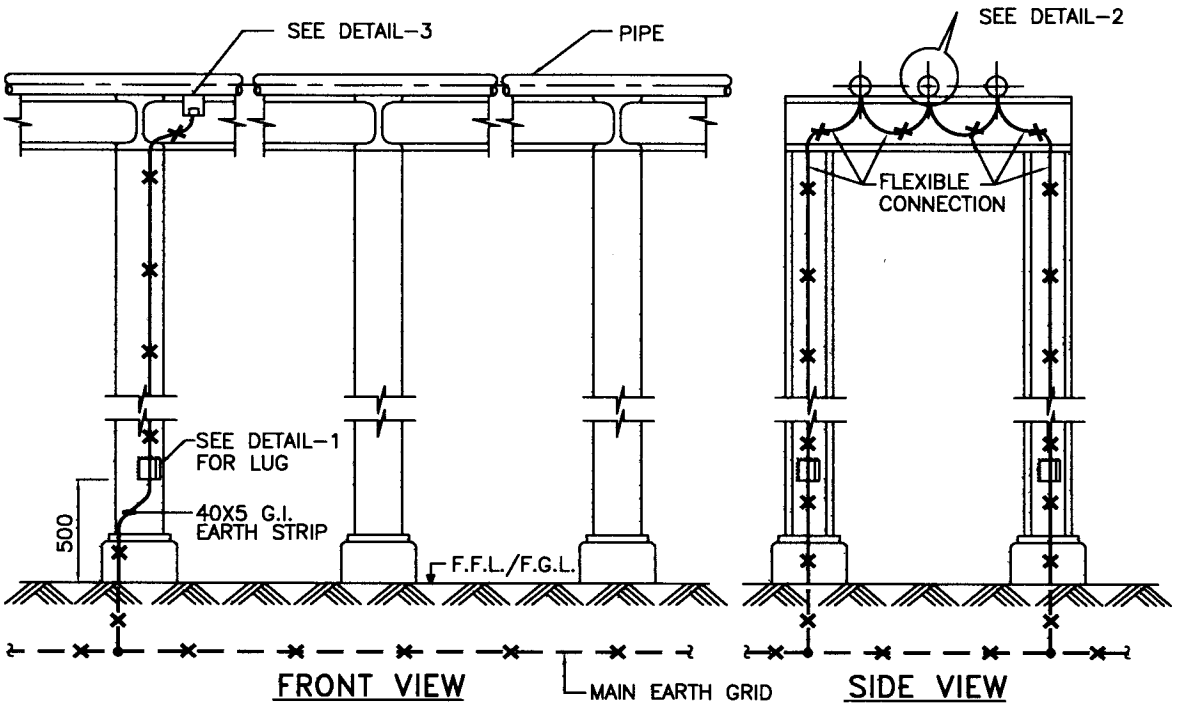

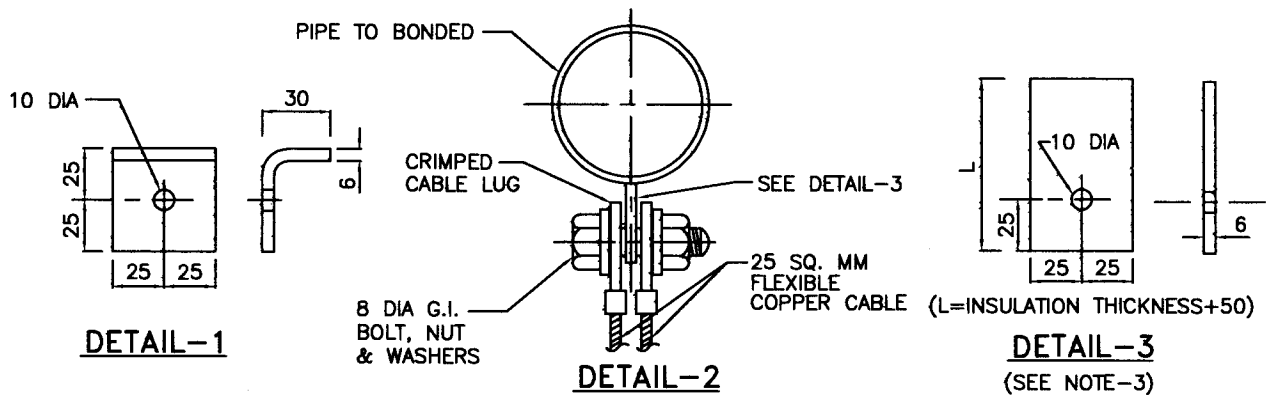

NOTES:-

1. UNLESS MENTIONED OTHERWISE ON PLANS OR JOB SPECIFICATIONS, THE PIPE LINES SHALL BE BONDED AND EARTHED ONLY AT THE ENTRY AND EXIT POINTS OF BATTERY LIMIT OF PROCESS UNIT HANDLING FLAMMABLE SUBSTANCES.
2. STEEL PIPE RACKS IN THE PROCESS UNIT AND OFFSITE AREA SHALL BE EARTHED AT MAXIMUM SPACING OF 25 METRES.
3. BEFORE HYDROTESTING OF PIPELINES, PIPING CONTRACTOR SHALL WELD A PLATE (AS SHOWN IN DETAIL-3) OF SUITABLE MATERIAL TO SUIT PIPELINE MATERIAL.
4. SUPPLY OF FLEXIBLE COPPER CABLE, LUGS, BOLTS, NUTS AND WASHERS ETC. AND MAKING CONNECTIONS SHALL BE DONE BY ELECTRICAL CONTRACTOR.

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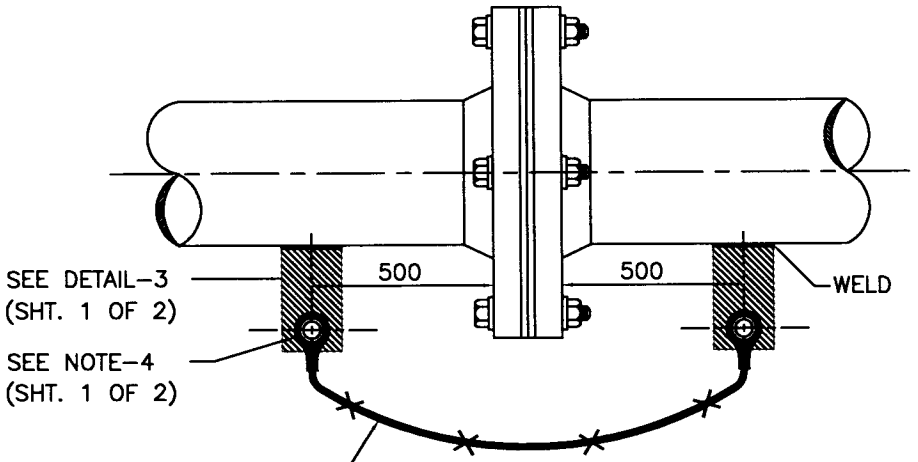
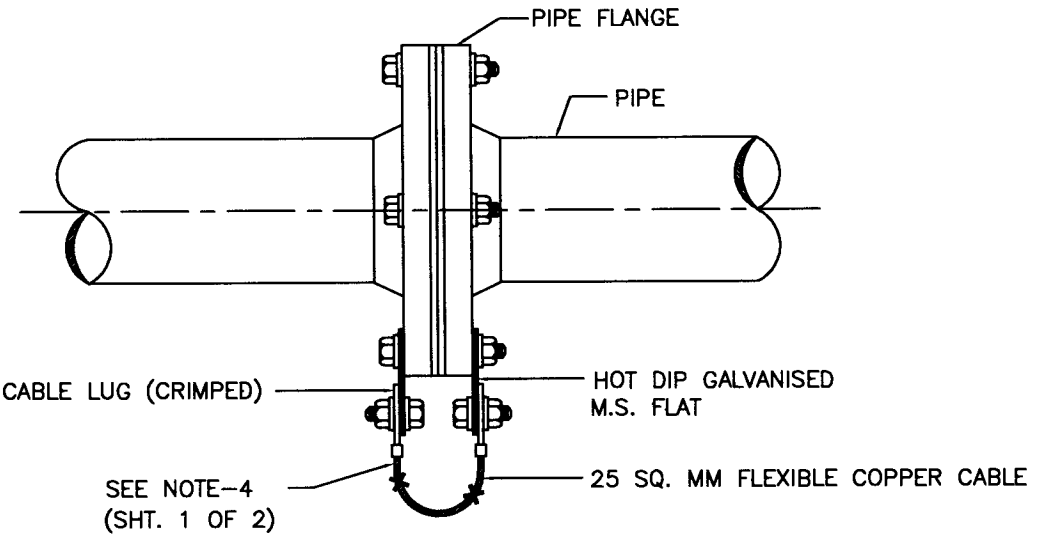
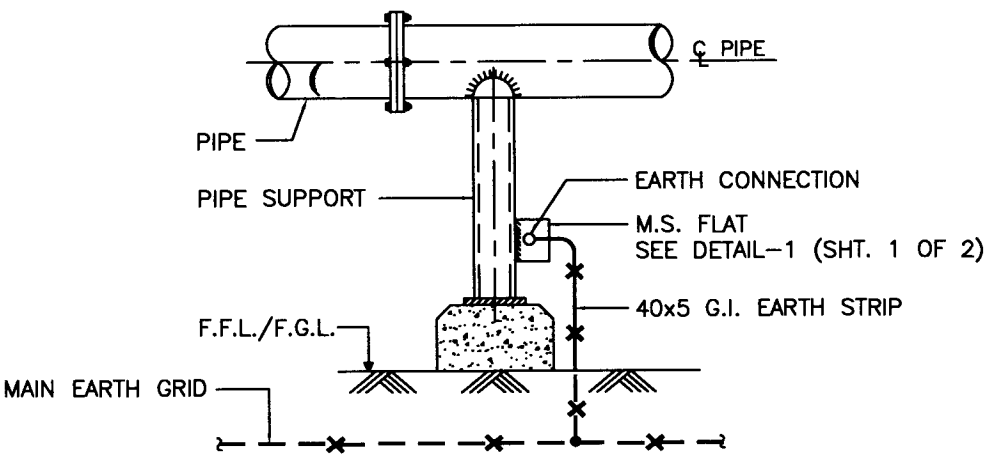


ARRANGEMENT–1



ARRANGEMENT–2

(APPLICABLE WHERE WELDED FLAT ARE NOT AVAILABLE AS PER ARRANGEMENT–1)



ARRANGEMENT–3

(APPLICABLE WHEREVER PIPE SUPPORTS ARE WELDED ON BOTH SIDES OF FLANGES / VALVES ETC.)

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6	07.12.21	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
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TYPE OF EQUIPMENT	EARTH CONDUCTOR SIZE (SEE NOTE-1)
LV MOTORS UPTO 3.7KW	8 SWG SOLID G.I. WIRE
LV MOTORS FROM 5.5KW TO 30KW & WELDING RECEPTACLES	10 MM (3/8") DIA G.I. WIRE ROPE
LV MOTORS ABOVE 30KW INCLUDING MV MOTORS	16 MM (5/8") DIA G.I. WIRE ROPE/ 40x5 MM G.I. STRIP
BUILDING COLUMNS	40 x 5 G.I. STRIP
STORAGE TANKS (VERTICAL & HORIZONTAL)	40 x 5 G.I. STRIP
LOADING RACKS	40 x 5 G.I. STRIP
VESSELS & HEAT EXCHANGERS	40 x 5 G.I. STRIP
SMALL EQUIPMENT & INSTRUMENTS	8 SWG SOLID G.I. WIRE
LIGHTING, POWER & INSTRUMENT PANELS	10 MM (3/8") DIA G.I. WIRE ROPE
MAIN EARTH BUS / LV, MV, HV & EHV SWITCH GEAR INTERCONNECTIONS/ POWER TRANSFORMER	AS SPECIFIED
EHV, HV & MV SUB-STATIONS	AS SPECIFIED
PUSH BUTTON STATIONS	8 SWG SOLID G.I. WIRE
STREET LIGHT POLES	10 MM (3/8") DIA G.I. WIRE ROPE
LIGHTING TRANSFORMER	16 MM (5/8") DIA G.I. WIRE ROPE
PIPE RACK	40 X 5 G.I. STRIP
BONDING OF PIPE	25 SQ. MM INSULATED FLEXIBLE CU. CABLE
LIGHTNING PROTECTION	25 X 3 MM G.I. EARTH STRIP
CABLE TRAYS	40 X 5 G.I. STRIP

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7	08.11.16	REVISED AND ISSUED AS STANDARD	BP	FA/HK	BRB	RN

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TYPE OF EQUIPMENT	ALUMINUM CABLE (SEE NOTE-1&2)	COPPER CABLE (SEE NOTE-1&2)
LV MOTORS UPTO 3.7KW	16 SQ MM	10 SQ MM
LV MOTORS FROM 5.5KW TO 30KW	16 SQ MM	10 SQ MM
LV MOTORS ABOVE 30KW TO 55KW	25 SQ MM	16 SQ MM
LV MOTORS ABOVE 55KW TO 160KW	70 SQ MM	50 SQ MM
MV MOTORS	120 SQ MM	95 SQ MM
STORAGE TANKS (VERTICAL & HORIZONTAL)	70 SQ MM	50 SQ MM
VESSELS & HEAT EXCHANGERS	25 SQ MM	16 SQ MM
LIGHTING, POWER & INSTRUMENT PANELS	10 SQ MM	10 SQ MM
PUSH BUTTON STATIONS	10 SQ MM	10 SQ MM
STREET LIGHT POLES & FLOOD LIGHT MAST	16 SQ MM	10 SQ MM
PIPE RACK	25 SQ MM	16 SQ MM
WELDING RECEPTACLES	25 SQ MM	16 SQ MM

NOTE:-

1. TYPE OF EARTH CONNECTIONS TO INDIVIDUAL EQUIPMENT (I.E. WIRE ROPE / STRIP OR CABLE) FROM NEAREST EARTH PLATE / GRID SHALL BE SELECTED AS SPECIFIED ELSEWHERE. CABLE/WIRE ROPE CONNECTIONS SHALL BE MADE USING CRIMP TYPE OF LUGS.

2. EARTHING CABLE SHALL BE SINGLE CORE PVC INSULATED GREEN COLOR/GREEN WITH YELLOW COLOR STRIPE OUTER SHEATH.

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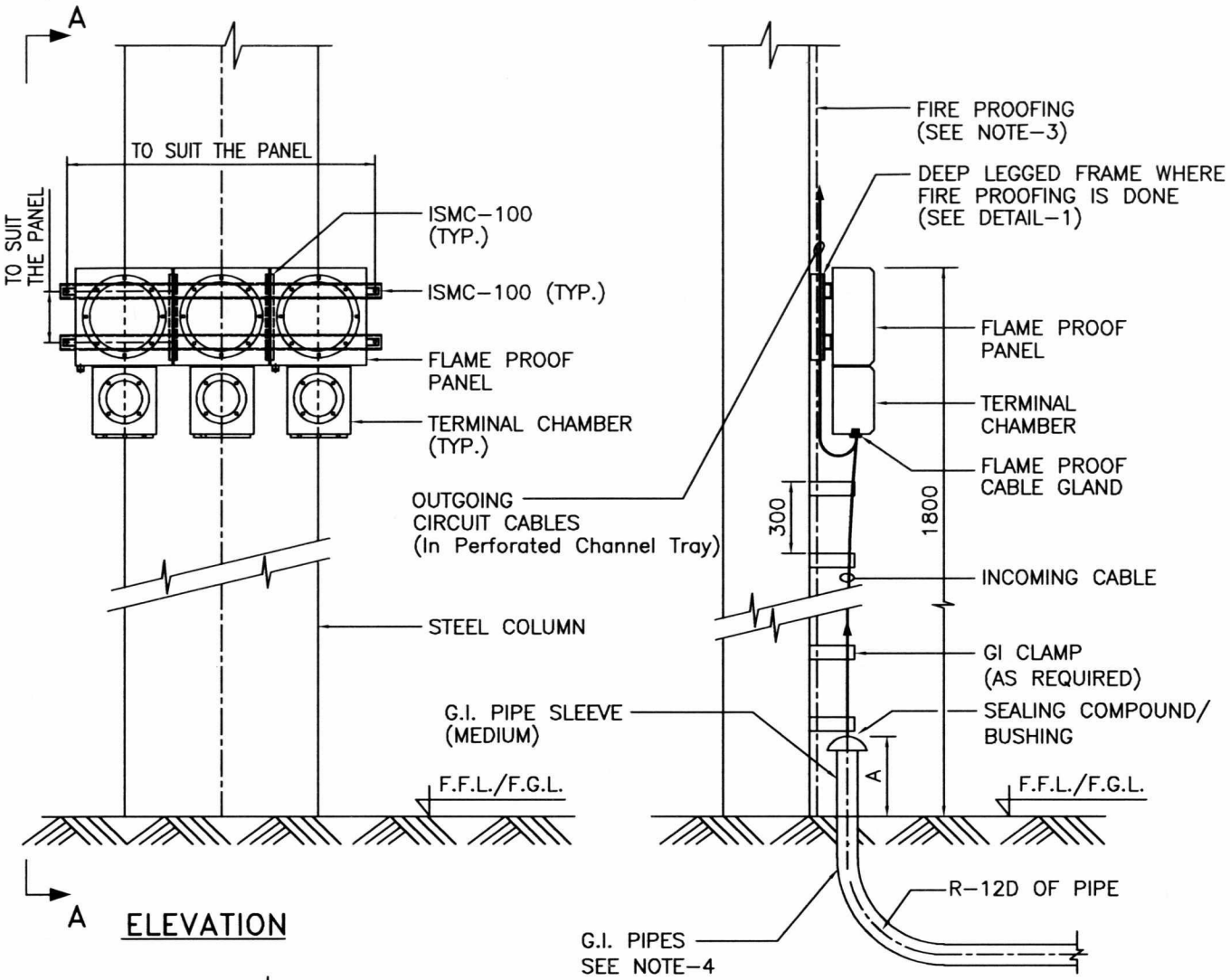

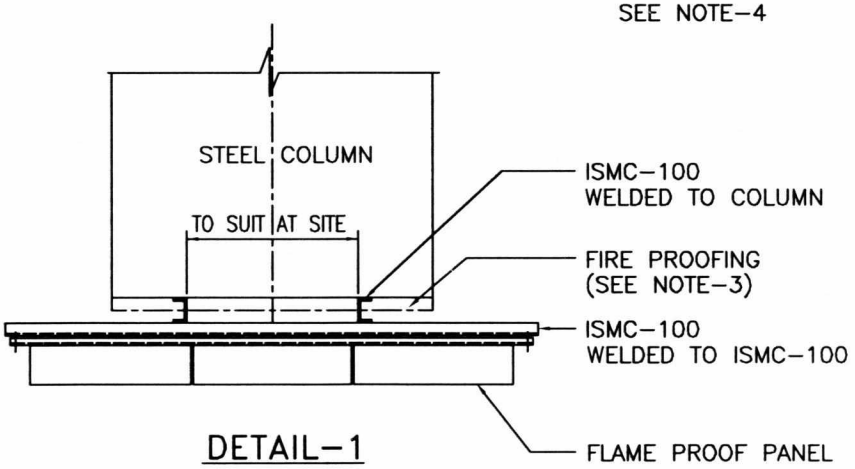

NOTES:–

A= { 150 MM (MIN.) FOR INDOOR LOCATIONS. / 300 MM (MIN.) FOR OUTDOOR LOCATIONS.

1. ALL DIMENSIONS ARE IN MM.
2. THE SUPPORT STRUCTURES SHALL BE PAINTED WITH SAME PAINT, AS FOLLOWED FOR CORRESPONDING STRUCTURE.
3. WHERE FIRE PROOFING COLUMNS / STRUCTURES ARE ENCOUNTERED, FLAME PROOF PANEL AND CABLE SHALL BE INSTALLED ON A SUITABLE DEEP LEGGED CHANNEL FRAME / DISTANCE BRACKET.
4. QUANTITY AND SIZE OF PIPE SLEEVES SHALL BE AS PER LAYOUT DRAWINGS.

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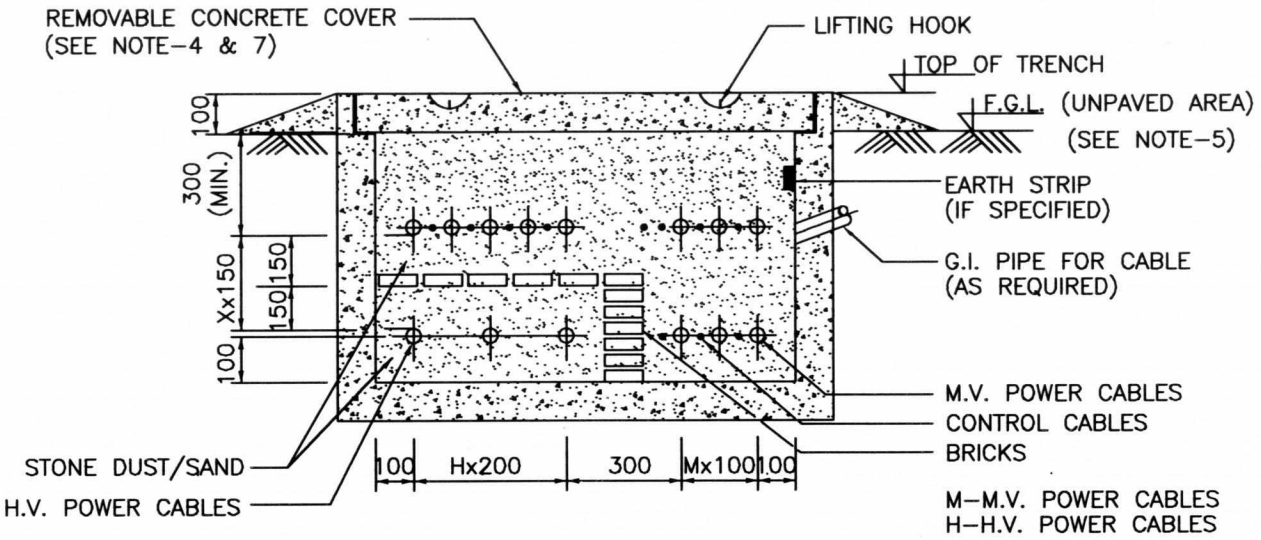
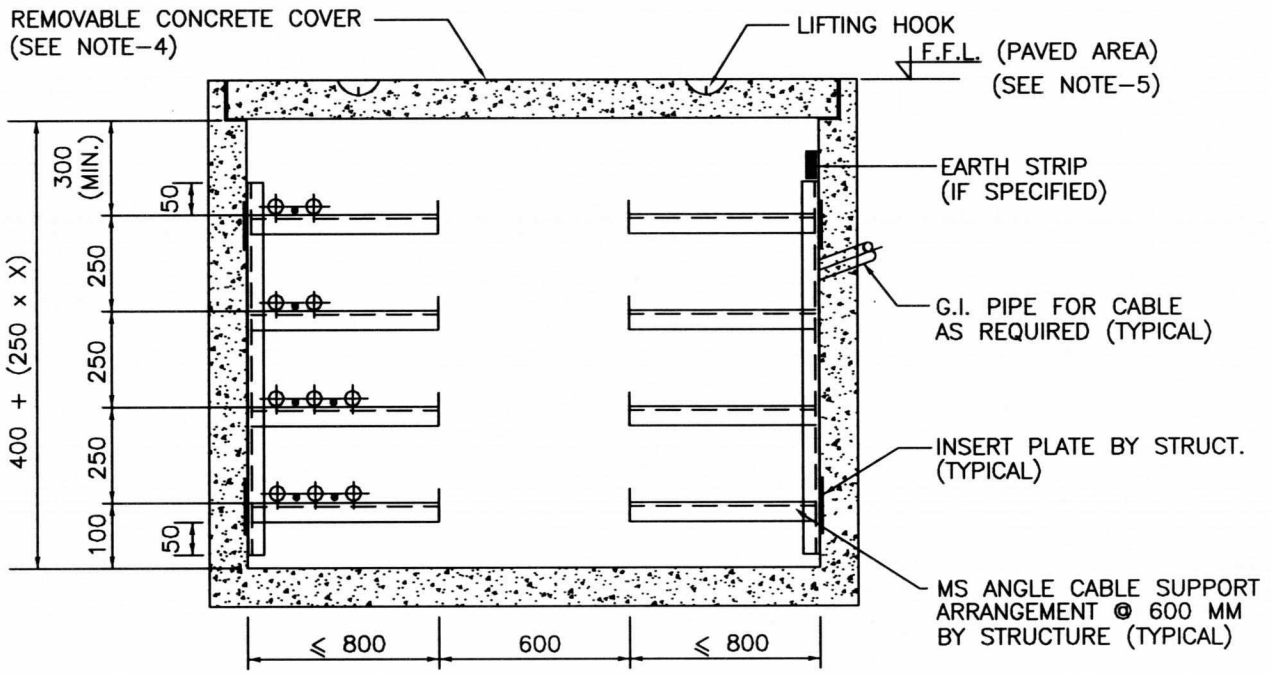


TYPICAL SECTION OF RCC CABLE TRENCH WITHOUT RACKS



TYPICAL SECTION OF RCC CABLE TRENCH WITH RACKS

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. WIDTH OF RACKS ON ONE SIDE OR BOTH SIDES SHALL BE DECIDED AS PER JOB REQUIREMENT.
3. THE EXACT HEIGHT OF OPENING IN TRENCH WALL FOR G.I. PIPE FOR TAKING CABLE SHALL BE SUITABLY DECIDED AT SITE.
4. THE REMOVABLE CONCRETE COVERS SHALL BE SEALED WITH MASTIC ASPHALT FILLER / BITUMEN TO PREVENT INGRESS OF WATER / HYDROCARBONS IN CABLE TRENCH.
5. TOP OF THE TRENCH SHALL BE 100 MM ABOVE FINISHED GRADE LEVEL (F.G.L.) IN CASE OF UNPAVED AREAS AND SHALL BE FLUSHED WITH FINISHED FLOOR LEVEL (F.F.L.) IN CASE OF PAVED AREAS.
6. MINIMUM GAP OF 250MM SHALL BE PROVIDED BETWEEN FA / COMMUNICATION / TELEPHONE CABLES AND ALL OTHER POWER / CONTROL CABLES.
7. INSTEAD OF REMOVABLE CONCRETE COVER, PCC/LEAN CONCRETE SHALL BE PROVIDED IF SPECIFIED IN JOB SPECIFICATION. THE THICKNESS OF PCC SHALL BE MININUM 100mm OR AS SPECIFIED IN STRUCTURAL SPECIFICATION.

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7	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
6	09.03.18	UPDATED & ISSUED AS STANDARD	RSD	VKS/HK	BRB	RN
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ELECTRICAL POWER IS THE MAINSTAY OF ANY CONSTRUCTION ACTIVITY. AT THE SAME TIME IT REQUIRES UTMOST CARE IN IT'S UTILISATION TO AVOID ACCIDENTS DUE TO ELECTRICAL SHOCK, FIRE INCIDENTS OR ELECTRIC SHORT CIRCUITS. EXPOSURE OF ELECTRICAL INSTALLATION TO ADVERSE ENVIRONMENTAL CONDITIONS INCREASE THE RISK OF SUCH ACCIDENTS. HENCE IT IS NECESSARY TO TAKE EXTRA PRECAUTIONS FOR SUCH INSTALLATIONS TO ENSURE SAFETY OF PERSONNEL AND EQUIPMENT. THIS STANDARD ADDRESSES THE SAFETY MEASURES REQUIRED TO BE ADOPTED FOR THE ELECTRICAL INSTALLATIONS BY ALL CONTRACTORS DURING CONSTRUCTION PHASE.

1. ALL ELECTRICAL CONNECTIONS/WORK FOR ELECTRICAL INSTALLATIONS SHALL BE CARRIED OUT AS PER PROVISIONS OF THE LATEST REVISION OF THE FOLLOWING CODES AND STANDARDS IN ADDITION TO THE REQUIREMENTS OF STATUTORY AUTHORITIES AND CEA REGULATIONS–2010.
   OISD–STD–173 : FIRE PREVENTION AND PROTECTION SYSTEM FOR ELECTRICAL INSTALLATIONS.
   OISD–STD–192 : SAFETY PRACTICE DURING CONSTRUCTION.
   SP–30 (BIS) : NATIONAL ELECTRIC CODE.
   THE INSTALLATION SHALL HAVE APPROVAL FROM CONCERNED STATUTORY AUTHORITIES.
2. ALL ELECTRICAL CONNECTIONS SHALL BE DONE BY AN ELECTRICIAN WITH VALID LICENCE AND TO THE SATISFACTION OF ENGINEER–IN–CHARGE.
3. ONE COMPETENT LICENCED ELECTRICIAN SHALL BE MADE AVAILABLE BY CONTRACTOR AT SITE ROUND THE CLOCK TO ATTEND TO THE NORMAL/EMERGENCY JOBS.
4. ALL SWITCH BOARDS/WELDING MACHINES SHALL BE KEPT IN WELL VENTILATED & COVERED SHED. THE SHED SHALL BE ELEVATED TO AVOID WATER LOGGING. NO FLAMMABLE MATERIALS SHALL BE USED FOR CONSTRUCTING THE SHED. ALSO FLAMMABLE MATERIALS SHALL NOT BE STORED IN AND AROUND ELECTRICAL EQUIPMENT/SWITCHBOARD. ADEQUATE CLEARANCES AND OPERATIONAL SPACE SHALL BE PROVIDED AROUND THE EQUIPMENT.
5. FIRE EXTINGUISHERS AND INSULATING MATS SHALL BE PROVIDED IN ALL POWER DISTRIBUTION CENTERS.
6. TEMPORARY ELECTRICAL EQUIPMENT SHALL NOT BE EMPLOYED IN HAZARDOUS AREAS WITHOUT OBTAINING SAFETY PERMIT.
7. PROPER HOUSE KEEPING SHALL BE DONE AROUND THE ELECTRICAL INSTALLATIONS.
8. ALL TEMPORARY INSTALLATIONS SHALL BE TESTED BEFORE ENERGISING, TO ENSURE PROPER EARTHING, BONDING, SUITABILITY OF PROTECTION SYSTEM, ADEQUACY OF FEEDERS/CABLES ETC.
9. ALL WELDERS SHALL USE HAND GLOVES IRRESPECTIVE OF HOLDER VOLTAGE.
10. MULTILINGUAL (ENGLISH, HINDI AND LOCAL LANGUAGE) CAUTION BOARDS, SHOCK TREATMENT CHARTS AND INSTRUCTION PLATE CONTAINING LOCATION OF ISOLATION POINT FOR INCOMING SUPPLY, NAME & TELEPHONE NO. OF CONTACT PERSON IN EMERGENCY SHALL BE PROVIDED IN SUBSTATIONS AND NEAR ALL DISTRIBUTION BOARDS/LOCAL PANELS.
11. OPERATION OF EARTH LEAKAGE DEVICE SHALL BE CHECKED REGULARLY BY PORTABLE ELCB/RCCB TESTER.
12. THE FOLLOWING DESIGN FEATURES SHALL BE ENSURED FOR ALL ELECTRICAL INSTALLATIONS DURING CONSTRUCTION PHASE.

12.1 EACH INSTALLATION SHALL HAVE A MAIN SWITCH WITH A PROTECTIVE DEVICE, INSTALLED IN AN ENCLOSURE ADJACENT TO THE METERING POINT. THE OPERATING HEIGHT OF THE MAIN SWITCH SHALL NOT EXCEED 1.5 M. THE MAIN SWITCH SHALL BE CONNECTED TO THE POINT OF SUPPLY BY MEANS OF ARMOURED CABLE.

12.2 THE OUTGOING FEEDERS SHALL BE DOUBLE OR TRIPLE POLE SWITCHES WITH FUSES/MCBs. LOADS IN A THREE PHASE CIRCUIT SHALL BE BALANCED AS FAR AS POSSIBLE AND LOAD ON NEUTRAL SHOULD NOT EXCEED 20% OF LOAD IN THE PHASE.

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12.3 THE INSTALLATION SHALL BE ADEQUATELY PROTECTED AGAINST OVERLOAD, SHORT CIRCUIT AND EARTH LEAKAGE BY THE USE OF SUITABLE PROTECTIVE DEVICES. FUSES WHEREVER USED SHALL BE HRC TYPE. USE OF REWIRABLE FUSES SHALL BE STRICTLY PROHIBITED. THE EARTH LEAKAGE DEVICE SHALL HAVE AN OPERATING CURRENT NOT EXCEEDING 30 mA.

12.4 ALL CONNECTIONS TO THE HANDTOOLS/WELDING RECEPTACLES SHALL BE TAKEN THROUGH PROPER SWITCHES, SOCKETS AND PLUGS.

12.5 ALL SINGLE PHASE SOCKETS SHALL BE MINIMUM 3 PIN TYPE ONLY. ALL UNUSED SOCKETS SHALL BE PROVIDED WITH SOCKET CAPS.

12.6 ONLY 3 CORE (P+N+E) OVERALL SHEATHED FLEXIBLE CABLES WITH MINIMUM CONDUCTOR SIZE OF 1.5 MM^2 COPPER SHALL BE USED FOR ALL HAND TOOLS.

12.7 ONLY METALLIC DISTRIBUTION BOXES WITH DOUBLE EARTHING SHALL BE USED AT SITE. NO WOODEN BOXES SHALL BE USED.

12.8 ALL POWER CABLES SHALL BE TERMINATED WITH COMPRESSION TYPE NICKEL PLATED BRASS CABLE GLANDS. LUGS OF COPPER/ALUMINIUM/BIMETALLIC MATERIAL, AS APPLICABLE SHALL BE USED FOR MULTISTRAND WIRES/CABLES HAVING MUTISTRAND/SOLID CONDUCTOR.

12.9 CABLES SHALL BE FREE FROM ANY INSULATION DAMAGE.

12.10 CABLES SHALL BE LAID IN UNDERGROUND AT A MINIMUM DEPTH OF 750 MM, FOR LV & CONTROLS AND 900MM FOR HV CABLES COVERED WITH SAND, BRICK AND SOIL FOR ENSURING MECHANICAL PROTECTION. CABLES SHALL NOT BE LAID IN WATER LOGGED AREA AS FAR AS PRACTICABLE. CABLE ROUTE MARKERS SHALL BE PROVIDED AT EVERY 25 M OF BURIED TRENCH ROUTE. WHEN LAID ABOVE GROUND, CABLES SHALL BE PROPERLY CLEATED OR SUPPORTED ON RIGID POLES OF ATLEAST 2.1 M HIGH. MINIMUM HEAD CLEARANCE OF 6 METERS SHALL BE PROVIDED AT ROAD CROSSING.

12.11 UNDER GROUND CABLES SHALL NOT BE ALLOWED TO CROSS THE ROADS WITHOUT PIPE SLEEVE.

12.12 ALL CABLE JOINTS SHALL BE DONE WITH PROPER JOINTING KIT. NO TAPED/TEMPORARY JOINTS SHALL BE USED.

12.13 AN INDEPENDENT EARTHING FACILITY SHOULD PREFERABLY BE ESTABLISHED WITHIN THE TEMPORARY INSTALLATION PREMISES. ALL APPLIANCES AND EQUIPMENT SHALL BE ADEQUATELY EARTHED. IN CASE ARMOURED CABLES ARE USED, THE ARMOUR SHALL BE BONDED TO THE EARTHING SYSTEM.

12.14 ALL CABLES AND WIRE ROPE USED FOR EARTH CONNECTIONS SHALL BE TERMINATED THROUGH LUGS OF TINNED COPPER/ALUMINIUM/ BIMETALLIC MATERIAL, AS APPLICABLE.

12.15 IN CASE OF LOCAL EARTHING, EARTH ELECTRODES SHALL BE BURIED NEAR THE SUPPLY POINT AND EARTH CONTINUITY WIRE SHALL BE CONNECTED TO LOCAL EARTH PLATE FOR FURTHER DISTRIBUTION TO VARIOUS APPLIANCES. ALL INSULATED WIRES FOR EARTH CONNECTION SHALL HAVE INSULATION OF GREEN COLOUR.

12.16 SEPARATE CORE SHALL BE PROVIDED FOR NEUTRAL. EARTH/STRUCTURES SHALL NOT BE USED AS A NEUTRAL IN ANY CASE.

12.17 ON/OFF POSITION OF ALL SWITCHES SHALL BE CLEARLY DESIGNATED/PAINTED FOR EASY ISOLATION IN EMERGENCY.

13. ALL INSULATIONS AND ELECTRICAL INSTALLATIONS SHALL BE INSPECTED BY ENGINEER-IN-CHARGE ATLEAST ONCE IN A MONTH.

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2	02.03.12	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP/JMS	DM

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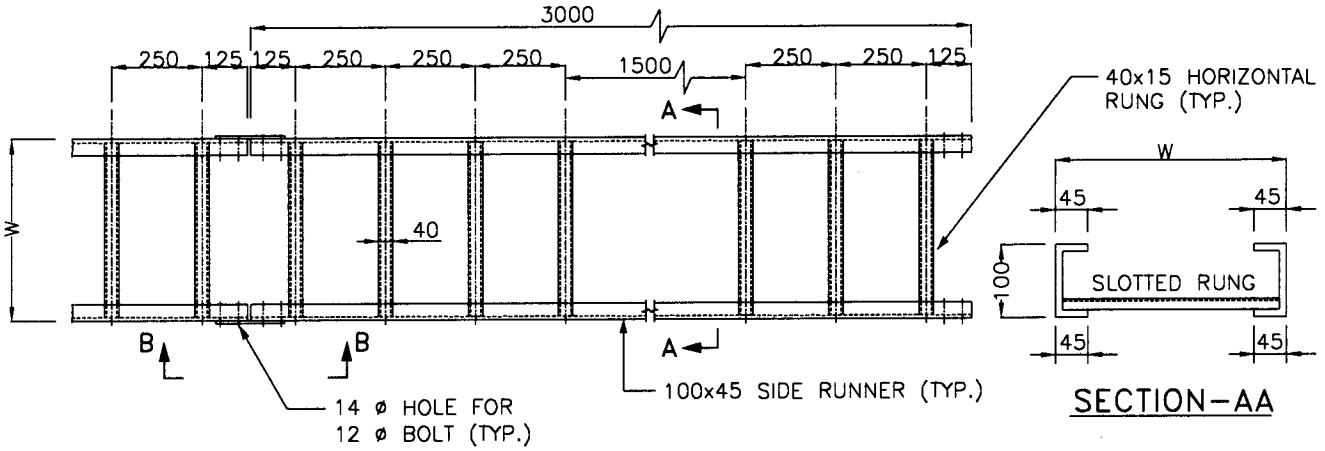
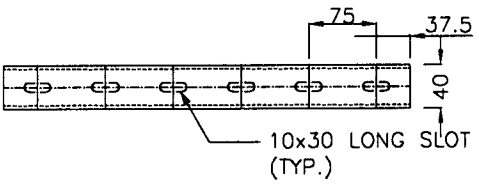
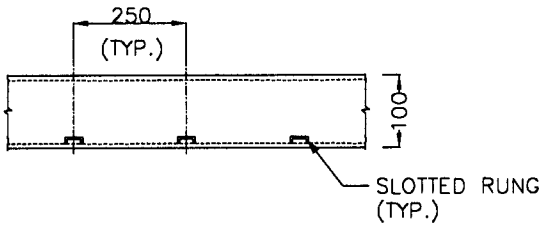


SECTION–AA

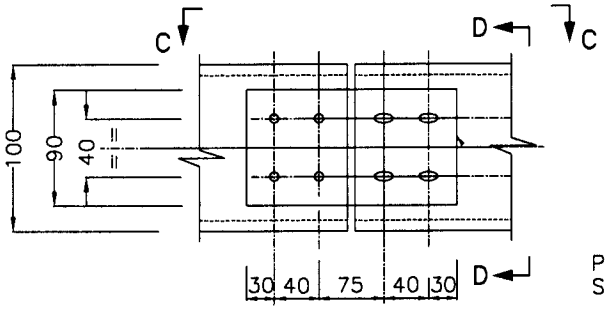
LADDER TYPE CABLE TRAY
(W=300/450/600/750/1000)



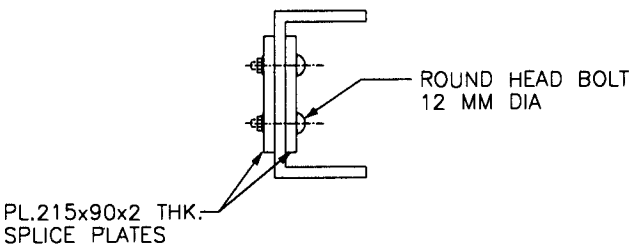
SLOTTED RUNG



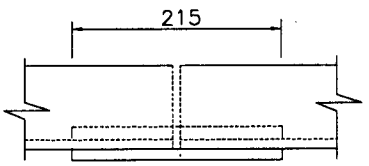
SIDE RUNNER



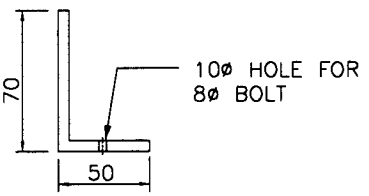
VIEW B–B



SECTION D–D



VIEW C–C



BARRIER PLATE
(100 MM LONG)

NOTES:–

1. 12 DIA ROUND HEAD BOLT WITH WASHERS & NUTS CONFORMING TO IS 1367 SHALL BE USED FOR FIXING OF SPLICE PLATE.

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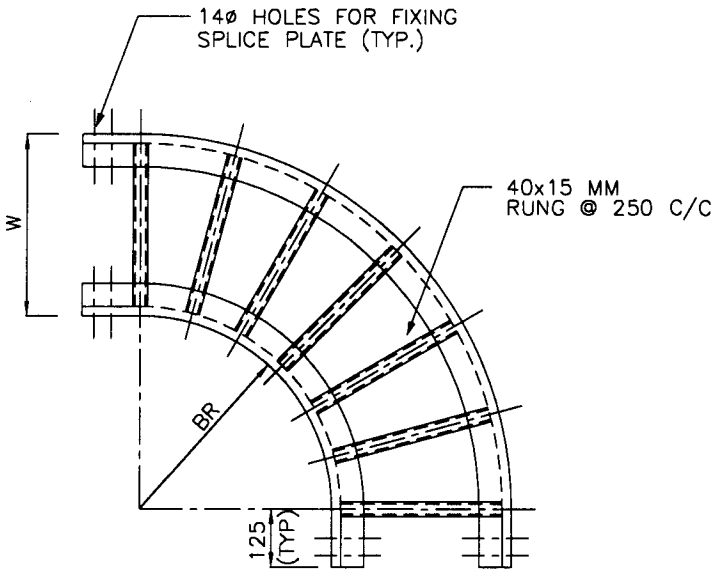
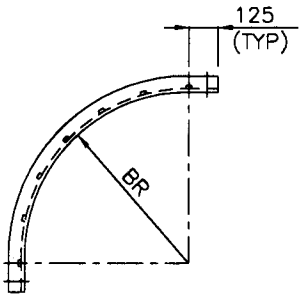
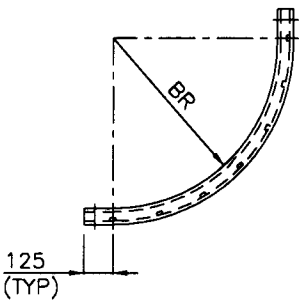


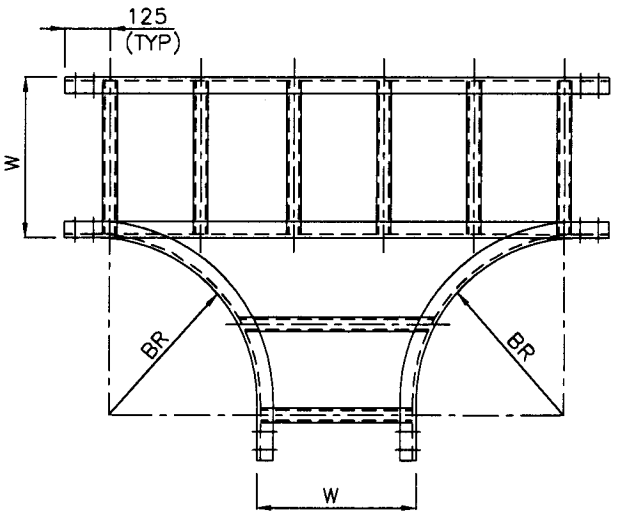
HORIZONTAL BEND



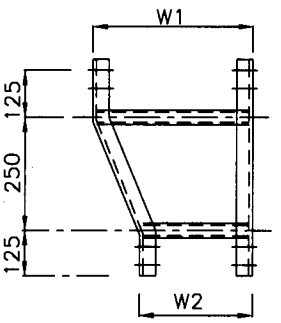
VERTICAL OUTSIDE BEND



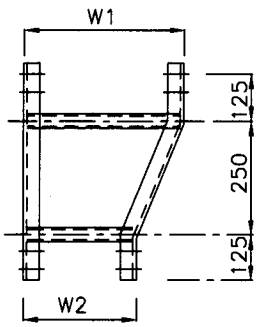
VERTICAL INSIDE BEND



'T' JOINT



LEFT HAND REDUCER



RIGHT HAND REDUCER

W – WIDTH OF CABLE TRAY (300/450/600/750/1000 MM)
W1 – WIDTH OF CABLE TRAY ON ONE SIDE
W2 – WIDTH OF CABLE TRAY ON OTHER SIDE
BR – BENDING RADIUS (750/1000/1250/1600/2000 MM)

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GENERAL NOTES:-

1. THE CABLE TRAYS AND ACCESSORIES SHALL COMPLY WITH LATEST EDITION OF INDIAN STANDARDS IS: 1367(PART-13), IS:2629, IS:5986.
2. THE CABLE TRAYS SHALL BE LADDER TYPE PREFABRICATED, HOT DIP GALVANIZED. THE LADDER TYPE TRAYS SHALL CONSIST OF SIDE RUNNERS & HORIZONTAL RUNGS AS PER DETAILS SHOWN IN PAGE 1 & 2.
3. THE LADDER TYPE TRAYS AND ACCESSORIES SHALL HAVE RIGID WELDED CONSTRUCTION AND SHALL BE FABRICATED OUT OF 2 mm THICK HOT ROLLED SHEET STEEL. THE RUNGS SHALL BE WELDED TO THE SIDE RUNNERS.
4. SIDE RUNNERS SHALL BE 100 x 45 mm CHANNEL INCLUDING FOR HOIZONTAL & VERTICAL BENDS WITH THE FLANGES FACING INSIDE. RUNGS SHALL BE 40 x 15 mm SLOTTED CHANNEL TYPE.
5. CABLE TRAYS SHALL BE SUITABLE FOR A CABLE WEIGHT OF 75 kg PER METRE OF RUNNING LENGTH OF TRAY AND SHALL BE SUPPORTED AT 3 m INTERVALS. IN ADDITION, TRAYS SHALL BE SUITABLE FOR A POINT LOAD OF 70 kg (EQUIVALENT WEIGHT OF A MAN WORKING ON THE CABLE TRAY).
6. EACH SIDE RUNNER CHANNELS SHALL BE CONNECTED AT ENDS USING 2 SPLICE PLATES ONE ON EACH SIDE AS SHOWN IN PAGE 1.
7. THE SIDE RUNNER WILL ALSO HAVE SUITABLE HOLES AT EVERY METRE FOR CLEATING EARTHING STRIP. SUITABLE THREADED HOLES SHALL BE PROVIDED ON THE RUNNER TOP AND BOTTOM FOR SUPPORTING AND FIXING TRAY COVERS WITH SCREWS AT EVERY METRE.
8. HOT DIP GALVANIZING SHALL BE DONE AFTER FABRICATION AS PER THE RELEVANT INDIAN STANDARD SPECIFICATIONS. THE AMOUNT OF GALVANIZING SHALL BE MINIMUM 610 g/m^2.
9. THE TYPE OF CONSTRUCTION SHALL BE SUCH AS TO FACILITATE EASY HANDLING, ASSEMBLY AND INSTALLATION AT SITE. FOR THE CONSTRUCTION OF CABLE TRAYS THE STANDARD STRAIGHT LENGTH OF CABLE TRAY SHALL BE 3 METERS UNLESS OTHERWISE SPECIFIED.
10. SPLICE PLATE OF CABLE TRAYS SHALL BE PLACED NOT MORE THAN 750 MM FROM SUPPORT ANGLE.
11. THE WORKMANSHIP SHALL BE SUCH AS TO ENSURE EASY LAYING OF CABLES WITHOUT CAUSING DAMAGE TO CABLES. ALL SURFACES SHALL BE FREE FROM DEFECTS SUCH AS BURRS, SHARP EDGES ETC.
12. THE HARDWARE SHALL CONFORM TO THE RELEVANT INDIAN STANDARD SPECIFICATIONS AND SHALL BE ABLE TO WITHSTAND THE MAXIMUM LOADING CONDITIONS AS REQUIRED. ALL HARDWARE AND FITTINGS SHALL BE STAINLESS STEEL SS-304. HARDWARE SHALL INCLUDE BOLTS, NUTS, WASHERS ETC.
13. THE BENDS, TEES, REDUCERS AND DROPPERS SHALL HAVE A BENDING RADIUS AS DESCRIBED IN THE SCHEDULE OF RATES.
14. THE FOLLOWING TESTS FOR THE AMOUNT OF ZINC COATING SHALL BE CARRIED OUT:
    - THICKNESS OF GALVANIZED COATING BY ELCOMETER.
    - MASS OF GALVANIZED COATING BY STRIPPING TEST.
    - DETERMINATION OF UNIFORMITY OF GALVANIZED COATING.

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ABBREVIATIONS

ABD	AMINE BLOW DOWN
A/G	ABOVE GROUND
API	AMERICAN PETROLEUM INSTITUTE
ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
AWWA	AMERICAN WATER WORKS ASSOCIATION
BC	BOX CULVERT
BCR	BEARING COOLING RETURN
BE	BEVEL END
BF	BLIND FLANGE
BL	BED LEVEL
BOP	BOTTOM OF PIPE
BOTT.EL	BOTTOM ELEVATION(CABLE DUCT ETC)
CBD	CLOSE BLOW DOWN
CI	CAST IRON
C/C	CENTRE TO CENTRE
℄	CENTRE LINE
CONC.RED	CONCENTRIC REDUCER
CONC	CONCRETE
CPLG	COUPLING
CS	CARBON STEEL
CONN	CONNECTION
CONT	CONTINUATION
CRWS	CONTAMINATED RAIN WATER SEWER
CW	CONSTRUCTION WATER/CARRIAGE WAY
CWPH	COOLING WATER PUMP HOUSE
CWS	CAUSTIC WASTE SEWER
COL	COLUMN
DIA	DIAMETER
DWG	DRAWING
DISCH.	DISCHARGE
ETP	EFFLUENT TREATMENT PLANT
ECC	ECCENTRIC
EL	ELEVATION
ERC	ELECTRIC CABLE ROAD CROSSING
EWSS	EYE WASH & SAFETY SHOWER
FCR	FOR CONTINUATION REFER
FF	FLAT FACE
FGL	FINISHED GROUND LEVEL
F TO F	FACE TO FACE
FFL	FINISHED FLOOR LEVEL
FLGD.	FLANGED
FDN	FOUNDATION
GLV	GALVANISED
GT	GALVANISED BLACK STEEL TUBE
GR	GROUND/GRADE
HC	HOSE COUPLING
HP	HORSE POWER
HS	HOSE STATION
HPP	HIGH POINT OF PAVEMENT
ID	INSIDE DIAMETER
INST	INSTRUMENT
INV	INVERT
IRC	INSTRUMENT CABLE ROAD CROSSING
MDS	MECHANICAL DATA SHEET
MK	MARK
MR	MATERIAL REQUISITION
MTO	MATERIAL TAKE OFF
MS	MILD STEEL
MH	MANHOLE
NGL	NATURAL GROUND LEVEL
OD	OUTSIDE DIAMETER
OHT	OVERHEAD TANK
OWS	OILY WATER SEWER
PC	PIPE CULVERT
PDS	PROCESS DATA SHEET
PE	PLAIN END
PR	PURCHASE REQUISITION
PWS	PROCESS WASTE SEWER
PWB	PIPE WAY BRIDGE
RCC	REINFORCED CEMENT CONCRETE
R	RADIUS
RF	RAISED FACE
REF	REFERENCE
RW	ROAD WAY
SO	SLIP ON
SOR	SCHEDULE OF RATES
SS	STORM SEWER
STD	STANDARD
SCRC	STREET CABLE ROAD CROSSING
STN	STATION
SWS	SANITARY WASTE SEWER
TEMP	TEMPERATURE
TOS	TOP OF SLEEPER
TYP	TYPICAL
TWDK	TEMPORARY DRINKING WATER
U/G	UNDER GROUND
WCS	COOLING WATER SUPPLY
WCR	COOLING WATER RETURN
WDK	DRINKING WATER
WF	FIRE WATER
WR	RAW WATER
WH	HORTICULTURE WATER
WT	TREATED WATER
WF	FILTERED WATER
WWS	WASTE WATER SYSTEM

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Approved by

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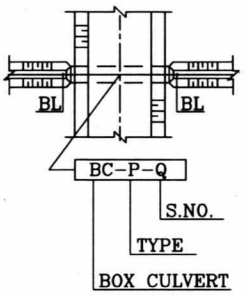
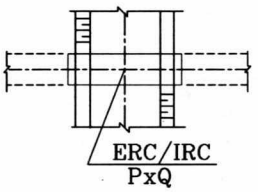
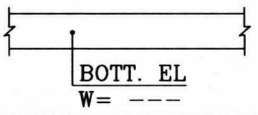
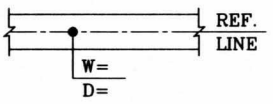
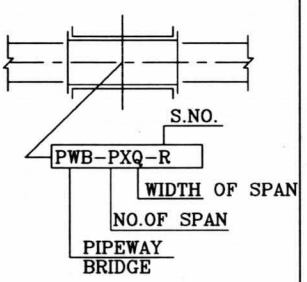
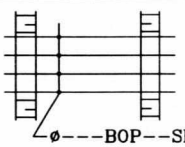
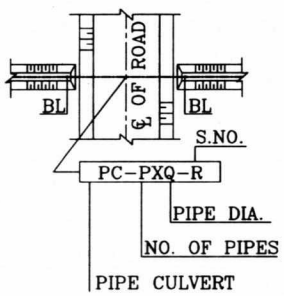
LEGENDS

○	NATURAL GROUND LEVEL		BOX CULVERT REPRESENTATION ON AREA DRAWING
●	FINISHED GROUND LEVEL		
⊖	ROAD TOP LEVEL/ PAVEMENT TOP LEVEL		
⊕	FINISHED FLOOR LEVEL OF BUILDING		
—·—·—	CENTRE LINE		
— — —	LAND ACQUISTION LIMIT		ERC–ELELCTRIC CABLE PxQ ROAD CROSSING NO.OF PIPE IN EACH LAYER NO. OF LAYERS
▬▬▬	COMPOUND WALL		
———	BATTERY LIMIT		
—·—·—	MATCHING LINE		R.C.C. CABLE TRENCH
ROAD–A	ROAD–A REPRESENTATION ON LAYOUTS (A=COORDINATE OF ROAD ℄)		
ROAD–A	ROAD–A REPRESENTATION IN AREA DRAWINGS (A=COORDINATE OF ROAD ℄)		BURIED CABLE TRENCH D=DEPTH W=WIDTH
HIGHER EDGE LOWER EDGE	SIDE SLOPE		PIPEWAY BRIDGE
BL	TRAPEZOIDAL DITCH REPRESENTATION ON AREA DRAWING		
BL TYPE---	RECTANGULAR DITCH REPRESENTATION ON AREA DRAWING		
BL	TRAPEZOIDAL DITCH REPRESENTATION ON LAYOUT DRAWING		
BL TYPE---	RECTANGULAR DITCH REPRESENTATION ON LAYOUT DRG.		PIPE SLEEVES
BL BL PC/BC---	PIPE CULVERT BOX CULVERT REPRESENTATION ON LAYOUT DRG.		
	PIPE CULVERT REPRESENTATION ON AREA DRAWING	ø--- -CW-PIPE CLASS---	CONSTRUCTION WATER PIPE LINE
		ø--- -WT-PIPE CLASS---	TREATED WATER PIPE LINE
		ø--- -TWDK-PIPE CLASS---	TEMPORARY DRINKING WATER PIPE LINE
		ø--- -WDK-PIPE CLASS---	DRINKING WATER PIPE LINE

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	14.03.2024	REVISED & ISSUED AS STANDARD	MK	AK	SKN	MN

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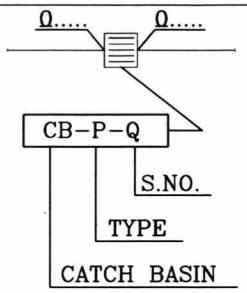
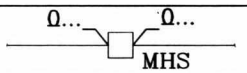
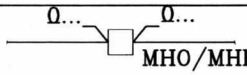
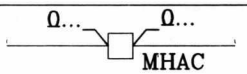
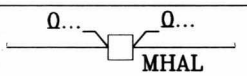
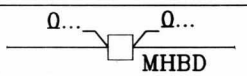
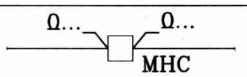
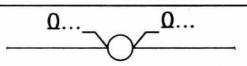
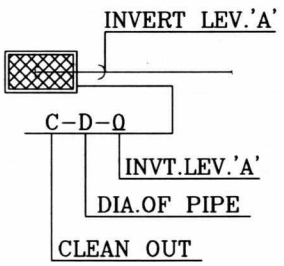
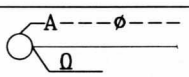
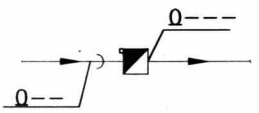
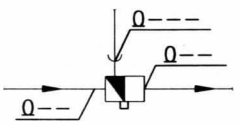
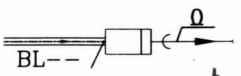
ø--- -WCS-PIPE CLASS---	COOLING WATER SUPPLY PIPE		45° BEND (TURNED DOWN)
ø--- -WCR-PIPE CLASS---	COOLING WATER RETURN PIPE		CATCH BASIN
ø--- -WF-PIPE CLASS---	FIRE WATER PIPE LINE		
ø--- -WH-PIPE CLASS---	HORTICULTURE WATER PIPE LINE		
ø--- -WS-PIPE CLASS---	SERVICE WATER PIPE LINE		
ø--- -SS-PIPE CLASS---	STORM SEWER		PIPE INVERT LEVEL
ø--- -DS-PIPE CLASS---	SANITARY WATER SEWER		SANITARY SEWER MANHOLE
ø---OWS/PWS-PIPE CLASS--	OILY WASTE SEWER/ PROCESS WASTE SEWER		OILY/PROCESS SEWER MANHOLE
ø--- -CTBD-PIPE CLASS--	COOLING TOWER BLOW DOWN		ACIDIC SEWER MANHOLE
ø--- -ACID-PIPE CLASS--	ACIDIC SEWER		ALKALI SEWER MANHOLE
ø---ALKALI-PIPE CLASS--	ALKALI SEWER		CTBD SEWER MANHOLE
ø---SANITARY PUMPING-PIPE CLASS---	SANITARY PUMPING MAIN		CHEMICAL SEWER MANHOLE
	GATE VALVE		CIRCULAR MANHOLE
	GLOBE VALVE		CLEAN OUT
	BUTTERFLY VALVE		
	CHECK VALVE		
	FLOAT VALVE		
	PIPE WITH FLANGED END		FUNNEL FOR STORAGE TANK DRAIN
	BLIND FLANGED END		RECTANGULAR SEALED MANHOLE (SINGLE COMPARTMENT)
TYPE	VALVE PIT IN PIPE LINE		
	90° BEND (TURNED UP)		RECTANGULAR SEALED MANHOLE (DOUBLE COMPARTMENT)
	90° BEND (TURNED DOWN)		
	45° BEND (TURNED UP)		SAND TRAP

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	14.03.2024	REVISED & ISSUED AS STANDARD	MK	AK	SKN	MN

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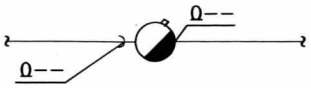
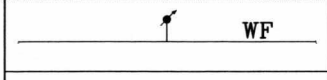
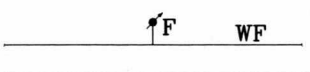
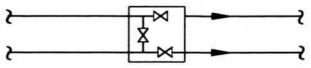
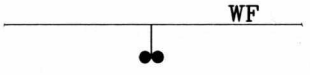
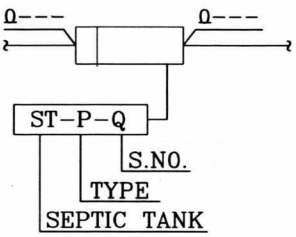
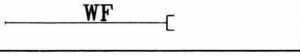
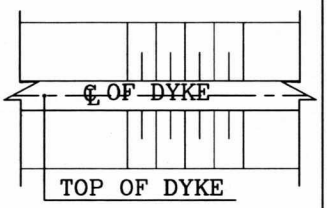
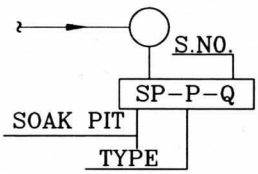
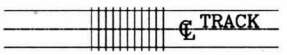
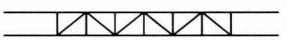
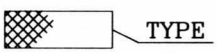
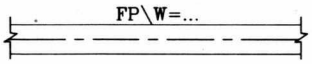
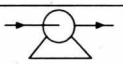
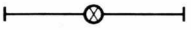
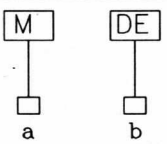
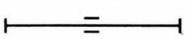
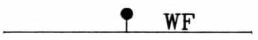
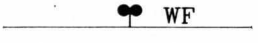
	SEALED MANHOLE (CIRCULAR)		WATER MONITOR FOR FOR FIRE WATER SYST.
			FOAM MONITOR FOR FOR FIRE WATER SYST.
	THREE WAY VALVE PIT (VALVE PITS OUTSIDE TANKFARM AREA FOR DRAINAGE)		DOUBLE HEADED FIRE HYDRANT AWAY FROM HEADER
	SEPTIC TANK		FIRE HOSE COUPLING
			EARTHEN DYKE
	SOAK PIT		RAILWAY TRACK REPRESENTATION ON LAYOUT
			RAILWAY TRACK REPRESENTATION ON AREA DWG.
	GULLY TRAP		PIPE RACK
	GATE		PIPE WAY
	BARBED WIRE FENCING	EQPT. SYMBOLS	
	CHAIN LINK FENCING	HC	HOSE CABINET
	R.C.C. PAVEMENT	HR	HOSE REEL
	FOOTPATH W=WIDTH OF FOOTPATH		DELUGE VALVE ASSEMBLY
	SLIDING SLEEPER		PUMP (HORIZONTAL)
	ANCHOR SLEEPER		PUMP VERTICAL a) ELECT. DRIVE b) DEISEL DRIVE
	GUIDE SLEEPER		
	JUMP OVER SLEEPER		
	FIRE HYDRANT SINGLE HEADED		WATER CUM FOAM MONITOR
	FIRE HYDRANT DOUBLE HEADED		

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5	14.03.2024	REVISED & ISSUED AS STANDARD	MK	AK	SKN	MN

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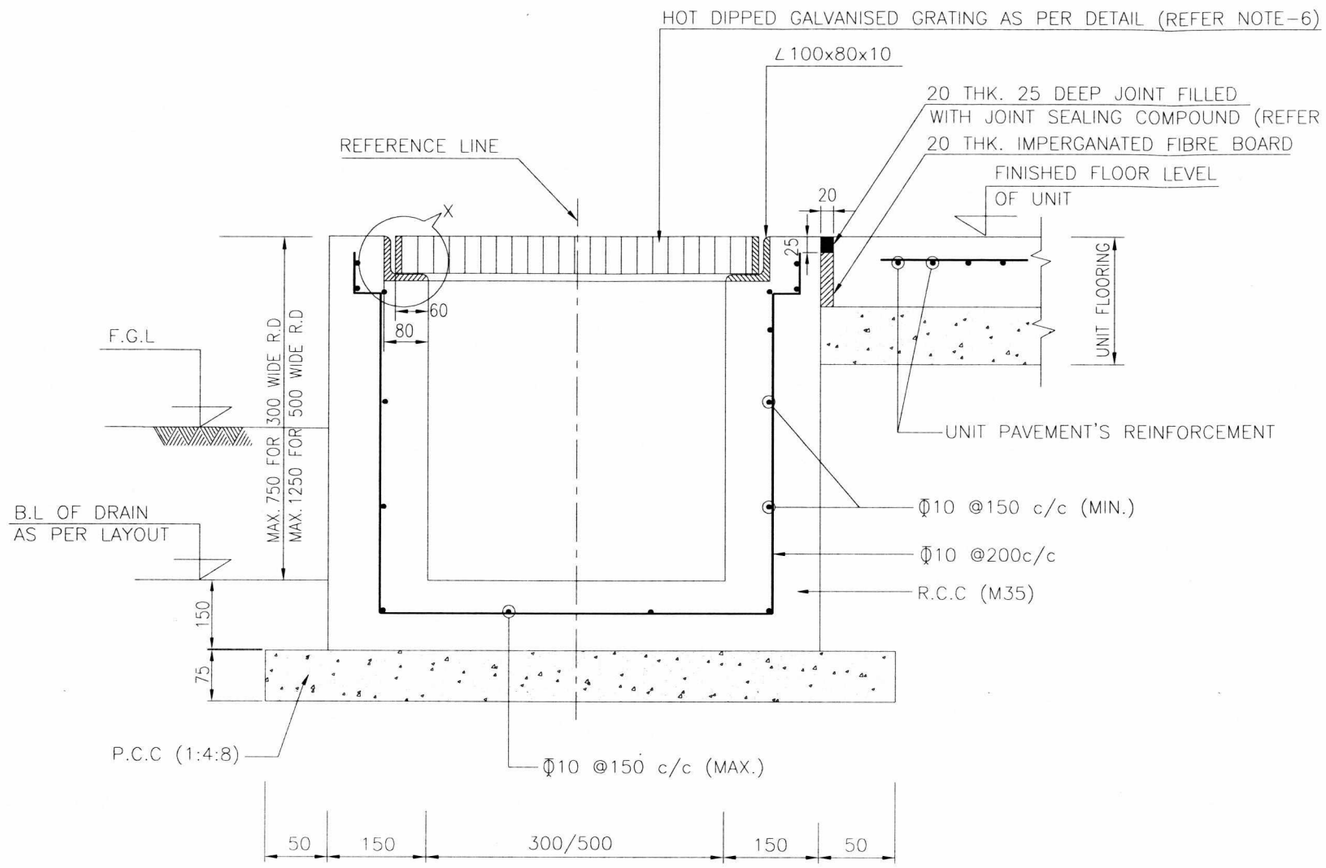
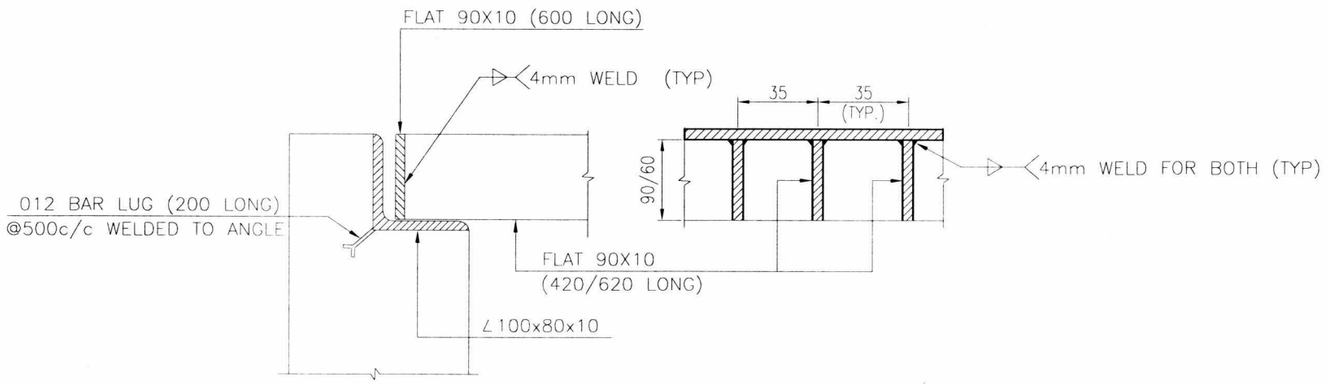
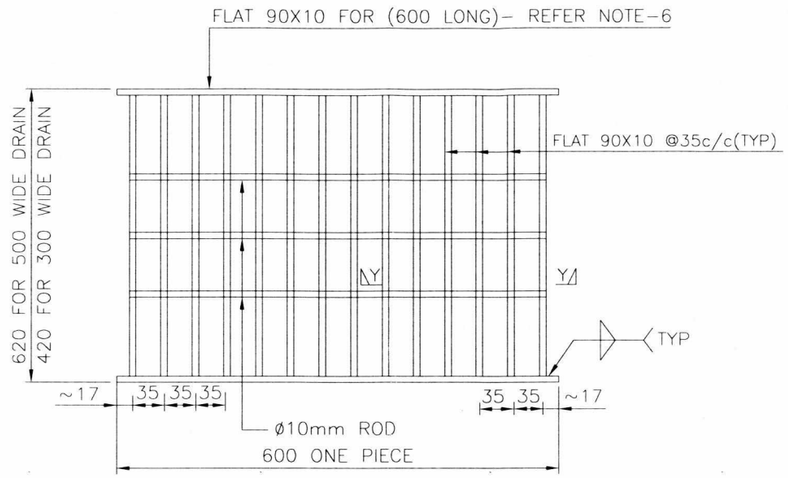


CROSS SECTION OF DRAIN.



DETAIL X

SECTION Y-Y



DETAIL PLAN OF GRATING

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. REFER STRUCTURAL GENERAL NOTES OF THE PROJECT FOR CONCRETE WORKS FOR THE FOLLOWING :
   a) GRADE OF CONCRETE
   b) GRADE AND TYPE OF CEMENT
   c) REINFORCEMENT STEEL BARS
   d) CLEAR COVER IN R.C.C. WORKS.
3. BAR BENDING SHALL CONFORM TO IS:2502.
4. ISA AND FLAT SHALL CONFORM TO IS:2062, GRADE-A.
5. EXPOSED STEEL SURFACES SHALL BE PROVIDED WITH PAINTING AS PER EIL STD.SPECIFICATION 6-79-0020 (OR AS PER JOB SPECIFICATION WHEREVER APPLICABLE.)
6. MATERIAL FOR GRATING (PAINTED BARS/MS FLAT) SHALL BE OF E250 SUBGRADE A/BR/BO CONFIRMING TO IS 2062. BEARING FLATS AND END FLATS SHALL BE AS PER IS 1730.
7. GRATING SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH IS 2629 AND TESTED AS PER IS 2633 AND IS 6745. QUANTITY OF ZINC COATING SHALL BE MINIMUM 900 GM/SQM OF SURFACE AREA (0.12MM UNIFORM THICKNESS) HALL BE AS PER APPROVED MANUFACTURER RECOMMENDATION.
8. JOINT SEALING COMPOUND SHALL BE APPROVED POLYSULPHIDE SEALANT (COLD SUITABLE PRIMER AS RECOMMENDED BY SEALANT MANUFACTURER, SHALL BE APPLIED IN ACCORDANCE WITH IRC:57.
9. BIPOLAR CONCRETE PENETRATING CORROSION INHIBITING ADMIXTURE OF APPROVED MAKE SHALL BE ADDED TO CONCRETE (SUB-STRUCTURE & SUPER-STRUCTURE) AS PER MANUFACTURER'S SPECIFICATIONS & EIL SPECIFICATION 6-68-0017 FOR PROTECTION OF REINFORCEMENT AGAINST CORROSION.
10. IF GRATING IS SUBJECTED ACID CONTACT THEN 30mm THICK FRP GRATING & FRP SUPPORT SHALL BE PROVIDED(FOR NON-VEHICULAR MOVEMENT AREA ONLY). DETAILING SHALL BE AS PER APPROVED MANUFACTURER RECOMMENDATION.
11. THE BAR SHALL BE PLACED AFTER CUTTING GROOVE IN THE FLAT SUCH THAT THE PROJECTION OF BAR ABOVE THE FLAT TOP IS NOT IN MORE THAN 5 MM.

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

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	20.03.23	REVISED AND ISSUED AS STD.	SJ	GYAS	SKN	SM
5	25.07.18	REVISED AND ISSUED AS STD.	Anil	RC	RBB	DV
					Approved by	

UNIT DRAINAGE DETAILS
(RECTANGULAR DITCH DETAILS)

STANDARD No.
7-65-0272 Rev. 6

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

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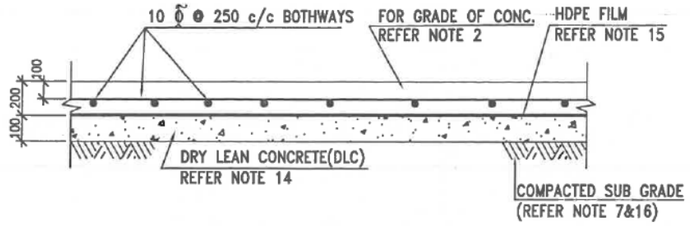
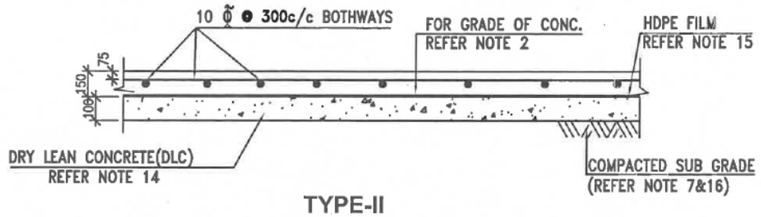
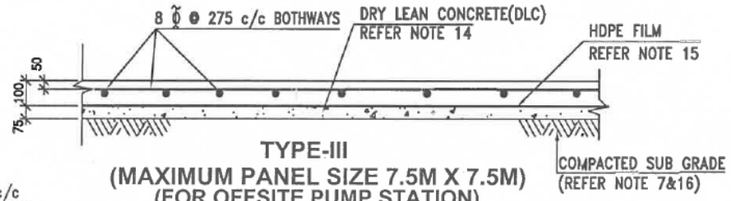


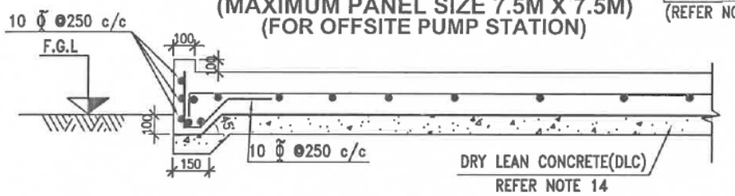
TYPE-I
(MAXIMUM PANEL SIZE 14M X 14M)
(FOR VEHICULAR MOVEMENT AREA)



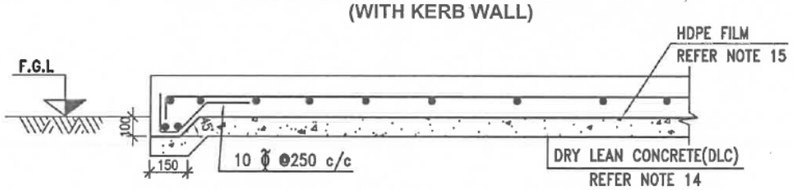
TYPE-II
(MAXIMUM PANEL SIZE 13M X 13M)
(FOR UNIT PAVEMENT)



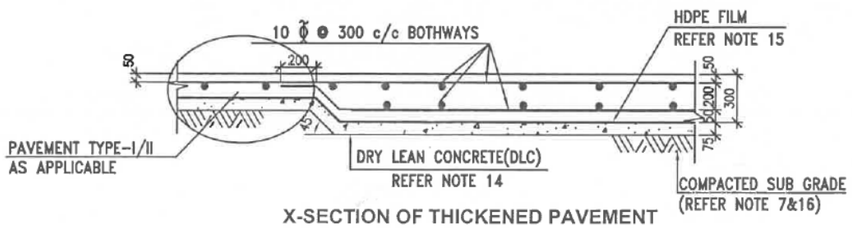
TYPE-III
(MAXIMUM PANEL SIZE 7.5M X 7.5M)
(FOR OFFSITE PUMP STATION)



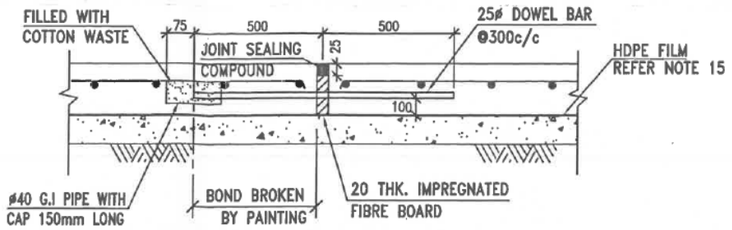
TYP. EDGE DETAIL DEPENDING ON TYPE OF PAVEMENT
(WITH KERB WALL)



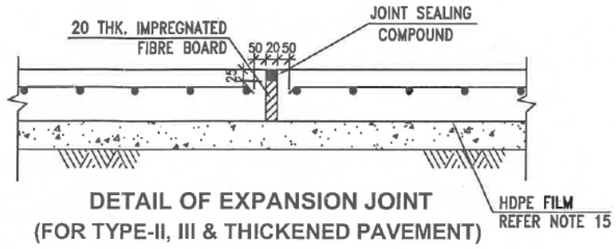
TYP. EDGE DETAIL DEPENDING ON TYPE OF PAVEMENT
(WITHOUT KERB WALL)



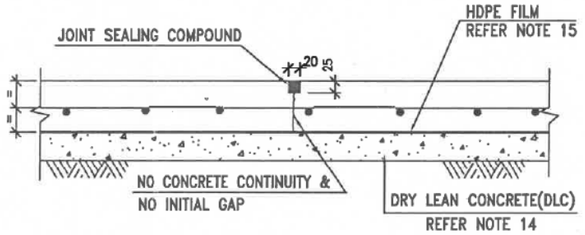
X-SECTION OF THICKENED PAVEMENT



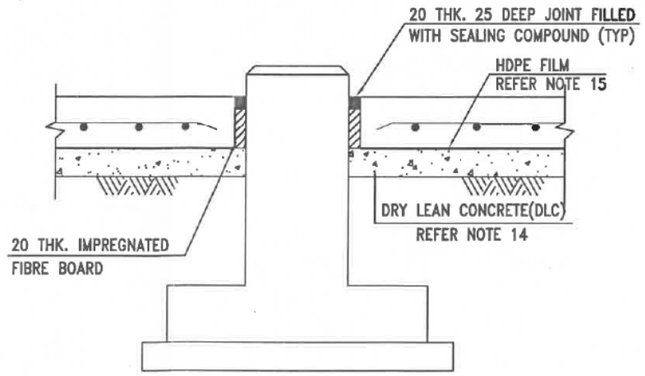
DETAIL OF EXPANSION JOINT
(FOR TYPE-I PAVEMENT)
(REFER NOTE-8 & 9)



DETAIL OF EXPANSION JOINT
(FOR TYPE-II, III & THICKENED PAVEMENT)



DETAIL OF CONSTRUCTION JOINT
(SEE NOTE-9 & 12)



TYP. DETAIL OF JOINT SEALING AROUND FOUNDATION

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. THE GRADE OF CONCRETE SHALL BE AS PER ENGINEERING DESIGN BASIS (MIN. GRADE OF CONCRETE SHALL BE M30).
3. ϕ DENOTES HIGH YIELD DEFORMED BARS OF GRADE Fe-500D CONFORMING TO IS:1786 UNLESS OTHERWISE SPECIFIED. THE DOWEL BAR SHALL CONFORM TO IS:432 GRADE-1.
4. JOINT SEALING COMPOUND SHALL BE POLYSULPHIDE BASE JOINT SEALANT (COLD POURED) OF APPROVED MAKE CONFIRMING TO BS: 5212. SUITABLE PRIMER AS RECOMMENDED BY SEALANT MANUFACTURER, SHALL BE APPLIED IN ACCORDANCE WITH IRC 57.
5. EXPANSION AND SEALING JOINT FILLER MATERIAL SHALL BE PREFORMED FILLERS OF BITUMEN IMPREGENATED FIBRE BOARD, CONFORMING TO IS:1838, PART-1.
6. CONC. PAVING SHALL BE SLOPED STEEPEST TO 1:100 UNLESS OTHERWISE SHOWN IN DETAIL ENGINEERING DRAWING. SLOPE OF THE SUB GRADE SHALL BE PREPARED TO MATCH WITH THE SLOPE OF PAVEMENT.
7. SUB GRADE BELOW PAVEMENT SHALL BE THOROUGHLY COMPACTED TO 95% OF LAB DRY DENSITY AS PER IS:2720, PART VIII OR 85% RELATIVE DENSITY AS PER AS PER IS:2720, PART XIV.
8. EXPANSION JOINTS SHALL BE SPACED AT 14.0M (MAX.) FOR TYPE-I PAVEMENTS & 13M C/C (MAX.) FOR TYPE-II PAVEMENTS.
9. EXPANSION JOINTS SHALL BE SPACED AT 15 M C/C & CONSTRUCTION JOINTS SHALL BE SPACED AT 7.5M C/C (MAXIMUM) FOR TYPE-III PAVEMENTS.
10. THIS STANDARD IS NOT VALID FOR CAUSTIC HANDLING AREAS.
11. LIMITATION OF SINGLE AXLE LOAD ON RCC PAVEMENT: FOR TYPE-I PAVEMENT : MAX. UPTO 12.0 TONNE FOR TYPE-II PAVEMENT : MAX. UPTO 6.0 TONNE (FOR SMALL VEHICLES LIKE FORK LIFT)
12. CONSTRUCTION JOINTS MAY BE PROVIDED IN CASE PANEL SIZE IS LESS THAN THE REQUIREMENT OF ELASTIC JOINT, TO SUIT SITE REQUIREMENTS.
13. THICKENED PAVEMENT AS SHOWN IS SUITABLE FOR SINGLE POINT LOAD UPTO 5 TON. PIPE SUPPORT DETAILS COMING IN THICKENED PAVEMENT AREA REFER RELEVANT PIPING GAD / PIPING STANDARDS.
14. DRY LEAN CONCRETE (DLC) FOR SUB-BASE SHALL HAVE 7 DAYS COMPRESSIVE STRENGTH OF 10MPa.
15. 150 MICRON THICK HM HDPE (GRADE-I) FILM CONFORMING TO IS 10889 SHALL BE PROVIDED AS SEPARATION LAYER BETWEEN DLC AND RCC.
16. THIS STANDARD IS APPLICABLE FOR SUB GRADE WITH SOAKED CBR OF 4.0% AND ABOVE.

SUBGRADE

a) GEOTECHNICAL RECOMMENDATION SHALL BE FOLLOWED FOR SUBGRADE PREPARATION BELOW PAVEMENTS.
b) SPECIAL CARE AS PER GEOTECH RECOMMENDATION SHALL BE TAKEN IN CASE OF BLACK COTTON SOIL.

5	13.01.25	REVISED & ISSUED AS STANDARD	TP	GYAS	S K NASKAR	M NANDI
4	12.07.19	REVISED & ISSUED AS STANDARD	SD	GS/AK	RS	RKT
Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	

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RCC PAVEMENT DETAILS

STANDARD No.
7-65-0404 Rev. 5
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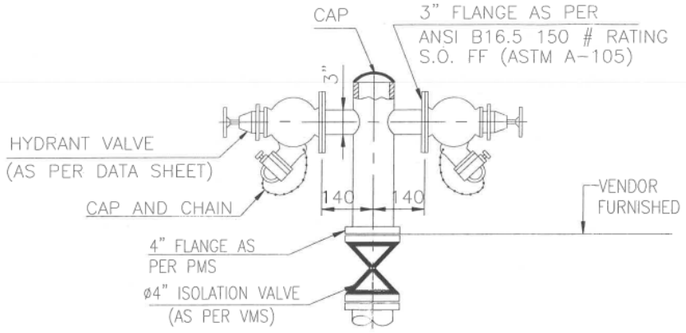
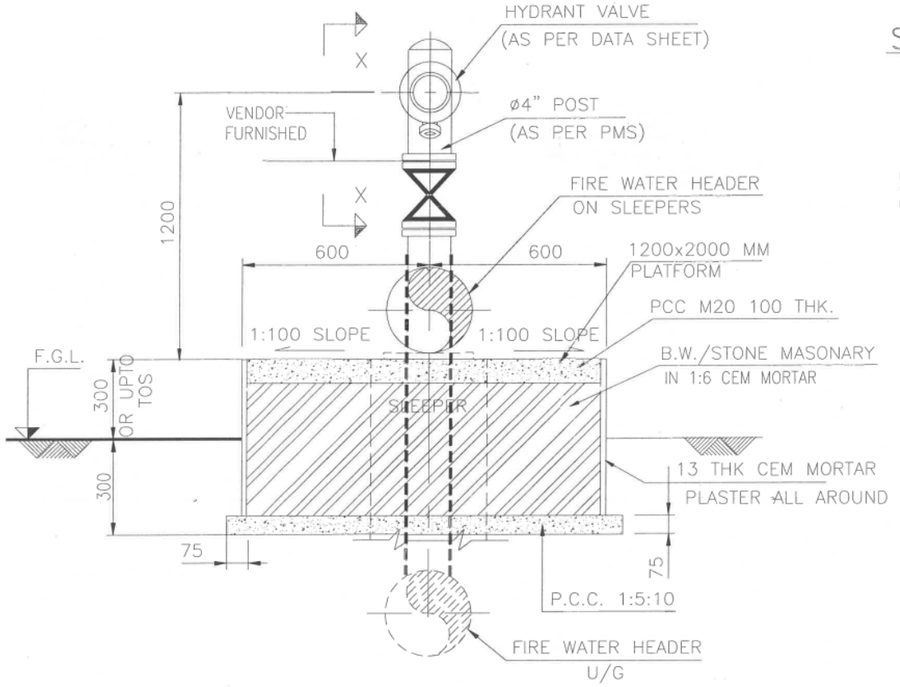
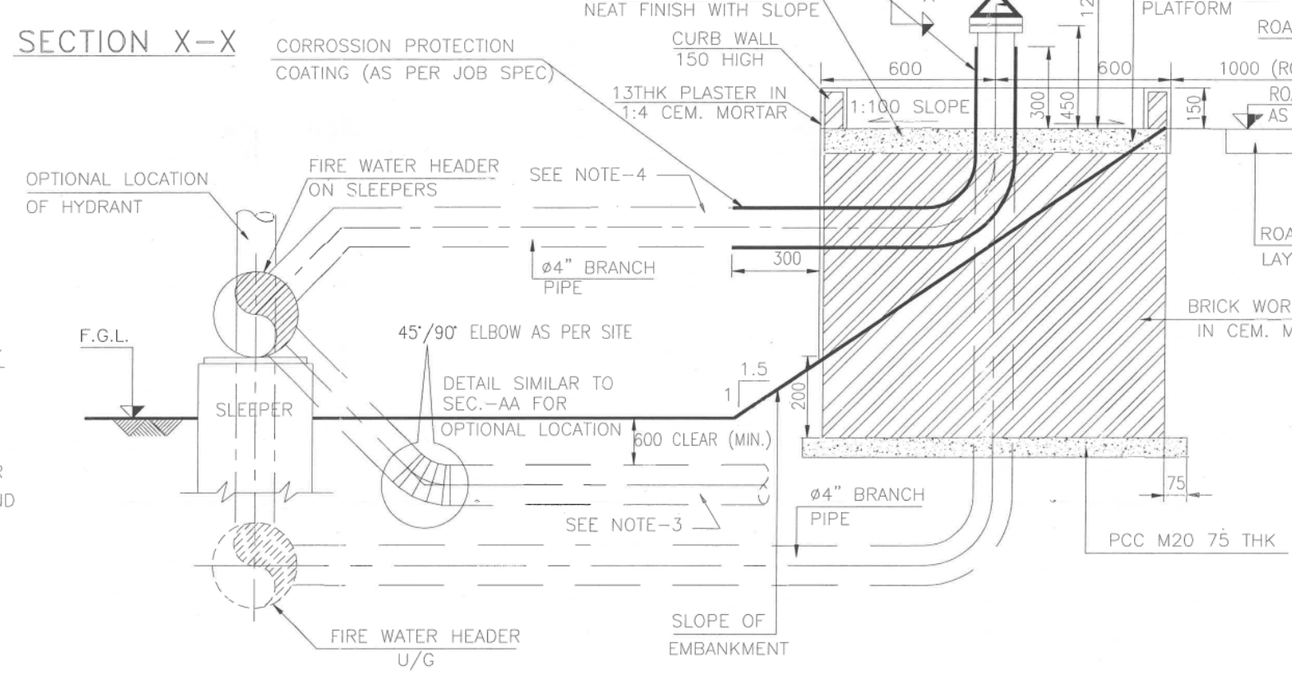
NOTES:–

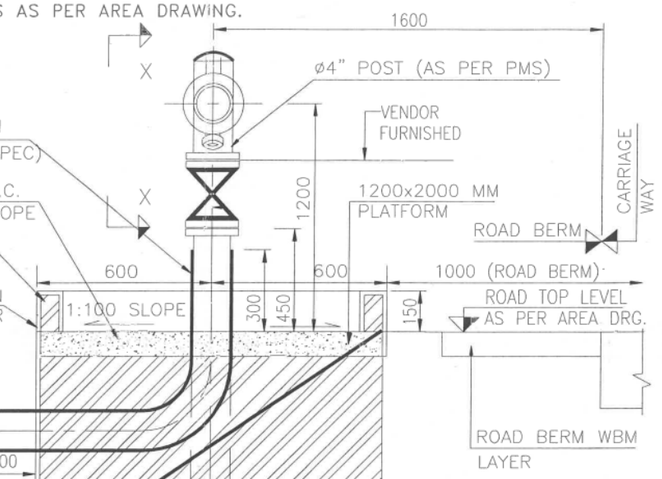
1. ALL DIMENSIONS ARE IN MM AND LEVEL IN M UNLESS STATED OTHERWISE.
2. LOCATIONS WHERE THE ROAD TOP LEVEL AND GRADE LEVEL DIFFERENCE IS MORE THAN 500mm, STEPS SHALL BE PROVIDED ON ROAD SIDE SLOPE, FOR ACCESS TO THE HYDRANT.
3. IN CASE ROAD TOP LEVEL TO GRADE LEVEL DIFFERENCE IS LESS THAN 1000MM, PIPE LAYOUT SHALL BE FOLLOWED AS SHOWN.
4. WHERE ROAD TOP TO GRADE LEVEL DIFFERENCE IS MORE THAN 1000MM, PIPE LAYOUT SHALL BE FOLLOWED AS SHOWN.
5. CLASS OF BRICK SHALL BE AS PER APPROVED PROJECT DESIGN BASIS.
6. SECTION A–A i.e. ONLINE HYDRANT SHALL BE PROVIDED ONLY IN CASE OF UNAVOIDABLE SITUATIONS AS PER AREA DRAWING.



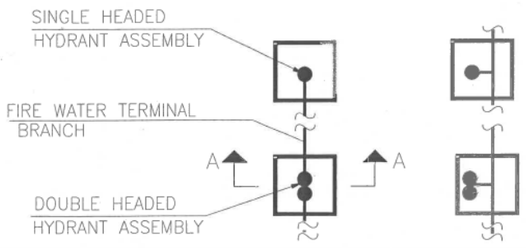


SECTION X–X

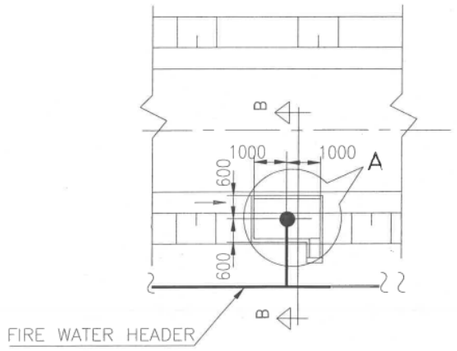




SECTION–AA

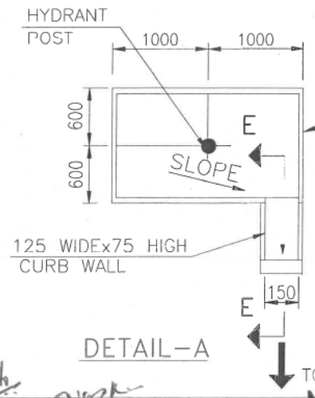


HYDRANT ON FIRE WATER TERMINAL BRANCH
(REPRESENTATION ON AREA DRG.)

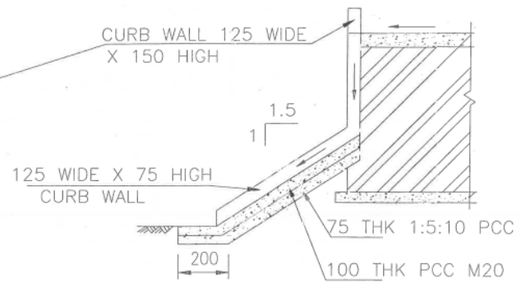


TYPICAL G.A. OF FIRE WATER HYDRANT ASSEMBLY
(REPRESENTATION ON AREA DRG.)

SECTION–BB



DETAIL–A



SECTION–EE

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	13.03.25	REVISED & REISSUED AS STANDARD	RA/PPC	AK	SKN	M NANDI
4	30.07.18	REVISED AND ISSUED AS STANDARD	Anil	GYAS	R. SRIVASTAVA	RK TRIVEDI
					Approved by	

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INSTALLATION DETAILS OF FIRE WATER HYDRANT

STANDARD No.
7-65-0420 Rev.5
Page 1 of 1

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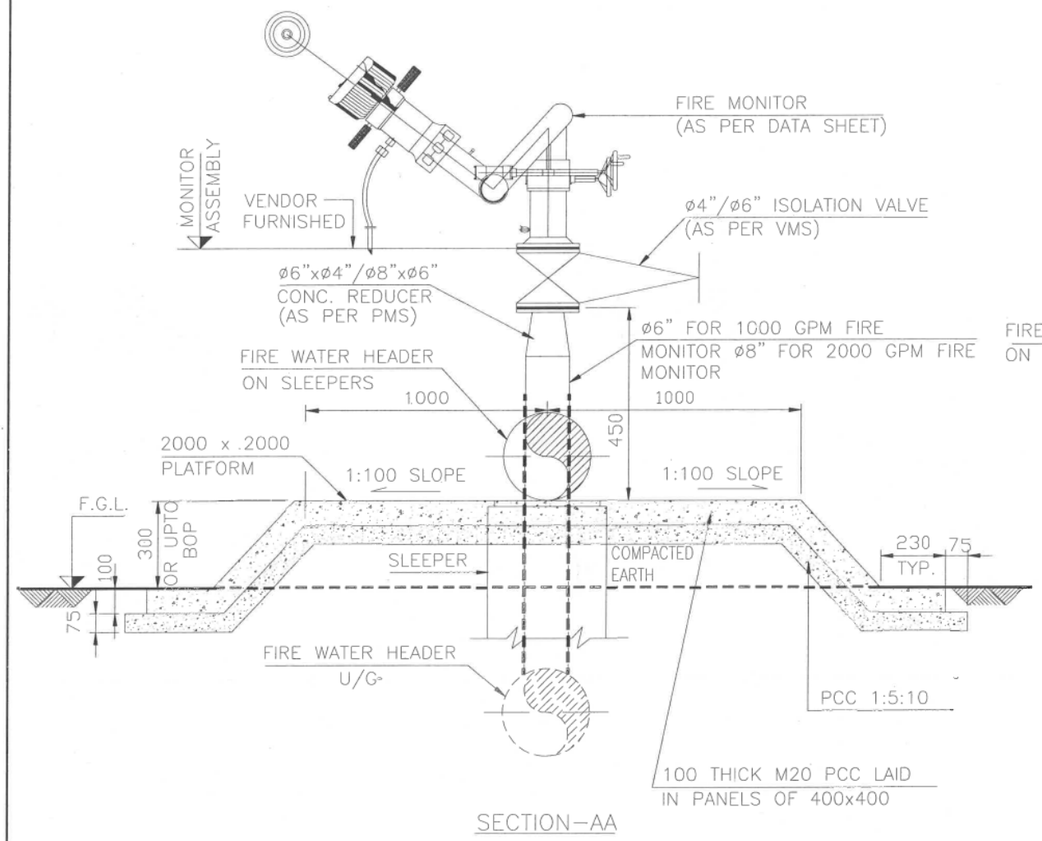
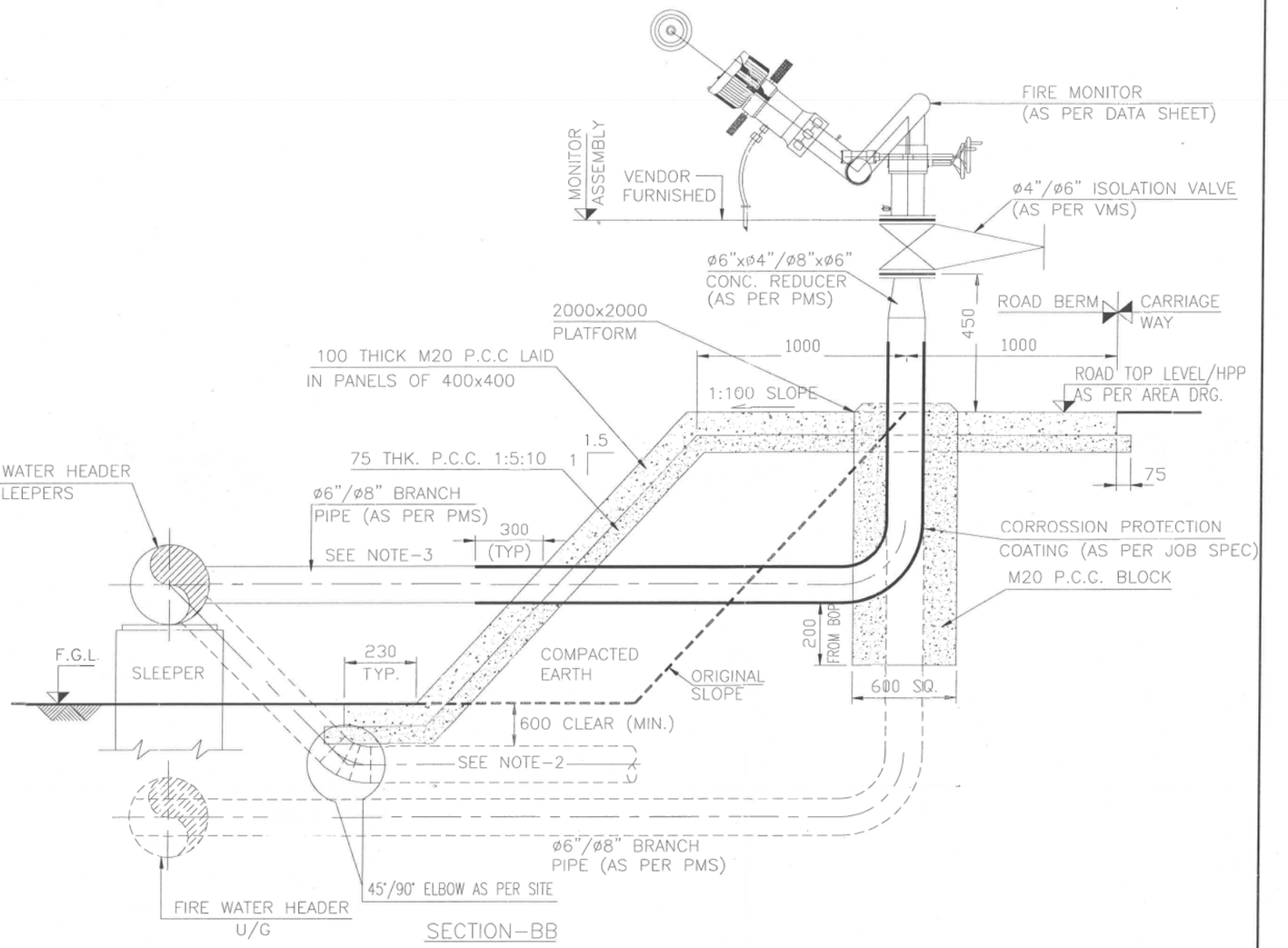
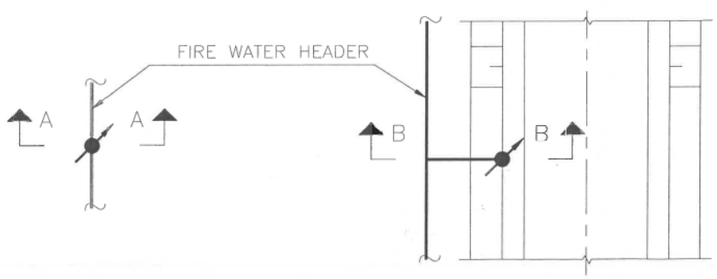


SECTION–AA



SECTION–BB



FIRE MONITOR ON FIRE WATER HEADER

TYPICAL G.A. OF FIRE MONITOR ASSEMBLY

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. IN CASE ROAD TOP LEVEL TO GRADE LEVEL DIFFERENCE IS LESS THAN 1000MM, PIPE LAYOUT SHALL BE FOLLOWED AS SHOWN.
3. WHERE ROAD TOP TO GRADE LEVEL DIFFERENCE IS 1000MM OR MORE PIPE LAYOUT SHALL BE FOLLOWED AS SHOWN.
4. SECTION B–B SHALL BE PREFERRED LAYOUT. SECTION A–A SHALL BE USED ONLY IN UNAVOIDABLE SITUATIONS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	13.03.25	REAFFIRMED & ISSUED AS STANDARD	RA/PPC	AK	SKN	M NANDI
3	30.07.18	REVISED & ISSUED AS STD.	Anil	GYAS	R. SRIVASTAVA	RK TRIVEDI

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INSTALLATION DETAILS OF
WATER OR WATER CUM FOAM MONITOR,
LONG RANGE FOAM / WATER MONITOR

STANDARD No.
7-65-0421 Rev.4
Page 1 of 1

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

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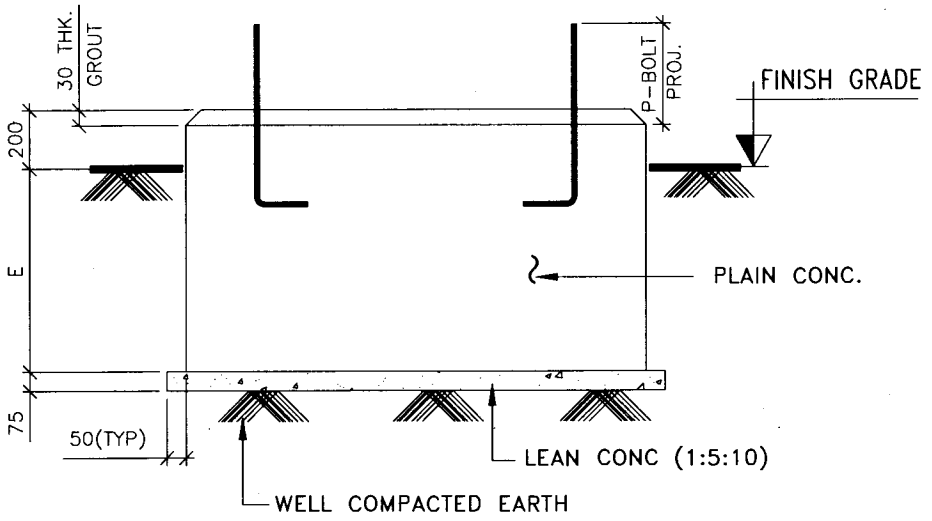
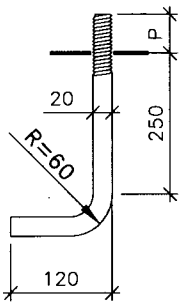
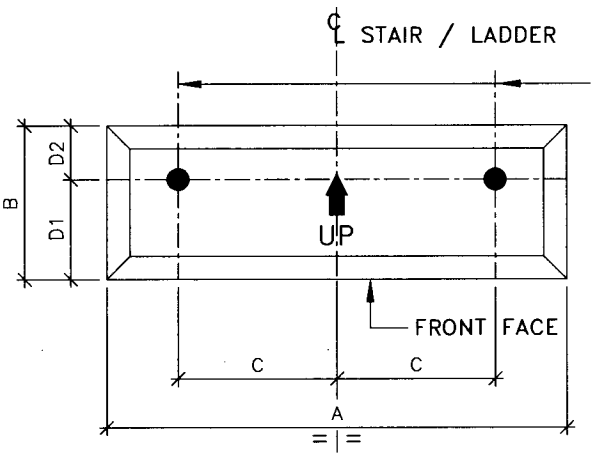


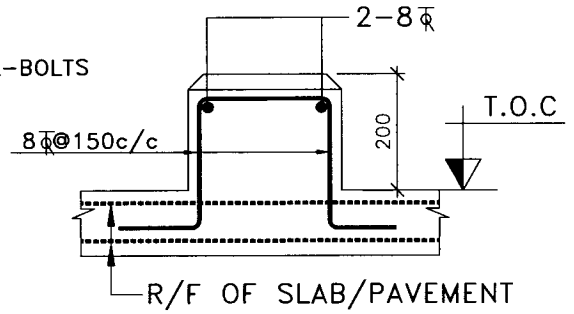
PEDESTAL FOR UNPAVED AREA



DET. OF L-BOLT



PLAN



PEDESTAL ON CONC. PAVEMENT/R.C.C. SLAB

S.NO.	ITEM	WIDTH	A	B	C	D1	D2	P	E	NUT	REMARKS
1	LADDER	450	750	300	280	200	100	90	500	SINGLE	
2	STAIR	750	1100	310	421	160	150	90	600	SINGLE	FOR STRINGER BEAM MC150
3	STAIR	750	1100	355	421	255	100	90	600	SINGLE	FOR STRINGER BEAM MC200

NOTES:-

1. IN CASE OF PEDESTAL OVER PILE CAP/RCC FOUNDATION, DIMENSION 'E' TO SUIT ACCORDINGLY BUT NOT TO EXCEED VALUES GIVEN IN ABOVE TABLE.
2. CONCRETE GRADE SHALL BE AS PER GENERAL NOTES OF THE PROJECT BUT NOT LOWER THEN M20.
3. REBARS GRADE SHALL BE AS PER GENERAL NOTES OF THE PROJECT.
4. M20 L-BOLT AS PER DETAIL GIVEN ABOVE SHALL BE PROVIDED.
5. ANCHOR BOLT GRADE, NUTS, WASHERS & THREADING SHALL BE AS PER STANDARD NO. 7-68-0417.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
			JITENDER GUPTA	ANKUR SHARMA	ANURAG SINHA	S. MAZUMDAR
8	08.07.21	REVISED AND ISSUED AS STANDARD				
7	16.09.16	REAFFIRMED AND ISSUED AS STANDARD	B.S SHARMA	R.B SHARMA	RAJAN JI SRIVASTAVA	R.NANDA

Approved by

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[A] NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. REINFORCEMENT AND CONCRETE GRADE SHALL BE AS PER PROJECT GENERAL NOTES.
3. DEPTH OF FOOTING SHALL BE MEASURED FROM HPP (HIGH POINT OF PAVEMENT)/FGL.
4. ANY UNDESIRABLE SOIL SHALL BE REMOVED AND REPLACED BY COMPACTED SAND.
5. ALL PEDESTALS SHALL BE PROVIDED WITH CHAMFERS AT CORNERS.
6. FOR SUPPORT TYPE 'F3' SUITABLE DOWELS SHALL BE LEFT ON ALL SIDES OF THE SLAB TO MAKE IT MONOLITHIC WITH THE PAVEMENT.
7. INCASE OF FOULING OF TWO OR MORE FOUNDATIONS WITH EACH OTHER THESE SHALL BE CAST MONOLITHICALLY. FOR CASES WHERE FOULING OF PEDESTALS IS ENCOUNTERED, THIS STANDARD IS NOT VALID.

[B] DIVISION OF SCOPE OF WORK (FOR MUILTI-CONTRACTS):

1. THE CONSTRUCTION OF THESE SUPPORTS SHALL BE IN THE SCOPE OF MECHANICAL/COMPOSITE WORK CONTRACTOR.
2. FOR TYPE F3 FOUNDATIONS SQUARE PLAN AREA OF (C+1000) SHALL BE IN THE SCOPE OF MECHANICAL CONTRACTOR (CONTRACTS OTHER THAN COMPOSITE WORKS).

[C] FOUNDATION DESIGN CRITERIA:

1. CO-EFFICIENT OF FRICTION (μ) BETWEEN STEEL SURFACES HAS BEEN TAKEN AS 0.30 FOR DESIGNING THE SUPPORTS.
2. DESIGN BEARING PRESSURE SHALL BE AS PER RECOMMENDATION CONTAINED IN GEOTECHNICAL REPORT AND ASSUMED AT FOUNDING LEVEL OF FOUNDATION.

[D] STEPS FOR CHOOSING FOUNDATION DETAIL:

1. IDENTIFY SAFE BEARING CAPACITY OF SOIL FOR APPLICABLE VERTICAL LOAD SELECT CORRESPONDING FOUNDATION TYPE TO GET PLAN DIMENSION OF FOUNDATION SLAB.
2. FIX PEDESTAL SIZE CORRESPONDING TO INSERT PLATE SIZE FROM PIPE SUPPORT INDEX.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	13.03.25	REAFFIRMED & ISSUED AS STANDARD	JITENDER	AMARJEET	ANURAG SINHA	MAINAK NANDI
6	28.01.20	REAFFIRMED & ISSUED AS STANDARD	JG	ALPANA SRIVASTAVA	RAJANJI SRIVASTAVA	R.K.TRIVEDI

Approved by

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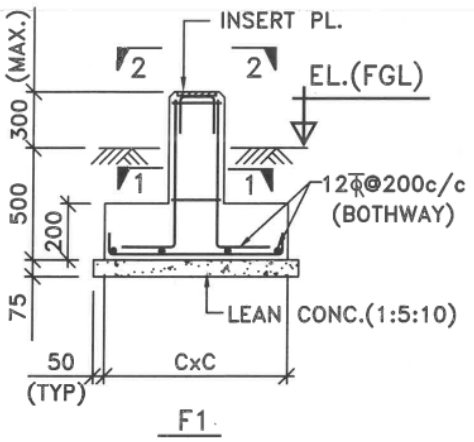
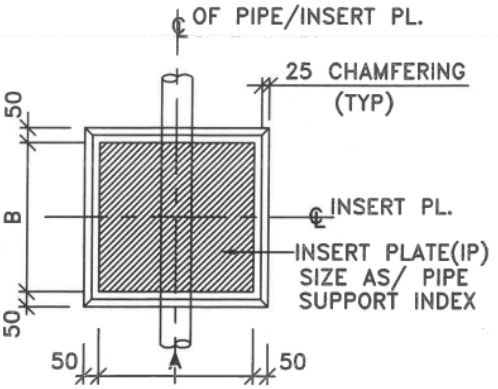
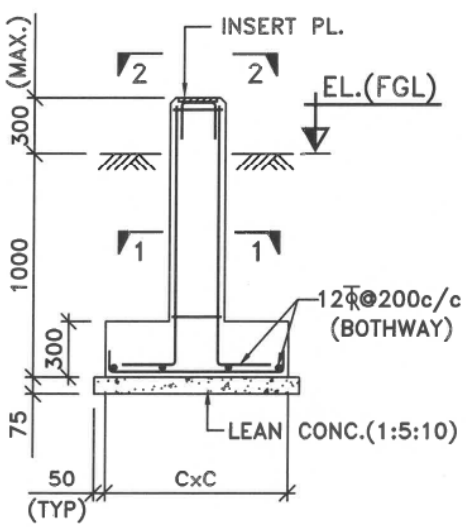


F1



VEIW 2-2



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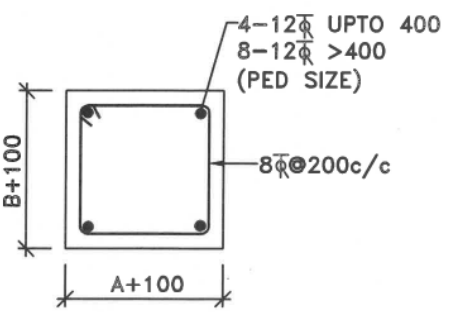
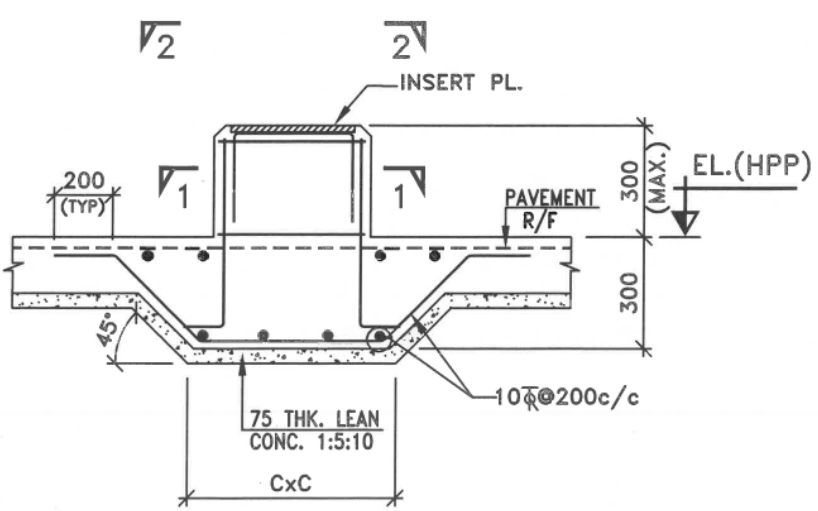
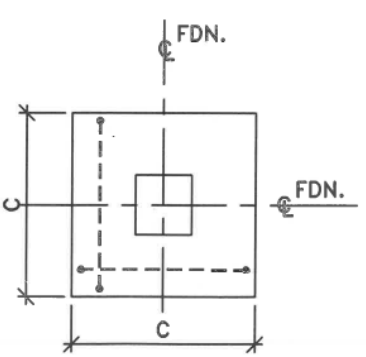


SEC. 1-1



F3



FOUNDATION PLAN
(FOR F1 & F2)

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FOUNDATION SIZE(CxC)

VERTICAL LOAD IN 'MT'	TYPE – F1		TYPE – F2		TYPE – F3	
	BEARING CAPACITIES OF SOIL IN T/SQ.M					
	5.0	7.5	5.0	7.5	2.5	5.0
UPTO 0.2	500	500	–	–	700	500
> 0.2 TO 0.4	650	650	–	–	850	650
> 0.4 TO 1.0	–	–	1050	900	1150	850
> 1.0 TO 2.0	–	–	1300	1150	1500	1100
> 2.0 TO 3.0	–	–	1500	1300	–	1250
> 3.0 TO 4.0	–	–	1700	1450	–	1400
> 4.0 TO 5.0	–	–	1900	1550	–	1550

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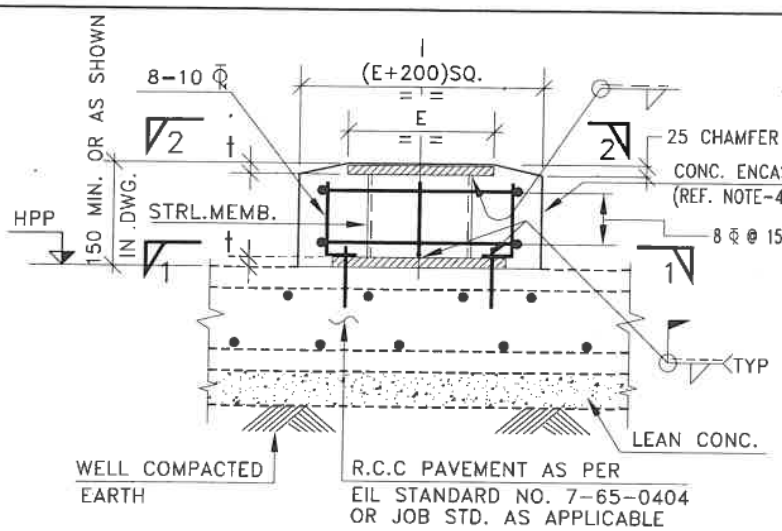
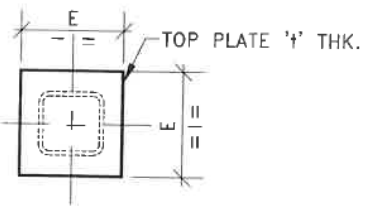
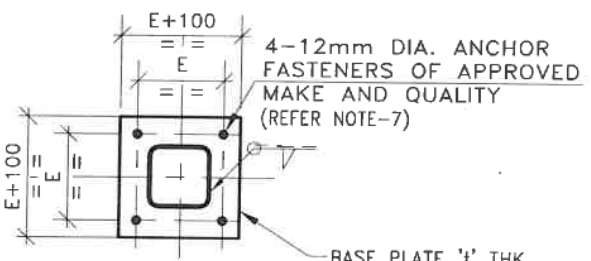


TYP. CROSS SECTION OF PIPE SUPPORT



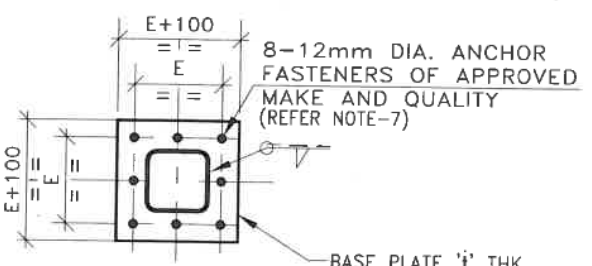
VIEW 2-2



SEC. 1-1

(FOR PIPE DIA. ≤ 18")

(CONC. ENCASEMENT & R/F NOT SHOWN FOR CLARITY)



SEC. 1-1

(FOR 18"< PIPE DIA. ≤ 36")

(CONC. ENCASEMENT & R/F NOT SHOWN FOR CLARITY)

SCHEDULE OF PIPE SUPPORTS :-

SL. NO.	SUPPORT PIPE DIA. (INCH)	MAX. VERTICAL LOAD (Kg)	MAX. HORIZONTAL LOAD AT TOP OF PEDESTAL (Kg)	STRUCTURAL MEMBER SIZE	SIZE OF TOP PLATE ExE (mm)	t(mm)	REMARKS
1	2 & 3	UP TO 500	150	SHS 150X6 OR MC 150 BOX	AS PER RELEVANT PIPING STD. FOR LOW SUPPORTS	10	
2	4	501 TO 1000	300			10	
3	6	1001 TO 1500	450			12	
4	8	1501 TO 2000	600			12	
5	10	2001 TO 2500	750			12	
6	12	2501 TO 3000	900			12	
7	14 & 16	1501 TO 2000	600			12	THESE SUPPORTS SHALL BE USED ONLY WHEN THE PIPE (14" TO 24") SERVICE IS GASEOUS AND NOT LIQUID
8	18	2001 TO 2500	750			12	
9	20 & 24	2501 TO 3000	900			12	
10	26 TO 36	3001 TO 5000	1250	SHS 220X8 OR MC 200 BOX		16	FOR GASEOUS SERVICE ONLY; PIPE SUPPORT ON THICKENED PAVEMENT ONLY

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	27-05-24	REVISED AND ISSUED AS STANDARD	GULSHAN	ANKUR/ALPANA	ANURAG SINHA	MAINAK NANDI
4	22-03-21	REAFFIRMED AND ISSUED AS STANDARD	SONAM	PAPIA	ANURAG SINHA	S MAJUMDAR

Approved by

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NOTES :-

1. THIS STANDARD SHALL BE READ IN CONJUNCTION WITH GENERAL NOTES OF THE PROJECT.
2. PAVEMENT DETAILS IN THE ZONE WHERE SUCH SUPPORTS ARE LOCATED, SHALL BE AS PER RELEVANT GENERAL CIVIL LAYOUT DRAWINGS.
3. MINIMUM DISTANCE BETWEEN THE CENTRE LINE OF PIPE SUPPORTS AND EDGE OF THE PAVEMENT SHALL BE KEPT AS 500mm.
4. GRADE OF CONCRETE, STRUCTURAL STEEL AND REINFORCEMENT FOR ENCASEMENT SHALL BE AS PER GENERAL NOTES OF THE PROJECT.
5. THIS STANDARD IS VALID FOR NET SAFE BEARING CAPACITY OF SOIL $\geq$ 3T/SQ.M. AT UNDERSIDE OF PAVEMENT.
6. THE PAVEMENT SHALL BE ROUGHENED BY CHISELLING BEFORE ENCASING THE PIPE SUPPORTS.
7. MEDIUM DUTY RUST PROOF ANCHOR FASTENERS SHALL HAVE MINIMUM ALLOWABLE TENSILE AND SHEAR CAPACITIES OF 0.7T & 0.85T RESPECTIVELY WITH A FACTOR OF SAFETY EQUAL TO 4.
8. THIS STANDARD IS VALID FOR PIPE SUPPORTS OF HEIGHT UPTO 1650mm ABOVE H.P.P.

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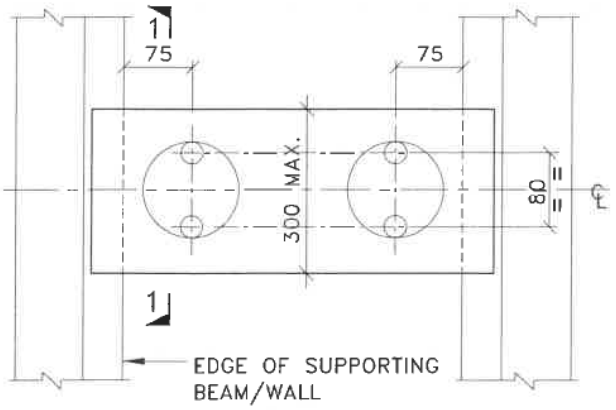
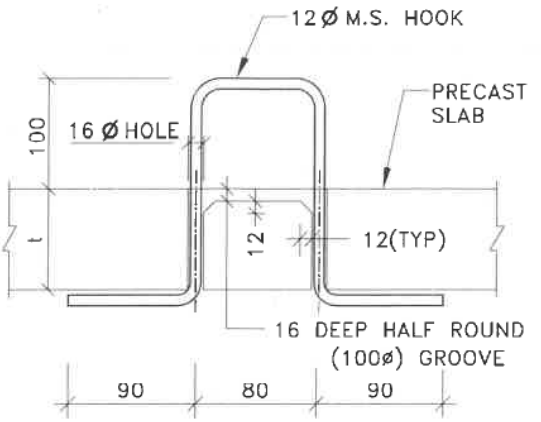
STANDARD LIFTING HOOKS IN PRECAST SLABS AND CHEQ. PLATES

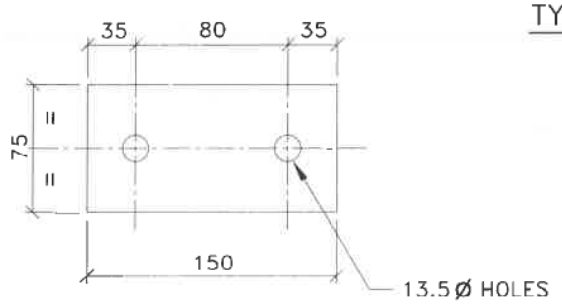


PLAN

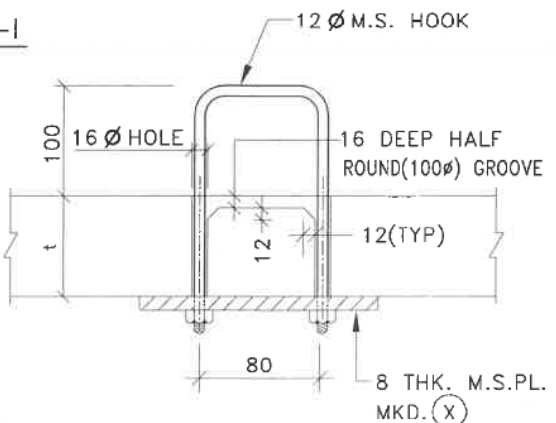


SECTION:1–1

TYPE–I

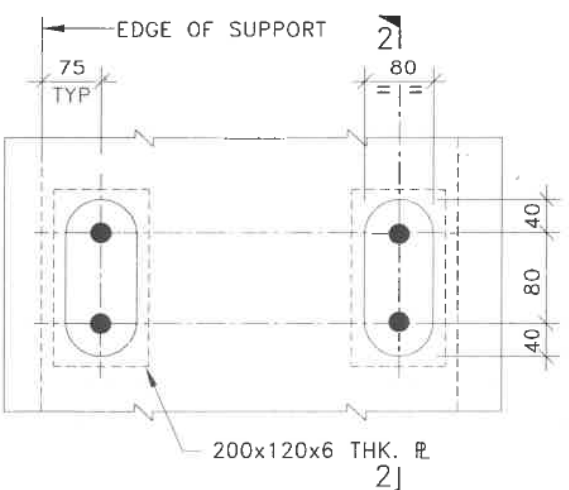


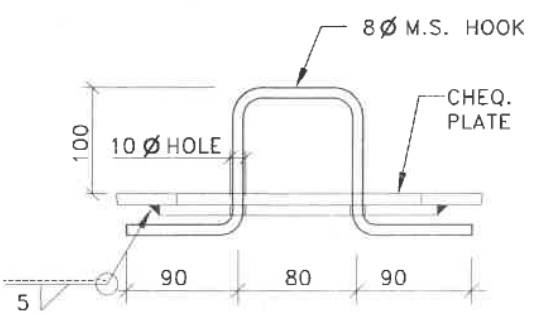
DETAIL OF M.S. PLATE MKD. (X)



SECTION:1–1

TYPE–II





SECTION:2–2

TYPE–III

(FOR CHEQ. PLATE ONLY)

NOTES:

1. ALL DIMENSIONS ARE IN mm
2. FOR PRECAST SLABS GENERALLY LIFTING HOOK TYPE–I SHALL BE USED UNLESS TYPE–II IS SPECIFIED IN THE DRAWING.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	28.03.24	REVISED AND ISSUED AS STANDARD	SN	AD/MM	ANURAG SINHA	MAINAK NANDI
6	27.08.18	REAFFIRMED AND ISSUED AS STANDARD	KKS	A. SINHA	R. SRIVASTAVA	R. K. TRIVEDI

Approved by

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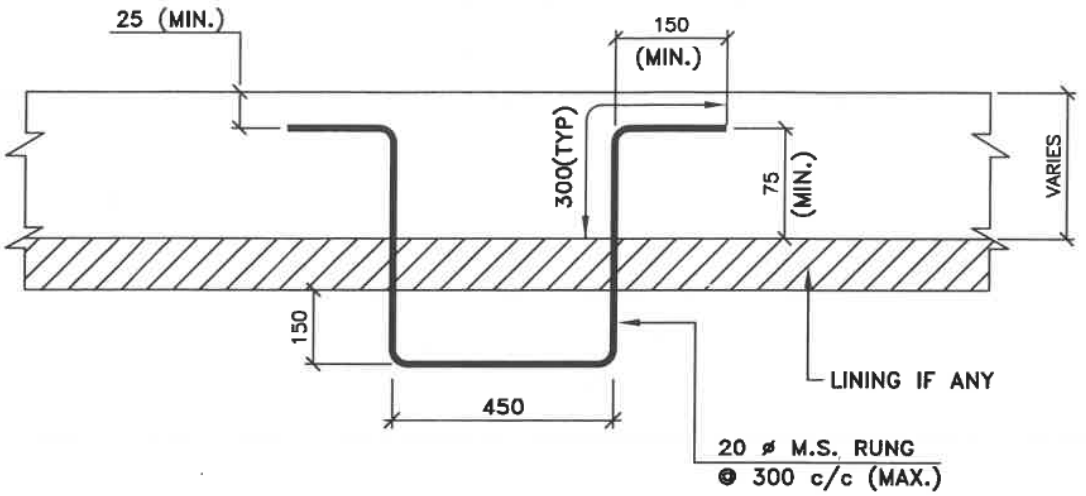
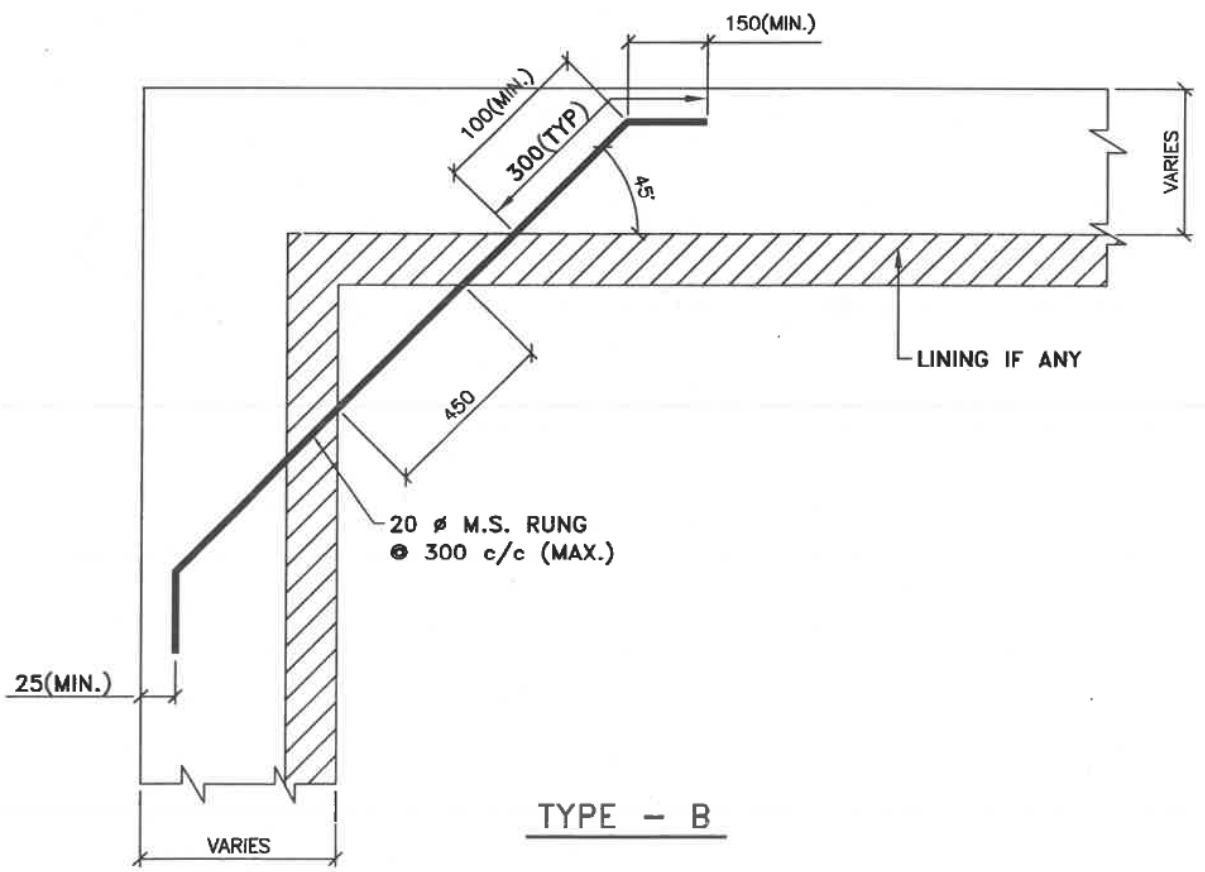


TYPE – A



TYPE – B

NOTES :–

1. ALL DIMENSIONS ARE IN mm.
2. FIRST RUNG SHALL BE AT 300 mm FROM TOP.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
8	28.03.24	REAFFIRMED AND ISSUED AS STANDARD	SN	AD/MM	ANURAG SINHA	MAINAK NANDI
7	18.06.18	REAFFIRMED AND ISSUED AS STANDARD	ANNU	VIKRAM GUPTA	RAJANJI SRIVASTAVA	R K TRIVEDI

Approved by

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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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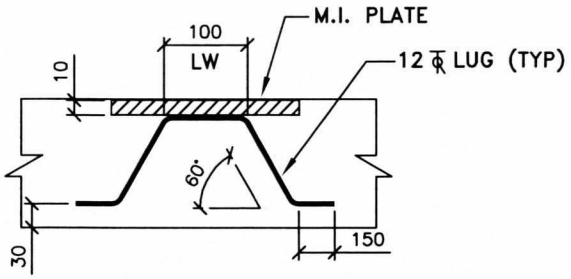
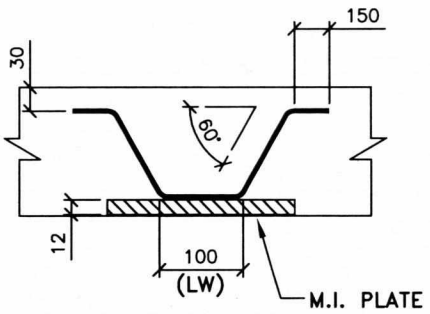
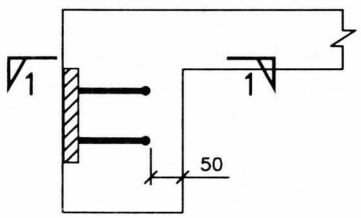
LUG BENDING DETAILS



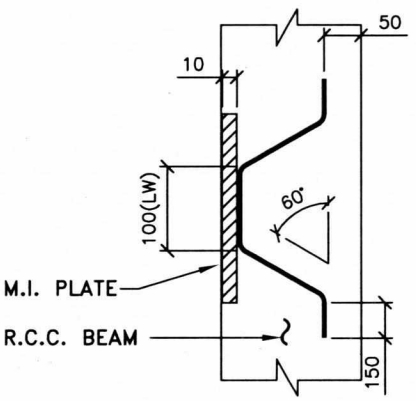
METAL INSERT DETAIL
ON TOP OF SLAB



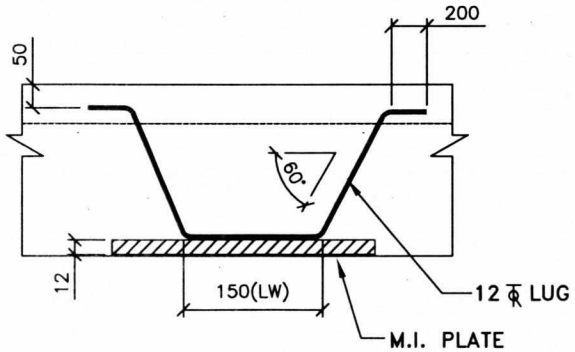
METAL INSERT DETAIL
ON BOTTOM OF SLAB



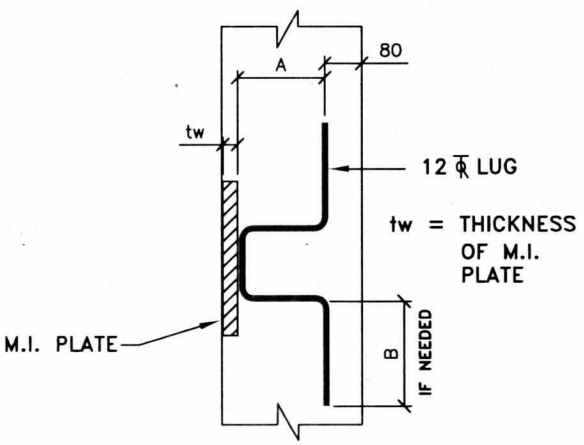
METAL INSERT DETAIL
ON SIDE OF BEAM



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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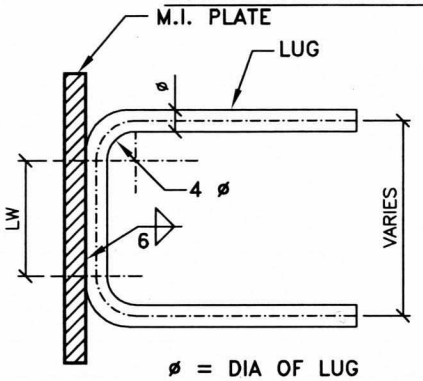
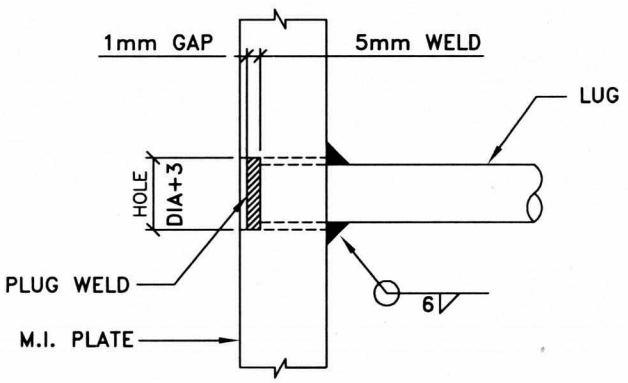
LUG BENDING DETAILS



ø = DIA OF LUG
LW = WELD LENGTH AVAILABLE

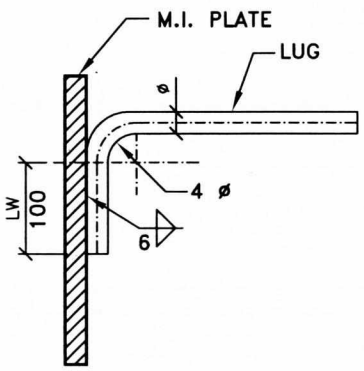
BENDING DIMENSIONS FOR 12ϕ & 16ϕ LUGS

(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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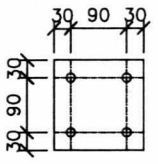
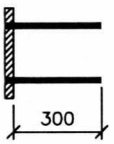
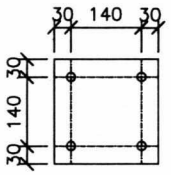
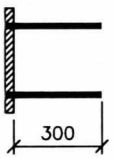
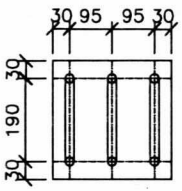
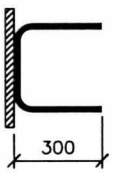
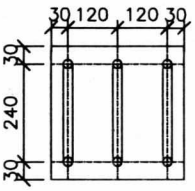
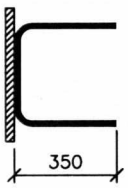
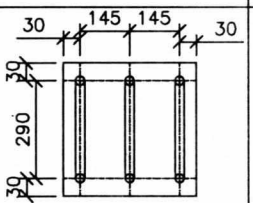
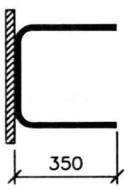
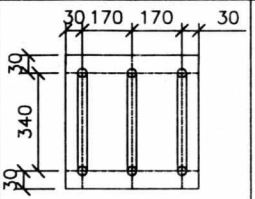
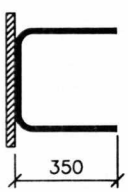
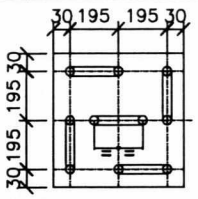
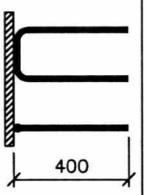
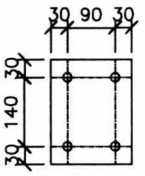
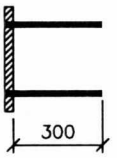
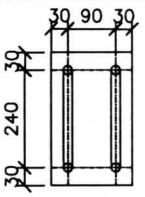
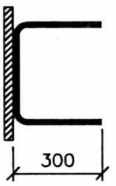
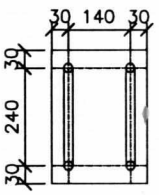
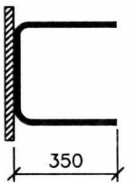
S/R DESIGNATES

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	
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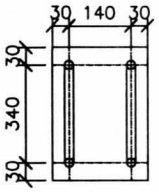
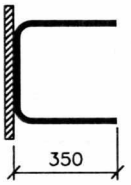
11.	R4a	12	12	 SIZE 200x400	
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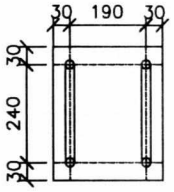
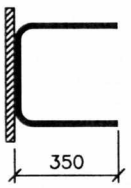
12.	R5a	12	12	 SIZE 250x300	
	R5b	16	16		

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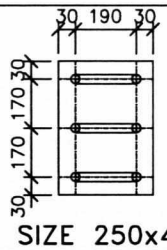
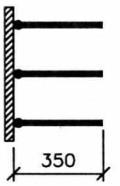
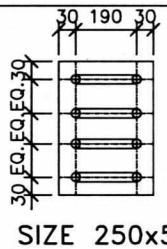
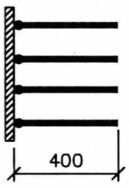
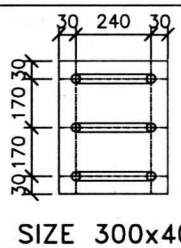
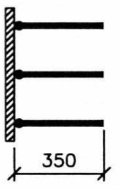
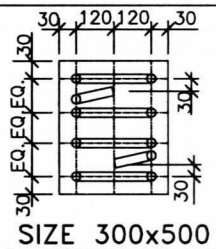
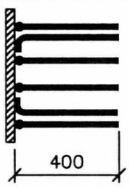
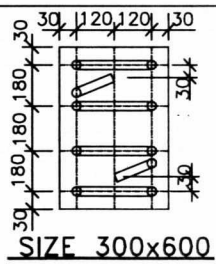
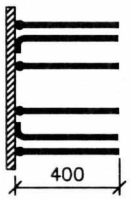
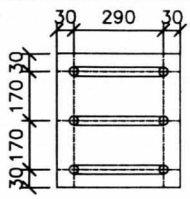
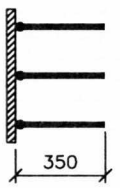
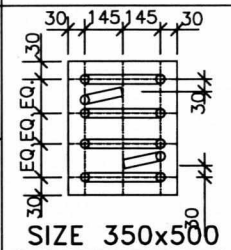
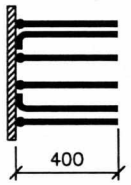
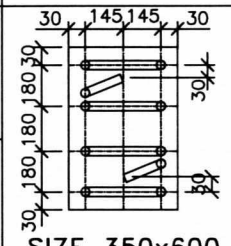
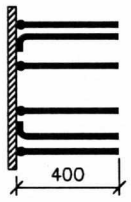
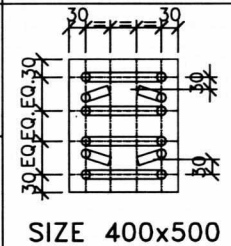
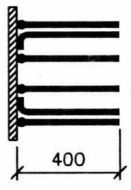
R DESIGNATES

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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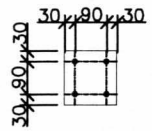
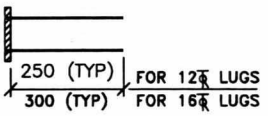
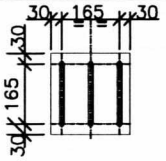
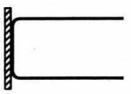
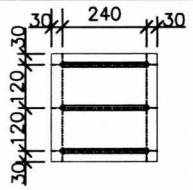
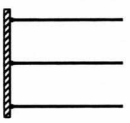
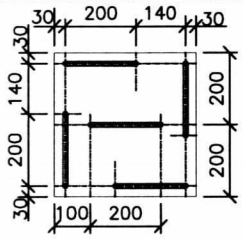
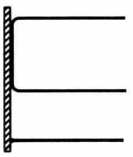
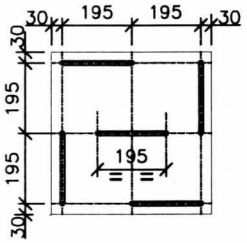
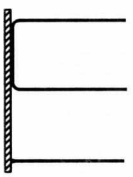
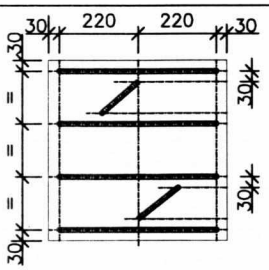
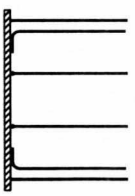
PS DESIGNATES

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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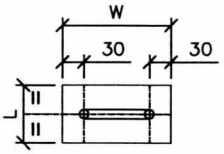
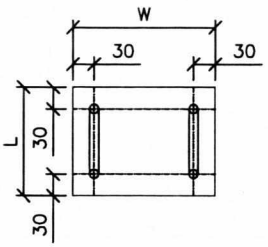
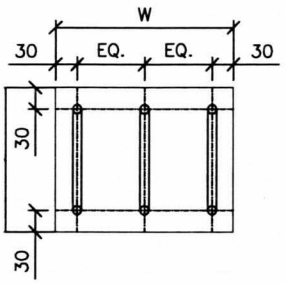
T DESIGNATES



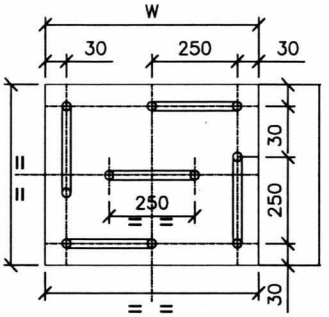
TYPE T1



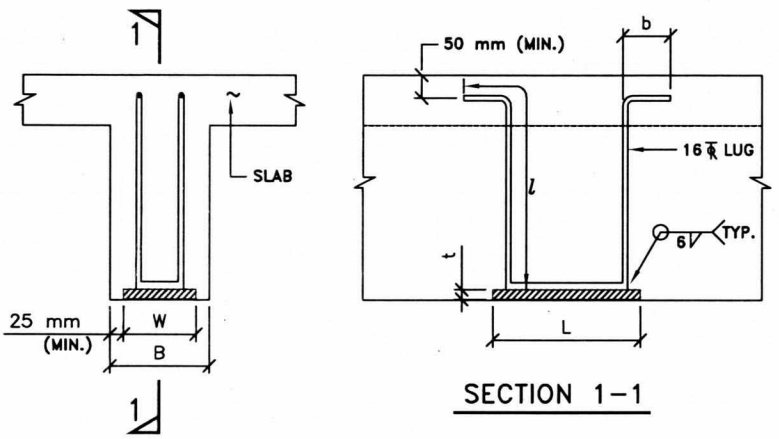
TYPE T2, T3 & T4



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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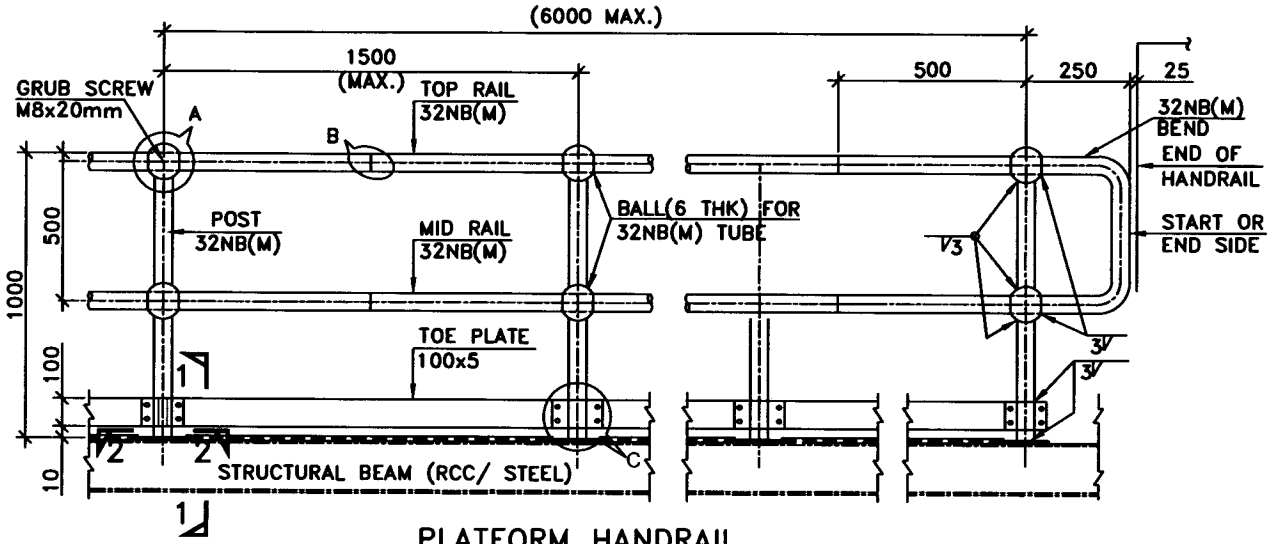
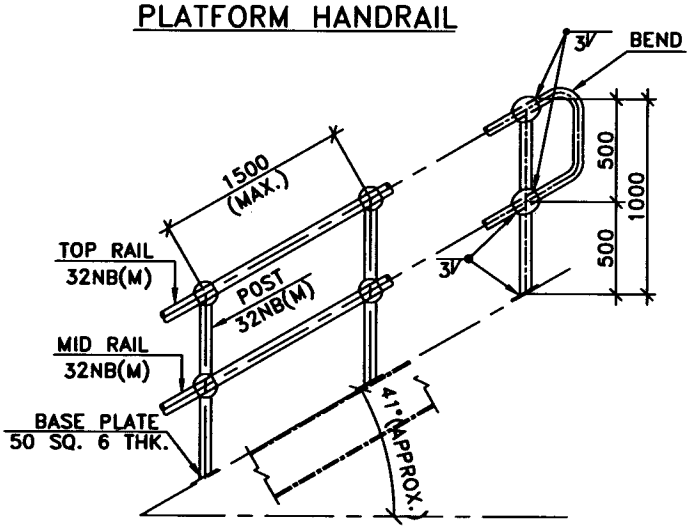
NOTES :-

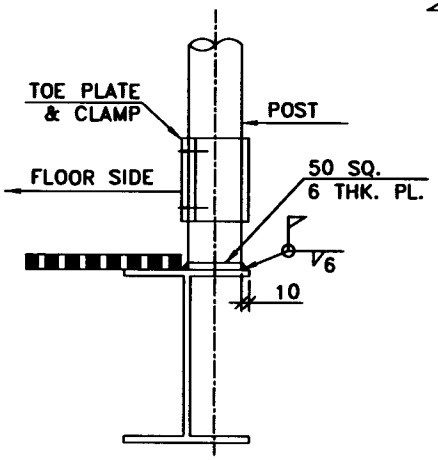
1. ALL DIMENSIONS ARE IN mm.
2. ALL M.S. TUBES SHALL CONFIRM TO IS : 1161/1239 & PLATE SHALL CONFIRM TO IS:2062.
3. PAINTING AND GALVANIZATION OF HANDRAIL SHALL BE AS PER JOB SPECIFICATION.



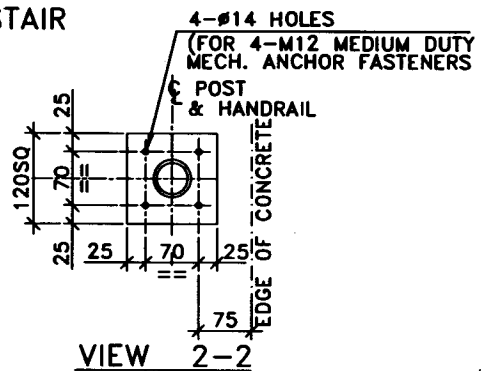
PLATFORM HANDRAIL



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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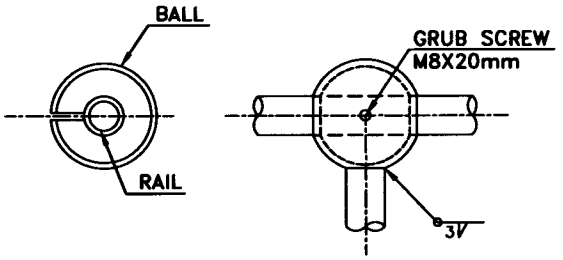
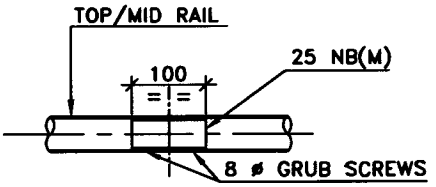
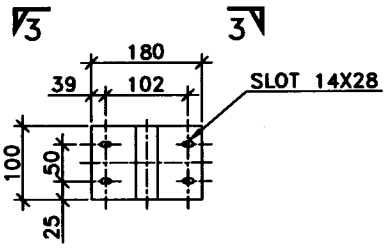


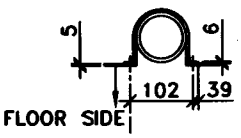
DETAIL– Ⓐ



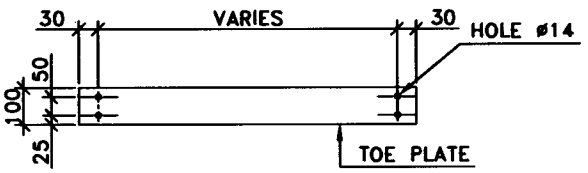
DETAIL – Ⓑ
DETAIL OF SPLICE



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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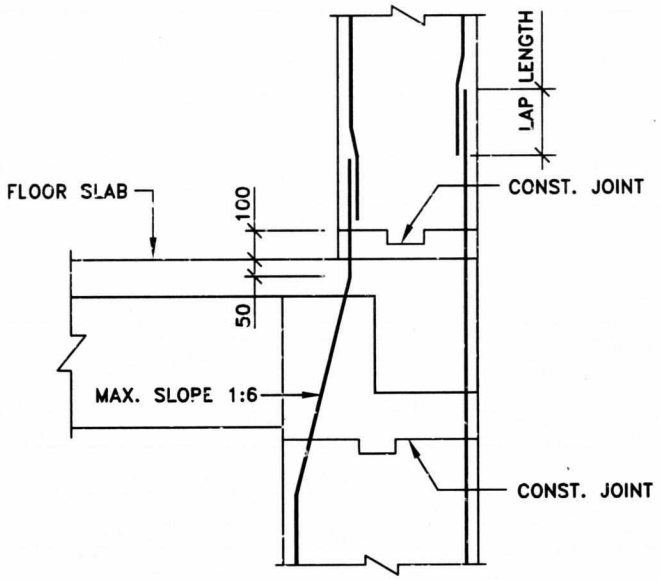
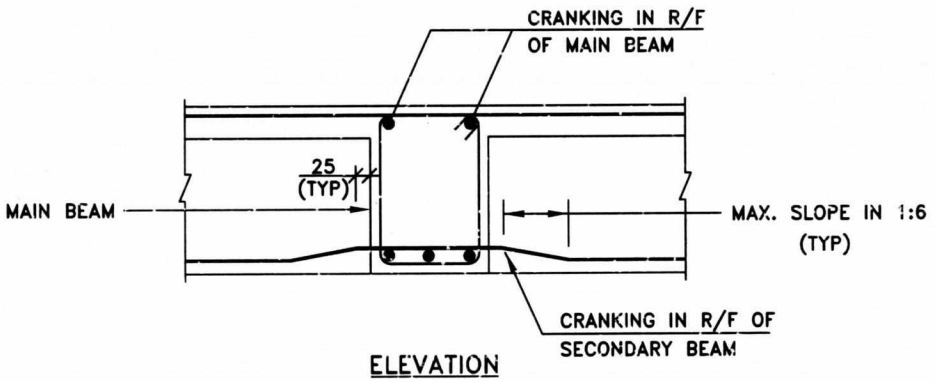


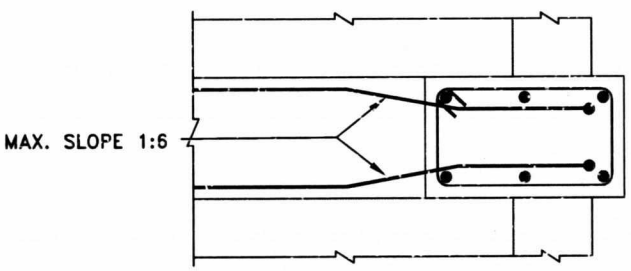
ELEVATION

TYP. DETAIL AT BEAM COLUMN JUNCTION



ELEVATION

TYP. DETAIL AT JUNCTION OF TWO BEAMS OF SAME DEPTH



PLAN

TYP. DETAIL AT JUNCTION OF BEAM AND COL. OF SAME WIDTH

NOTE:

ALL DIMENSIONS ARE IN mm.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	04.03.2024	REAFFIRMED AND ISSUED AS STANDARD	IMMANUEL	SUDIP PAUL	ANURAG SINHA	MAINAK NANDI
6	06.06.2018	REAFFIRMED AND ISSUED AS STANDARD	CS	AVK	R.SRIVASTAVA	RK TRIVEDI

Approved by

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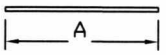
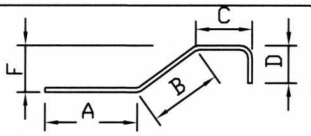
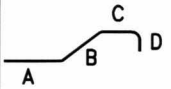
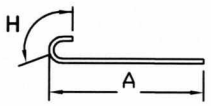
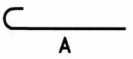
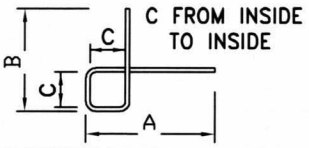
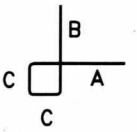
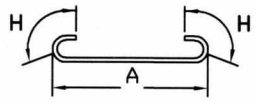
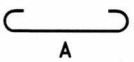
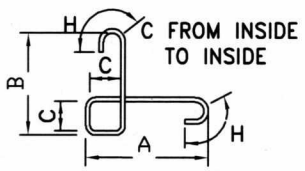
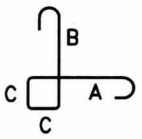
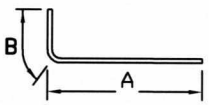
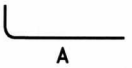
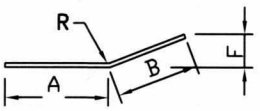
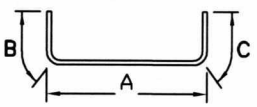
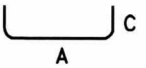
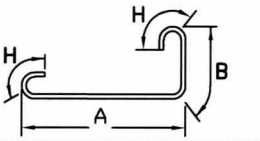
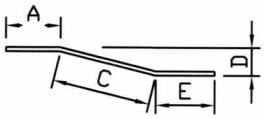
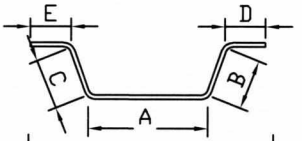
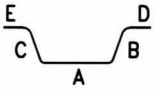
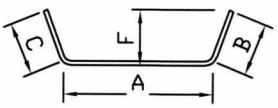
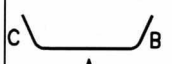
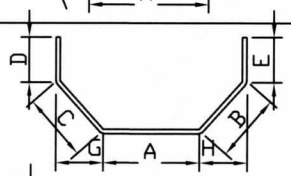
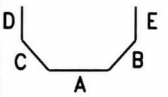
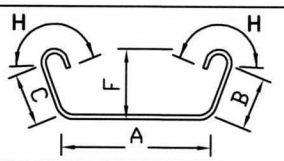
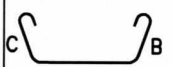
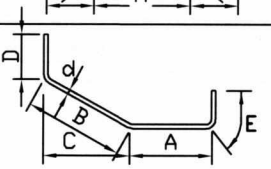
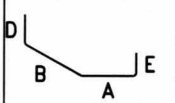
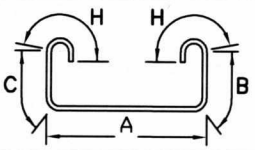
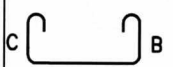
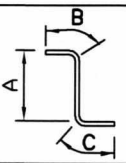
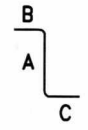
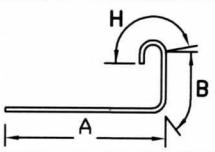
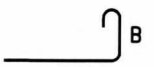
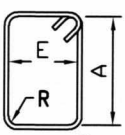
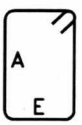
TABLE-1: STANDARD RE-BAR SHAPES

SL. NO.	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE	SL. NO.	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE
1		STRAIGHT	11		
2			12		
3			13		
4			14		
5			15		
6			16		
7			17		
8			18		
9			19		
10			20		

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	26-02-24	REVISED AND ISSUED AS STANDARD	AM	SR	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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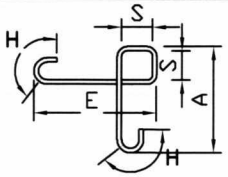
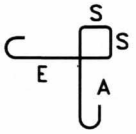
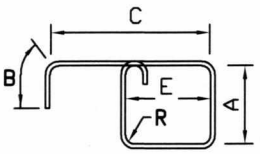
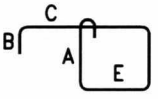
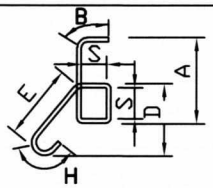
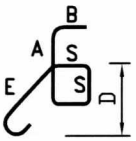
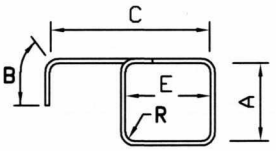
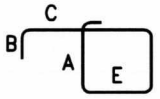
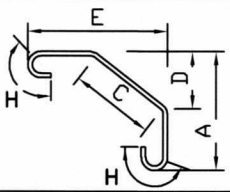
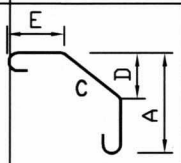
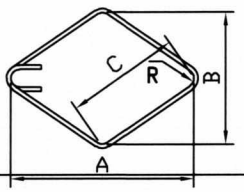
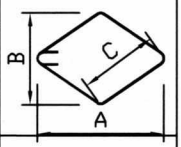
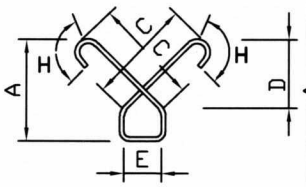
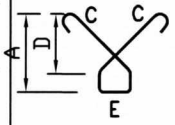
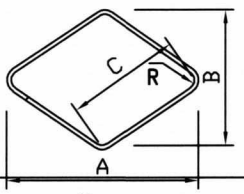
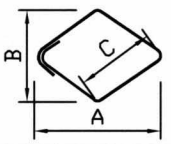
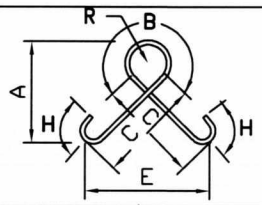
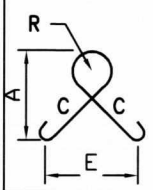
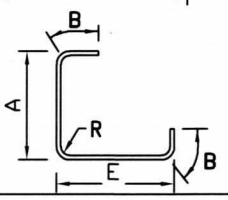
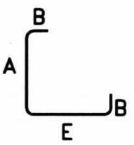
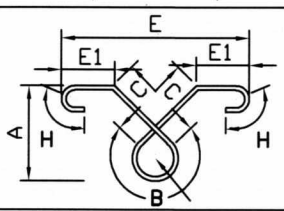
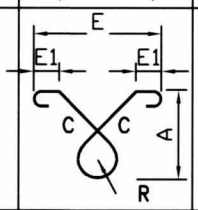
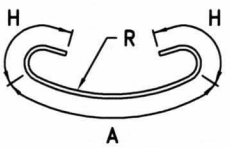
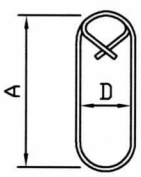
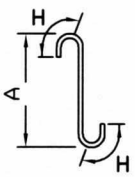
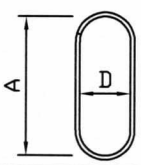
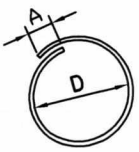
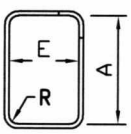
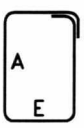
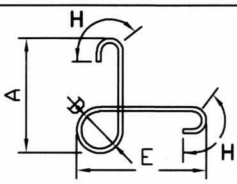
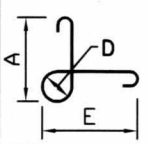
SL. NO.	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE	SL. NO.	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE
21			30		
22			31		
23			32		
24			33		
25			34		
26			35		
27			36		
28			37		
29			38		

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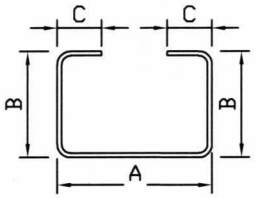
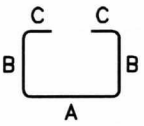
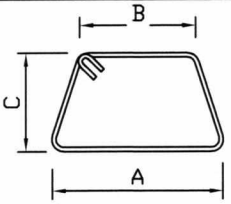
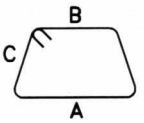
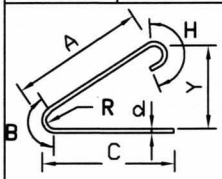
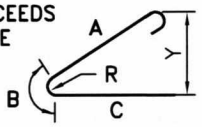
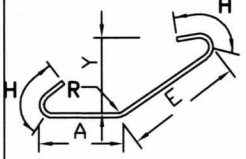
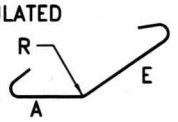
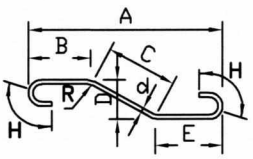
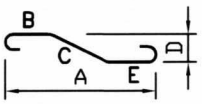
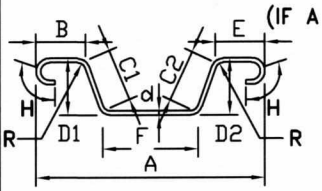
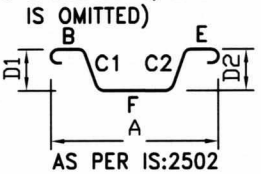
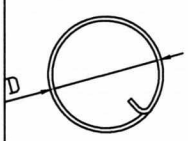
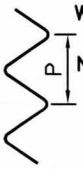
SL. NO.	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE	SL. NO.	METHOD OF MEASUREMENT OF BENDING DIMENSIONS	SKETCH & DIMENSIONS TO BE GIVEN IN SCHEDULE
39			40		
 IF ANGLE WITH HORZ. IS 45° OR LESS A+B+C+H−2(R+d) IF ANGLE IS GREATER THAN 45° & R EXCEEDS 12d, L TO BE CALCULATED 			 IF ANGLE WITH HORZ. IS 45° OR LESS & R IS 12d OR LESS A+E+2H, IF ANGLE IS GREATER THAN 45° & R EXCEEDS 12d L TO BE CALCULATED 		
 IF ANGLE WITH HORZ. IS 45° OR LESS & R IS 12d OR LESS B+C+E+2H OR $A+2H+C-\sqrt{C^2-D^2}$ (IF A IS SPECIFIED B OR E IS OMITTED) 			IF ANGLE WITH HORZ. IS 45° OR LESS & R IS 12d OR LESS B+C1+C2+E+F+2H OR $A+C1+C2+2H-\sqrt{C1^2-D1^2}-\sqrt{C2^2-D2^2}$ (IF A IS SPECIFIED B, E OR F IS OMITTED)   AS PER IS:2502		
  WHERE P IS NOT GREATER THAN D/5 N π(D+d)+8d N= NUMBER OF COMPLETE AND FRACTIONAL TURNS D= INTERNAL DIA. P= PITCH OF HELIX d= SIZE OF BAR				

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CUT LENGTH CALCULATION

TABLE-2:

BAR TYPE REFER SHT. 1 TO 3	HIGH YIELD DEFORMED BARS DIAMETER ≤ 25 MM	HIGH YIELD DEFORMED BARS DIAMETER > 25 MM	REMARKS
1	A	A	
2	A+13d	A+17d	
3	A+13d+13d	A+17d+17d	
4	A+B-3d	A+B-4d	
5	A+B+C-(3d+3d)	A+B+C-(4d+4d)	
6	A+E+C	A+E+C	*
7	A+B+C	A+B+C	*
8	A+B+C+13d+13d	A+B+C+17d+17d	*
9	A+B+C+13d+13d-(3d+3d)	A+B+C+17d+17d-(4d+4d)	
10	A+B+13d-3d	A+B+17d-4d	
11	A+B+C+D-3d	A+B+C+D-4d	*
12	A+B+C+C+d	A+B+C+C+d	
13	A+B+C+C+13d+13d+d	A+B+C+C+17d+17d+d	
14	A+B	A+B	*
15	A+B+13d+13d-3d	A+B+17d+17d-4d	
16	A+B+C+D+E	A+B+C+D+E	*
17	A+B+C+D+E	A+B+C+D+E	*
18	A+B+D+E-3d	A+B+D+E-4d	*
19	A+B+C-3d-3d	A+B+C-4d-4d	
20	2(A+E)+24d	2(A+E)+24d	
21	A+E+S+S+13d+13d+d	A+E+S+S+17d+17d+d	
22	A+E+S+S+S+13d+6d+2d	A+E+S+S+S+17d+7d+2d	
23	$A+E+C+13d+13d-D\sqrt{C^2-D^2}$	$A+E+C+17d+17d-D\sqrt{C^2-D^2}$	*
24	E+2A-2D+2C+13d+13d	E+2A-2D+2C+17d+17d	
25	B+2C+13d+13d	B+2C+17d+17d	
26	2C+2E1+B+13d+13d	2C+2E1+B+17d+17d	
27	2A+3D+22d	2A+3D+22d	
28	2A+3D+22d	2A+3D+22d	
29	2(A+E)+20d	2(A+E)+20d	
30	2A+E+C+12d+6d	2A+E+C+12d+7d	
31	2A+E+C+9d+6d	2A+E+C+9d+7d	
32	4C+24d	4C+24d	
33	4C+24d	4C+24d	
34	A+E-1/2R-d+12d	A+E-1/2R-d+14d	
35	A+13d+13d	A+17d+17d	
36	A+13d+13d	A+17d+17d	

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CUT LENGTH CALCULATION

BAR TYPE REFER 7-68-0101) SHT. 4	HIGH YIELD DEFORMED BARS DIAMETER ≤ 25 MM	HIGH YIELD DEFORMED BARS DIAMETER > 25 MM	REMARKS
37	$\pi D+A$	$\pi D+A$	
38	A+E+4/3d+13d+13d	A+E+4/3d+17d+17d	
39	A+2B+2C-12d	A+2B+2C-12d	
40	$A+B+2[\{(A-B)/2\}^2+C^2]^{1/2}+13d$	$A+B+2[\{(A-B)/2\}^2+C^2]^{1/2}+17d$	

NOTES: -

1. READ SHEETS 1 TO 5 IN CONJUNCTION.
2. THE COMPUTATIONS OF CUT LENGTH ARE BASED ON IS 2502 EXCEPT THAT THESE SHALL BE IN MULTIPLES OF 10mm.
3. WHERE MARKED * ON SHEETS 4 & 5, IT IS ASSUMED THAT ANGLE OR BEND WITH HORIZONTAL IS 45° OR LESS.
4. HOOKS INDICATED IN SHT. 1 TO 3 ARE FOR DRAFTING PURPOSE ONLY. FOR 90° BEND, HOOKS ARE NOT REQUIRED, ONLY HOOK ALLOWANCE SHALL BE ADOPTED AS PER SHT. 4 & 5.
5. ALL DIMENSIONS ON SHT. 1 to 3 ARE FROM OUTSIDE EDGES OF BARS UNLESS OTHERWISE MENTIONED.

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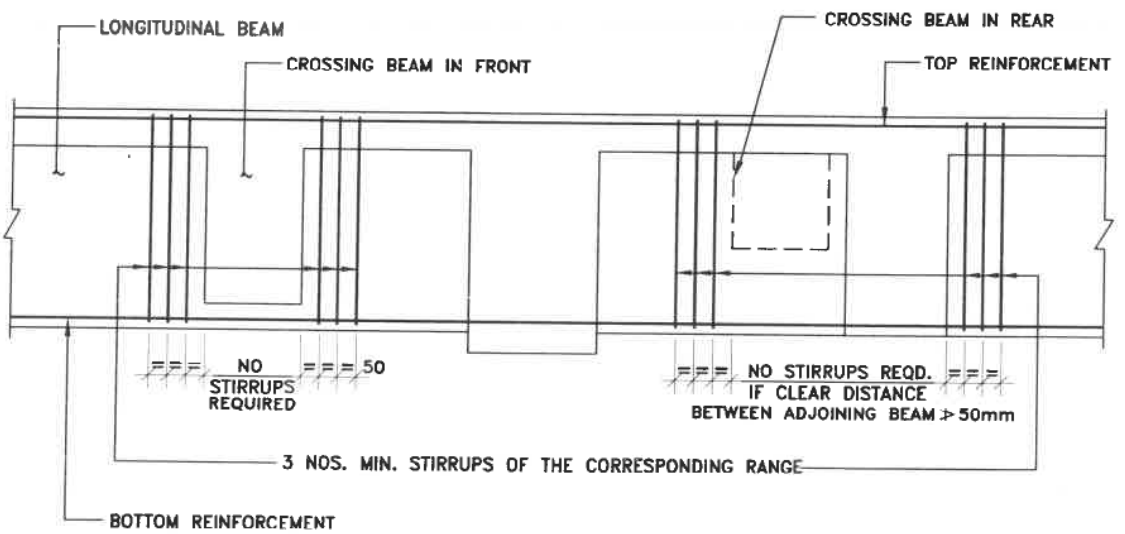

NOTE:

ALL DIMENSIONS ARE IN mm.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	29.03.24	REAFFIRMED AND ISSUED AS STANDARD	KML		ANURAG SINHA	MAINAK NANDI
5	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

Approved by

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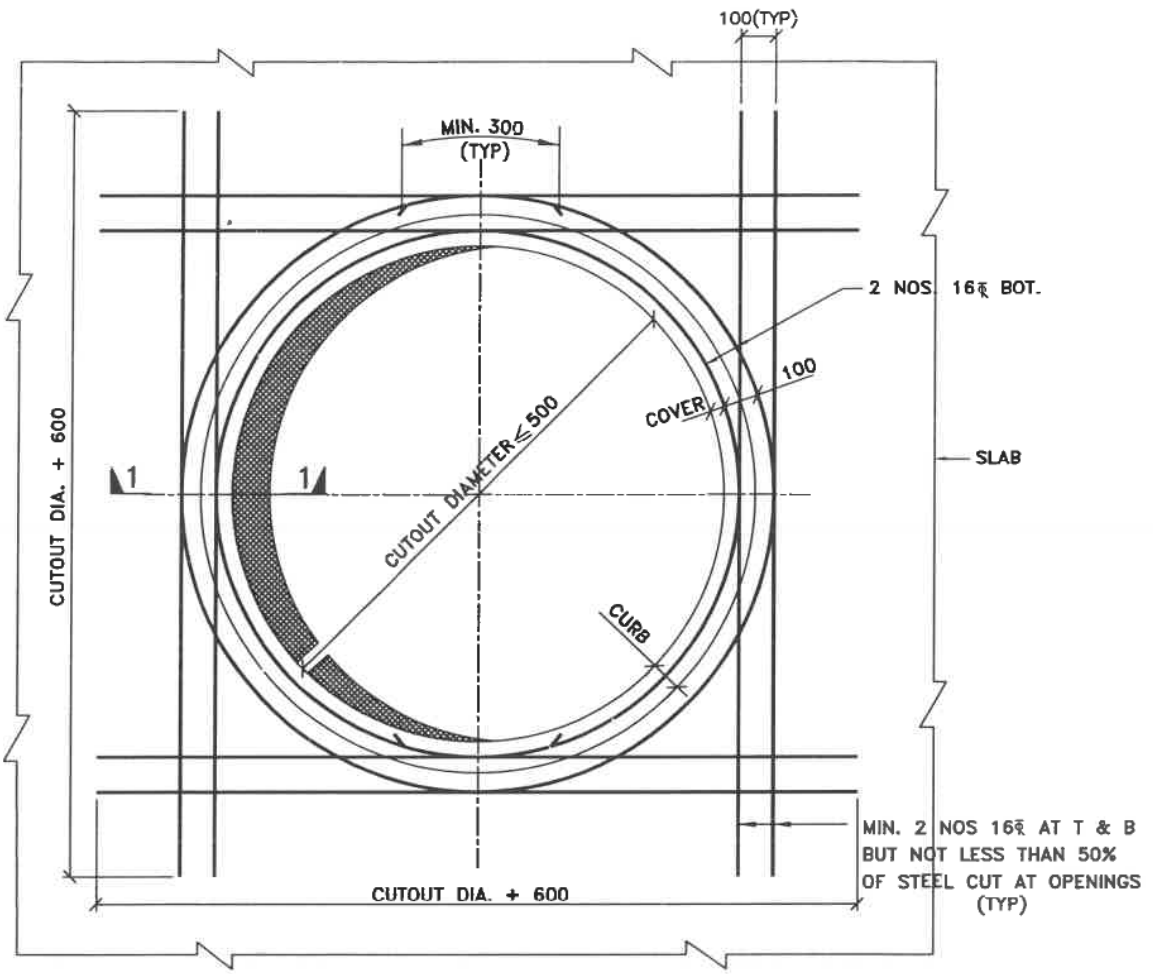

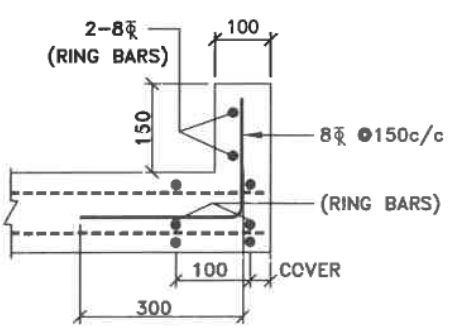

SECTION: 1-1

NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. ALL THE BARS SHALL BE EFFECTIVELY TIED WITH THE MAIN REINFORCEMENT BARS CUT OR SPLAYED NEAR THE OPENING AS PER THE DIRECTION OF THE ENGINEER-IN-CHARGE.
3. THIS DETAIL APPLIES TO SLABS UPTO 200 THK.
4. OMIT CURB WHERE SPECIFICALLY STATED ON DRAWINGS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	29.03.24	REAFFIRMED AND ISSUED AS STANDARD	KML	PM	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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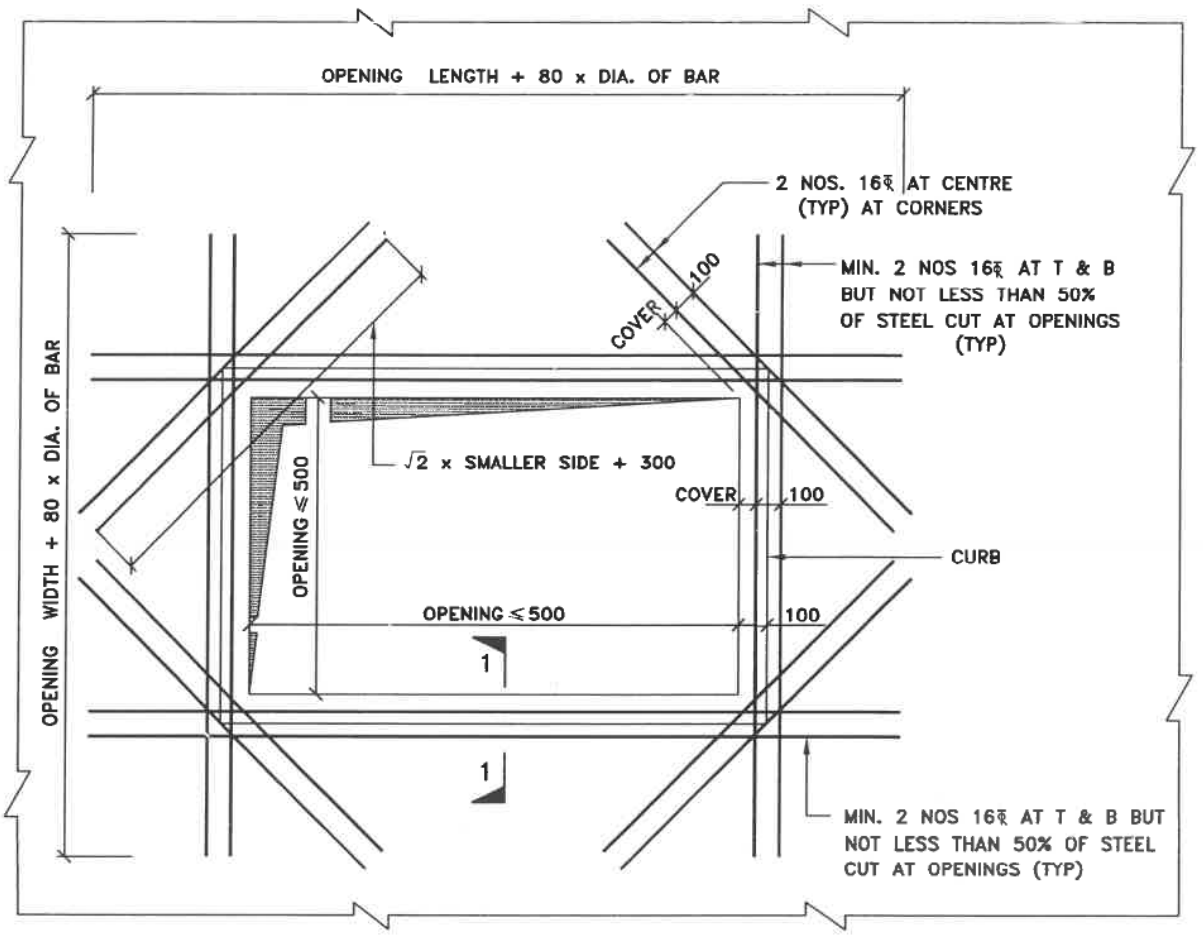

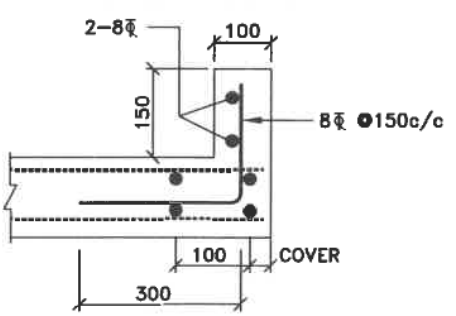

SECTION: 1–1

NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. EXTRA BARS MAY BE OMITTED IF A BEAM IS PROVIDED AT THE RELEVANT EDGE.
3. CORNER BAR MAY BE OMITTED IF TWO BEAMS MEET AT THE RELEVANT CORNER.
4. ALL THE BARS MENTIONED ABOVE SHALL BE EFFECTIVELY TIED WITH THE MAIN REINFORCEMENT BARS CUT OR SPLAYED NEAR OPENING AS DIRECTED BY ENGINEER-IN-CHARGE.
5. OMIT CURB WHERE SPECIFICALLY STATED ON DRAWING.
6. THIS DETAIL APPLIES TO SLABS UPTO 200 THK.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
7	29.03.24	REAFFIRMED AND ISSUED AS STANDARD	KML	PM	ANURAG SINHA	MAINAK NANDI
6	06.06.18	REAFFIRMED AND ISSUED AS STANDARD	CS	AVM	R.SRIVASTAVA	RK TRIVEDI

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STANDARD LAP LENGTH FOR REBARS

TYPE OF REBARS	TYPE OF STRUCTURE	LAP LENGTH GRADE OF CONCRETE						TENSILE STRESS (σ_s) FOR Fe500 (N / mm^2)	DESIGN METHOD
		M20	M25	M30	M35	M40	M45		
HIGH STRENGTH DEFORMED BARS CONFORMING TO IS 1786 AS PER GENERAL NOTES OF THE PROJECT	GENERAL R.C.C STRUCTURES / LIQUID RETAINING STRUCTURES / CHIMNEY	57 D	49 D	46 D	40 D	36 D	36 D	435	LIMIT STATE
	STORAGE BINS	54 D	48 D	43 D	40 D	36 D	34 D	275	WORKING STRESS

REMARKS: 'D' DENOTES DIAMETER OF REBARS.

NOTES :-

1. LAP LENGTHS FOR REBARS, FULLY STRESSED TO TENSILE STESS AT DESIGN LOAD / WORKING LOAD, HAS BEEN DERIVED FROM THE BASIC FORMULA GIVEN BELOW (REFER CLAUSE 26.2.1, IS 456)

$$L_d = \frac{D\sigma_s}{4\tau_{bd}}$$

WHERE D = NOMINAL DIAMETER OF THE BARS ; L_d = LAP LENGTH

σ_s = TENSILE STRESS AT DESIGN LOAD / WORKING LOAD IN REBARS HAS BEEN ADOPTED AS 0.87fy FOR LIMIT STATE AND 0.55fy FOR WORKING STRESS

τ_{bd} = DESIGN BOND STRESS AS PER CLAUSE 26.2.1.1 OF IS 456 FOR LIMIT STATE AND TABLE 21 OF IS 456 FOR WORKING STRESS DESIGN.

2. IS CODE REFERENCES :

LIQUID RETAINING STRUCTURE	IS 3370
R.C.C CHIMNEYS	IS 4998
STORAGE BINS	IS 4995
GENERAL R.C.C STRUCTURES	IS 456

3. LAP LENGTH SHALL BE ROUNDED UP TO THE NEXT HIGHER WHOLE NUMBER.
4. THE LONGITUDINAL DISTANCE BETWEEN TWO ADJACENT LAPS SHOULD NOT BE LESS THAN 1.3 TIMES THE LAP LENGTH L_d.
5. LAP SPLICES SHALL NOT BE USED FOR BARS LARGER THAN 32mm.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
8	22.12.25	REVISED AND REISSUED AS STANDARD	AK	PM	AS	MN
7	28.09.20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SM
6	21.07.14	REVISED AND ISSUED AS STANDARD	A.K. SHARMA	AMARJEET	P.K.MITTAL	S.CHANDA

Approved by

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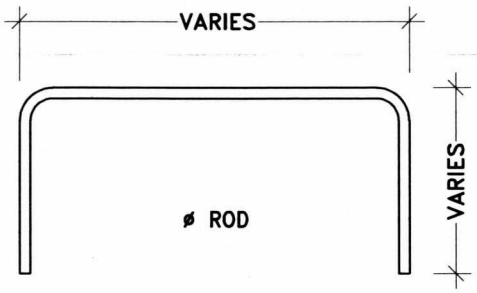

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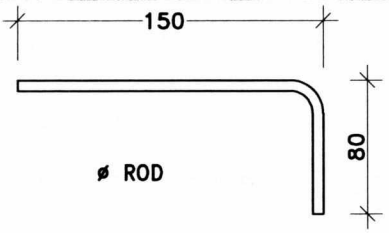

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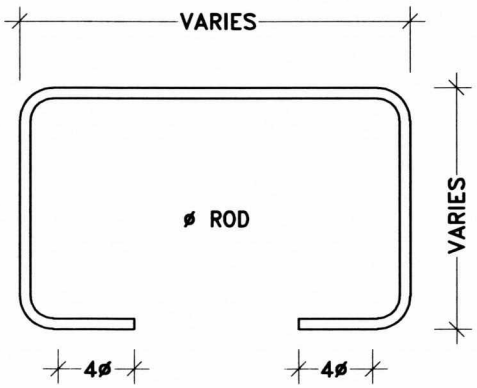

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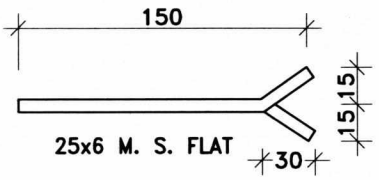

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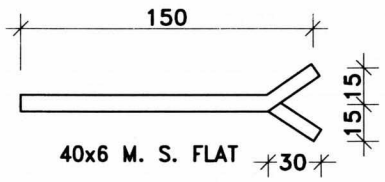

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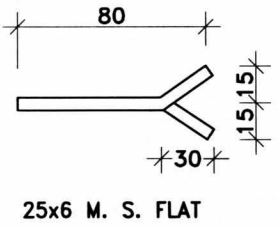

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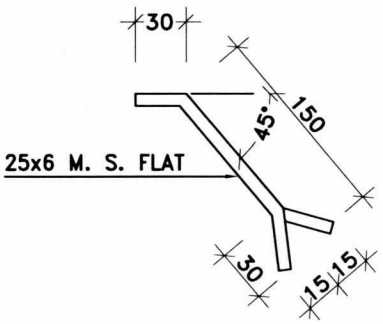

TYPE–'C4'

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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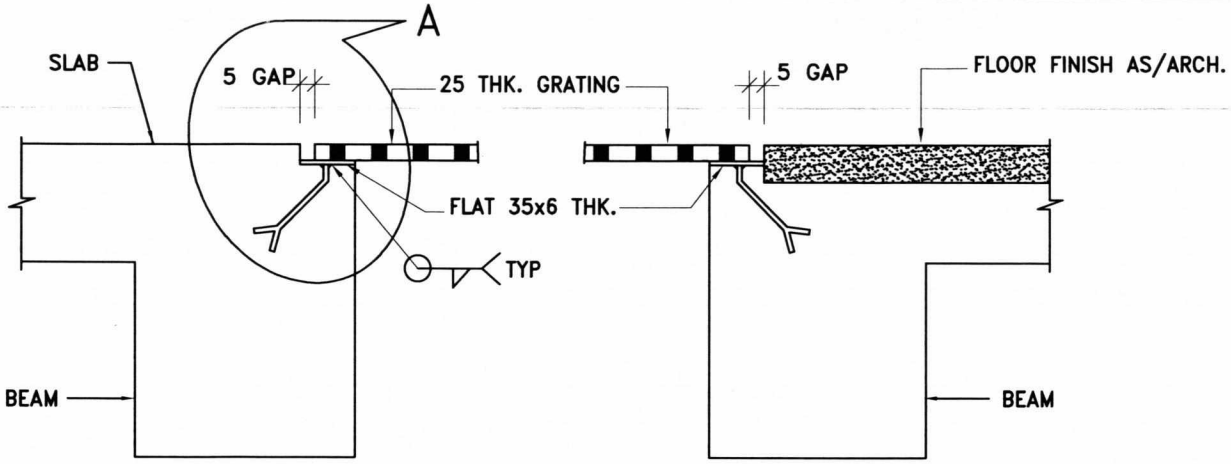
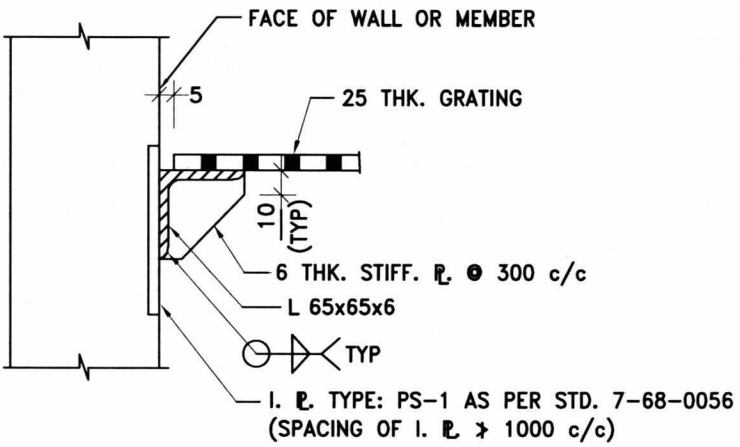
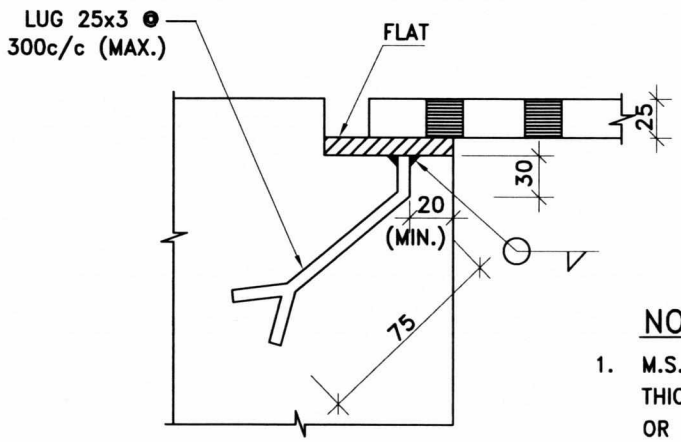


GRATING SUPPORT OVER BEAM WITHOUT FLOOR FINISH

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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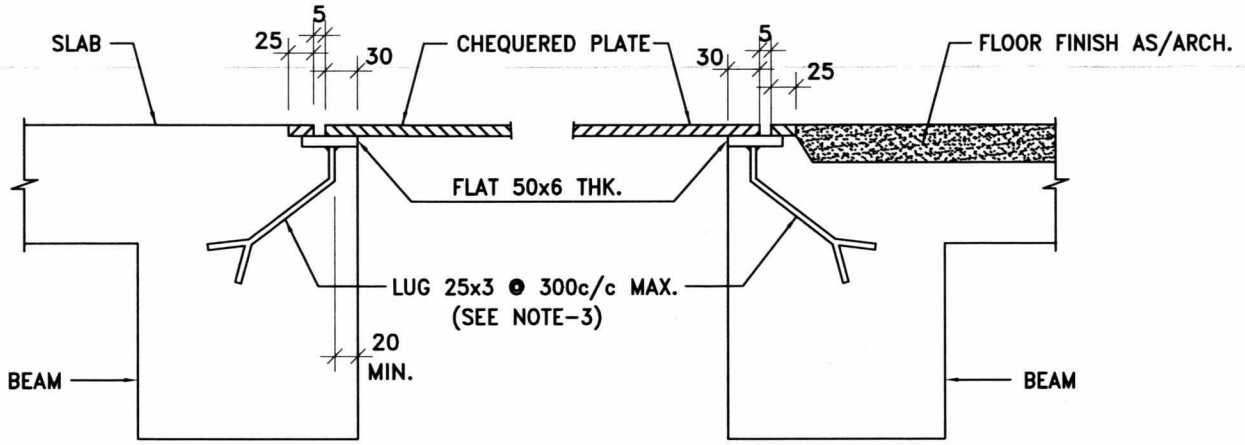
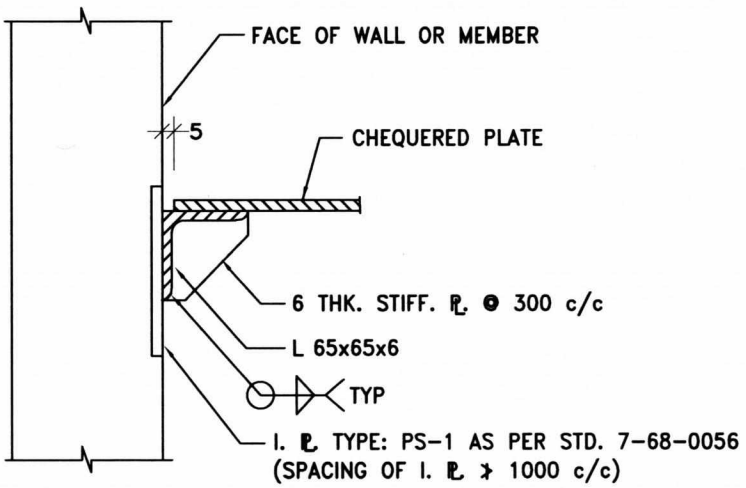


CHQD. PL SUPPORT OVER BEAM WITHOUT FLOOR FINISH

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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NOTES:–

1. ALL DIMENSIONS ARE IN mm.
2. SPLICE IS DESIGNED FOR FULL STRENGTH OF SMALLER ISMB SECTION.
3. ENDS OF ISMB SECTIONS SHALL BE GROUND FLUSH, BEFORE WELDING TO THE BASE / CAP PLATES.
4. BASE AND CAP PLATE SURFACES SHALL BE GROUND FLUSH.
5. ERECTION BOLTS ARE DESIGNED FOR 5% MOMENT AND 5% AXIAL LOAD CAPACITY OF THE SMALLER SECTION.
6. UPPER COLUMN SHALL BE SUITABLY HELD IN POSITION WITH THE HELP OF GUY–ROPES / TIES TILL THE BASE AND CAP PLATES ARE WELDED IN POSITION.
7. ERECTION BOLTS SHALL BE LEFT PERMANENTLY IN POSITION.
8. ERECTION BOLTS SHALL BE OF PROPERTY CLASS 4.6 CONFORMING TO IS:1367.
9. BASE PLATE OF SMALLER ISMB SECTION SHALL BE OMITTED IN CASE OF SHOP SPLICING AND THE SMALLER ISMB SECTION ALONG WITH ALL GUSSETS AS SHOWN SHALL BE WELDED WITH THE CAP PLATE OF THE LARGER ISMB SECTION.
10. THIS STANDARD IS VALID FOR STRUCTURAL STEEL OF GRADE E350 & E250 CONFIRMING TO IS 2062.
11. GRADE OF BASE PLATE, CAP PLATE, FLANGE PLATE & ALL MISC. CONNECTION PLATES SHALL BE SAME AS THAT OF GRADE OF COLUMN.
12. WELDING ELECTRODE SHALL BE COMPATIBLE WITH CORRESPONDING GRADE OF STEEL.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	01.05.25	REVISED AND ISSUED AS STANDARD	AB	SP	ANURAG SINHA	MAINAK NANDI
5	01.08.19	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	RAJANJI SRIVASTAVA	R.K.TRIVEDI
4	21.01.14	REAFFIRMED AND ISSUED AS STANDARD	VPS	AJS	P K.MITTAL	S CHANDA

Approved by

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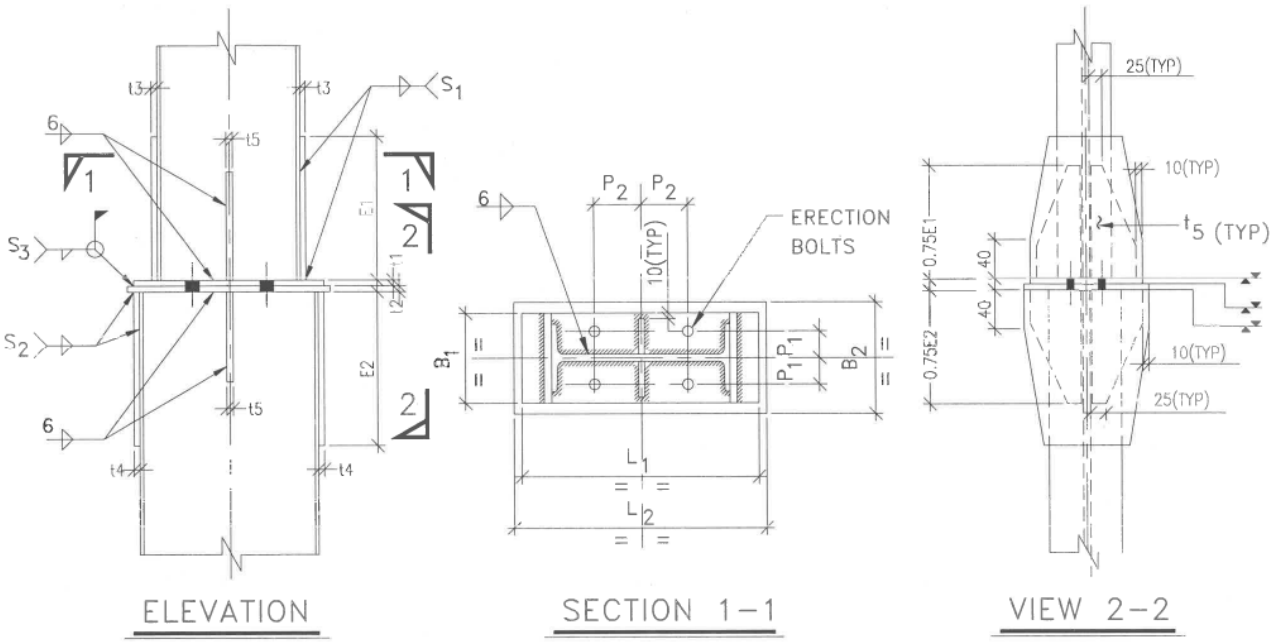

ELEVATION SECTION 1–1 VIEW 2–2

COLUMN SECTIONS SPLICED		BASE AND FLANGE PLATE DETAILS (SMALLER SECTION)						CAP AND FLANGE PLATE DETAILS (LARGER SECTION)						WELD SIZE	ERECTION BOLT			
UPPER	LOWER	L_1	B_1	E_1	t_1	t_3	S_1	L_2	B_2	E_2	t_2	t_4	S_2	S_3	ø	P_1	P_2	t_5
100	125/150	140	100	150	12	08	06	165/190	120/125	150/160	12/12	08/08	06/06	06	12	30	25	OMIT
125	150/175	165	105	160	12	08	06	190/215	125/130	160/165	12/12	08/08	06/06	06	12	30	35	OMIT
150	175/200	190	110	165	16	10	06	215/240	130/170	165/220	16/16	08/08	06/06	06	12	35	50	OMIT
175	200/225	215	145	220	16	10	06	240/280	170/180	220/225	16/20	08/10	06/08	08	12	50	60	OMIT
200	225/250	250	150	225	20	12	08	280/305	180/180	225/225	20/20	10/10	08/08	10	16	45	65	10
225	250/300	275	150	225	20	12	10	305/350	180/205	225/265	20/20	10/10	08/10	10	16	45	75	10
250	300/350	300	175	265	20	12	10	350/400	205/220	265/285	20/20	10/10	10/10	10	16	55	85	10
300	350/400	350	190	285	20	12	10	400/450	220/220	285/285	20/25	10/12	10/10	12	16	65	110	12
350	400/450	415	190	285	25	16	12	450/500	220/245	285/310	25/25	12/12	10/10	12	20	60	130	12
400	450/500	465	205	310	25	16	12	500/560	245/285	310/360	25/25	12/12	10/10	12	20	70	150	12
450	500	525	240	360	25	18	12	560	285	360	25	12	10	12	20	85	175	12
500	600	580	280	420	28	18	12	665	315	420	28	12	12	12	20	105	200	12

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NOTES :-

1. ALL DIMENSIONS ARE IN mm.
2. ALL BUTT WELD ARE FULL STRENGTH WELDS.
3. ALL EDGES SHALL BE PREPARED BEFORE BUTT WELDING.
4. SPLICE PLATES ARE DESIGNED FOR 40% OF FULL STRENGTH OF THE MEMBER.
5. SPLICE SHALL NOT BE LOCATED AT THE POINT OF MAXIMUM BENDING MOMENT AND/OR MAXIMUM SHEAR FORCE.
6. SPLICE PLATES MAY BE OMITTED FOR PURLINS & SIDE GIRTS FOR MEMBER SIZES UPTO 150MM DEPTH.
7. SPLICE DETAILS FOR APPROPRIATE GRADE OF STEEL LIKE E250, E350, Yst240, Yst310, Yst355, ETC. AS PER PROJECT GENERAL NOTES SHALL BE FOLLOWED.
8. NUMBER OF SPLICES PER MEMBER SHALL BE AS PER CLAUSE 5.2.8 OF SPECIFICATION NO. 6-68-0006.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
7	11-09-23	REVISED AND ISSUED AS STANDARD	JITENDER	AKSHAY/AMARJEET	ANURAG SINHA	SANJAY MAZUMDAR
6	27-03-19	REAFFIRMED AND ISSUED AS STANDARD	JG	AJS	RAJANJI SRIVASTAVA	R.K. TRIVEDI

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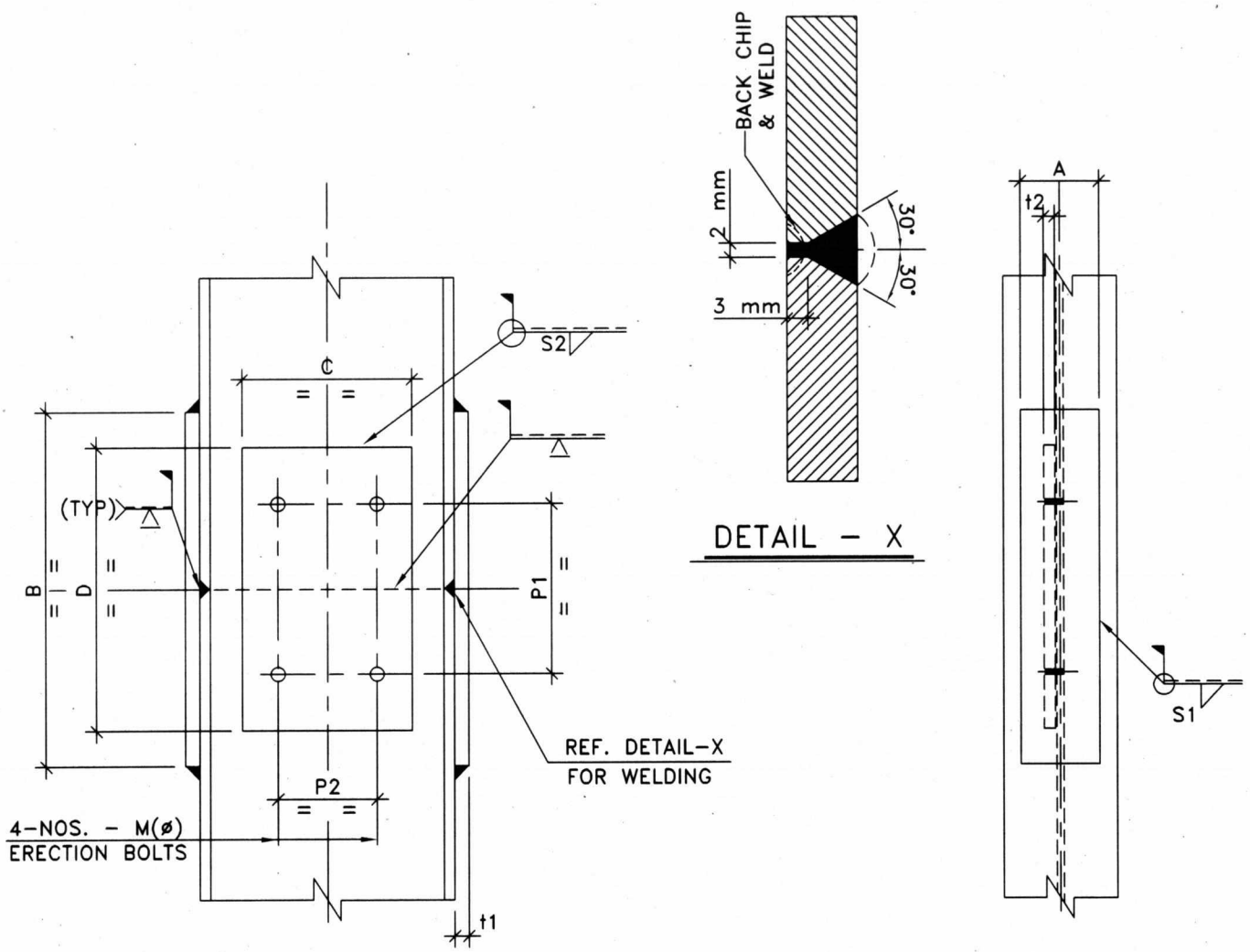

BEAMS

SIZE OF JOIST	FLANGE SPLICE PLATE					WEB SPLICE PLATE					ERECTION BOLTS		
	A	B (E250)	B (E350)	t1	WELD SIZE S1	C	D (E250)	D (E350)	t2	WELD SIZE S2	M(ø)	P1	P2
MB125	55	100	100	6	6	90	100	100	6	6	12	50	40
MB150	60	120	120	6	6	110	120	120	6	6	16	60	50
MB175	70	120	120	6	6	120	120	120	6	6	16	60	60
MB200	80	150	150	6	6	120	120	120	6	6	16	60	60
MB225	90	170	190	6	6	120	120	120	6	6	16	60	60
MB250	100	260	260	8	6	120	120	120	6	6	16	60	60
MB300	120	300	300	8	6	150	120	140	6	6	16	60	80
MB350	120	300	340	8	6	150	160	200	8	6	16	60	80
MB400	120	300	340	10	8	180	210	250	8	6	16	60	100
MB450	130	300	340	10	8	215	240	300	8	6	16	60	135
MB500	160	400	400	10	8	260	300	350	8	6	16	60	150
MB600	180	400	450	12	10	300	300	350	10	8	16	60	160

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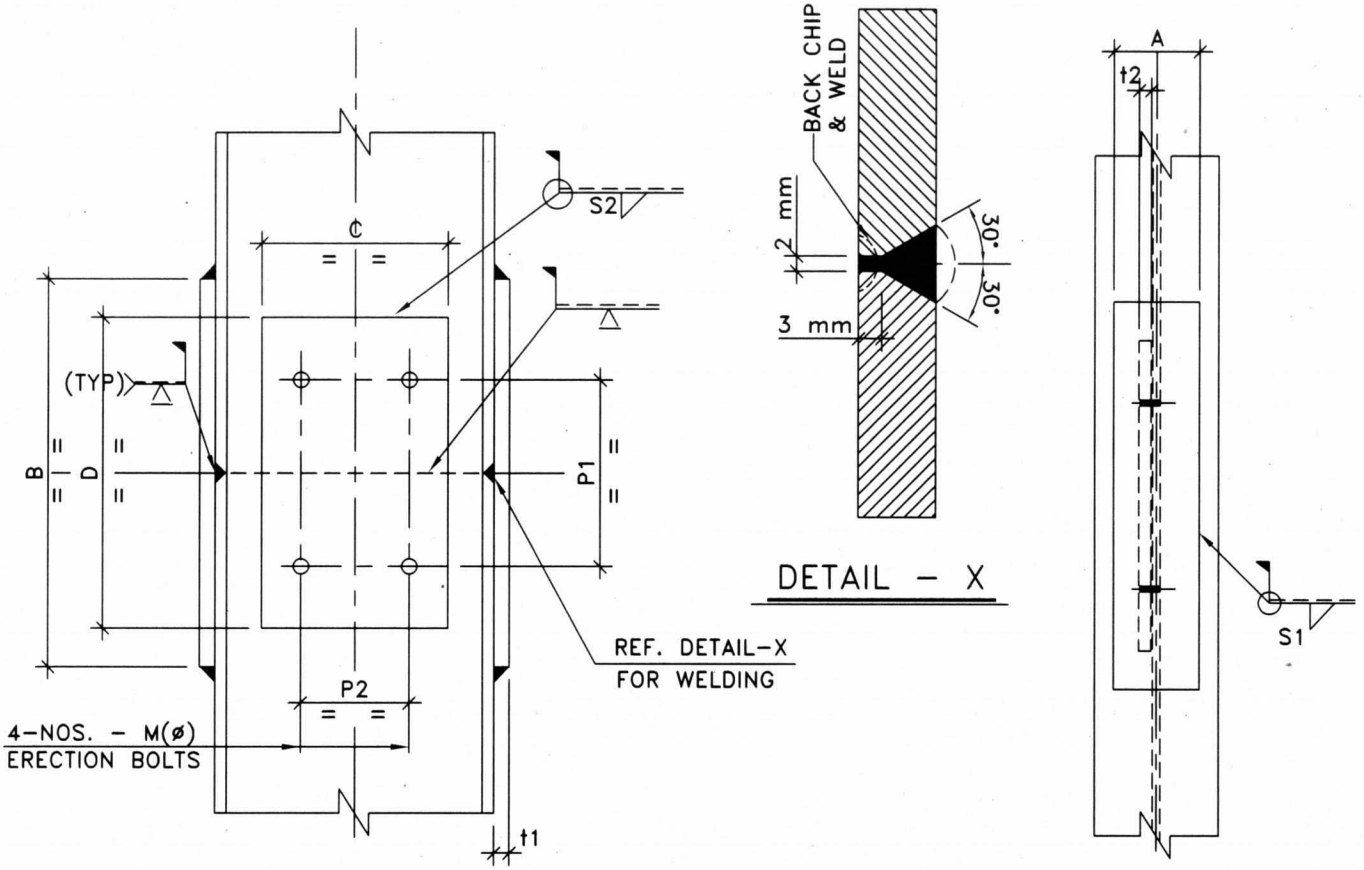

ELEVATION

SIDE VIEW

PARALLEL FLANGE BEAMS

MEMBER SIZE	FLANGE SPLICE PLATE					WEB SPLICE PLATE					ERECTION BOLTS		
	A	B (E250)	B (E350)	t1	WELD SIZE S1	C	D (E250)	D (E350)	t2	WELD SIZE S2	M(ø)	P1	P2
NPB 300x150x49.32	120	300	340	8	6	150	120	150	8	6	16	60	80
NPB 400x180x66.3	140	300	340	10	8	180	200	250	8	6	16	60	100
NPB 500x200x90.7	160	400	450	10	8	250	300	380	8	6	16	60	150
NPB 600x220x122.4	180	400	450	12	10	300	300	380	10	8	16	60	160
WPB 600x300x128.79	250	400	450	12	10	300	300	380	10	8	16	80	170
WPB 600x300x177.8	250	500	600	14	12	300	340	400	10	8	16	80	180
WPB 700x300x149.89	250	500	600	14	12	350	380	440	10	8	16	80	190
WPB 700x300x204.5	250	600	680	16	12	350	380	440	12	10	16	80	190
WPB 700x300x240.5	250	600	680	18	14	350	380	440	14	12	16	80	190
WPB 800x300x224.37	250	600	680	18	14	400	380	450	14	12	16	100	200
WPB 800x300x262.33	250	600	680	20	16	400	380	450	14	12	16	100	200
WPB 900x300x291.45	250	600	700	20	16	450	450	550	16	12	16	100	200

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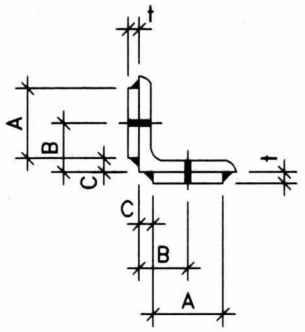
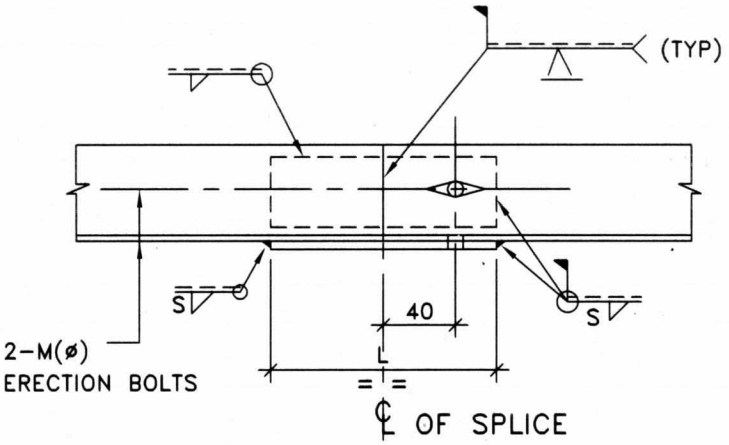


END VIEW



ELEVATION

EQUAL ANGLE (SINGLE)

SIZE OF ANGLE	SPLICE PLATE			B	C	BOLT DIA M(ø)	SIZE OF WELD (S)
	A	t	L				
L 50x50x6	30	6	130	28	10	12	5
L 65x65x6	45	6	130	35	10	12	5
L 65x65x8	45	6	130	35	10	12	6
L 75x75x6	55	6	130	40	10	16	6
L 75x75x8	55	6	130	40	10	16	6
L 90x90x6	60	6	130	50	15	16	6
L 90x90x8	60	8	130	50	15	16	8
L 100x100x8	60	8	150	60	20	16	8
L 130x130x10	70	8	200	80	30	16	8
L 150x150x10	80	8	200	90	35	16	8

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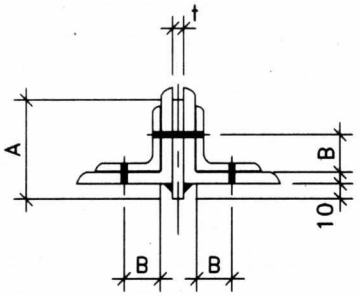
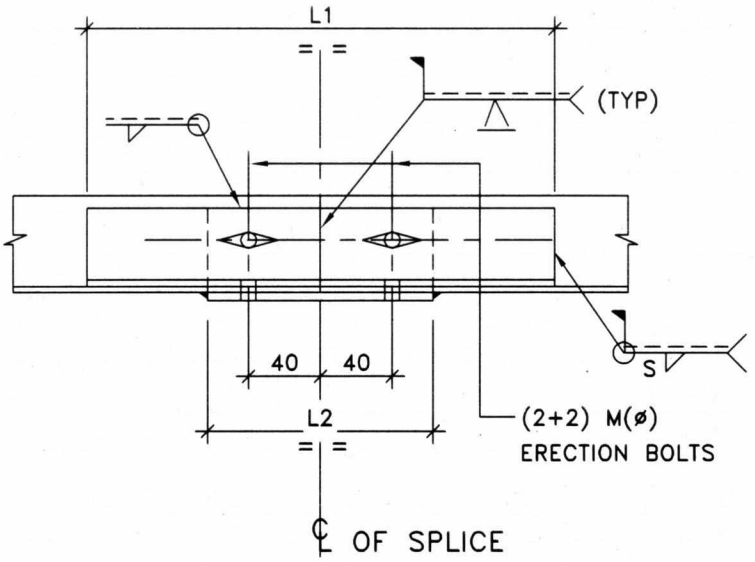


END VIEW



ELEVATION

EQUAL ANGLES (DOUBLE)

SIZE OF ANGLE	SPLICE ANGLE	L1	SPLICE PLATE			B	ERECTION BOLT DIA M(ø)	SIZE OF WELD (S)
			A	t	L2			
JL 50x50x6	JL 35x35x6	150	50	t	130	19	12	5
JL 65x65x6	JL 35x35x6	150	65	t	130	19	12	5
JL 65x65x8	JL 50x50x6	200	65	t	130	28	12	6
JL 75x75x6	JL 50x50x6	200	75	t	130	28	12	6
JL 75x75x8	JL 50x50x6	230	75	t	130	28	12	6
JL 90x90x6	JL 50x50x6	240	90	t	130	28	12	6
JL 90x90x8	JL 65x65x6	270	90	t	130	35	12	6
JL 100x100x8	JL 65x65x6	300	100	t	130	35	12	6
JL 130x130x10	JL 75x75x8	400	130	t	130	40	16	6
JL 150x150x10	JL 90x90x8	480	150	t	130	50	16	6

t – THICKNESS OF PLATE AS PER DESIGN DRG./CONNECTION DESIGN.

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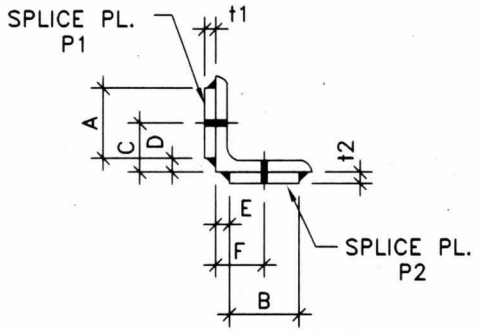
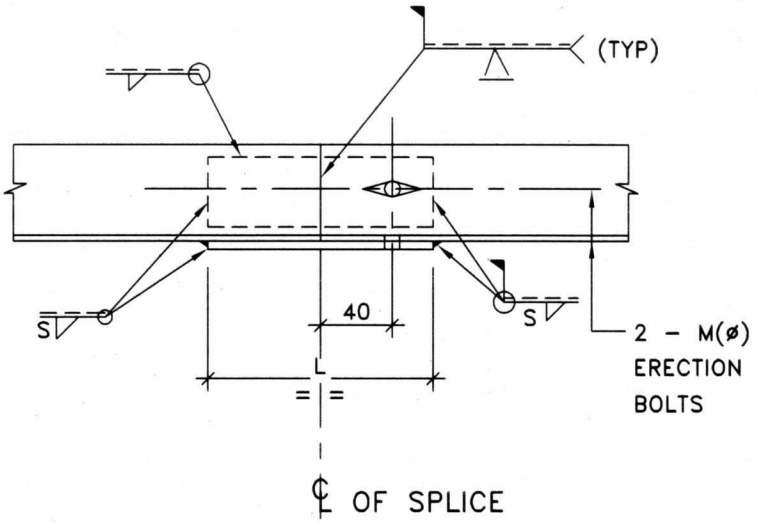


END VIEW



ELEVATION

UNEQUAL ANGLE (SINGLE)

SIZE OF ANGLE	SPLICE PLATE P1		SPLICE PLATE P2		L	C	D	E	F	EREC-TION BOLT DIA M(ø)	SIZE OF WELD (S)
	A	t1	B	t2							
L 75x50x6	35	6	30	6	130	40	20	10	28	12	6
L 100x75x6	40	6	45	6	130	60	40	15	40	12	6
L 100x75x8	60	6	50	6	130	60	30	15	40	12	6
L 125x75x8	75	6	50	6	150	75	40	15	40	12	6
L 125x75x10	75	6	50	6	200	75	40	15	40	12	6
L 150x75x10	100	6	50	6	250	90	40	15	40	12	6
L 150x115x10	100	6	75	6	250	90	40	30	70	16	6

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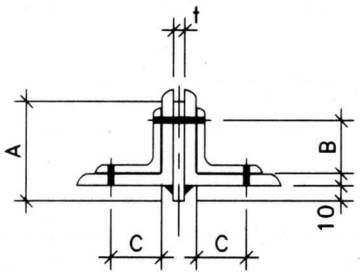
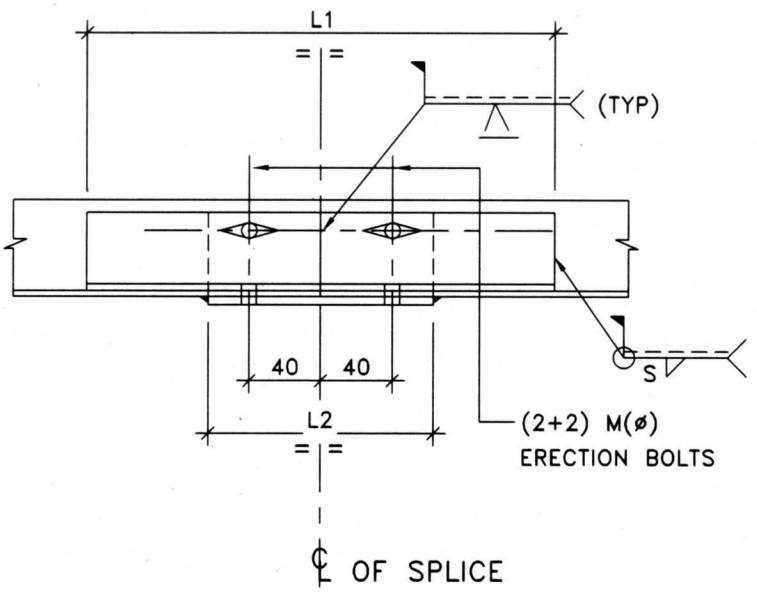


END VIEW



ELEVATION

UNEQUAL ANGLES (DOUBLE)

SIZE OF ANGLE	SPLICE ANGLE	L1	SPLICE PLATE			B	C	ERECTION BOLT DIA M(ø)	SIZE OF WELD (S)
			A	t	L2				
JL 75x50x6	JL 35x35x6	150	75	t	130	19	19	12	6
JL 100x75x6	JL 50x50x6	200	100	t	130	28	28	12	6
JL 100x75x8	JL 50x50x6	270	100	t	130	28	28	12	6
JL 125x75x8	JL 75x50x6	300	125	t	130	40	28	12	6
JL 125x75x10	JL 75x50x8	320	125	t	130	40	28	12	6
JL 150x75x10	JL 75x50x8	350	150	t	130	40	28	12	6
JL 150x115x10	JL 100x75x8	420	150	t	130	60	40	12	6

t – THICKNESS OF PLATE AS PER DESIGN DRG./CONNECTION DESIGN.

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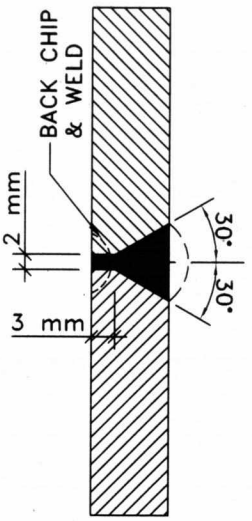
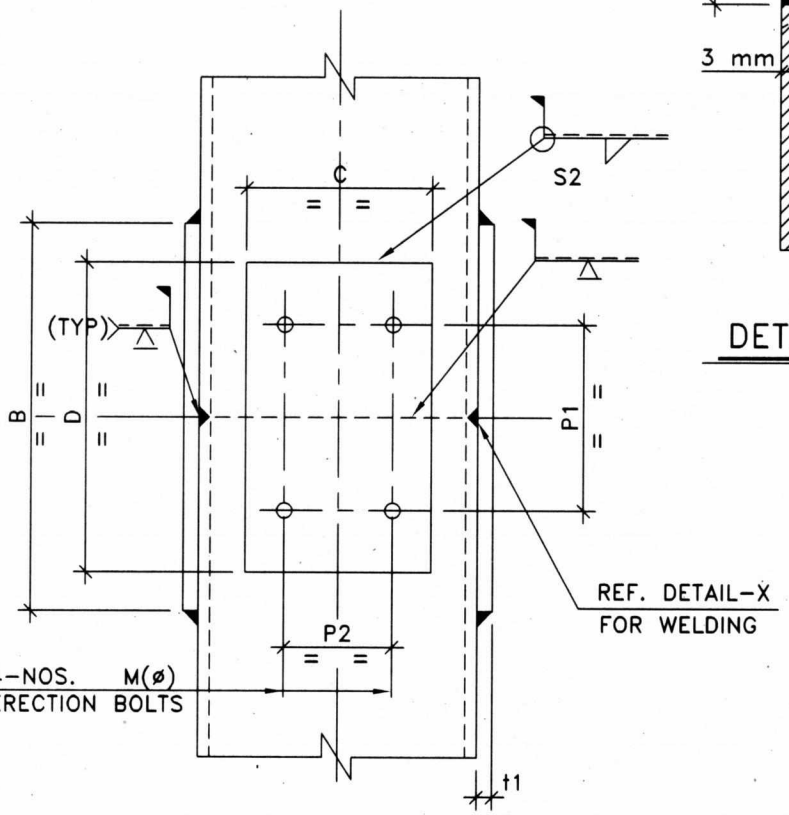
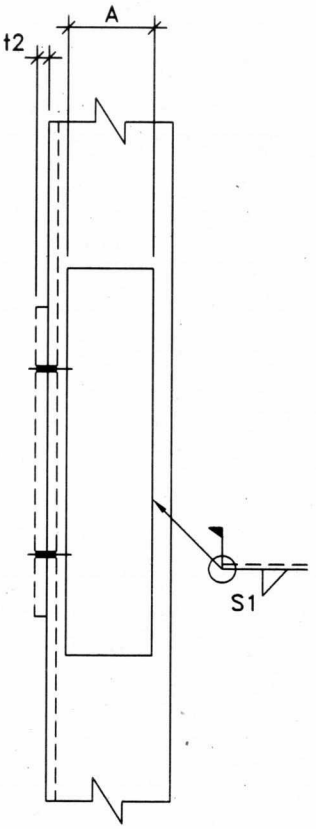
SECTION



DETAIL – X



ELEVATION



END VIEW

CHANNELS

SIZE OF CHANNEL	FLANGE SPLICE PLATE					WEB SPLICE PLATE					ERECTION BOLTS			REMARKS
	A	B (E250)	B (E350)	t1	WELD SIZE S1	C	D (E250)	D (E350)	t2	WELD SIZE S2	M(ø)	P1	P2	
MC100	35	120	120	8	6	40	90	90	6	6	12	50	–	TWO BOLTS
MC125	45	120	120	8	6	50	90	90	6	6	12	50	–	TWO BOLTS
MC150	55	150	150	8	6	60	120	120	6	6	16	60	–	TWO BOLTS
MC175	55	150	150	10	8	120	120	120	6	6	16	60	60	
MC200	55	150	150	12	10	120	120	120	6	6	16	60	60	
MC225	60	160	160	12	10	120	120	120	6	6	16	60	60	
MC250	60	160	160	12	10	120	120	120	6	6	16	60	60	
MC300	70	160	160	12	10	150	120	140	6	6	16	60	60	
MC350	80	190	190	12	10	200	120	150	6	6	16	60	60	
MC400	80	190	190	12	10	240	140	180	6	6	16	60	60	

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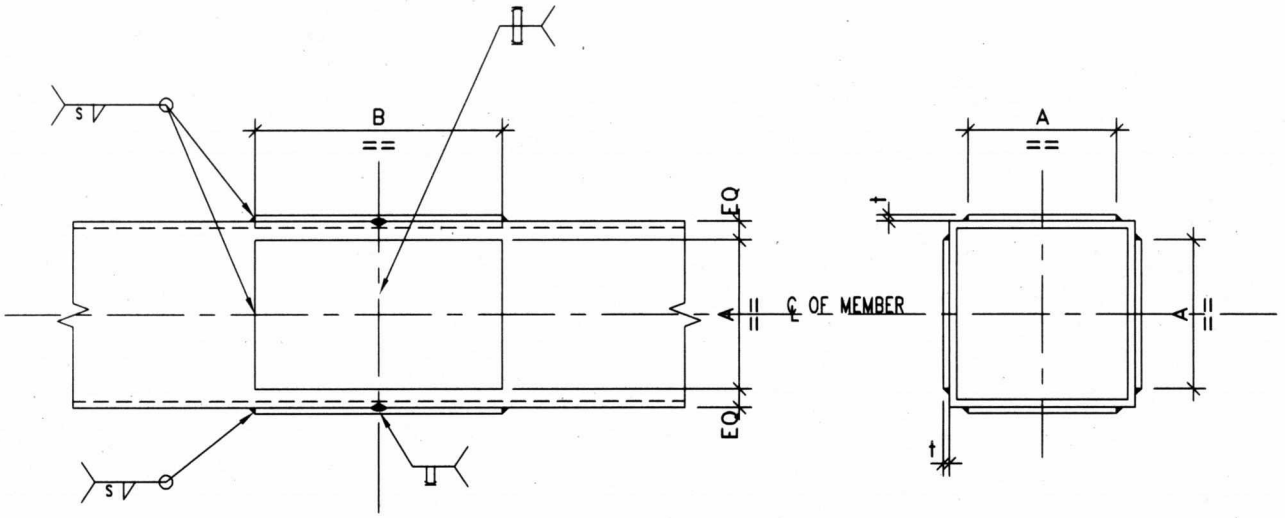

ELEVATION

END VIEW

SQUARE HOLLOW SECTIONS

MEMBER SIZE	SPLICE PLATE					SIZE OF WELD (S)
	A	B (Yst240)	B (Yst310)	B (Yst355)	t	
SHS 75x4.9	40	100	100	100	6	6
SHS 100x6	60	100	100	100	6	6
SHS 132x5.4	90	120	120	120	6	6
SHS 150x6	110	120	120	120	6	6
SHS 180x8	130	180	200	220	6	6
SHS 200x10	150	250	310	320	8	6
SHS 220X10	170	300	350	350	8	6
SHS 250x10	200	300	350	350	10	8
SHS 300X10	240	300	350	350	10	8
SHS 300X12.5	240	350	420	440	10	8

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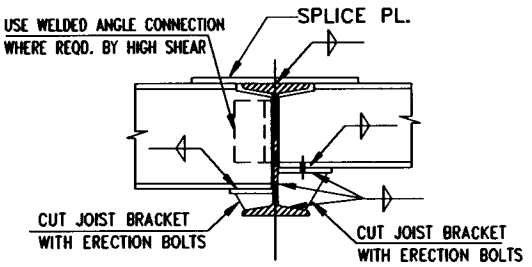
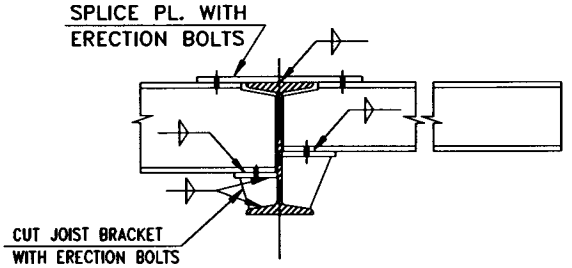
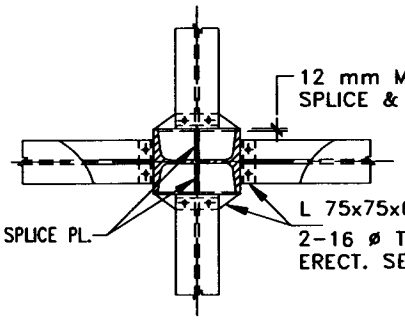


DETAIL–1

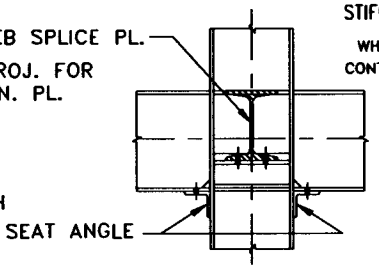


DETAIL–2

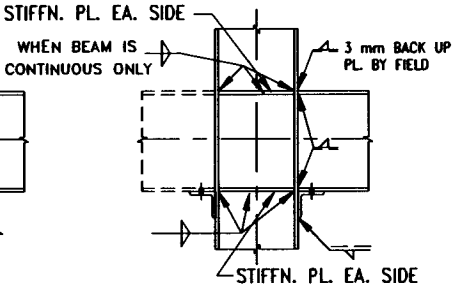
TYPICAL BEAM TO GIRDER CONNECTION



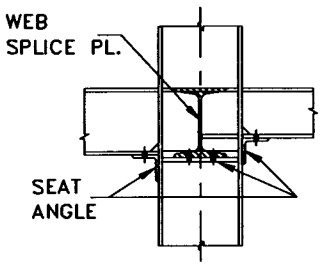
PLAN



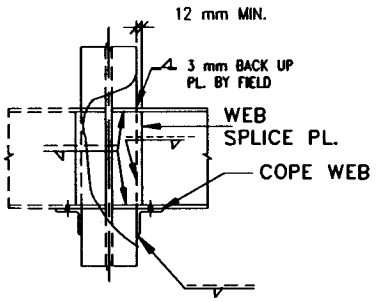
ELEVATION – A
(FOR DET. NOT SHOWN SEE ELEVATION B)



ELEVATION – B
(BEAM FRAMING AT 90° NOT SHOWN)



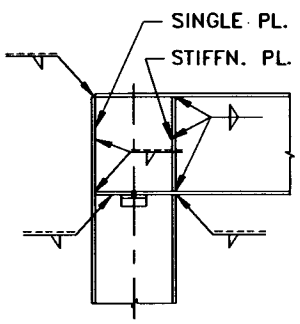
ELEVATION – C
(DET. NOT SHOWN SEE ELEVATION B)



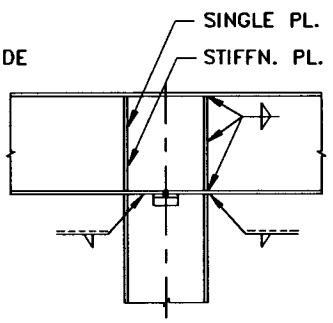
ELEVATION – D

NOTES :–
(ALSO APPLICABLE TO STD. NOS. 7–68–0209 & 7–68–0212)

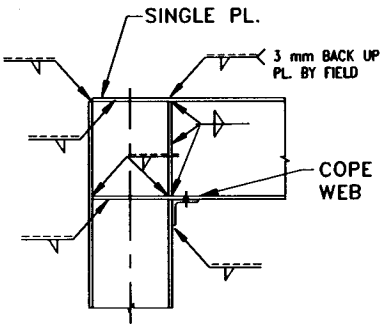
1. DETAILS SHOWN ARE TYPICAL ONLY AND SHALL BE USED WHEREVER DESIGN CONSIDERATIONS PERMIT IN WELDED CONTINUOUS FRAME STRUCTURE.
2. ALL MATERIAL & FABRICATION SHALL CONFORM TO IS CODE FOR FUSION WELDING IN BUILDING CONSTRUCTION.
3. OMIT ERECTION ANGLES & CLIPS WHEN WELDS ARE MADE IN SHOP.
4. ALL REINFORCING FILLET WELDS USED IN CONJUNCTION WITH V–WELDS SHALL BE 5 mm.
5. MILLED ENDS MAY BE ELIMINATED ON SMALL, LIGHTLY LOADED COLUMNS.
6. AT INTERSECTIONS, THICKNESS OF CONNECTION PLATES AND/ OR STIFFENER PLATES TO BE GOVERNED BY MAX. BEAM FLANGE THICKNESS.



DETAIL–4



DETAIL–5



DETAIL–6

TYPICAL BEAM TO COLUMN RIGID CONNECTION

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	28–09–20	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	AS	SM
5	07–08–14	REAFFIRMED AND ISSUED AS STANDARD	SUSHMA	V.GOEL	P.K.MITTAL	S.CHANDA

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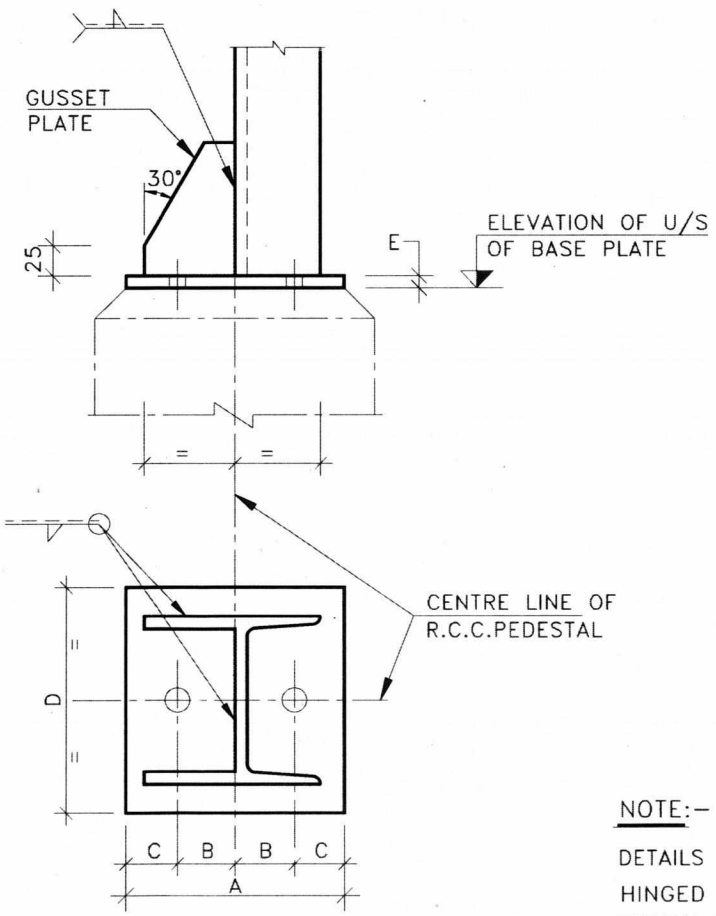
	A	B	C	D	E	HOLE ø	BOLT M	AREA OF BASE PL cm^2	RESISTING AREA FOR 2 BOLTS cm^2	ALLOWABLE TENSION (kg)	ALLOWABLE SHEAR (kg)	WEIGHT (kg)
ISMC 100	150	40	35	140	12	19	16	210	3.14	3690	2460	1.98
ISMC 125	150	40	35	170	12	19	16	255	3.14	3690	2460	2.41
ISMC 150	180	50	40	190	12	21	18	342	3.84	4510	3010	3.23
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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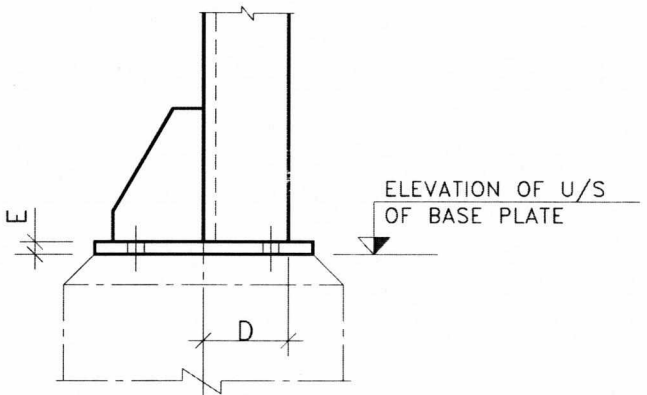
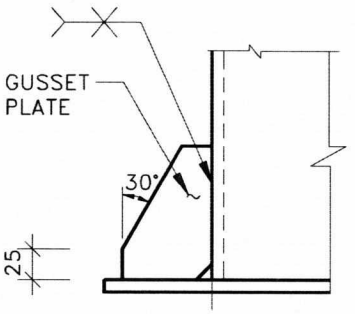
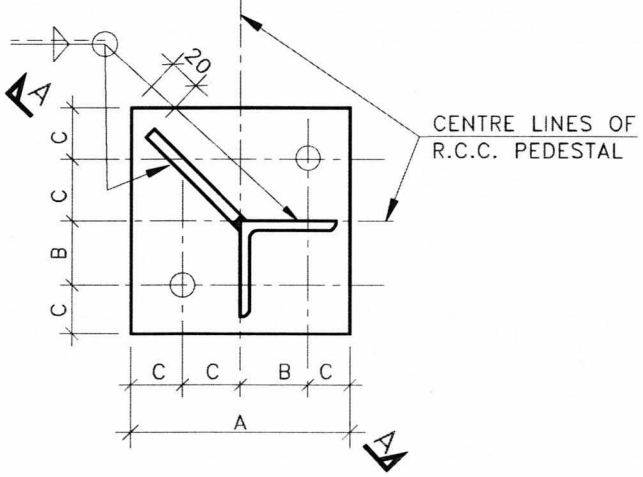
	A	B	C	D	E	HOLE ø	BOLT M	AREA OF BASE PL cm^2	RESISTING AREA FOR 2 BOLTS cm^2	ALLOWABLE TENSION (kg)	ALLOWABLE SHEAR (kg)	WEIGHT (kg)
L 50x50x6	145	40	35	50	10	19	16	210	3.14	3690	2460	1.67
L 65x65x6	145	40	35	65	10	19	16	210	3.14	3690	2460	1.67
L 75x75x8	155	50	35	75	16	23	20	240	4.90	5750	3840	3.02
L 80x80x8	160	55	35	80	16	23	20	256	4.90	5750	3840	3.22
L 90x90x8	180	60	40	90	16	23	20	324	4.90	5750	3840	4.07
L 100x100x8	200	65	45	100	16	27	24	400	7.06	8290	5540	5.08
L 130x130x10	240	90	50	130	16	27	24	576	7.06	8290	5540	7.24
L 150x150x12	280	100	60	150	20	32	27	784	9.18	10790	7200	12.31





VIEW A–A



L 50x50x6 TO L 150x150x12

GUSSET PLATE	STEEL SHAPES	THK
	L 50 TO 75	6
	L 80 TO 100	8
	L 130 TO 150	10

NOTE :-

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

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

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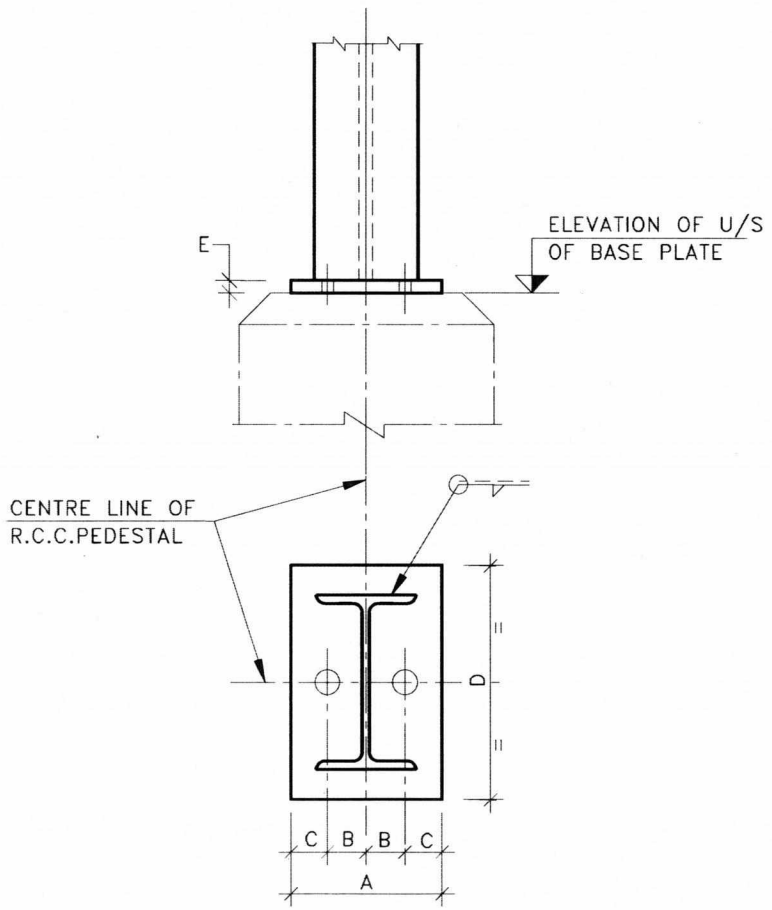
	A	B	C	D	E	HOLE ø	BOLT M	AREA OF BASE PL cm^2	RESISTING AREA FOR 2 BOLTS cm^2	ALLOWABLE TENSION (kg)	ALLOWABLE SHEAR (kg)	WEIGHT (kg)
MB 100	130	35	30	140	12	19	16	182	3.14	3690	2460	1.72
MB 125	130	35	30	170	12	19	16	221	3.14	3690	2460	2.08
MB 150	150	40	35	190	16	23	20	285	4.90	5750	3840	3.58
MB 175	150	40	35	210	16	23	20	315	4.90	5750	3840	3.96
MB 200	180	50	40	240	16	23	20	432	4.90	5750	3840	5.43
MB 225	180	50	40	270	20	27	24	486	7.06	8290	5540	7.63
MB 250	200	60	40	290	20	27	24	580	7.06	8290	5540	9.11
MB 300	220	60	50	340	20	32	27	748	9.18	10790	7200	11.75
MB 350	220	60	50	390	20	35	30	858	11.22	13180	8800	13.45
MB 400	230	60	55	440	20	35	30	1012	11.12	13180	8800	15.90



MB 100 TO MB 400

NOTE:

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

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
8	08-12-22	REAFFIRMED AND ISSUED AS STANDARD	JITENDER	ALPANA SRIVASTAVA	ANURAG SINHA	S. MAZUMDAR
7	15-04-17	REAFFIRMED AND ISSUED AS STANDARD	Anju	ADITYA	RAJAN JI SRIVASTAVA	R.NANDA

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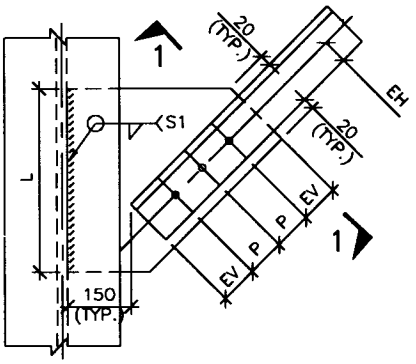
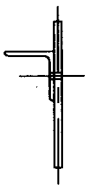
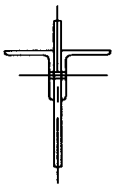
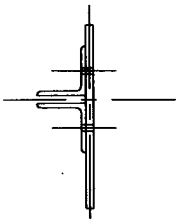




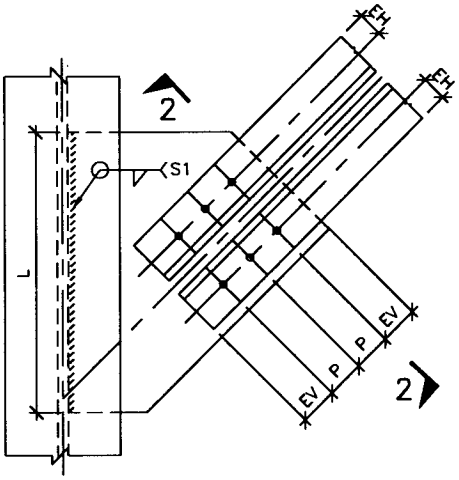
SEC. 1–1
(FOR SINGLE ANGLE)

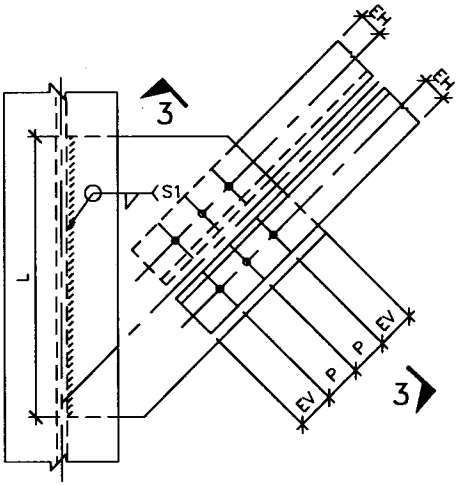


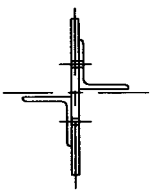
SEC. 1–1
(FOR DOUBLE ANGLE)



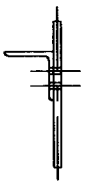
SEC. 2–2



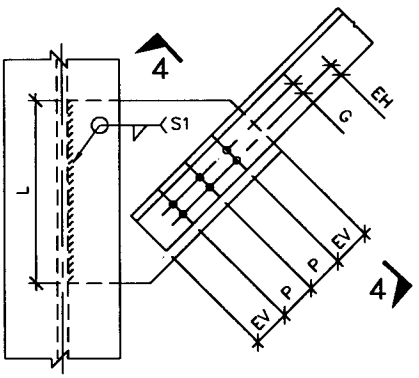


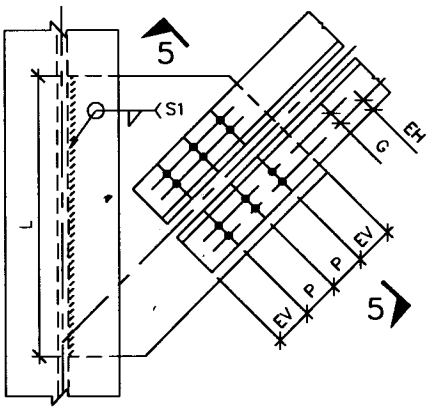


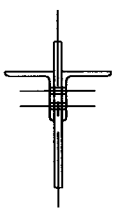
SEC. 3–3



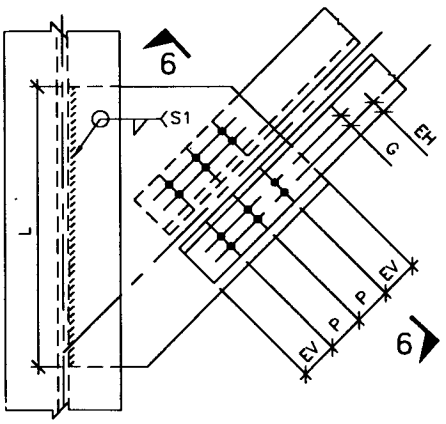
SEC. 4–4
(FOR SINGLE ANGLE)

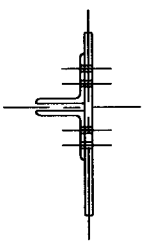




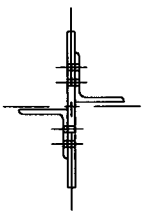


SEC. 4–4
(FOR DOUBLE ANGLE)





SEC. 5–5



SEC. 6–6

TYP. BRACING CONNECTION DETAILS OF ISA WITH GUSSET PLATES

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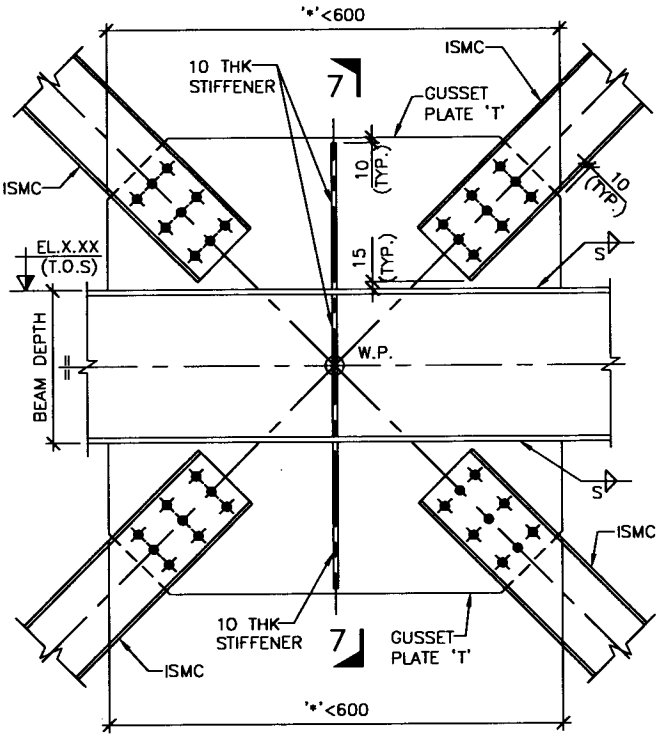
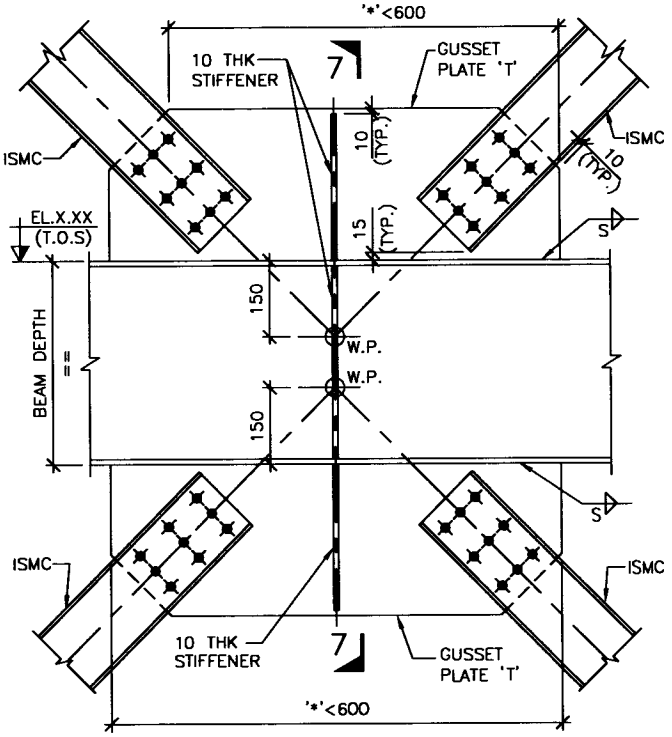


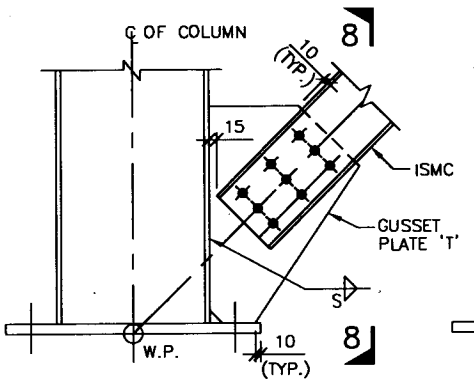
FOR BEAM UPTO 300 DEEP



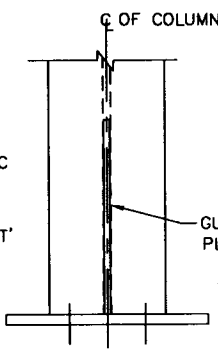
FOR BEAM GREATER THAN 300 DEEP

DETAIL-4A

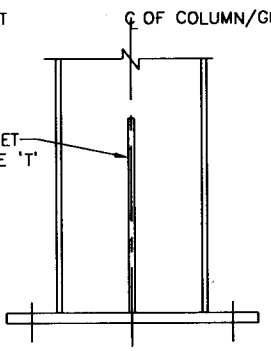
(*- WHEREVER THE DIMENSION WITH * IS MORE THAN 600 mm, SEPARATE GUSSET PLATE TO BE PROVIDED & INTERMEDIATE STIFFENERS TO BE AVOIDED)



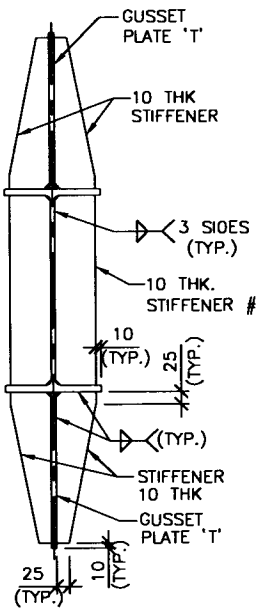
FOR COLUMN FLANGE



SECTION 8-8

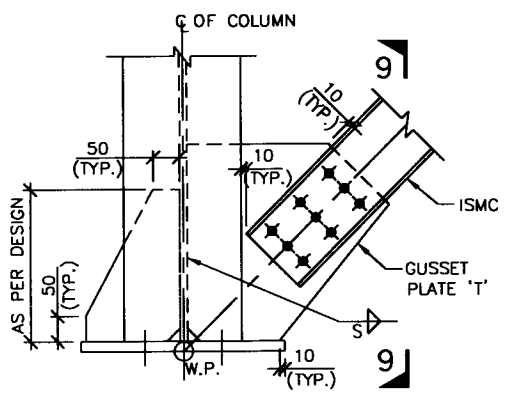


SECTION 9-9

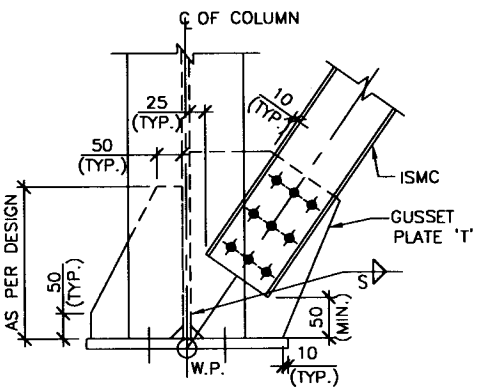


SECTION 7-7

(# DEPTH OF STIFFENER CAN BE REDUCE BASED ON BEAM DEPTH AND HANGER/POST LOADINGS)



FOR COLUMN WEB



FOR COLUMN WEB
FOR COLUMN SIZE GREATER THAN 700 DEEP

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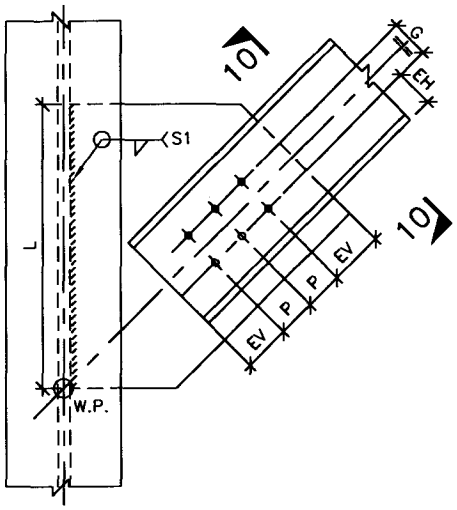
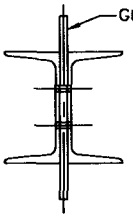
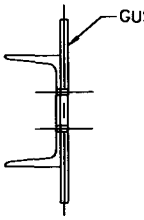
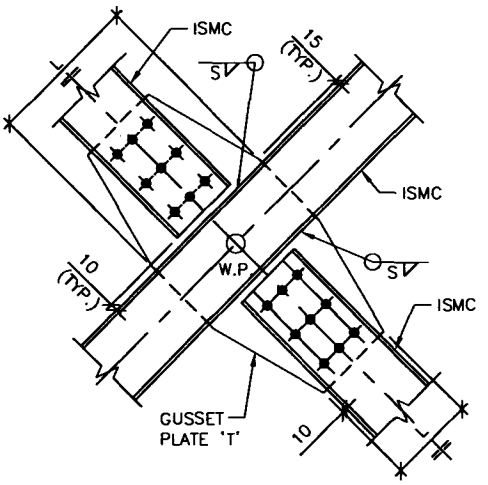




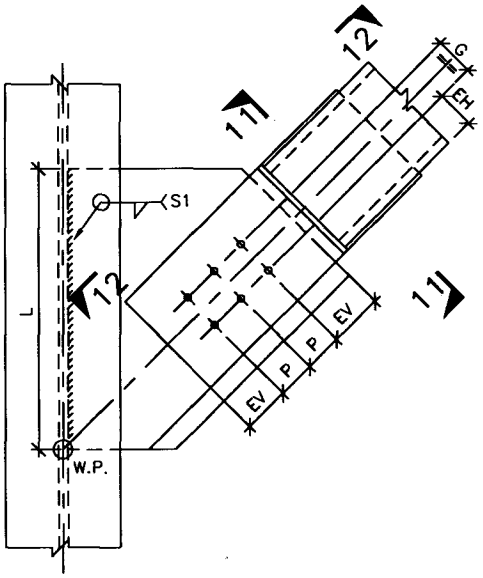
SECTION 10–10
(FOR DOUBLE CHANNEL)

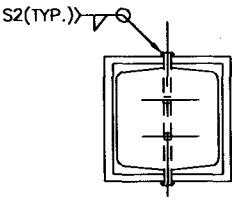


SECTION 10–10
(FOR SINGLE CHANNEL)

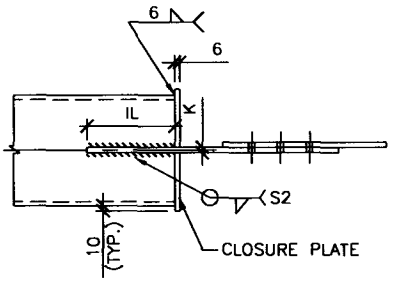


DETAIL FOR CROSS BRACING





SECTION 11–11
(IN TWO HALVES)



VIEW 12–12

TYP. BRACING CONNECTION DETAILS OF ISMC WITH GUSSET PLATES

NOTES :–

1. ALL DIMENSIONS ARE IN mm.
2. ANGLE & ISMC SECTIONS SHALL CONFORM TO IS:808 & SQUARE HOLLOW SECTIONS SHALL CONFORM TO IS:4923.
3. GRADE OF STRUCTURAL STEEL FOR ALL ISA, ISMC & CONNECTING GUSSET SHALL PLATE SHALL BE E350 CONFIRMING IS 2062 & FOR SQUARE HOLLOW SECTIONS SHALL BE YSt 310 CONFIRMING TO IS:4923.
4. CONNECTION DESIGN IS AS PER CLAUSE 10.3 (BEARING TYPE BOLTS) OF IS:800–2007.
5. CONNECTION DETAILS SHOWN HERE ARE FOR VERTICAL BRACINGS CONNECTIONS ONLY.
6. NO HOT WORK (e.g. WELDING, MAKING HOLES, ETC.) IS PERMITTED AT SITE.
7. ALL CONNECTION BOLTS SHALL BE OF PROPERTY CLASS 8.8 CONFORMING TO IS:3757 & IS:4000.
8. HEXAGONAL NUTS SHALL CONFORM TO IS:6623
9. WASHERS SHALL CONFORM TO IS:6649.
10. TIGHTENING OF NUTS SHALL BE AS PER IS:4000.
11. ALL HOLES ARE SHOWN THUS .
12. THE CONNECTIONS ARE DESIGNED FOR 100% OF AXIAL CAPACITY FOR YIELDING OF GROSS SECTIONS OF BRACING MEMBER AS PER IS:800–2007 (LSD)
13. ALL BOLTS, NUTS & WASHERS SHALL BE GALVANISED AS PER IS:1367, PART XIII.
14. ANCHOR BOLTS ARRANGEMENT SHALL BE SUCH THAT WORK POINT OF VERTICAL BRACING SHALL BE FROM UNDERSIDE OF BASE PLATE.
15. NO. OF BOLTS SHOWN IN CONNECTION DETAIL ARE INDICATIVE ONLY, FOR ACTUAL CONNECTION DETAIL REFER DESIGN TABLE OF RESPECTIVE CONNECTION.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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TABLE-1 : BRACING CONNECTION (SINGLE ANGLE)

SL NO.	BRACING MEMBER	NO. OF COL. OF BOLT	NO. OF ROW OF BOLT	BOLT DIA (mm)	HOLE DIA (mm)	GUSSET LENGTH (L) (mm)	GUSSET PLATE THK. (T) (mm)	WELD SIZE S_1 (mm)	SPACE B/W COL. P(mm)	SPACE B/W ROW G (mm)	EV (mm)	EH (mm)	AXIAL CAPACITY OF CONNECTION (kN)
1	ISA 50x50x6	4	1	16	18	120	10	6	55	-	27	27	180
2	ISA 65x65x6	4	1	16	18	160	10	6	60	-	35	35	235
3	ISA 75x75x6	5	1	16	18	180	10	6	60	-	35	35	275
4	ISA 75x75x8	4	1	20	22	230	10	6	70	-	40	40	360
5	ISA 90x90x6	5	1	20	22	220	10	6	70	-	45	45	330
6	ISA 90x90x8	5	1	20	22	280	10	6	70	-	45	45	435
7	ISA 100x100x8	6	1	20	22	310	10	6	80	-	45	45	490
8	ISA 100x100x10	7	1	20	22	380	10	6	80	-	45	45	600
9	ISA 100x100x12	8	1	20	22	420	10	6	80	-	45	45	670
10	ISA 110x110x12	6	1	24	26	400	10	8	80	-	45	45	795
11	ISA 130x130x10	7	1	24	26	400	10	8	80	-	50	50	795
12	ISA 130x130x12	8	1	24	26	480	10	8	80	-	50	50	950
13	ISA 150x150x12	6	2	20	22	430	12	10	110	50	50	50	1105
14	ISA 150x150x16	6	2	20	22	560	12	10	110	50	50	50	1450
15	ISA 200x200x16	7	2	24	26	760	12	10	120	80	60	60	1965
16	ISA 200x200x20	7	2	24	26	940	12	10	135	80	60	60	2430

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TABLE -2 : BRACING CONNECTION (DOUBLE ANGLE)

SL NO.	BRACING MEMBER	NO. OF COL. OF BOLT	NO. OF ROW OF BOLT	BOLT DIA (mm)	HOLE DIA (mm)	GUSSET LENGTH L(mm)	GUSSET PLATE THK.(T) (mm)	WELD SIZE S_1 (mm)	SPACE B/W COL. P (mm)	SPACE B/W ROW G (mm)	EV (mm)	EH (mm)	AXIAL CAPACITY OF CONNECTION (kN)
1	2xISA 50x50x6	4	1	16	18	170	12	8	55	-	27	27	360
2	2xISA 65x65x6	4	1	16	18	220	12	8	60	-	35	35	470
3	2xISA 75x75x6	5	1	16	18	220	12	10	60	-	35	35	550
4	2xISA 75x75x8	4	1	20	22	230	16	12	70	-	40	40	725
5	2xISA 90x90x6	5	1	20	22	210	16	12	70	-	45	45	665
6	2xISA 90x90x8	5	1	20	22	280	16	12	70	-	45	45	875
7	2xISA 100x100x8	6	1	20	22	310	16	12	80	-	45	45	980
8	2xISA 100x100x10	7	1	20	22	380	20	12	80	-	45	45	1205
9	2xISA 100x100x12	8	1	20	22	420	20	12	80	-	45	45	1340
10	2xISA 110x110x12	6	1	24	26	500	20	12	80	-	45	45	1595
11	2xISA 130x130x10	7	1	24	26	500	20	12	80	-	50	50	1595
12	2xISA 130x130x12	8	1	24	26	600	20	12	80	-	50	50	1900
13	2xISA 150x150x12	6	2	24	26	530	20	16	110	50	50	50	2210
14	2xISA 150x150x16	6	2	24	26	700	20	16	110	50	50	50	2900
15	2xISA 200x200x16	7	2	24	26	730	25	20	120	80	60	60	3930
16	2xISA 200x200x20	7	2	24	26	900	25	20	135	80	60	60	4860

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TABLE -3 : BRACING CONNECTION (SINGLE CHANNEL)

SL NO.	BRACING MEMBER	NO. OF COL. OF BOLT	NO. OF ROW OF BOLT	BOLT DIA (mm)	HOLE DIA (mm)	GUSSET LENGTH L (mm)	GUSSET PLATE THK. (T) (mm)	WELD SIZE		SPACE B/W COL. P (mm)	SPACE B/W ROW. G (mm)	EV (mm)	EH (mm)	AXIAL CAPACITY OF CONNECTION (kN)
								GUSSET S_1 (mm)	BOX S_2 (mm)					
1	ISMC 100	5	2	16	18	190	10	8	-	60	40	30	30	385
2	ISMC 150	5	2	20	22	270	12	10	-	80	50	50	50	675
3	ISMC 200	5	2	20	22	360	12	10	-	100	80	60	60	905
4	ISMC 250	5	2	24	26	480	12	10	-	100	100	75	75	1240
5	ISMC 300	5	2	24	26	480	16	12	-	120	130	85	85	1470
6	ISMC 400	5	2	30	33	500	20	16	-	120	220	90	90	2030

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TABLE - 4 : BRACING CONNECTION (DOUBLE CHANNEL)

SL NO.	BRACING MEMBER	NO. OF COL. OF BOLT	NO. OF ROW OF BOLT	BOLT DIA (mm)	HOLE DIA (mm)	GUSSET LENGTH L (mm)	GUSSET PLATE THK. (T) (mm)	WELD SIZE		K (mm)	IL (mm)	SPACE B/W COL. P (mm)	SPACE B/W ROW. G (mm)	EV (mm)	EH (mm)	AXIAL CAPACITY OF CONNECTION (kN)
								GUSSET $T S_1$ (mm)	BOX S_2 (mm)							
1	ISMC 100][	5	2	16	18	260	16	12	-	-	-	60	40	30	30	775
2	ISMC 150][	5	2	20	22	440	16	12	-	-	-	80	50	50	50	1355
3	ISMC 200][	5	2	20	22	580	20	12	-	-	-	100	80	60	60	1810
4	ISMC 250][	5	2	24	26	600	20	16	-	-	-	100	100	75	75	2480
5	ISMC 300][	5	2	24	26	630	20	18				120	130	85	85	2945
6	ISMC 400][	5	2	30	33	780	25	20				120	220	90	90	4060
7	ISMC 100 []	4	2	20	22	260	16	12	6	25	240	50	40	30	30	775
8	ISMC 150 []	5	2	20	22	440	20	12	8	32	330	50	50	50	50	1355
9	ISMC 200 []	5	2	24	26	580	20	12	8	32	430	60	80	60	60	1810
10	ISMC 250 []	5	2	24	26	600	20	16	10	32	470	80	100	75	75	2480
11	ISMC 300 []	5	2	27	30	630	25	18	12	32	470	100	130	85	85	2945
12	ISMC 400 []	5	2	30	33	780	25	20	12	32	640	100	220	90	90	4060

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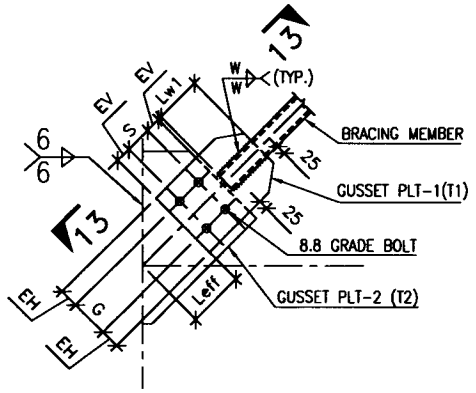
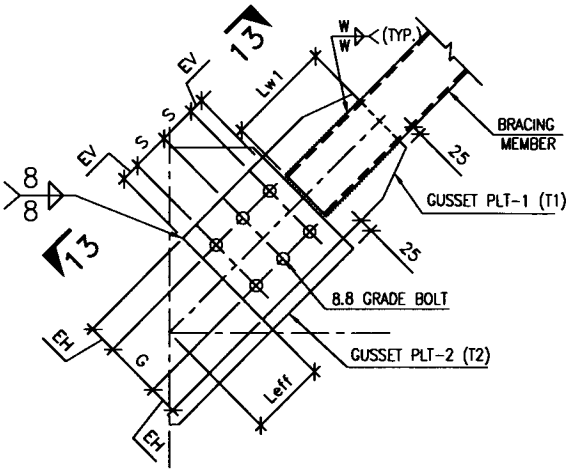
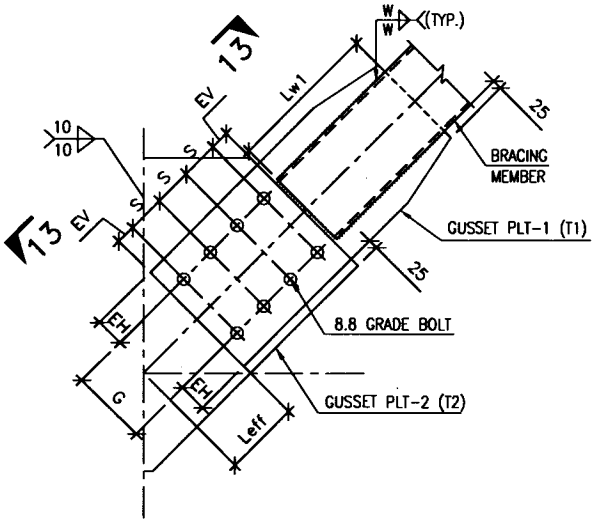


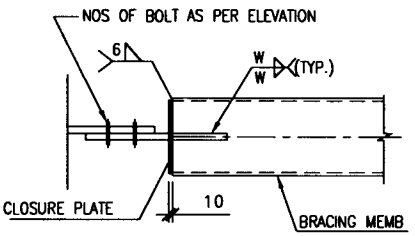
TYPE–I
(4 BOLT)



TYPE–II
(6 BOLT)



TYPE–III
(8 BOLT)



SECTION 13–13

MEMBER	TYPE	DIA OF BOLT	PLATE (T1)	PLATE (T2)	END DIST (EV)	PITCH (S)	GAUGE (G)	EDGE DIST (EH)	Leff	WELD LENGTH BETWEEN VER. BRACE & PLATE T1 (Lw1)	WELD SIZE BETWEEN VER. BRACE & PLATE T1 (W)	MIN. WELD LENGTH BETWEEN T2 & CONNECTING STR MEMB
SHS60X60X4	I	20	10	10	40	50	100	50	150	125	4	125
SHS80X80X4	I	20	10	10	40	50	100	50	150	150	4	175
SHS100X100X5	I	24	12	12	45	60	125	60	150	175	5	250
SHS150X150X6	II	30	16	16	50	75	150	75	200	275	6	350
SHS180X180X6	II	30	20	20	50	75	150	75	200	325	6	400
SHS220X220X6	III	30	20	20	50	75	150	75	200	400	6	400
SHS220X220X8	III	36	25	25	55	90	200	100	200	425	8	525
SHS250X250X8	III	36	25	25	55	90	200	100	200	500	8	600

NOTE 1: STRUCTURAL STEEL SECTION GRADE YST 310 , PLATE GRADE E350 CONFORMING TO IS:2062 AND BOLT SHALL BE OF PROPERTY CLASS 8.8 CONFIRMING TO IS:3757 & IS:4000.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
0	18.05.2022	ISSUED AS STANDARD	AV	RM	AS	SM

Approved by

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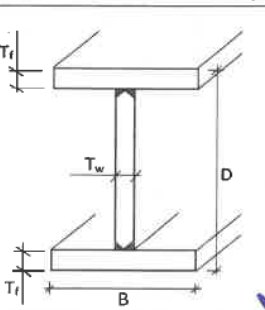
SPECIFIED STRUCTURAL STEEL SECTIONS	RECOMMENDED EQUIVALENT STRUCTURAL STEEL SECTIONS FOR SUBSTITUTION		
SECTIONS AS PER IS 808	SECTIONS AS PER IS 808	SECTIONS AS PER BS EN 10365	PLATE FABRICATED SECTIONS (REFER NOTE 8)
ISMC 100 (9.56)	-	UPN 100 (10.60) / UPE 100 (9.80)	-
ISMC 150 (16.80)	-	UPN 160 (18.80) / UPE 160 (17.00)	-
ISMC 200 (22.30)	-	UPN 200 (25.30) / UPE 200 (22.80)	-
ISMC 250 (30.60)	-	UPN 240 (33.20) / UPE 240 (30.20)	-
ISMB 200 (24.17)	ISNPB 200x100x25.09	UB 203x133x25 / IPE O 200 (25.10)	-
ISMB 250 (37.30)	ISNPB 250x150x39.78	UB 254x146x37 / IPE O 270 (42.30)	-
ISMB 300 (46.02)	ISNPB 300x150x49.32	UB 305x165x46 / IPE O 300 (49.30)	-
ISMB 400 (61.55)	ISNPB 400x180x66.31	UB 406x178x60 / IPE 400 (66.30)	-
ISMB 450 (72.38)	ISNPB 450x190x77.58	UB 457x152x74 / IPE 450 (77.60)	-
ISMB 500 (86.88)	ISNPB 500x200x90.69	UB 533x210x92 / IPE 500 (90.70)	-
ISMB 600 (121.00)	ISNPB 600x220x122.45	UB 610x229x125 / IPE 600 (122.40)	-
ISNPB 200x100x25.09	-	UB 203x133x25 / IPE O 200 (25.10)	-
ISNPB 250x150x39.78	-	IPE O 270 (42.30)	-
ISNPB 300x150x49.32	-	IPE O 300 (49.30)	-
ISNPB 400x180x66.31	-	IPE 400 (66.30)	-
ISNPB 450x190x77.58	-	IPE 450 (77.60)	-
ISNPB 500x200x90.69	-	UB 533x210x92 / IPE 500 (90.70)	-
ISNPB 600x220x122.45	-	UB 610x229x125 / IPE 600 (122.40)	-
ISWPB 200x200x42.26	-	UC 203x203x46 / HE 200 A (42.30)	D192 x B185 x T_w 8 x T_f 14 (50.97)
ISWPB 250x250x73.15	-	UC 254x254x73	D252 x B250 x T_w 12 x T_f 16 (83.53)
ISWPB 300x300x100.85	-	UC 305x305x97 / HE 320 A (97.60)	D294 x B290 x T_w 12 x T_f 20 (114.99)
ISWPB 300x300x117.03	-	-	D300 x B290 x T_w 14 x T_f 25 (141.3)
ISWPB 360x300x125.81	-	UC 356x368x129 / HE 320 B (127.00)	D350 x B300 x T_w 12 x T_f 22 (132.45)
ISWPB 600x300x128.79	-	HE 600 AA (129.00)	D570 x B300 x T_w 14 x T_f 20 (152.45)
ISWPB 600x300x177.78	-	HE 600 A (178.00)	D590 x B300 x T_w 16 x T_f 32 (216.79)
ISWPB 700x300x149.89	-	HE 700 AA (150.00)	D670 x B300 x T_w 16 x T_f 22 (182.25)
ISWPB 700x300x204.48	-	HE 700 A (204.00)	D690 x B300 x T_w 16 x T_f 36 (247.19)
ISWPB 700x300x240.51	-	HE 700 B (241.00)	D700 x B300 x T_w 22 x T_f 40 (295.48)
ISWPB 800x300x262.34	-	HE 800 B (262.00)	D800 x B300 x T_w 20 x T_f 45 (323.42)
ISWPB 900x300x291.46	-	HE 900 B (291.00)	D900 x B300 x T_w 22 x T_f 45 (351.84)

LEGENDS:

D = Overall depth of section (mm)
B = Width of flange plates (mm)
(xxx.xx) = (Unit Weight in kg/m)

T_w = Thickness of web plate (mm)
T_f = Thickness of flange plates (mm)



Rev. No	Date	Purpose	Prepared by	Checked by	Standard Committee Convenor	Standards Bureau Chairman
					Approved by	
1	04.03.2025	ISSUED AS STANDARD	RAVI / RK	PM	ANURAG SINHA	MAINAK NANDI
0	26.11.2024	ISSUED AS STANDARD	RAVI / RK	PM	ANURAG SINHA	MAINAK NANDI

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LEGENDS (CONTD.):

ISMC : Indian Standard Medium Channels
ISMB : Indian Standard Medium Beams
ISNPB : Indian Standard Narrow Parallel Flange Beams
ISWPB: Indian Standard Wide Parallel Flange Beams
UPN : Tapered Flange Channels
UPE : Parallel Flange Channels
UB : Universal Beams
IPE : Parallel Flange I Sections
UC : Universal Columns
HE : Wide Flange Beams

NOTES:

1. THE RECOMMENDED EQUIVALENT STRUCTURAL STEEL SECTIONS SHALL BE USED ONLY IN CASE THE SPECIFIED STRUCTURAL STEEL SECTIONS AS MENTIONED IN THE AFC DRAWINGS ARE NOT AVAILABLE, OR DELIVERY PERIOD IS NOT COMMENSURATE WITH PROJECT COMPLETION SCHEDULE, BASED ON THE ENQUIRY(S) MADE.
2. THE LIST OF BIS CERTIFIED MANUFACTURERS (AS PER IS 2062) IS AVAILABLE AT https://www.manakonline.in/MANAK/ApplicationLicenceRelatedrpt
3. PREFERENCE OF SUBSTITUTION SHALL BE GIVEN TO ROLLED SECTIONS OVER PLATE FABRICATED SECTIONS, WHEREVER POSSIBLE, TO REDUCE FABRICATION EFFORTS.
4. SUBSTITUTION OF SECTIONS, IF ANY SHALL BE PROPOSED BY THE CONTRACTOR TO THE ENGINEER-IN-CHARGE IN ADVANCE FOR APPROVAL.
5. GRADE OF MATERIAL FOR RECOMMENDED EQUIVALENT STRUCTURAL STEEL SECTIONS SHALL BE SAME AS THAT OF THE SPECIFIED STRUCTURAL STEEL SECTION.
6. UNIT WEIGHTS OF THE RECOMMENDED EQUIVALENT STRUCTURAL STEEL SECTIONS SHALL BE AS PER THE RESPECTIVE CODES/ AS MENTIONED.
7. SUBSTITUTED SECTIONS (IF ANY) SHALL BE INCORPORATED IN THE AS-BUILT DRAWINGS BY THE CONTRACTOR.
8. FOR RECOMMENDED EQUIVALENT PLATE FABRICATED SECTIONS, WELDS BETWEEN FLANGES AND WEB PLATE SHALL BE FULL PENETRATION BUTT WELD. THERE SHALL NOT BE ANY JOINT WITHIN FLANGES & WEB PLATES. EACH FLANGE & WEB PLATE SHALL BE A SINGLE ENTITY.
9. PAYMENT FOR THE INCREASE IN WEIGHT (IF ANY) FOR REPLACING THE SPECIFIED STEEL SECTIONS WITH THE RECOMMENDED EQUIVALENT STEEL SECTIONS SHALL BE AS PER COMMERCIAL TERMS & CONDITIONS OF CONTRACT.

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INTRODUCTION:–

THIS STANDARD ON WELDING SYMBOLS INCORPORATES THE REQUIREMENTS OF THE BIS (BUREAU OF INDIAN STANDARD) CODE ON WELDING AND ALLIED PROCESSES PART–1 SYMBOLIC REPRESENTATION ON DRAWINGS–WELDED JOINTS (IS 813 PART–1 2018). FOR OTHER ADDITIONAL SYMBOLS REFER IS 813 PART–1 2018.

THESE WELDING SYMBOLS SHALL BE USED ON DRAWINGS FOR ALL JOBS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
7	25.09.25	REVISED AND ISSUED AS STANDARD	AB	SP	ANURAG SINHA	MAINAK NANDI
6	01.08.19	REAFFIRMED AND ISSUED AS STANDARD	JG	AVM	RAJANJI SRIVASTAVA	R.K.TRIVEDI
5	28.11.13	REAFFIRMED AND ISSUED AS STANDARD	A K SHARMA	AMARJEET	P K MITTAL	S CHANDA

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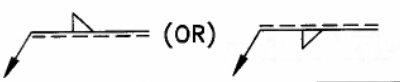
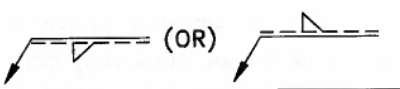
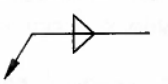
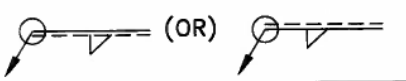
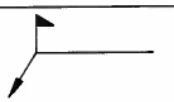
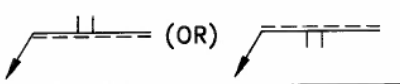
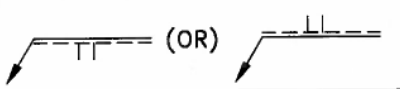
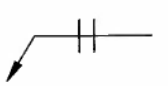
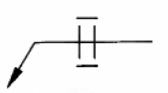
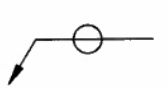
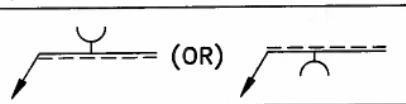
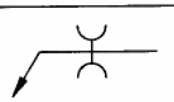
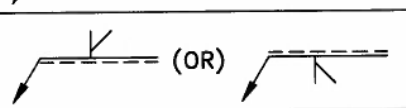
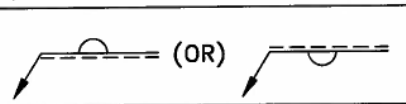
STANDARD BASIC SYMBOLS FOR WELDING

REFER IS 813(PART 1) 2018

S.NO.	INSTRUCTIONS	DRAWING REPRESENTATION
1	NEAR SIDE FILLET WELD	
2	FAR SIDE FILLET WELD	
3	BOTH SIDE FILLET WELD	
4	FILLET WELD ALL ROUND	
5	SITE WELD	
6	SQUARE BUTT NEAR SIDE	
7	SQUARE BUTT FAR SIDE	
8	SQUARE BUTT BOTH SIDE	
9	SQUARE BUTT BOTH SIDE GRINDING FINISH	
10	RESISTANCE SPOT WELD	
11	SINGLE-U BUTT (NEAR SIDE)	
12	DOUBLE-U BUTT	
13	SINGLE BEVEL BUTT WELD WITH BROAD ROOT FACE (NEAR SIDE)	
14	BACKING RUN, BACK OR BACKING WELD (NEAR SIDE)	

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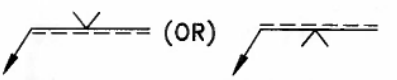
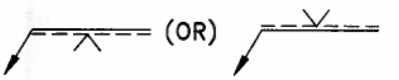
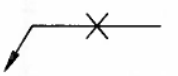
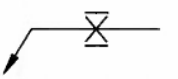
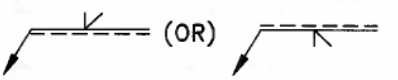
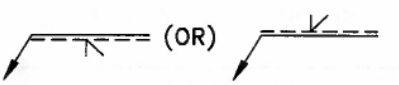
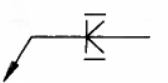
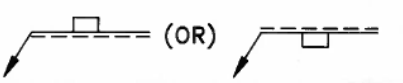
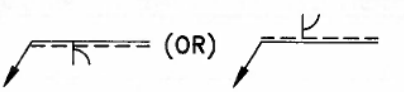
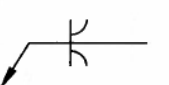
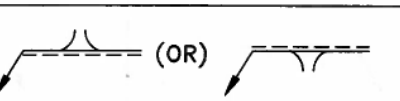
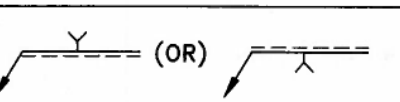
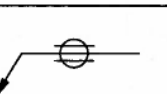
STANDARD BASIC SYMBOLS FOR WELDING

REFER IS 813(PART 1) 2018

S.NO.	INSTRUCTIONS	DRAWING REPRESENTATION
15	SINGLE–V BUTT NEAR SIDE	
16	SINGLE–V BUTT FAR SIDE	
17	DOUBLE–V BUTT	
18	DOUBLE–V BUTT GRINDING FINISH	
19	SINGLE BEVEL–BUTT NEAR SIDE	
20	SINGLE BEVEL–BUTT FAR SIDE	
21	DOUBLE BEVEL–BUTT	
22	DOUBLE BEVEL–BUTT GRINDING FINISH	
23	STITCH WELD	REFER SHEET 5 OF 6
24	PLUG OR SLOT WELD (NEAR SIDE)	
25	SINGLE J– BUTT (FAR SIDE)	
26	DOUBLE–J BUTT	
27	FLANGED BUTT/CORNER WELD BETWEEN PLATES WITH RAISED EDGES(NEAR SIDE)	
28	SINGLE–V BUTT WELD WITH BROAD ROOT FACE (NEAR SIDE)	
29	RESISTANCE SEAM WELD	

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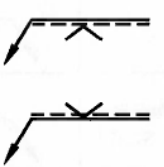
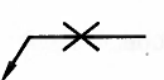
SUPPLEMENTARY SYMBOLS:

SHAPE OF WELD SURFACE	SYMBOL
a) FLAT (USUALLY FINISHED FLUSH)	
b) CONVEX	
c) CONCAVE	

EXAMPLE OF APPLICATION OF SUPPLEMENTARY SYMBOLS:

SHAPE OF WELD SURFACE	SYMBOL
FLAT (FLUSH) SINGLE-V BUTT WELD	
CONVEX DOUBLE-V BUTT WELD	
CONCAVE FILLET WELD	
FLAT (FLUSH) SINGLE-V BUTT WELD WITH FLAT (FLUSH) BACKING RUN	

POSITION OF SYMBOL ACCORDING TO THE REFERENCE LINE

a) TO BE WELDED ON ARROW SIDE	 b) TO BE WELDED ON OTHER SIDE	 c) FOR SYMMETRIC WELDS

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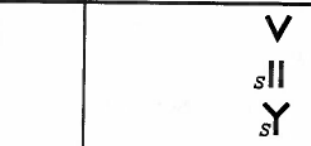
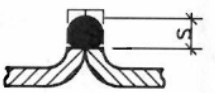
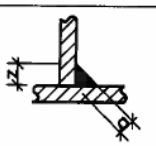
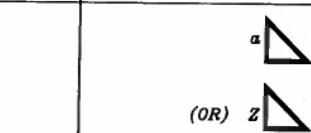
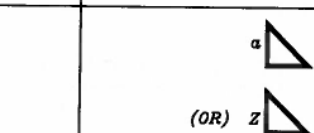
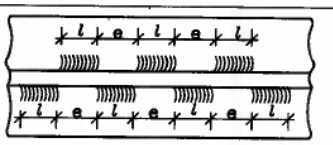
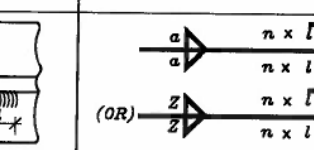
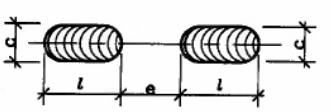
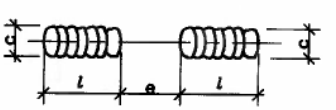
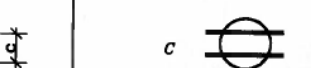
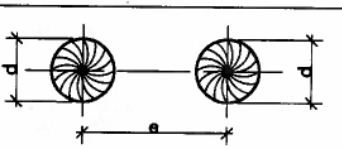
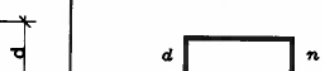
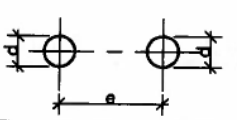
METHOD OF INDICATING DIMENSIONS OF WELD:

IS 813(PART 1) 2018

S.NO.	DESIGNATION OF WELDS	DEFINITION	INSCRIPTION
1	BUTT WELD		
2	BUTT WELD BETWEEN PLATES WITH RAISED EDGES		
3	CONTINUOUS FILLET WELD		
4	INTERMITTENT FILLET WELD		
5	STAGGERED INTERMITTENT FILLET WELD		
6	PLUG OR SLOT WELD		
7	SEAM WELD		
8	PLUG WELD		
9	SPOT WELD		

NOTE : 'n' INDICATES NUMBER OF WELD ELEMENTS
'l' INDICATES LENGTH OF WELD (WITHOUT END CRATERS)

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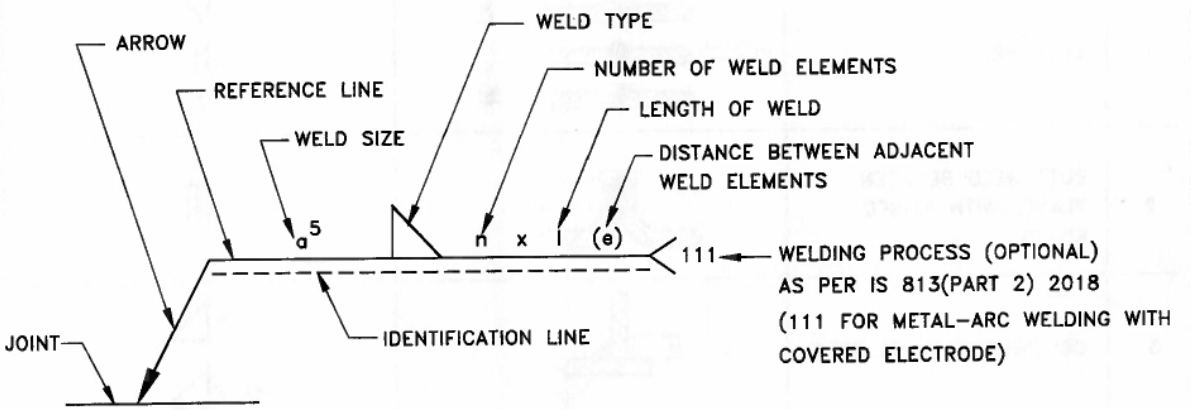
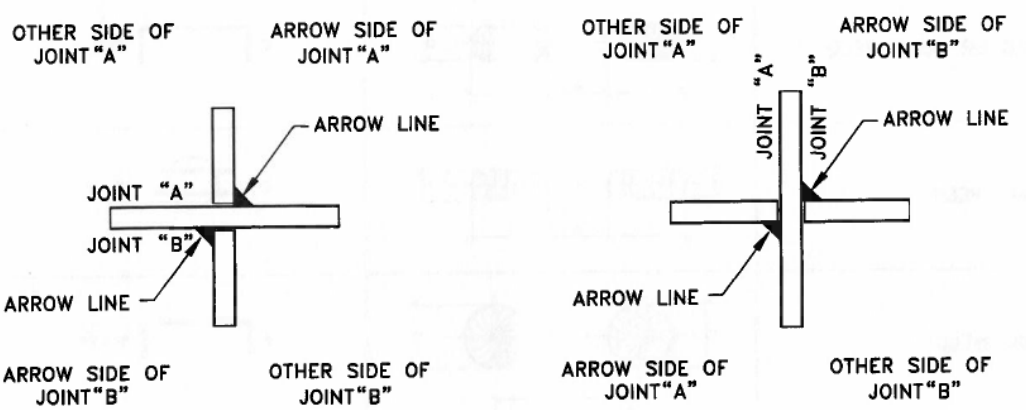


STANDARD REPRESENTATION OF WELDS IN DRAWINGS



POSITION OF WELDING SYMBOL ACCORDING TO THE REFERENCE LINE

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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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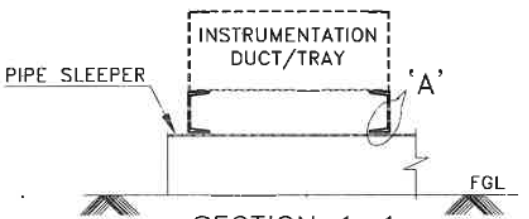
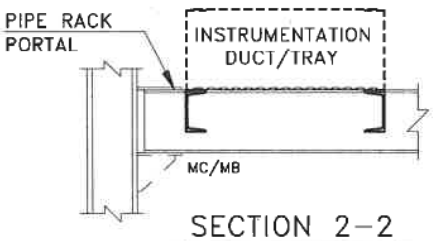
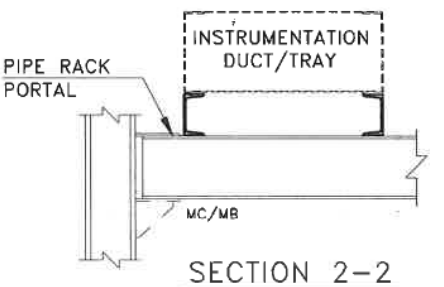


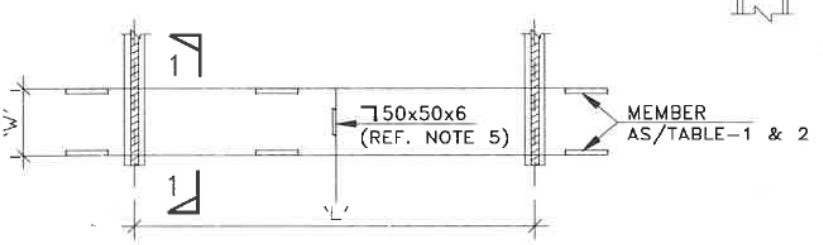
SECTION 1–1



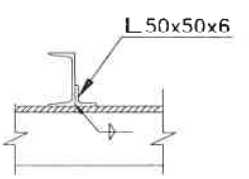
SECTION 2–2
(OPTION–1)



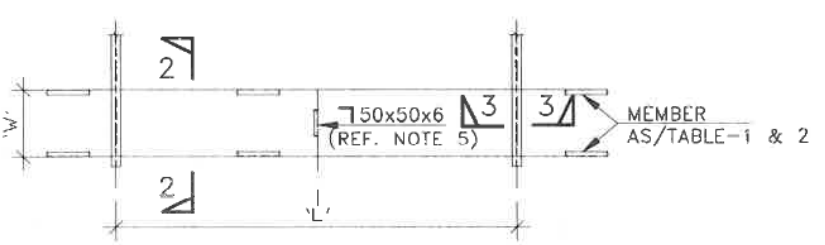
SECTION 2–2
(OPTION–2)



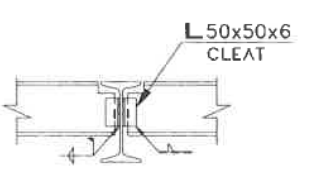
TYPICAL ARRANGEMENT SHOWING INSTRUMENTATION CABLE DUCT/TRAY SUPPORTS ON PIPE SLEEPERS



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	MANAK 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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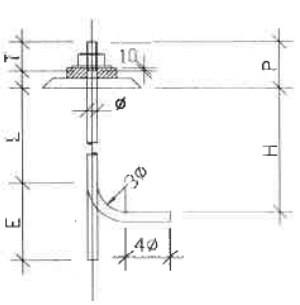
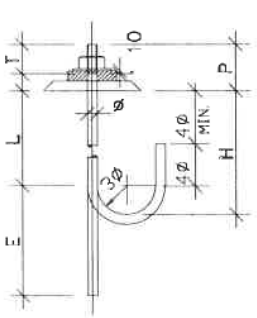
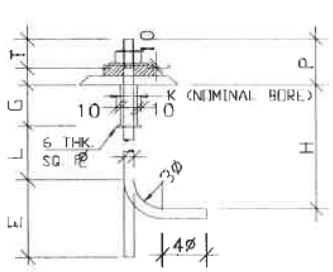
GRADE OF CONC.	BOLT TYPE	DIMENSIONS MM		BOLT DIA (ø) IN MM											
				10	12	16	18	20	22	24	27	30	33	36	39
M35	I & III	L		160	190	275	295	340	390	410	480	525	595	640	710
		E		95	115	155	170	190	210	230	255	285	315	345	370
		H	TYPE-I	190	230	325	350	400	460	485	565	615	695	750	830
			TYPE-III	340	380	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



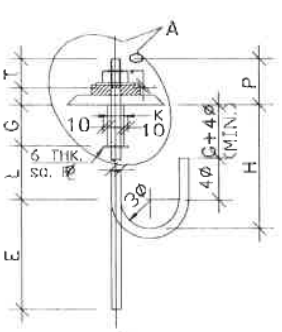
TYPE – I



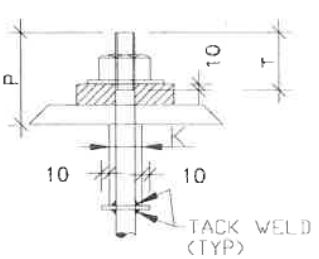
TYPE – II



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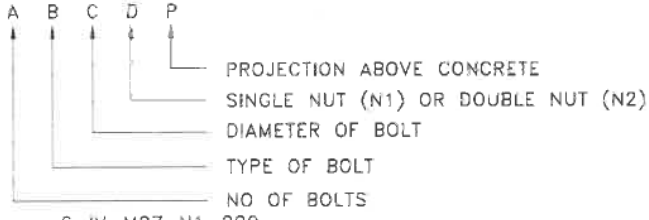
Format No. 8-00-0001-F4 Rev.0

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.

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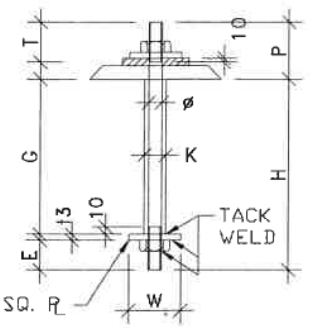
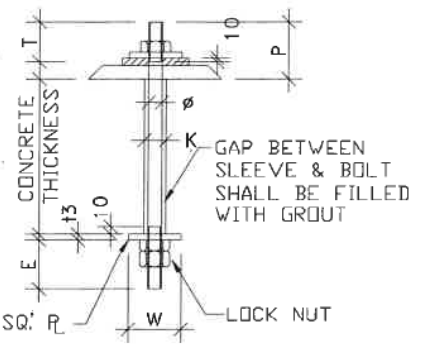
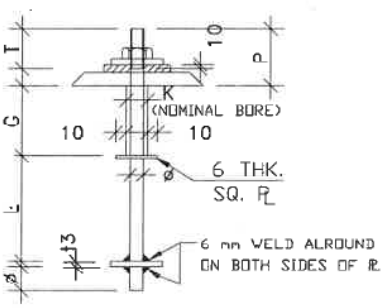
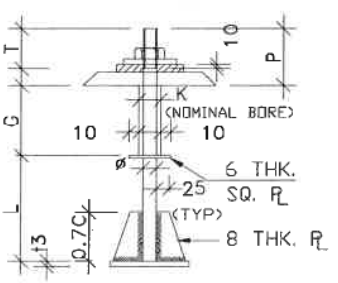


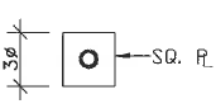
TYPE – V



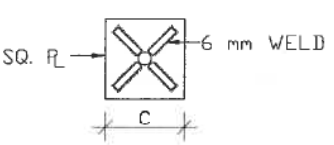
TYPE – VI



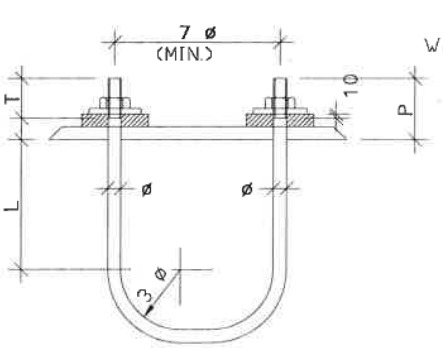




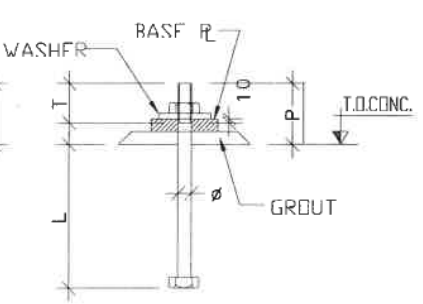
TYPE – VII



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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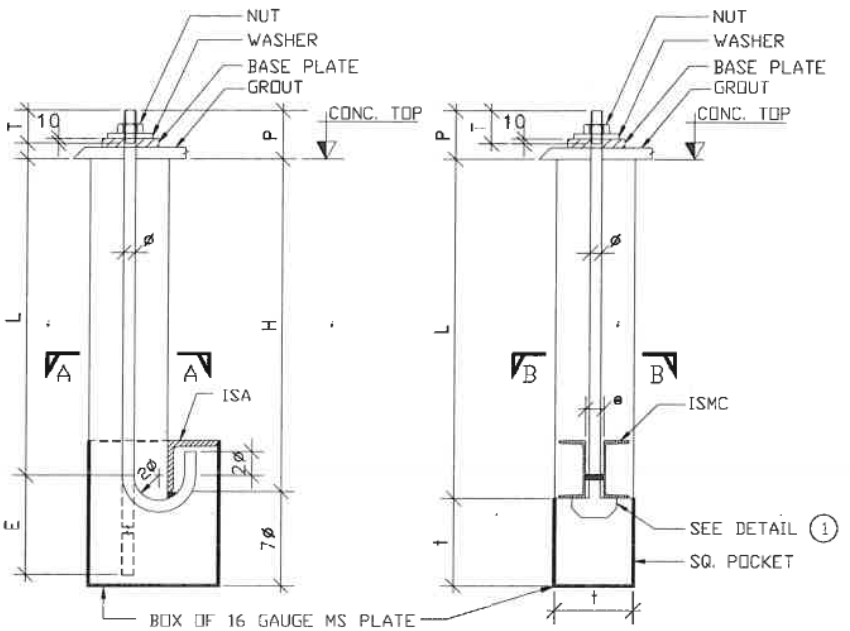
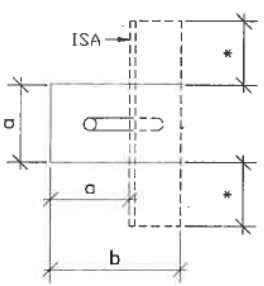
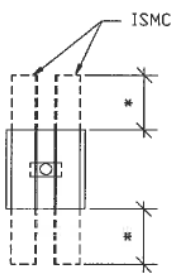




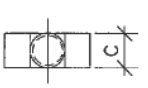
VIEW A – A

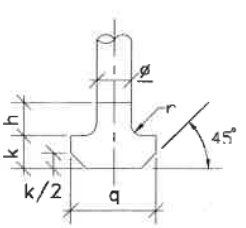
TYPE – X

(* AS PER DESIGN REQUIREMENT)



VIEW B – B





DETAIL – (1)

(FOR FORGED BOLT HEAD)

TYPE – XI

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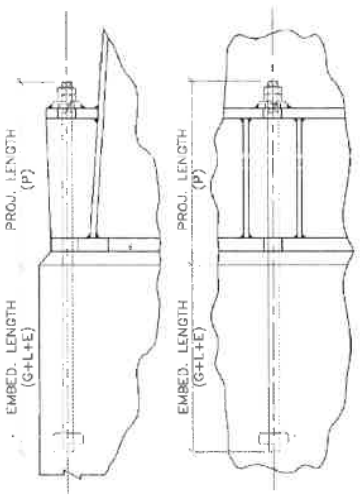

FIGURE 1: ANCHOR BOLT WITH ANCHOR CHAIR
(VERTICAL VESSELS ON SKIRT, STORAGE TANKS, ETC.)

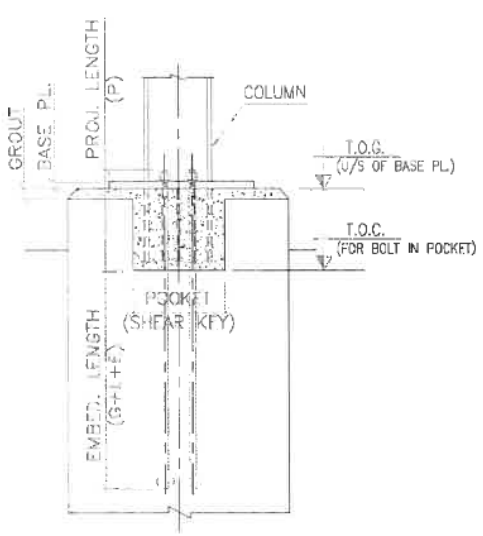

FIGURE 2: ANCHOR BOLT WITH POCKET IN PEDESTAL

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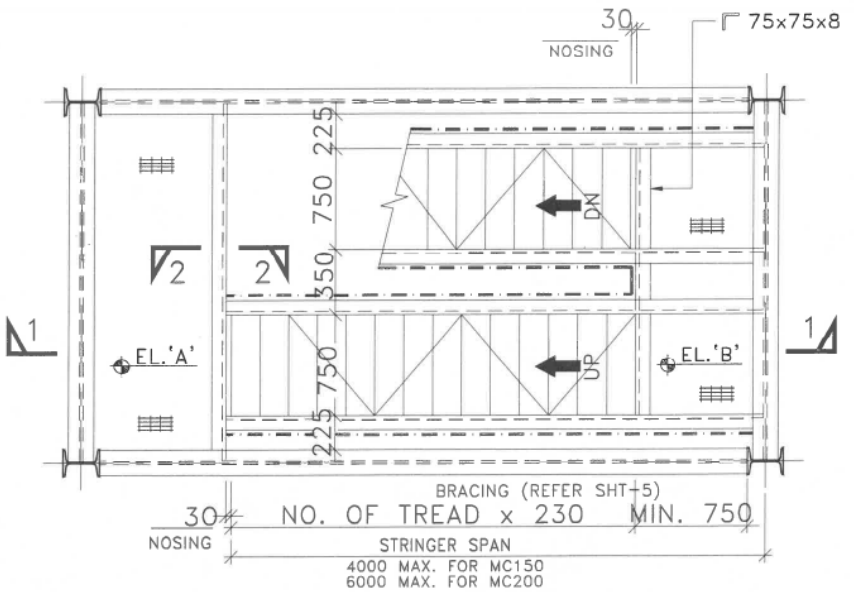
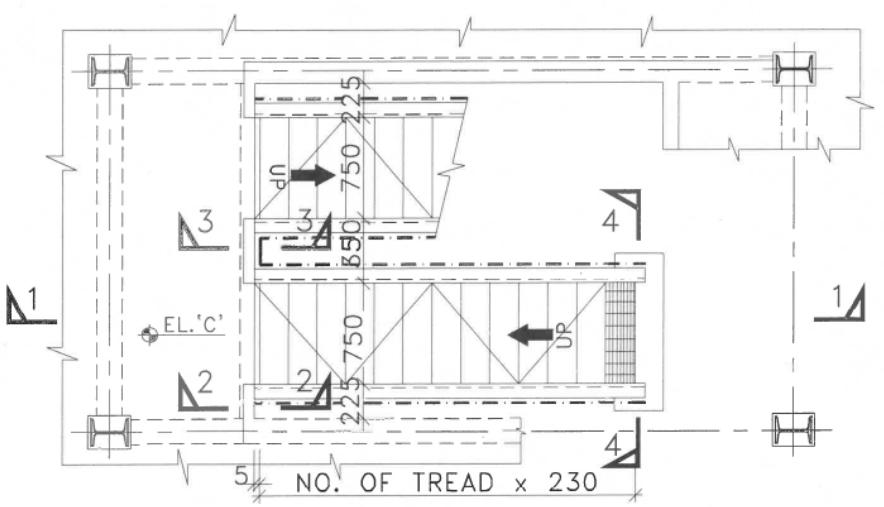
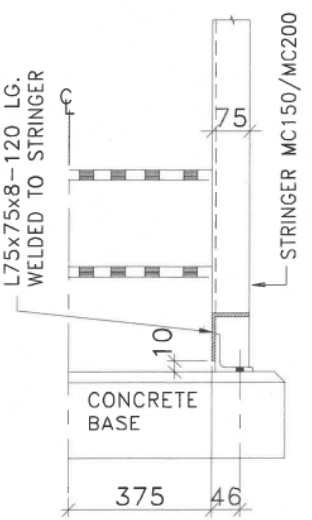


PLAN AT EL. 'A'



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
					Approved by	
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

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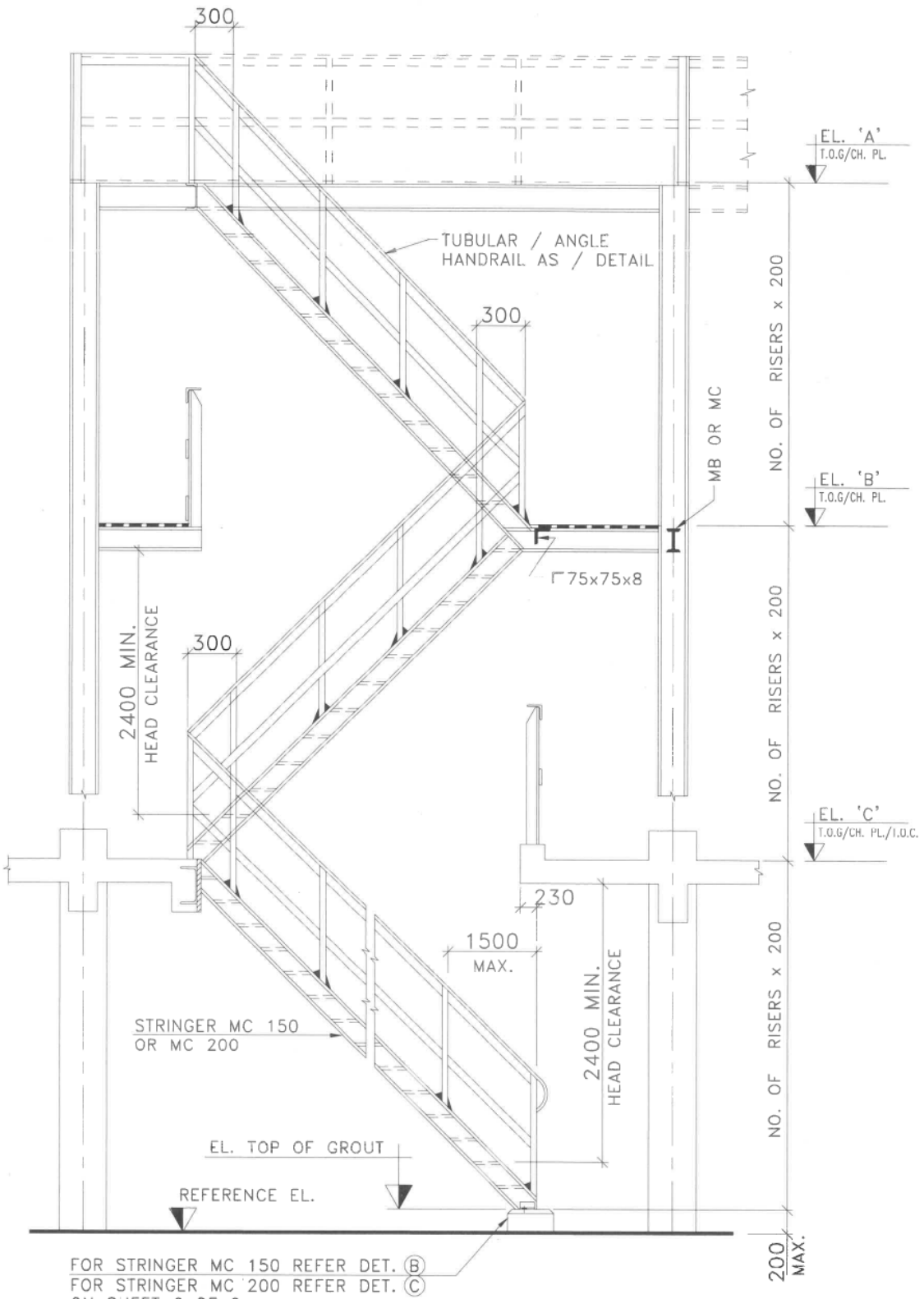

SECTION 1–1

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

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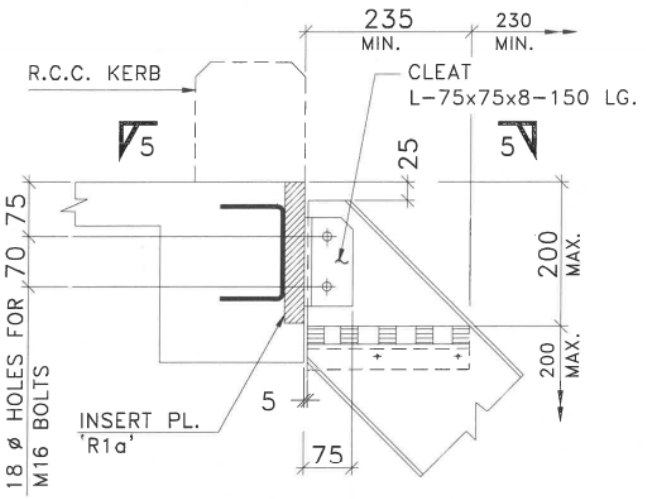
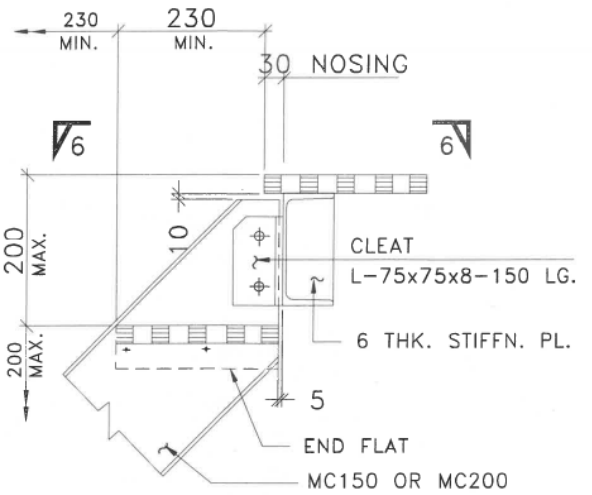


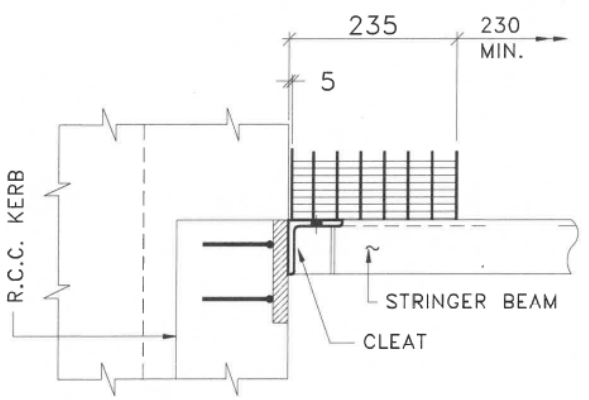
SECTION 2-2

(CONNECTION WITH CONCRETE BEAM)

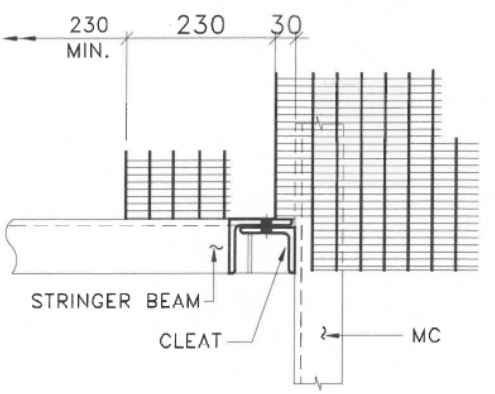


SECTION 2-2

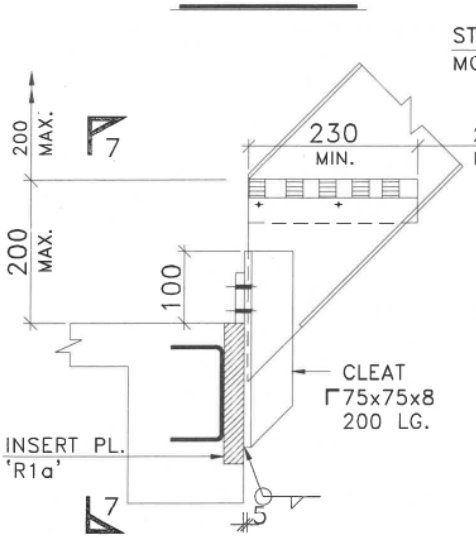
(CONNECTION WITH STEEL BEAM MC)



VIEW 5-5

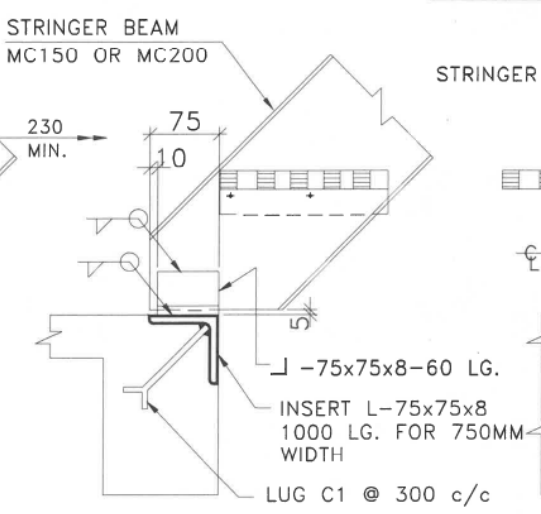


VIEW 6-6



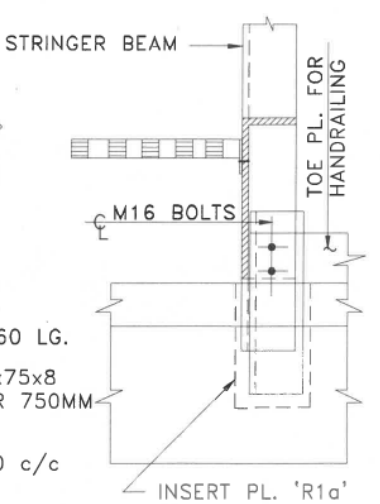
SECTION 3-3

(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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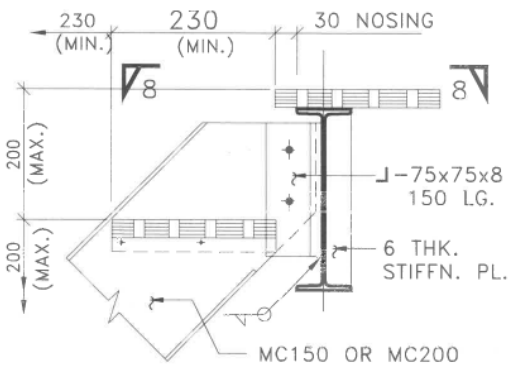
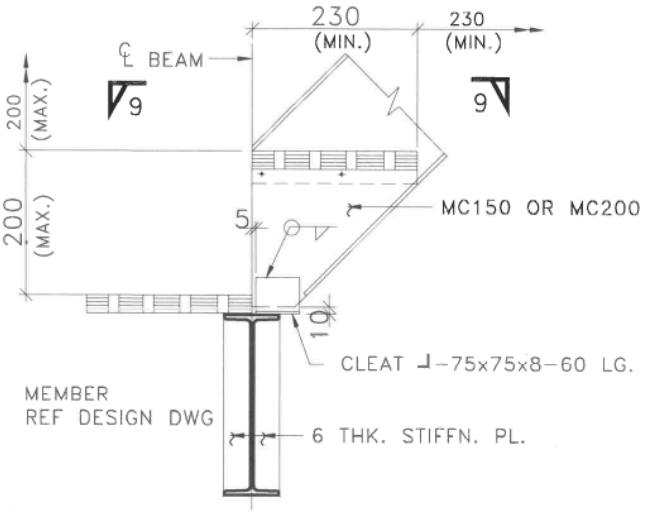
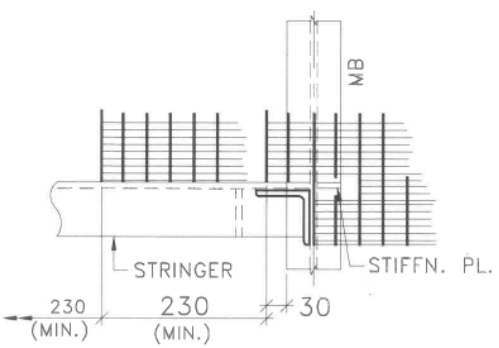


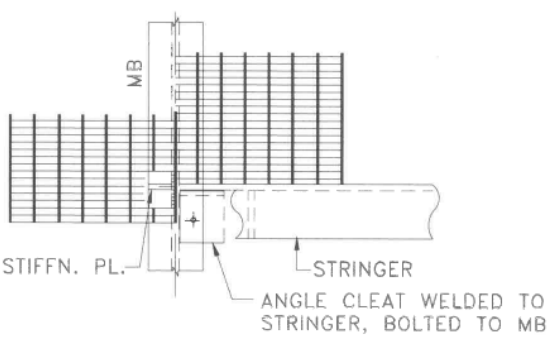
SECTION 2-2
(CONNECTION WITH STEEL BEAM ISMB)



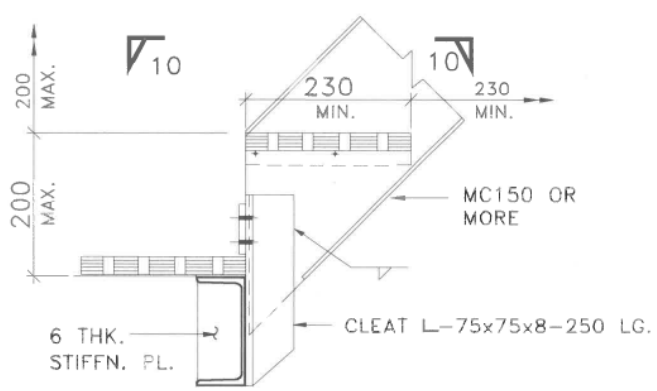
SECTION 3-3
(CONNECTION WITH STEEL BEAM ISMB)



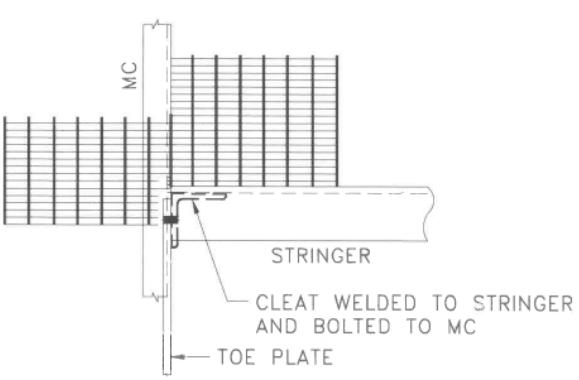
VIEW 8-8



VIEW 9-9



SECTION 3-3
(CONNECTION WITH STEEL BEAM ISMC)



VIEW 10-10

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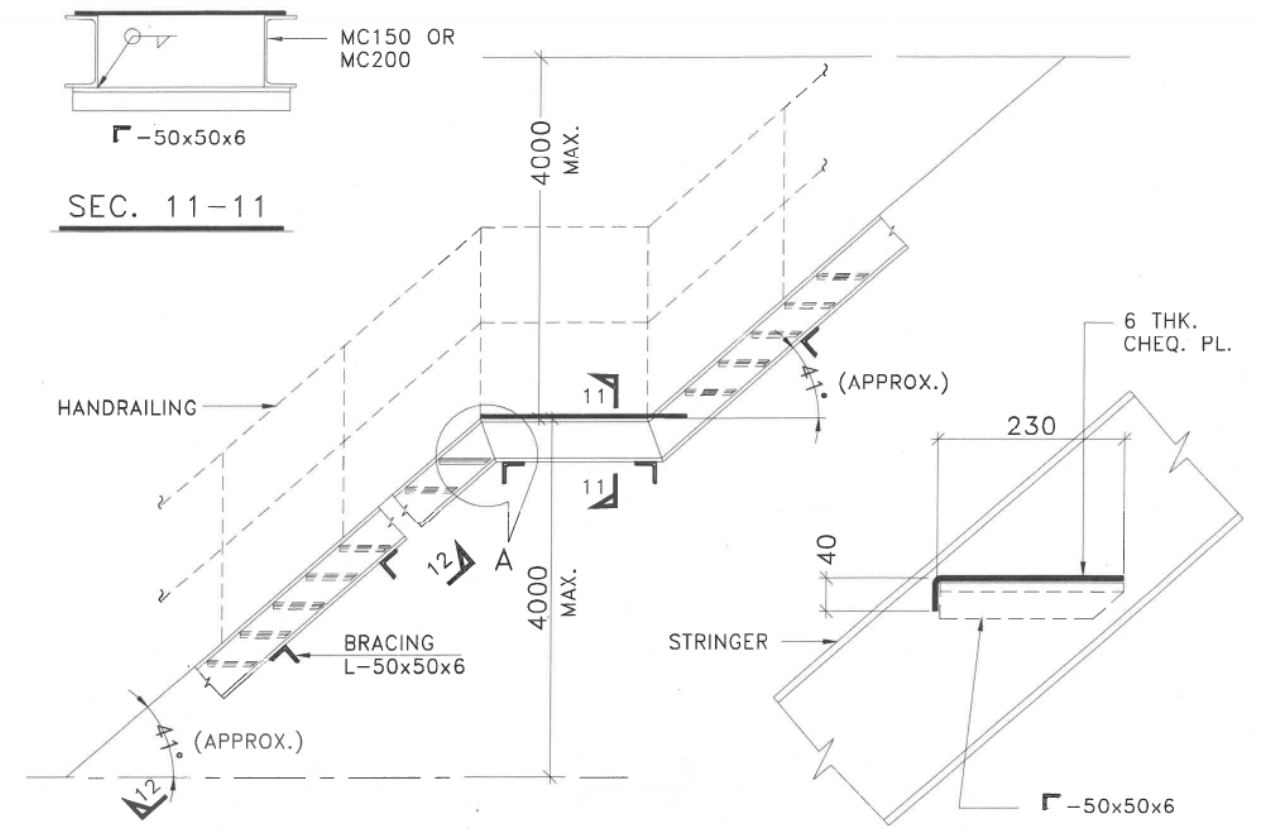
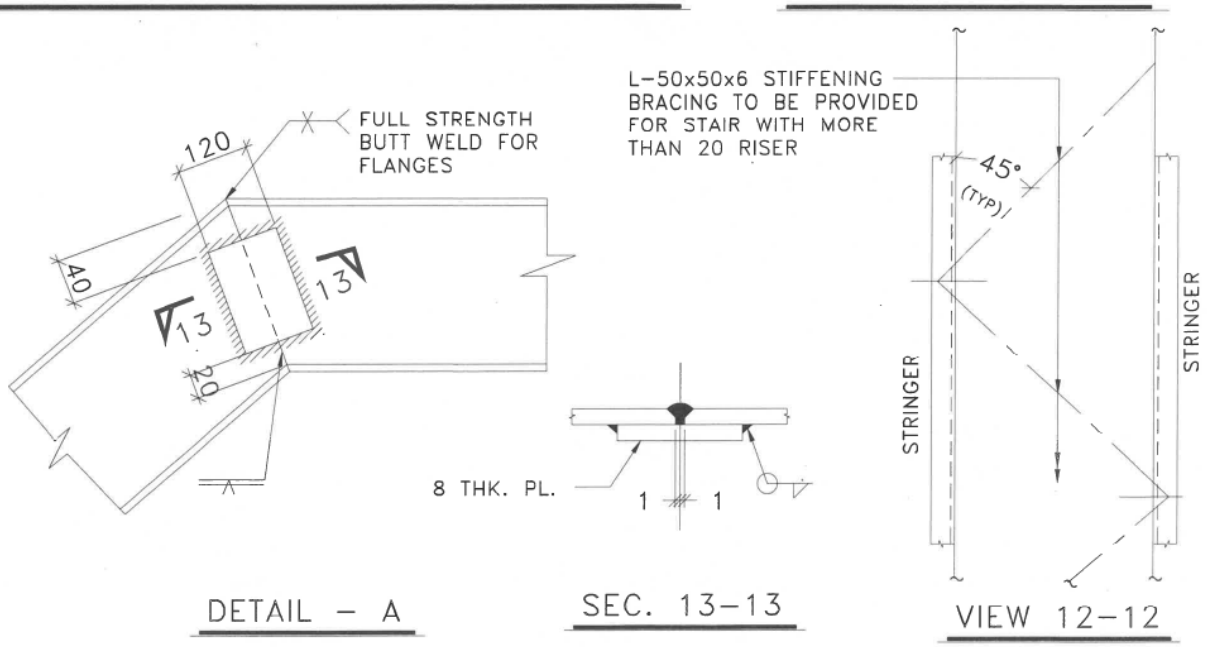


ELEVATION SHOWING STRINGER BRACINGS

TYP. DET. OF CHEQ. PL. STEP



DETAIL − A

SEC. 13−13

VIEW 12−12

STAIR DETS WITH CHEQURED PLATE STEPS

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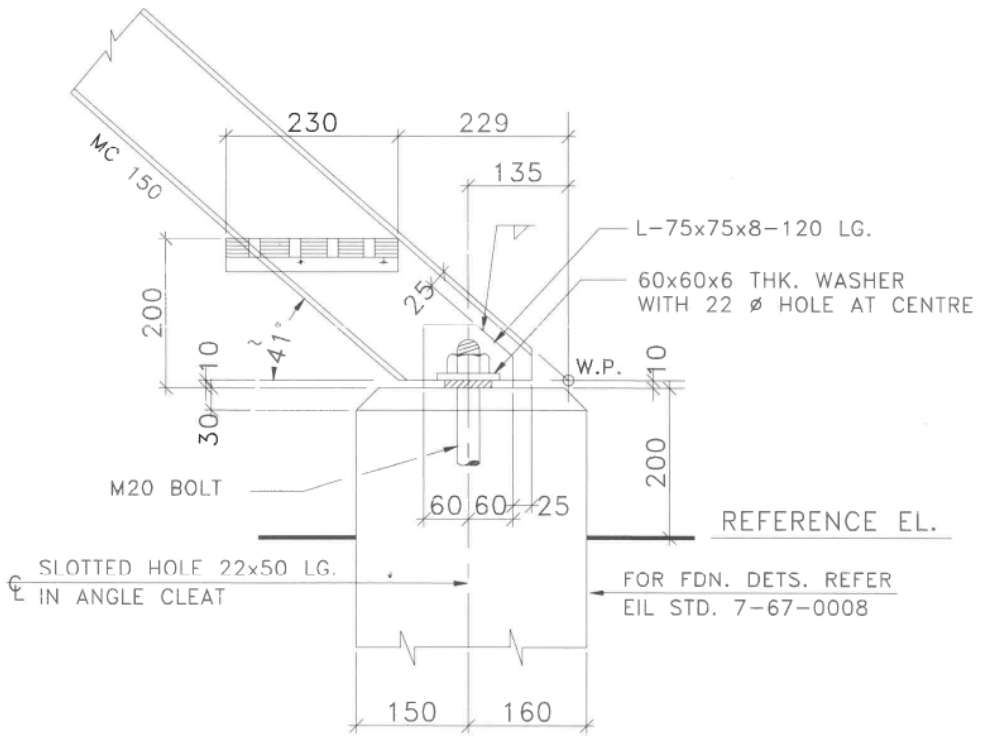
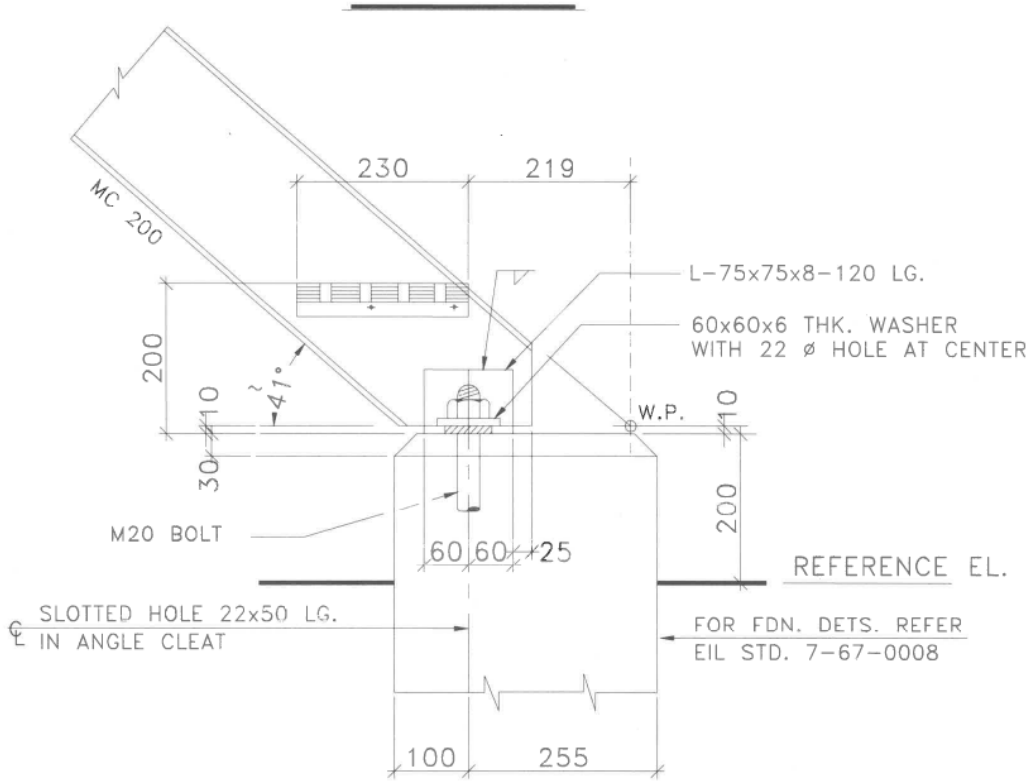


DETAIL – B



DETAIL – C

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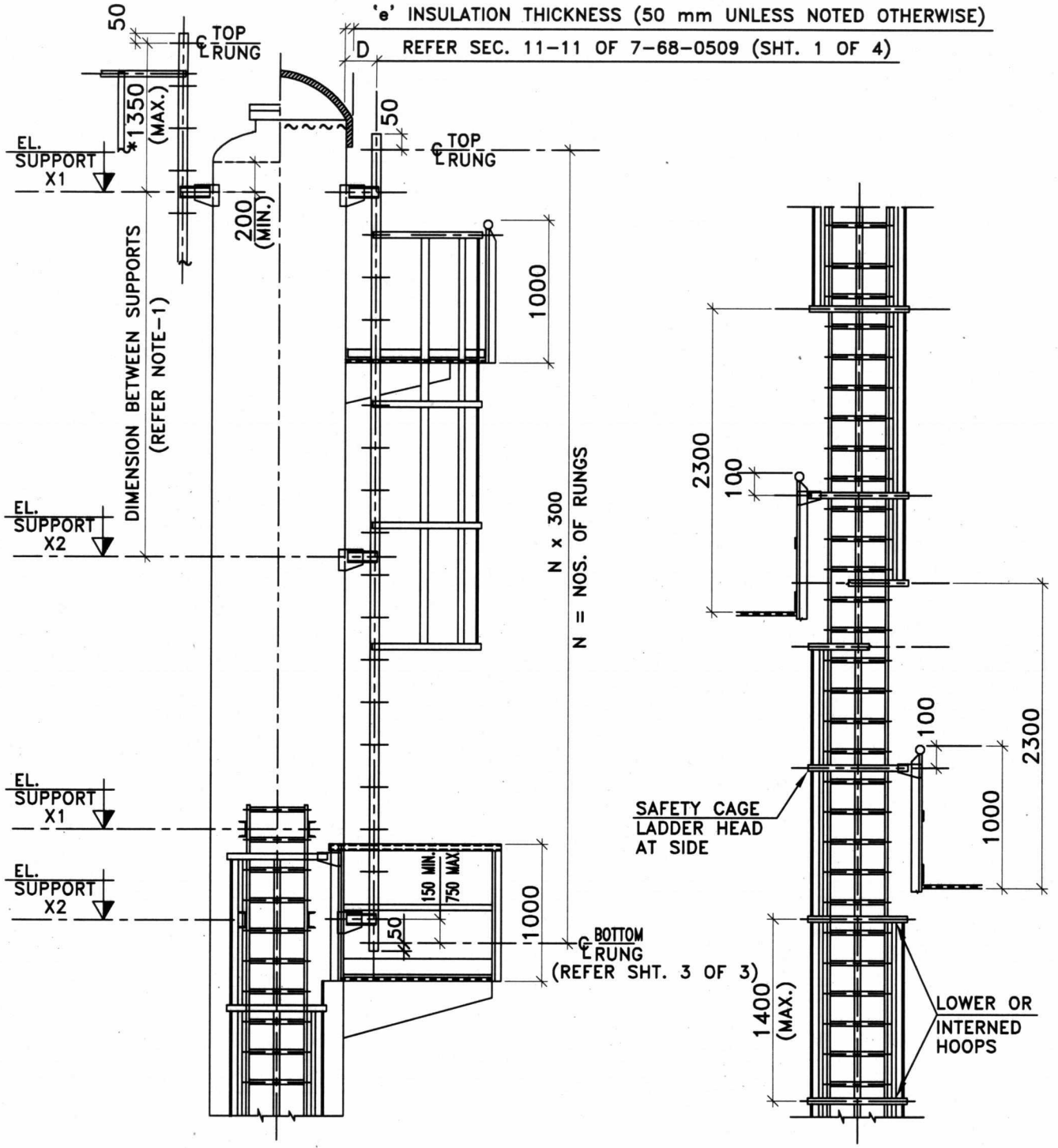
DETAILS OF STEEL LADDER



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
					Approved by	
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

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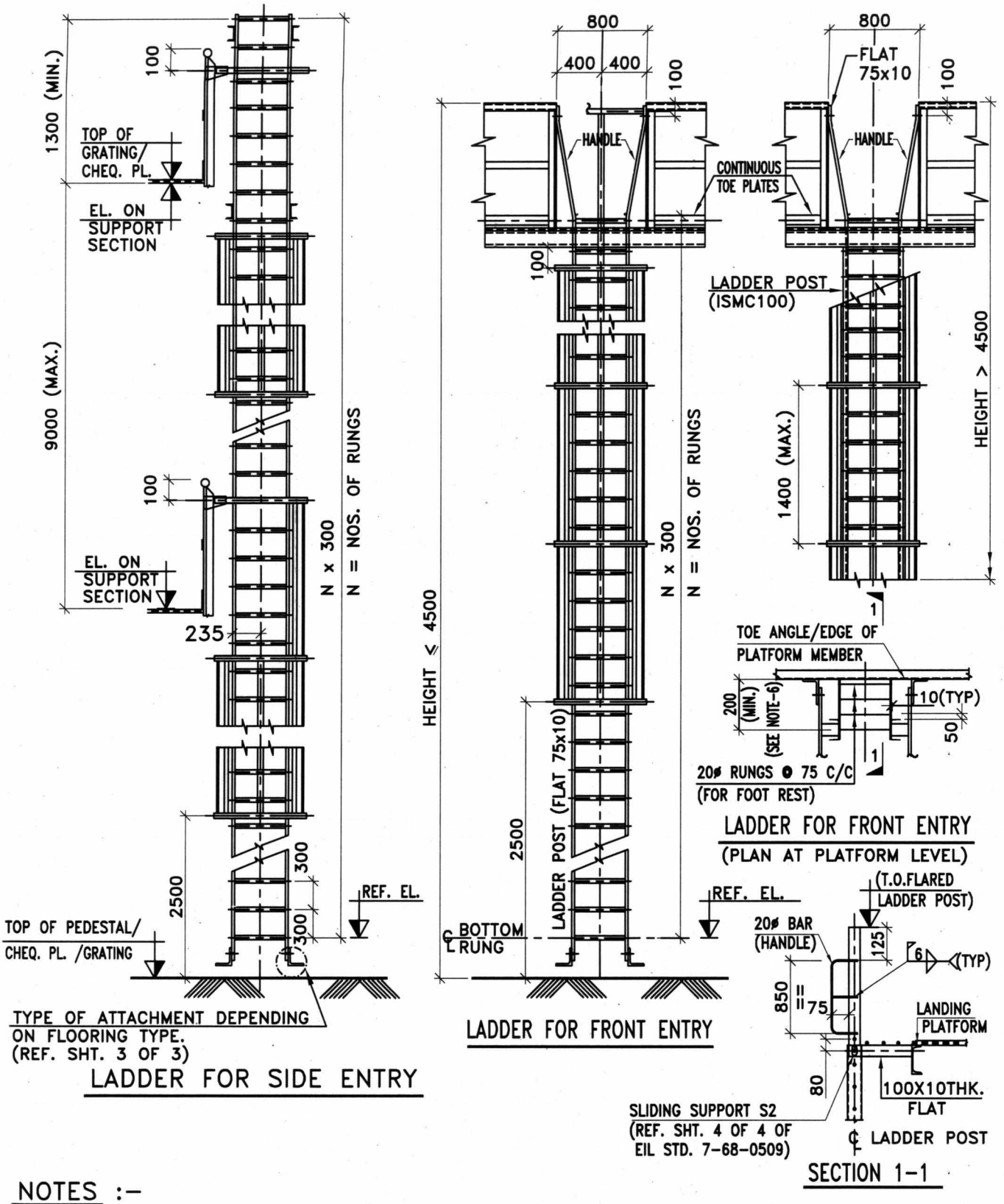
DETAILS OF STEEL LADDER



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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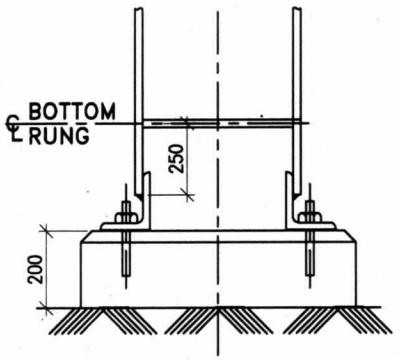
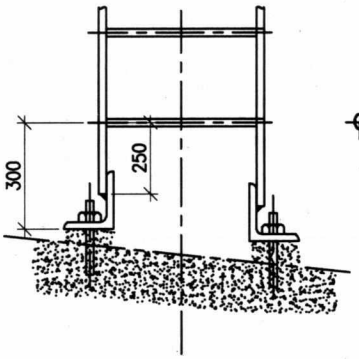
DETAILS OF STEEL LADDER

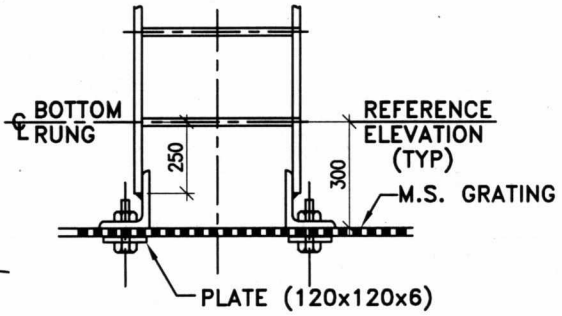
TYPE OF ATTACHMENT	NATURE OF SUPPORT SECTION	REMARKS
A1, A2	SITE WITHOUT PAVING	
B1, B2	CONCRETE FLOOR	A1, B1, C1, D1 : FIXED TYPE
C1, C2, D1, D2	CHEQUERED PLATE / GRATING FLOORING	A2, B2, C2, D2 : SLIDING TYPE



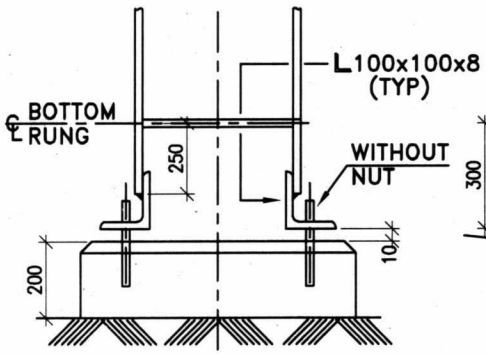
TYPE – A1



TYPE – B1



TYPE – C1



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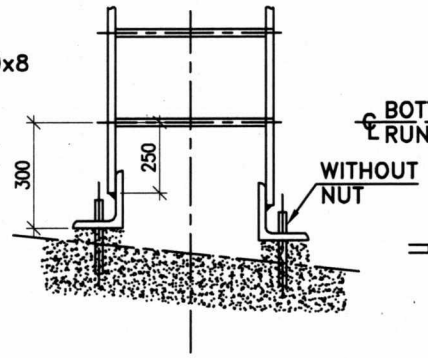
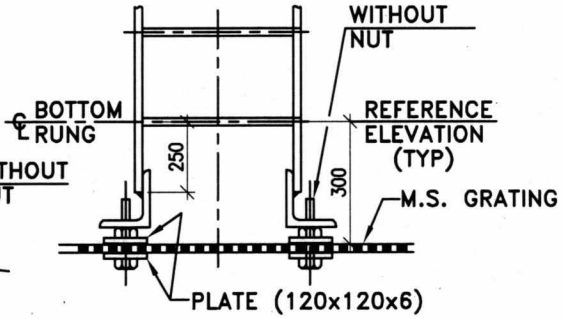


TYPE – B2



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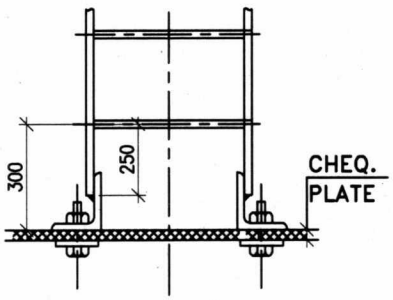
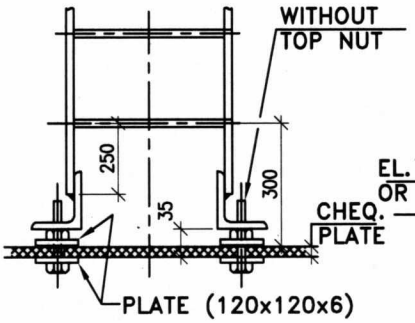


TYPE – D1



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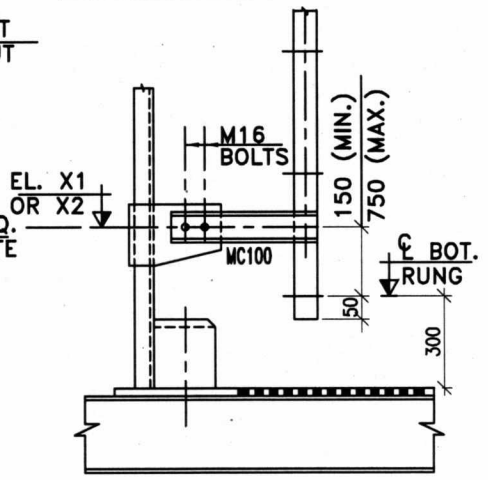
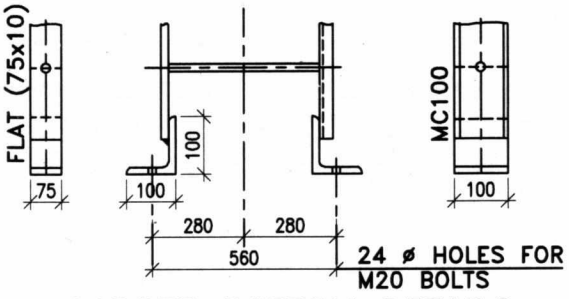


TYPE – E

(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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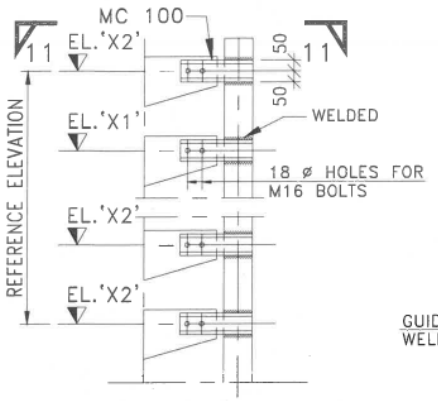
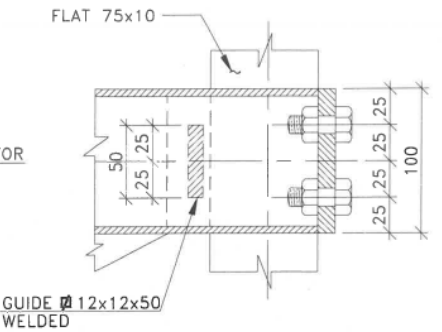
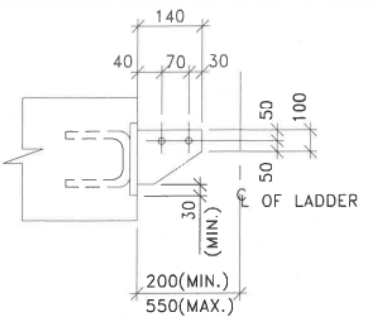


LADDER ATTACHMENT TO VESSELS



SECTION 12–12



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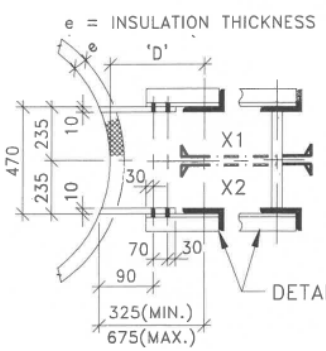
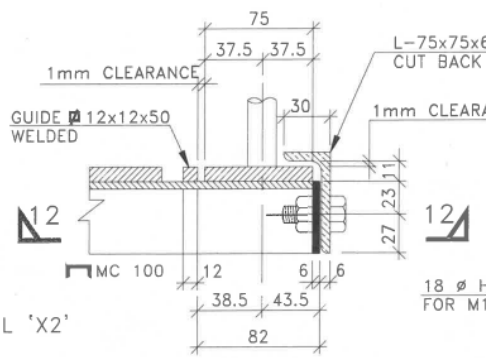
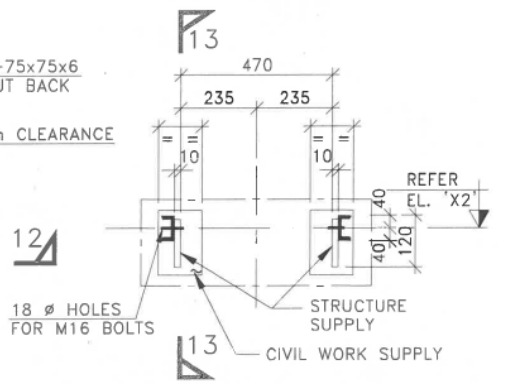


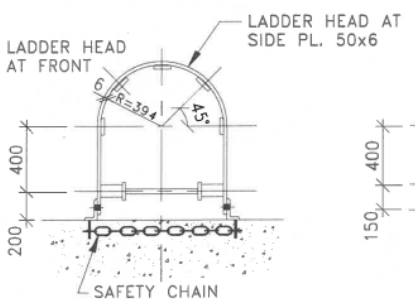


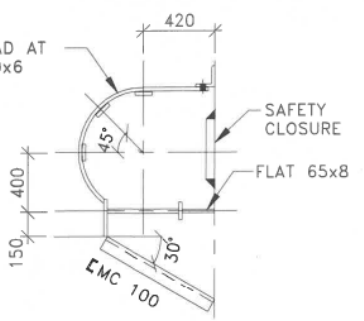
DETAIL 'X2'
(FOR LADDER POST FLAT 75x10)



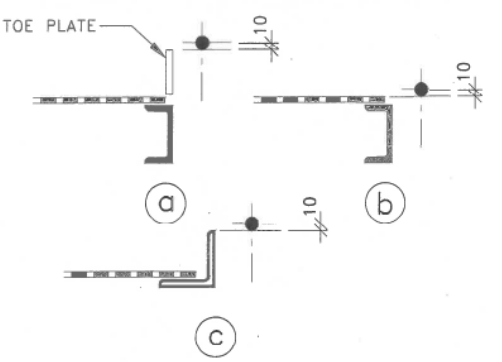
LADDER ATTACHMENT TO CONCRETE

SECTION 11–11

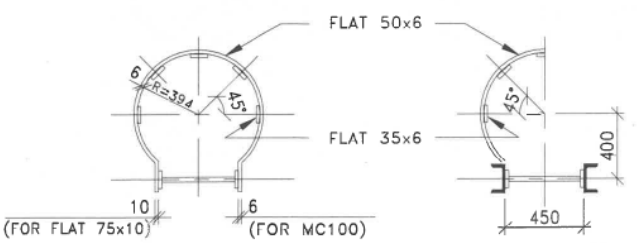




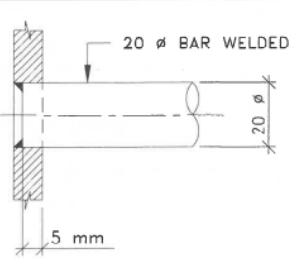
SAFETY CAGE HOOP DETAILS



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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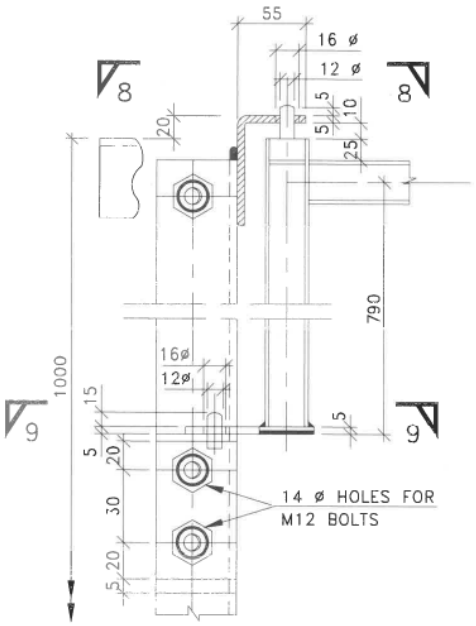
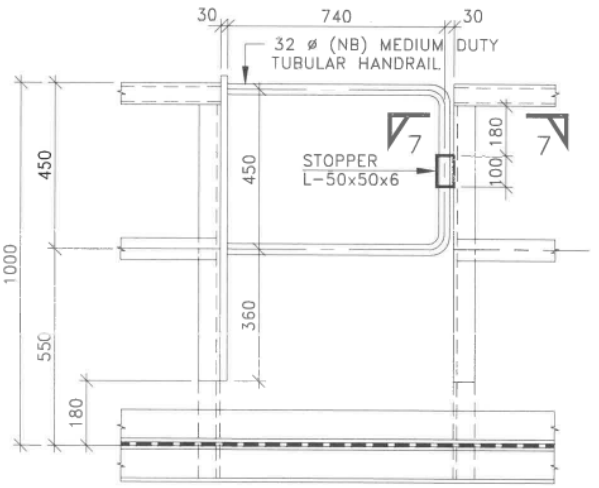
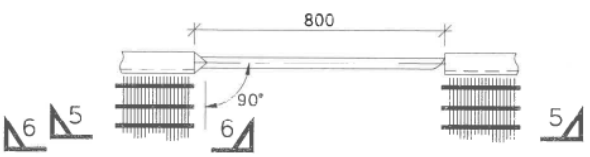


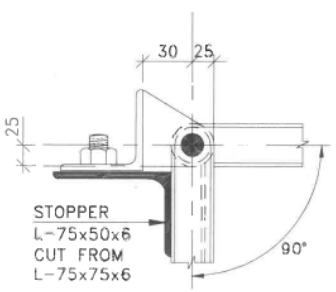
SECTION 6-6



SECTION 5-5



AUTOMATIC BARRIER



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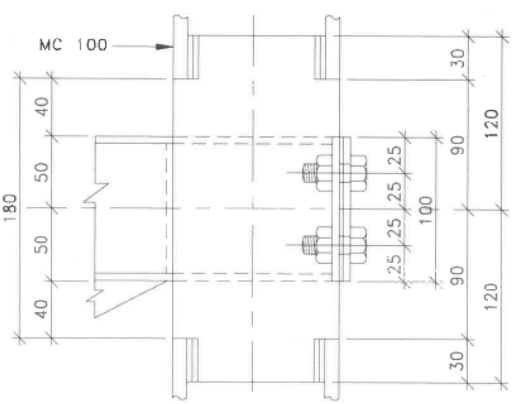

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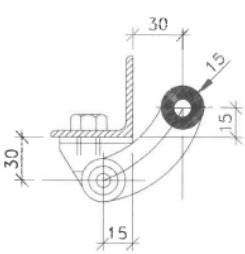
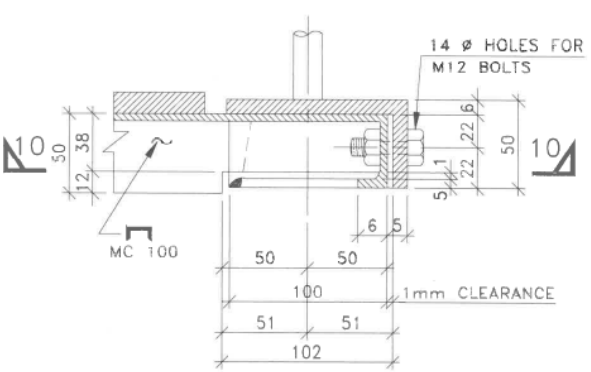
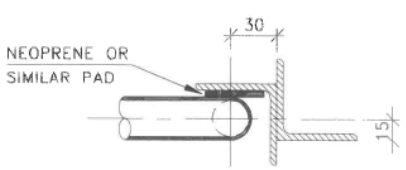


SECTION 9-9



DETAIL 'X2'
(FOR LADDER POST MC 100)



SECTION 7-7

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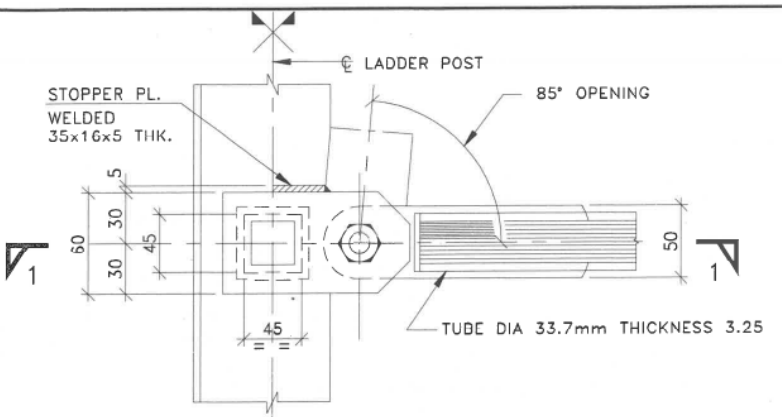
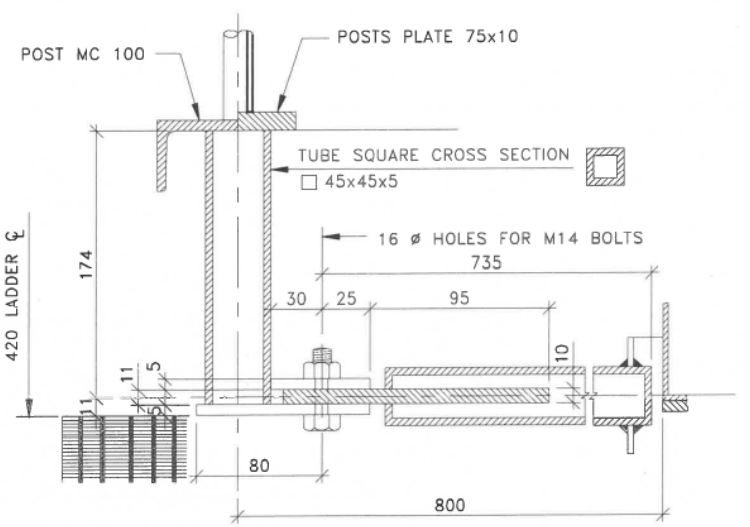
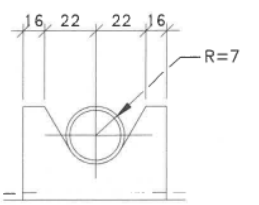


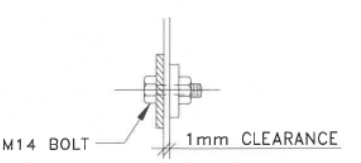
SAFETY BAR INSTALLATION ON LADDER POSTS



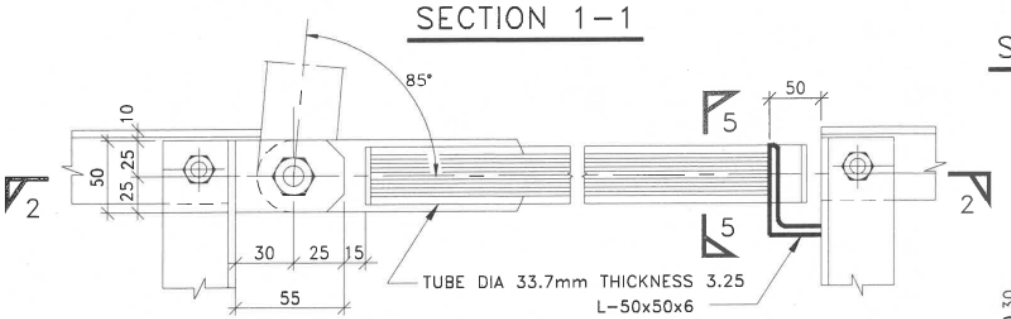
SECTION 1–1



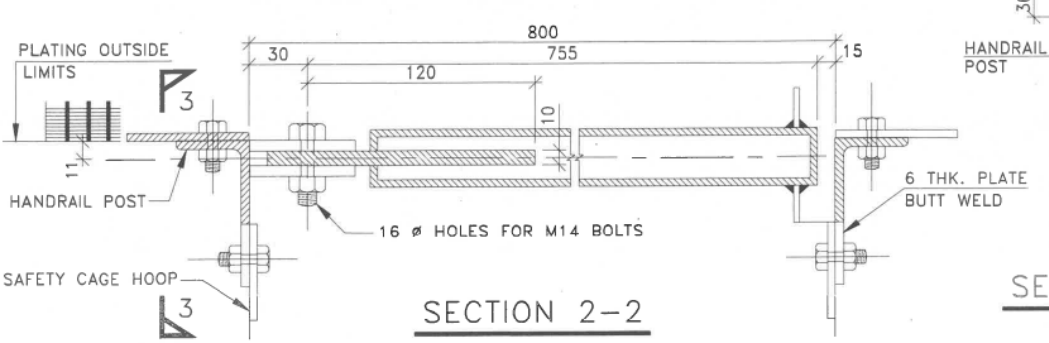
SECTION 5–5



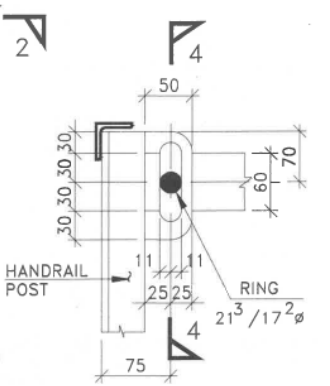
SECTION 4–4



SAFETY BAR INSTALLATION ON HANDRAIL POSTS



SECTION 2–2



SAFETY CAGE HOOP ATTACHMENT TO HANDRAIL POST

SECTION 3–3

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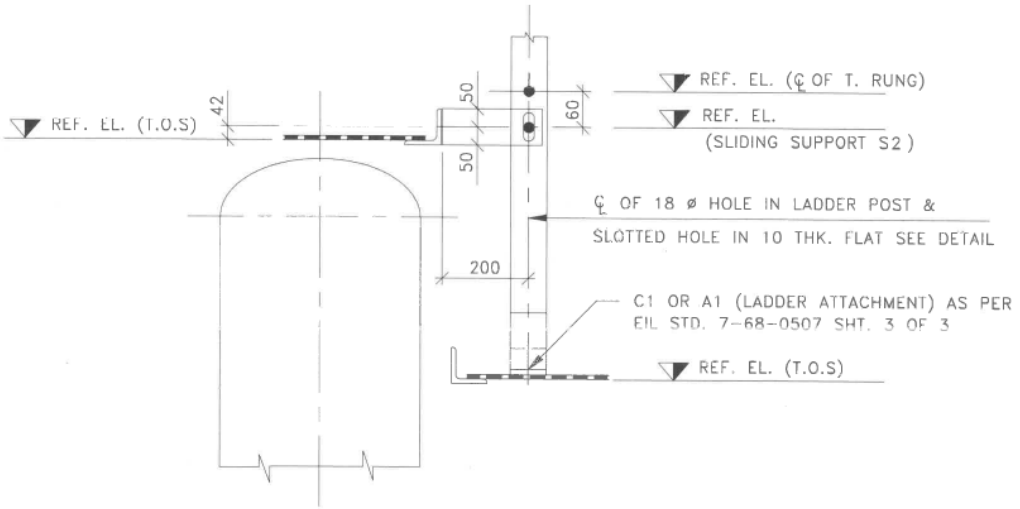
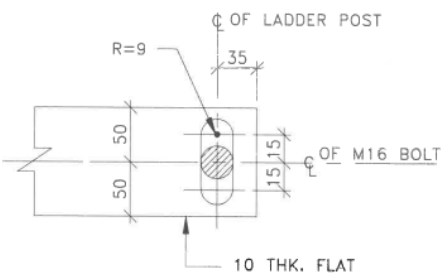


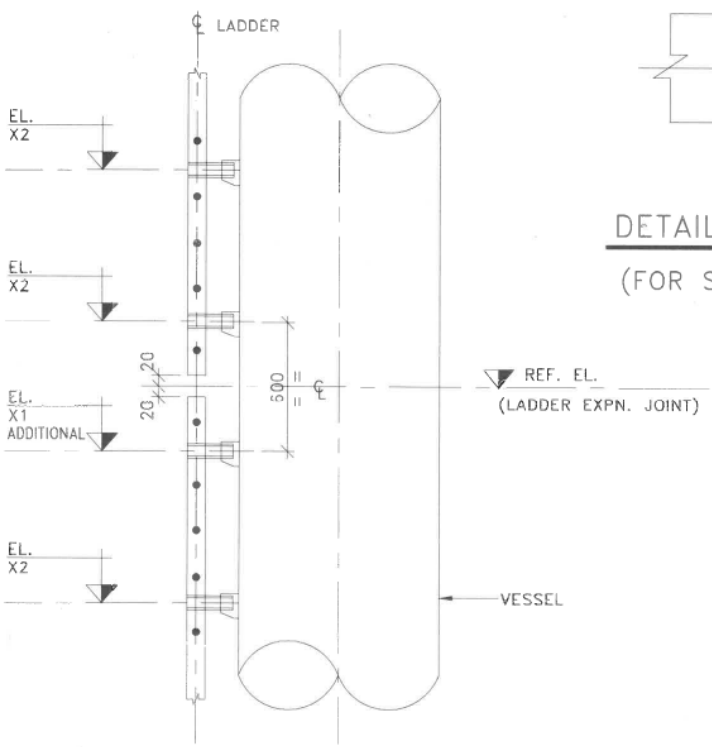
SLIDING CONN. DET. OF LADDER

(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. THIS STANDARD COVERS DETAILS OF OPERATING PLATFORMS ON GRADE, OR ON ELEVATED RCC STRUCTURE FOR A MAXIMUM HEIGHT OF 2300mm ABOVE FGL/HPP AND/OR 2150mm ABOVE FFL.
2. ALL DIMENSIONS ARE IN MILLIMETRES.
3. STRUCTURAL STEEL SHALL BE OF MINIMUM E250 GRADE, QUALITY BR/BO CONFORMING TO IS 2062.
4. GRADE OF CONCRETE AND REINFORCEMENT BARS SHALL BE AS MENTIONED IN GENERAL NOTES OF THE PROJECT.
5. GENERAL NOTES OF THE PROJECT SHALL ALSO BE FOLLOWED FOR CONCRETE AND STEEL WORKS.
6. THE LOCATION AND ORIENTATION OF PLATFORMS SHALL BE AS PER STRUCTURAL DRG/PIPING GAD.
7. LIVE LOAD OF 3.0 KN/SQM HAS BEEN CONSIDERED WHILE DESIGNING THE PLATFORMS.
8. DETAILS OF LADDERS SHALL BE AS PER EIL STD. NO. 7–68–0507.
9. DETAILS OF LADDER PEDESTAL SHALL BE AS PER EIL STD. NO. 7–67–0008.
10. GRATING SHALL BE ELECTROFORGED TYPE–I AS PER EIL STD. NO. 7–68–0697.
11. HANDRAIL TYPE–IV AS PER EIL STD. NO. 7–68–0501 SHALL BE USED.
12. ALL GUSSET PLATES SHALL BE 8mm THICK, UNLESS NOTED OTHERWISE.
13. ALL CONNECTIONS SHALL BE WELDED USING 6mm THICK FILLET WELDS. CONNECTIONS AT CORNER LOCATIONS SHALL BE WITH SUITABLE CLEAT ANGLE.
14. ANCHOR BOLTS SHALL BE AS PER EIL STD. NO. 7–68–0417.
15. FOUNDATIONS SHOWN IN THIS STANDARD ARE VALID FOR SBC OF 5.0 T/SQM AND ABOVE AT FOUNDATION LEVEL.
16. CONSTRUCTION JOINTS IN PAVEMENT SHALL BE SUITABLY LOCATED AT SITE IN CASE THICKENED PAVEMENT IS ADOPTED FOR PLATFORM FOUNDATIONS.
17. GROUT SHALL BE 1:2 CEMENT SAND MORTAR TYPE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	29.03.24	REVISED AND ISSUED AS STANDARD	JITENDER	AMARJEET	ANURAG SINHA	MAINAK NANDI
5	09.07.18	REVISED AND ISSUED AS STANDARD	GAURAV KUMAR	ALPANA	RAJANJI SRIVASTAVA	R.K. TRIVEDI

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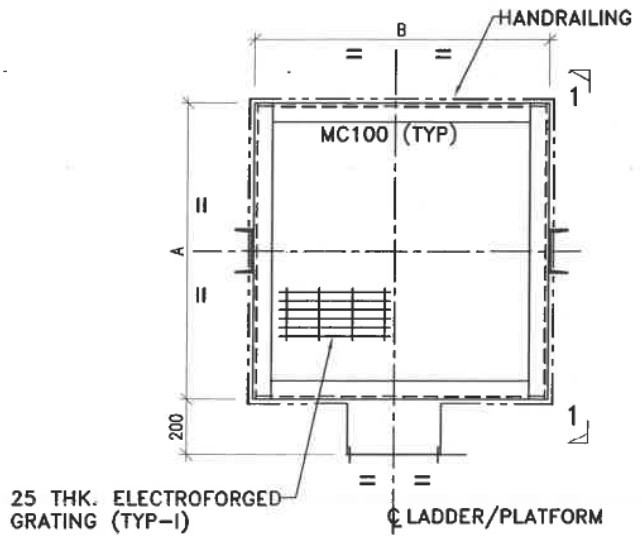
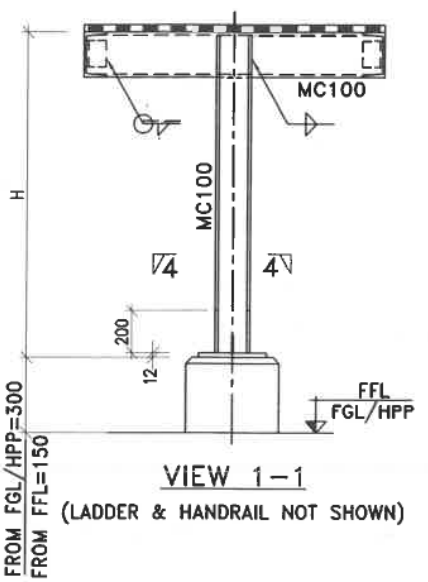
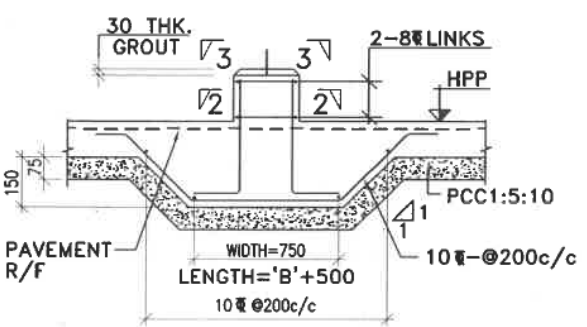


PLAN



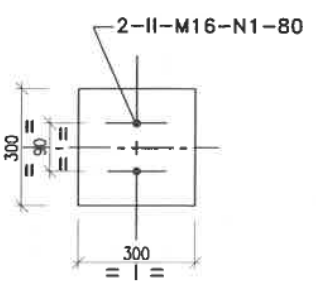
VIEW 1-1

(LADDER & HANDRAIL NOT SHOWN)

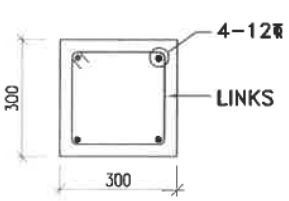


DETAIL OF FOUNDATION

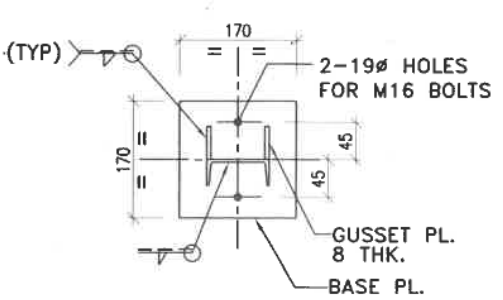
(W.R.T. VIEW 1-1)



VIEW 3-3



SEC. 2-2



VIEW. 4-4

TYP. DETAILS OF PLATFORMS FOR

750	≤A	≤1000
750	≤B	≤1000
750	≤H	≤1000

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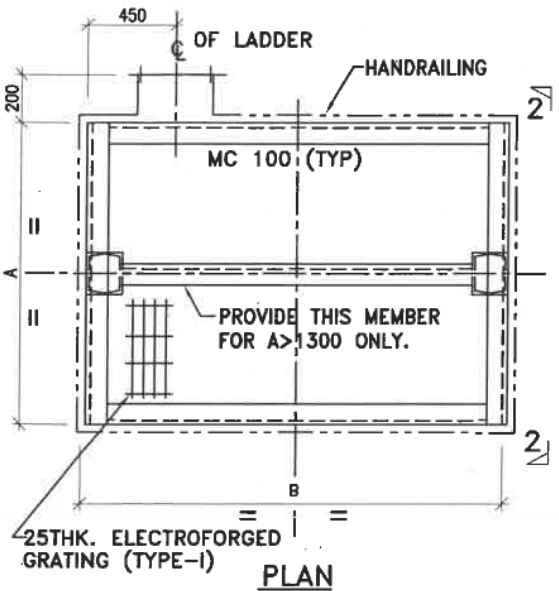
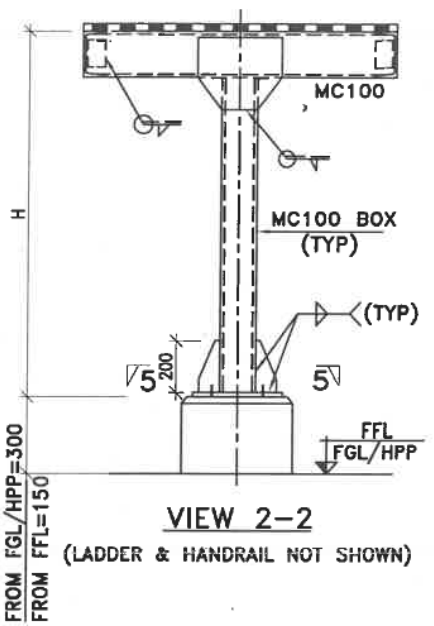
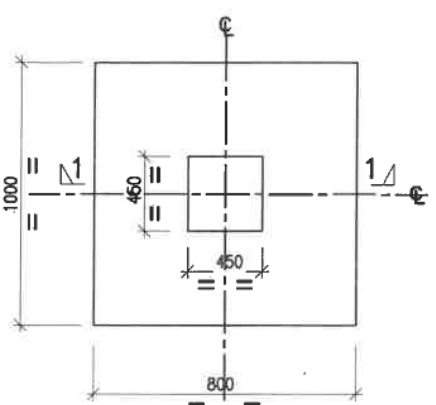


PLAN



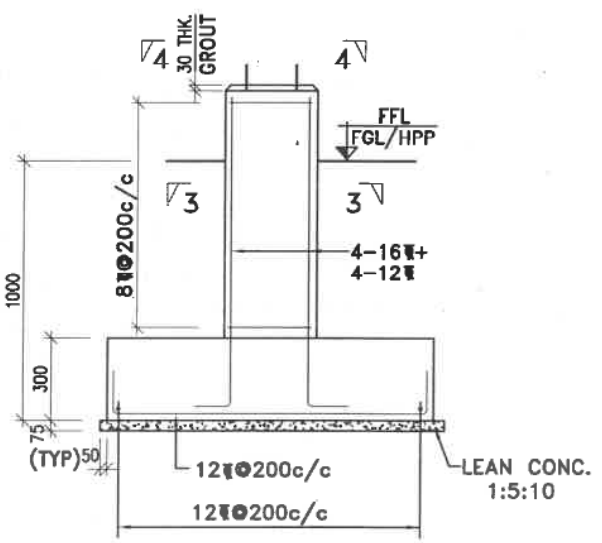
VIEW 2-2

(LADDER & HANDRAIL NOT SHOWN)

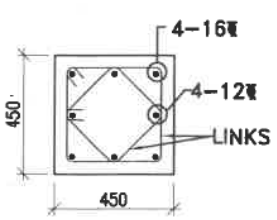


PLAN OF FOUNDATION

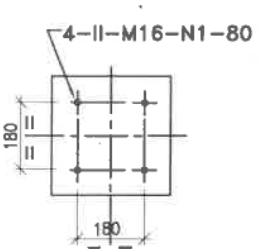
(2 NOS. REQD. THUS)



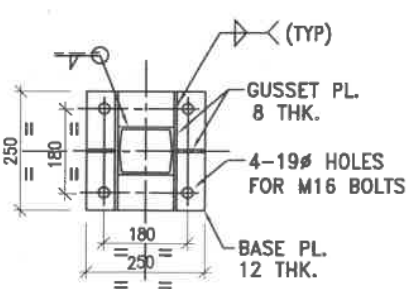
SECTION 1-1



SEC. 3-3



VIEW 4-4



VIEW 5-5

TYP. DETAILS OF PLATFORMS FOR

1000	≤A	≤1500
1000	≤B	≤2500
1000	≤H	≤2000

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NOTES :-

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. FOLLOWING LOADING HAS BEEN CONSIDERED :-
   a) LIVE LOAD =2.0 kN/m^2 ON CROSSOVERS.
   b) SELF WEIGHT OF MEMBER INCLUDING GRATINGS.
3. REINFORCEMENT, CONCRETE AND STRUCTURAL STEEL GRADE SHALL BE AS PER GENERAL NOTES FOR THE PROJECT.
4. LOCATION AND ORIENTATION OF PLATFORMS SHALL BE AS PER PIPING GAD.
5. STAIRCASE DETAIL SHALL BE AS PER EIL STANDARD NO. 7-68-0506.
6. STAIRCASE ON EACH SIDE OF CROSSOVER SHALL HAVE INCLINATION OF 41° TO HORIZONTAL, WITH RISERS NOT EXCEEDING 200mm.
7. GRATING SHALL BE TYPE-I AS PER EIL STANDARD NO. 7-68-0697.
8. FOR D $\geq$ 2000 HANDRAIL SHALL BE OF TYPE-II AS PER EIL STD. NO. 7-68-0501, HANDRAIL FOR OTHER PLATFORMS SHALL BE OF TYPE-IV.
9. GUSSET PLATES SHALL BE 8mm THICK, UNLESS NOTED OTHERWISE.
10. ANCHOR BOLTS SHALL BE AS PER EIL STANDARD 7-68-0417.
11. PIPE SLEEPERS HAVE BEEN ASSUMED TO BE 500mm (MAXIMUM) ABOVE GRADE AND WITH A MAXIMUM LENGTH OF 5000mm SYMMETRICALLY LOCATED WITH RESPECT TO CENTRE LINE, THUS REQUIRING SINGLE SPAN CROSSOVERS.
12. VARYING CROSSOVER LENGTHS AGAINST HEIGHT OF 1000, 1600, 2000 AND 2500 ABOVE THE PEDESTAL HAVE BEEN TABULATED ON SHT. 3 OF THIS STANDARD.
13. TABULATED HORIZONTAL AND VERTICAL FORCES 'H AND V' ON THE FOUNDATION MAY BE USED FOR DESIGN OF FOOTING, SINCE SOIL RECOMMENDATION VARY FOR DIFFERENT SITES. HOWEVER, A STANDARD FOUNDATION DETAIL GIVEN ON SHEET 4 MAY BE ADOPTED FOR MINIMUM SOIL BEARING CAPACITY OF $5T/m^2$ AT FOUNDATION LEVEL.
14. THIS STANDARD SHALL BE SUITABLY USED AS CROSS-OVER FOR RCC/ MASONARY DYKE WALLS IN TANK FARM, AS APPLICABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
5	28.11.22	REVISED AND ISSUED AS STANDARD	ATULYA	DEEPAK	ANURAG SINHA	S. MAZUMDAR
4	23.07.14	REVISED AND ISSUED AS STANDARD	SUSHMA	AJS	P.K.MITTAL	S.CHANDA

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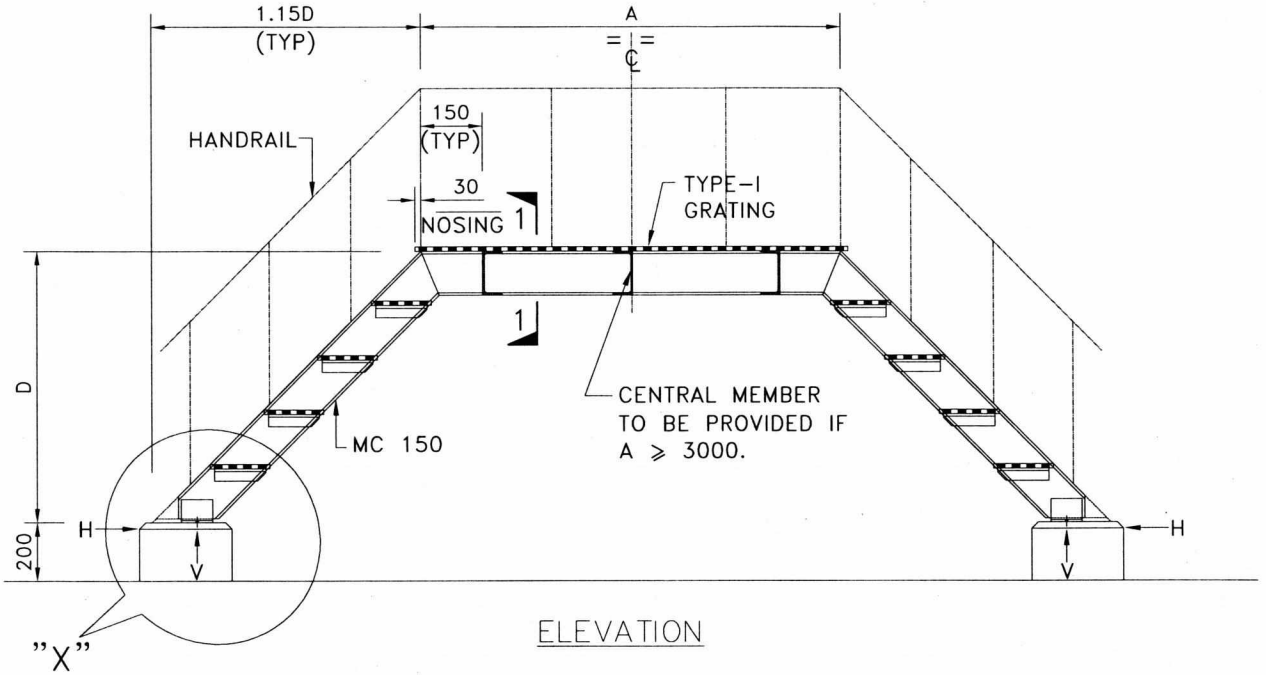
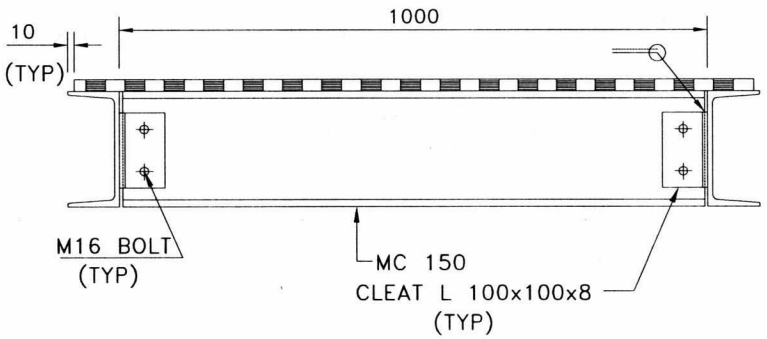
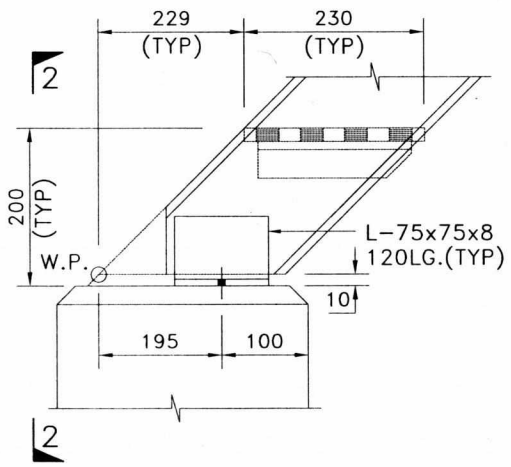


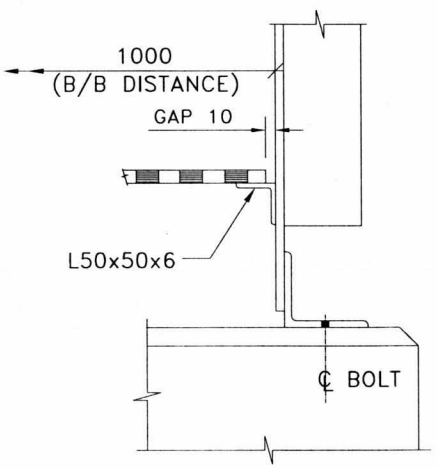
ELEVATION



SECTION 1-1
(HANDRAIL NOT SHOWN)



DETAIL "X" FOR
MC150 STRINGER



VIEW 2-2

Rev. No.	Date	Purpose	Prepared by	Checked	Stds. Committee Convenor	Stds. Bureau Chairman
5	28.11.22	REVISED AND ISSUED AS STANDARD	ATULYA	AJS	P.K.MISHRA	ANURADHA DEMA ZUMDAR
4	23.07.14	REVISED AND ISSUED AS STANDARD	SUSHMA			S.CHANDA

Approved by

Signature Not Verified
Digitally signed by ARITRA DE
Date: 2026.05.18 16:57:19 IST
Location: eProcure-EPROC

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