FORMAT NO. : I-1

INCOMING MATERIAL INSPECTION REPORT

Report No. :
Date :

Project	:	Unit	:	Name of Work	:
Contractor	:	Consultant	:	Job No.	:
Work order No.	:	P.O. No. & Date	:	LR No.	:

Sl. No.	SOR Item No.	Material description/Tag no	Date of Receipt	Qty. Received	Qty. Accepted	Manufacturer/ Vendor	MTC No./ IRN No. with Date/ Field, Lab test, etc	Heat/ Batch No.	Ref. Invoice/ Challan No., E-Way Bill (as applicable)	Observation/Remarks/ Storage Instruction

Notes :

INSPECTION ACTIVITY AT SITE (Tick as applicable)

1. Quantity verified and found in order ☐
2. Material condition appears to be good ☐
3. Heat/Batch/Tag No. mentioned on the material ☐
4. Color coding done as applicable ☐
5. Site identification mark on material ☐
6. Correlation w.r.t. IRN/MTC/Lab Tests report ☐
7. TC verification w.r.t. IRN/Spec/QAP, etc. ☐
8. Check forVendor/Source approval ☐
9. Special Requirement if any. ☐

Based on above, materials are accepted.

Contractor Field Engineer

Contractor RCM/Site Incharge

EIL Field Supervisor

EIL Lead Engineer/Area coordinator/Spread Incharge
(countersigned)

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FORMAT NO. : I-2

RECORD OF CALIBRATION OF MEASURING/TESTING EQUIPMENTS

Report No. :
Date :

Project :
Client :
Consultant :
Contractor :
Work order No. :

Name of work :
Job No. :

Sl. No.	Test Equipment Description	Make/ Model No./ Sr. No.	Calibrated by	Calibration Certificate No./ Date	Calibration Validity Period & Date	Next Calibration Due Date	Accepted		Remarks
							Contractor	EIL	

Note : Ensure measuring/test equipment is sent to laboratory prior to expiry of present certificate

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FORMAT NO. : I-3

CALIBRATION REPORT FOR LOCAL GAUGES (PG, DPG, TG)

Report No. :
Date :

Project :
Job No. :
Name of work :

Client :
Contractor :

Instrument details :
Type :
Tag No. :
Make :
Model No :
Sl No. :
Cal . Range :
Cal Date :
Ref. Data sheet :

Details of Master calibration instruments used:
Type :
Make :
Model No. :
Sl No. :
Cal. Range :
Testing agency :
Ref. T/C No. :
Valid upto :

Sl. No.	Ascending				Remarks	Descending			Remarks
	Input	Desired	Actual	Error		Desired	Actual	Error	
	%	Unit	Unit	Unit		Unit	Unit	Unit	
1.	0								
2.	25								
3.	50								
4.	75								
5.	100								

NOTE :
i) Acceptance criteria as per instrument data sheet
ii) For Diff. Pressure gauge, LP side shall be open to atmosphere

CALIBRATION OF ABOVE SAID INSTRUMENT IS ACCEPTABLE : YES ☐ NO ☐

Contractor **EIL** **OWNER**

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FORMAT NO. : I-4

CALIBRATION REPORT FOR TRANSMITTERS (PT, DPT, TT, FT, LT)

Report No. :
Date :

Project :
Job No. :
Name of work :

Client :
Contractor :

Instrument details :
Type :
Tag No. :
Make :
Model No :
Sl No. :
Cal . Range :
Cal Date :
Ref. Data sheet :

Details of Master calibration instruments used:
Type :
Make :
Model No. :
Sl No. :
Cal. Range :
Testing agency :
Ref. T/C No. :
Valid upto :

Sl. No.	Input		Output (Ascending)				Output (Descending)			
			Desired	Actual	Error	Remarks	Desired	Actual	Error	Remarks
	%	Unit	m A	m A	m A		m A	m A	m A	
1.	0		4				4			
2.	25		8				8			
3.	50		12				12			
4.	75		16				16			
5.	100		20				20			

NOTE :
i) Acceptance criteria as per instrument data sheet
ii) For Diff. Pressure gauge, LP side shall be open to atmosphere

CALIBRATION OF ABOVE SAID INSTRUMENT IS ACCEPTABLE : YES ☐ NO ☐

Contractor **EIL** **OWNER**

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FORMAT NO. : I-5

I/P CONVERTER CALIBRATION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :

Client :
Contractor :

Instrument details :
Tag No. :
Model No :
Sl No. :
Manufacturer :
Range :
Ref. Data sheet :
Calibration date :

Details of Master calibration instruments used:
Type :
Model No. :
Sl No. :
Testing agency :
T/C No. :
Valid upto :

Physical check :

Process connection correct	: Yes/No	Stamping of cal. Date	: Yes/No	Ancillary equipment supply	: Yes/No
Elect. Supply set5ting /span correct	: Yes/No	Pneumatic/Elec. Connection correct	: Yes/No	Air supply setting correct	: Yes/No
General condition satisfactory	: Yes/No	Range/span correct	: Yes/No		

Input		Output-Rising			Remarks	Output Falling			Remarks
%	Actual	Desired	Actual	Error		Desired	Actual	% Error	
	m A	Kg/cm²	Kg/cm²	Kg/cm²		Kg/cm²	Kg/cm²	Kg/cm²	
0									
25									
50									
75									
100									

Acceptance criteria : Instrument Data Sheet
Above instruments' calibration is accepted : YES ☐ NO ☐

Contractor

EIL

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FORMAT NO. : I-6

TESTING REPORT FOR PRESSURE RELIEF VALVES & SAFETY VALVES

Report No. :
Date :

Project :
Client :
Contractor :
Name of work :

Job No. :

Valve Details

Tag No. : Type : Sr. No. :

Make : Model No. : Size/Rating :

Service :

Test Gauge details

Gauge No./Range : Certificate No. :

Calibration Validity :

Test Result

	Specified	Test Result	Remarks
(a) Set Pr/CDSP			
(b) Reset Pr.			
(c) Seat leakage rate			
(d) Back Pr. Test			

Safety Valve : Accepted ☐ Not Accepted ☐

Contractor **EIL**

FORMAT NO. : I-7

CALIBRATION REPORT FOR VALVES (Like Control valves, ON/OFF Valves, shut down valves)

Report No. :
Date :

Project :
Job No. :
Name of work :

Client :
Contractor :

Instrument details :
Tag No. :
Model No :
Sl No. :
Manufacturer :
Range :
Ref. Data sheet :
Calibration date :

Details of Master calibration instruments used:
Type :
Model No. :
Sl No. :
Testing agency :
T/C No. :
Valid upto :

Input		I/P Positioner Output	Valve Positioner Indicator Output						Stroke Action	Remarks
			With Positioner			Without Positioner				
%	Actual / Unit		INC	DEC	DIFF	INC	DEC	DIFF		
0										
25										
50										
75										
100										

Acceptance criteria : As per CV/SDV/instrumentation data sheet

(a) Hysteris with positioner (within ± 1% FS) : Yes/No
(b) Hysteris without positioner (within ± 1% FS) : Yes/No
(c) Linearity checked : Yes/No
(d) Shutdown valves stroke speed :
(e) Air fail trip action checked : Open/ Close
(f) Solenoid power supply :
(g) Solenoid valve OP checked : Yes/No
(h) Limit /proximity switch functioning : Yes/No

Contractor

EIL

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FORMAT NO. : I-8

CALIBRATION REPORT FOR SWITCHES (PRESSURE & LEVEL)

Report No. :
Date :

Project :
Job No. :
Name of work :

Client :
Contractor :

Instrument details :

Type :
Tag No. :
Make :
Model No :
Sl No. :
Cal . Range :
Cal Date :
Ref. Data sheet :

Details of Master calibration instruments used:

Type :
Make :
Model No. :
Sl No. :
Cal. Range :
Testing agency :
Ref. T/C No. :
Valid upto :

As per Data Sheet	Actual Input	Output set at	Output reset at	Remarks
Unit	Unit			
Alarm Set value				
Alarm Reset value				
Trip Set value				
Trip Reset value				
Diff. of Set & Reset value				

Acceptance criteria : As per instrument data sheet

CALIBRATION OF ABOVE INSTRUMENT IS ACCEPTED : YES ☐ NO ☐

Contractor

EIL

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FORMAT NO. : I-9

INSTRUMENT DUCT INSTALLATION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl. No.	Duct Size	From	To	Location	Support	Fastening/ Welding, if any	Cable dressing	Covering/ Clamping	Fire Proofing *	Remarks

* Fire proofing activity shall be carried out by Fire Proofing agency

Contractor **EIL**

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FORMAT NO. : I-10

INSTRUMENT CABLE TRAY INSTALLATION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl.No.	Tray size	From	To	Location	Support	Painting	Fastening/ Welding, if any	Fire Proofing *	Remarks

* Fire proofing activity shall be carried out by Fire Proofing agency

Contractor **EIL**

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FORMAT NO. : I-11

INSTRUMENT / STANCHION/ PANEL/ JB/ CANOPY/ SUPPORT INSTALLATION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl No.	Tag No.	Location	Dimension/ Type	Installation	Alignment	Painting Report no.	Vent Hole Sealing	Verification by		Remarks
								Contractor	EIL	

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FORMAT NO. : I-12

FIELD INSTRUMENT INSTALLATION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl. No.	Tag No.	Location	Elevation	Inst. STD	Installation	Support	Alignment	Canopy	Accessories installation*	Verification by		Remarks
										Contractor	EIL	

* if required/indicated in Data sheet/PR

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FORMAT NO. : I-13

INSTRUMENT IMPULSE LINE INSTALLATION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl. No.	Tag No.	Location	Service	Instln. STD no.	PMS Class	Checking of					Supports	Hydro/ Pneumatic test	Painting Report no.	Verification by		Remarks
						Flow direction	Tapping orientation	Upstream run(mm)	Downstream run(mm)	Direction of Valves				Contractor	EIL	

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FORMAT NO. : I-14

IMPULSE LINE HYDRO/PNEUMATIC TEST REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl No.	Tag No.	Service/ Line No./ Eqpt. No	Mechanical/ NDT Clearance	Operating Pressure (Kg/Cm²)	Test Pressure (Kg/Cm²)	Test medium	Pr. Held Time	Test Gauge details			Test Result	Draining/ Drying	Verification by		Remarks
							(Min)	Sl/ Model No.	Range (Kg/Cm²)	Calibr-ation Certificate No. & Validity upto			Contractor	EIL	

Note : Refer Line History Sheet for details.

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FORMAT NO. : I-15

INSTRUMENT CABLE INSULATION RESISTANCE CHECK REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Details of TEST EQUIPMENT :
Make :
Model No. :
Validity upto :

Sl No. :
Test certificate No. :

Sl. No.	Cable Identification Tag	Cable Length	Insulation Resistance (IR) test			Remarks	Sl. No.	Cable Identification Tag	Cable Length	Insulation Resistance (IR) test			Remarks
			Test voltage	Core to Core	Core to Earth					Test voltage	Core to Core	Core to Earth	

Note : Acceptance criteria - As per cable data sheet

Remarks, if any:

Contractor **EIL**

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FORMAT NO. : I-16

INSTRUMENT CABLE LAYING REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl. No.	Cable Tag	From	To	Act. Length (m)	Cable Type	Dressing	Clamping/ Tagging	Gland Type	Gland Size	Glanding	Ferruling	Termination	Verification by		Remarks
													Contractor	EIL	

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FORMAT NO. : I-17

JUNCTION BOX/LCP INSTALLATION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl. No.	Tag No.	Type	Location	Support	Instln	Alignment	Earthing	Gland type	Plugging	Support Painting/ Stenciling	Verification by		Remarks
											Contractor	EIL	

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FORMAT NO. : I-18

INSTRUMENT AIR LINE/PNEUMATIC TUBE ERECTION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl. No.	Tag No.	Hook Up STD	From	To	Check for				Support	Painting	Flushing	Test Gauge details					Test Pr.	Joints Leak test	Verification by	
					Union/ Loop	drain	Vent	BOM				Sl/ Model No.	Range (Kg/cm²)	Cal. Report No.	Valid upto	Kg/cm²	Joint Tightening		Contractor	EIL

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FORMAT NO. : I-19

LEVEL INSTRUMENT INSTALLATION REPORT

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl. No.	Tag No.	Model No.	Serial No.	Location	PMS Class	Flange Rating	Check for correctness of					Instln. check For Float/ Displacer	Test Gauge details			Hydro-Static test result	Verification by	
							Flanges	Gasket	Stud/ Nut	Verti-cality	Orient-ation		Sl/ Model No.	Range (Kg/cm²)	Cal Report/ Validity		Contractor	EIL

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FORMAT NO. : I-20

INSTALLATION REPORT FOR TEST T/W, TG, TC, RTD

Report No. :
Date :

Project :
Job No. :
Name of work :
Client :
Contractor :

Sl No.	Tag No.	Location	Range Deg C	PMS Class	Flange rating	Immersion Length (mm)	Tapping size	Orientation	Gasket	Stud/ Nut	Tightness of stud/ nut	Plugging	Verification by		Remarks
													Contractor	EIL	

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FORMAT NO. : I-21

INSTRUMENT CABLE TESTING ACCEPTANCE REPORT

Report No. :
Date :

Project :
Job No. :
Contractor :
Instr. Tag No. :
Vender :
Type :

Range :
Serial No :
Span/Scale :

Sl. No.	Mechanical Acceptance Items	Signature with Date		Remarks
		Contractor	EIL	
	Under Ground Cables - Protection conduits to junction boxes - Sealing of cable entries to junction boxes **Above Ground Cables** - Cable correctly clamped - Sealing of cable entries to junction boxes - Cable tagging **Electrical Testing** - Continuity and Resistance - Insulation core to core/ ground/ shield For intrinsically safe loops only : Inductivity/capacity of loop **Pneumatic Properties** - Cores blown through (if applicable) - Leak tested **Junction boxes** - Terminals/connections tagging - Type of junction boxes in Acc. with area classification			

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FORMAT NO. : I-22
LOOP TEST REPORT

Report No. :
Date :

Plant :
Job No. :
Contractor :

Name of work :
Client :

	Loop No.	Range	Tag No.	Input %	Input Actual	Input Unit	Output INC	Output Dec	Output Unit	Mean	% Error	Remarks
Control Valve				0								
				25								
				50								
				75								
				100								
Analog Signal				0								
				25								
				50								
				75								
				100								
Pressure/ Level Switches (Digital)				0								
				25								
				50								
				75								
				100								
Other Digital Signal				0								
				25								
				50								
				75								
				100								
Any Other				0								
				25								
				50								
				75								
				100								

	Remarks
Limit Switch :	
SOV Energisation :	
ZSH : OK/Not OK	
ZSL : OK/Not OK	

Type of Alarm	OK/NOK			Remarks
Trip		Set Input		
High		Differential		
Very High		Type of contact:	No/ NC	
Low				
Very Low				

Physical condition	OK/NOK	Type of Contact	OK/NOK	Remarks
Open		NO/NC		
Close		NO/NC		

Remarks :

Ref. documents : 1) Instrument data sheet 2) Loop wiring diagram 3) Functional schematic

Contractor **EIL**

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FORMAT NO. : I-23

CABLE/TUBE DRUM CUTTING PLAN

Report No. :

Date :

Project :
Name of Work :
Consultant :
Contractor :

Job No. :

Sl. No.	Cable/Tube Size	From	To	Drum No.	Drum Length	Length as per Cable/tube Schedule	Actual Length	Balance	Test Reports	Remarks

Contractor **EIL**

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FORMAT NO. : IM-3

ELECTORDE QUALIFICATION TEST REPORT

(Sheet 1 of 3)

Report No. : _____
Date : _____

Project : _____
Name of Work : _____
Job No. : _____

Unit : _____

Work order No. : _____

Site _____

Test started on _____

Sponsoring Contractor _____

Test completed on _____

_____

H.O. Reference _____

Manufacturer _____

Date of approval _____

Brand Name _____

Batch No./Size _____

Ref. Code _____

IS/AWS Classification _____

Colour code _____

All Weld Test

Base material used _____

Buttering used Yes/No

Preheat temp. _____
Interpass temp. _____
Postheat temp/time _____

Visual Inspection _____

Radiographic result : Gr.I/Gr.II/Not required (As per ASME Sec II Part C)

Mechanical Test Results

Identification	Size of Electrode	UTS Kgs/mm²		YS Kgs/mm²		% Elongation Gauge length	
		Code	Actual	Code	Actual	Code	Actual

UTS = Ultimate tensile strength YS = Yield strength

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IMPACT TEST RESULTS : °C

Identi-fication	Size of Elect-rode	Cooling Medium	I_1 Kgf-m	I_2 Kgf-m	I_3 Kgf-m	I_4 Kgf-m	I_5 Kgf-m	I Average Kgf-m	Code Kgf-m

CHEMICAL ANALYSIS RESULTS
WELD PAD/FILLER WIRE

Iden-tifi-cation	Size of Elec-trode	C	Mn	P	S	Si	Ni	Cr	Mo	V	Cu	Co/Nb	% As per Code
													% As per Actual Code/Act

FILLET WELD TEST RESULT

Identification	Size of Electrode	F Flat	H Horizontal	V Vertical	OH Over Head

Macro Examinations Result _____

Procedure Test Result

Material _____
Pipe/Plate Size _____ Position _____
In combination if any (ELECTRODE) _____ Current : _____ AC/DC
Preheat temp. _____
Post heat temp/time _____
Visual Examination Result _____ Radiographic Examination

Dye Penetrant/Magnetic Particle Testing Result _____
Result _____

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(Sheet 3 of 3)

TENSILE AND BEND TEST RESULT

Position	Identification	Tensile Tests Kg/mm²			Bend Tests			
		Code	Actual		F1/S1	F2/S2	R1/S3	R2/S4
			T1	T2				

Impact Test Results _____ °C

Identification : _____

Location	I1 Kgf-m	I2 Kgf-m	I3 Kgf-m	I4 Kgf-m	I5 Kgf-m	I average Kgf-m	Code requirements Kgf-m
WELD							
HAZ .							

POSITION TEST AS PER IS-814 (M.S. ELECTRODES ONLY)

Material _____
Plate size _____
Visual _____ Radiography Result _____
Identification _____

Position	Identification	Tensile Test T-kg/mm²		Bend Tests				Impact Tests				
		Code	Actual	F1	F2	R1	R2	I1 Kgf-m -oC	I2 Kgf-m -oC	I3 Kgf-m -oC	I average	Code Kgf-m
1G												
2G												
3G												
4G												

Special Remarks for approval _____
Encl 1)
2)
Strike whichever is not applicable
Suffix indicates specimen number.

Index

T	=	Tensile Test
S	=	Side Bend
F	=	Face Bend
R	=	Root Bend
I	=	Impact Test

Witnessed by **Approved by**

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FORMAT NO. : IM-4

INSPECTION REPORT - FILLER MATERIAL MANUFACTURER'S WORKS

Report No. : _____
Date : _____

Project : _____ Unit : _____
Name of Work : _____
Job No. : _____ Work order No. : _____

1. Date of visit _____ 2. By _____
3. Manufacturer _____ 4. Ref. _____
5. Location _____ 6. Person contacted _____
7. Brand name of electrode/Filler wire/Bare electrode _____
8. Specification _____ 9. Classification _____
10. Current I.S. approval available: (Yes/No) Valid upto _____
11. Testing laboratory: Available/Not available
12. Testing facilities: Including Machining
    A) Mechanical
    i) Tensile _____
    ii) Bend _____
    iii) Impact _____
    B) Chemical elements _____
13. Qualified chemists: Available/No available
    If yes Name _____
14. Quality control procedure: Suitable/Unsuitable
    (copy enclosed for ready reference)
15. Qualified quality control personal: Available/No available
16. Raw material supplier _____
17. List of approvals _____
18. List of users _____
19. Remarks _____

To
Manager of Construction

Through RCM/Site In-charge

Signature

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FORMAT NO. : IM-5

FORMAT FOR WELDING PROCEDURE SPECIFICATIONS(WPS)
(Section IX, ASME Boiler and Pressure Vessel Code)

(Sheet 1 of 2)

Report No. : _____
Date : _____

Project : _____ Unit : _____
Name of Work : _____ Contractor : _____
Job No. : _____ Work order No. : _____

Company Name _____ By _____
Welding Procedure Specification No. _____ Date _____ Supporting PQR No.(s) _____
Revision No. _____ Date _____
Welding Process(es) _____ Type(s) _____
(Manual, Semi-Auto or Automatic)

JOINTS (QW-402) Details :
Joint Design _____
Backing (Yes) _____ (No.) _____
Backing Material (Type) _____
Sketches, Production Drawings, Weld Symbols or Written Description should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove may be specified.
(At the option of the Mfgr., sketches may be attached to illustrate joint design, weld layers and bead sequence, e.g. for notch toughness procedures, for multiple process procedures. etc.

***BASE METALS (QW-403)**
P.No. _____ Group No. _____ to P.No. _____ Group No. _____
OR
Specification type and grade _____ to
Specification type and grade _____
OR
Chem. Analysis and Mech. Prop. _____
Thickness Range :
Base Metal : Groove _____ Fillet _____
Deposited Weld Metal
PipeDia.Range : Groove _____ Fillet _____
Other _____

***FILLER METALS (QW-404)**
F.No. _____ Other _____
A.No. _____ Other _____
Spec. No. (SFA) _____
AWS No. (Class) _____
Size of filler metals _____
_____
(Electrode, Cold Wire, Hot wire etc.)
Electrode-Flux (Class) _____
Flux Trade Name _____
Consumable Insert _____

* Each base metal-filler metal combination should be recorded individually.

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(Sheet 2 of 2)

POSITIONS (QW-405)
Position(s) of Groove _____
Welding Progression : Up _____ Down _____
Position(s) of Fillet _____

POSTWELD HEAT TREATMENT (QW-407)
Temperature Range _____
Time Range _____

PREHEAT (QW-406)
Preheat Temp. Min. _____
Interpass Temp. Max. _____
Preheat Maintenance _____
(Continuous or special heating where applicable should be recorded)

GAS (QW-408)
Shielding Gas(es) _____
Percent Composition (mixtures) _____
_____
Flow Rate _____
Gas Backing _____
Trailing Shielding Gas Composition _____

ELECTRICAL CHARACTERISTICS (QW-409)
Current AC or DC _____ Polarity _____
Amps (Range) _____ Volts (Range) _____
(Amps and volts range should be recorded for each electrode size, position, and thickness, etc. This information may be listed in a tabular form similar to that shown below.)
Tungsten Electrode Size and Type _____
(Pure Tungsten, 2% Thoriated, etc.)
Mode of Metal Transfer for GMAW _____
(Spray arc, short circuiting arc, etc.)
Electrode wire feed speed range _____

TECHNIQUE (QW-410)
String or Weave Bead _____
Orifice or Gas Cup size _____
Initial and Interpass Cleaning (Brushing, Grinding etc.) _____
_____
Method of Back Gouging _____
Oscillation _____
Contact Tube to Work Distance _____
Multiple or SinglePass (per side) _____
Multiple or Single Electrodes _____
Travel Speed (Range) _____
Peening _____
Other _____
_____
_____

Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range	Other
		Class	Dia.	Type Polar.	Amp Range			
								e.g. Remarks, Comments Hot Wire Addition Technique Torch Angle Etc.

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FORMAT NO. : IM -6

SUGGESTED FORMAT FOR PROCEDUREQUALIFICATION RECORD (PQR)
(Section IX, ASME Boiler and Pressure Vessel Code)

(Sheet 1 of 2)

Report No. : _____
Date : _____

Project : _____ Unit : _____
Name of Work : _____
Job No. : _____ Work order No. : _____
Company Name _____
Procedure Qualification Record No. _____ Date _____
WPS No. _____
Welding Process(es) _____
Type (Manual, Automatic, Semi-Auto) _____

JOINTS (QW-402)

Groove Design Used

BASE METALS (QW-403)
Materials Spec. _____
Type or Grade _____
P. No._____ to P.No. _____
Thickness _____
Diameter _____
Other _____

POSTWELD HEAT TREATMENT (QW-407)
Temperature _____
Time _____
Other _____

GAS (QW-408)
Type of Gas or Gases _____
Composition of Gas Mixture _____
Other _____

FILLER METALS (QW-404)
Weld Metal Analysis A No._____
Size of Electrode _____
Filler Metal F No. _____
SFA Specification_____
AWS Classification _____
Other _____

ELECTRICAL CHARACTERISTICS (QW-409)
Current _____
Polarity _____
Amps. _____ Volts _____
Other _____

POSITION (QW-405)
Position of Groove _____
Weld Progression (Uphill, Downhill) _____
Other _____

PREHEAT (QW-406)
Preheat Temp. _____
Interpass Temp. _____
Other _____

TECHNIQUE (QW-410)
Travel Speed _____
String or Weave Bead _____
Oscillation _____
Multipass or SinglePass (per side) _____
Single or Multiple Electrodes _____
Other _____

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(Sheet 2 of 2)

Tensile Test (QW – 150)

Specimen No.	Width	Thickness	Area	Ultimate Total Load lb.	Ultimate Unit Stress psi	Character of Failure & Location

Guided Bend Tests (QW-160)

Type and Figure No.	Results

Toughness Test (QW-170)

Specimen No.	Notch Location	Notch Type	Test Temp.	Impact Values	Lateral Exp.		Drop Weight	
					% shear	M/s	Break	No. Break

Fillet Weld Test (QW-180)

Results-Satisfactory : Yes_____ No _____ Penetration into Parent Metal : Yes _____ No _____
Type and Character of Flt: Micro _____ Macro-Results _____

Other Tests

Type of Test _____
Deposit Analysis _____
Other _____

.....

Welder's Name _____ Clock No. _____ Stamp No. _____
Tests conducted by: _____ Laboratory Test No _____
We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Manufacturer _____
Date _____ By _____

(Details of record of tests are illustrative only and may be modified to conform to the type and number of test required by the Code.)

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FORMAT NO. : IM -7

SUGGESTED FORMAT FOR MANUFACTURER'S RECORD OF WELDER OR WELDING OPERATOR QUALIFICATION TESTS
(Section IX, ASME Boiler and Pressure Vessel Code)

Report No. : _____
Date : _____

Project : _____ Unit : _____
Name of Work : _____ Contractor : _____
Job No. : _____ Work order No. : _____
Welder Name _____ Check No. _____ Stamp No. _____
Welding Process _____ Type _____
In accordance with Welding Procedure Specification (WPS) _____
Backing (QW-402) _____
Material (QW-403) Spec. _____ to _____ of P No. _____ to P No. _____
Thickness _____ Dia _____
Filler Metal (QW-404) Spec.No. _____ Class No. _____ F. No. _____
Other _____
Position (QW-405) (1G, 2G, 6G) _____
Gas (QW-408 type) _____ % Composition _____
Electrical Characteristics (QW-409) Current Polarity _____
Weld Progression (QW-410) _____
Other _____

For Information Only

Filler Metal Diameter and Trade Name _____
Submerged Arc Flux Trade Name _____
Gas Metal Arc Welding Shield Gas Trade Name _____

Guided Bend Test Results QW-462.2(a), QW-462.3(a), QW-462.3(b)

Type and Fig No.	Fault

Radiographic Test Results (QW-305)
For alternative qualification of grove welds

Radiographic Results:

Fillet weld test Results (QW-462.4(a), QW-462.4(b))

Fracture Test (Describe the location nature arrange of any check ring of the specimen)

Length and per cent of defects _____ inches _____ _____%
Macro Test-Fusion _____
Appearance-Fillet size: deg _____ in. x _____ in. Convexity _____ in. or concavity _____ in.

Test conducted by _____ Laboratory – Test No. _____
We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Sections IX of the ASME Code

Organization _____
Date : _____ by _____

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code)
Note : Any essential variables in addition to those above shall be recorded.

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FORMAT NO. : IM -8

WELDER'S IDENTIFICATION CARD

Report No. : _____
Date : _____

Project : _____ Unit : _____
Name of Work : _____ Contractor : _____
Job No. : _____ Work order No. : _____

NAME :

Identification :

Date of Testing :

Plate/Pipe size :

Welding process :

Filler material Classification :

Position :

Qualified to weld :

Valid until :

WELDING ENIGNEER (Contractor)

_____ _____

(NAME & DATE) EIL

DETAILS OF QUALIFICATIONS : BACKSIDE OF IDENTITY CARD

Sr. No.	WPS/PQR No.	Date of Test	Qualified On	EIL Signature	Remarks

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FORMAT NO. : IM -9

MATERIAL TRACEABILITY REPORT

Project : _____ Job No. : _____ Report No. : _____

Contract No. : _____ Date : _____

Contractor : _____

S. No.	Line/ Heater No.	Area No.	Dia.	Joint No.	Spool No.	Piping Component	Manufacturer	Material	Heat/ Batch No.	Colour Code	Verified			Remarks
											Sub-Contractor	Contractor	EIL/ Owner*	

* As per approved Inspection & Test Plans (ITPs)

NOTE : A sketch of the spool may be enclosed.

(Contractor) **(EIL)**

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FORMAT NO. : IM -10

DAILY FIT-UP INSPECTION REPORT
(FOR ABOVE GROUND PIPING/HEATER)

Report No. : _____
Date : _____

Project : _____ Unit :

Name of Work : _____ Contractor : _____
Job No. : _____ Work order No. : _____

Sl. No.	Line/Heater No.	Area No.	Dia	Joint No.	Type (*)	Inch Metre	Inspection Clearance	Remarks
	TOTAL INCH DIA.			TOTAL INCH MTR				

TOTAL INCH DIA. =
PREVIOUS =
TILL DATE =
TOTAL IN MTR. =
PREVIOUS =
TILL DATE =

(*)
G - BUTT WELD
S - SOCKET WELD
B - BRANCH WELD
M - MITRE WELD

_____ CONTRACTOR

_____ EIL

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FORMAT NO. : IM -11

DAILY WELDING INSPECTION REPORT (FOR ABOVE GROUND PIPING/HEATER)

Report No. : _____
Date : _____

Project : _____ Unit :

Name of Work : _____ Contractor : _____
Job No. : _____ Work order No. : _____

Sl. No.	Heater/Line No.	Area No.	Dia	Jont No.	Type (*)	Welder No.	Inspection Clearance	Remarks
		Total Inch Dia.						

(*)
G = BUTT WELD
S = SOCKET WELD
B = BRANCH WELD
M = MITRE WLED

TOTAL IN DIA. =
PREVIOUS =
TILL DATE =

CONTRACTOR EIL

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FORMAT NO. : IM -12

HARDNESS TEST RECORD

Report No. : _____
Date : _____

Project : _____
Name of Work : _____
Job No. : _____

Unit : _____
Contractor : _____
Work order No. : _____

Line No./ Equipment No.	Weld Joint No.	Stress Relief Chart No.	Hardness Bar Factor	Diameter After Impression				B.H.N.		Observation	Remarks
				Bar		Job					
				0^0	180^0	0^0	180^0	0^0	180^0		

CONTRACTOR

EIL

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FORMAT NO. : IM -13

LIQUID PENETRANT EXAMINATION REPORT

Report No. : _____
Date : _____

Project : _____ Unit :

Name of Work : _____ Contractor : _____
Job No. : _____ Work order No. : _____

Item Name/No. **Drg. No.**

Part Name	Method of Examination	Colour Contrast Solvent Removal	Application No.	Material

EXAMINATION DETAIL

Surface Temperature & Penetrant Time _____ °C _____ Minute

Penetrant

Remover

Developer

Sketch	Line No.	Joint No.	Type	Size

CONTRACTOR EIL

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FORMAT NO. : IM -14

MAGNETIC PARTICLE EXAMINATION REPORT

Report No. : _____
Date : _____

Project : _____ Unit :

Name of Work : _____ Contractor : _____
Job No. : _____ Work order No. : _____

Name of Item Drg. No.

Item No.

Joint No.

1. **Test Condition**

Tester Type : _____ Magnetizing Type : Not Remained

Method : Prod. Remained

Coil Exami. Medium Dry White
Wet Brown
Fluorescent

Magnetizing Current ___ A Standard JIS A type

Magnetizing Time ___ Sec. Surface Condition Surface Temp.

2. **Acceptance Observations**

3. **Sketch**

4. **Result**

Remarks

CONTRACTOR EIL

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FORMAT NO. : IM -15

RADIOGRAPHY OFFERING REPORT
(FOR ABOVE GROUND PIPING/HEATER)

Report No. : _____
Date : _____

Project : _____ Unit :

Name of Work : _____ Contractor : _____
Job No. : _____ Work order No. : _____

TO

_____
_____
_____

Please arrange to radiograph the following welds and submit the results with in 24 hours positively.

Sl. No.	Heater/Line No.	Area	Dia	Joint No.	Welder No.	Radio-graphy No.	Accepted Date	Remarks

Contractor EIL

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FORMAT NO. : IM -16

RADIOGRAPHY INTERPRETATION REPORT
(FOR ABOVE GROUND PIPING/HEATER)

Name of Work: _____ Report No. : _____
Radiography Technique : SWSI/DWSI/DWDI Date : _____
Source ☐ IR 192, ☐ X RAY, ☐ COBALT CO Project : _____
Film Type & Name : _____ Contractor : _____
IQI : _____
Radiography Procedure No. _____

Sl. No.	Heater/ Line No.	Area No.	Dia	Joint No.	Welder No.	Radio-graphy No.	Segment	Results	Joint Status A/R/H (*)

SWSI - SINGLE WALL SINGLE IMAGE, DWDI - DOUBLE WALL DOUBLE IMAGE
DWSI - DOUBLE WALL SINGLE IMAGE

(*) A - ACCEPTED, R - REPAIR, H - HOLD

CONTRACTOR EIL

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FORMAT NO. : IM-18

POSITIVE MATERIAL IDENTIFICATION (PMI) REPORT

Report No: _____

Name of work : _____

Contractor : _____ Date of PMI : _____

Project : _____ Inspection Agency : _____

Location : _____ PMI Agency : _____

Job No.: _____ PMI Equipment Model : _____

Line No. /ISO Drg. No : _____ Make & Serial No.: _____
/Heater No./Drawing No

Sr. No.	Part Identification	Material As per Drg./spec	Material as per PMI	Result (Accepted/Rejected/ Retest)

(PMI AGENCY) (TPI AGENCY) (CONTRACTOR) (EIL)

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मानक गुणवत्ता आश्वासन योजना

(आइटम रेट ठेकेदारो के लिये)

STANDARD QUALITY ASSURANCE PLAN
(FOR ITEM RATE CONTRACTORS)

Rev. No.	Date	Purpose	Prepared by	Checked by	Standards Committee Convenor	Standards Bureau Chairman
					Approved by	
4	29.03.2024	REVISED AND UPDATED	DK	AC	RKS	MN
3	30/03/2019	REVISED AND UPDATED	SKG	AP	AKK	RKT
2	26/02/2014	REVISED AND UPDATED	SM	DJ	RKD	SC
1	23/05/2008	REVISED AND UPDATED	AS	RK	SCB	VC
0	05/12/2002	ISSUED FOR IMPLEMENTATION	AB	MPJ	RSG	GRR

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Abbreviations :

CI	:	Cast Iron
EHT	:	Extra High Tension
EMCC	:	Emergency Motor Control Centre
EOT	:	Electrically Operated Traveling
GI	:	Galvanized Iron
HOT	:	Hand Operated Traveling
HT	:	High Tension
JB	:	Junction Box
M	:	Supervisor (Mechanical)
MCC	:	Motor Control Centre
PCC	:	Power Control Centre
QAP	:	Quality Assurance Plan
RCC	:	Reinforced Cement Concrete
VSD	:	Variable Speed Drives
WBM	:	Water Bound Macadam

Construction Standards Committee

Convenor: Sh. R K Singh, ED (Construction)

Members: Sh. D S N Murthy, GGM (Projects)
Sh. Chinmoy Kapuria, CGM (SCM)
Sh. Udayan Chakravarty, CGM (Piping)
Sh. Abhijit Chakraborty, GM (Construction)
Sh. Pankaj Kumar Rai, DGM (Construction)
Sh. Dhananjay, AGM (Construction)

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1.	Quality Assurance Plan for General Civil Works	6-82-6101	5 - 6
2.	Quality Assurance Plan for Structural Works	6-82-6105	7 - 8
3.	Quality Assurance Plan for Architectural Works	6-82-6110	9
4.	Quality Assurance Plan for Mechanical Works	6-82-6115	10
5.	Quality Assurance Plan for Electrical Works	6-82-6120	11
6.	Quality Assurance Plan for Instrumentation Works	6-82-6125	12
7.	Quality Assurance Plan for General Works	6-82-6130	13

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GENERAL NOTE

1. *These are only sample Quality Assurance Plans (QAPs). Contractor to prepare job specific QAP depending upon the contract specification, scope, technology, etc. and submit the same for approval of the Engineer-in-Charge well before commencement of the activity*

2. *Specifications mentioned under 'Code of conformance' column are only for the purpose of illustration. The applicable specification(s) shall be followed by the contractor.*

LEGEND

RE	:	**Resident Engineer / Resident Construction Manager**
SC	:	**Engineer/Supervisor (Civil)**
SM	:	**Engineer/Supervisor (Mechanical)**
SE	:	**Engineer/Supervisor (Electrical)**
SI	:	**Engineer/Supervisor (Instrumentation)**
SQ	:	**Engineer/Supervisor (Quality)**
SS	:	**Engineer/Supervisor (HSE)**
LE	:	**Lead Discipline Engineer**

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QAP No. : 6101

QAP FOR GENERAL CIVIL WORKS

(Sheet 1 of 2)

	ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Survey works	Contractor's Procedure	EIL Spec. No. 6-65-0002	SC	LE/SQ	RE	Yes
2.	Earthwork for underground piping	- Do -	EIL Spec. No. 6-65-0006	SC	LE/SQ	RE	Yes
3.	Compound wall	- Do -	EIL Spec. No. 6-65-0010	SC	LE/SQ	RE	Yes
4.	Classification of soil for Earth Work in site grading	- Do -	EIL Spec. No. 6-65-0016	SC	LE/SQ	RE	Yes
5.	Site grading & rock cutting for site grading	- Do -	EIL Spec. No. 6-65-0017	SC	LE/SQ	RE	Yes
6.	Road & flexible pavements (upto WBM layer)	- Do -	EIL Spec. No. 6-65-0018	SC	LE/SQ	RE	Yes
7.	Road & flexible pavements (upto WMM layer)	- Do -	EIL Spec. No. 6-65-0014	SC	LE/SQ	RE	Yes
8.	Concrete Pavement	- Do -	EIL Spec. No. 6-65-0019	SC	LE/SQ	RE	Yes
9.	Flexible pavements with bitumen premix carpet	- Do -	EIL Spec. No. 6-65-0020	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

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QAP No. : 6101

QAP FOR GENERAL CIVIL WORKS

(Sheet 2 of 2)

	ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
9.	Tank Pads	Contractor's Procedure	EIL Spec. No. 6-65-0022	SC	LE/SQ	RE	Yes
10.	Underground and above ground G.I. pipeline system (water services)	- Do -	EIL Spec. No. 6-65-0027	SC	LE/SQ	RE	Yes
11.	Fabrication and laying of Underground piping	- Do -	EIL Spec. No. 6-65-0030	SC/SM	LE/SQ	RE	Yes
12.	Corrosion protection tape coating for underground steel piping	- Do -	EIL Spec. No. 6-79-0011	SC/SM	LE/SQ	RE	Yes
13.	Underground C.I. piping system	- Do -	EIL Spec. No. 6-65-0036	SC	LE/SQ	RE	Yes
14.	Underground sewer system - pre cast R.C.C. pipes	- Do -	EIL Spec. No. 6-65-0042	SC	LE/SQ	RE	Yes
15.	Underground sewer system-HDPE Pipes	- Do -	EIL Spec. No. 6-65-0044	SC	LE/SQ	RE	Yes
16.	Film lining covered with concrete lining for earthern reservoir	- Do -	EIL Spec. No. 6-65-0046	SC	LE/SQ	RE	Yes
17.	Plumbing and building drainage	- Do -	EIL Spec. No. 6-65-0053	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

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QAP No. : 6105

QAP FOR STRUCTURAL WORKS

(Sheet 1 of 2)

	ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Civil & structural works – materials	Contractor's Procedure	EIL Spec. No. 6-68-0002	SC	LE/SQ	RE	Yes
2.	Earth work	- Do -	EIL Spec. No. 6-68-0003	SC	LE/SQ	RE	Yes
3.	Plain & reinforced cement concrete	- Do -	EIL Spec. No. 6-68-0004	SC	LE/SQ	RE	Yes
4.	Reinforced cement concrete in liquid retaining structures	- Do -	EIL Spec. No. 6-68-0005	SC	LE/SQ	RE	Yes
5.	Structural steel works	- Do -	EIL Spec. No. 6-68-0006	SC/SM	LE/SQ	RE	Yes
6.	Structural steel works (tubular/ hollow sections)	- Do -	EIL Spec. No. 6-68-0007	SC/SM	LE/SQ	RE	Yes
7.	Miscellaneous steel works	- Do -	EIL Spec. No. 6-68-0008	SC/SM	LE/SQ	RE	Yes
8.	Brick masonry	- Do -	EIL Spec. No. 6-68-0009	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

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QAP No. : 6105

QAP FOR STRUCTURAL WORKS

(Sheet 2 of 2)

	ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
9.	Demolition and dismantling	Contractor's Procedure	EIL Spec. No. 6-68-0012	SC	LE/SQ	RE	Yes
10.	Miscellaneous items (like Anti-termite treatment)	- Do -	EIL Spec. No. 6-68-0013	SC	LE/SQ	RE	Yes
11.	Fire proofing of steel structures	- Do -	EIL Spec. No. 6-68-0033	SC	LE/SQ	RE	Yes
12.	Shotcreting (guniting)	- Do -	EIL Spec. No. 6-68-0055	SC	LE/SQ	RE	Yes
13.	Vacuum dewatering concrete system	- Do -	EIL Spec. No. 6-68-0062	SC	LE/SQ	RE	Yes
14.	Materials for reinforced concrete piles	- Do -	EIL Spec. No. 6-74-0006	SC	LE/SQ	RE	Yes
15.	Construction and installation of driven cast-in-situ piles	- Do -	EIL Spec. No. 6-74-0010	SC	LE/SQ	RE	Yes
16.	Testing of concrete piles	- Do -	EIL Spec. No. 6-74-0013	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

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QAP No. : 6110

QAP FOR ARCHITECTURAL WORKS

	ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Floor finishing	Contractor's Procedure	EIL Spec. No. 6-75-0002	SC	LE/SQ	RE	Yes
2.	Steel/Aluminium Doors, Windows and Ventilators	- Do -	EIL Spec. No. 6-75-0004	SC	LE/SQ	RE	Yes
3.	Plastering and pointing	- Do -	EIL Spec. No. 6-75-0005	SC	LE/SQ	RE	Yes
4.	Roofing Treatment	- Do -	EIL Spec. No. 6-75-0006	SC	LE/SQ	RE	Yes
5.	Whitewashing, Colour Washing Distempering, Painting and Polishing	- Do -	EIL Spec. No. 6-75-0007	SC	LE/SQ	RE	Yes
6.	Roofing	- Do -	EIL Spec. No. 6-75-0008	SC	LE/SQ	RE	Yes
7.	Sanitary Fittings and Fixtures	- Do -	EIL Spec. No. 6-75-0009	SC	LE/SQ	RE	Yes
8.	False Ceiling, False Flooring Under deck Insulation & Partitioning	- Do -	EIL Spec. No. 6-75-0010	SC	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

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QAP No. : 6115

QAP FOR MECHANICAL WORKS

ACTIVITY DESCRIPTION		PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Above Ground & Underground Piping	Contractor's/ Vendor's Procedure	EIL Spec. Nos. 6-44-0005, 0012,0013, 0016	SM	LE/SQ	RE	Yes
2.	Column Internals	- Do -	EIL Spec. No. 6-14-0016	SM	LE/SQ	RE	Yes
3.	Fired Heaters	- Do -	EIL Spec. No. 6-17-0001	SM	LE/SQ	RE	Yes
4.	Refractory & Insulation Works-Fired Heaters	- Do -	EIL Spec. No. 6-17-0001, 6-79-0001	SM	LE/SQ	RE	Yes
5.	Equipment Erection (Static)	- Do -	EIL Spec. No. 6-76-0001	SM	LE/SQ	RE	Yes
6.	Equipment Erection (Rotary)	- Do -	EIL Spec. No. 6-76-0001	SM	LE/SQ	RE	Yes
7.	Crane (EOT/HOT)	- Do -	EIL Spec. No. 6-48-0002, 0003	SM	LE/SQ	RE	Yes
8.	Storage Tanks	- Do -	EIL Spec. No. 6-13-0053	SM	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

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QAP No. : 6120

QAP FOR ELECTRICAL WORKS

	ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Transformer (Power/Distribution/Lighting)	Contractor's/Vendor's Procedure	EIL Spec. No. 6-51-0081	SE	LE/SQ	RE	Yes
2.	Motor (HT/LT)	- Do -	EIL Spec. No. 6-51-0081	SE	LE/SQ	RE	Yes
3.	Generator	- Do -	EIL Spec. No. 6-51-0035, 0040, 6-51-0081	SE	LE/SQ	RE	Yes
4.	Switch Gears (HV/MV)/ VSD	- Do -	EIL Spec. No. 6-51-0081	SE	LE/SQ	RE	Yes
5.	EHT/HT Main Bus &Allied Equip.	- Do -	EIL Spec. No. 6-51-0081	SE	LE/SQ	RE	Yes
6.	Cable Laying	- Do -	EIL Spec. No. 6-51-0082	SE	LE/SQ	RE	Yes
7.	Lighting	- Do -	EIL Spec. No. 6-51-0083	SE	LE/SQ	RE	Yes
8.	Earthing	- Do -	EIL Spec. No. 6-51-0084	SE	LE/SQ	RE	Yes
9.	Field inspection, testing and commissioning of electrical installations	- Do -	EIL Spec. No. 6-51-0087	SE	LE/SQ	RE	Yes

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QAP No. : 6125

QAP FOR INSTRUMENTATION WORKS (FIELD)

	ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Installation of field instruments including calibration	Contractor's Procedure	EIL Spec. No. 6-52-0060	SI	LE/SQ	RE	Yes
2.	Cable works	- Do -	EIL Spec. No. 6-52-0060	SI	LE/SQ	RE	Yes
3.	Impulse piping/tubing works	- Do -	EIL Spec. No. 6-52-0060	SI	LE/SQ	RE	Yes
4.	Panel/Console works including DCS/PLC works	- Do -	EIL Spec. Nos. 6-52-0049, 6-52-0060	SI	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

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QAP No. : 6130

QAP FOR GENERAL WORKS

	ACTIVITY DESCRIPTION	PROCEDURE NO.	CODE OF CONFORMANCE	PERFORMER	CHECKER	APPROVER	RECORDS TO BE SUBMITTED
1.	Painting	Contractor's/Vendor's Procedure	EIL Spec. No. 6-79-0021	SC/SM	LE/SQ	RE	Yes
2.	Insulation	- Do -	EIL Spec. Nos. 6-79-0026, 0027	SC/ SM	LE/SQ	RE	Yes
3.	Refractory Lining	- Do -	EIL Spec. No. 6-79-0001	SC/SM	LE/SQ	RE	Yes
4.	Ceramic Fibre Lining	- Do -	EIL Spec. No. 6-79-0005	SC/SM	LE/SQ	RE	Yes
5.	Incoming material Inspection	- Do -	EIL Spec. No. 6-82-1010	SC/SM/SI/SE	LE/SQ	RE	Yes
6.	Health, Safety & Environmental Management	- Do -	EIL Spec. No. 6-82-0001	SS/SC/SM/SE/SI	LE/SQ	RE	Yes

Please refer Page 4 of 13 for General Notes and Legend

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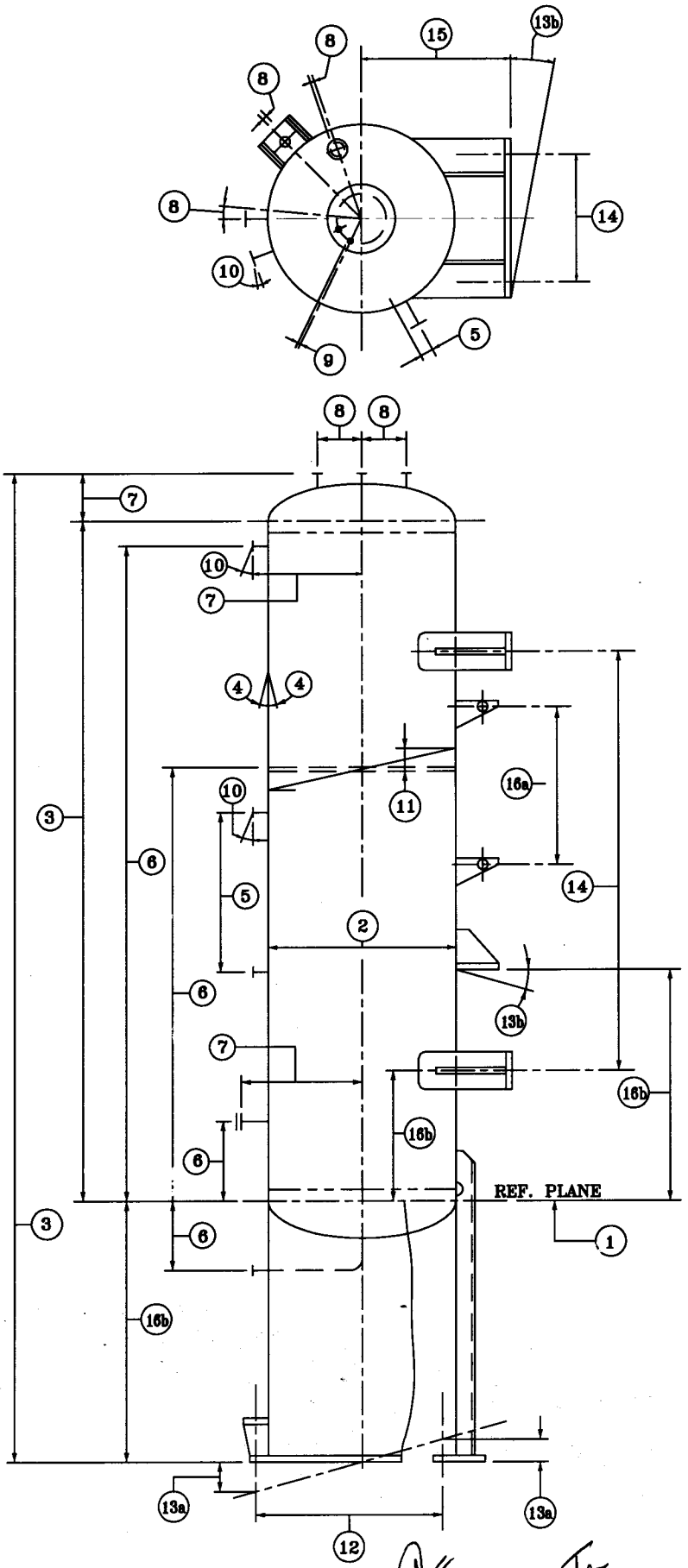

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7	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	PK	NK	SM
6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN

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NOTES

1. REFERENCE LINES SHALL BE LIGHTLY PUNCH-MARKED INSIDE AND OUTSIDE AROUND THE CIRCUMFERENCE OF THE SHELL PLATE ON THE TANGENT LINES OF THE VESSEL.
2. a) OUT OF ROUNDNESS (OVALITY) SHALL BE AS PER APPLICABLE CODE.
   b) OUTSIDE CIRCUMFERENCE OF SHELL SHALL BE WITHIN THE FOLLOWING LIMITS.
   ± 10 mm FOR NOMINAL DIAMETER 1200 mm AND UNDER.
   ± 12 mm FOR NOMINAL DIAMETER 1201 mm THROUGH 2400 mm.
   ± 20 mm FOR NOMINAL DIAMETER ABOVE 2400 mm.
   c) FOLLOWING TOLERANCES ON DIAMETER SHALL APPLY THROUGHOUT ITS LENGTH FOR VESSELS WITH TRAYS AND / OR PACKING. (FOR CARTRIDGE TYPE TRAY REFER SPECIAL NOTE-E).

VESSEL NOM. DIA.	TOLERANCE ON NOM. DIA.
2000 mm AND UNDER	± 0.5%
2001 mm TO 4000 mm	GREATER OF ± 10 mm OR ± 0.35%
4001 mm TO 8000 mm	GREATER OF ± 14 mm OR ± 0.25%
ABOVE 8000 mm	TO BE SPECIFIED ON VESSEL DRAWING.

3. TOLERANCE FOR LENGTH ± 5 mm PER 3000 mm, MAXIMUM 15 mm.
4. OUTSIDE SURFACE OF CYLINDER MAY BE OUT OF ALIGNMENT / STRAIGHTNESS NOT MORE THAN 6 mm PER 6000 mm STRAIGHT LENGHT, BUT NOT MORE THAN 20 mm FOR ANY LENGTH.
5. TOLERANCE FOR CENTRE TO CENTRE DISTANCE BETWEEN ANY PAIR OF INSTRUMENT CONNECTIONS TO BE AS FOLLOWS:-
   DISTANCE BETWEEN NOZZLES : ± 1 mm
   ORIENTATION : ± 1 mm
   NOZZLE FACE INCLINATION : ± 1/4°
6. ELEVATIONS FROM REFERENCE PLANE MAY VARY AS FOLLOWS:-
   MANHOLE: ± 12 mm, NOZZLE ± 6 mm, INTERNAL SUPPORTS: ± 3 mm, EXCEPT THAT LOCATIONS OF MANHOLES AND NOZZLES NEAR THE TRAY SHALL NOT VARY MORE THAN ± 3 mm FROM THE TRAY.
7. PROJECTION OF FLANGE FACE FROM SHELL CENTRAL LINE / TANGENT LINE MAY VARY ± 5 mm FOR NOZZLES AND ± 12 mm FOR MANHOLES.
8. CIRCUMFERENTIAL AND RADIAL DEVIATION OF NOZZLES, MANHOLES AND SUPPORTS FROM THE TRUE POSITION SHALL NOT VARY MORE THAN ± 3 mm.
9. BOLT HOLE ORIENTATION OF NOZZLES MAY VARY ± 2 mm AT BOLT CIRCLE.
10. VERTICAL AND HORIZONTAL DEFLECTION OF NOZZLE FLANGE FACES FROM PLANES NORMAL TO NOZZLE CENTRE LINES OR PARALLEL TO VESSEL CENTRE LINE SHALL NOT BE MORE THAN ± 1/2°
11. ALL TOLERANCES OF TRAY SUPPORTS TO BE AS PER TRAY SPECIFICATIONS / DRAWING.
12. THE BASE RING BOLT CIRCLE DIAMETER MAY VARY ± 5 mm. FOR ANY DIAMETER MEASURED AT POINTS 90° APART, DISTANCE BETWEEN TWO CONSECUTIVE HOLES MAY VARY BY ± 5 mm.
13. a) DEVIATION OF SUPPORT BASE FROM HORIZONTAL MAY BE AS FOLLOWS:-
   FOR VESSEL DIA. 1500 mm AND UNDER 3 mm
   FOR VESSEL DIA. OVER 1500 mm TO 2000 mm 5 mm
   FOR VESSEL DIA. OVER 2000 mm TO 4000 mm 6 mm
   FOR VESSEL DIA. OVER 4000 mm TO 5000 mm 8 mm
   FOR VESSEL DIA. OVER 5000 mm 10 mm
   b) DEVIATION OF SUPPORT BASE FOR BRACKET TYPE SUPPORT / SADDLE SUPPORT FROM HORIZONTAL MAY BE ± 1°
14. DISTANCE BETWEEN CL TO CL OF SUPPORTS AND BOLT HOLES IN SUPPORTS FOR HORIZONTAL VESSELS MAY VARY ± 3 mm.
15. DISTANCE BETWEEN CENTRE LINE OF HORIZONTAL VESSEL AND BOTTOM OF SUPPORT MAY VARY ± 3 mm.
16. a) TOLERANCE FOR CENTRE TO CENTRE DISTANCE BETWEEN ANY PART OF EXTERNAL STRUCTURAL ATTACHMENT SHALL NOT VARY MORE THAN ± 3 mm.
   b) TOLERANCE FOR DISTANCE FROM REFERENCE PLANE TO BASE OF VERTICAL SUPPORTS AND CENTRE LINE OF SADDLE SUPPORT MAY VARY ± 6 mm.

SPECIAL NOTES

A. CUMULATIVE TOLERANCES ON CONSECUTIVE DIMENSIONS SHALL BE LIMITED BY OVERALL DIMENSIONAL TOLERANCES. ALL TOLERANCES ARE FROM REFERENCE PLANE UNLESS OTHERWISE INDICATED.

B. INTERFERENCE BETWEEN INTERNAL AND EXTERNAL PARTS OR ANY RESTRICTION TO THE INTENDED FUNCTION OF ANY PART SHALL BE KEPT IN VIEW WHERE TOLERANCES ARE CUMULATIVE.

C. SPECIFIC TOLERANCES FOR ANY PART SHOWN ON EIL DRAWING SHALL BE GIVEN PREFERENCE TO THOSE GIVEN IN THIS STANDARD.

D. UNUSUALLY LARGE OR COMPLEX VESSELS MAY BE EXECUTED AS PER FABRICATOR'S STANDARD WHEN THE TOLERANCES AS SHOWN ARE UNREASONABLE. IN SUCH INSTANCES FABRICATOR'S TOLERANCES & LIMITS MUST BE SUBMITTED FOR APPROVAL.

E. VESSEL UPTO AND INCLUDING 750 mm NOMINAL DIAMETER SHALL HAVE CARTRIDGE TYPE TRAY. FOLLOWING TOLERANCES ON DIAMETER SHALL APPLY THROUGHOUT ITS LENGTH.

VESSEL NOMINAL DIAMETER	TOLERANCE
500 mm AND UNDER	VESSEL I.D. $^{+1\ mm}_{-0\ mm}$
501 mm TO 750 mm	VESSEL I.D. ± 3 mm

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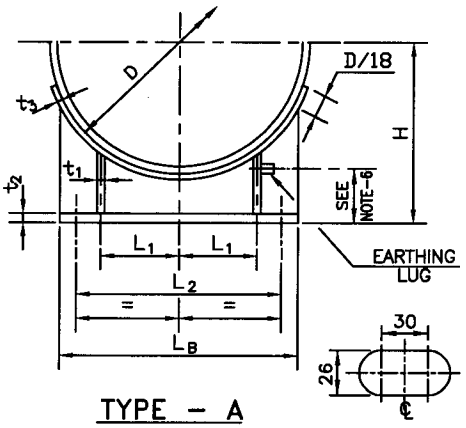

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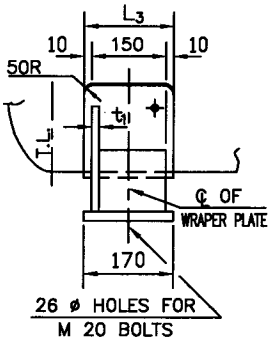
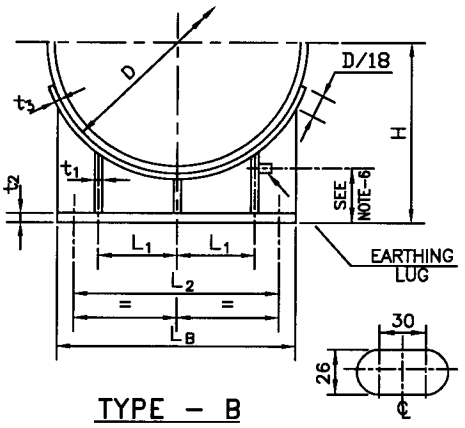


HOLE FOR SLIDING SUPPORT



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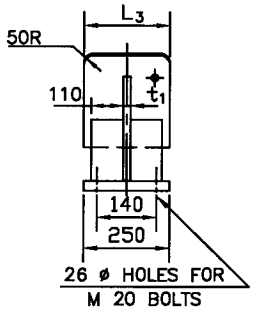
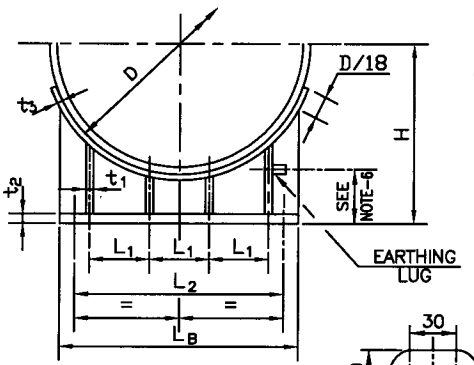
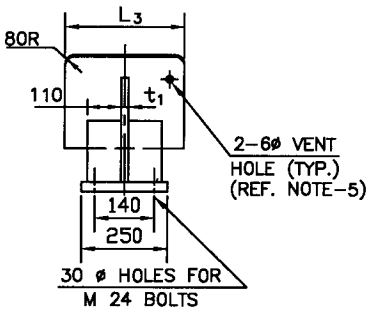


HOLE FOR SLIDING SUPPORT



TYPE – C, D, E



HOLE FOR SLIDING SUPPORT

D	L_B	H	L_1	L_2	TYPE	MAX. LOAD PER SADDLE (M. TON)	APPROX. WT. PER SADDLE (KGS.)
300	260	300	50	200	A	4.4	17
350	280	325	55	210	A	4.8	18
400	330	350	75	250	A	4.5	20
450	370	375	95	300	A	3.6	22
500	450	450	125	370	A	14.9	40
600	560	500	175	470	A	13.2	50
700	650	550	225	570	A	11.0	55
800	750	600	275	670	A	10.6	65
900	850	650	300	760	A	11.0	75
1000	950	700	330	820	B	12.3	85
1200	1100	800	375	960	B	19.4	130
1400	1250	900	465	1150	B	19.7	140
1600	1450	1000	370	1300	C	23.3	165
1800	1600	1100	410	1450	C	39.1	260
2000	1750	1200	445	1600	C	43.5	290
2200	1950	1300	495	1800	D	49.1	295
2400	2150	1450	545	2000	D	53.5	390
2600	2300	1550	585	2150	D	52.9	440
2800	2500	1650	620	2300	E	52.7	475
3000	2670	1750	670	2500	E	64.9	600
3200	2800	1850	710	2600	E	63.8	620
3400	3000	1950	760	2800	E	64.9	630
3600	3200	2050	830	3000	E	60.5	725
3800	3350	2150	845	3150	E	61.0	745
4000	3550	2250	895	3300	E	60.6	820

TYPE	t_1	t_2	L_3	t_3
A	10	10	170	12
B	10	12	250	12
C	12	16	300	16
D	16	20	350	20
E	20	20	400	20

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. VESSEL DIAMETER 'D' REFERS TO THE OUTER DIAMETER OF THE SHELL.
3. FOR INTERMEDIATE DIAMETERS TAKE THE IMMEDIATE NEAREST DIAMETER SUPPORT.
4. WELDING SHALL BE DONE ALL AROUND AND SHALL BE CONTINUOUS FILLET WELD. WELD SIZE SHALL BE 6 mm FOR VESSELS UPTO 1400 mm DIA. AND 8 mm FOR VESSELS ABOVE 1400 mm DIA.
5. PROVIDE 2 NO. 6ø VENT HOLES IN SADDLE WRAPPER PLATE. THESE HOLES SHALL BE PROVIDED DIAGONALLY OPPOSITE AND BE LEFT UNPLUGED AND SHALL BE FILLED WITH HARD GREASE ONLY.
6. WHERE EARTHING LUG CANNOT BE PUT AT AN ELEVATION OF 400 mm ABOVE THE SADDLE BASE PLATE IT SHALL BE LOCATED AS HIGH AS POSSIBLE.
7. EARTHING LUGS ARE NOT TO BE PAINTED OR GALVANIZED.
8. DETAIL, DIMENSIONS AND NOTES IN ENGINEERING DRAWING TAKE PRECEDENCE OVER THOSE SHOWN HERE.
9. MATERIALS SHALL BE AS PER ENGINEERING DRAWING.
10. EARTHING LUG SHALL BE AS PER STANDARD 7–12–0026.

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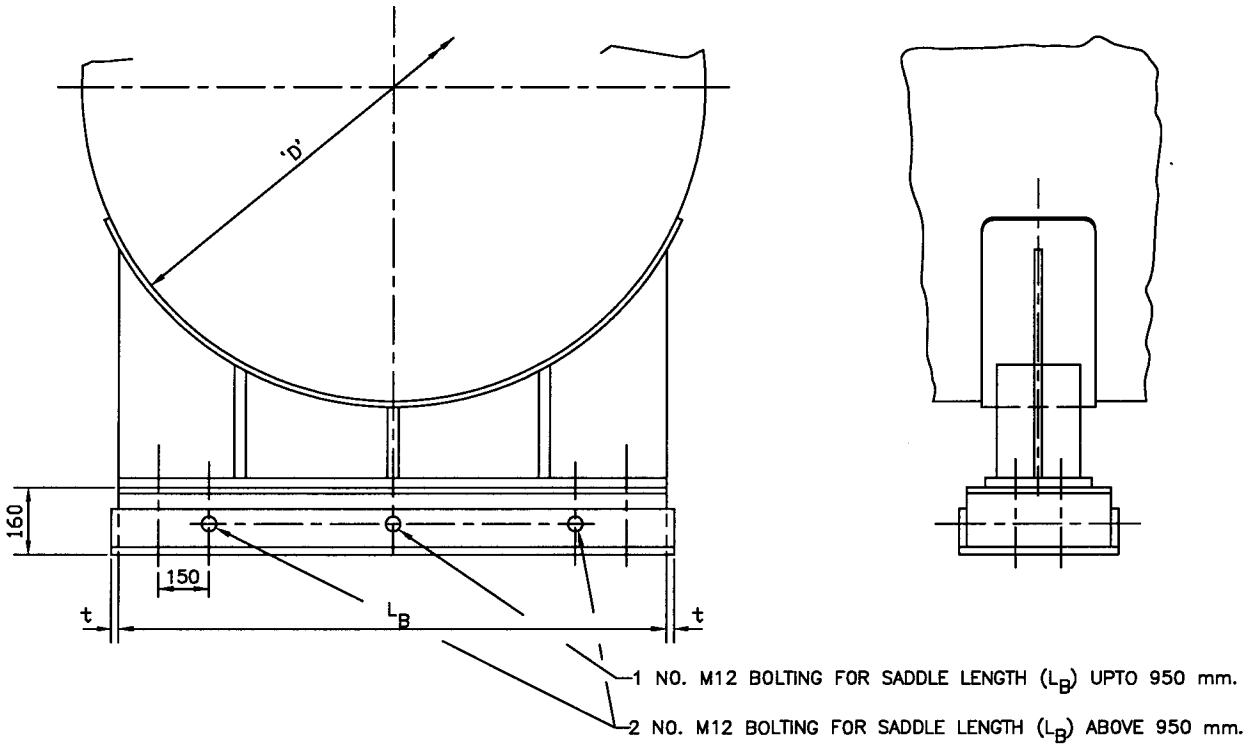
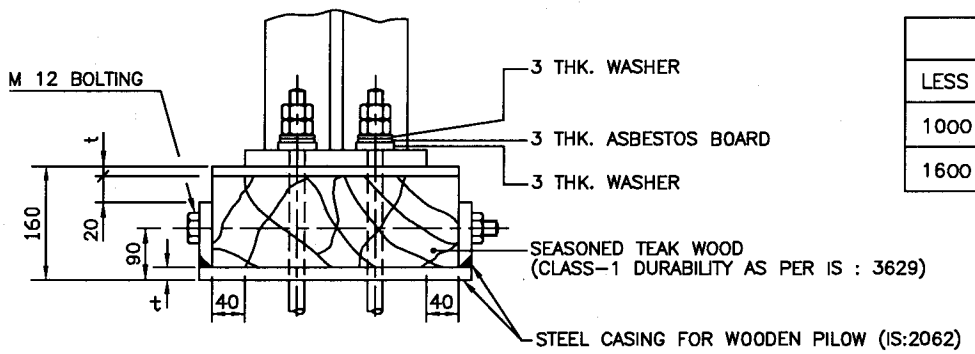
WOODEN PILLOWS FOR SADDLE SUPPORT





D	t
LESS THAN 1000	8
1000 TO 1599	10
1600 TO 4000	12

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. THIS STANDARD IS APPLICABLE FOR ALL HORIZONTAL VESSELS WITH DESIGN TEMPERATUE BELOW 0°C
3. FOR SADDLE DIMENSIONS REFER STANDARD 7–12–0002.
4. 2–WEEP HOLES OF 20 mm DIA SHALL BE PROVIDED AT THE BOTTOM OF THE FRAME.
5. UNLESS OTHERWISE SPECIFIED THE WOODEN PILLOWS REQUIRED FOR SADDLE SUPPORTS SHALL BE SUPPLIED BY MECHANICAL ERECTION CONTRACTOR.

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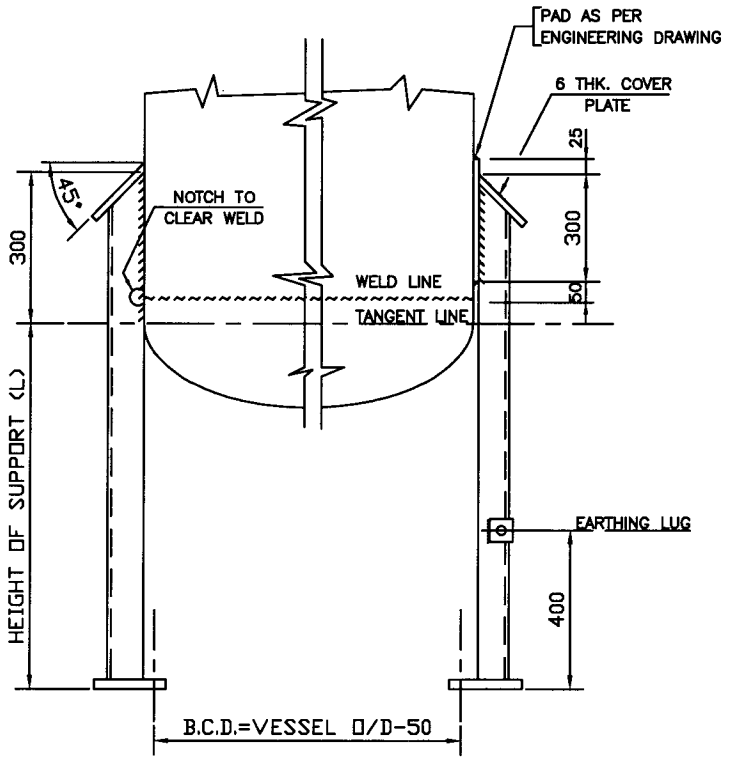
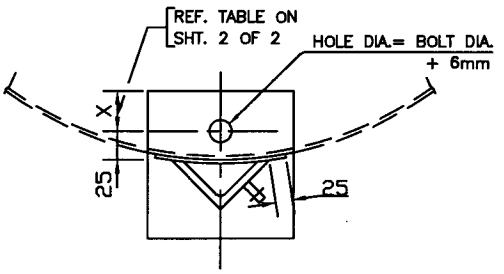
ANGLE LEG SUPPORT





SUPPORT BASE DETAIL

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. THIS STD. IS APPLICABLE FOR VESSEL DIAMETER UPTO AND INCLUDING 2000mm, MAXIMUM SHELL THICKNESS OF 20mm AND MAXIMUM LENGTH (T.L. TO T.L.) OF 3000mm VESSELS BEYOND ABOVE RANGE REQUIRE SPECIAL CONSIDERATION.
3. FOR CALCULATION, FOLLOWINGS PARAMETERS HAVE BEEN CONSIDERED.
   a) WIND PRESSURE 200 Kg/m^2
   SHAPE FACTOR 0.7
   BASIC SEISMIC CO-EFFICENT (α_0) 0.08
   SOIL FOUNDATION SYSTEM FACTOR (β) 1.5
   IMPORTANCE FACTOR (I) 2.0
   b) EMPTY WEIGHT WITH WIND LOADING OR HYDROSTATIC WEIGHT WITH SEISMIC LOADING.
4. HEIGHT AND NUMBER OF LEG SUPPORTS AND SIZE OF ANCHOR BOLTS SHALL BE AS PER ENGINEERING DRAWING.
5. MINIMUM BOLT SIZE SHALL BE M 20.
6. MAXIMUM INSULATION THICKNESS CONSIDERED IS 150 mm.
7. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
8. ALL FILLET WELDS SHALL BE 6 mm MINIMUM.
9. MATERIALS SHALL BE AS PER ENGINEERING DRAWING.
10. EARTHING LUG SHALL BE AS PER STANDARD 7-12-0026.

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LEG SUPPORT SIZES

VESSEL O/D(mm)	NO.OF LEGS	LEG SIZE			BASE PLATE SIZE (mm)	X (mm)	MAXIMUM ALLOWABLE LOAD OF VESSEL (Kg.)
		MAX. VESSEL LENGTH (T.L. TO T.L.) UP TO AND INCLUDING 3.0 M					
		L = 1.5 M	L = 2.0 M	L = 2.5 M			
500	3	ISA 100x100x8	ISA 100x100x10	ISA 110x110x15	170x170x16 THK.	40	1500
800	4	ISA 100x100x10	ISA 130x130x8	ISA 130x130x12	200x200x16 THK.	45	3150
1000	4	ISA 100x100x12	ISA 130x130x10	ISA 150x150x12	230x230x16 THK.	45	4600
1250	4	ISA 110x110x15	ISA 150x150x10	ISA 150x150x12	230x230x16 THK.	45	6750
1600	4	ISA 130x130x15	ISA 150x150x15	ISA 150x150x18	230x230x16 THK.	60	9500
1750	4	ISA 150x150x12	ISA 150x150x18	ISA 200x200x12	300x300x16 THK.	60	12700
2000	4	ISA 150x150x18	ISA 200x200x12	ISA 200x200x15	300x300x20 THK.	75	16400

NOTES

FOR A VESSEL WITH MAXIMUM SUPPORT LEG HEIGHT OF 1500mm, FOLLOWING ALTERNATIVE LEG SIZES MAY BE USED :–

a) ISA 65x65x8 WITH HYDROSTATIC WEIGHT UPTO 500 Kg.

b) ISA 80x80x8 WITH HYDROSTATIC WEIGHT 501 Kg. TO 1000 Kg.

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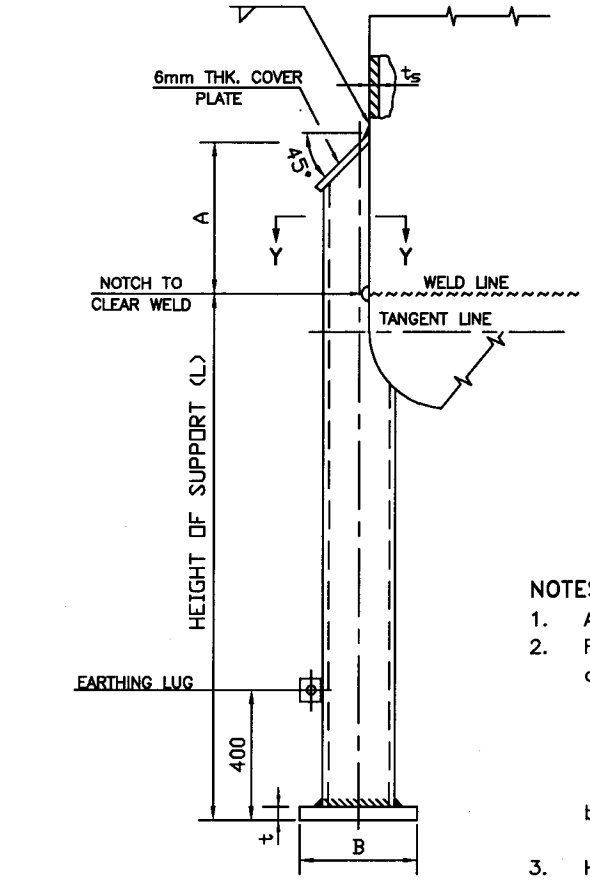
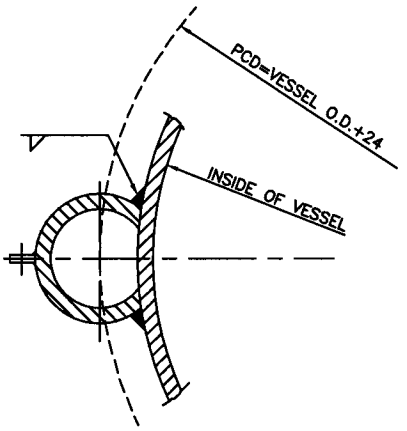
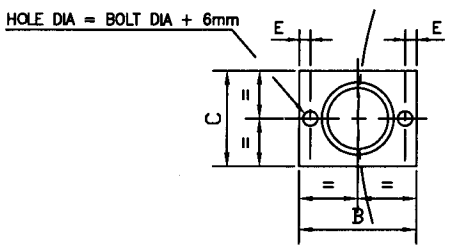




SECTION–YY



SUPPORT BASE DETAIL

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. FOR DESIGN OF SUPPORT, FOLLOWINGS PARAMETERS HAVE BEEN CONSIDERED.
   a) WIND PRESSURE 200 Kg/m^2
   SHAPE FACTOR 0.7
   BASIC SEISMIC CO–EFFICENT (α_0) 0.08
   SOIL FOUNDATION SYSTEM FACTOR (β) 1.5
   IMPORTANCE FACTOR (I) 2.0
   b) EMPTY WEIGHT WITH WIND LOADING OR HYDROSTATIC WEIGHT WITH SEISMIC LOADING.
3. HEIGHT AND NUMBER OF LEG SUPPORTS AND SIZE OF ANCHOR BOLTS SHALL BE AS PER ENGINEERING DRAWING.
4. MINIMUM BOLT SIZE SHALL BE M 20.
5. MAXIMUM INSULATION THICKNESS CONSIDERED IS 150 mm.
6. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
7. ALL FILLET WELDS SHALL BE 6 mm MINIMUM.
8. MATERIALS SHALL BE AS PER ENGINEERING DRAWING.
9. EARTHING LUG SHALL BE AS PER STANDARD 7–12–0026.
10. SUITABLE PAD FOR SS VESSEL SHALL BE PROVIDED.

LEG PIPE SIZE	A	B	C	E	t	MAXIMUM ALLOWABLE LOAD PER LEG (Kgs) MAXIMUM HEIGHT OF SUPPORT (L) IN METERS		
						2.0	2.5	3.0
50NB x EXTRA STRONG	120	230	140	36	20	2300	2050	1800
80NB x EXTRA STRONG	180	250	160	36	25	5700	5500	4900
100NB x EXTRA STRONG	230	310	185	42	25	9000	8600	8300
150NB x EXTRA STRONG	320	370	235	44	25	18500	18000	17500

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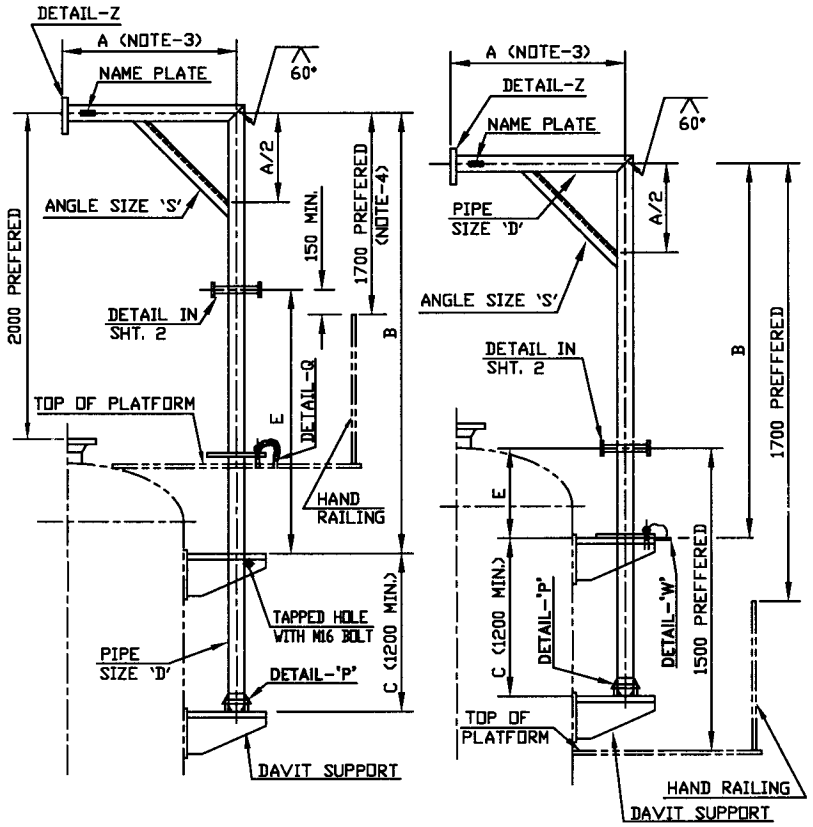
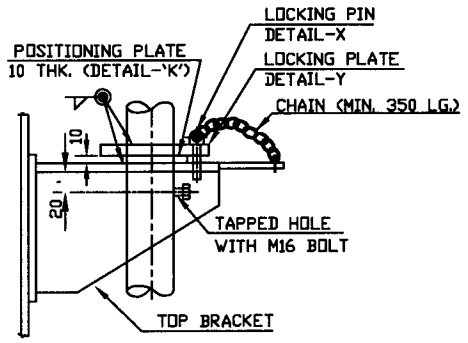
PIPE DAVIT

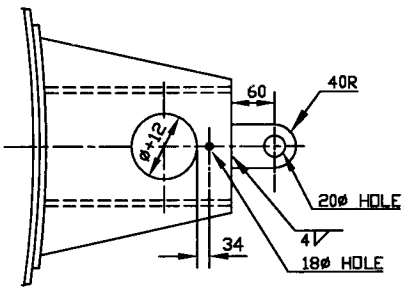


(TYPE-1)
DEVIT FOR TOP MOUNTED PLATFORM

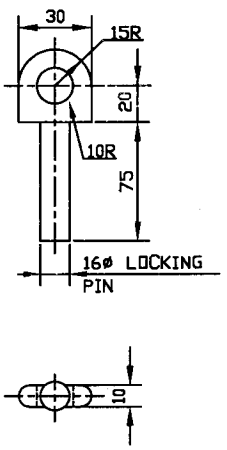
(TYPE-2)
DEVIT FOR SIDE MOUNTED PLATFORM

A (MAX) (mm)	B (mm)	CAPACITY (kgs.)	PIPE SIZE D	ANGLE SIZE S	R1	R2	r	t
1000	≤4000 (NOTE-13)	500	100NB×SCH.160	75x75x6	75	60	10	20
		1000	150NB×SCH.80	100x100x8	110	60	12	25
2000		500	150NB×SCH.80	100x100x8	110	60	10	20
		1000	200NB×SCH.80	150x150x10	140	60	12	25
3000		500	200NB×SCH.80	150x150x10	140	60	10	20
		1000	200NB×SCH.160	150x150x12	140	60	12	25

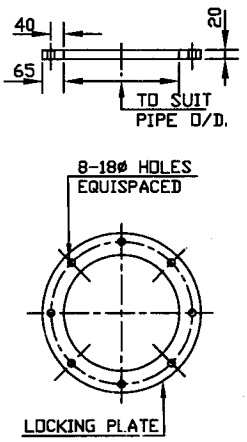




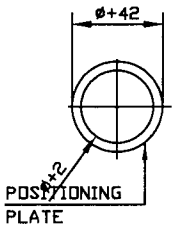
DETAIL – W



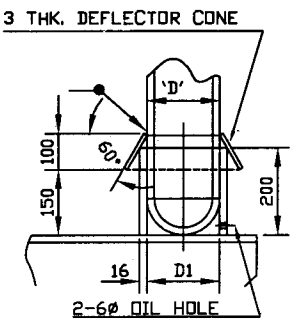
DETAIL–X



DETAIL–Y

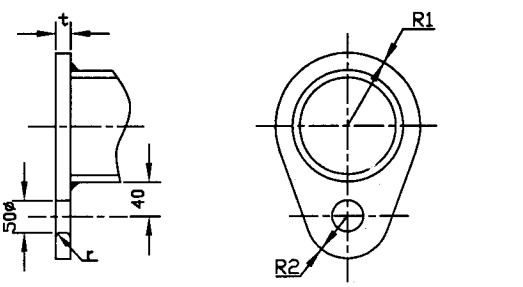


DETAIL–K



D (NB)	D1
100	120
150	175
200	225

DETAIL–P



DETAIL–Z (DAVIT EYE)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
8	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	SK	NK	SM
7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN

Approved by

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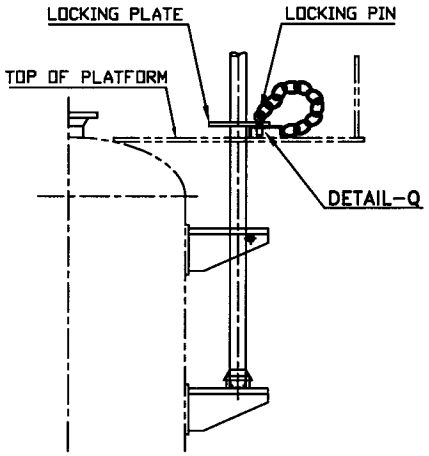
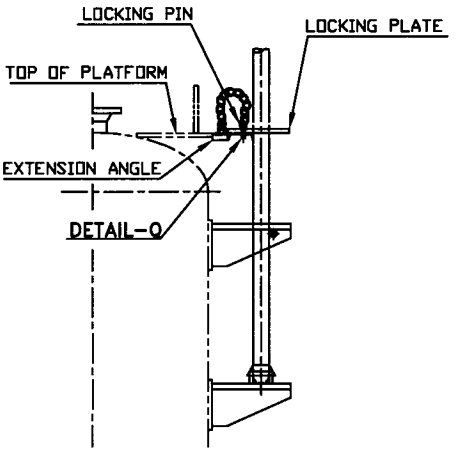
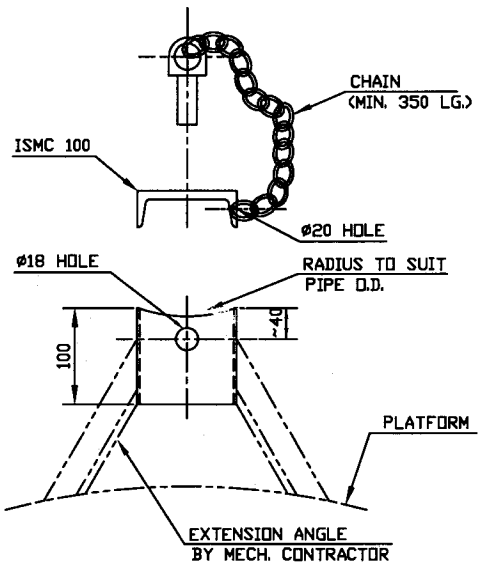


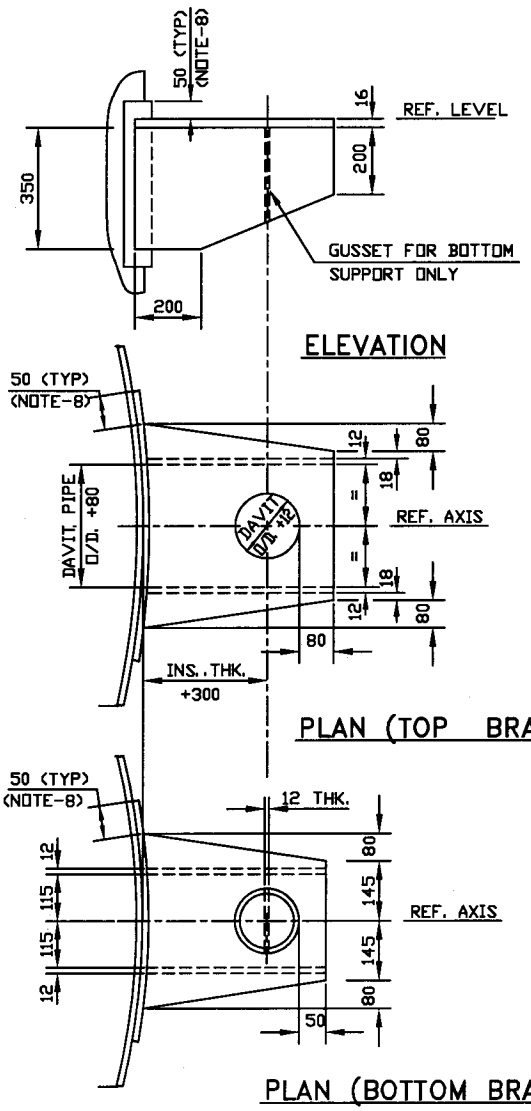
LOCKING ARRANGEMENT OF DAVIT PIPE PASSING THROUGH PLATFORM



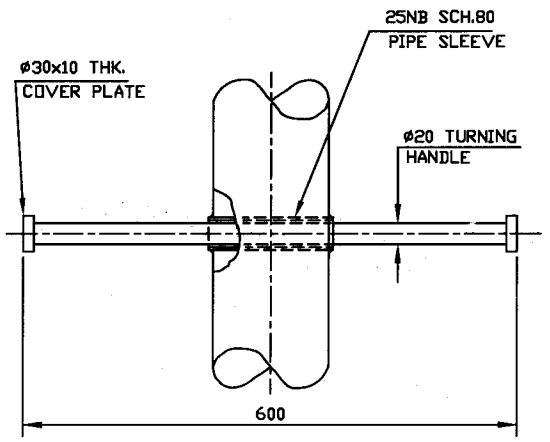
LOCKING ARRANGEMENT OF DAVIT PIPE PASSING THROUGH SIDE OF PLATFORM



DETAIL – Q



DAVIT SUPPORTS



TURNING HANDLE DETAIL

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					Approved by	
8	18.01.2022	REAFFIRMED AND REISSUED AS STANDARD	NIKHIL	KK	NK	SM
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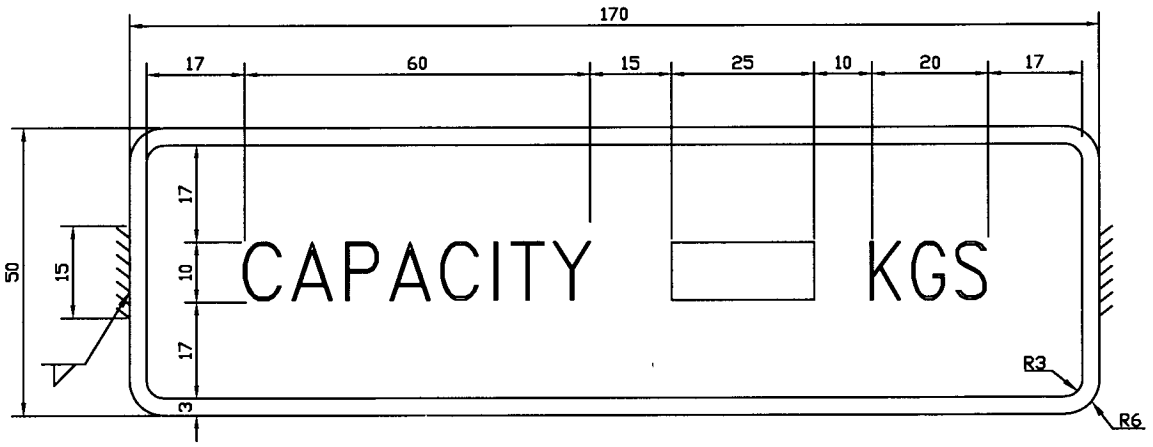

NAME PLATE

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
2. NAME PLATE
   a) MATERIAL STAINLESS STEEL 2mm THICK.
   b) NAME PLATE IS TO BE TACK WELDED TO THE DAVIT PIPE.
   c) THE LETTERS AND NUMBERS SHALL HAVE RAISED POLISHED FACE.
   d) BACKGROUND SHALL BE BLACK.
3. DIMENSION 'A' SHALL BE SUCH THAT THE DAVIT EYE EXTENDS PREFERABLY BY 900 mm OUTSIDE PLATFORM.
4. REFER ENGINEERING DRAWING FOR DIMENSIONS A, B, C, E, CAPACITY OF DAVIT AND INSULATION THICKNESS.
5. THE DAVIT USED SHALL CLEAR HANDRAIL OF THE EQUIPMENT.
6. MATERIAL OF PIPE SHALL BE A–53 / IS:1978 OR EQUIVALENT AND STRUCTURAL PARTS SHALL BE IS:2062 GR.B OR EQUIVALENT.
7. IN CASE OF CONFLICT ENGINEERING DRAWING SHALL GOVERN.
8. FOR THIN WALLED EQUIPMENT, DESIGNER SHALL ANALYSE THE STIFFNESS OF SHELL AT THE BRACKET LOCATIONS.
9. DETAIL DIMENSIONS AND NOTES IN ENGINEERING DRAWING TAKE PRECEDENCE OVER THOSE SHOWN HERE.
10. LOCKING PLATE (DETAIL –Y), LOCKING PIN (DETAIL –X) WITH CHAIN, POSITIONING PLATE (DETAIL –K), DEFLECTOR CONE (DETAIL–P) AND LOCKING SUPPORT CHANNEL (DETAIL –Q) SHALL BE SUPPLIED LOOSE BY FABRICATOR AND WELDED AT SITE BY MECHANICAL CONTRACTOR.
11. ALL FILLET WELDS SHALL BE 6 mm MINIMUM.
12. FOR LOW TEMPERATURE SERVICE, BRACKET DETAILS SHALL BE AS PER EIL STD. 7–12–0034
13. IN CASE DIMENSIONS 'B' IS BEYOND THIS STANDARD, IT IS RECOMMENDED TO INSTALL PIPE DAVIT ON STRUCTURAL PLATFORM.

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7	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN

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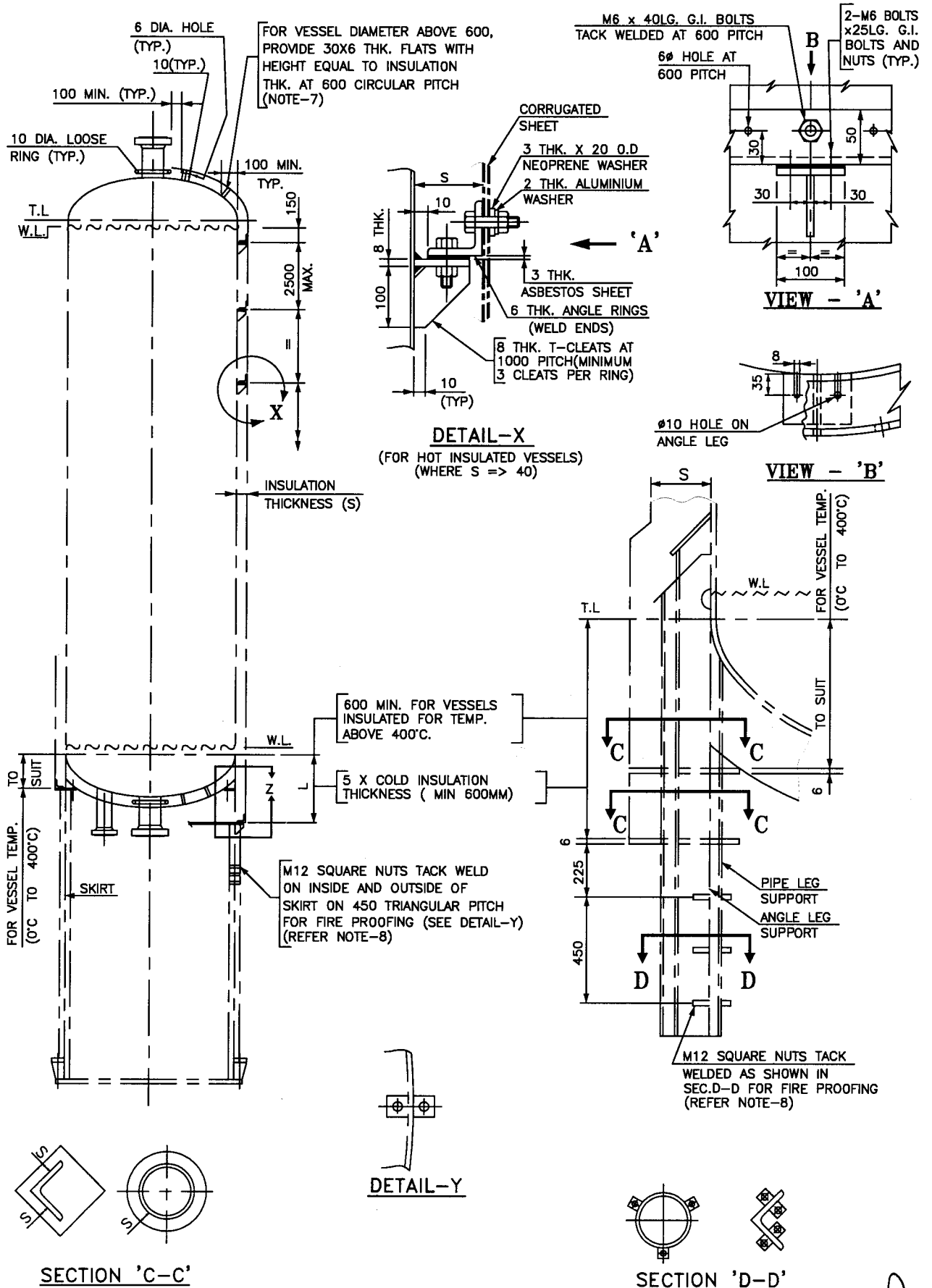

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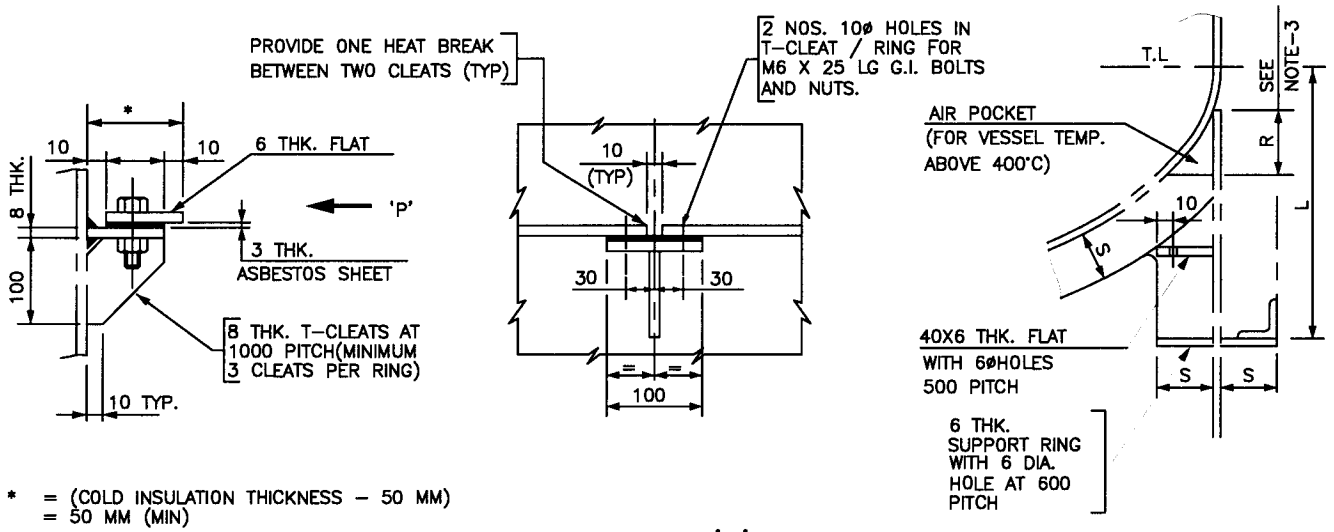
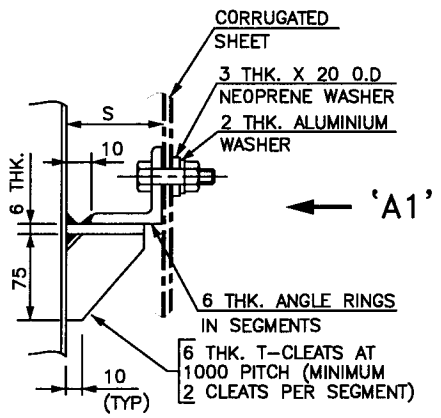


* = (COLD INSULATION THICKNESS – 50 MM)
= 50 MM (MIN)

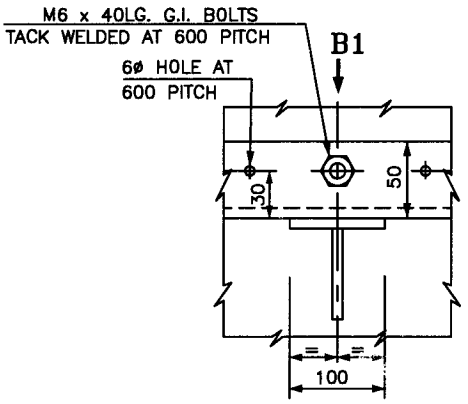
VIEW – 'P'

DETAIL – 'Z'

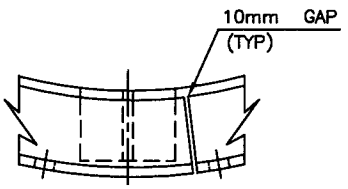
DETAIL–X
(FOR COLD INSULATED VESSELS)



DETAIL–X
(FOR HOT INSULATED VESSELS)
(WHERE S < 40)



VIEW – 'A1'



VIEW – 'B1'

NOTES

1. ALL DIMENSIONS ARE IN mm.
2. FOR MATERIAL SPECIFICATION REFER ENGINEERING DRAWING.
3. 'R' SHALL BE EQUAL TO 175mm FOR VESSELS UPTO 3000mm DIAMETER AND 300mm FOR VESSELS ABOVE 3000mm DIAMETER.
4. DETAILS, DIMENSIONS AND NOTES ON ENGINEERING DRAWING SHALL TAKE PRECEDENCE OVER THOSE SHOWN HEREIN.
5. CLIPS SHALL CLEAR WELD SEAMS AND INSULATION RINGS SHALL BE SUITABLY NOTCHED INCASE OF INTERFERENCE WITH NOZZLES/ATTACHMENTS.
6. ONLY T–CLEATS WITH ASBESTOS SHEET AND G.I. BOLTINGS, ANGLE RING ALONG WITH TACK WELDED BOLTS, INSULATION SUPPORT CLEATS WELDED TO EQUIPMENT, LOOSE RINGS & M12 NUTS SHALL BE SUPPLIED BY EQUIPMENT FABRICATOR.
7. a) FOR COLD INSULATED VESSELS CLEATS ON DISHED ENDS ARE NOT REQUIRED.
   b) FOR COLD INSULATED VESSELS CLEATS ON SHELL ARE TO BE PROVIDED IF COLD INSULATION THICKNESS IS MORE THAN 60mm.
8. FOR UNINSULATED VESSELS SQUARE NUTS SHALL BE PROVIDED FOR ENTIRE HEIGHT OF SUPPORT (SKIRT, PIPE/ANGLE LEG).

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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6	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN

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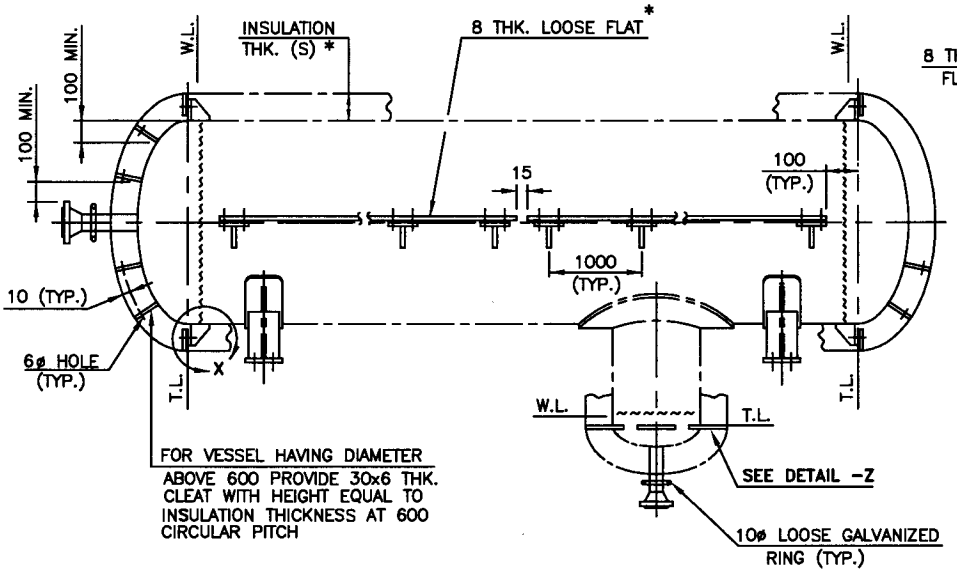
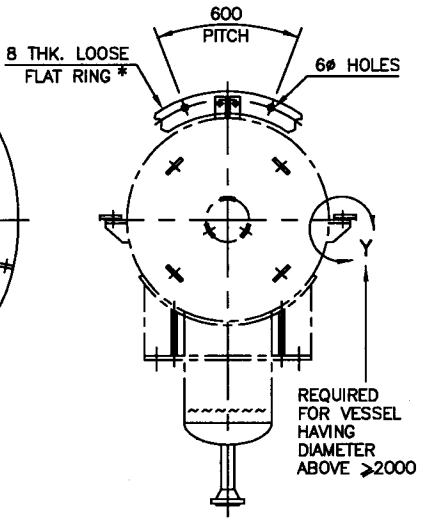
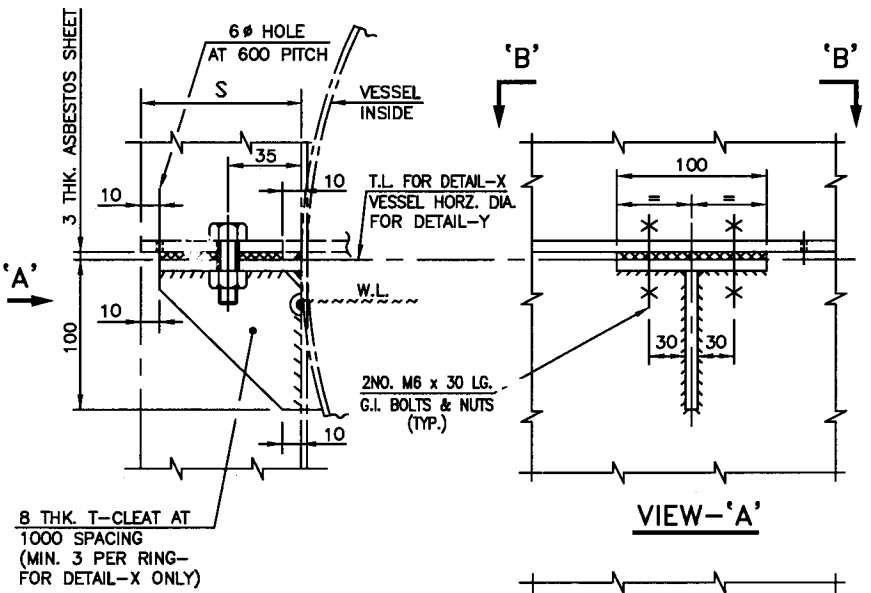
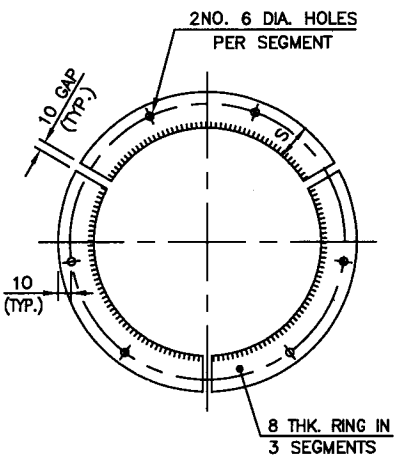




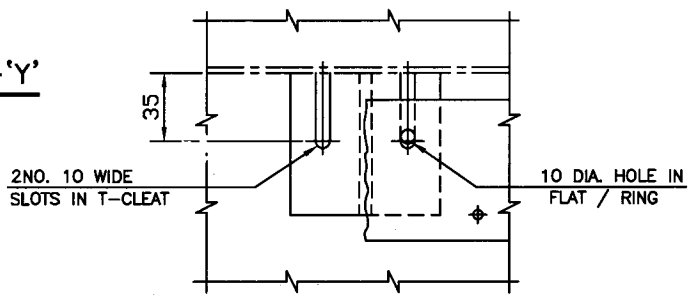


VIEW-'A'

DETAIL-'X'/ DETAIL-'Y'
(SEE NOTE-6)



DETAIL-'Z' (PLAN)



VIEW 'B-B'

NOTES

1. ALL DIMENSIONS ARE IN mm.
2. FOR MATERIAL SPECIFICATION REFER ENGINEERING DRAWING.
3. DETAILS, DIMENSIONS AND NOTES ON ENGINEERING DRAWING SHALL TAKE PRECEDENCE OVER THOSE SHOWN HEREIN.
4. CLEATS SHALL CLEAR WELD SEAMS AND IN CASE OF INTERFERENCE WITH NOZZLES/ATTACHMENTS, INSULATION RINGS SHALL BE NOTCHED/MODIFIED SUITABLY.
5. ONLY T-CLEATS WITH ASBESTOS SHEET, G.I. BOLTING, INSULATION SUPPORT CLEATS AND LOOSE RING/FLAT SHALL BE SUPPLIED BY THE EQUIPMENT FABRICATOR.
- * 6. FOR INSULATION THICKNESS (S) 40mm AND LESS, ONLY RINGS AND FLATS IN PIECES SHALL BE DIRECTLY WELDED TO SHELL/HEAD, AS SHOWN IN DETAIL-'Z'.

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5	31.10.2016	REAFFIRMED AND REISSUED AS STANDARD	JIT SINGH	SK/KJH	RKT	RN

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	BUS
OR	CROSSING OF CONDUCTORS–NOT CONNECTED
	CONNECTIONS OF CONDUCTORS
K	KEY INTERLOCK, K–KEY, ARROW TERMINATES AT DEVICE
OR SF6/ VACUUM	SF6 / VACUUM CIRCUIT BREAKER
	AIR CIRCUIT BREAKER
	DRAWOUT FEATURE
	CABLE GLAND
	AIR BREAK ISOLATOR/DISCONNECT SWITCH
	OIL IMMERSED ISOLATOR/DISCONNECT SWITCH
	FUSE
	AIR CIRCUIT BREAKER WITH INHERENT RELEASES
	DOUBLE BREAK ISOLATOR
	ISOLATOR WITH EARTH SWITCH
LA	LIGHTNING ARRESTOR
	CONTACTOR

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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6	01.11.21	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
5	08.11.16	UPDATED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN
4	27.06.11	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP	DM

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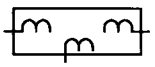
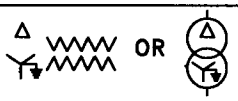
	CURRENT TRANSFORMER
	SUMMATION CT
	INTERPOSING CT
	CORE BALANCE CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
	POWER/DISTRIBUTION TRANSFORMER–DESCRIPTION AS NOTED (PRIMARY DELTA CONNECTED, SECONDARY STAR CONNECTED. STAR POINT SOLIDLY EARTHED)
	TRANSFORMER WITH OLTC
	INSTRUMENT, A– AMMETER, V– VOLTMETER, W– WATTMETER, KWH– KILOWATT HOUR METER, F– FREQUENCY METER, pf– POWER FACTOR METER, HM– HOUR RUN COUNTER MF – MULTI FUNCTION METER
	AS– AMMETER SELECTOR SWITCH, VS– VOLTMETER SELECTOR SWITCH
	FREQUENCY RECORDER
	VOLTAGE RECORDER
	TRI VECTOR METER
	INDICATING LIGHT R– RED, W– WHITE, B– BLUE, Y– YELLOW G– GREEN AND A– AMBER
	415V, 3 PHASE POWER/WELDING RECEPTACLE
	BUS DUCT
	BATTERY

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4	27.06.11	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP	DM

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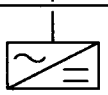
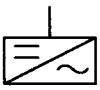
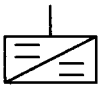
PMG	PERMANENT MAGNET GENERATOR
~ OR G	GENERATOR–DESCRIPTION AS INDICATED
M	INDUCTION MOTOR
M	SYNCHRONOUS MOTOR
	MINIATURE CIRCUIT BREAKER (MCB)
	MINIATURE CIRCUIT BREAKER WITH EARTH LEAKAGE CIRCUIT BREAKER (MCB + ELCB)
	MOULDED CASE CIRCUIT BREAKER (MCCB)
	RECTIFIER
	INVERTER
	DC – DC CONVERTER
SVR	STATIC VOLTAGE REGULATOR
AVR	AUTOMATIC VOLTAGE REGULATOR
	PUSH BUTTON STATION / LOCAL CONTROL STATION
	PUSH BUTTON STATION WITH AMMETER
	PUSH BUTTON STATION WITH INDICATING LAMP
	CAPACITOR, VARIABLE CAPACITOR

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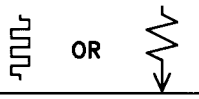
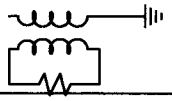
	NEUTRAL GROUNDING RESISTOR
	NEUTRAL GROUNDING TRANSFORMER
	TWO WAY SELECTOR SWITCH
	THREE WAY SELECTOR SWITCH
(2)	TIME DELAY RELAY
(21)	DISTANCE PROTECTION RELAY
(25)	CHECK SYNCHRONISING RELAY
(27)	27 – UNDER VOLTAGE RELAY 27R – RESIDUAL VOLTAGE CHECK RELAY 27M – UNDER VOLTAGE RELAY (MOTOR PROTECTION) 27C – VOLTAGE HEALTHY CHECK RELAY
(32)	REVERSE POWER RELAY
(37)	LOW FORWARD POWER RELAY
(40)	LOSS OF EXCITATION RELAY
(46)	NEGATIVE PHASE SEQUENCE RELAY
(49)	THERMAL OVERLOAD RELAY
(50)	INSTANTANEOUS OVER CURRENT RELAY
(50N)	INSTANTANEOUS EARTH FAULT RELAY

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51	IDMTL OVER CURRENT RELAY
51G	STANDBY EARTH FAULT RELAY
51N	IDMTL EARTH FAULT RELAY
51V	VOLTAGE RESTRAINED IDMTL OVER CURRENT RELAY
59	OVER VOLTAGE RELAY
60	NEUTRAL DISPLACEMENT RELAY
63TX	AUX. RELAY FOR TRANSFORMER TROUBLE/TRIP
64F	ROTOR EARTH FAULT RELAY
64G 1,2	STATOR EARTH FAULT MAIN AND BACKUP RELAY
64R	RESTRICTED EARTH FAULT RELAY
67	DIRECTIONAL OVER CURRENT RELAY
67N	DIRECTIONAL EARTH FAULT RELAY
78	OUT OF STEP RELAY
80	CONTROL SUPPLY SUPERVISION RELAY
81	UNDER FREQUENCY / df/dt RELAY
86	LOCKOUT RELAY

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87CH	CHECK DIFFERENTIAL RELAY
87F	DIFFERENTIAL RELAY F– FEEDER, G– GENERATOR, T– TRANSFORMER, M– MOTOR, GT– GENERATOR+TRAFORMER COMBINED
95	TRIP CIRCUIT SUPERVISION RELAY
97	PT MONITORING RELAY
98	DEAD BUS RELAY
99	OVERFLUXING RELAY
MPR	MOTOR PROTECTION RELAY
ELR	EARTH LEAKAGE RELAY
	THERMAL OVERLOAD RELAY

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4	27.06.11	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP	DM

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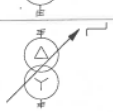
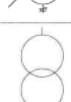
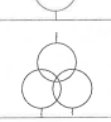
SYMBOL	DESCRIPTION	CODE/AGENCY
	A.C. MOTOR	IEC
	A.C. GENERATOR	IEC
	SYNCHRONOUS GENERATOR (GS)	IEC
	SYNCHRONOUS MOTOR (MS)	IEC
	MOTOR STARTER-GENERAL	IEC
	STARTER-NON REVERSING MOTOR	IEC
	STARTER-REVERSING MOTOR	IEC
	STAR-DELTA STARTER	IEC
	STARTER REGULATOR WITH THYRISTOR	IEC
	DIRECT ON-LINE CONTACTOR STARTER -REVERSING MOTOR	IEC
	STARTER OPERATING IN STEPS	IEC
	THREE PHASE DELTA-STAR TRANSFORMER	IEC
	THREE PHASE DELTA-STAR TRANSFORMER WITH OLTC	IEC
	TRANSFORMER WITH TWO WINDINGS	IEC
	TRANSFORMER WITH THREE WINDINGS	IEC
	VOLTAGE TRANSFORMER	IEC

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	05.05.2025	REAFFIRMED & ISSUED AS STANDARD	SKC	SKS	HK	MN
1	05.03.2019	REAFFIRMED & ISSUED AS STANDARD	VKS	HK	BRB	RKT
0	26.03.2014	ISSUED AS STANDARD	SL / AKH	HK / SA	BRB	SC

Approved by

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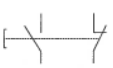
SYMBOL	DESCRIPTION	CODE/AGENCY
	CURRENT TRANSFORMER	IEC
	CURRENT TRANSFORMER, CORE BALANCE	IEC
	AUTO TRANSFORMER	IEC
	EMERGENCY STOP LOCKING TYPE	EIL
	EMERGENCY STOP NON-LOCKING TYPE	EIL
	THREE PHASE WINDING, STAR	IEC
	THREE PHASE WINDING, DELTA	IEC
	THREE PHASE WINDING, STAR WITH NEUTRAL BROUGHT OUT	IEC
	CIRCUIT BREAKER, GENERAL	IEC
	CIRCUIT BREAKER, 1 POLE	IEC
	CIRCUIT BREAKER, 3 POLE *=DENOTES TYPE ACB = AIR CIRCUIT BREAKER VCB = VACUUM CIRCUIT BREAKER MCCB = MOULDED CASE CKT. BREAKER MCB = MINIATURE CIRCUIT BREAKER SF6 = SULPHUR HEXAFLUORIDE CIRCUIT BREAKER	IEC
	DISCONNECTOR (ISOLATOR) 3 POLE	EIL
	SWITCH DISCONNECTOR, 3 POLE (ON-LOAD ISOLATING SWITCH)	EIL
	SWITCH DISCONNECTOR, 3 POLE NEUTRAL (ON-LOAD ISOLATING SWITCH)	EIL
	SWITCH DISCONNECTOR, 3 POLE NEUTRAL(FIXED) ON-LOAD ISOLATING SWITCH	EIL

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SYMBOL	DESCRIPTION	CODE/AGENCY
	FUSE, GENERAL	IEC
	MULTIPLE FUSE	EIL
	FUSE SHOWING POWER FLOW DIRECTION	IEC
	FUSE SWITCH 3 POLE	EIL
	CONTACTOR	IEC
	ARROWHEAD	EIL
	CONNECTION POINT	IEC
	TERMINAL	IEC
	CABLE TERMINATION	IEC
	PLUG AND SOCKET	IEC
	KEY INTERLOCK	IEC
	MECHANICAL INTERLOCK	EIL
	ELECTRICAL INTERLOCK	EIL
	REMOVABLE LINK	IEC
	INTEGRATING METER A1 = DENOTES TYPE Wh = WATT HOUR METER h = HOURS RUN METER Ah = AMPERE-HOUR METER	IEC

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SYMBOL	DESCRIPTION	CODE/AGENCY
	INDICATING INSTRUMENT A1 = DENOTES TYPE V = VOLTMETER A = AMMETER Hz = FREQUENCY METER cos Ø = POWER FACTOR METER Var = VAR METER Hz = FREQUENCY METER Ø = PHASE METER n = TACHOMETER	IEC
	RECORDING INSTRUMENT A1 = DENOTES TYPE W = WATT METER	IEC
	SYNCHROSCOPE	IEC
	1 PHASE/NEUTRAL/EARTH	EIL
	3 PHASE	EIL
	3 PHASE/NEUTRAL/EARTH	EIL
	DRAWOUT FEATURE	EIL
	BUSDUCT	EIL
	CENTRE BREAK DISCONNECT	EIL
	INTEGRAL EARTHING SWITCHGEAR	EIL
	ROTATING DISCONNECT CLOCKWISE EARTHING SWITCH	EIL
ASS	AMMETER SELECTOR SWITCH	EIL
VSS	VOLTMETER SELECTOR SWITCH	EIL

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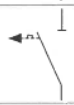
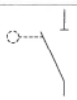
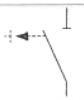
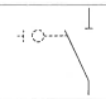
SYMBOL	DESCRIPTION	CODE/AGENCY
	OVERCURRENT PROTECTION	EIL
	THERMAL OVERCURRENT PROTECTION	EIL
	MAGNETIC OVERCURRENT PROTECTION	EIL
	UNDER VOLTAGE PROTECTION	EIL
	EARTH LEAKAGE PROTECTION BY CURRENT	EIL
	EARTH LEAKAGE PROTECTION BY VOLTAGE	EIL
	LOCKING DEVICE PADLOCK FACILITY	EIL
	MECHANICAL INTERLOCK BETWEEN TWO DEVICES	EIL
	AUTOMATIC RETURN	EIL
	OPERATED BY KEY	IEC
	OPERATED BY ELECTRIC MOTOR	IEC
	MOTOR–OPERATED VALVE	EIL
	REMOTE CONTROL UNIT WITH AMMETER CONTROLLED BY ROTARY STACK SWITCH	EIL
	REMOTE CONTROL UNIT WITHOUT AMMETER CONTROLLED BY ROTARY STACK SWITCH	EIL
	REMOTE CONTROL UNIT WITH AMMETER CONTROLLED BY PUSH BUTTON	EIL
	REMOTE CONTROL UNIT WITHOUT AMMETER CONTROLLED BY PUSH BUTTON	EIL

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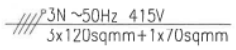
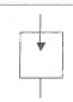
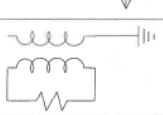
SYMBOL	DESCRIPTION	CODE/AGENCY
	CABLE SINGLE LINE REPRESENTATION	EIL
	EQUIPOTENTIALITY	EIL
	BUSBAR	EIL
	PROTECTIVE EARTH	IEC
	CHANGE-OVER CONTACT WITH CENTRE-OFF POSITION	IEC
	STATIC SWITCH PASSING CURRENT IN ONE DIRECTION	EIL
	T CONNECTION	IEC
	LIGHTENING ARRESTOR	IEC
	REACTOR	IEC
	BATTERY (PRIMARY OR SECONDARY CELLS)	IEC
	RECTIFIER	IEC
	INVERTER	IEC
	DC/DC CONVERTOR	IEC
	NEUTRAL GROUNDING RESISTOR	EIL
	NEUTRAL GROUNDING TRANSFORMER	EIL

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SYMBOL	DESCRIPTION	CODE/AGENCY
	START PUSH-BUTTON AND AUTOMATIC RETURN	IEC
	STOP PUSH-BUTTON	EIL
	MAKE CONTACT DELAYED WHEN CLOSING	IEC
	MAKE CONTACT DELAYED WHEN OPENING	IEC
	BREAK CONTACT DELAYED WHEN OPENING	IEC
	BREAK CONTACT DELAYED WHEN CLOSING	IEC
	MAKE CONTACT	IEC
	BREAK CONTACT	IEC
	CHANGE-OVER CONTACT BREAK BEFORE MAKE	IEC
	CHANGE-OVER CONTACT MAKE BEFORE BREAK	IEC
	CONTACT WITH TWO MAKES	IEC
	CONTACT WITH TWO BREAKS	IEC
	INDICATING LAMP * = DENOTES COLOUR GN = GREEN YE = YELLOW RD = RED BU = BLUE WH = WHITE	IEC
	FUSE SWITCH	IEC
	CIRCUIT BREAKER WITH AUTOMATIC RELEASE	EIL
	RELAY CONTACT MAKE WITH SPRING RETURN	EIL

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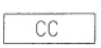
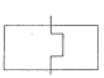
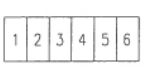
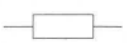
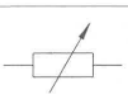
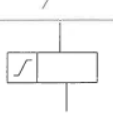
SYMBOL	DESCRIPTION	CODE/AGENCY
	DISCONNECTOR (ISOLATOR)	IEC
	SWITCH–DISCONNECTOR (ON–LOAD ISOLATING SWITCH)	IEC
	FUSE DISCONNECTOR (FUSE ISOLATOR)	IEC
	FUSE SWITCH DISCONNECTOR (ONLOAD ISOLATING FUSE SWITCH)	IEC
	ANTI–CONDENSATION HEATER	IEC
	CONTACTOR COIL	EIL
	EARTH (GROUND), GENERAL SYMBOL	IEC
	CHASSIS OR FRAME EARTH	IEC
	CLEAN EARTH (NOISELESS)	IEC
	THERMAL O/L RELAY–OPERATING DEVICE	IEC
	DIODE	IEC
	THYRISTOR	IEC
	TERMINAL STRIP	IEC
	RESISTOR, GENERAL	IEC
	ADJUSTABLE RESISTOR	IEC
	RELAY COIL OF PERMANENT RELAY	IEC

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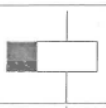
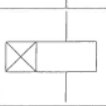
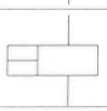
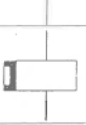
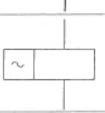
SYMBOL	DESCRIPTION	CODE/AGENCY
	RELAY COIL OF SLOW RELEASING RELAY	IEC
	RELAY COIL OF SLOW OPERATING RELAY	IEC
	RELAY COIL– SLOW OPERATING SLOW RELEASING RELAY	IEC
	RELAY COIL– HIGH SPEED RELAY (FAST OPERATING & RELEASING)	IEC
	RELAY COIL– POLARISED RELAY	IEC
	RELAY COIL OF ALTERNATING CURRENT RELAY	IEC
	CAPACITOR, GENERAL	IEC
	POLARISED CAPACITOR	IEC
	ADUSTABLE CAPACITOR	IEC
	INDUCTOR, COIL, WINDING CHOKE	IEC
	PHOTOVOLTIC CELL	IEC
	PHOTO DIODE (PHOTO CONDUCTIVE WITH ASYMMETRICAL CONDUCTIVITY)	IEC
	LIGHT DEPENDENT RESISTOR (PHOTO CONDUCTIVE DEVICE WITH SYMMETRICAL CONDUCTIVITY)	IEC
	2 POSITION SWITCH	IEC
	3 POSITION SWITCH	IEC
	4 POSITION SWITCH	IEC

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SYMBOL	DESCRIPTION	CODE/AGENCY
R1	RELAY COIL GENERAL	IEEE/NEMA
AVR	AUTOMATIC VOLTAGE REGULATOR RELAY	EIL
U=0	NO VOLTAGE RELAY	IEC
2	TIME DELAY RELAY	IEEE/NEMA
12	OVERSPEED RELAY	IEEE/NEMA
21	DISTANCE PROTECTION RELAY	IEEE/NEMA
25	CHECK SYNCHRONISING RELAY	IEEE/NEMA
27	27 – UNDER VOLTAGE RELAY 27R – RESIDUAL VOLTAGE CHECK RELAY 27M – UNDER VOLTAGE RELAY (MOTOR PROTECTION) 27H – VOLTAGE HEALTHY CHECK RELAY	IEEE/NEMA
32	REVERSE POWER / DIRECTIONAL POWER RELAY	IEEE/NEMA
37	LOW FORWARD POWER / UNDER CURRENT RELAY	IEEE/NEMA
40	LOSS OF EXCITATION RELAY	IEEE/NEMA
46	NEGATIVE PHASE SEQUENCE RELAY	IEEE/NEMA
49	THERMAL OVERLOAD RELAY	IEEE/NEMA
50	INSTANTANEOUS OVER CURRENT RELAY	IEEE/NEMA
50N	INSTANTANEOUS EARTH FAULT RELAY	IEEE/NEMA

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SYMBOL	DESCRIPTION	CODE/AGENCY
51	IDMTL OVER CURRENT RELAY	IEEE/NEMA
51G	STANDBY EARTH FAULT RELAY	IEEE/NEMA
51N	IDMTL EARTH FAULT RELAY	IEEE/NEMA
51V	VOLTAGE RESTRAINED IDMTL OVER CURRENT RELAY	IEEE/NEMA
59	OVER VOLTAGE RELAY	IEEE/NEMA
60	NEUTRAL DISPLACEMENT RELAY	IEEE/NEMA
63TX	AUX. RELAY FOR TRANSFORMER TROUBLE/TRIP	IEEE/NEMA
64F	ROTOR EARTH FAULT RELAY	IEEE/NEMA
64G 1,2	STATOR EARTH FAULT MAIN AND BACKUP RELAY	IEEE/NEMA
64R	RESTRICTED EARTH FAULT RELAY	IEEE/NEMA
67	DIRECTIONAL OVER CURRENT RELAY	IEEE/NEMA
67N	DIRECTIONAL EARTH FAULT RELAY	IEEE/NEMA
78	OUT OF STEP RELAY	IEEE/NEMA
80	CONTROL SUPPLY SUPERVISION RELAY	IEEE/NEMA
81	UNDER FREQUENCY / df/dt RELAY	IEEE/NEMA
86	LOCKOUT RELAY	IEEE/NEMA

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SYMBOL	DESCRIPTION	CODE/AGENCY
87CII	CHECK DIFFERENTIAL RELAY	IEEE/NEMA
87F	DIFFERENTIAL RELAY F–FEEDER, G–GENERATOR, T–TRANSFORMER, GT–GEN.+TRAFO.	IEEE/NEMA
95	TRIP CIRCUIT SUPERVISION RELAY	IEEE/NEMA
97	PT MONITORINC RELAY	IEEE/NEMA
98	DEAD BUS RELAY	IEEE/NEMA
99	OVERFLUXINC RELAY	IEEE/NEMA
MPR	MOTOR PROTECTION RELAY	EIL
ELR	EARTH LEAKAGE RELAY	EIL

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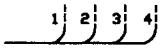
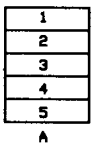
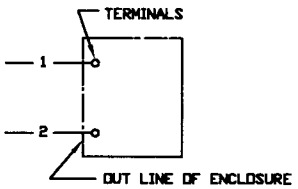
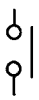
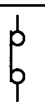
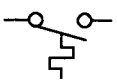
	GROUPING OF CONDUCTORS, LINE BEND INDICATES DIRECTION OF CONDUCTOR JOINING CABLE, NUMERAL INDICATES WIRE NUMBER
	TERMINAL BLOCK 'A', NUMERAL INDICATES TERMINAL NUMBER
	WIRES DESIGNATED 1 & 2 ARE CONNECTED TO TERMINALS OF AN APPARATUS
	HOOTER H – HORN S – SIREN LSP – LOUDSPEAKER
	RELAY COIL, 2 – INDICATES RELAY NUMBER
	BREAK CONTACT DELAYED BREAK
	MAKE CONTACT DELAYED MAKE
	BREAK CONTACT DELAYED MAKE
	MAKE CONTACT DELAYED BREAK
	OPEN CONTACT – THE POSITION OF THE CONTACT IN A RELAY IS SHOWN WITH COIL DE-ENERGISED
	CLOSED CONTACT – THE POSITION OF THE CONTACT IN A RELAY IS SHOWN WITH COIL DE-ENERGISED
	MOTOR, 3 PHASE
	NORMALLY OPEN
	NORMALLY CLOSED

TEMPERATURE ACTUATED SWITCH

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	01.11.21	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
5	08.11.16	UPDATED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN
4	27.06.11	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP	DM

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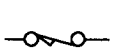
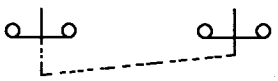
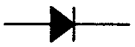
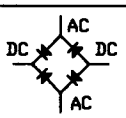
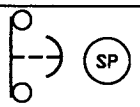
	HELD CLOSE	LIMIT SWITCH
	HELD OPEN	
	NORMALLY OPEN (OPEN ON LOW PRESSURE)	VACUUM/ PRESSURE SWITCH
	NORMALLY CLOSE (CLOSED ON LOW PRESSURE)	
	PUSH BUTTON – CLOSING, SINGLE CIRCUIT, MOMENTARY OR SPRING RETURN	
	PUSH BUTTON – OPENING, SINGLE CIRCUIT, MOMENTARY OR SPRING RETURN	
	PUSH BUTTON, TWO CIRCUIT, MOMENTARY OR SPRING RETURN	
	PUSH BUTTON, TWO CIRCUIT, MAINTAINED OR NON–SPRING RETURN	
	SEMICONDUCTOR DIODE	
	SILICON CONTROL RECTIFIER	
	FULL WAVE RECTIFIER	
	FUSE	
	EMERGENCY STOP (MUSHROOM HEAD)	
	STAY PUT EMERGENCY STOP (MUSHROOM HEAD) PUSH BUTTON WITH RESETTING FEATURE	
	EARTH CONNECTION	

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6	01.11.21	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
5	08.11.16	UPDATED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN
4	27.06.11	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP	DM

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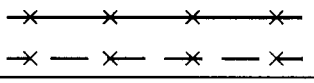
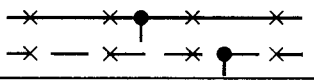
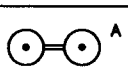
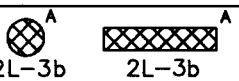
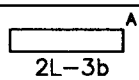
	EARTH CONDUCTOR–EXPOSED EARTH CONDUCTOR–BURIED SIZE AS SHOWN OR SPECIFIED ON PLANS
	EARTH STRIP / WIRE TAP, SIZE AS SHOWN OR SPECIFIED ON PLANS
	EARTH ELECTRODE IN TEST PIT
	DIRECTLY BURIED EARTH ELECTRODE
	EARTH PLATE
	LIGHTNING ARRESTOR
	POLE MOUNTED LIGHTING FIXTURE (IN ELEVATION)
	LIGHTING FIXTURE (IN ELEVATION)
A 2L–3b	CEILING MOUNTED LIGHTING FIXTURE
A 2L–3b	BRACKET MOUNTED LIGHTING FIXTURE
A 2L–3b	POLE MOUNTED LIGHTING FIXTURE
A 2L–3b	POLE MOUNTED STREET LIGHTING FIXTURE
A 2L–3b	POLE MOUNTED FLOOD LIGHTING FIXTURE
 A	DOUBLE OBSTRUCTION AVIATION LIGHTING FIXTURE
A A 2EL–3b 2EL–3b	EMERGENCY LIGHTING FIXTURE
 A A 2L–3b 2L–3b	CRITICAL LIGHTING FIXTURE
 A 2L–3b	FLUORESCENT FIXTURE
	A – FIXTURE TYPE (AS PER DATASHEET FOR LIGHTING FIXTURE SCHEDULE) 2L – LIGHTING PANEL NO. 2, 3 – CIRCUIT NO., b – CONTROLLING SIWTCH
LP–2L 	LP – LIGHTING PANEL 2L – LIGHTING PANEL NO.
PP–2P 	PP – POWER PANEL 2P – POWER PANEL NO.
ELP–2L 	ELP – EMERGENCY LIGHTING PANEL 2EL – EMERGENCY LIGHTING PANEL NO.

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MDB–501	MDB – MAIN DISTRIBUTION BOARD MDB–501 – MAIN DISTRIBUTION BOARD NO.
FLM–1	FLOOD LIGHT MAST–LATTICE STRUCTURE FLM–1 – FLOOD LIGHT MAST NO.
HM–1	HM – HIGH MAST HM–1 – HIGH MAST NO.
2e	5A, 240V SINGLE POLE SWITCH 2 – CIRCUIT NO., e – SWITCH NUMBER
	5A, 240V DOUBLE POLE SWITCH
	5A, 240V SINGLE POLE 2 WAY SWITCH
	15A, 240V SINGLE POLE SWITCH
	20A, DP MCB UNIT FOR WINDOW TYPE AC
	CEILING FAN
	AIR CIRCULATOR
	EXHAUST FAN
	5A, 240V, 3/5 PIN SOCKET/RECEPTACLE
	15/5A, 240V, 6 PIN SOCKET/RECEPTACLE
	10A, 240V, 3 PIN INDUSTRIAL TYPE SOCKET/RECEPTACLE
	20A, 240V, 3 PIN INDUSTRIAL TYPE SOCKET/RECEPTACLE
	5A, 24V, 3 PIN SOCKET/RECEPTALE
	15A, 240V, 3 PIN SOCKET /RECEPTACLE
	415V, 3 PHASE POWER/WELDING RECEPTACLE
	PUSH BUTTON STATION
	LIGHTING JUNCTION BOX (3WAY)
	LIGHTING JUNCTION BOX (4WAY)

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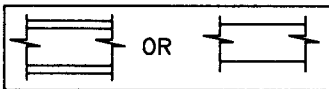
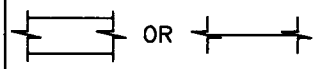
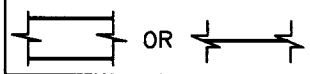
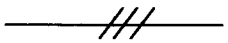
 OR	LINED (RCC) CABLE TRENCH
 OR	DIRECTLY BURIED CABLE TRENCH
 OR	CABLE TRAY
ERC–1	ERC – ELECTRICAL ROAD CROSSING ERC–1 – ELECTRICAL ROAD CROSSING NO.
SCRC–1	SCRC – STREET LIGHTING AND COMMUNICATION/FIRE ALARM CABLES ROAD CROSSING SCRC–1 – STREET LIGHTING AND COMMUNICATION/FIRE ALARM CABLES ROAD CROSSING NO.
	CONDUIT / CABLE RUN EXPOSED
	CONDUIT / CABLE RUN CONCEALED OR EMBEDDED
	CONDUIT / CABLE BEND UP
	CONDUIT / CABLE BEND–DOWN
	CONDUIT RUN, NUMBER OF OBLIQUE LINES INDICATING NUMBER OF WIRES
	HOME RUN OF CIRCUIT TO PANEL/DISTRIBUTION BOX/JUNCTION BOX
LS	LIMIT SWITCH
VS	VIBRATION SWITCH
FC	MULTISENSOR FIRE ALARM DETECTOR FC – FALSE CEILING, TC – TRUE CEILING, FF – FALSE FLOORING
R	RESPONSE INDICATOR
BG	MANUAL BREAK GLASS UNIT
H	HOOTER H – HORN LSP – LOUDSPEAKER S – SIREN
FAJB	JUNCTION BOX FAJB – FIRE ALARM JUNCTION BOX TJB – TELEPHONE JUNCTION BOX PAJB – PLANT COMMUNICATION JUNCTION BOX
EXIT	EXIT SIGN
	END OF LINE RESISTANCE
	TELEPHONE

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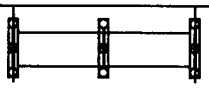
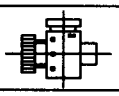
	2 PIN SOCKET FOR TELEPHONE
	CIRCUIT BREAKER (SWITCHYARD)
	ISOLATOR (SWITCHYARD)
	GANTRY (SWITCHYARD)
	TRANSFORMER (SWITCHYARD)
	POTENTIAL TRANSFORMER (SWITCHYARD)
	CURRENT TRANSFORMER (SWITCHYARD)
	LIGHTNING ARRESTOR (SWITCHYARD)

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4	27.06.11	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP	DM

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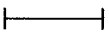
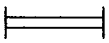
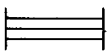
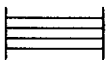
	SURFACE MOUNTED 1x18/36W FLUORESCENT LIGHTING FIXTURE	IEC
	SURFACE MOUNTED 2x18/36W FLUORESCENT LIGHTING FIXTURE	IEC
	SURFACE MOUNTED 3x18/36W FLUORESCENT LIGHTING FIXTURE	IEC
	SURFACE MOUNTED 4x18/36W FLUORESCENT LIGHTING FIXTURE	IEC
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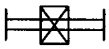
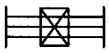
	SURFACE MOUNTED 2x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
	SURFACE MOUNTED 3x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
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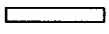
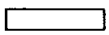
	RECESS MOUNTED 1x18/36W FLUORESCENT LIGHTING FIXTURE	EIL
	RECESS MOUNTED 2x18/36W FLUORESCENT LIGHTING FIXTURE	EIL
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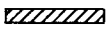
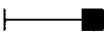
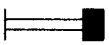
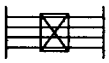
	RECESS MOUNTED 1x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
	RECESS MOUNTED 2x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
	RECESS MOUNTED 3/4x18W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
	SURFACE MOUNTED 1x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE WITH BATTERY BACKUP	EIL
	SURFACE MOUNTED 2x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE WITH BATTERY BACKUP	EIL

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					Approved by	
1	23 08 2019	REAFFIRMED & ISSUED AS STANDARD	BP	AR	SA	RKT
0	28 01 2015	ISSUED AS STANDARD	BP	FA / AK	BRB	SC

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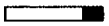
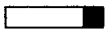
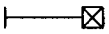
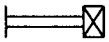
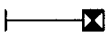
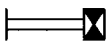
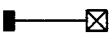
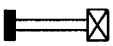
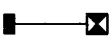
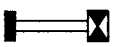
	RECESS MOUNTED 1x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE WITH BATTERY BACKUP	EIL
	RECESS MOUNTED 2x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE WITH BATTERY BACKUP	EIL
	NON SPARKING 1x18/36W FLUORESCENT LIGHTING FIXTURE	EIL
	NON SPARKING 2x18/36W FLUORESCENT LIGHTING FIXTURE	EIL
	NON SPARKING 1x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
	NON SPARKING 2x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
	FLAME PROOF 1x18/36W FLUORESCENT LIGHTING FIXTURE	EIL
	FLAME PROOF 2x18/36W FLUORESCENT LIGHTING FIXTURE	EIL
	FLAME PROOF 1x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
	FLAME PROOF 2x18/36W FLUORESCENT EMERGENCY LIGHTING FIXTURE	EIL
	125W HPMV/150W METAL HALIDE LIGHTING FIXTURE SUITABLE FOR SAFE AREA	EIL
	250W HPMV/METAL HALIDE LIGHTING FIXTURE SUITABLE FOR SAFE AREA	EIL
	400W HPMV/METAL HALIDE LIGHTING FIXTURE SUITABLE FOR SAFE AREA	EIL
	125W HPMV/150W METAL HALIDE EMERGENCY LIGHTING FIXTURE SUITABLE FOR SAFE AREA	EIL
	250W HPMV/METAL HALIDE LAMP EMERGENCY LIGHTING FIXTURE SUITABLE FOR SAFE AREA	EIL
	400W HPMV/METAL HALIDE LAMP EMERGENCY LIGHTING FIXTURE SUITABLE FOR SAFE AREA	EIL

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SYMBOL	DESCRIPTION	AUTHOR
	NON SPARKING (Exn'R') TYPE 125W HPMV/150W METAL HALIDE LIGHTING FIXTURE	EIL
	NON SPARKING (Exn'R') TYPE 250W HPMV/METAL HALIDE LIGHTING FIXTURE	EIL
	NON SPARKING (Exn'R') TYPE 400W HPMV/METAL HALIDE LIGHTING FIXTURE	EIL
	NON SPARKING (Exn'R') TYPE 125W HPMV/150W METAL HALIDE EMERGENCY LIGHTING FIXTURE	EIL
	NON SPARKING (Exn'R') TYPE 250W HPMV/METAL HALIDE EMERGENCY LIGHTING FIXTURE	EIL
	NON SPARKING (Exn'R') TYPE 400W HPMV/METAL HALIDE EMERGENCY LIGHTING FIXTURE	EIL
	FLAME PROOF (Exd) TYPE 125W HPMV/150W METAL HALIDE LIGHTING FIXTURE SUITABLE FOR IIA/IIB AREA	EIL
	FLAME PROOF (Exd) TYPE 250W HPMV/METAL HALIDE LIGHTING FIXTURE SUITABLE FOR IIA/IIB AREA	EIL
	FLAME PROOF (Exd) TYPE 400W HPMV/METAL HALIDE LIGHTING FIXTURE SUITABLE FOR IIA/IIB AREA	EIL
	FLAME PROOF (Exd) TYPE 125W HPMV/150W METAL HALIDE EMERGENCY LIGHTING FIXTURE SUITABLE FOR IIA/IIB AREA	EIL
	FLAME PROOF (Exd) TYPE 250W HPMV/METAL HALIDE EMERGENCY LIGHTING FIXTURE SUITABLE FOR IIA/IIB AREA	EIL
	FLAME PROOF (Exd) TYPE 400W HPMV/METAL HALIDE EMERGENCY LIGHTING FIXTURE SUITABLE FOR IIA/IIB AREA	EIL
IIC	FLAME PROOF (Exd) TYPE 125W HPMV/150W METAL HALIDE LIGHTING FIXTURE SUITABLE FOR IIC AREA	EIL
IIC	FLAME PROOF (Exd) TYPE 250W HPMV/METAL HALIDE LIGHTING FIXTURE SUITABLE FOR IIC AREA	EIL
IIC	FLAME PROOF (Exd) TYPE 400W HPMV/METAL HALIDE LIGHTING FIXTURE SUITABLE FOR IIC AREA	EIL
IIC	FLAME PROOF (Exd) TYPE 125W HPMV/150W METAL HALIDE EMERGENCY LIGHTING FIXTURE SUITABLE FOR IIC AREA	EIL

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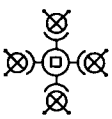
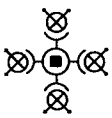
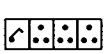
SYMBOL	DESCRIPTION	AUTHOR
IIC	FLAME PROOF (Exd) TYPE 250W HPMV/METAL HALIDE EMERGENCY LIGHTING FIXTURE SUITABLE FOR IIC AREA	EIL
IIC	FLAME PROOF (Exd) TYPE 400W HPMV/METAL HALIDE EMERGENCY LIGHTING FIXTURE SUITABLE FOR IIC AREA	EIL
	200W GLS LAMP EMERGENCY LIGHTING FIXTURE SUITABLE FOR SAFE AREA	EIL
	FLAME PROOF(Exd) TYPE 200W GLS LAMP EMERGENCY LIGHTING FIXTURE SUITABLE FOR IIA/IIB AREA	EIL
IIC	FLAME PROOF (Exd) TYPE 200W GLS LAMP EMERGENCY LIGHTING FIXTURE SUITABLE FOR IIC AREA	EIL
	BULKHEAD LIGHTING FIXTURE	EIL
	DECORATIVE LUMINAIRE	EIL
	NAVIGATION LIGHT	IEC
	20M HIGH MAST (NO. OF FLOOD LIGHTS AS PER LAYOUT)	EIL
	30M HIGH MAST (NO. OF FLOOD LIGHTS AS PER LAYOUT)	EIL
	PUSH BUTTON STATION (LOCAL CONTROL STATION)	EIL
	EMERGENCY STOP PUSH BUTTON STATION	EIL
	63A, 415V WELDING SOCKET	EIL
	63A, 415V FLAME PROOF WELDING SOCKET	EIL
	3 NOS., 5A SOCKET W1TH 1 NO. 15A SWITCH	EIL

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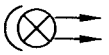
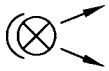
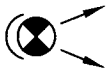
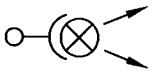
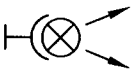
SYMBOL	DESCRIPTION	AUTHOR
	SPOT LIGHT	IEC
	FLOOD LIGHT FIXTURE	IEC
	FLOOD LIGHT FIXTURE SUITABLE FOR ZONE–1	EIL
	FLOOD LIGHT FIXTURE POLE MOUNTED	EIL
	FLOOD LIGHT FIXTURE WALL MOUNTED	EIL
	STREET LIGHTING FIXTURE POLE MOUNTED	EIL
	STREET LIGHTING FIXTURE WALL MOUNTED	EIL
	GROUND MOUNTED POLE LIGHTING FIXTURE	EIL
	LIGHTING FIXTURE IN ELEVATION	EIL
	POLE MOUNTED LIGHTING FIXTURE IN ELEVATION	EIL
	SURFACE MOUNTED CRITICAL LIGHTING FIXTURE	EIL
	RECESS MOUNTED CRITICAL LIGHTING FIXTURE	EIL
CFL–1	SURFACE MOUNTED CFL LIGHTING FIXTURE 1 – TYPE OF CFL LIGHTING FIXTURE	EIL
CFL–1	RECESS MOUNTED CFL LIGHTING FIXTURE 1 – TYPE OF CFL LIGHTING FIXTURE	EIL
LED–1	SURFACE MOUNTED LED LIGHTING FIXTURE 1 – TYPE OF LED LIGHTING FIXTURE	EIL
LED–1	RECESS MOUNTED LED LIGHTING FIXTURE 1 – TYPE OF LED LIGHTING FIXTURE	EIL

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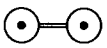
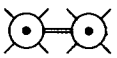
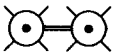
	DOUBLE OBSTRUCTION AVIATION LIGHTING FIXTURE SUITABLE FOR SAFE AREA	EIL
	DOUBLE OBSTRUCTION AVIATION LIGHTING FIXTURE SUITABLE FOR FLP IIA/IIB AREA	EIL
 IIC	DOUBLE OBSTRUCTION AVIATION LIGHTING FIXTURE SUITABLE FOR FLP IIC ARAE	EIL
	LIGHTING PANEL	EIL
	POWER PANEL	EIL
	EMERGENCY LIGHTING PANEL	EIL
MDB	MAIN DISTRIBUTION BOARD	EIL
FP	FEEDER PILLAR	EIL
	CEILING FAN	EIL
	AIR CIRCULATOR	EIL
	EXHAUST FAN	EIL
	5A SINGLE POLE SWITCH	IEC
	15A SINGLE POLE SWITCH	IEC
	5A TWO POLE SWITCH	IEC
	5A SINGLE POLE PULL CORD SWITCH	IEC
	5A TWO WAY SINGLE POLE SWITCH	IEC

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SYMBOL	DESCRIPTION	AUTHOR
	3 WAY JUNCTION BOX	EIL
	4 WAY JUNCTION BOX	EIL
	SOCKET OUTLET	IEC
	5A, 240V, 3 PIN SWITCHED SOCKET OUTLET / RECEPTACLE	EIL
	15A, 240V, 3 PIN SWITCHED SOCKET OUTLET / RECEPTACLE	EIL
	15/5A, 240V, 6 PIN SWITCHED SOCKET OUTLET / RECEPTACLE	EIL
	5A, 110V, 3PIN SWITCHED SOCKET OUTLET / RECEPTACLE	EIL
	15A, 24V, 3PIN SWITCHED SOCKET OUTLET / RECEPTACLE	EIL
	10A, 240V DP+E WITH MCB INDUSTRIAL TYPE FLAME PROOF SOCKET OUTLET / RECEPTACLE	EIL
	20A, 240V DP+E WITH MCB INDUSTRIAL TYPE FLAME PROOF SOCKET OUTLET / RECEPTACLE	EIL
	10A, 240V INDUSTRIAL TYPE SWITCHED SOCKET	EIL
	20A, 240V INDUSTRIAL TYPE SWITCHED SOCKET	EIL
	TV SOCKET OUTLET	EIL
	32A, DP MCB UNIT FOR WINDOW TYPE AC	EIL
	MOTOR OPERATED VALVE	EIL

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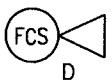
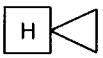
SYMBOL	DESCRIPTION	AUTHOR
	ADDRESSABLE DETECTOR TRUE CEILING (ABOVE FALSE CEILING) M – MULTI–SENSOR DETECTOR P – PHOTO ELECTRIC DETECTOR H – HEAT DETECTOR	EIL
	ADDRESSABLE DETECTOR BELOW FALSE CEILING M – MULTI–SENSOR DETECTOR P – PHOTO ELECTRIC DETECTOR H – HEAT DETECTOR	EIL
	ADDRESSABLE DETECTOR UNDER FALSE FLOORING M – MULTI–SENSOR DETECTOR P – PHOTO ELECTRIC DETECTOR H – HEAT DETECTOR	EIL
	MCS – MASTER CONTROL STATION (DESK TOP) OCS – OPERATOR CONTROL STATION (DESK TOP)	EIL
	FCS – FIELD CALL STATION WITH BUILT–IN MICROPHONE WITH EXTERNAL LOUD SPEAKER D – DESK TYPE W – WALL MOUNTED TYPE	EIL
	FIRE ALARM BREAK GLASS UNIT (MANUALLY OPERATED)	IEC
	FAJB – FIRE ALARM JUNCTION BOX	EIL
	CRM – CONTROL RELAY MODULE FIM – FAULT ISOLATOR MODULE	EIL
	EXIT SIGN W – WALL MOUNTED TYPE ONE FACED C – CEILING MOUNTED TYPE DOUBLE FACED	EIL
	H – ELECTRIC HOOTER	EIL
	HAB – HOOTER ACKNOWLEDGEMENT BOX	EIL
	R – RESPONSE INDICATOR	EIL

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SYMBOL	DESCRIPTION	AUTHOR
	HORN	IEC
	LOUD SPEAKER	IEC
	SIREN	IEC
	BELL	IEC
	BUZZER	IEC
	MASTER CLOCK	IEC
	CLOCK	IEC
	TELEPHONE SET GENERAL SYMBOL	IEC
	TELEPHONE SET WITH COMMON BATTERY	IEC
	TELEPHONE SET WITH LOUD SPEAKER	IEC
	TELEPHONE SET WITH PUSH BUTTON DIALING	IEC
PAJB	TJB – TELEPHONE JUNCTION BOX PAJB – PLANT COMMUNICATION JUNCTION BOX DCJB – DC JUNCTION BOX	EIL
LAN	LAN – LOCAL AREA NETWORK SOCKET TEL – TELEPHONE SOCKET Wi Fi – Wi Fi SOCKET	EIL
ES	ES – ETHERNET SWITCH	EIL
	TWO PIN SOCKET FOR TELEPHONE	EIL

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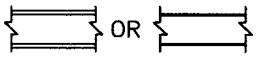
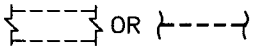
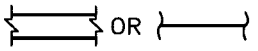
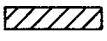
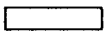
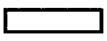
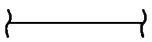
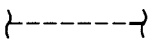
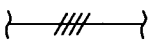
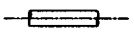
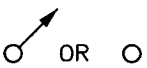
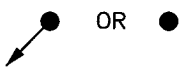
	LINED (RCC) CABLE TRENCH	EIL
	DIRECTLY BURIED CABLE TRENCH	EIL
	CABLE TREAY	EIL
	ELECTRICAL ROAD CROSSING	EIL
	STREET LIGHTING AND COMMUNICATION/FIRE ALARM CABLE ROAD CROSSING	EIL
	BOX CULVERT (ELECTRICAL ROAD CROSSING)	EIL
	CONDUIT / CABLE RUN EXPOSED	EIL
	CONDUIT RUN CONCEALED OR EMBEDDED	EIL
	CONDUIT RUN (EXPOSED OR CONCEALED) NO. OF OBLIQUE LINES INDICATES NUMBER OF WIRES	EIL
	HOME RUN OF CIRCUIT TO PANEL/DISTRIBUTION BOX/JUNCTION BOX	EIL
	PIPE SLEEVE	EIL
	CABLE RISES UP	EIL
	CABLE DROPS DOWN	EIL
	HEATER	EIL
	CONTACTOR	EIL
	ISOLATOR	EIL

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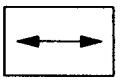
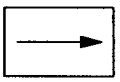
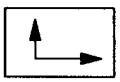
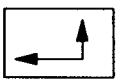
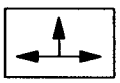
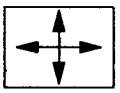
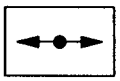
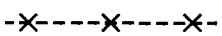
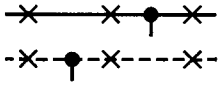
	CABLE ROUTE MARKER BOTH WAYS	EIL
	CABLE ROUTE MARKER STRAIGHT	EIL
	CABLE ROUTE MARKER RIGHT ANGLE TYPE 'A'	EIL
	CABLE ROUTE MARKER RIGHT ANGLE TYPE 'B'	EIL
	CABLE ROUTE MARKER TEE	EIL
	CABLE ROUTE MARKER CROSS OVER	EIL
	CABLE JOINT MARKER	EIL
	EARTH STRIP / CONDUCTOR EXPOSED	EIL
	EARTH STRIP / CONDUCTOR BURIED	EIL
	EARTH STRIP / CONDUCTOR TAPPING	EIL
	75x10 MM EARTH STRIP / CONDUCTOR EXPOSED	EIL
	75x10 MM EARTH STRIP / CONDUCTOR BURIED	EIL
	EARTH ELECTRODE IN TEST PIT	EIL
	EARTH ELECTRODE WITHOUT TEST PIT	EIL
	EARTH PLATE	EIL

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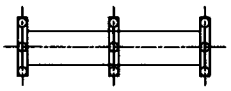
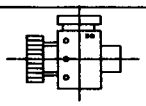
SYMBOL	DESCRIPTION	AUTHOR
	CIRCUIT BREAKER (SWITCH YARD)	EIL
	ISOLATOR (SWITCH YARD)	EIL
	GANTRY (SWITCH YARD)	EIL
	TRANSFORMER	EIL
	POTENTIAL TRANSFORMER (SWITCH YARD)	EIL
	CURRENT TRANSFORMER (SWITCH YARD)	EIL
	LIGHTNING ARRESTOR (SWITCH YARD)	EIL

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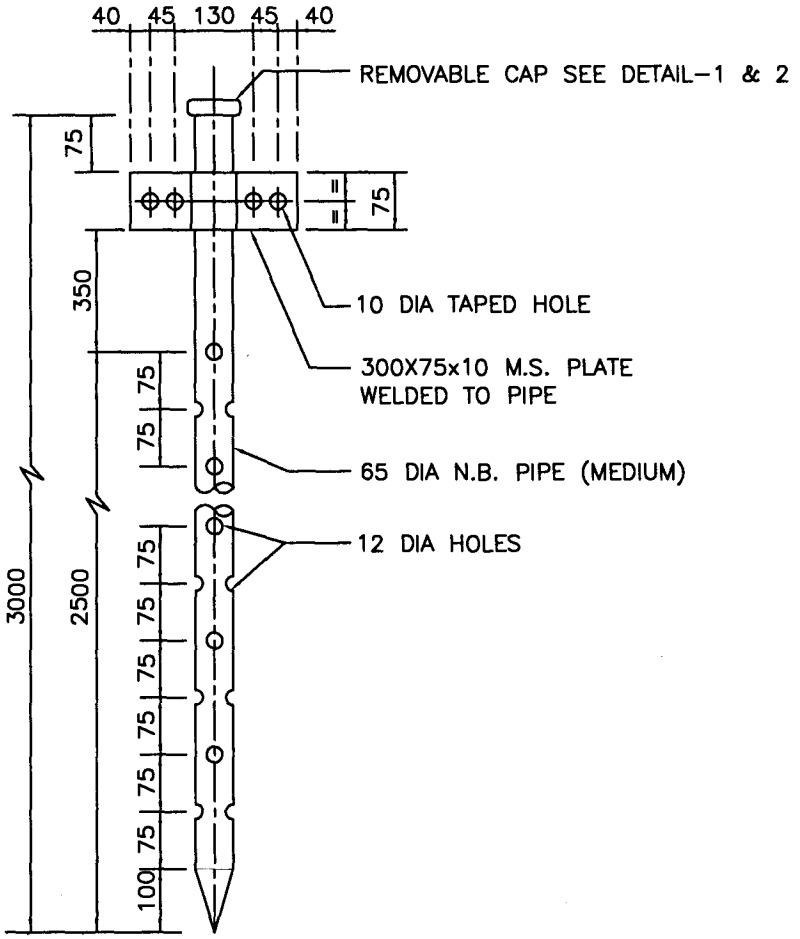
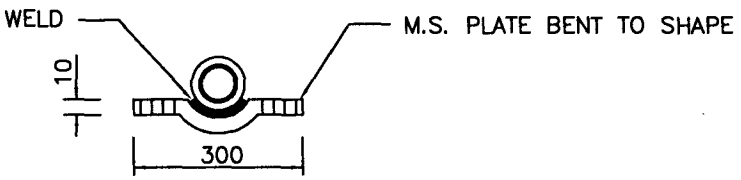
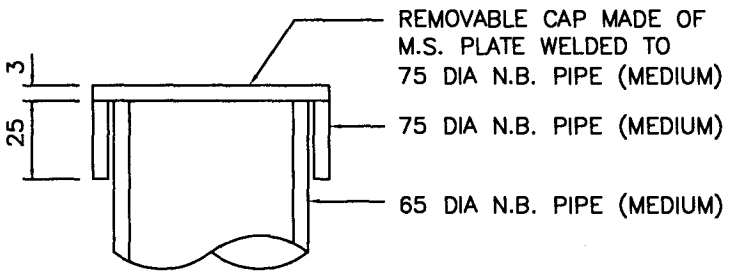
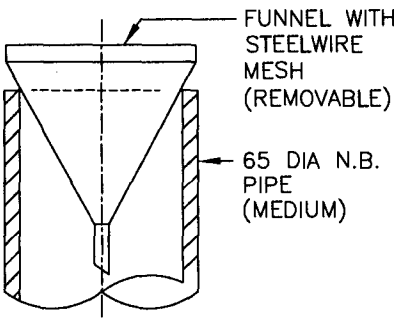






DETAIL-1



DETAIL-2

NOTE:-

1. THE PIPE ASSEMBLY SHALL BE HOT DIP GALVANISED AFTER FABRICATION. AMOUNT OF GALVANISING SHALL BE 150 MICRONS (MIN.) AS PER IS:3043.

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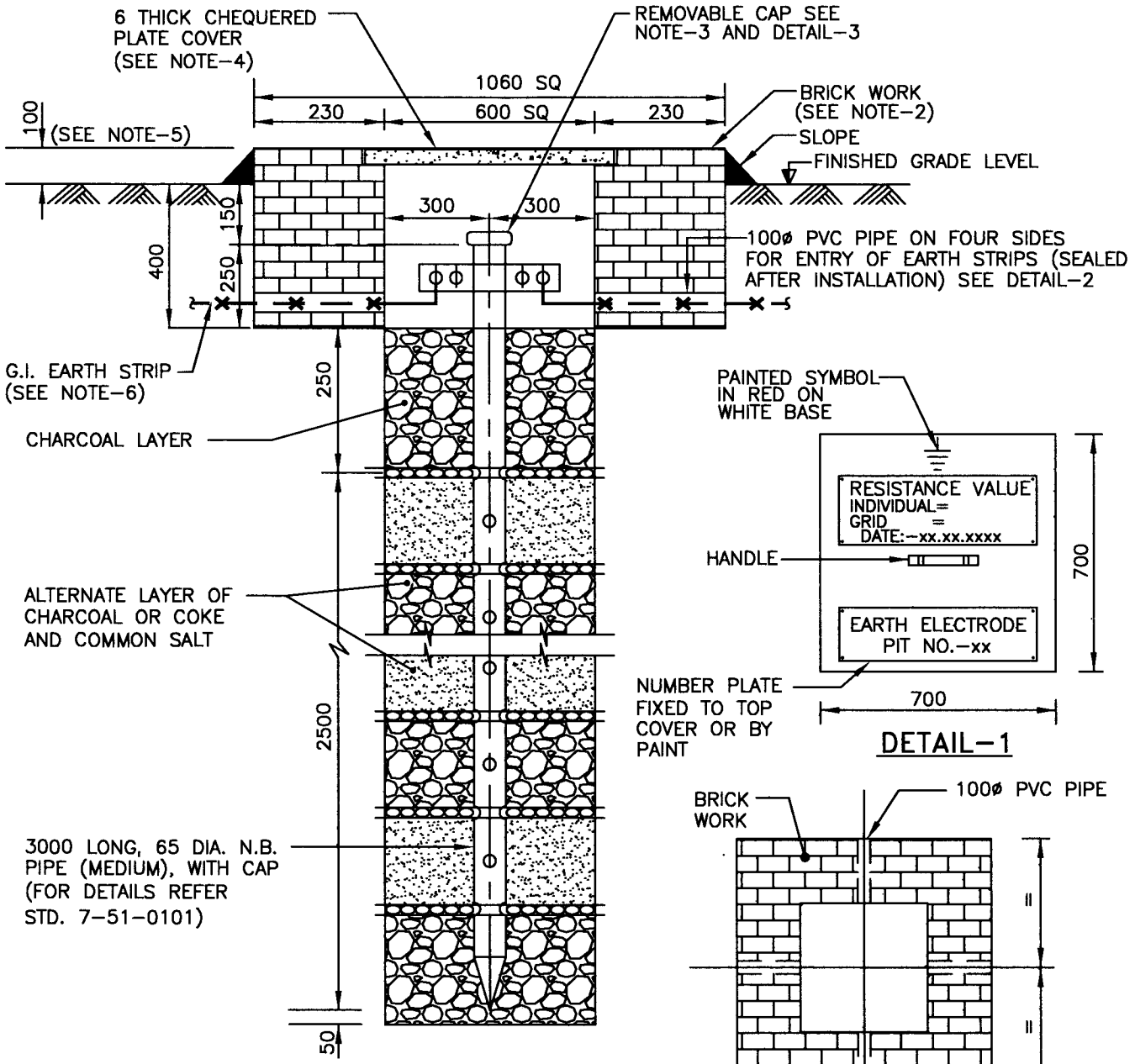
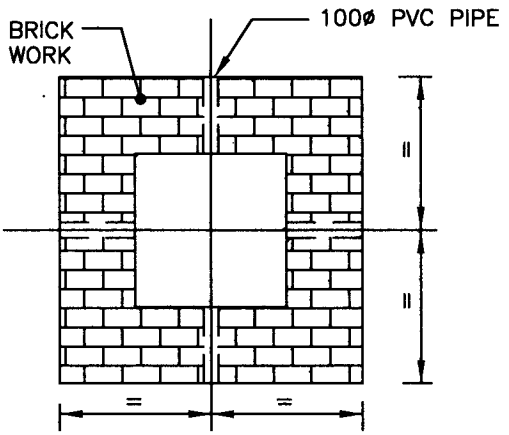
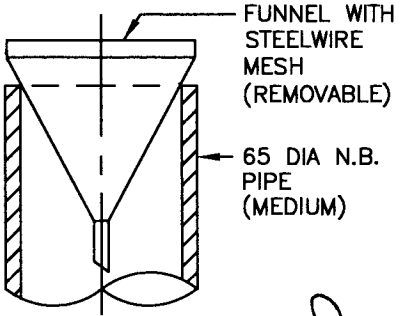


DETAIL-1



DETAIL-2



DETAIL-3

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. BRICK WORK SHALL BE DONE AFTER COMPACTING THE SOIL IN UNPAVED AREA.
3. AFTER REMOVAL OF CAP, OWNER SHALL BE ABLE TO POUR WATER THROUGH HIS OWN FUNNEL WITH STEEL WIRE MESH.
4. COLOUR CODING & PAINTING OF COVERS SHALL BE AS PER PAINTING SPEC. NO. 6-79-0020.
5. IN CASE OF PAVED AREAS, TOP OF PIT SHALL BE FLUSHED WITH FFL, WHEREAS IN UNPAVED AREAS, TOP OF PIT SHALL BE PROJECTED 100MM ABOVE FGL.
6. CONNECTIONS OF G.I. EARTH STRIP TO THE PLATE SHALL BE IN LINE WITH STD. 7-51-0103.

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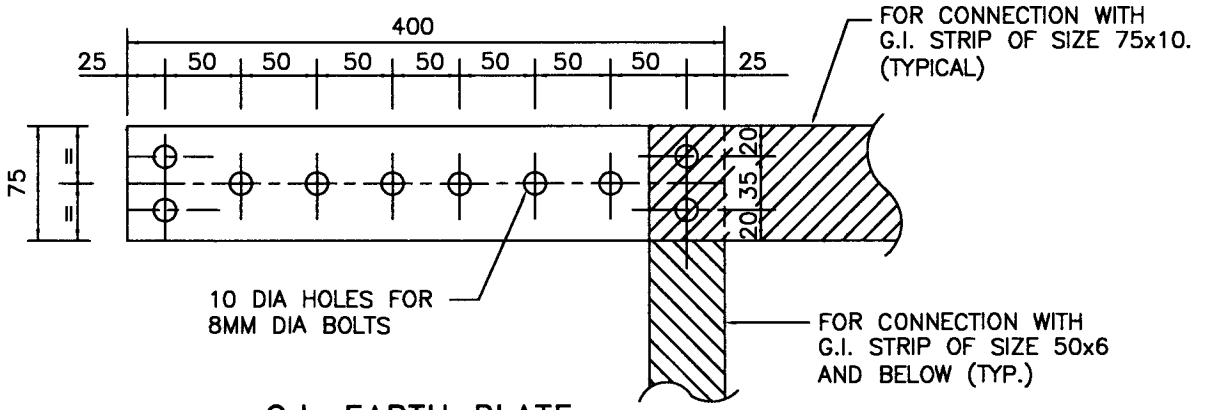
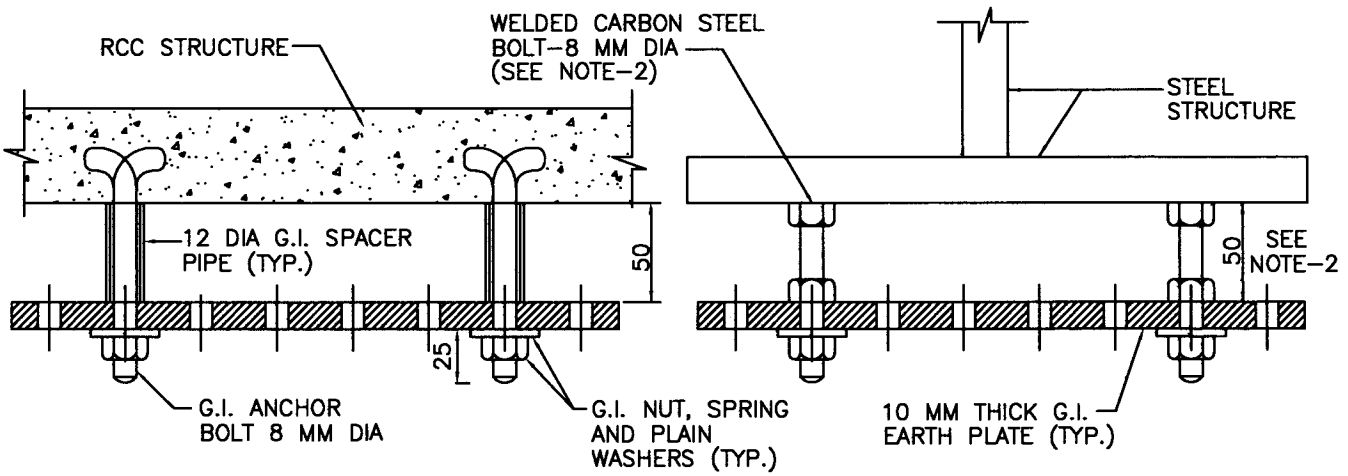
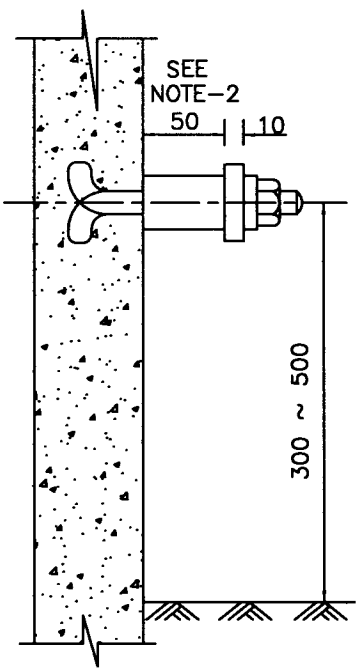
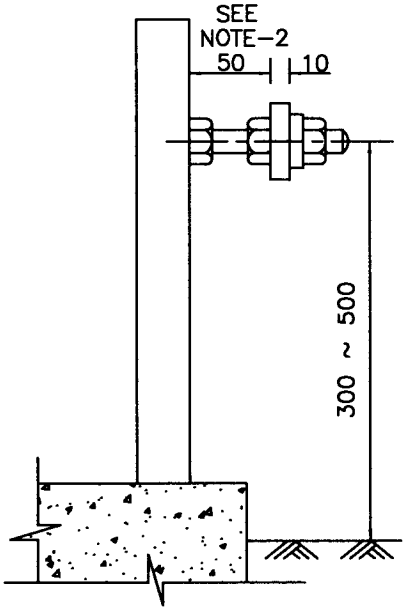


G.I. EARTH PLATE

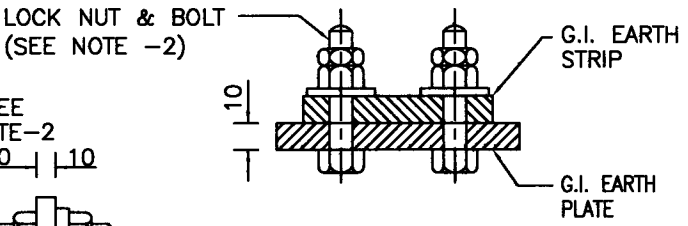




TYPICAL INSTALLATION OF EARTH PLATE ON R.C.C. STRUCTURES



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.

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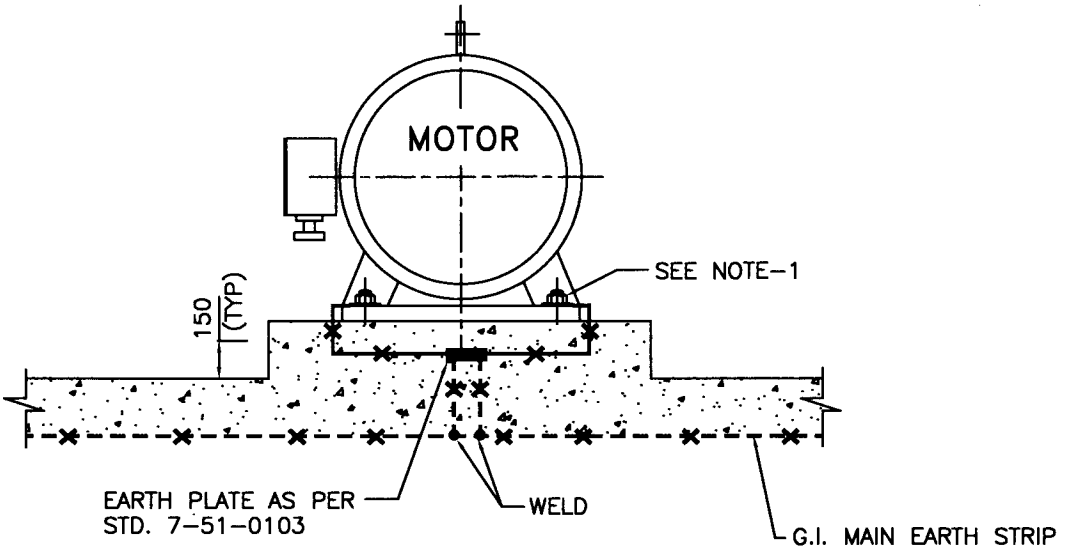
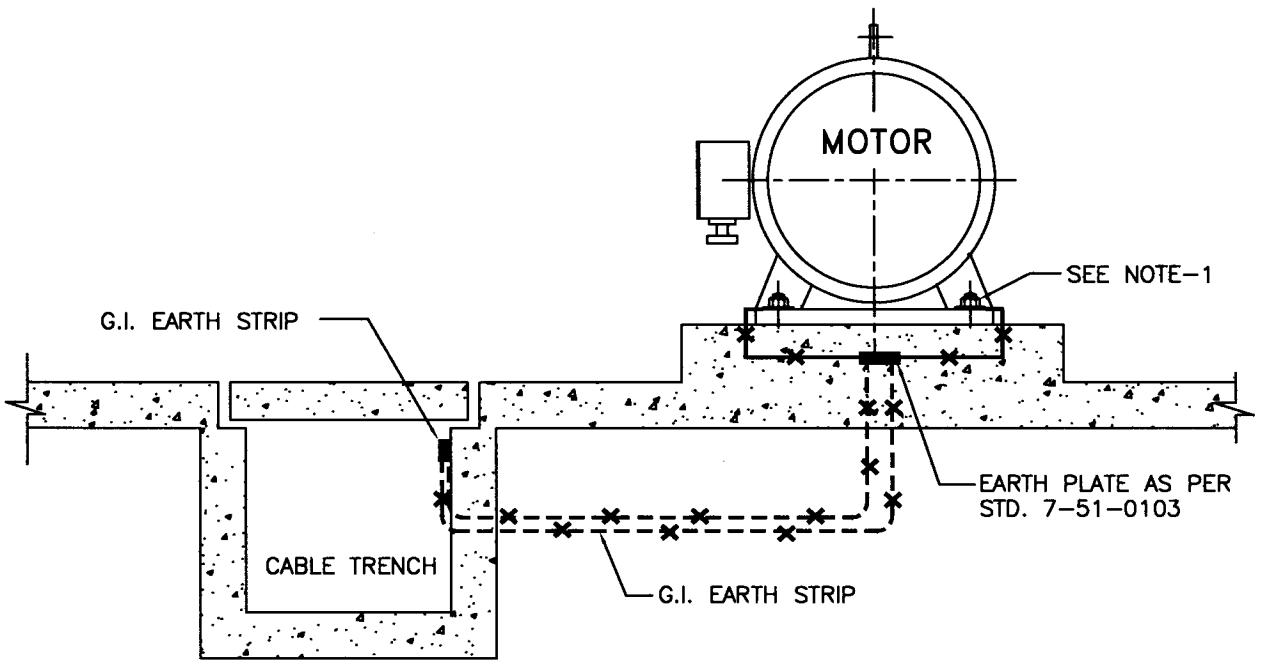


DETAIL–1
CONNECTION WITH BURIED EARTH GRID



DETAIL–2
CONNECTION WITH EARTH GRID IN RCC TRENCH

NOTE:–

1. MOTOR FOUNDATION BOLT SHALL NOT BE USED FOR EARTHING.
2. EARTHING OF P.B. STN. INSTALLED NEAR MOTOR FOUNDATION SHALL BE DONE BY TAPPING 8 SWG G.I. WIRE FROM EARTH PLATE.

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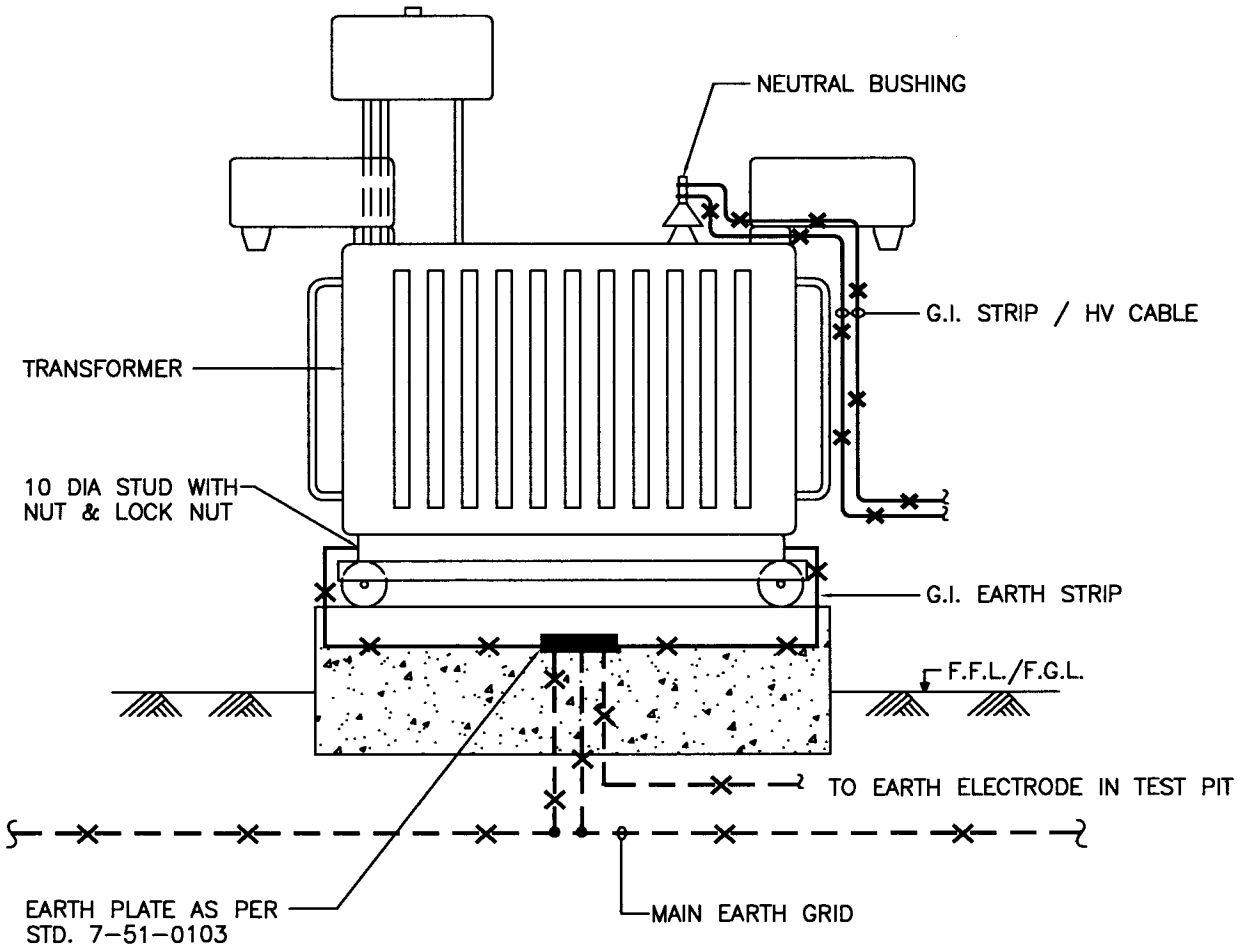
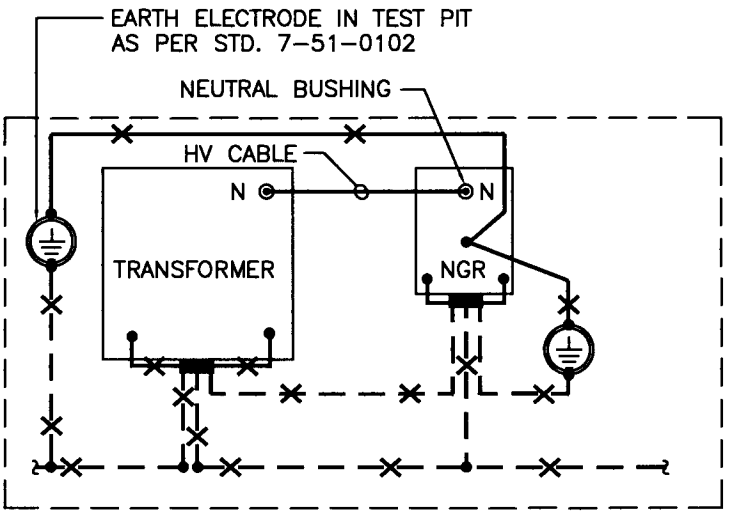
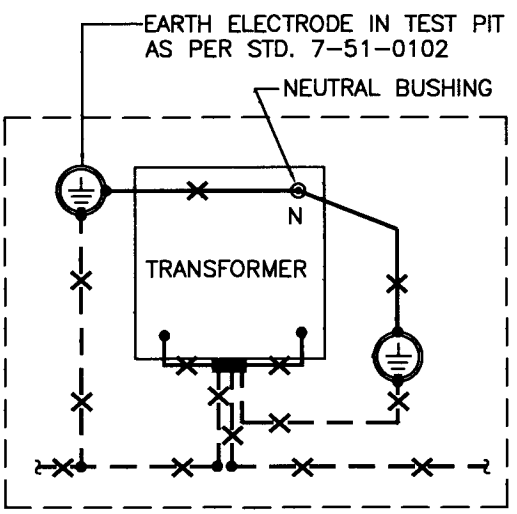




LINE DIAGRAM
NEUTRAL EARTHING THROUGH NGR



LINE DIAGRAM
SOLID NEUTRAL EARTHING

NOTES:-

1. EARTH ELECTRODE IN TEST PITS SHALL BE SO LOCATED THAT DISTANCE BETWEEN TWO PITS SHALL BE MINIMUM 6 METER.

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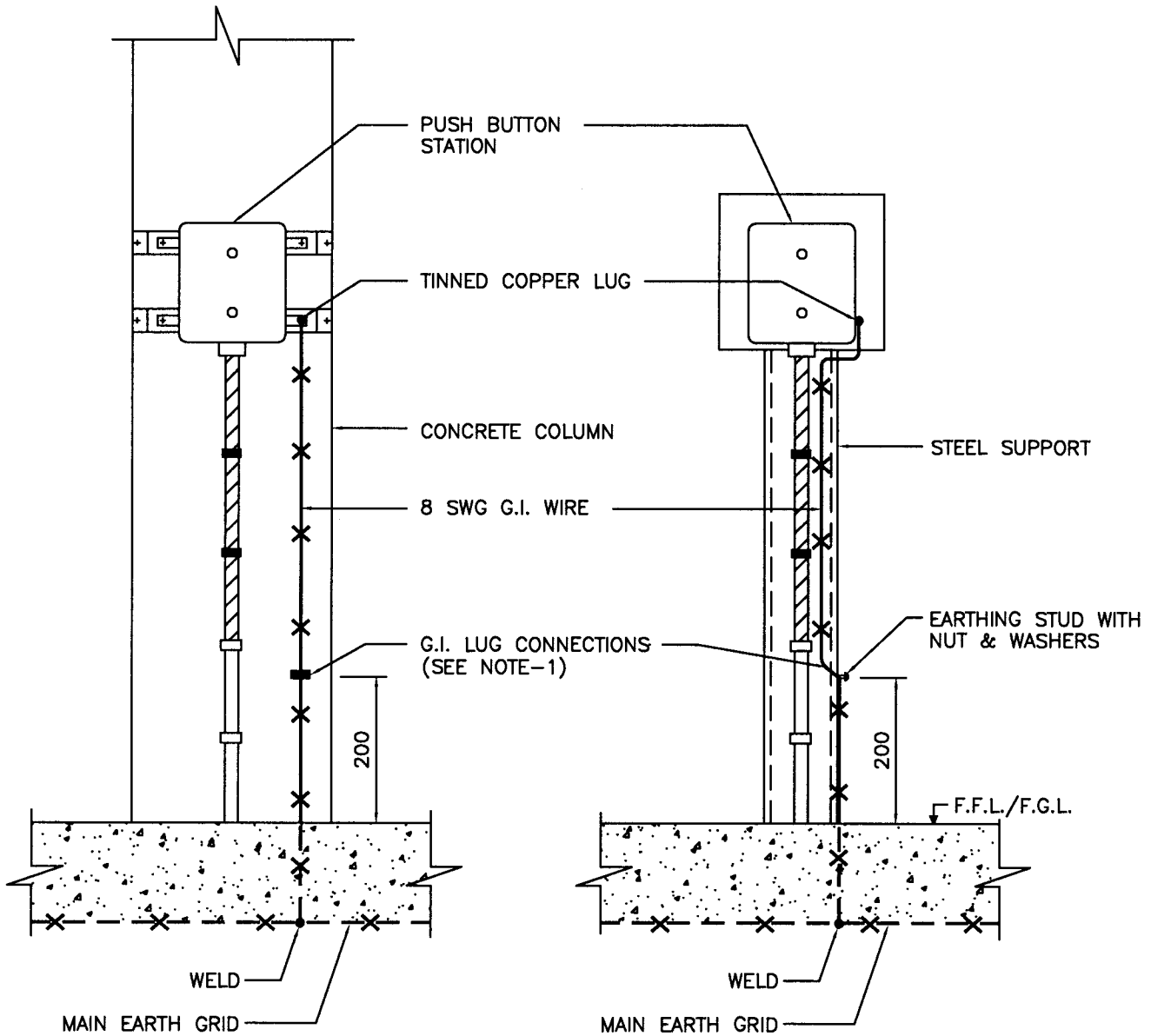

NOTES:-

1. ALTERNATIVELY, CONNECTION SHALL BE TAKEN FROM THE NEAREST AVAILABLE EARTH PLATE.

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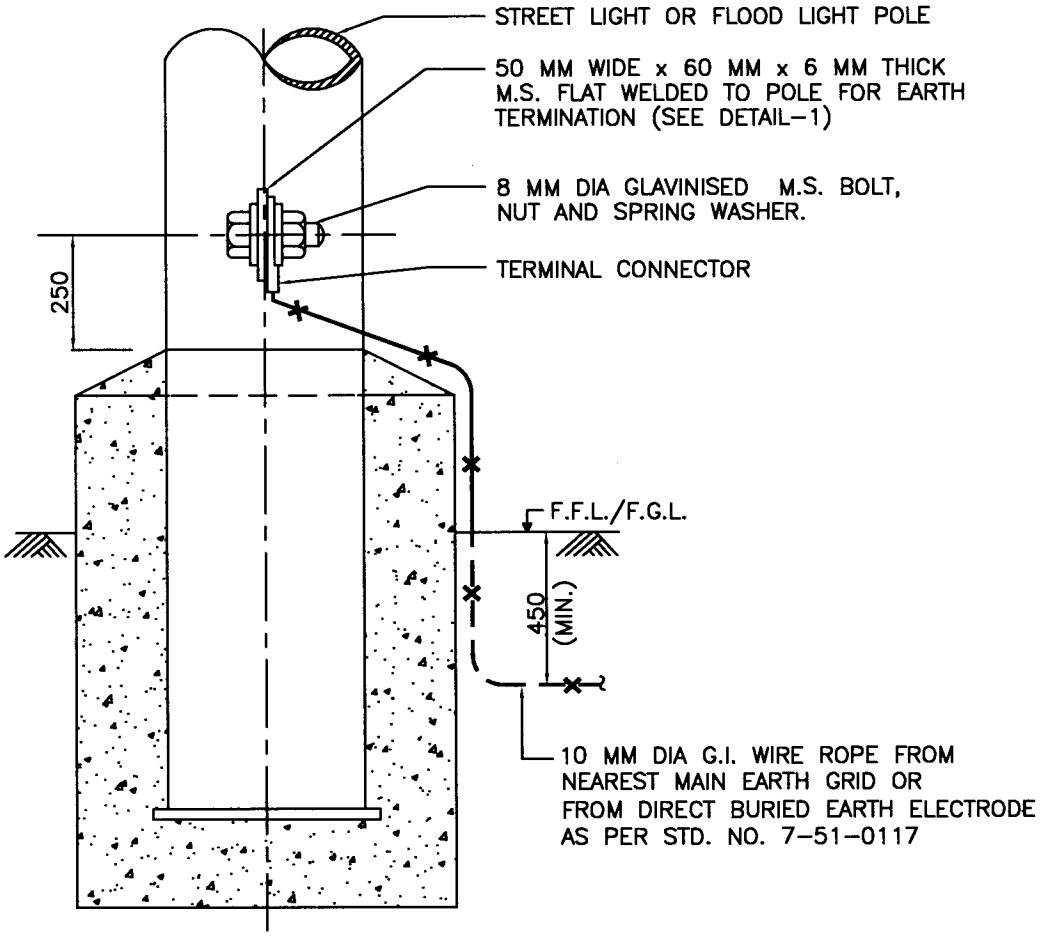

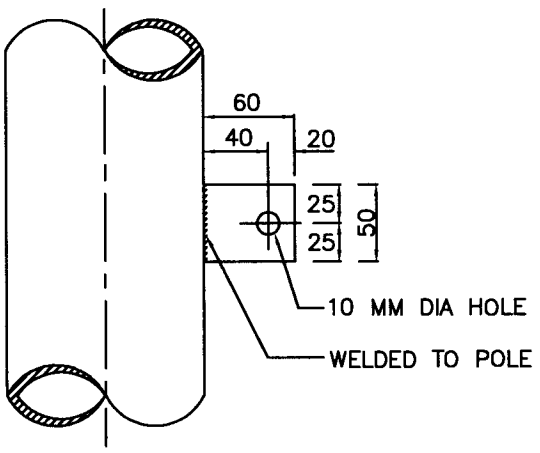

DETAIL–1

NOTES:–

1. USE TWO WIRES ROPES IF VOLTAGE IN THE POLE JUNCTION BOX IS 415 VOLTS.

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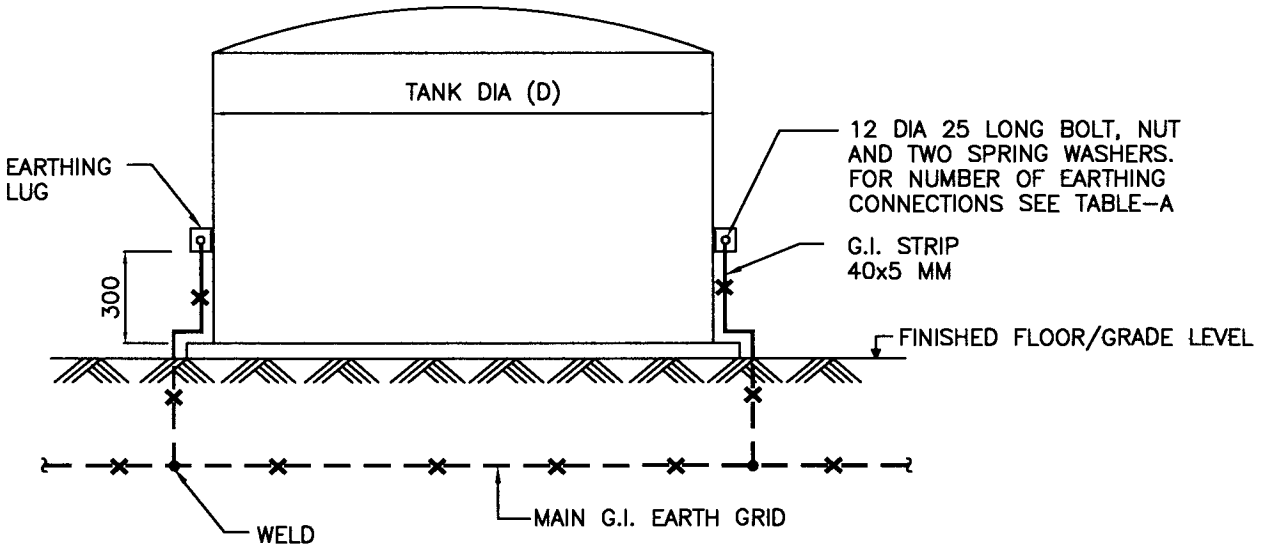
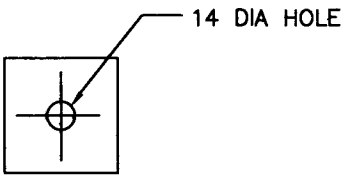


DETAIL-1 (TANK)

TABLE-A

TANK/SPHERE DIAMETER(D) (IN MTRS)	EARTHING CONNECTION
<15	2 AT 180°
15 ≤ D <25	3 AT 120°
25 ≤ D <35	4 AT 90°
35 ≤ D <45	5 AT 72°
45 ≤ D <55	6 AT 60°
55 ≤ D <65	7 AT 51.43°
65 ≤ D <75	8 AT 45°
75 ≤ D <85	9 AT 40°
85 ≤ D <95	10 AT 36°



EARTH LUG ON TANK
BY TANK FABRICATOR

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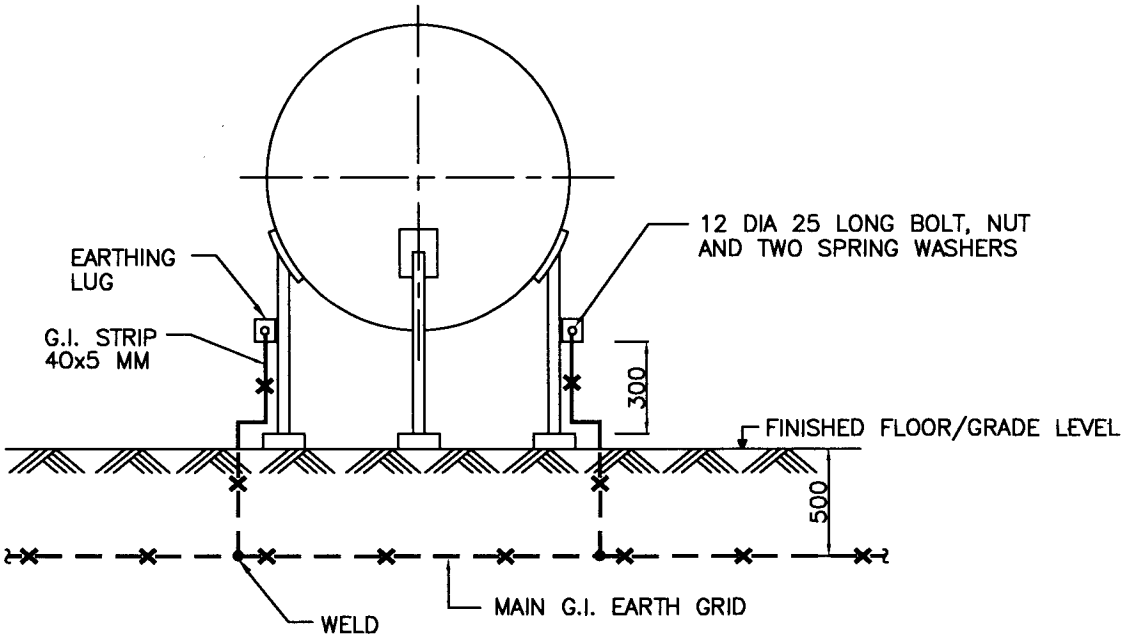
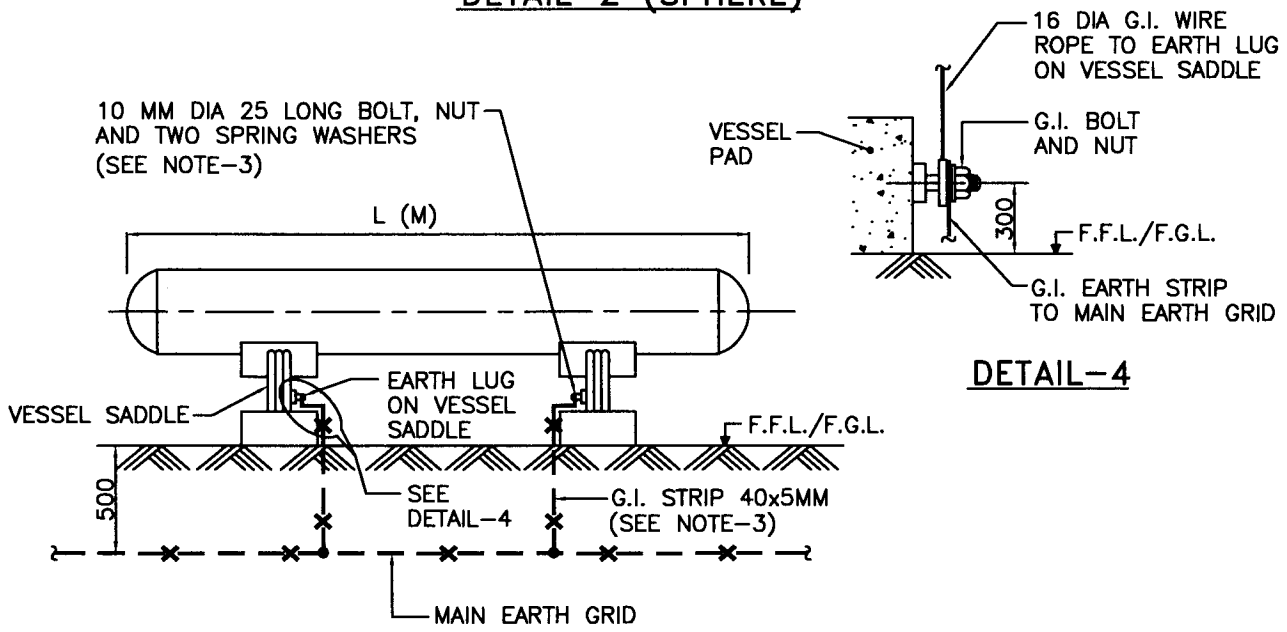


DETAIL–2 (SPHERE)



DETAIL–4

DETAIL–3 (HORIZONTAL VESSEL)

NOTES:–

1. FOR VESSELS TWO NOS. OF DIAMETRICALLY OPPSITE EARTHING LUGS WILL BE AVAILABLE ON LEG SUPPORTS OF EQUIPMENT FOR PROVIDING EARTH CONNECTION.
2. ALL VESSELS SHALL HAVE TWO EARTH CONNECTIONS IN GENERAL.
3. HORIZONTAL VESSEL OF LENGTH MORE THAN 20 METERS :–
   TWO EARTH LUGS ARE PROVIDED ON EACH SADDLE OF HORIZONTAL VESSELS, ACCORDINGLY THERE SHALL BE TWO EARTH CONNECTIONS TO THE EARTH GRID FROM EACH SADDLE.

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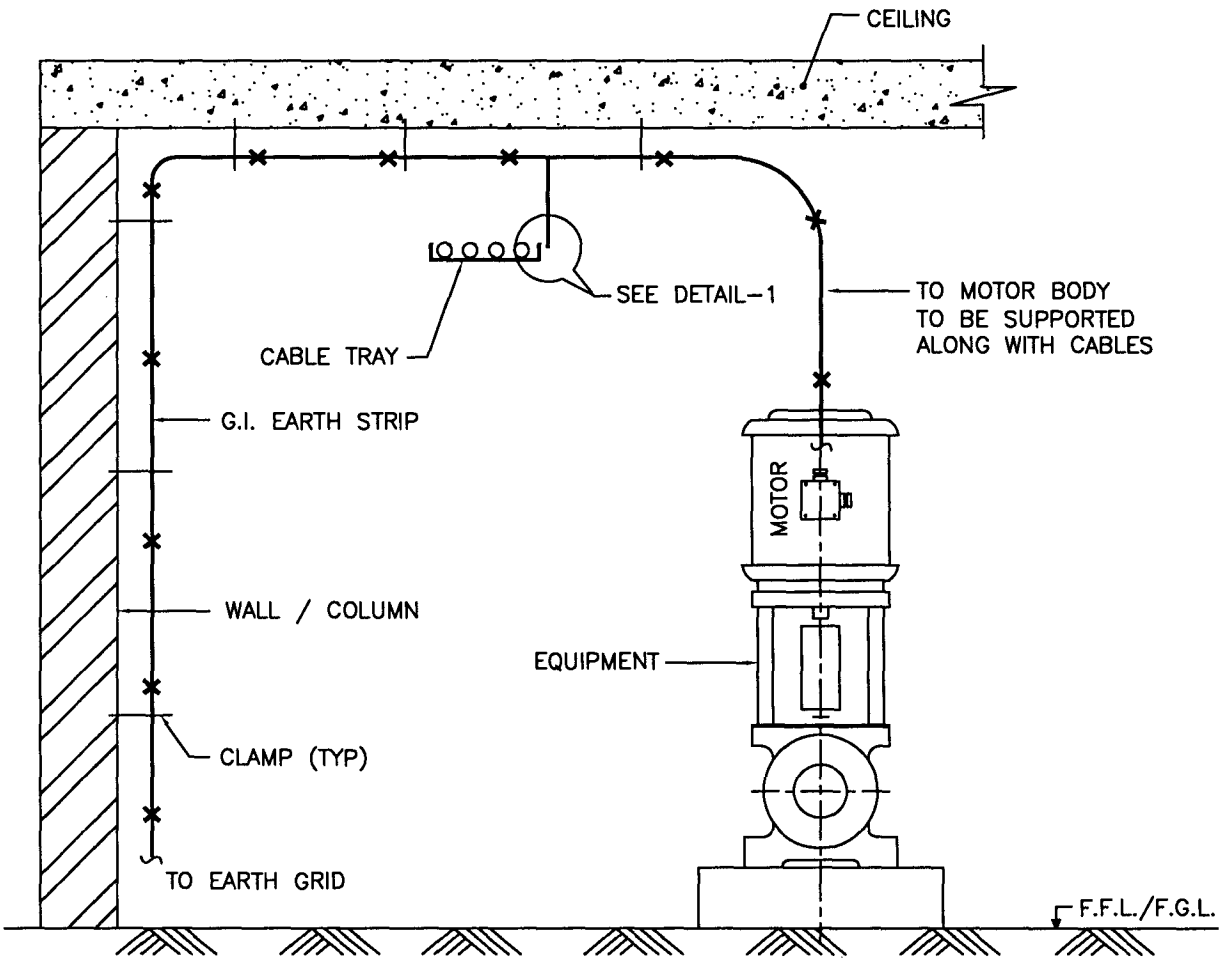
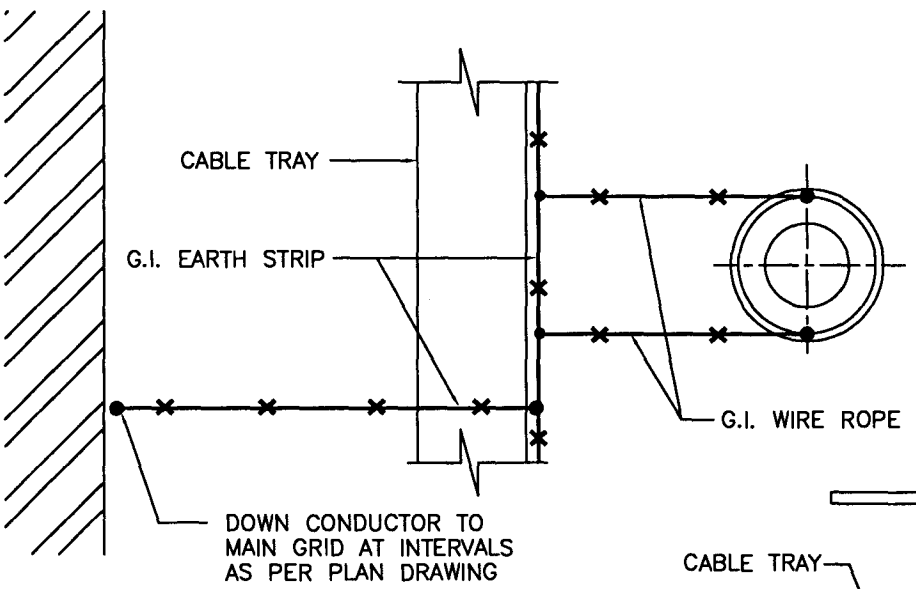
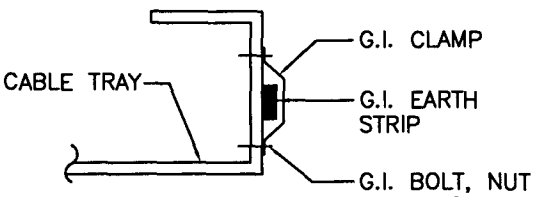




PLAN VIEW



DETAIL-1

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6	29.11.21	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
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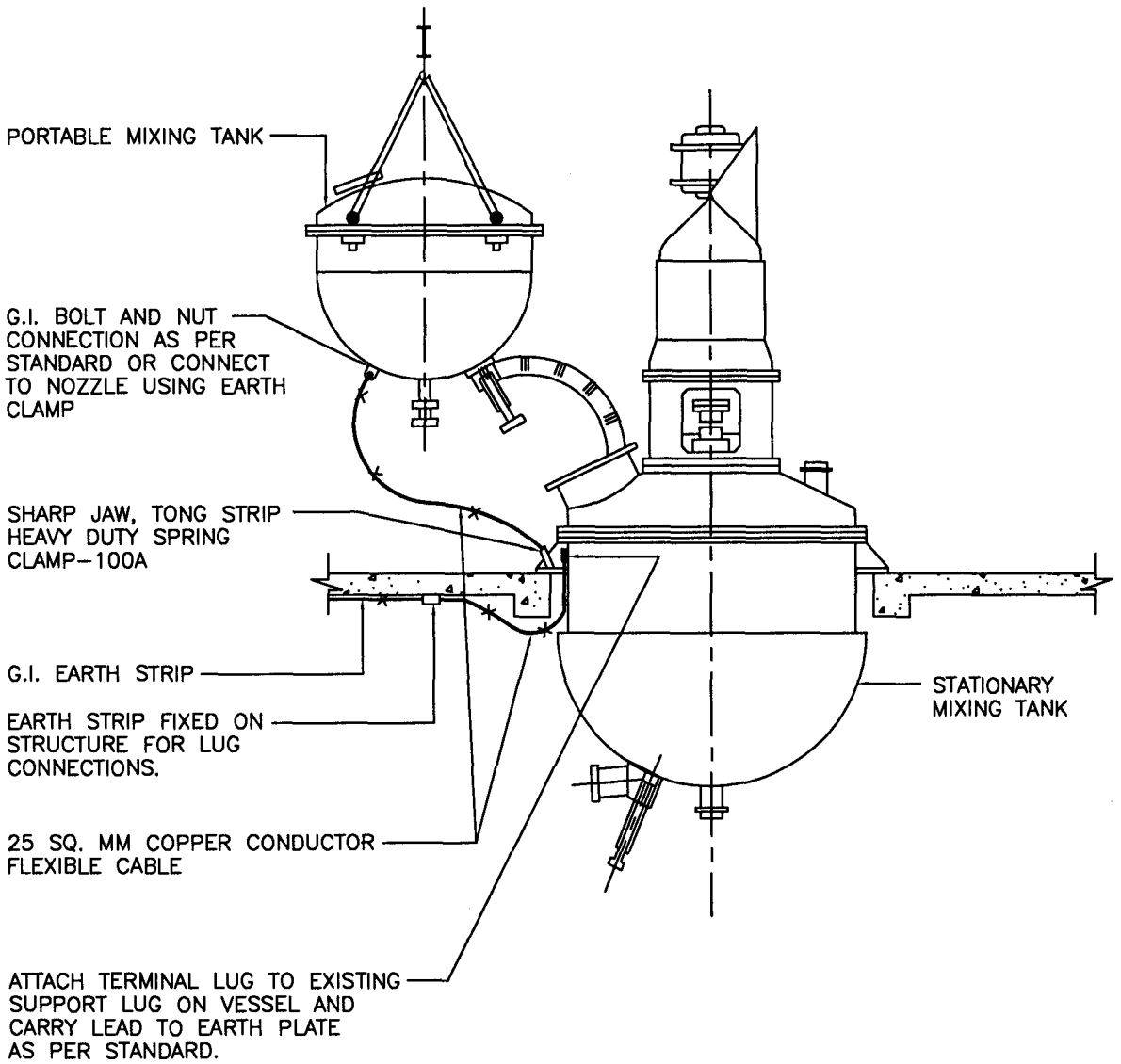

NOTE:–

1. ALL PROCESSING EQUIPMENT SUCH AS MIXTURES, CHURNS, AUTOCLAVES, COLUMNS, CENTRIFUGES, FILTERS, PRESS PUMPS ETC. SHALL BE EARTHED, IF THESE ARE NOT IN DIRECT CONTACT WITH PROPERLY EARTHED STEEL MEMBERS.
2. ALL TEMPORARY EARTH CONNECTIONS SHALL BE MADE BEFORE OPENING THE VESSEL.

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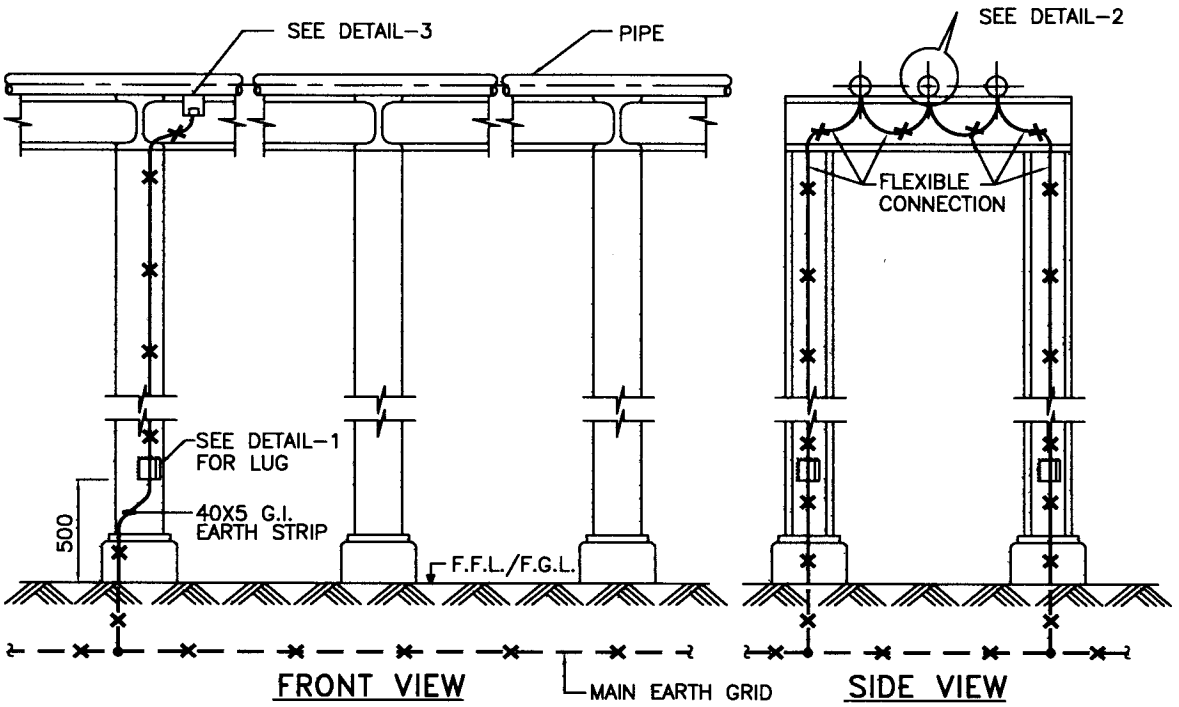

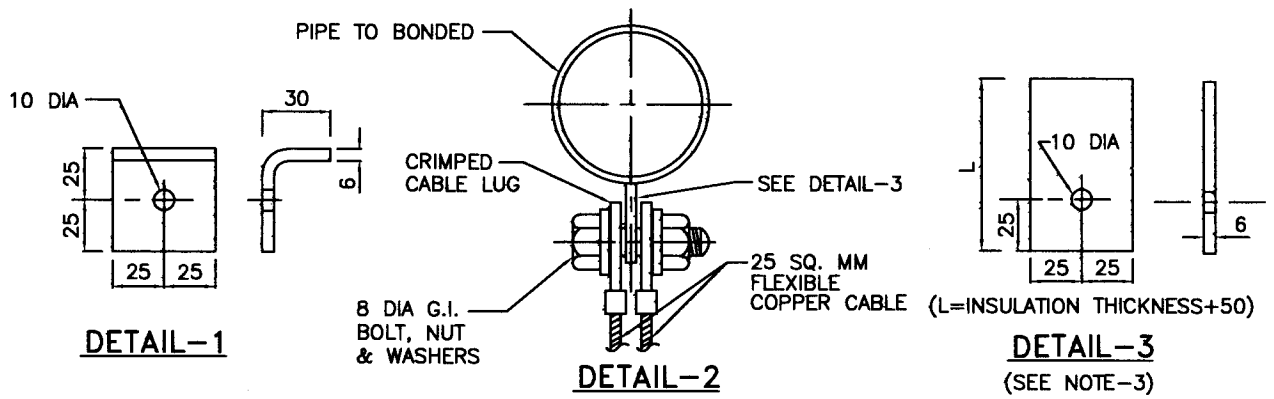

NOTES:–

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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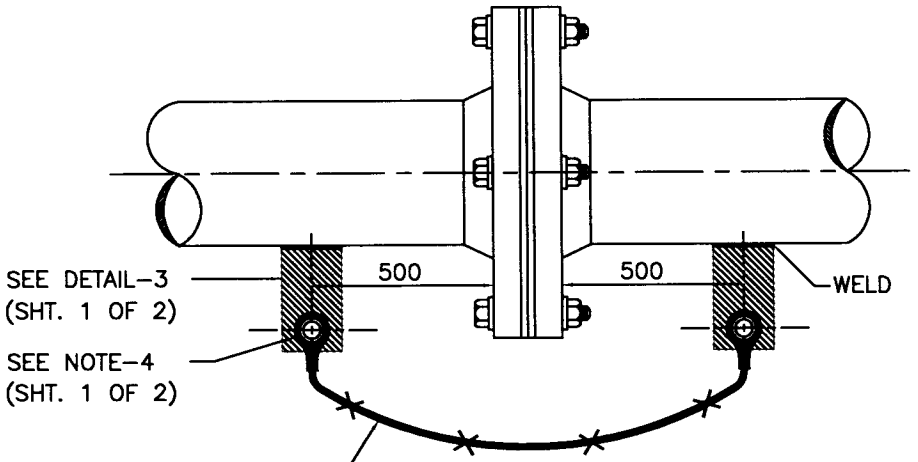
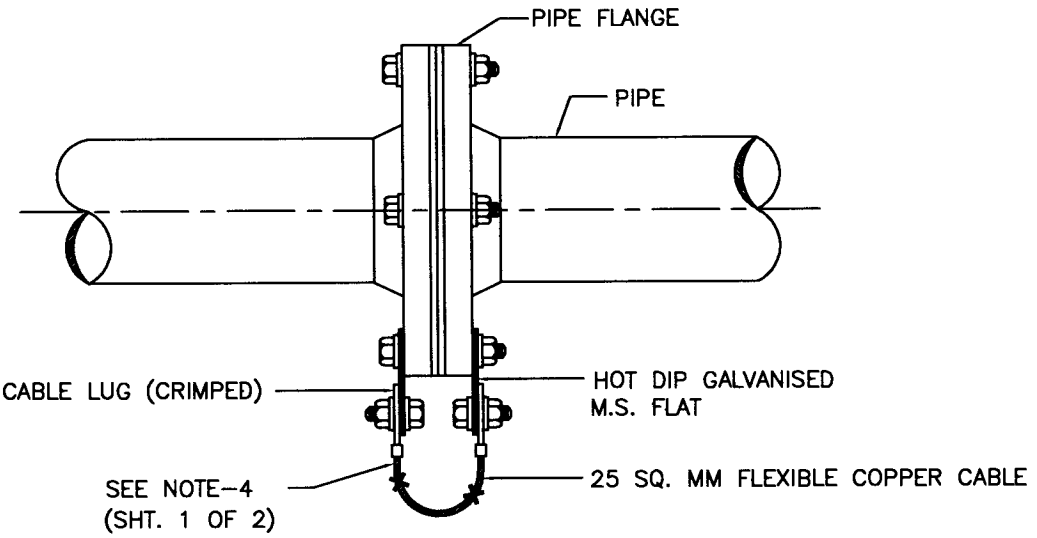
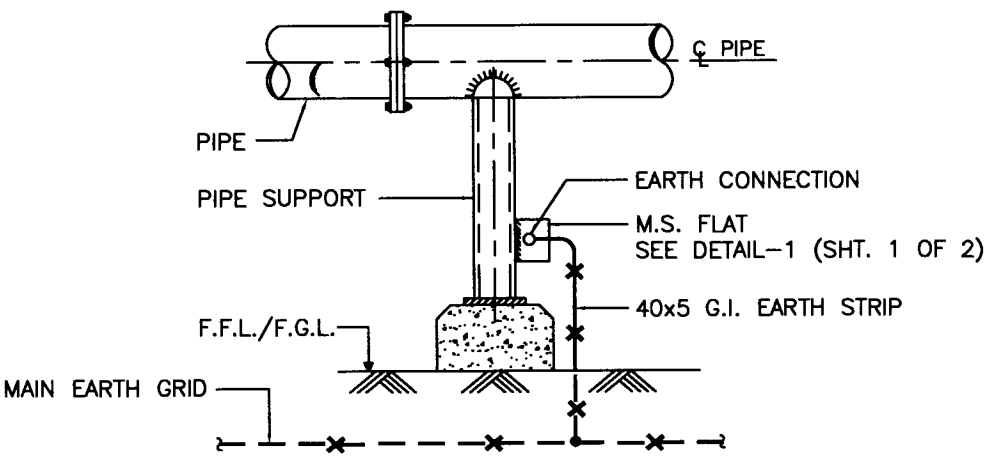


ARRANGEMENT–1



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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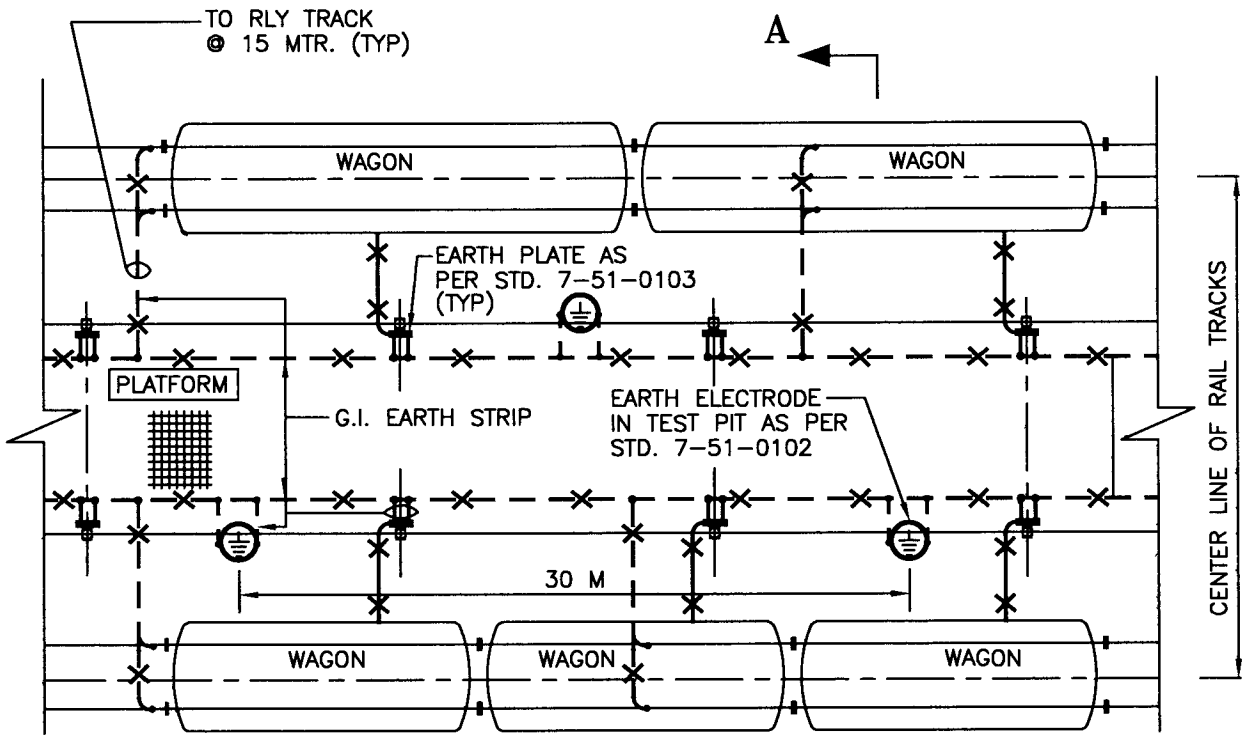
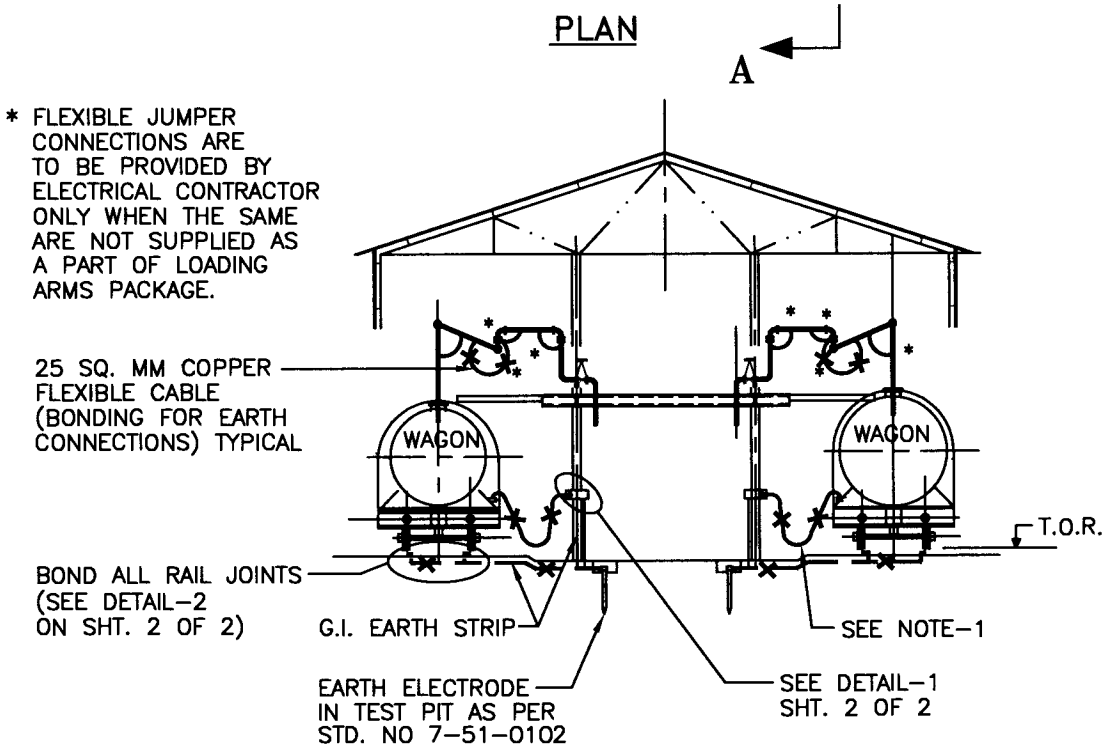


PLAN



SECTION A-A

NOTE:-

1. SUPPLY OF FLEXIBLE CABLE AND SPRING CLAMPS BY ELECTRICAL CONTRACTOR ARE NOT REQUIRED WHEN MONITORING OF EARTH SCHEME IS INCLUDED AS PART OF PLANT AUTOMATION PACKAGE.

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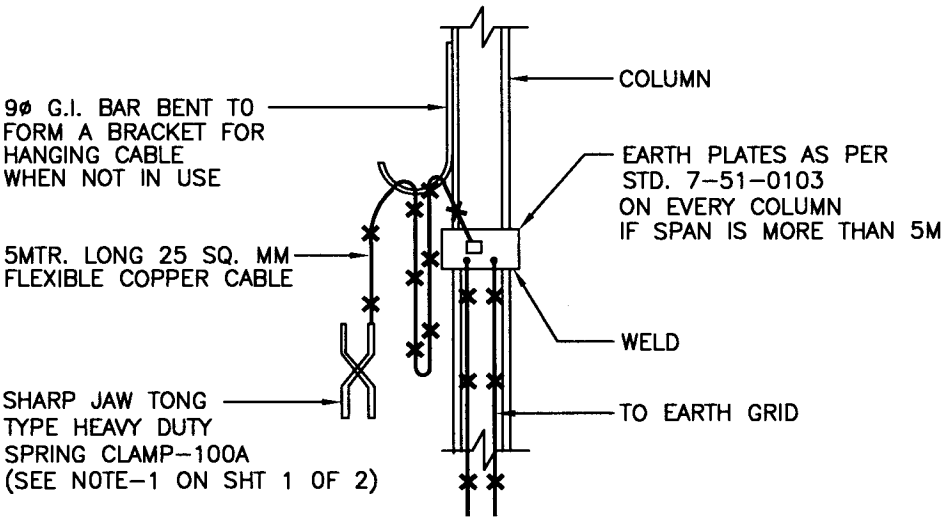
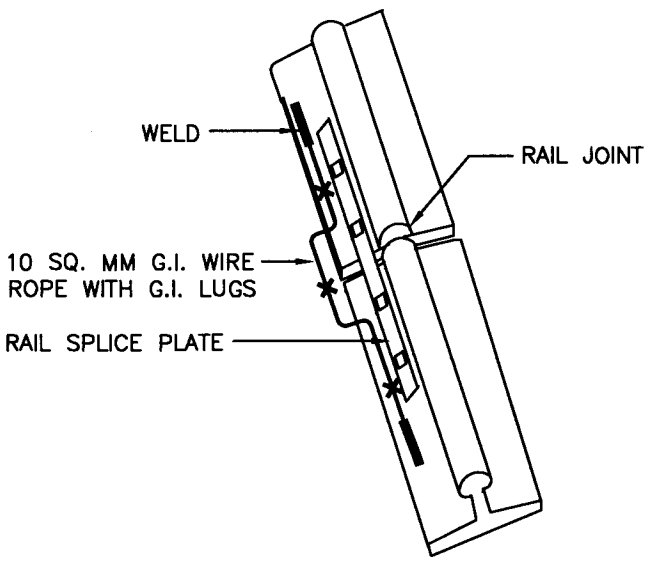


DETAIL–1



DETAIL–2

BONDING OF SINGLE RAIL

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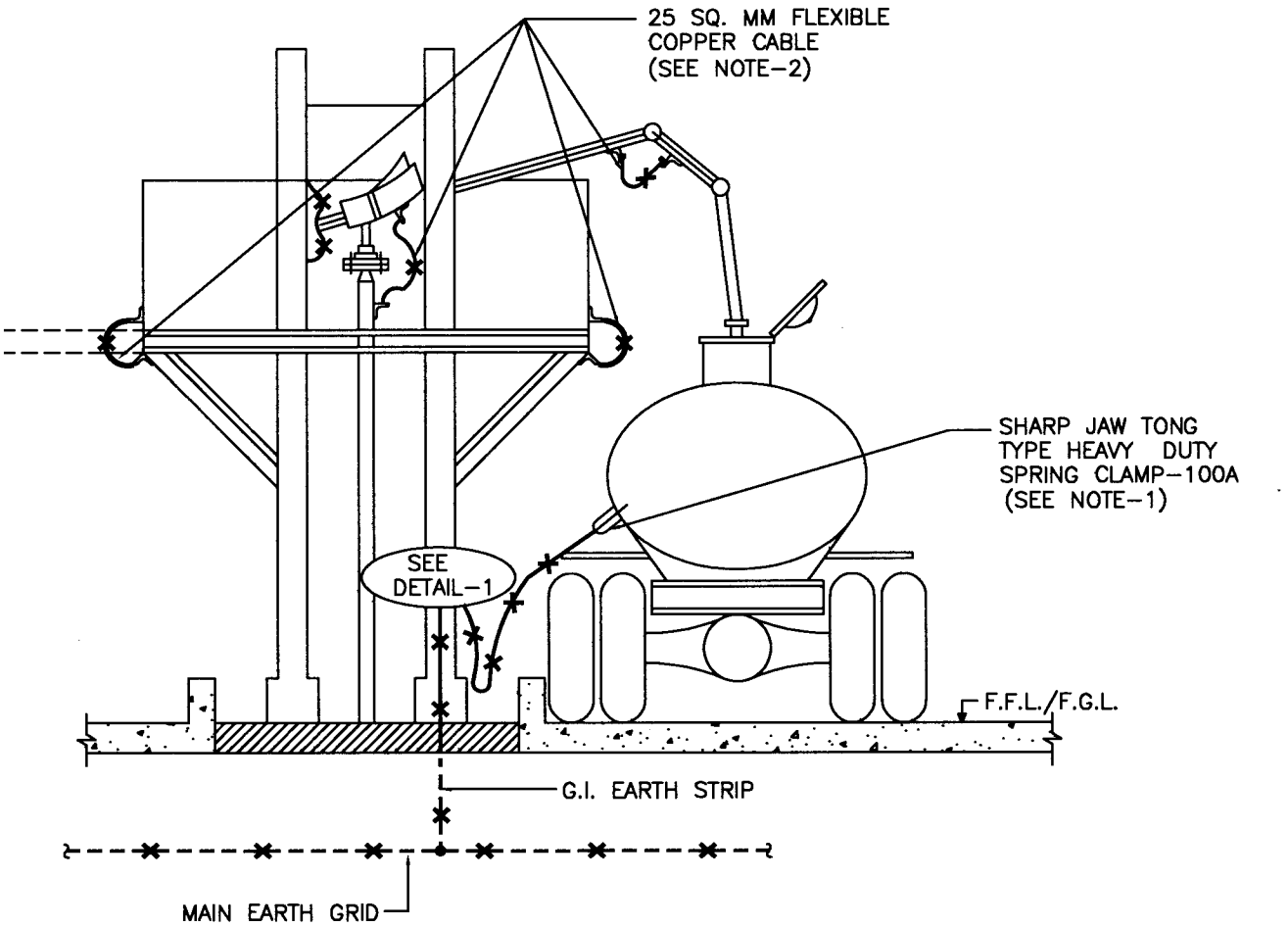

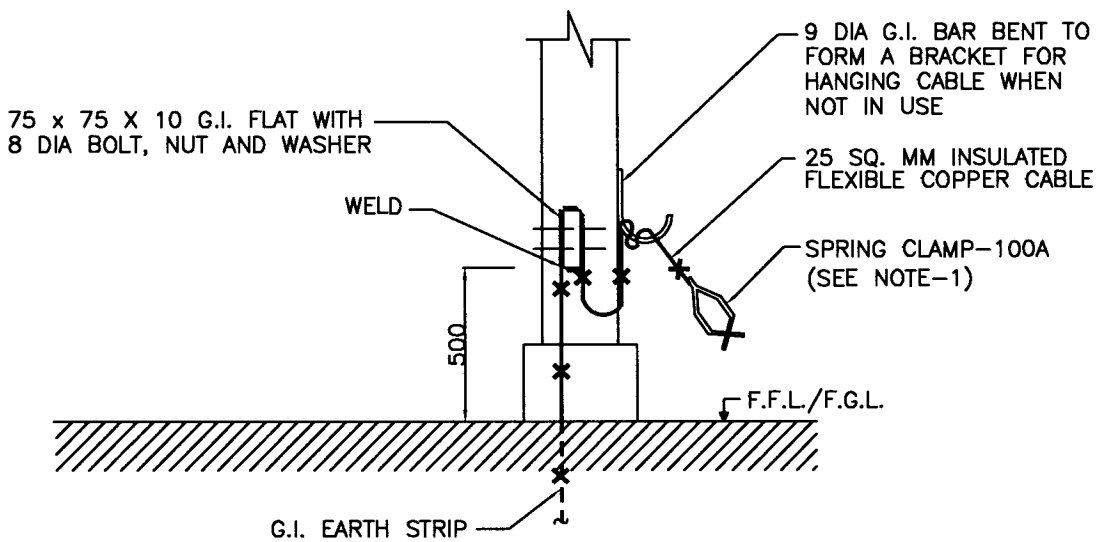

DETAIL-1

NOTE:-

1. SUPPLY OF FLEXIBLE CABLE AND SPRING CLAMPS BY ELECTRICAL CONTRACTOR ARE NOT REQUIRED, WHEN EARTHING SCHEME MONITORING IS INCLUDED AS PART OF PLANT AUTOMATION PACKAGE.
2. 25 MM SQ. FLEXIBLE COPPER CABLE (BONDING FOR EARTH CONNECTIONS) SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR WHEN THE SAME IS NOT INCLUDED AS A PART OF LOADING ARMS PACKAGE.

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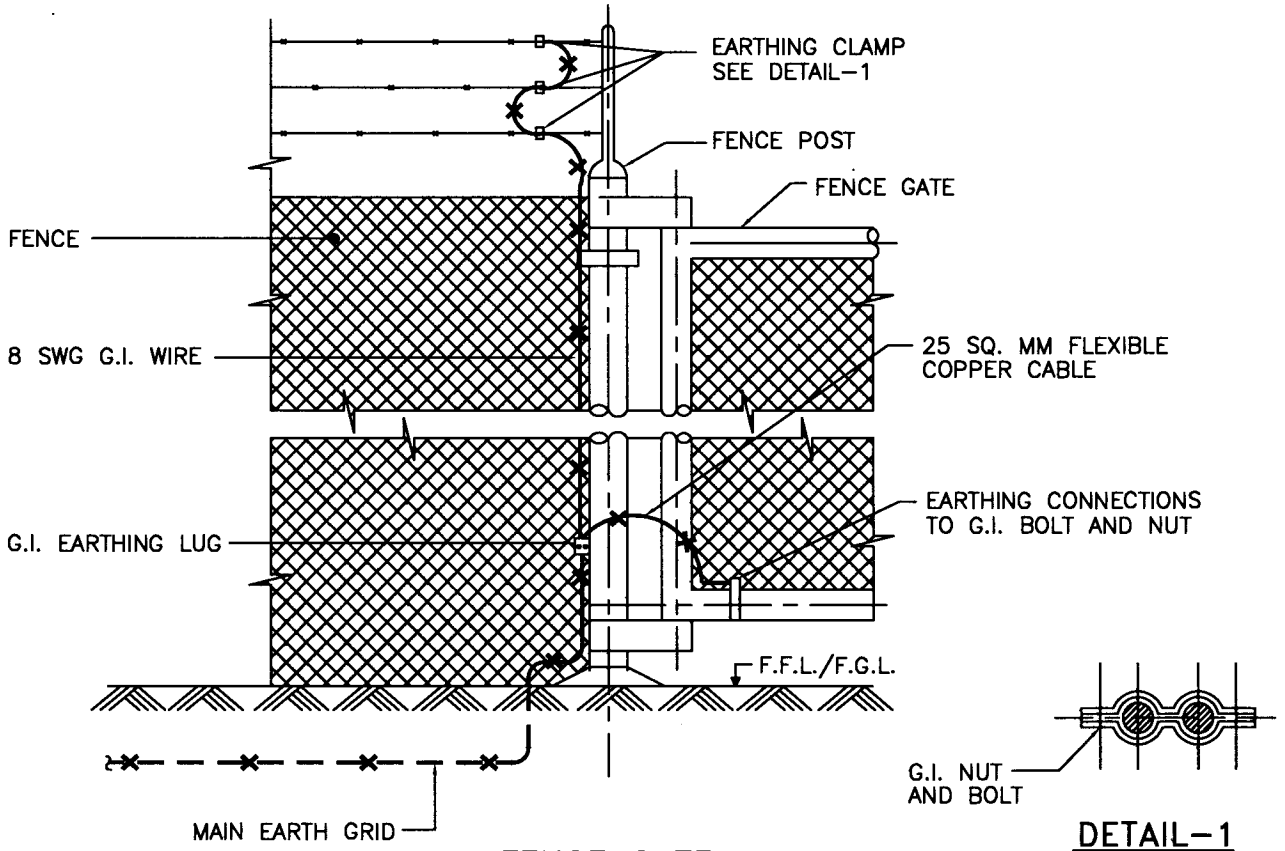
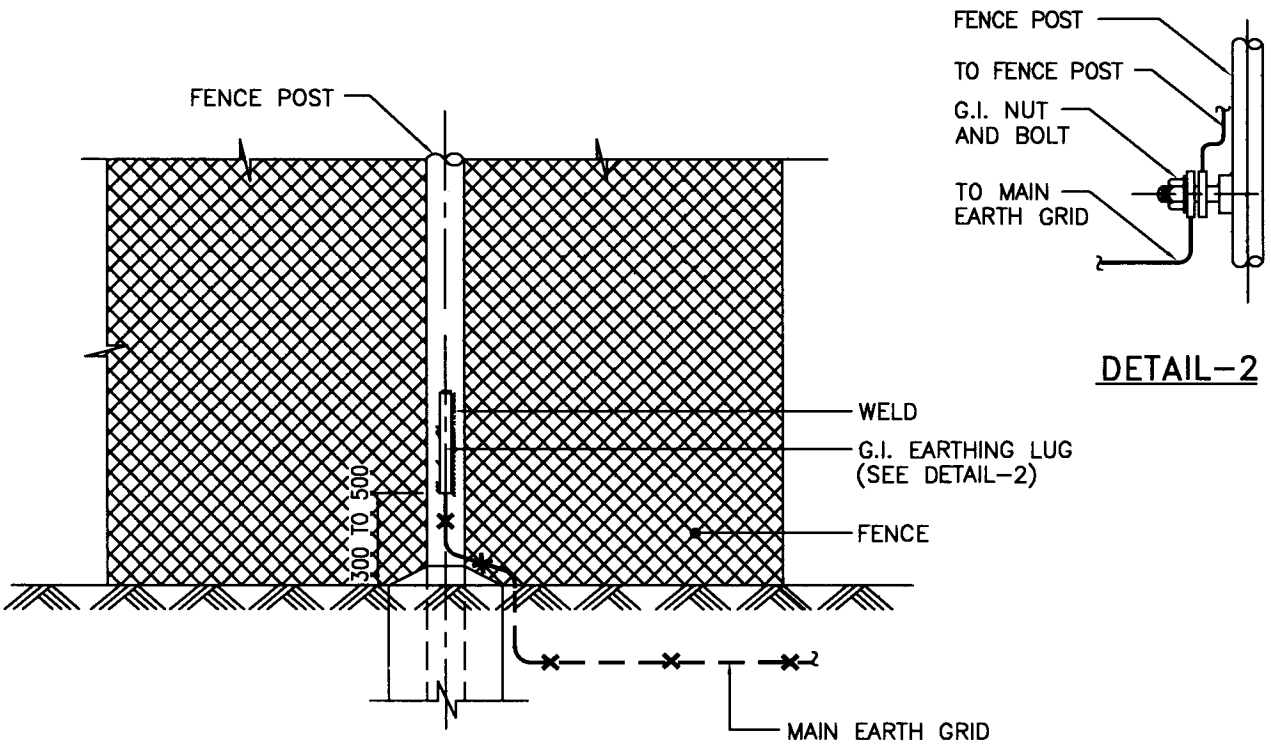


FENCE GATE

DETAIL–1



DETAIL–2

FENCE POST

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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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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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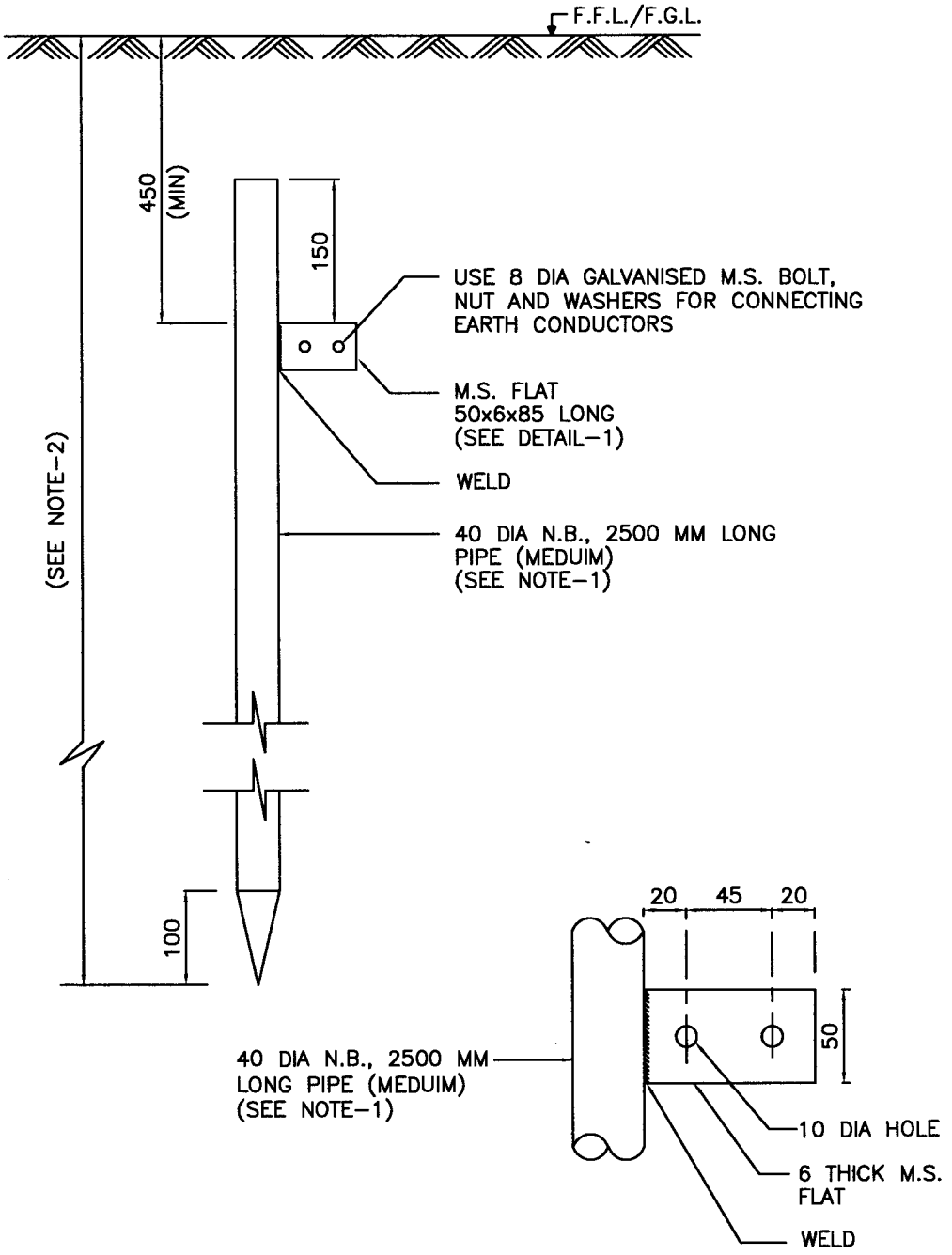

DETAIL-1

NOTES:-

1. PIPE ASSEMBLY SHALL BE HOT DIP GALVANISED AFTER FABRICATION.
2. THE ELECTRODE SHALL BE DRIVEN TO A DEPTH TO REACH PERMANENT MOIST SOIL.

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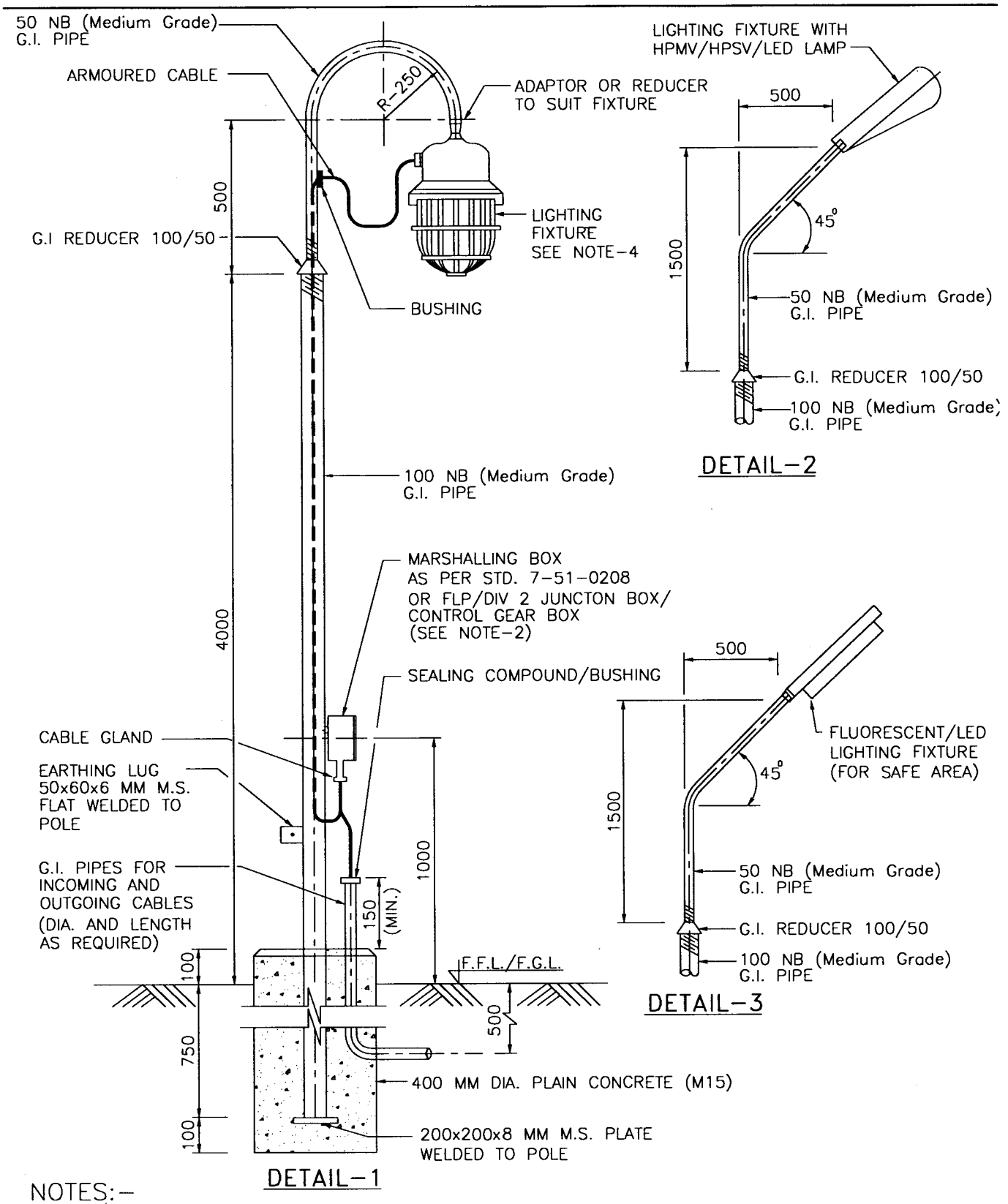

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. MARSHALLING BOX/JUNCTION BOX AND G.I. PIPES FOR CABLES SHALL BE LOCATED FACING CABLE TRENCH SIDE.
3. ALL G.I. PIPES SHALL BE MEDIUM GRADE.
4. LIGHTING FIXTURE CAN BE WELL GLASS/DOME GLASS/FLAT GLASS TYPE BASED ON TYPE OF LAMP.

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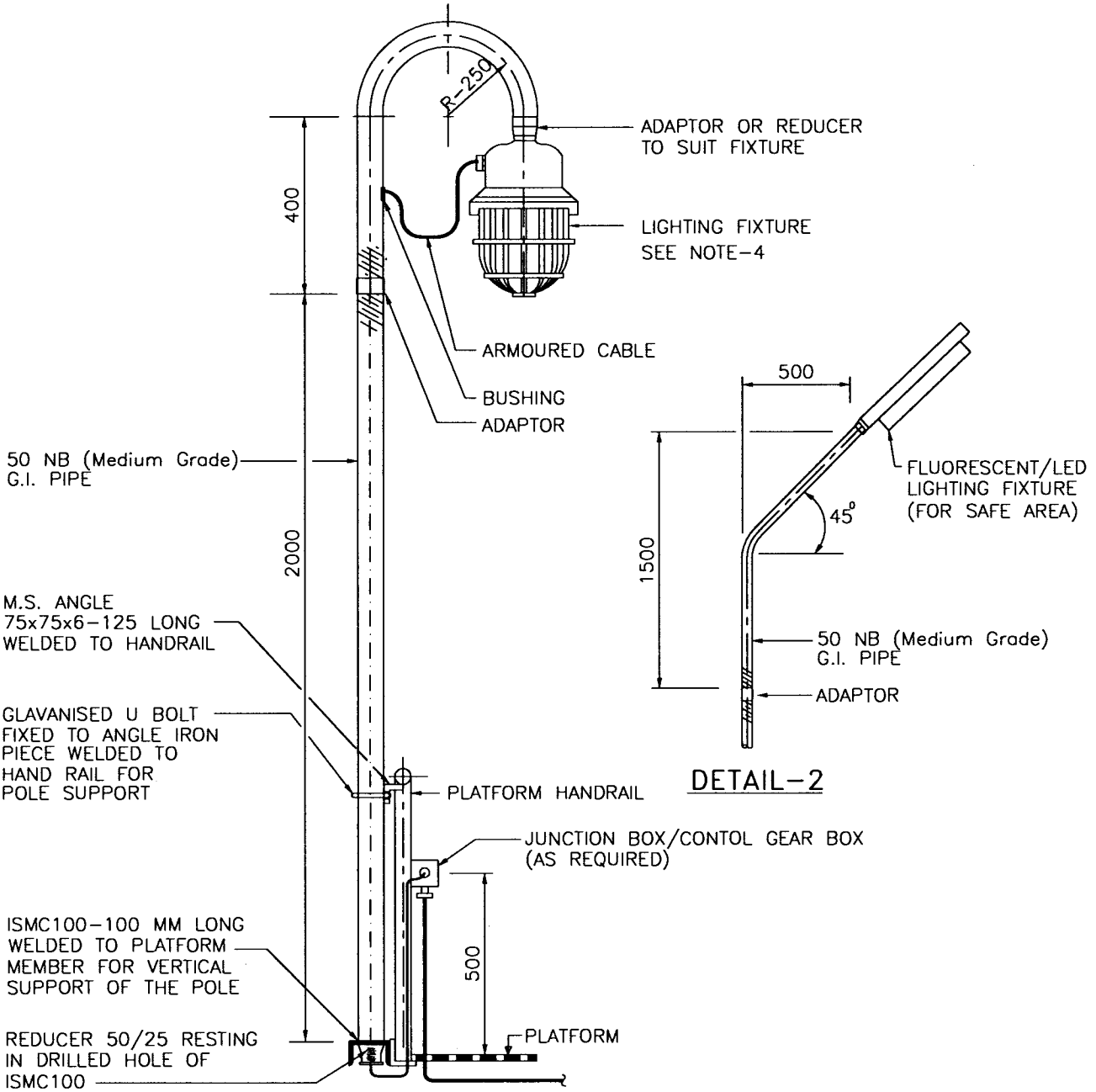

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. FOR TYPE OF FIXTURE REFER LAYOUT DRAWING / LIGHTING FIXTURE SCHEDULE.
3. ALL G.I. PIPES SHALL BE MEDIUM GRADE.
4. LIGHTING FIXTURE CAN BE WELL GLASS/DOME GLASS/FLAT GLASS TYPE BASED ON TYPE OF LAMP.

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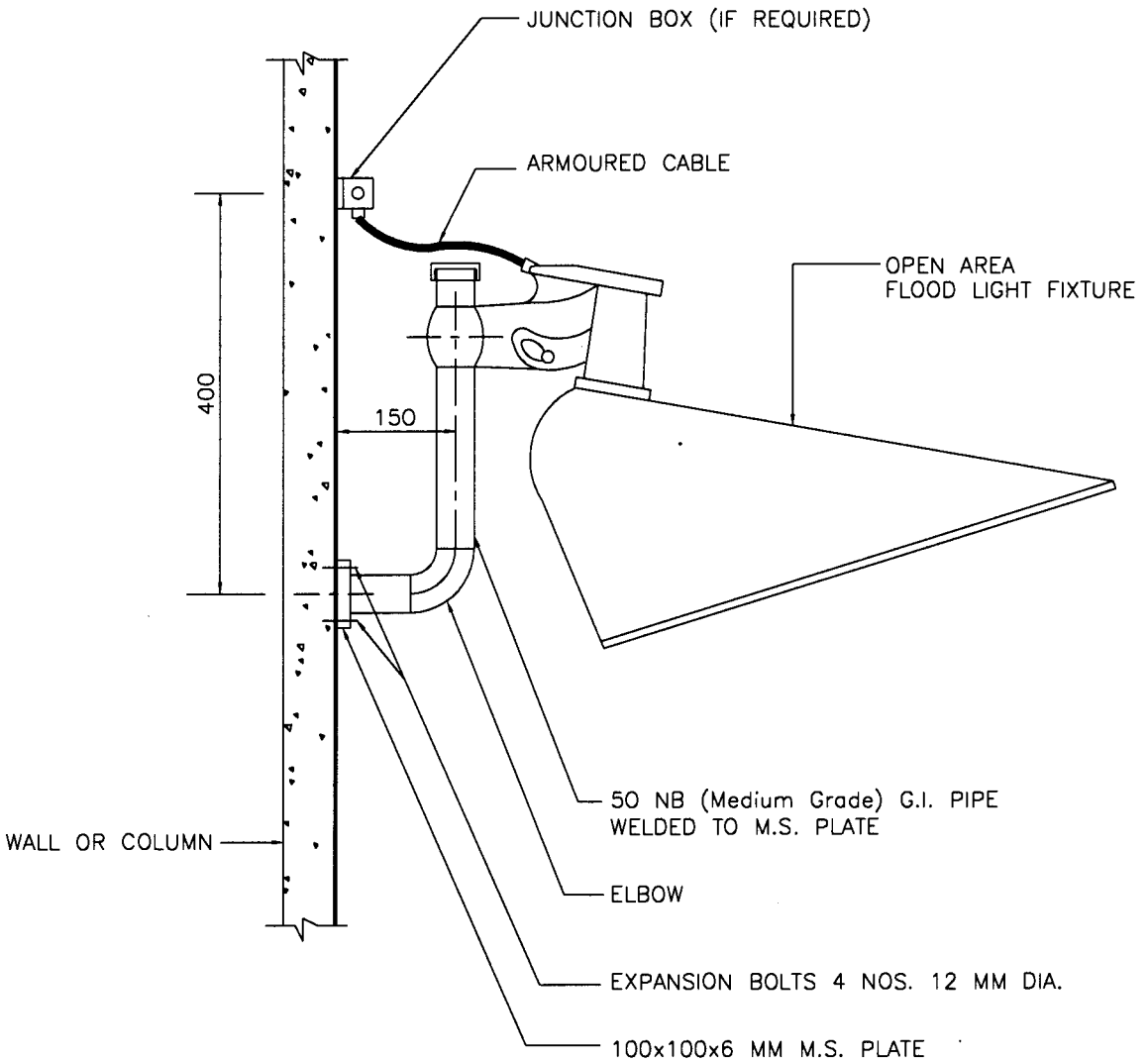

NOTES:–

1. ALL DIMENSIONS ARE IN MM.

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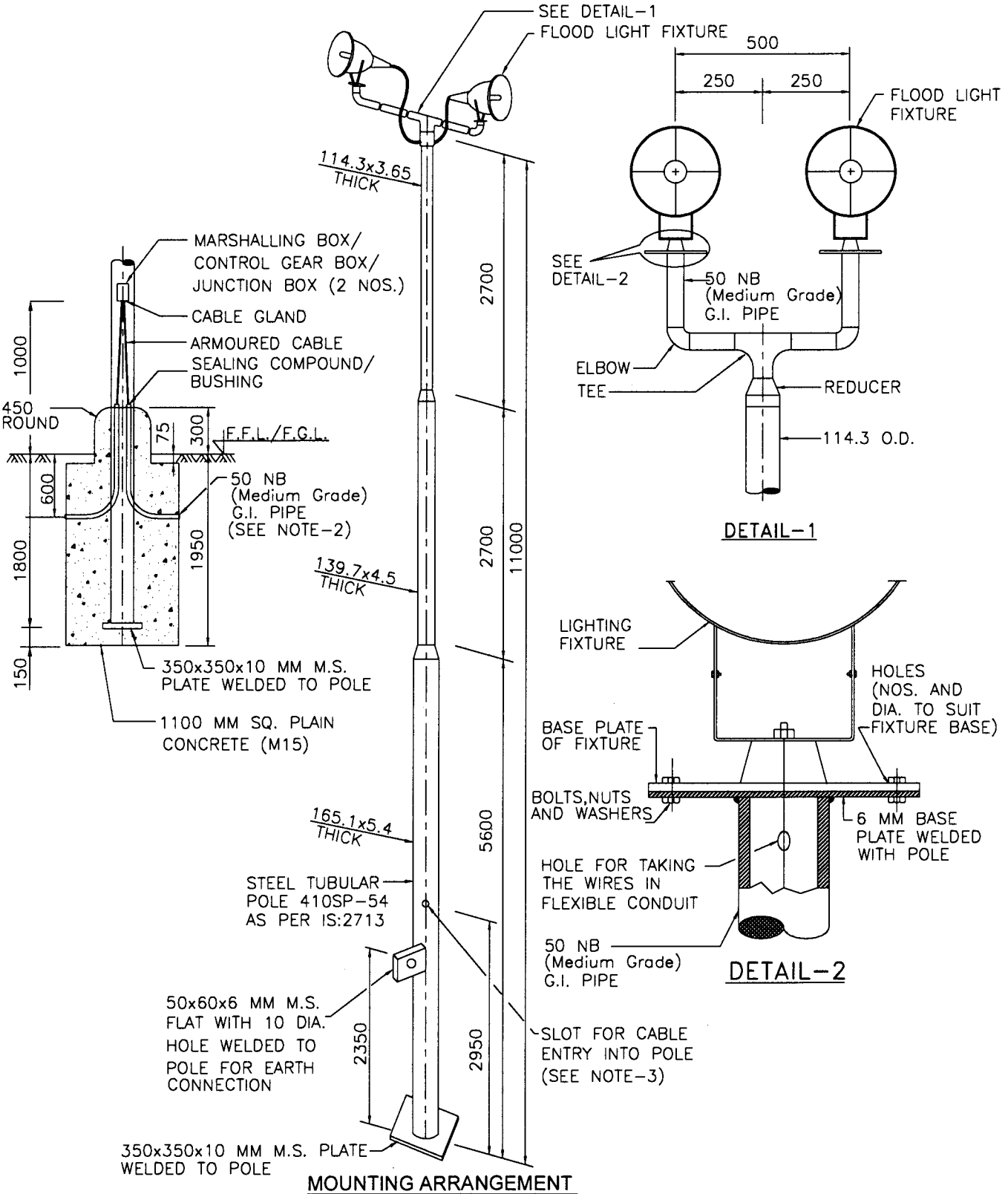

MOUNTING ARRANGEMENT FOR SAFE AREA FIXTURES

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. MINIMUM TWO AND MAXIMUM THREE NUMBERS OF SLEEVES SHALL BE PROVIDED AS PER PLAN DRAWING.
3. 2 NOS. 25 DIA. HOLES SHALL BE POVIDED ON OPPOSITE ENDS FOR FIXING OF MARSHALLING BOX ON ONE END AND CONTROL GEAR BOX/JUNCTION BOX ON OTHER END.

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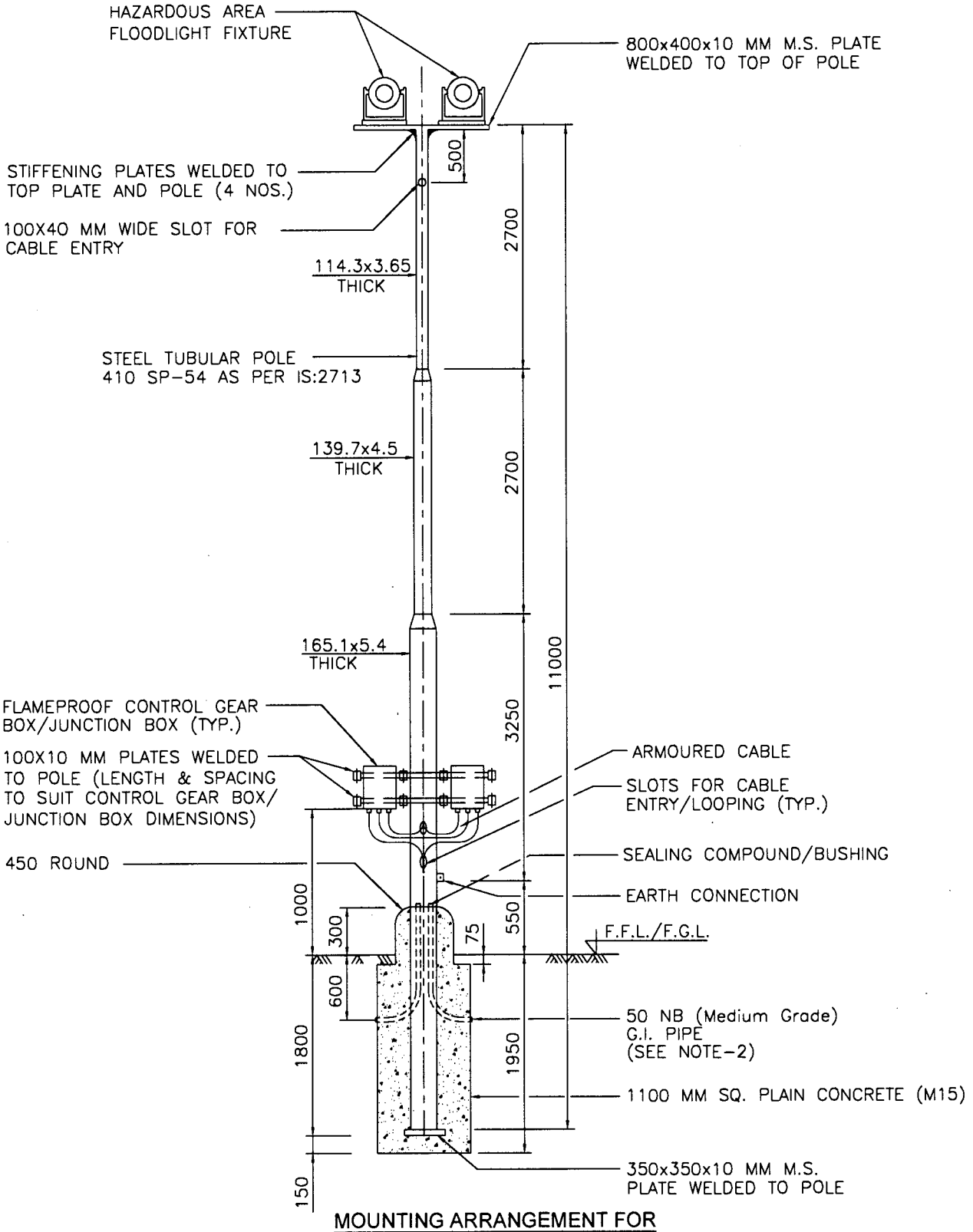

MOUNTING ARRANGEMENT FOR HAZARDOUS AREA FIXTURES

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. MINIMUM TWO AND MAXIMUM THREE NUMBERS OF SLEEVES SHALL BE PROVIDED AS PER PLAN DRAWING.

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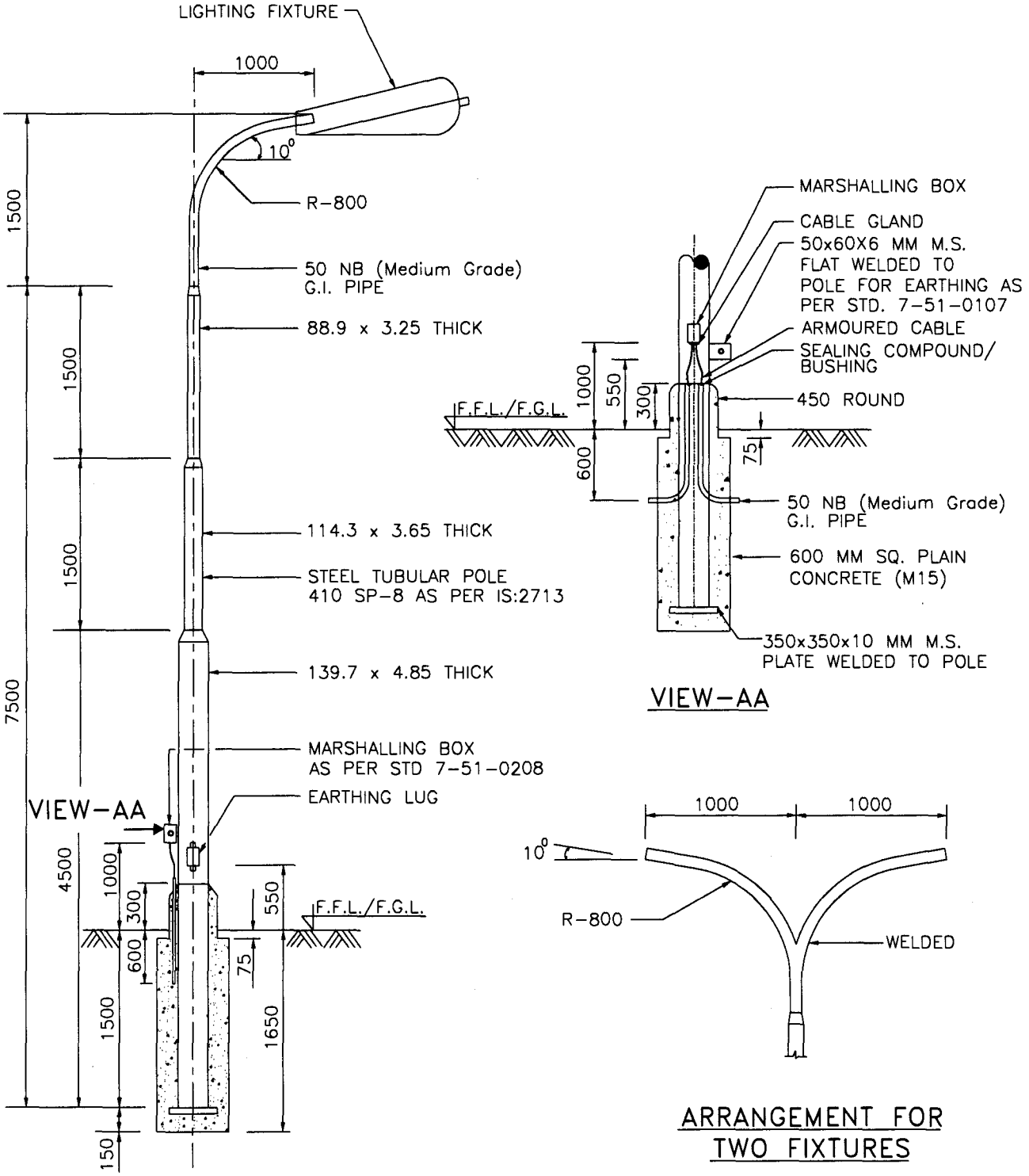

7.5M HIGH ABOVE ROAD LEVEL

ARRANGEMENT FOR TWO FIXTURES

NOTES:-

1. ALL G.I. PIPE SHALL BE MEDIUM GRADE.

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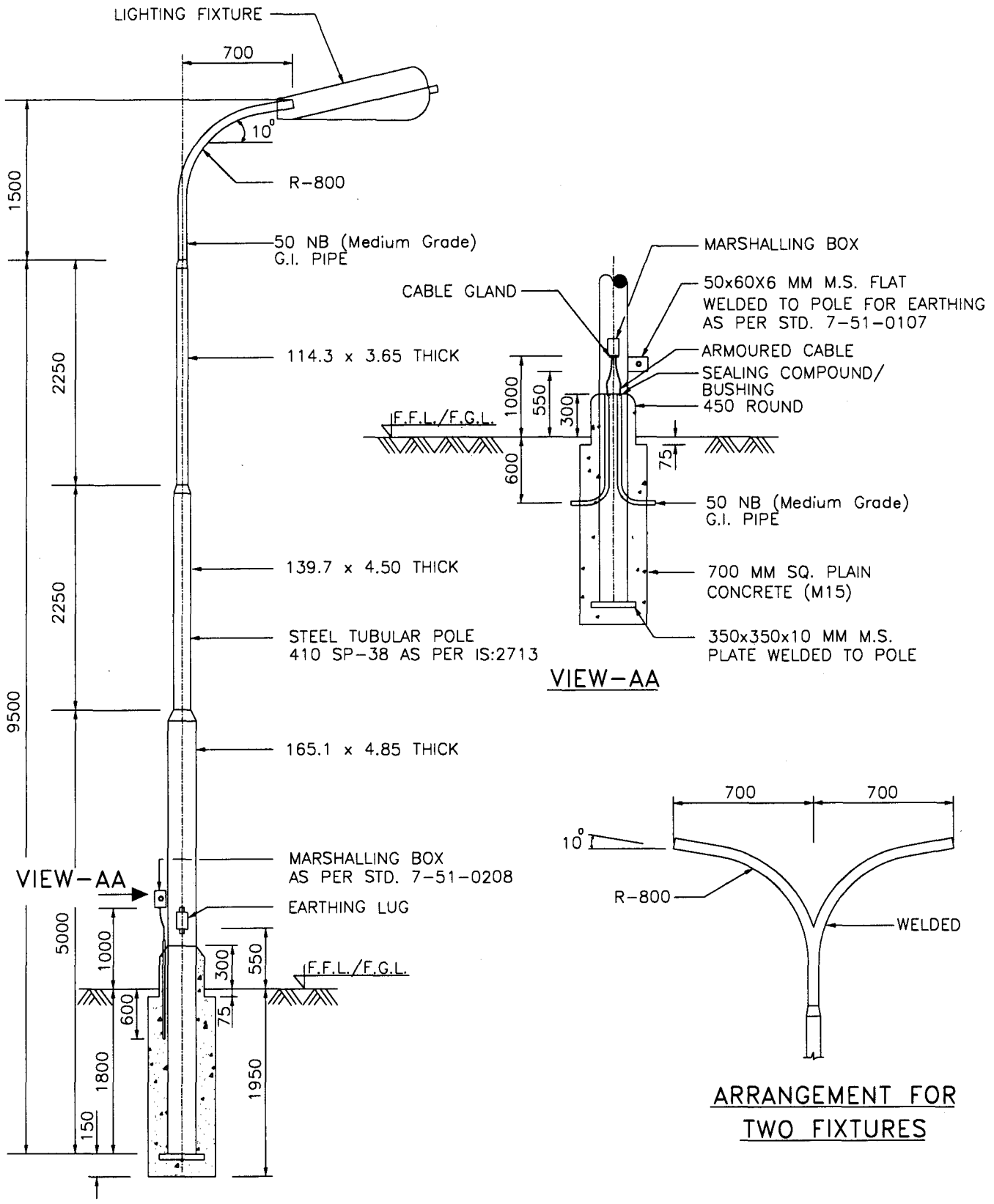

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. ALL G.I. PIPES SHALL BE MEDIUM GRADE.

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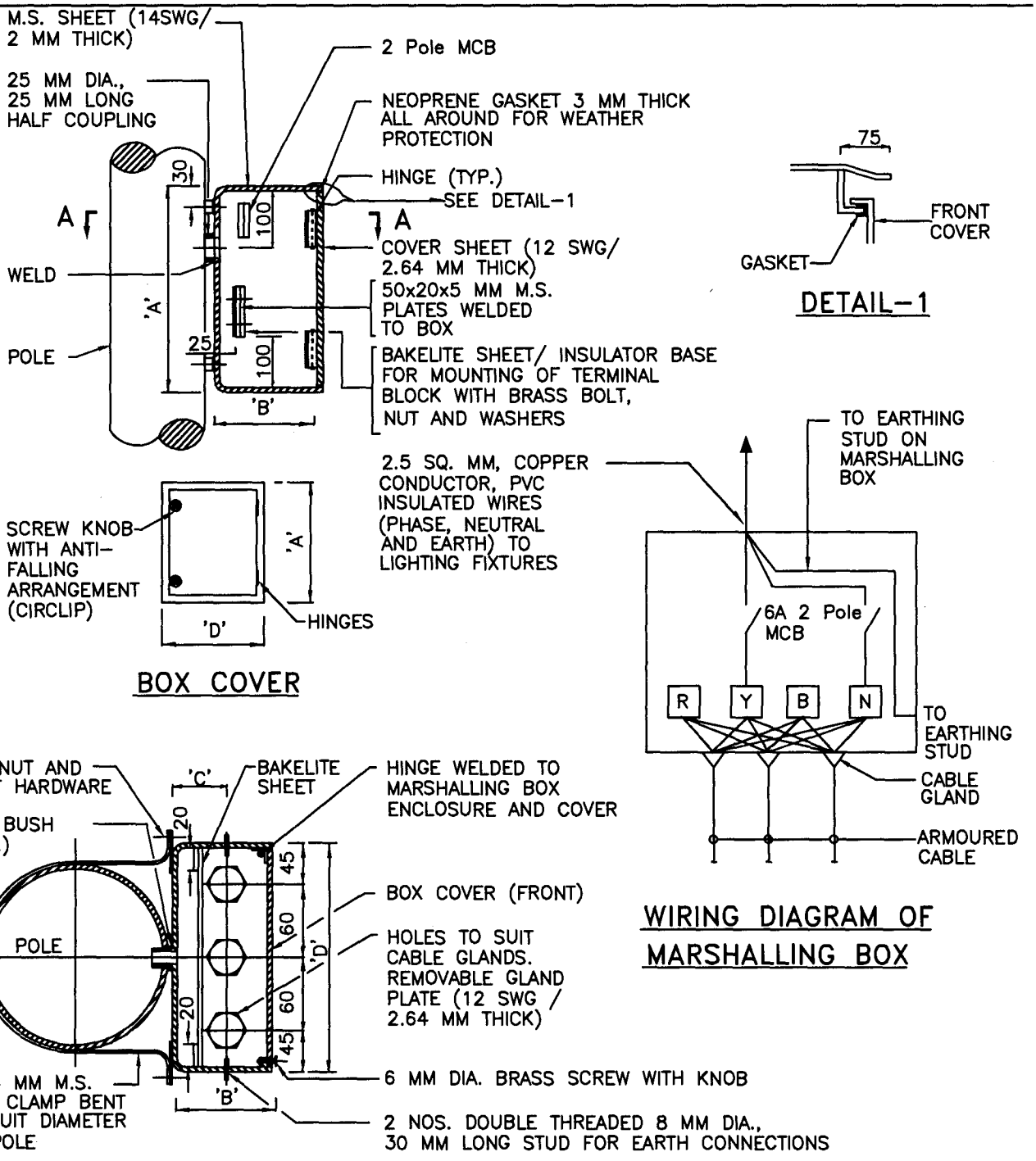

MARSHALLING BOX DIMENSIONS

CABLE SIZE (IN SQ. MM)	CABLE ENTRIES	DIMENSIONS IN MM				
		'A'	'B'	'C'	'D'	Terminal Bolt Size
UPTO 4 X 16	2	250	100	45	210	5
ABOVE 4 X 16 AND UPTO 3.5 X 50	3	300	150	75	210	10

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. MARSHALLING BOX SHALL HAVE WEATHER PROOF (IP55) ENCLOSURE PROTECTION, WITH DOUBLE COMPRESSION CABLE GLANDS WITH CHECK NUTS & LUGS.
3. THE BOX WITH ALL WELDED ATTACHMENTS, SHALL BE THOROUGHLY CLEANED AFTER FABRICATION AND SHALL BE PAINTED WITH EPOXY PAINT.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
7	12.10.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
6	10.07.17	UPDATED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN

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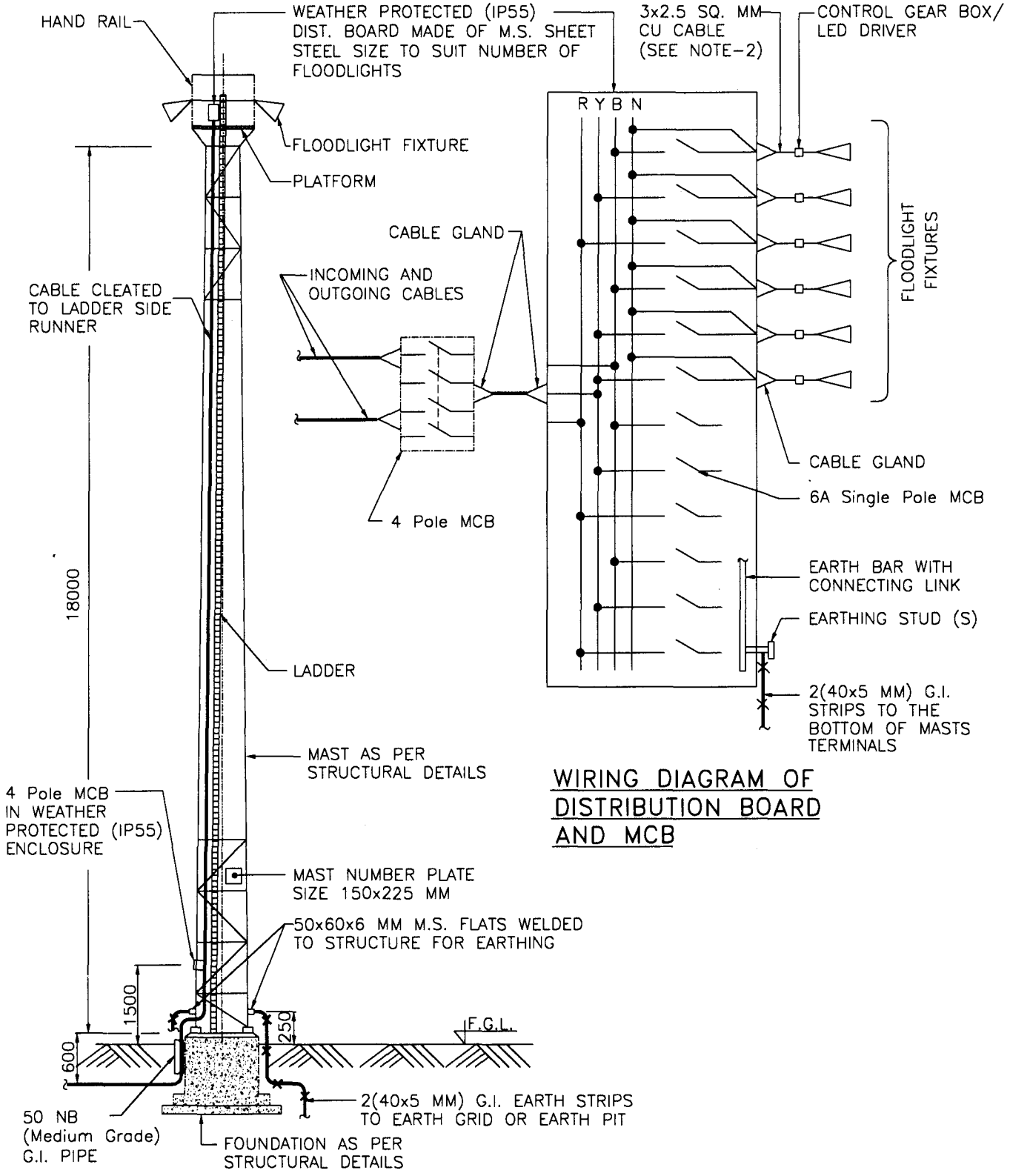

WIRING DIAGRAM OF DISTRIBUTION BOARD AND MCB

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. ALL CABLES FROM DISTRIBUTION BOARD TO CONTROL GEAR BOX/ LED DRIVER/ LIGHTING FIXTURE SHALL BE NEATLY CLAMPED TO THE HANDRAIL STRUCTURE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
5	10.07.17	REAFFIRMED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN

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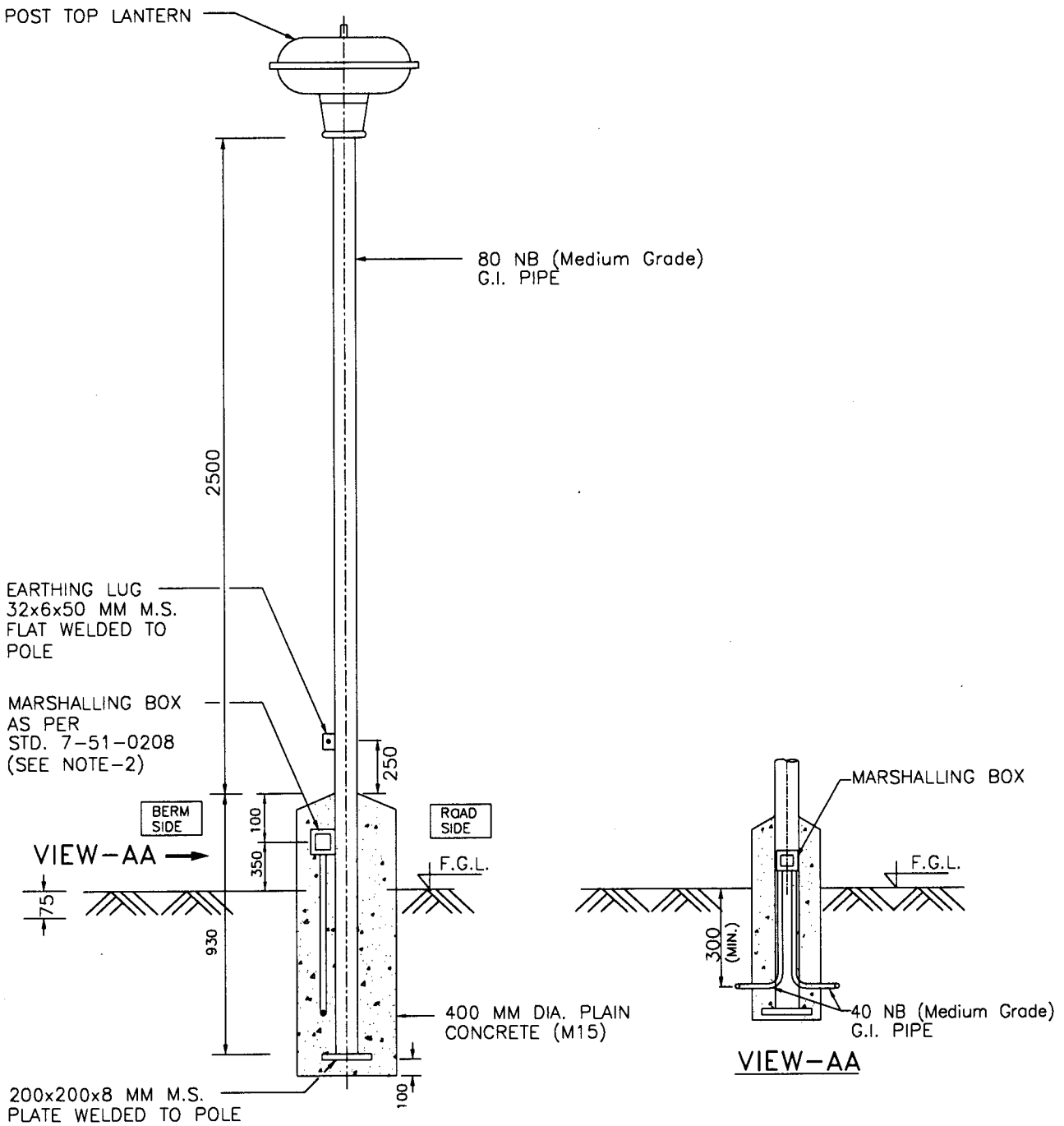

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. USE WEATHER PROTECTED SINGLE PHASE JUNCTION BOX IN PLACE OF MARSHALLING BOX IF SUPPLY IS SINGLE PHASE.
3. ALL G.I. PIPES SHALL BE MEDIUM GRADE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
5	10.07.17	REAFFIRMED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN

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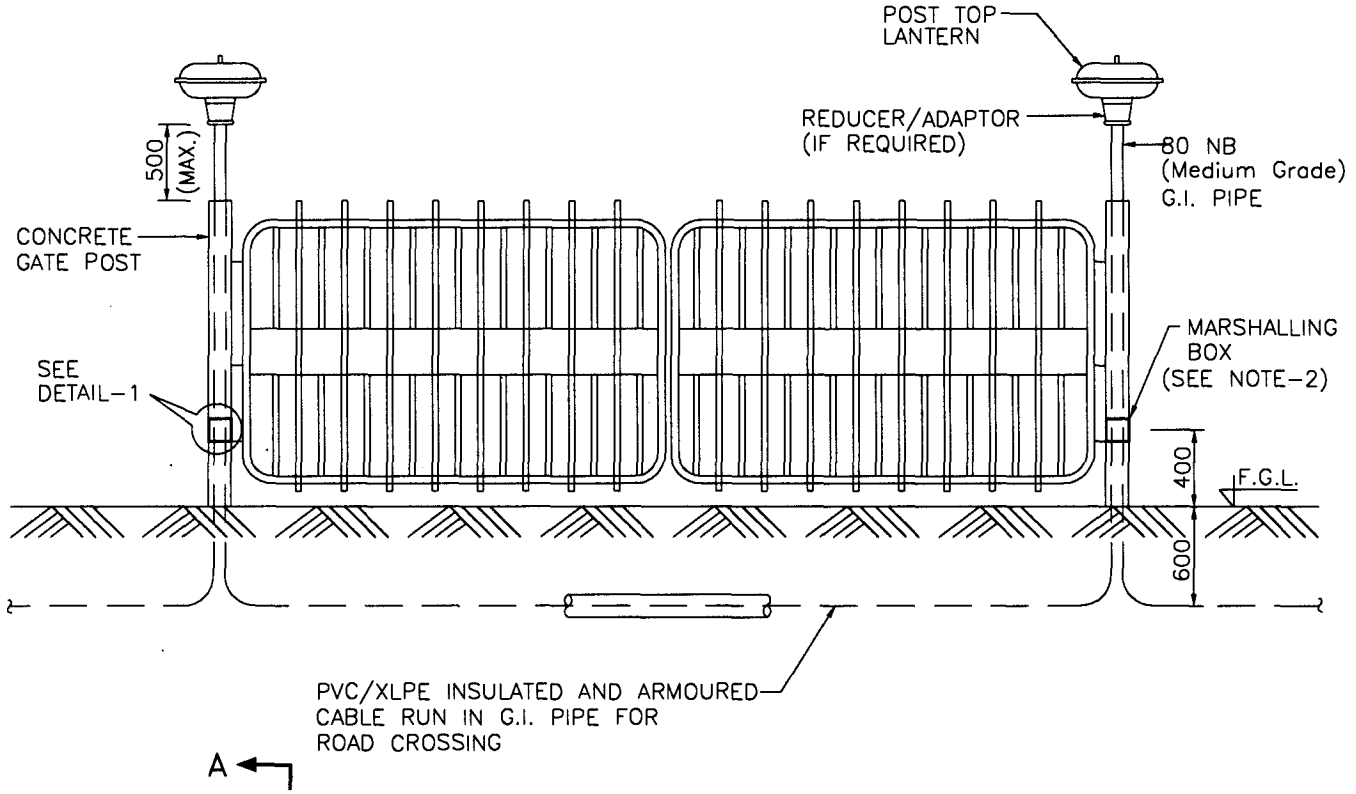

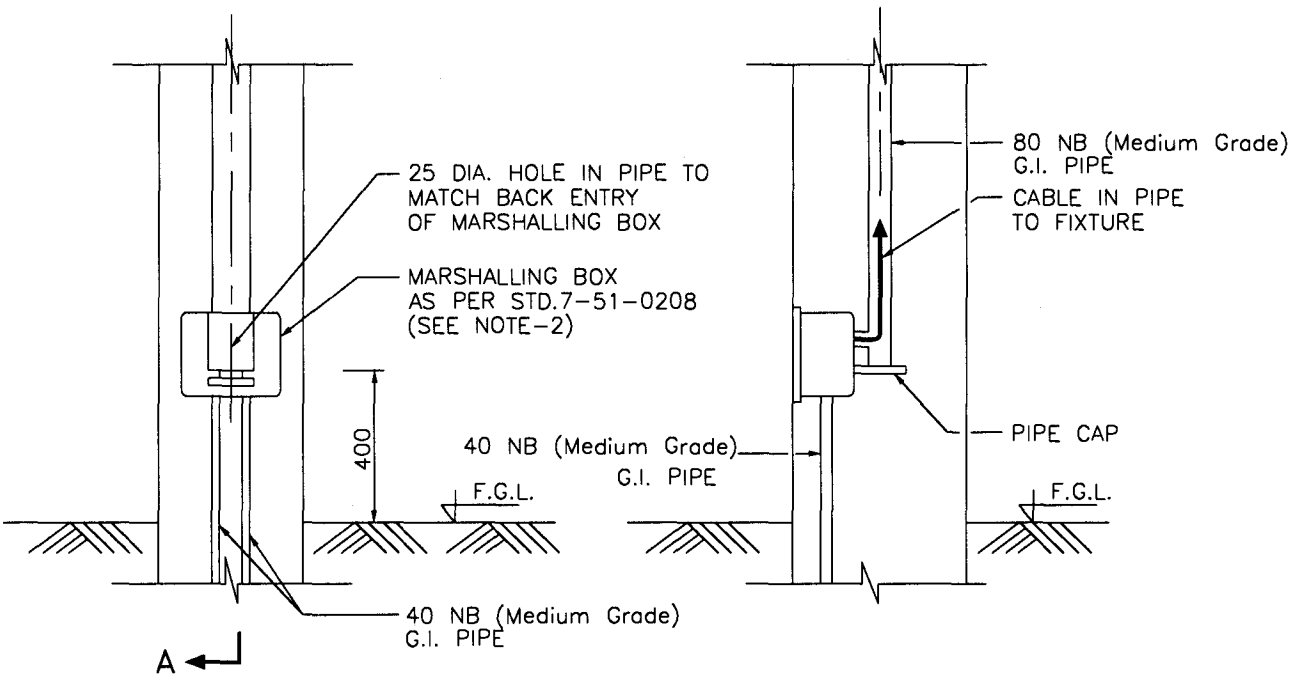

DETAIL-1 SECTION A-A

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. USE WEATHER PROTECTED SINGLE PHASE JUNCTION BOX IN PLACE OF MARSHALLING BOX IF SUPPLY IS SINGLE PHASE.
3. ALL G.I. PIPES SHALL BE MEDIUM GRADE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
5	10.07.17	REAFFIRMED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN

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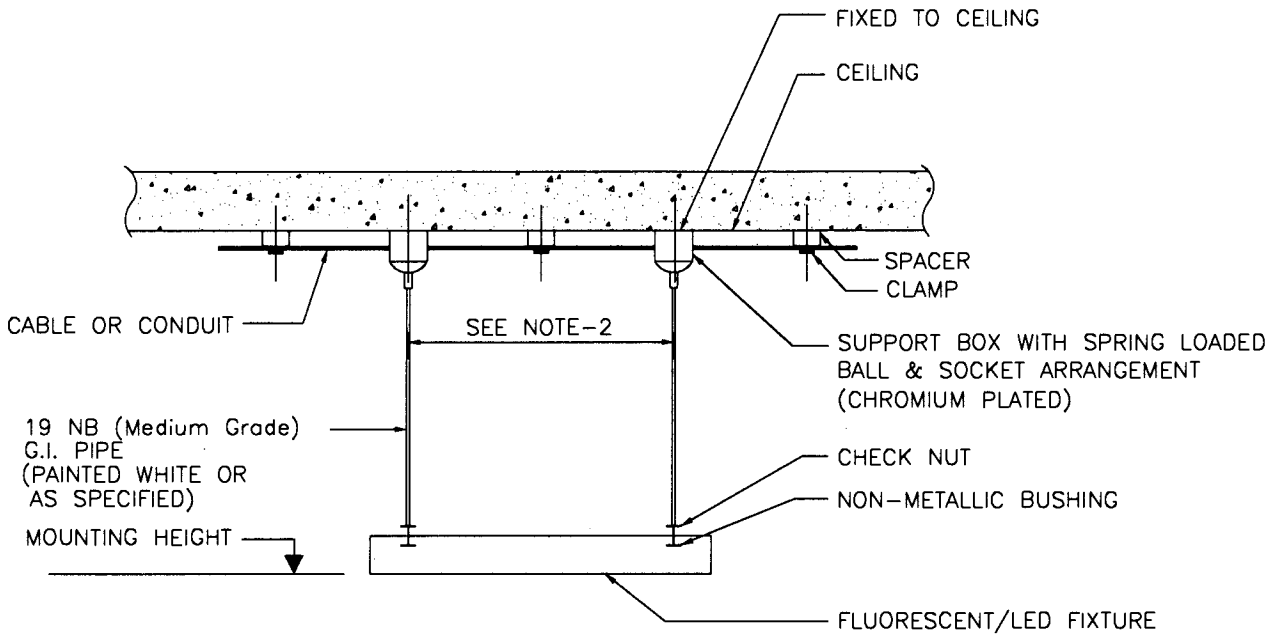
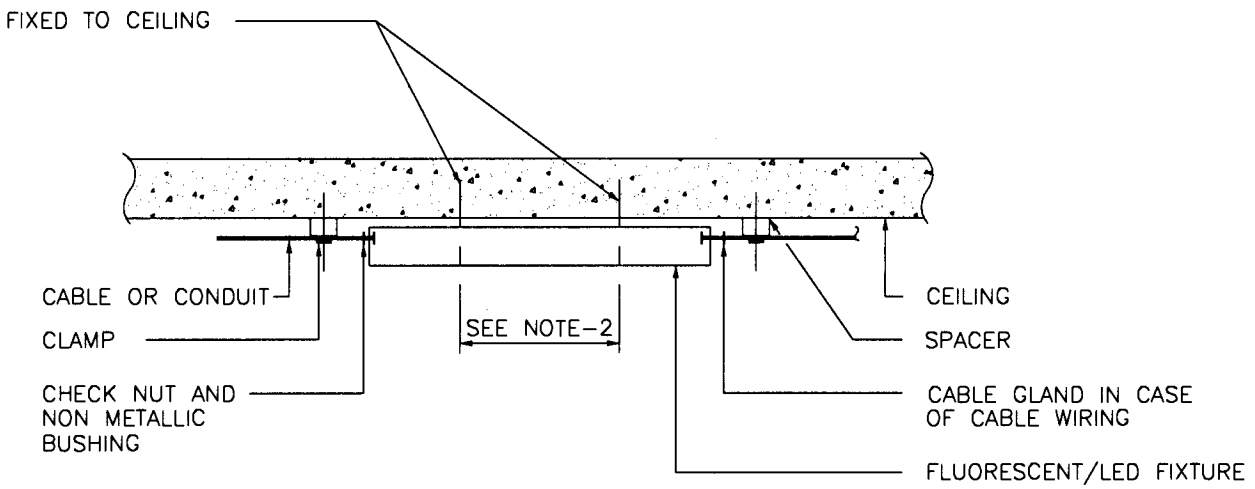


DETAIL-1
SUSPENSION MOUNTING



DETAIL-2
CEILING MOUNTING

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. SUSPENSION/FIXING CENTRES SHALL BE AS PER FIXTURE MANUFACTURER'S DETAILS.
3. IN CASE OF CABLE WIRING ONE NO. JUNCTION BOX COMPLETE WITH CABLE GLANDS SHALL BE PROVIDED NEAR EACH FIXTURE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
5	10.07.17	UPDATED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN

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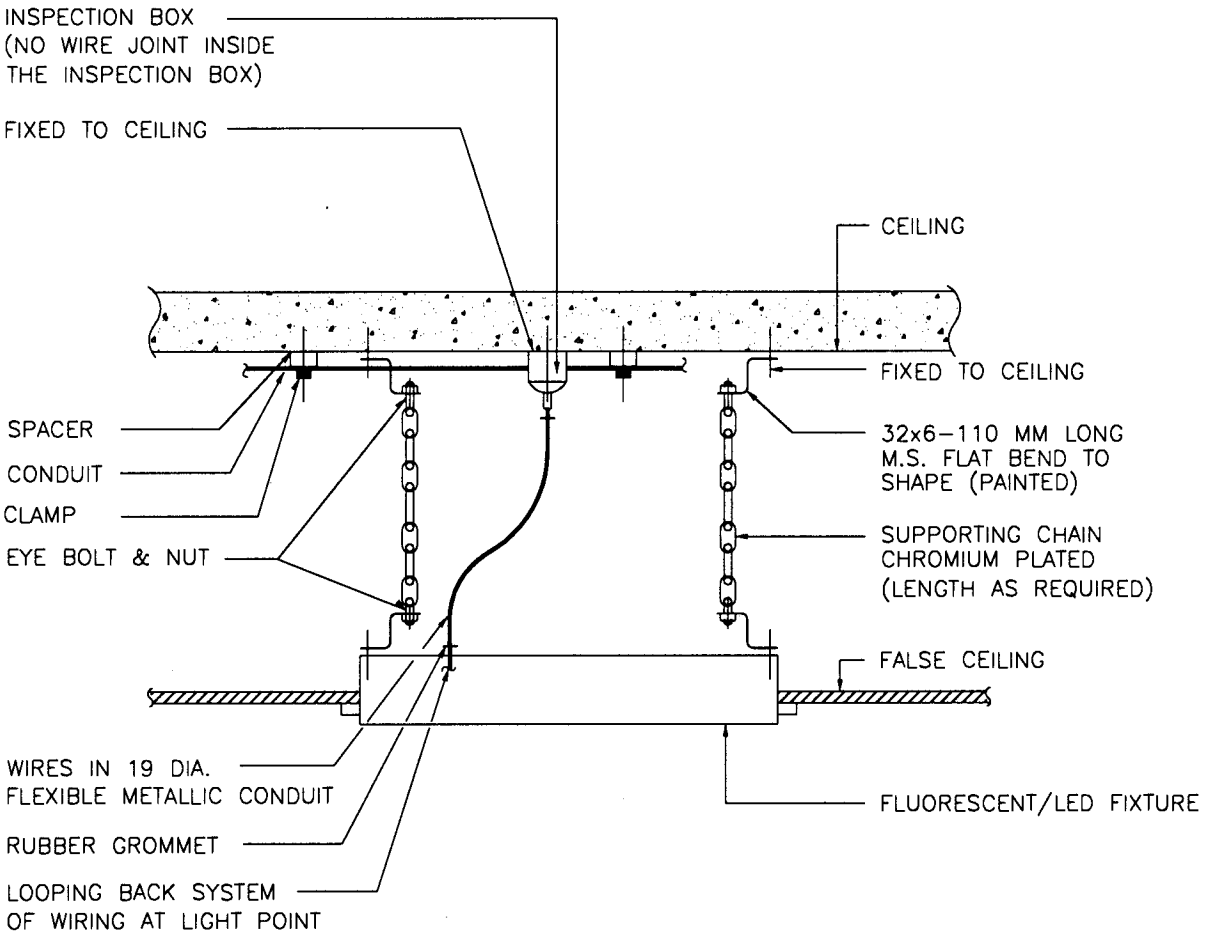

MOUNTING ARRANGEMENT WITH CHAIN SUPPORT

NOTES:–

1. ALL DIMENSIONS ARE IN MM.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
5	10.07.17	UPDATED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN

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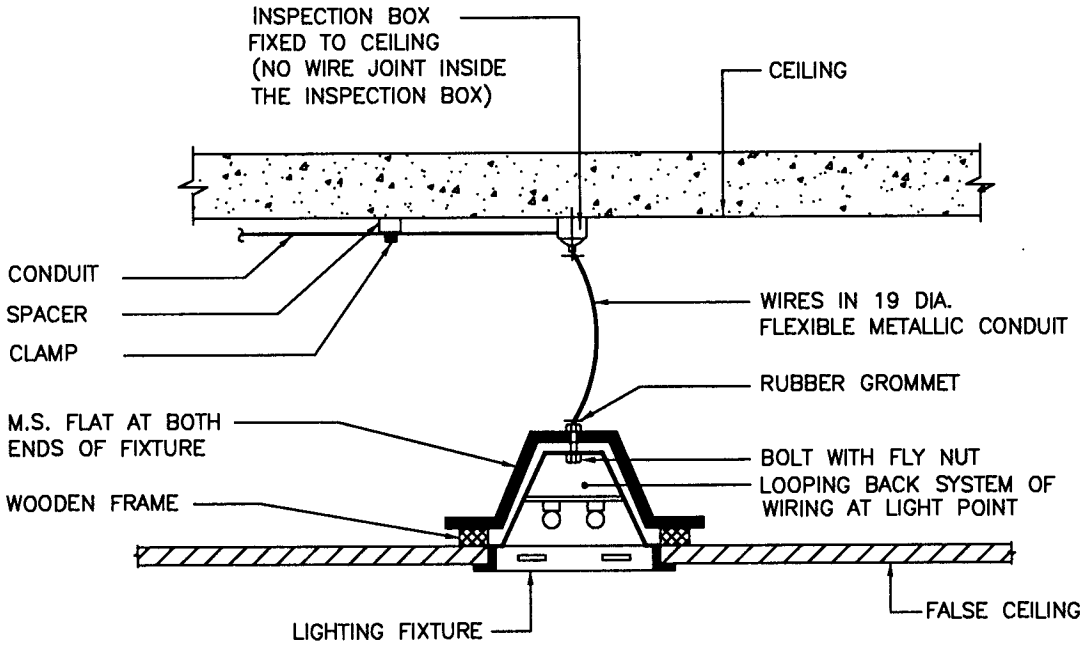
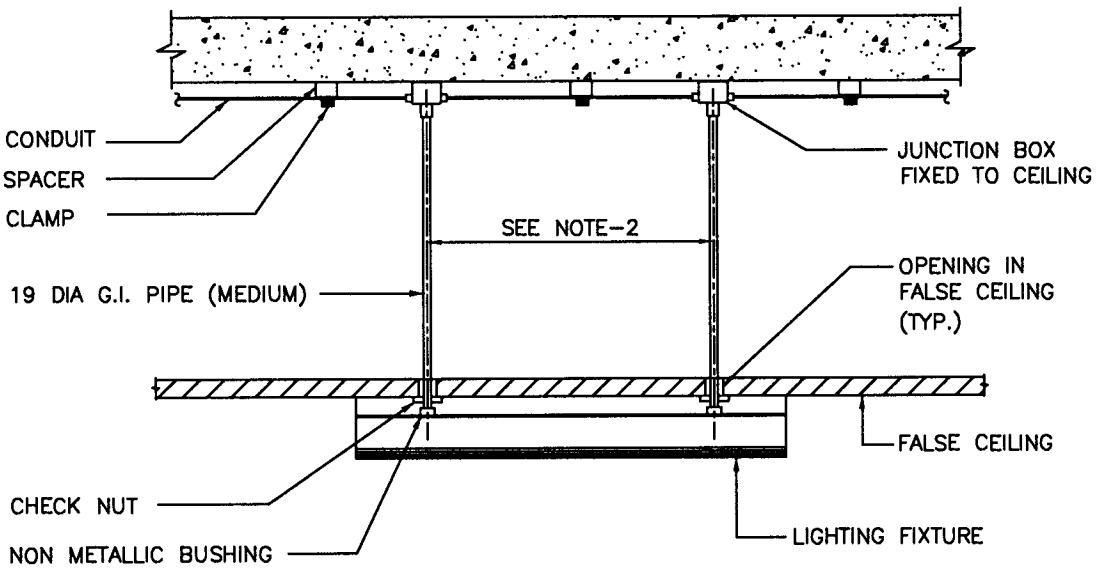


DETAIL–1
RECESS MOUNTED FIXTURE SUPPORTED ON WOODEN FRAME



DETAIL–2
FIXTURE MOUNTING BELOW FALSE CEILING

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. SUSPENSION/FIXING CENTRES SHALL BE AS PER FIXTURE MANUFACTURER'S DETAILS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	29.11.21	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
5	21.10.16	REVISED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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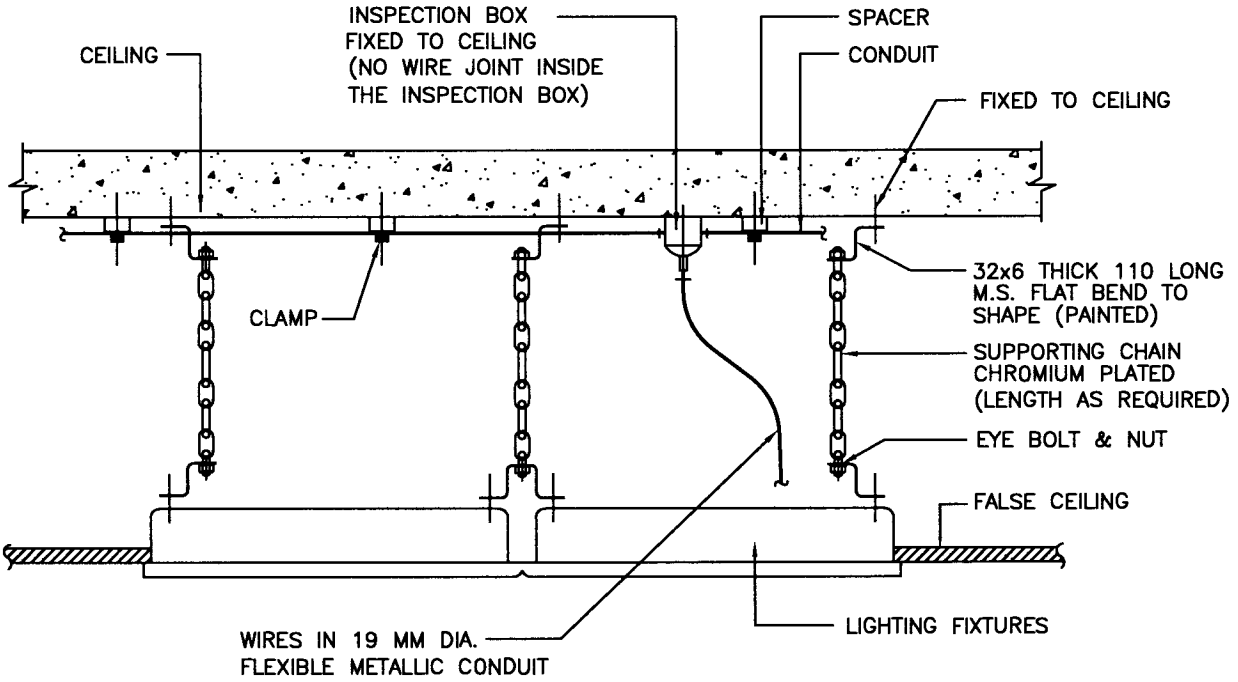

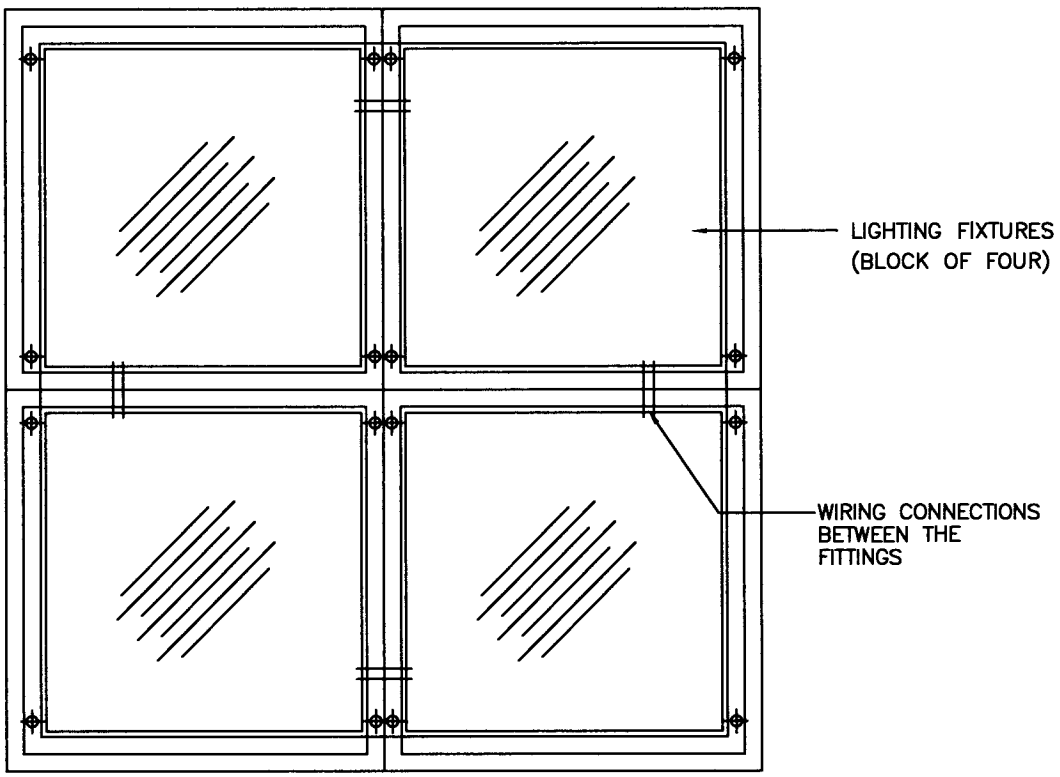

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. SUSPENSION/FIXING CENTRES SHALL BE AS PER FIXTURE MANUFACTURER'S DETAILS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
6	01.11.21	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
5	21.10.16	REVISED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

Approved by

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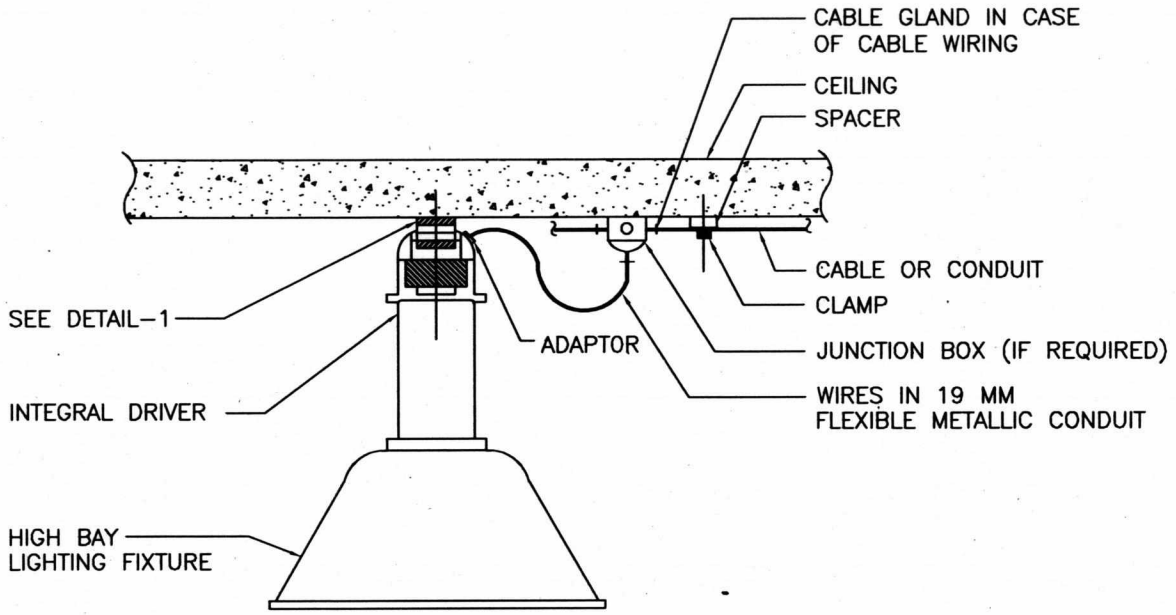

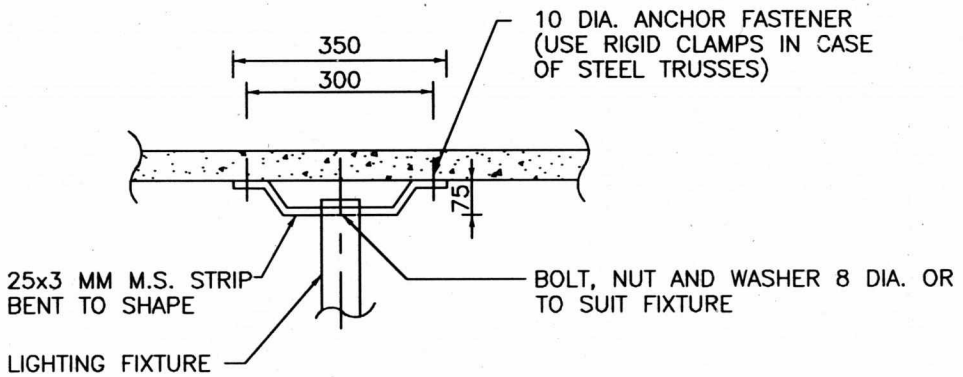

DETAIL–1

NOTES:–

1. ALL DIMENSIONS ARE IN MM.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	15.09.22	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	22.02.18	UPDATED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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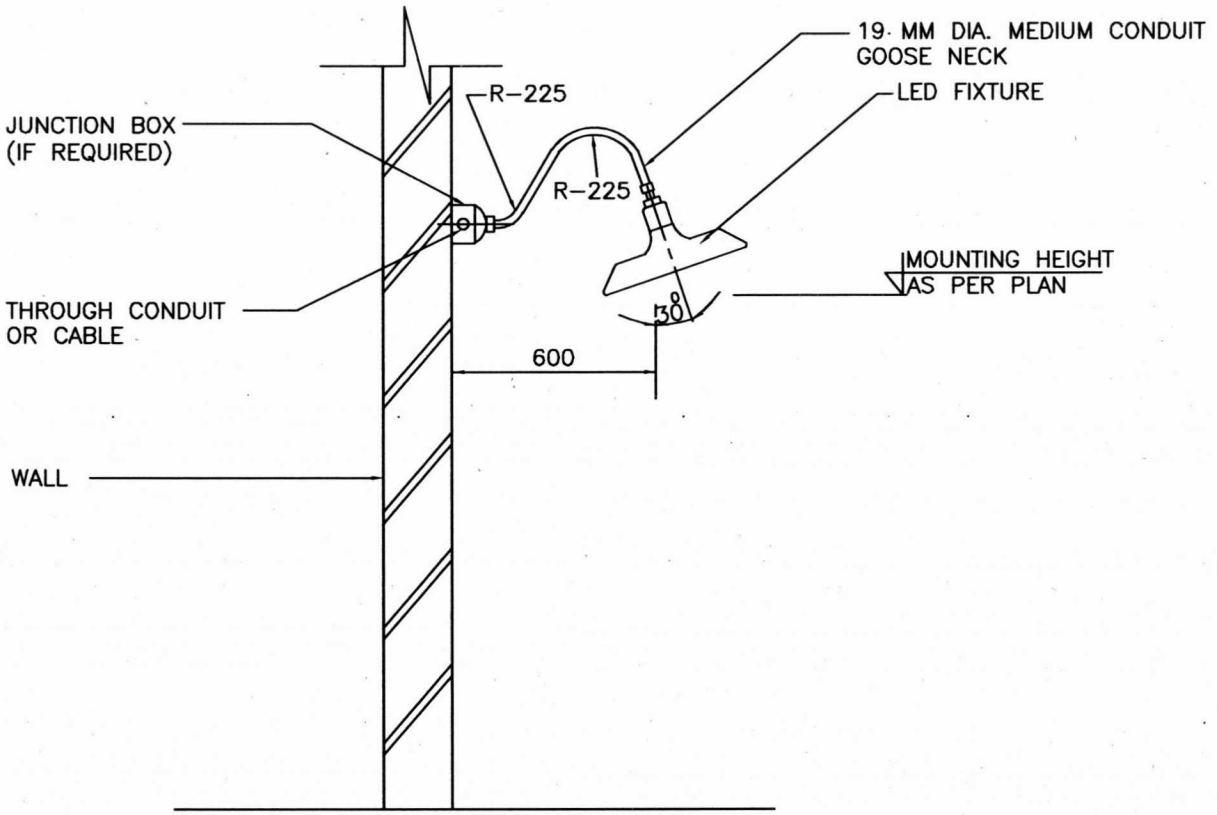
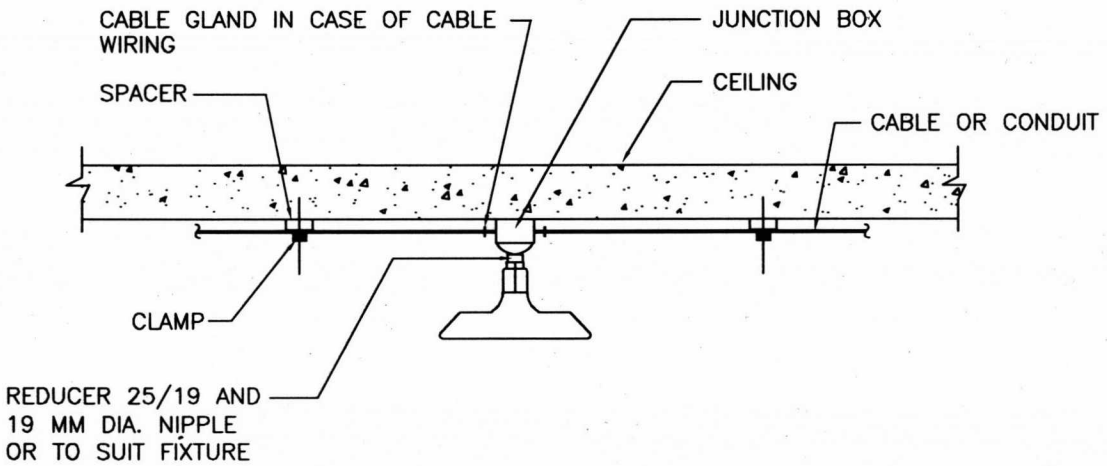


WALL-MOUNTED



CEILING-MOUNTED

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. APPLICABLE FOR SAFE AREAS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	15.09.22	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	22.02.18	UPDATED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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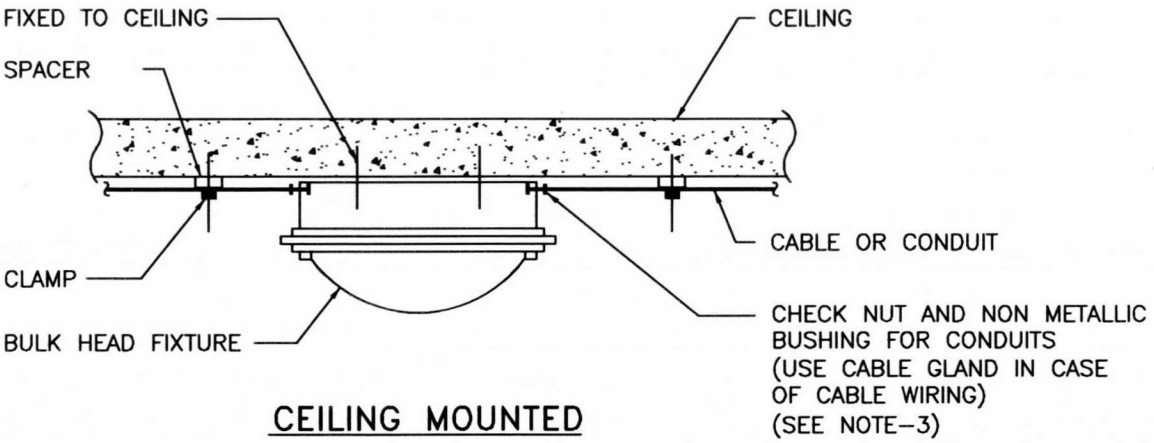
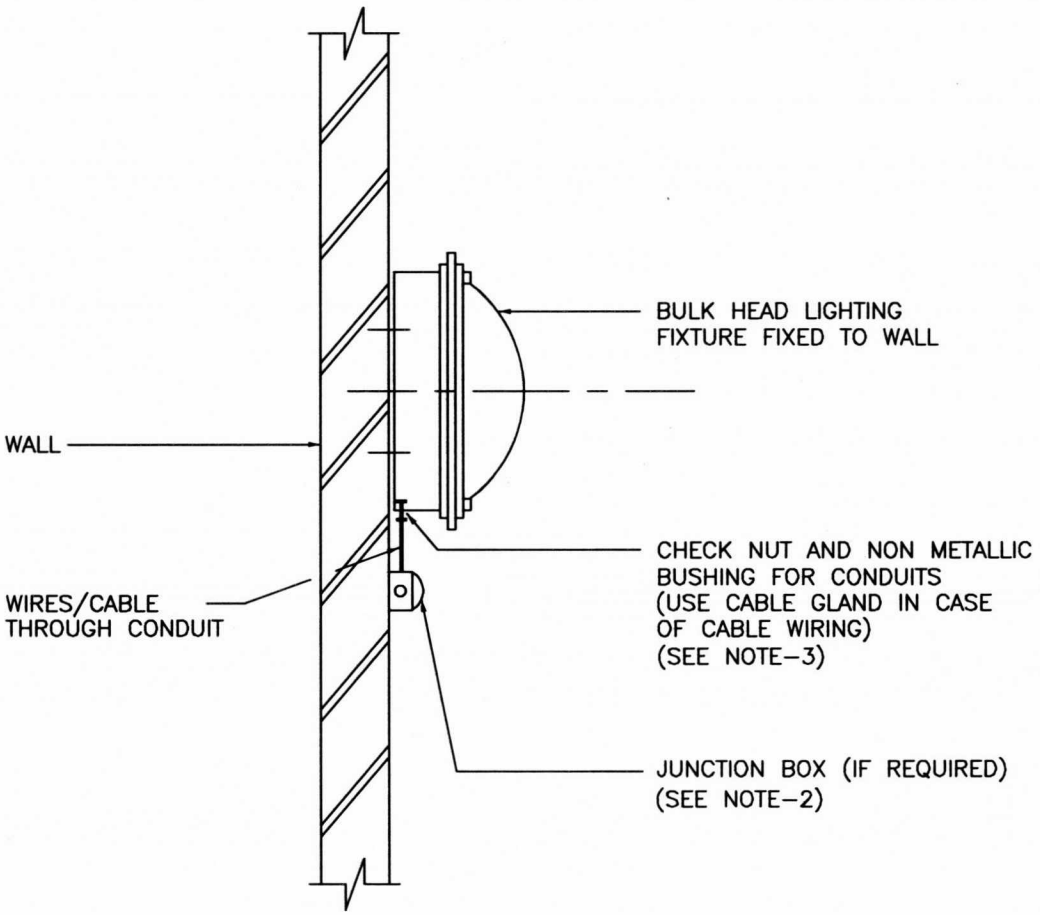


CEILING MOUNTED



WALL MOUNTED

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. FOR INSTALLATION IN OUT DOOR FIXTURES, FIXTURES & JUNCTION BOX SHALL BE IP–55 (WEATHER PROTECTED).
3. PROPER SEALING SHALL BE ENSURED WHEREVER REQUIRED TO PREVENT INGRESS OF WATER.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	22.02.18	UPDATED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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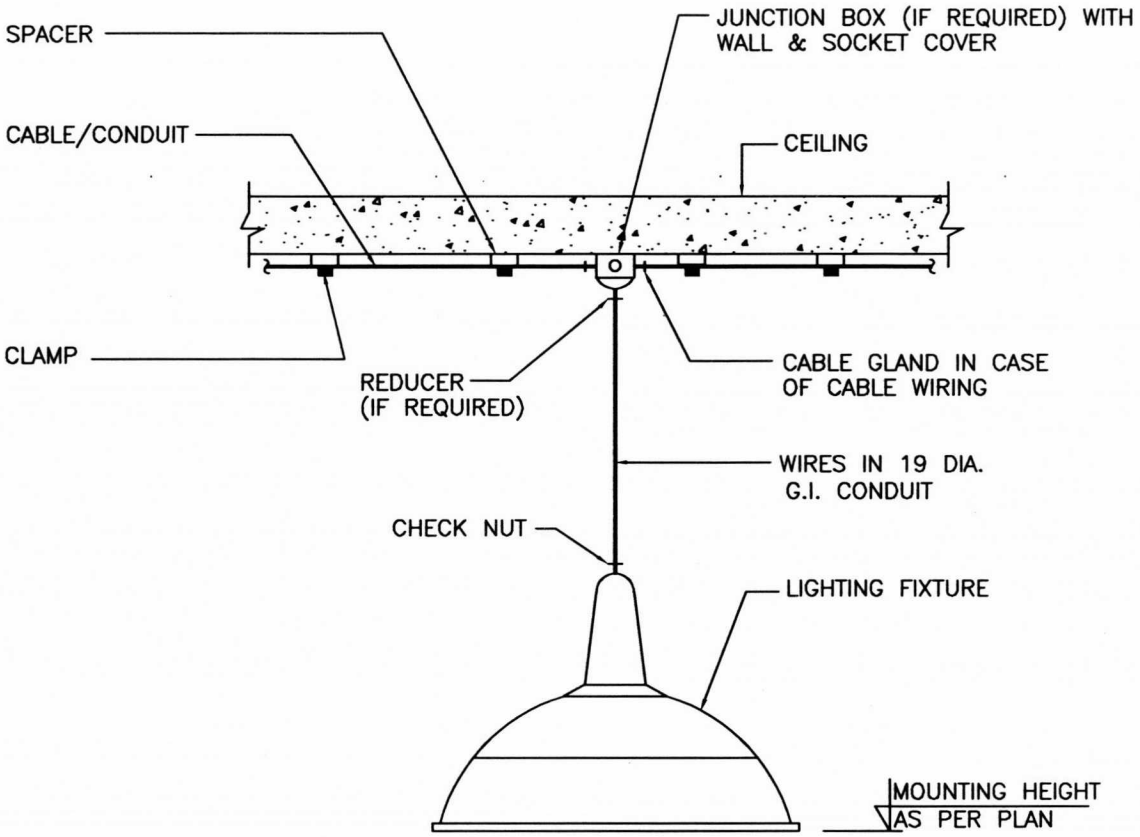

NOTES:–

1. ALL DIMENSIONS ARE IN MM.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	22.02.18	REAFFIRMED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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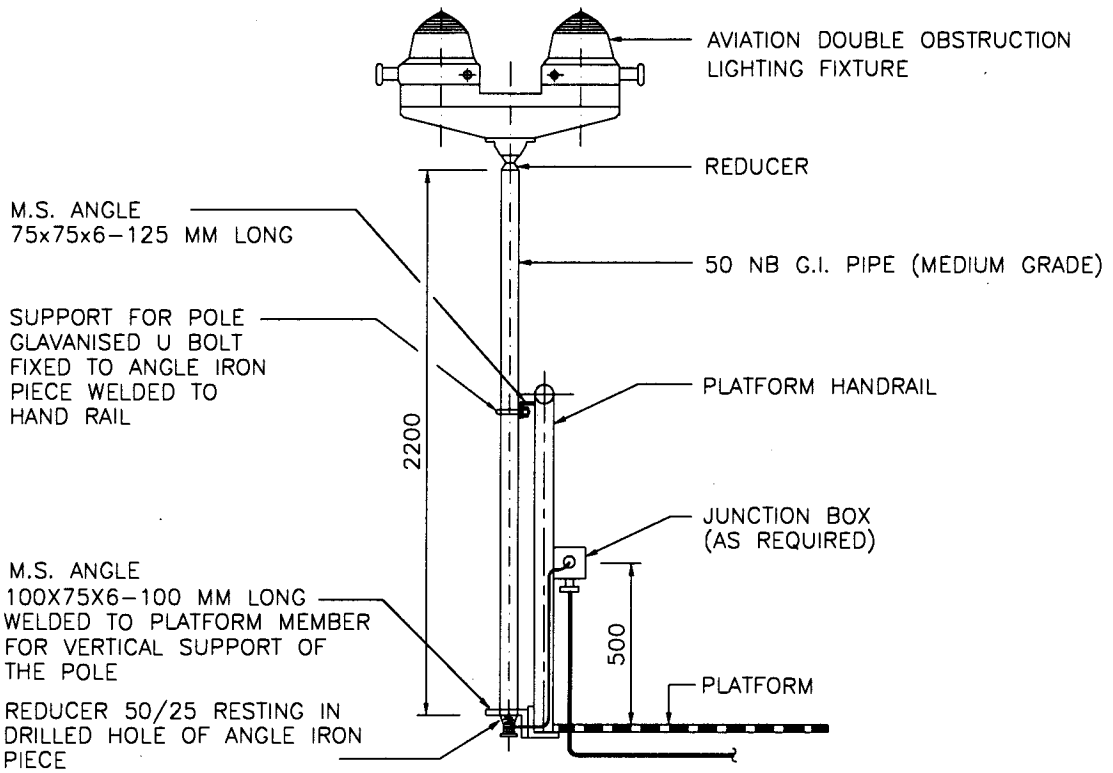
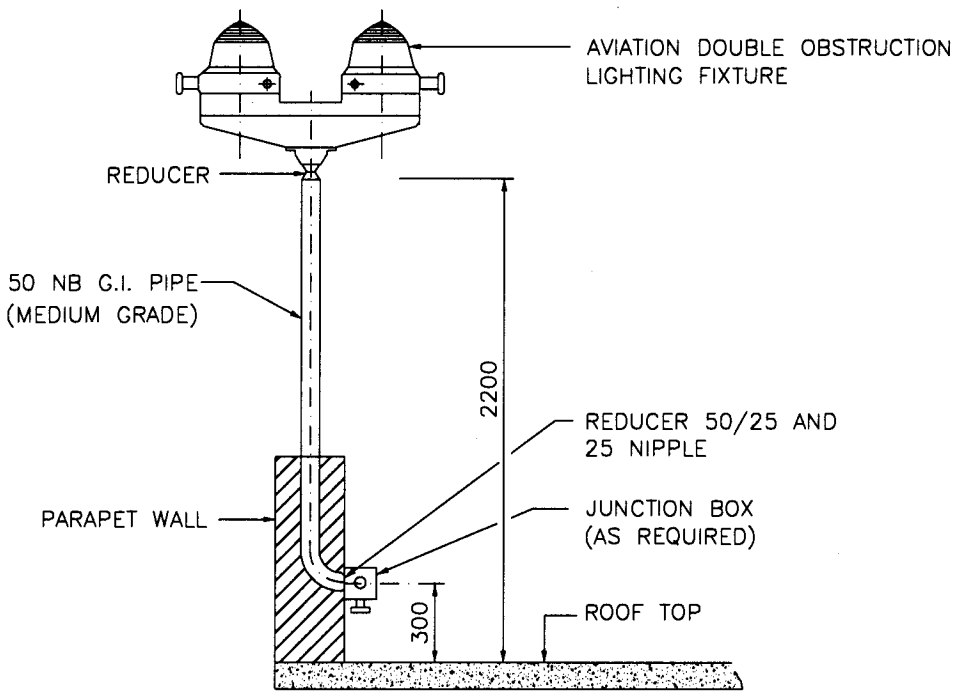


MOUNTED ON TOP OF STRUCTURE PLATFORM

DETAIL–1



MOUNTED ON TOP OF BUILDING PARAPET WALL

DETAIL–2

NOTES:–

1. ALL DIMENSIONS ARE IN MM.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
			JSK	VKS/HK	SA	SM
6	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
5	22.02.18	REAFFIRMED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN

Approved by

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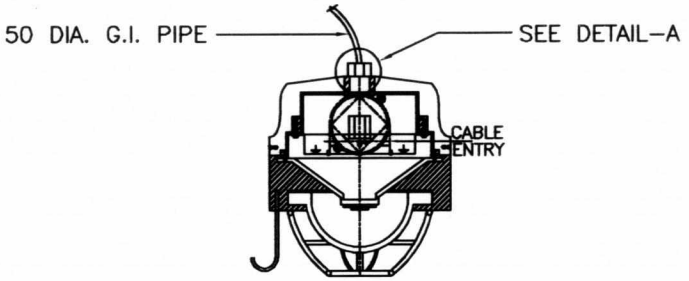
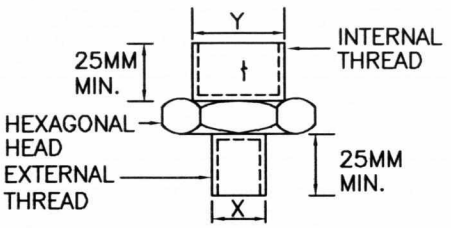


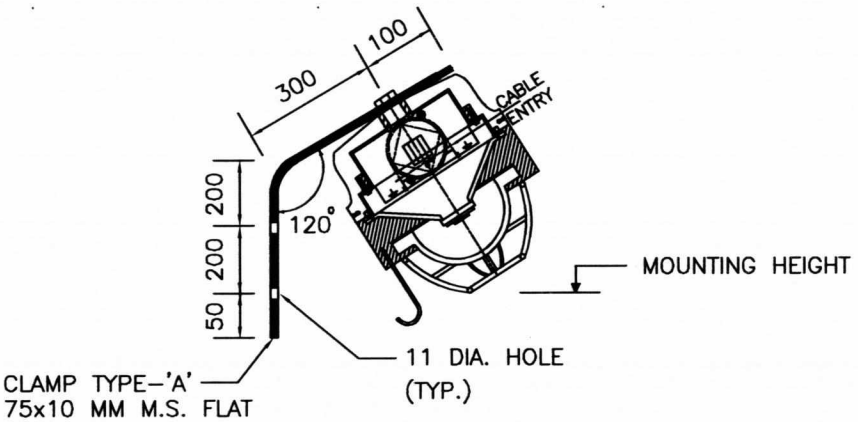
DETAIL–1
POLE MOUNTED



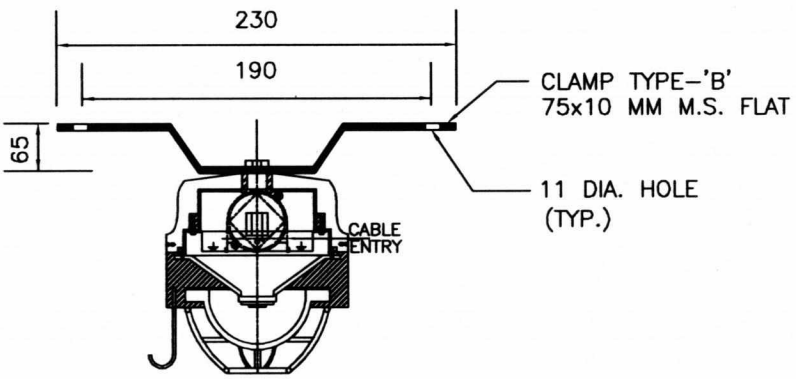
DETAIL–A
(ADAPTOR)

DIMENSIONS	
X	Y
*TO SUIT 19 DIA.	TO SUIT 50 DIA.

* ALTERNATIVELY SIZE TO SUIT FIXTURE



DETAIL–2
BRACKET MOUNTED



DETAIL–3
CEILING MOUNTED

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. SUPPORT ACCESSORIES VIZ THE BRACKET, CEILING ADAPTOR SHALL BE PAINTED WITH EPOXY BASED PAINT.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	26.02.18	UPDATED & ISSUED AS STANDARD	RSD	VKS/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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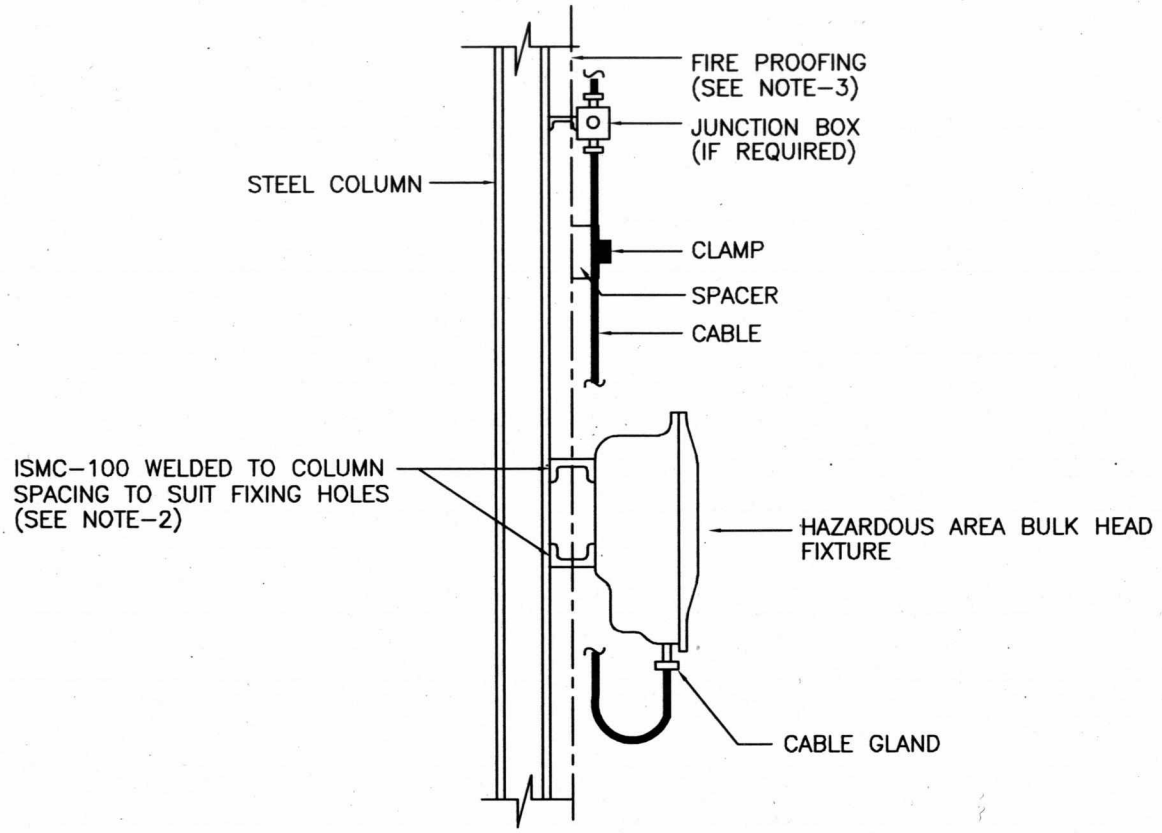
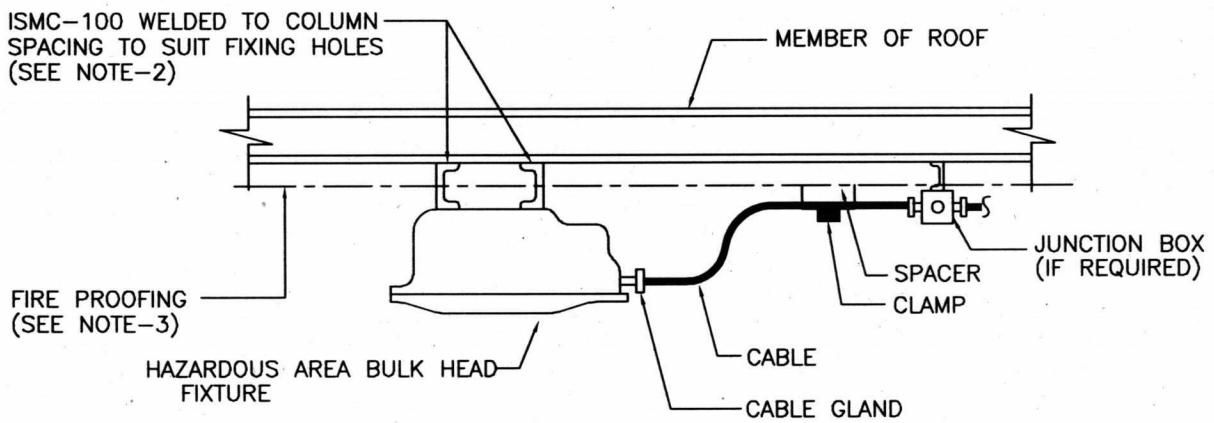


DETAIL–1
COLUMN MOUNTED



DETAIL–2
CEILING MOUNTED

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. USE ANCHOR BOLTS FOR INSTALLATION OF FIXTURES ON CONCRETE COLUMNS.
3. WHERE FIRE PROOFING COLUMNS / STRUCTURES ARE ENCOUNTERED FIXTURE/ JUNCTION BOX AND CABLE/CONDUIT SHALL BE INSTALLED ON A SUITABLE DEEP LEGGED ANGLE IRON FRAME / DISTANCE BRACKET.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	22.02.18	UPDATED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN
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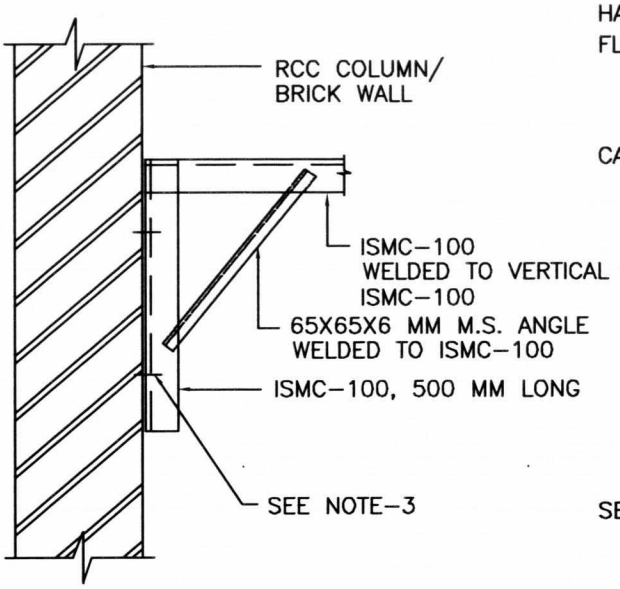
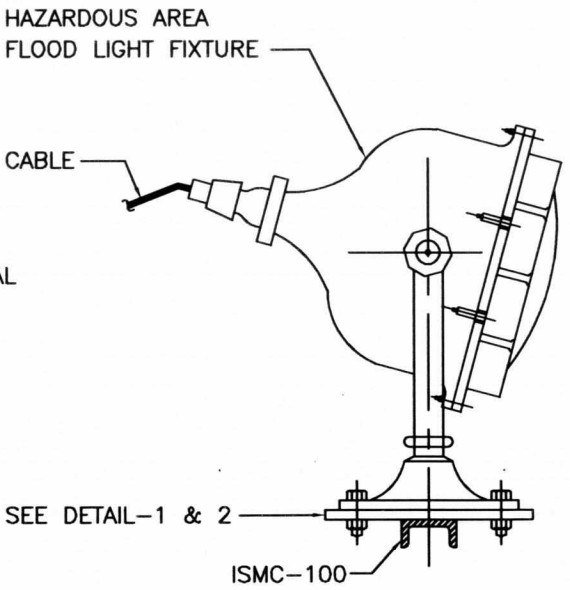
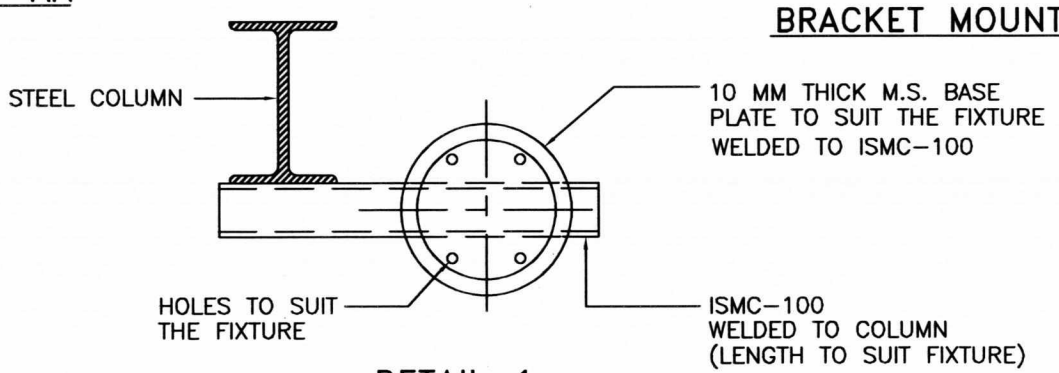


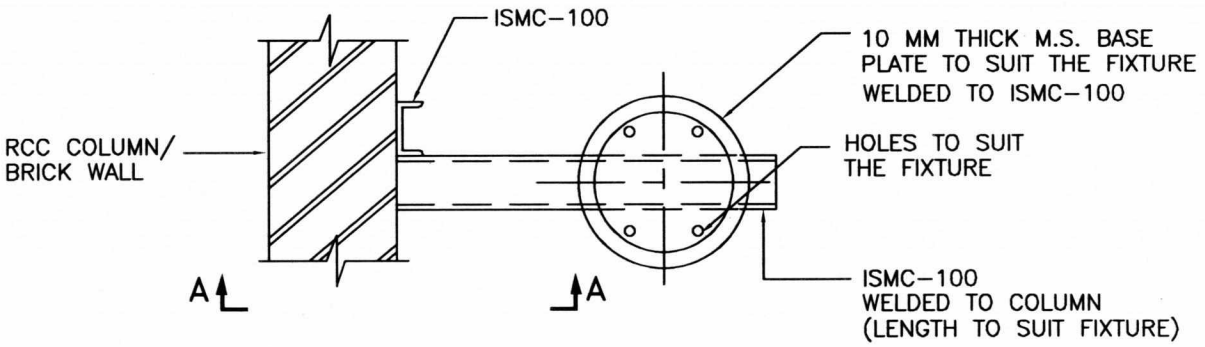
VIEW–AA



ELEVATION
BRACKET MOUNTED



DETAIL–1
MOUNTED ON STEEL COLUMN



DETAIL–2
MOUNTED ON RCC COLUMN/BRICK WALL

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. WHERE FIRE PROOFING COLUMNS / STRUCTURES ARE ENCOUNTERED FIXTURE/ JUNCTION BOX AND CABLE/CONDUIT SHALL BE INSTALLED ON A SUITABLE DEEP LEGGED ANGLE IRON FRAME / DISTANCE BRACKET.
3. SUPPORT FOR FLOOD LIGHT FIXTURE SHALL BE SUITABLY FIXED TO RCC COLUMN/ BRICK WALL BY USING ANCHOR FASTENER.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	22.02.18	UPDATED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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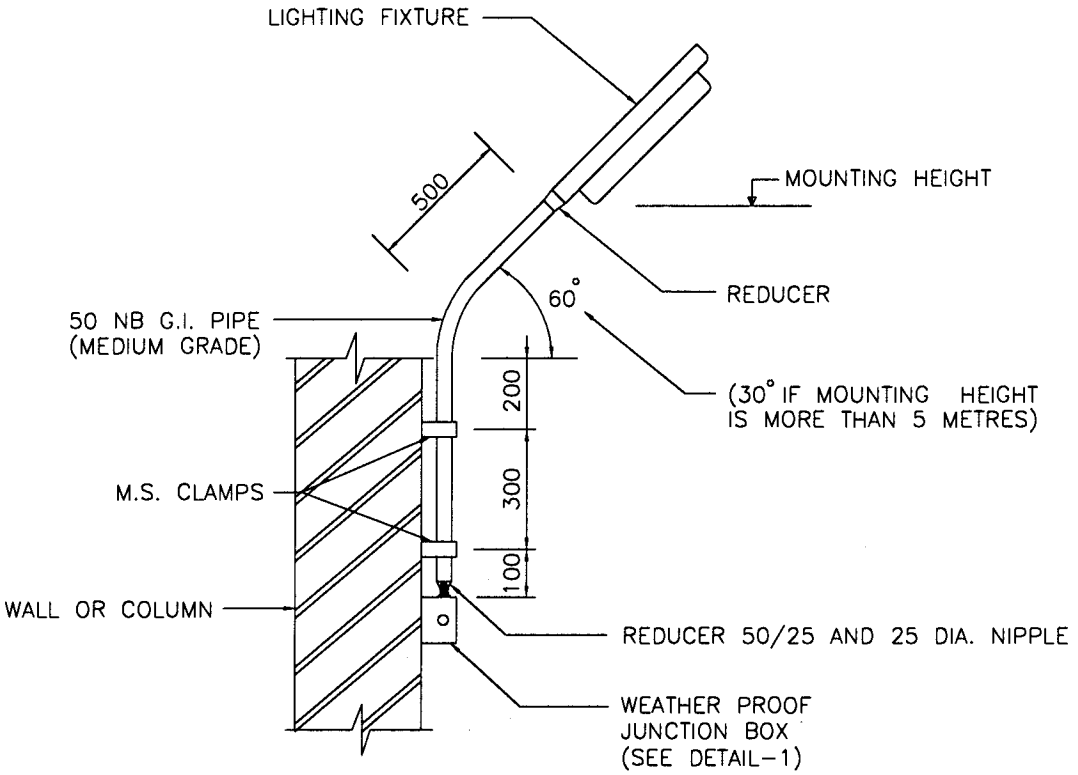
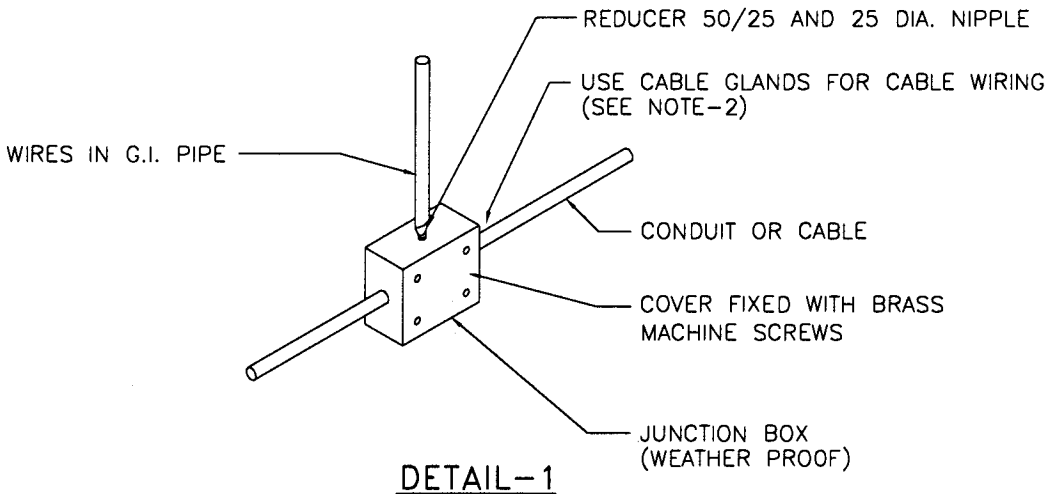


MOUNTED ON WALLS OR COLUMNS



DETAIL-1

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. PROPER SEALING SHALL BE ENSURED TO PREVENT INGRESS OF WATER.
3. WHERE FIRE PROOFING COLUMNS / STRUCTURES ARE ENCOUNTERED FIXTURE/ JUNCTION BOX AND CABLE/CONDUIT SHALL BE INSTALLED ON A SUITABLE DEEP LEGGED ANGLE IRON FRAME / DISTANCE BRACKET.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
5	22.02.18	UPDATED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN

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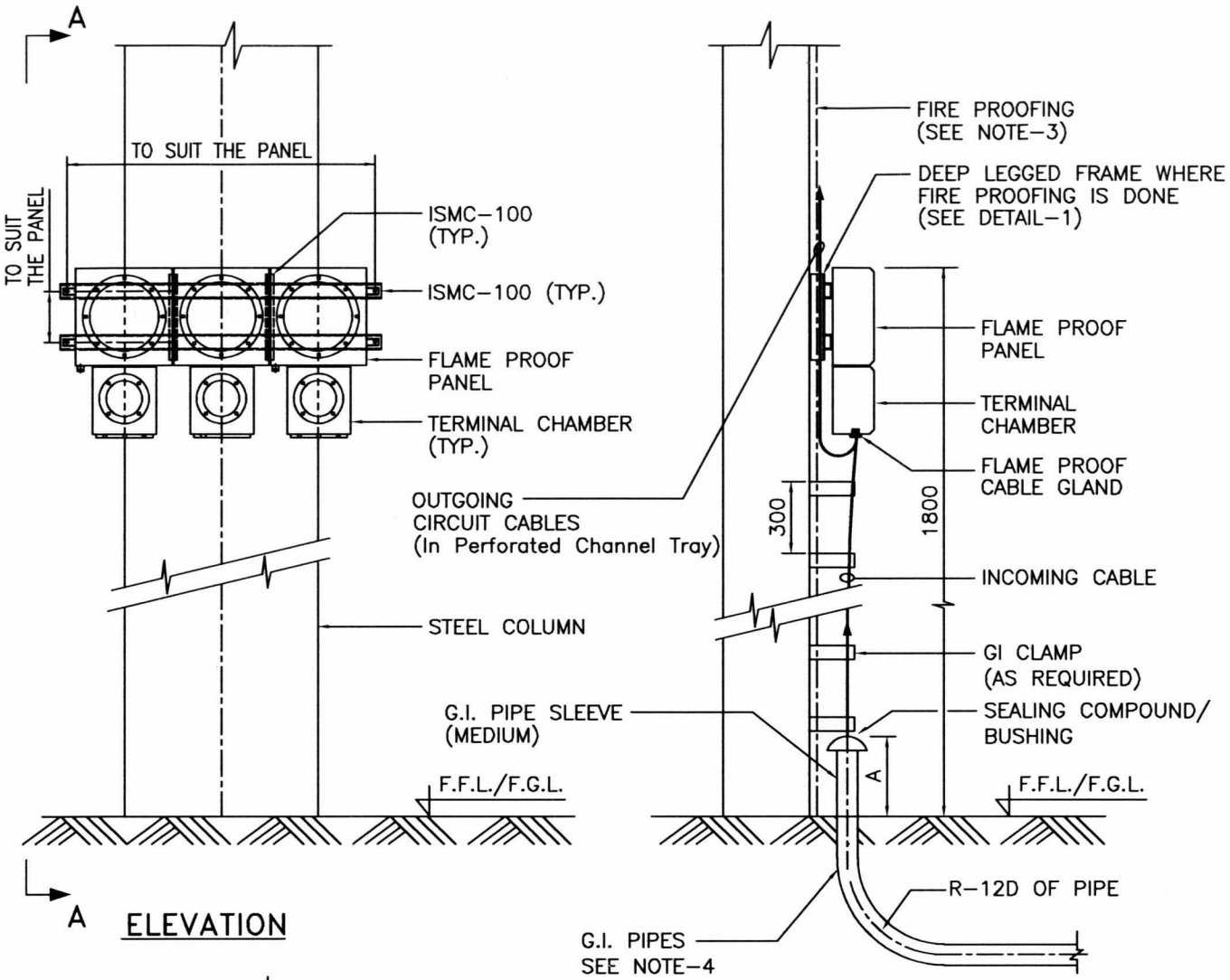

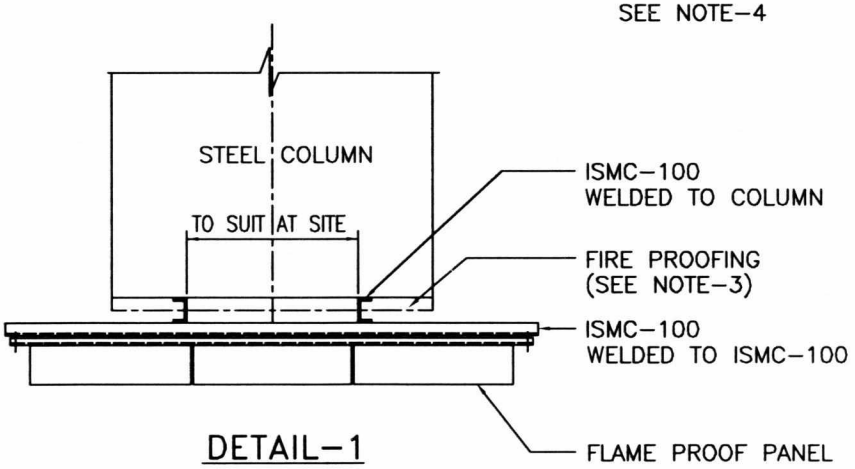

NOTES:–

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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					Approved by	
6	25.08.23	UPDATED & ISSUED AS STANDARD	SONU	VKS/HK	MKS	SM
5	16.07.18	UPDATED & ISSUED AS STANDARD	RSD	VKS/HK	BRB	RKT
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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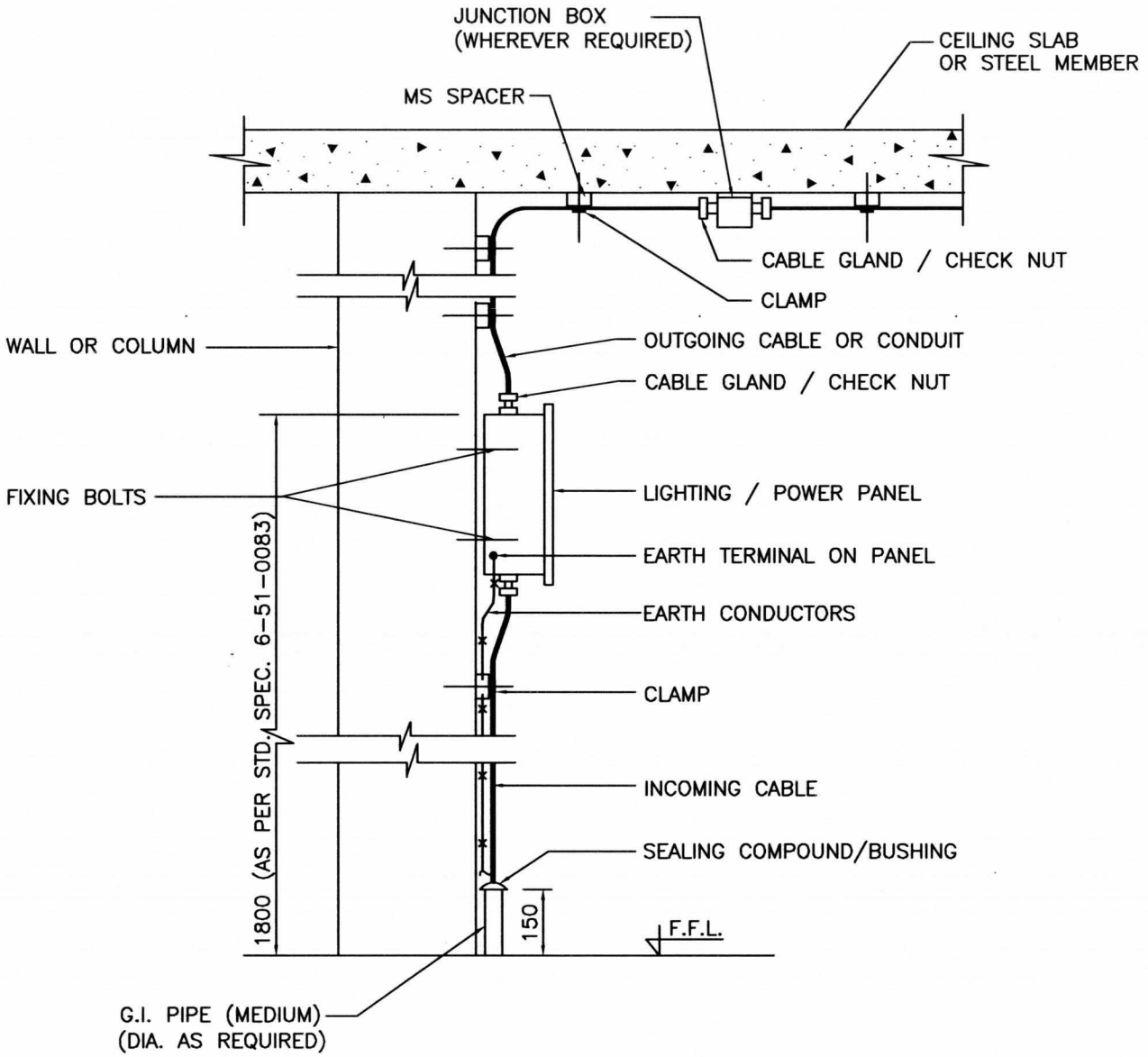

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. WHERE FIRE PROOFING COLUMNS / STRUCTURES ARE ENCOUNTERED FIXTURE/ PANEL/ JUNCTION BOX AND CABLE/CONDUIT SHALL BE INSTALLED ON A SUITABLE DEEP LEGGED ANGLE IRON FRAME / DISTANCE BRACKET.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
6	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	22.02.18	UPDATED & ISSUED AS STANDARD	BP	VKS/HK	BRB	RN
4	17.07.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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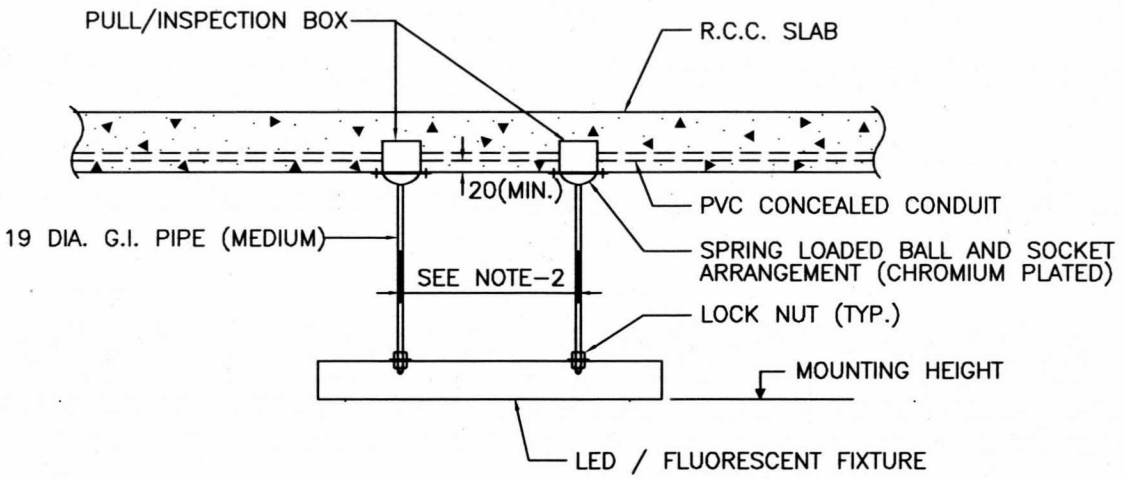
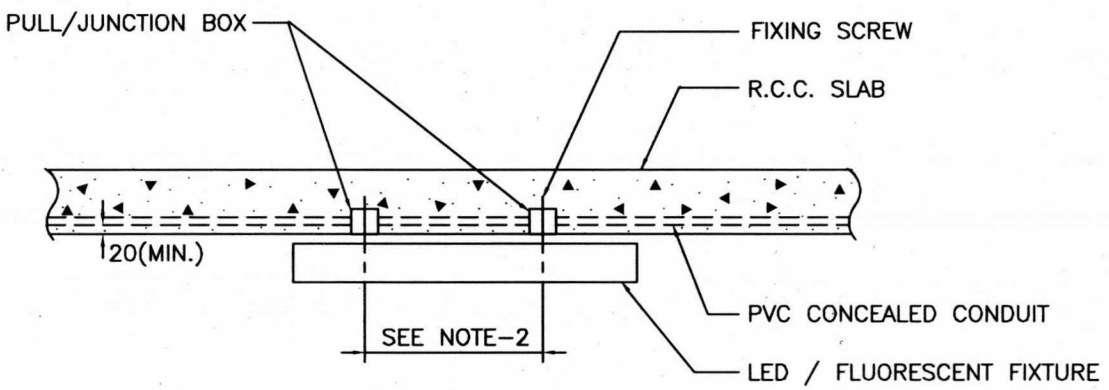


SUSPENSION MOUNTING



CEILING MOUNTING

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. SUSPENSION/FIXING CENTERS SHALL BE AS PER FIXTURE MANUFACTURER'S DETAILS.

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6	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
5	09.03.18	UPDATED & ISSUED AS STANDARD	RSD	VKS/HK	BRB	RN
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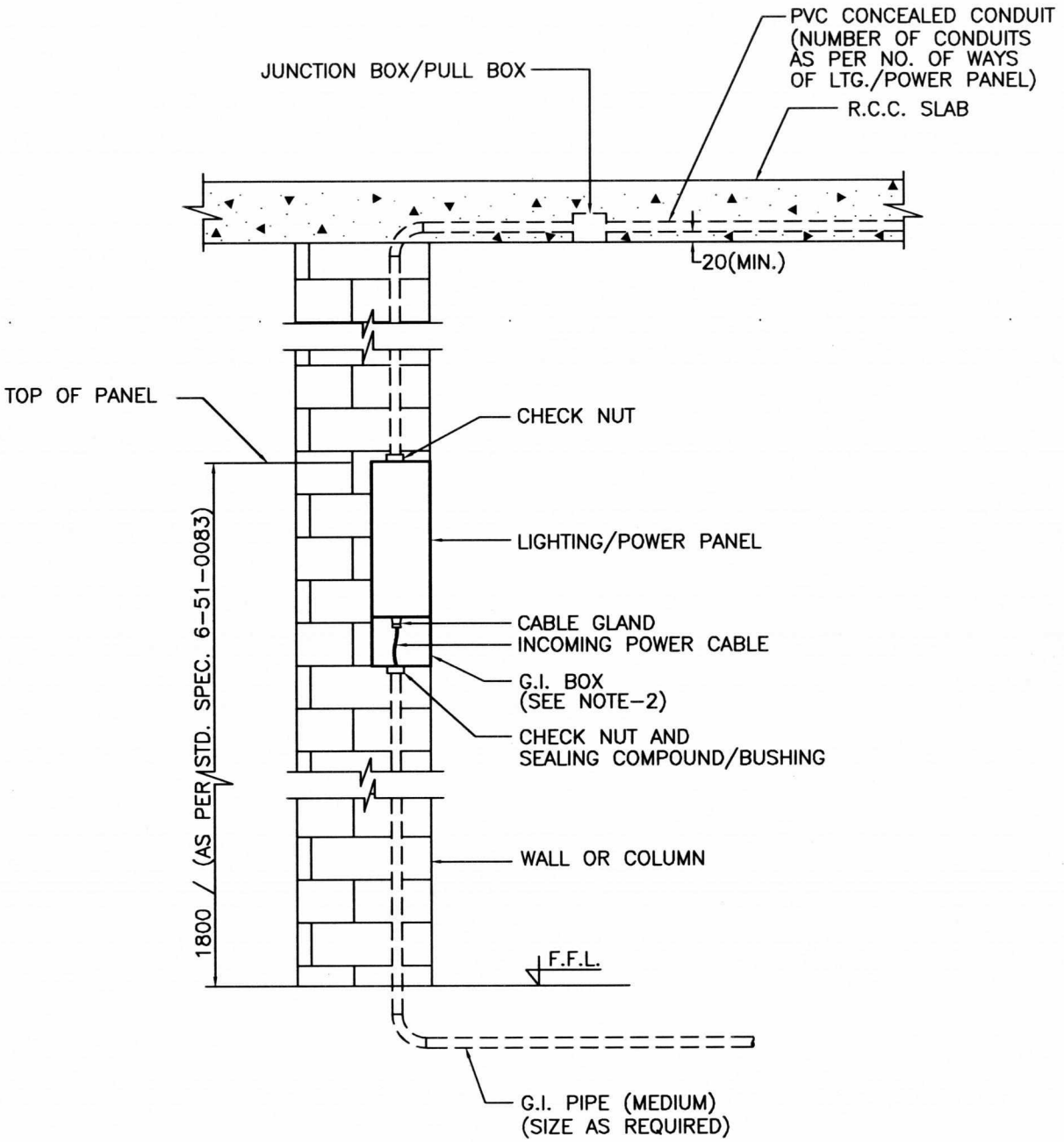

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. G.I. ADAPTOR BOX OF SUITABLE SIZE WITH REMOVABLE COVER SHALL BE PROVIDED BELOW THE PANEL TO FACILITATE CABLE TERMINATION.

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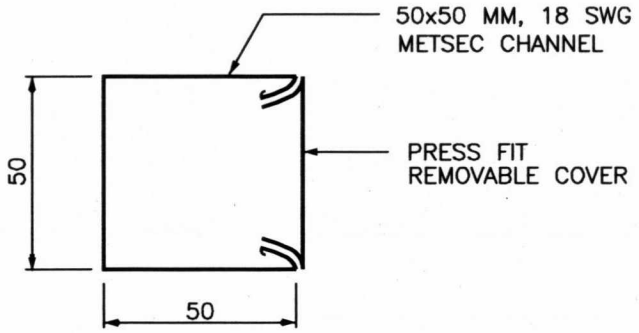
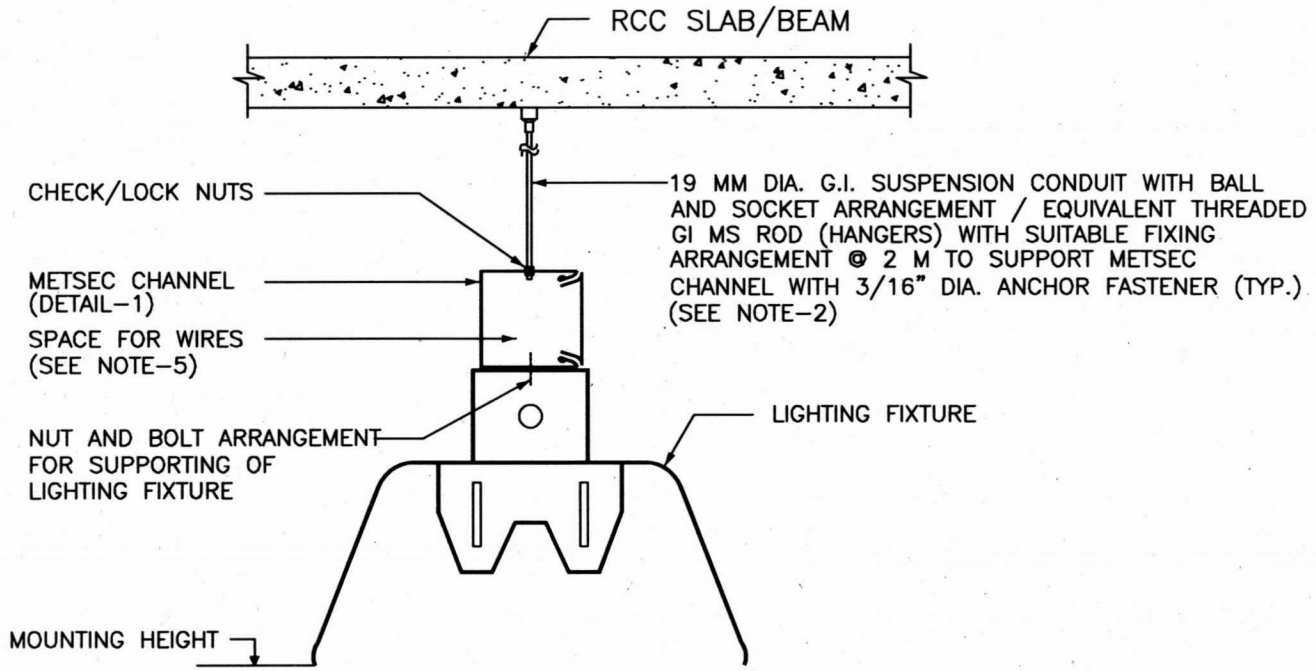


DETAIL–1
METSEC CHANNEL



INSTALLATION OF LIGHTING FIXTURE BELOW METSEC CHANNEL

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. LENGTH OF SUSPENSION CONDUITS / MS ROD SHALL BE ADJUSTED AS PER MOUNTING HEIGHT OF LIGHTING FIXTURES.
3. IN CASE, METSEC CHANNEL IS NOT TO BE SUSPENDED, IT SHALL BE DIRECTLY FIXED TO THE CEILING BY 3/16" DIA. ANCHOR FASTENERS @ 2 M INTERVALS.
4. METSEC CHANNEL SHALL BE SPRAY PAINTED AFTER INSTALLATION.
5. WIRES FOR EACH TYPE OF CIRCUIT (LIGHTING/POWER/DC LIGHTING) SHALL BE NEATLY BUNCHED IN METSEC CHANNEL.

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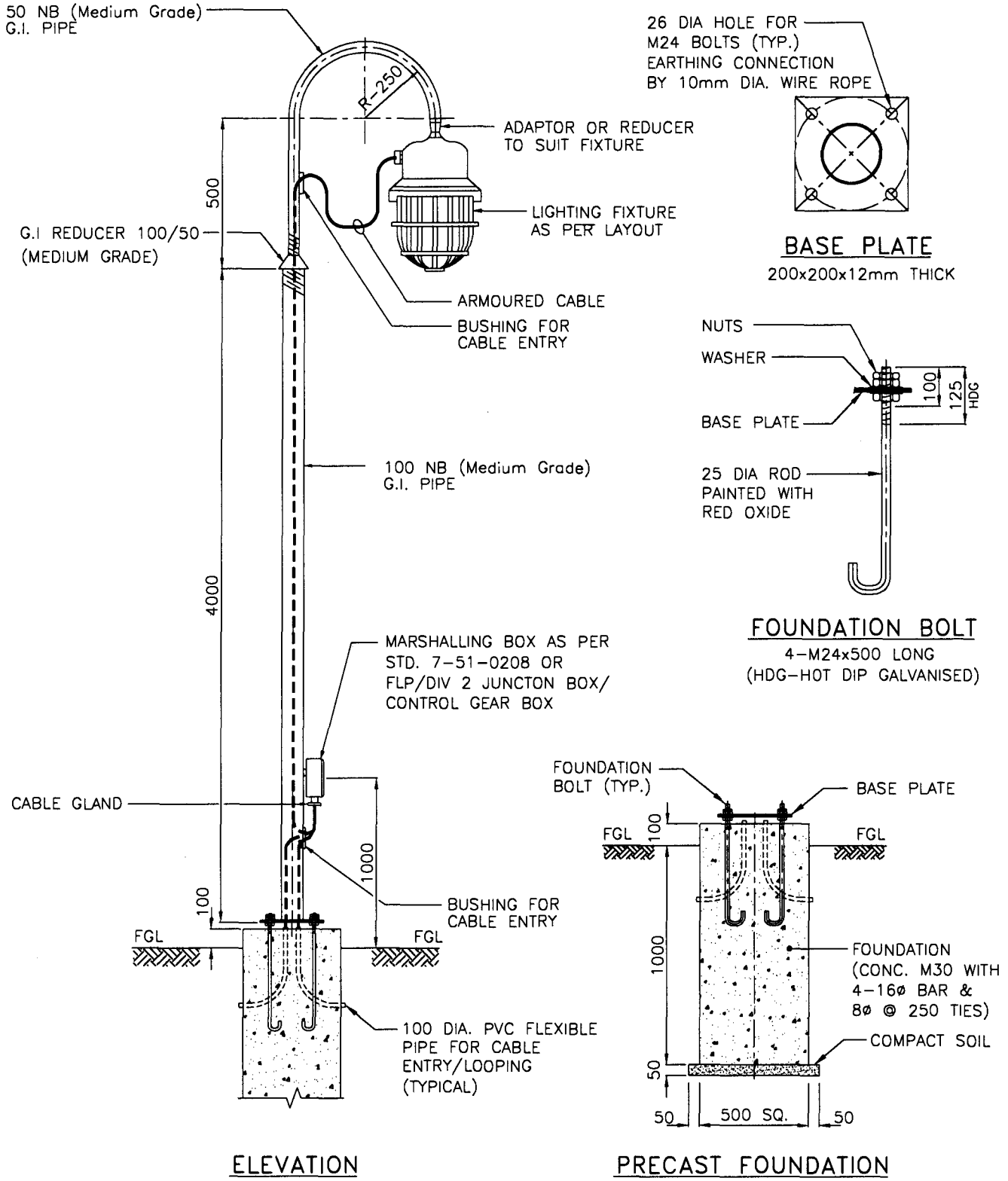

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. THE LIGHTING POLE AND ACCESSORIES DETAILS SHOWN HERE ARE INDICATIVE ONLY. ACTUAL DESIGN & ARRANGEMENT SHALL BE AS PER MANUFACTURER'S DETAILS.

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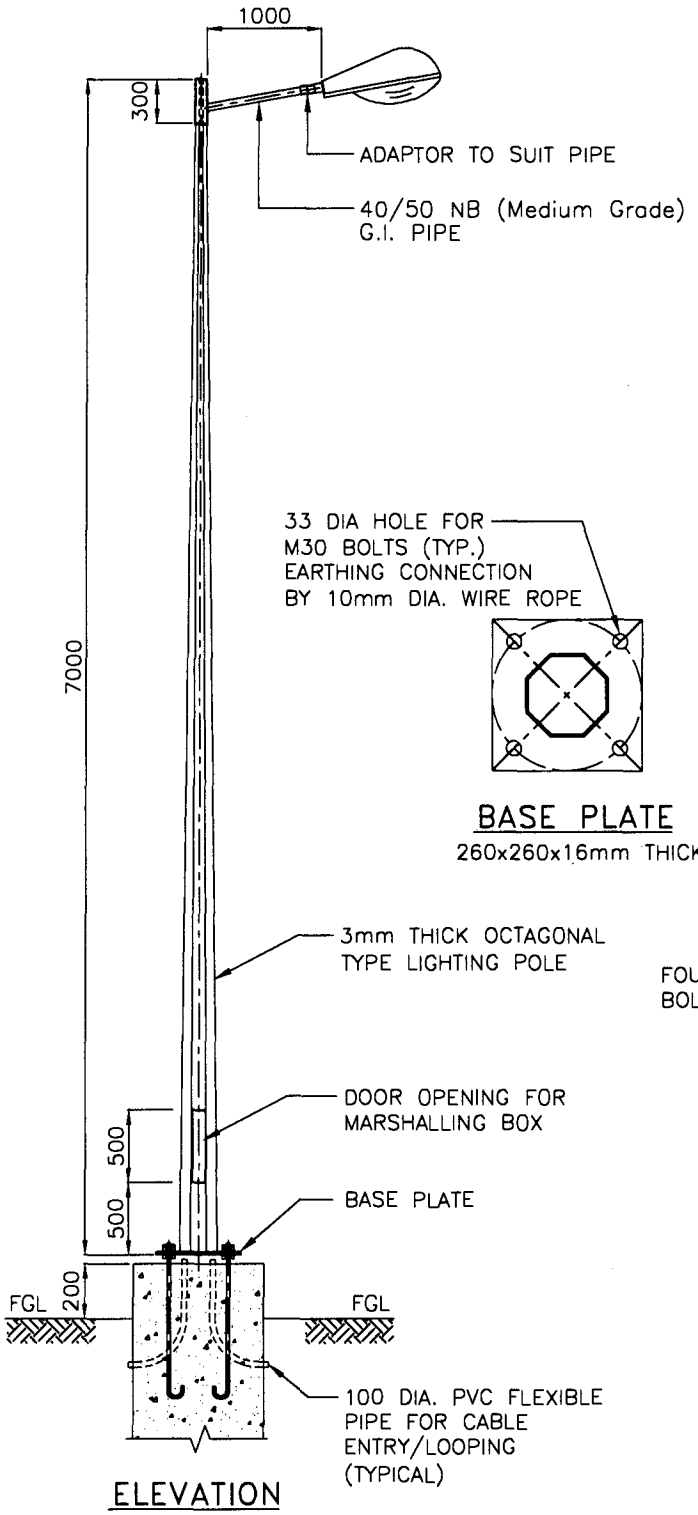
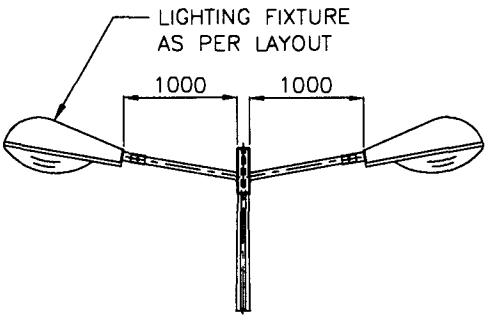


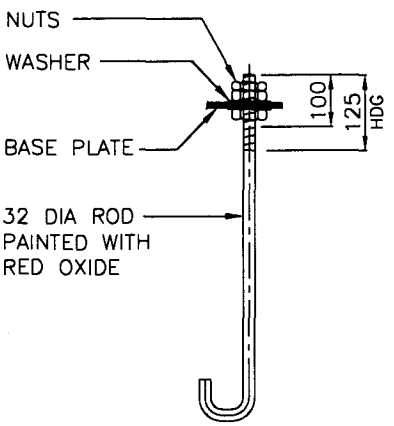
ELEVATION



ARRANGEMENT FOR TWO FIXTURES

BASE PLATE

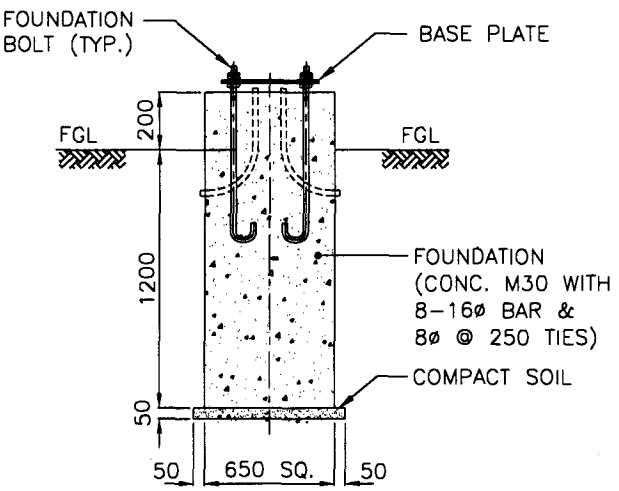
260x260x16mm THICK



FOUNDATION BOLT

4–M30x750 LONG

(HDG–HOT DIP GALVANISED)



PRECAST FOUNDATION

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. THE LIGHTING POLE AND ACCESSORIES DETAILS SHOWN HERE ARE INDICATIVE ONLY. ACTUAL DESIGN & ARRANGEMENT SHALL BE AS PER MANUFACTURER'S DETAILS.

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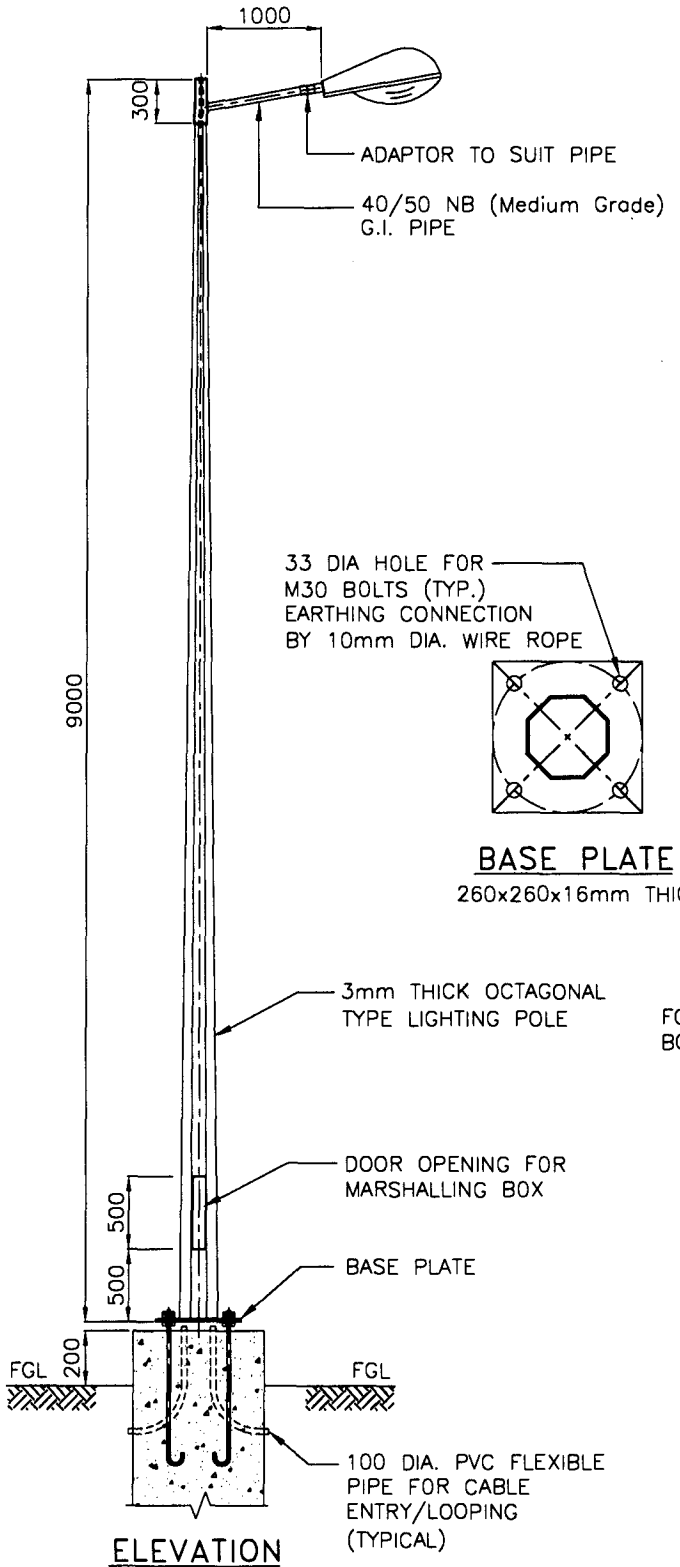
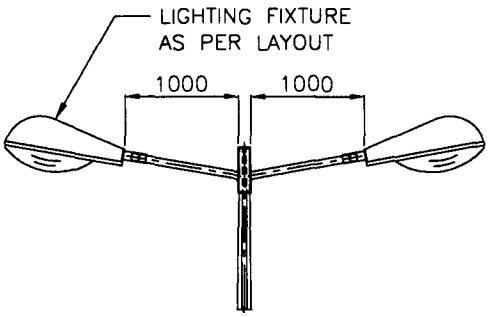
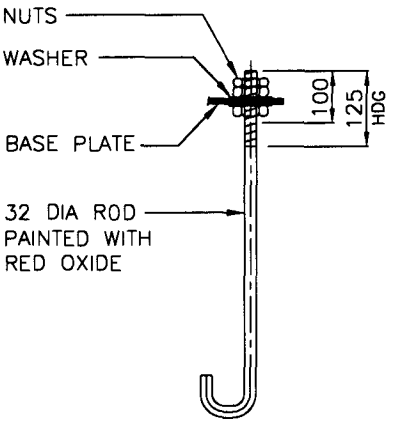


ELEVATION

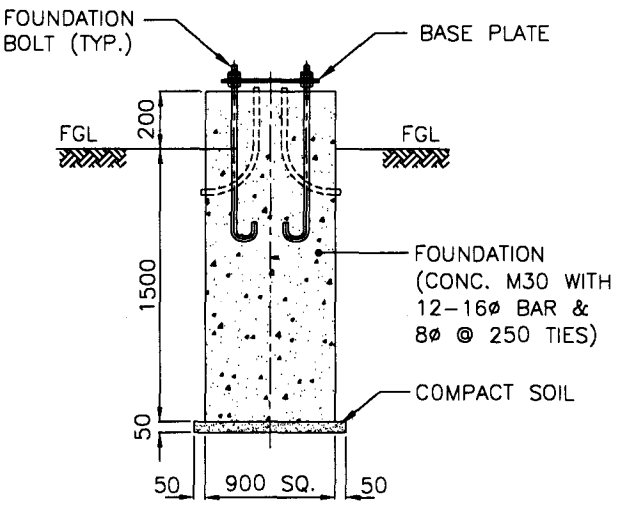


ARRANGEMENT FOR TWO FIXTURES

BASE PLATE
260x260x16mm THICK



FOUNDATION BOLT
4–M30x750 LONG
(HDG–HOT DIP GALVANISED)



PRECAST FOUNDATION

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. THE LIGHTING POLE AND ACCESSORIES DETAILS SHOWN HERE ARE INDICATIVE ONLY. ACTUAL DESIGN & ARRANGEMENT SHALL BE AS PER MANUFACTURER'S DETAILS.

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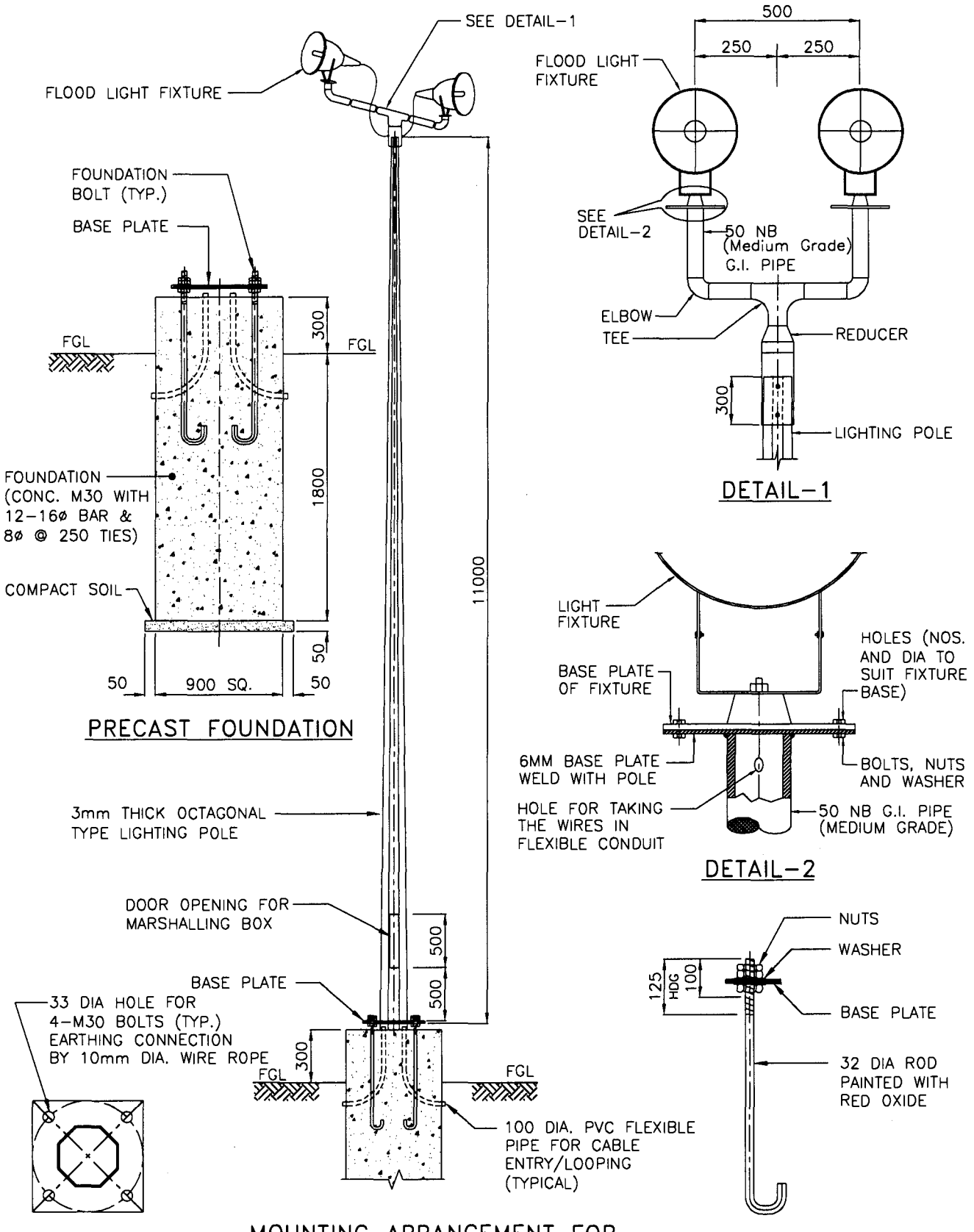

PRECAST FOUNDATION

DETAIL-1

DETAIL-2

BASE PLATE
350x350x16mm THICK

MOUNTING ARRANGEMENT FOR SAFE AREA LIGHTING FIXTURE

FOUNDATION BOLT
4-M30x900 LONG
(HDG-HOT DIP GALVANISED)

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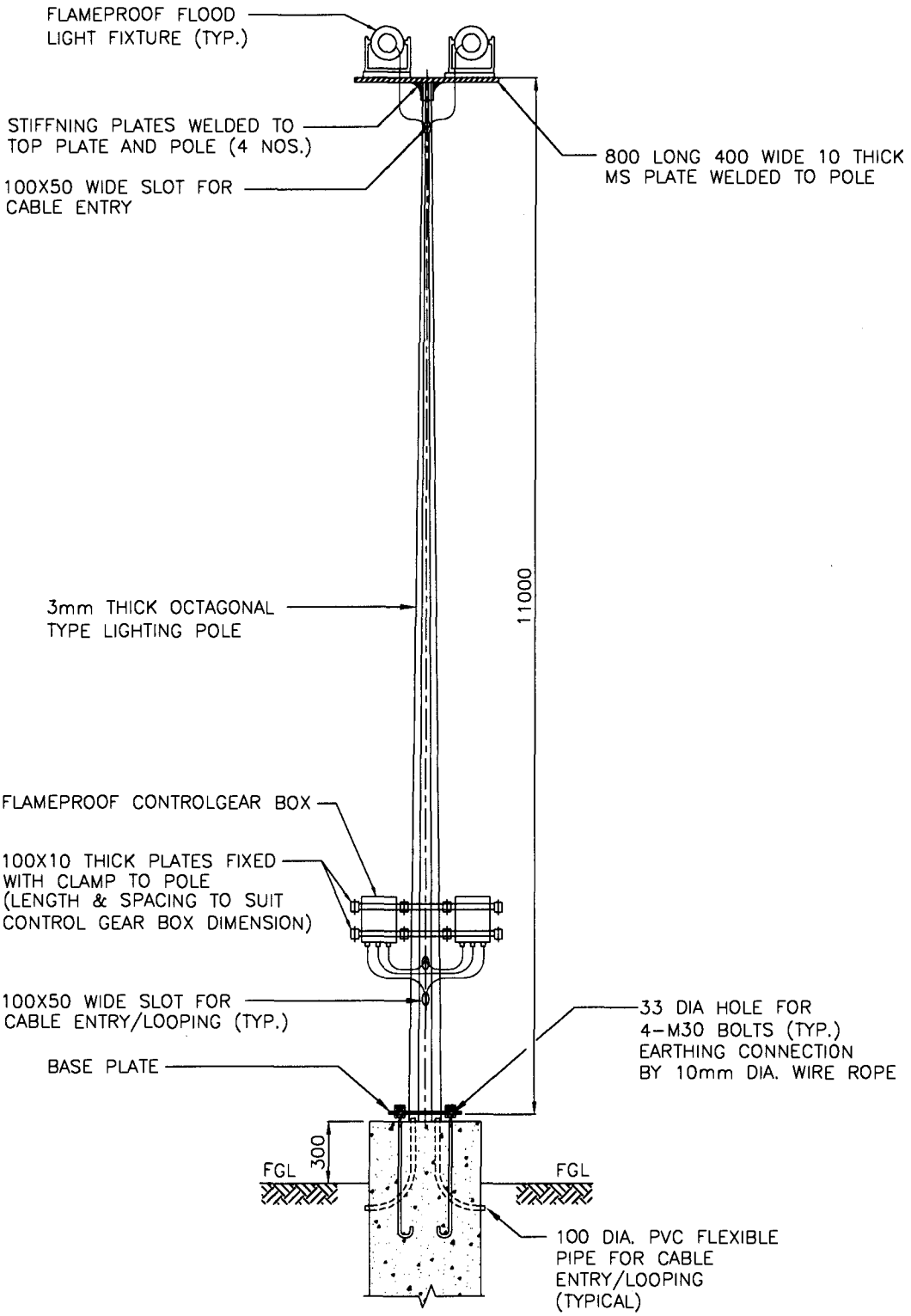

MOUNTING ARRANGEMENT FOR HAZARDOUS AREA LIGHTING FIXTURE

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
2. THE LIGHTING POLE AND ACCESSORIES DETAILS SHOWN HERE ARE INDICATIVE ONLY. ACTUAL DESIGN & ARRANGEMENT SHALL BE AS PER MANUFACTURER'S DETAILS.
3. 2 NOS. 25 DIA. HOLES SHALL BE PROVIDED ON OPPOSITE SIDE FOR FIXING OF MARSHALLING BOX ON ONE END AND CONTROL GEAR BOX ON OTHER END.

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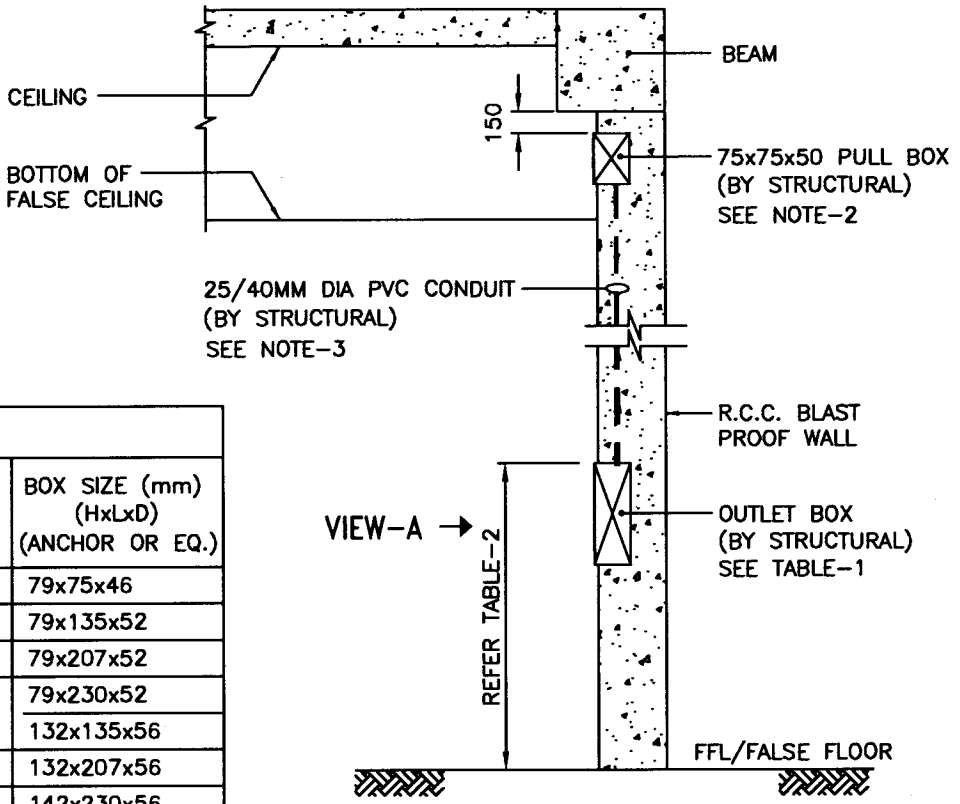


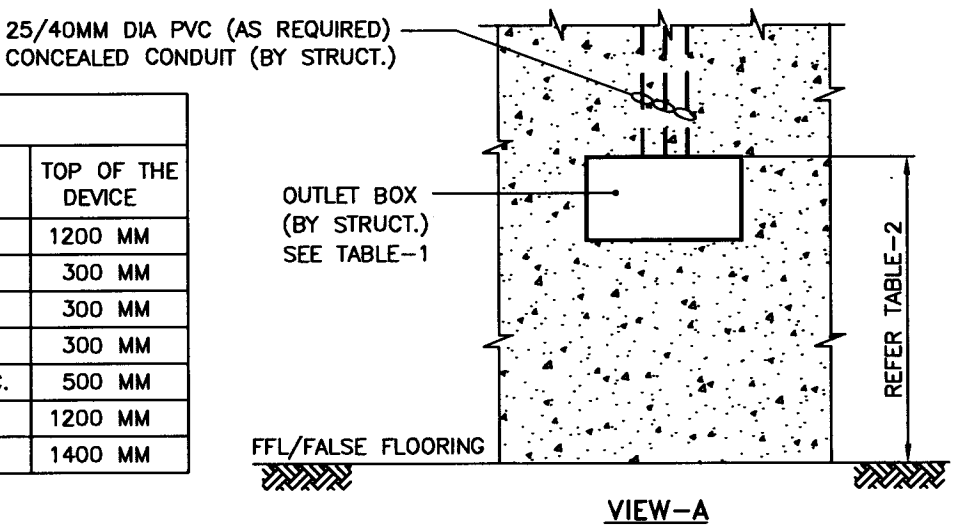
DETAIL-1

TYPICAL ARRANGEMENT FOR LIGHTING/MCP/FCS OUTLET BOX IN BLAST PROOF WALL WITH FALSE CEILING

TABLE-1

S. NO.	NO. OF MODULES*	BOX SIZE (mm) (HxLxD) (ANCHOR OR EQ.)
1	2 MODULES	79x75x46
2	4 MODULES	79x135x52
3	6 MODULES	79x207x52
4	8 MODULES	79x230x52 132x135x56
5	12 MODULES	132x207x56
6	16 MODULES	142x230x56
7	18 MODULES	207x207x60

* 1 MODULE FOR 1 SWITCH/REGULATOR
* 2 MODULES FOR 1 POWER SOCKET



VIEW-A

TABLE-2

S. NO.	DEVICE NAME	TOP OF THE DEVICE
1	LIGHTING SWITCH BOX	1200 MM
2	POWER RECEPTACLE	300 MM
3	LAN SOCKETS/SWITCH	300 MM
4	TELEPHONE SOCKET	300 MM
5	DP MCB BOX FOR A.C.	500 MM
6	MCP	1200 MM
7	FCS	1400 MM

NOTES:-

1. NO. OF CONDUITS FOR LIGHTING/POWER CIRCUITS SHALL BE PROVIDED AS PER LAYOUT DRAWING/OUTLET BOX.
2. 75x75x50MM PULL BOX TO BE PROVIDED IN RCC BLAST PROOF WALL/CEILING AT END OF CONDUITS TO ENABLE WIRING BY ELECTRICAL CONTRACTOR (NO. OF BOXES SHALL BE AS PER NO. OF CONDUITS). THE PULL BOXES SHALL BE COVERED WITH FACE PLATE AFTER LAYING OF WIRING.
3. 25MM PVC CONDUIT SHALL BE USED FOR LIGHTING/POWER AND 40MM PVC CONDUIT SHALL BE USED FOR FIRE ALARM AND PLANT COMMUNICATION SYSTEM.
4. JUNCTION BOX FOR FIRE DETECTORS/CEILING FANS SHALL BE PROVIDED AS PER LAYOUT DRAWINGS.

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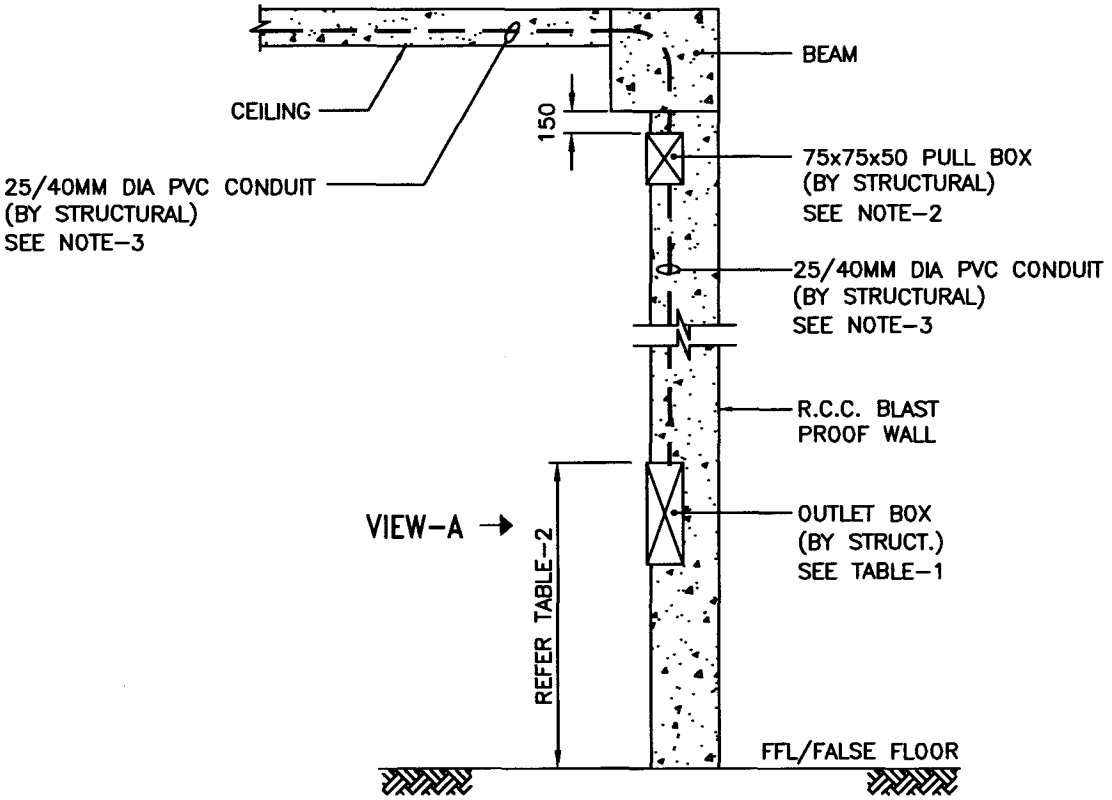
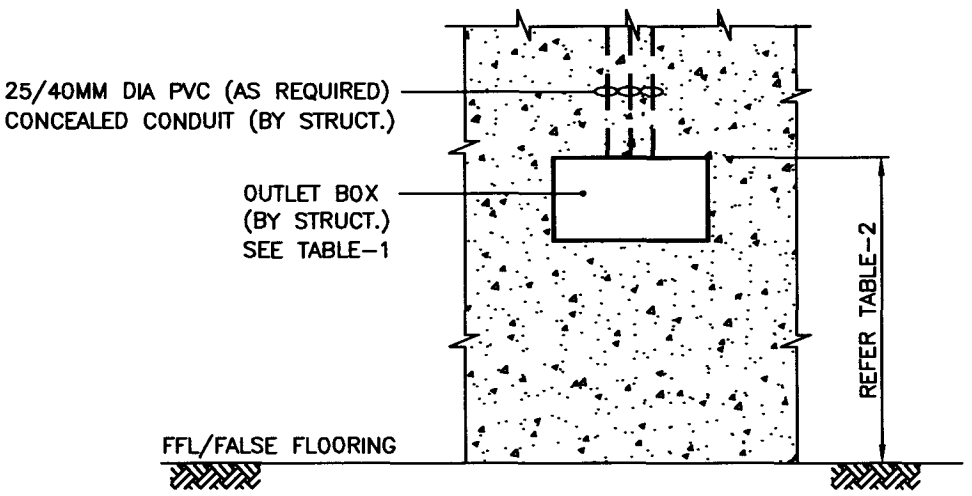


DETAIL-2

TYPICAL ARRANGEMENT FOR LIGHTING/MCP/FCS OUTLET BOX IN BLAST PROOF WALL WITHOUT FALSE CEILING



VIEW-A

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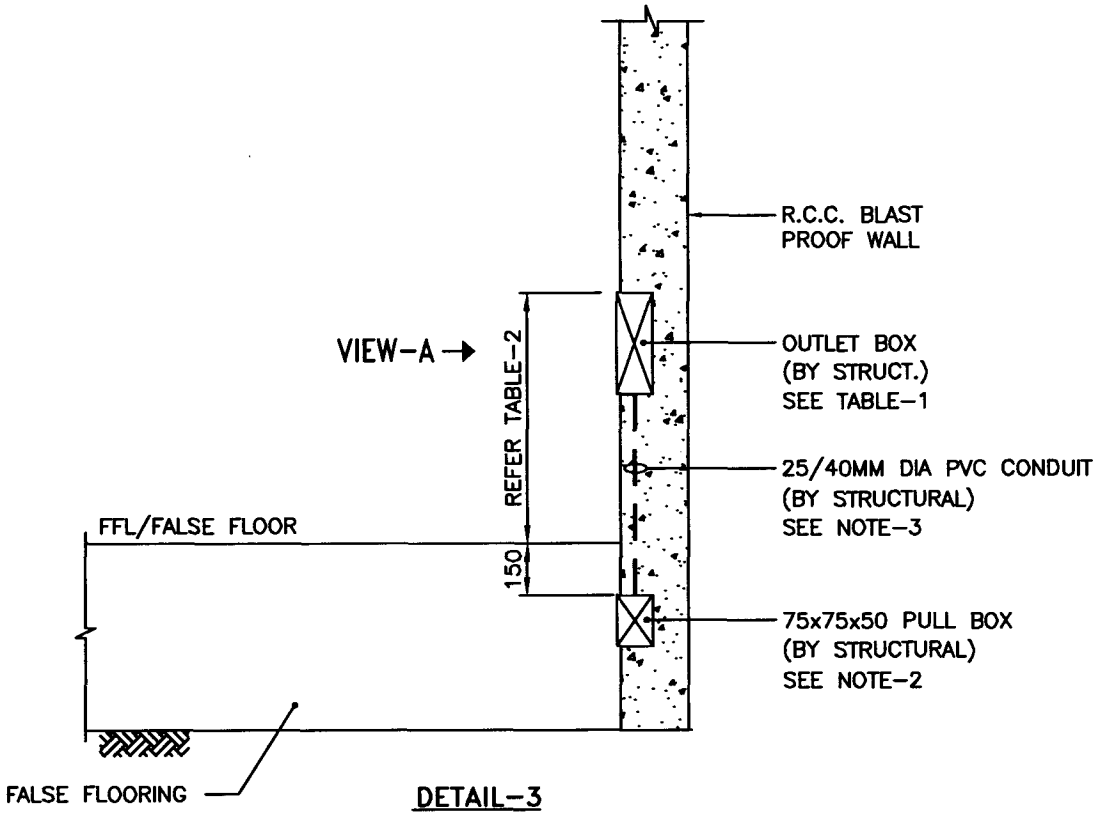
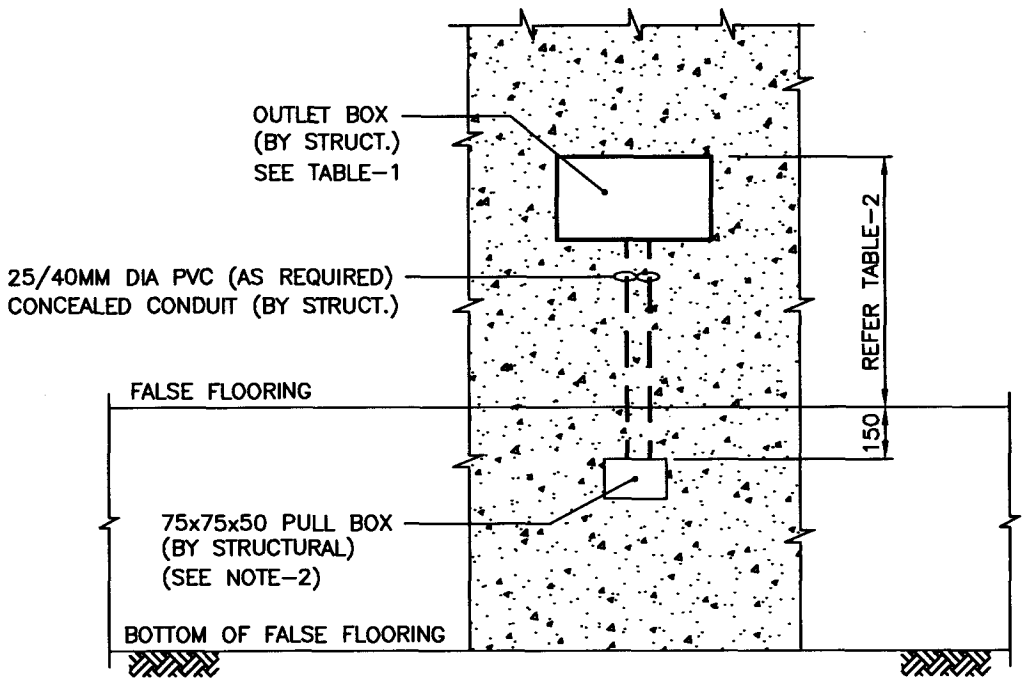


DETAIL-3

TYPICAL ARRANGEMENT FOR POWER/TELEPHONE SOCKET OUTLET BOX IN BLAST PROOF WALL WITH FALSE FLOORING



VIEW-A

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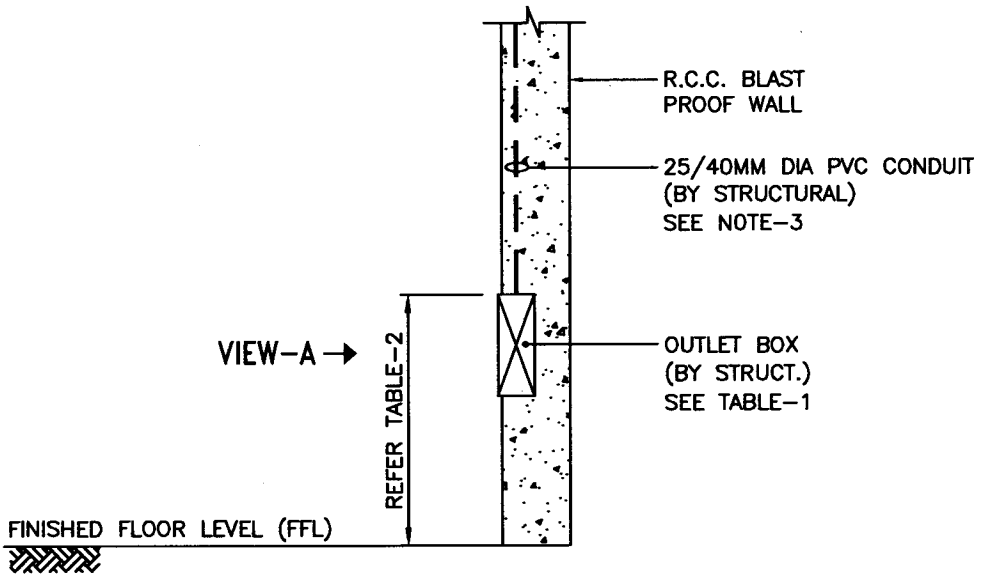
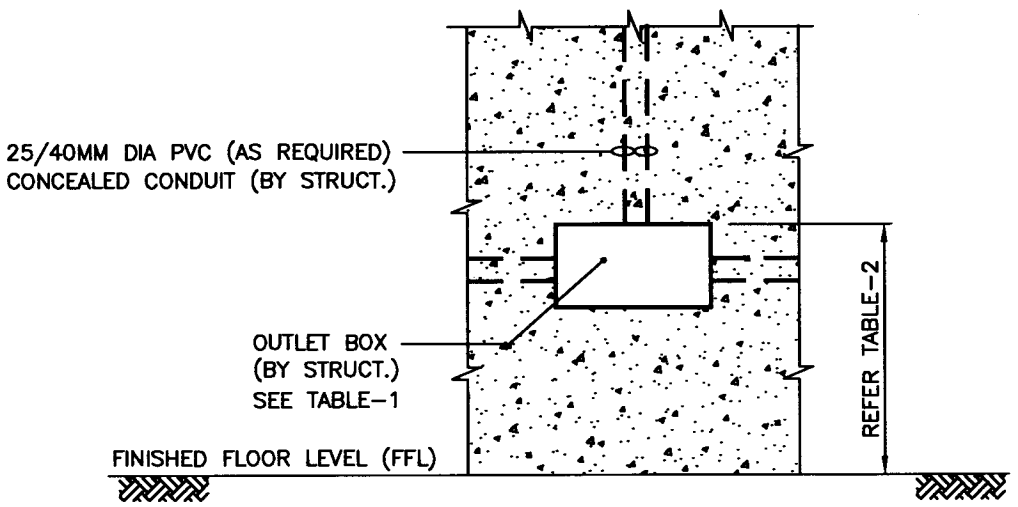


DETAIL-4

TYPICAL ARRANGEMENT FOR POWER/TELEPHONE SOCKET OUTLET BOX IN BLAST PROOF WALL WITHOUT FALSE FLOORING



VIEW-A

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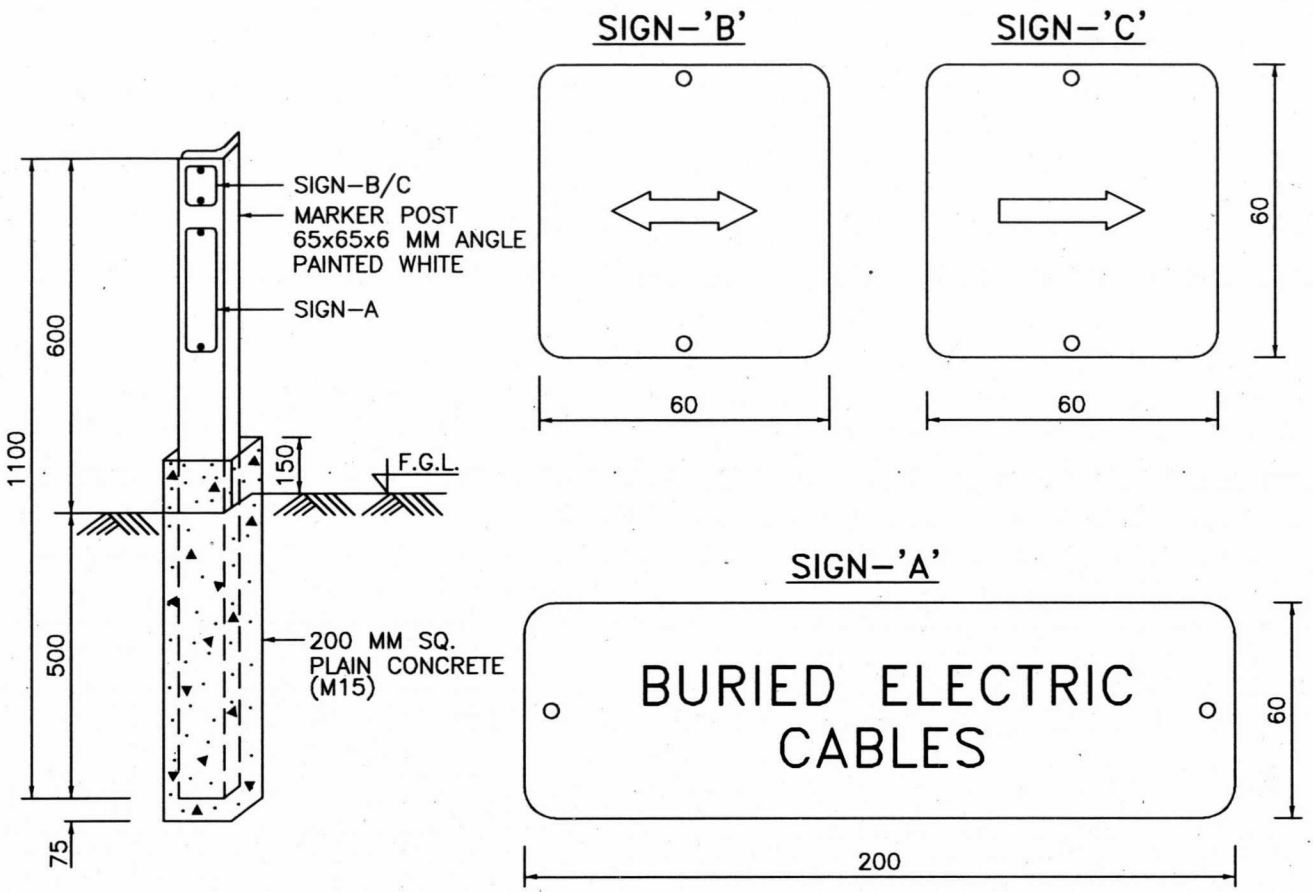
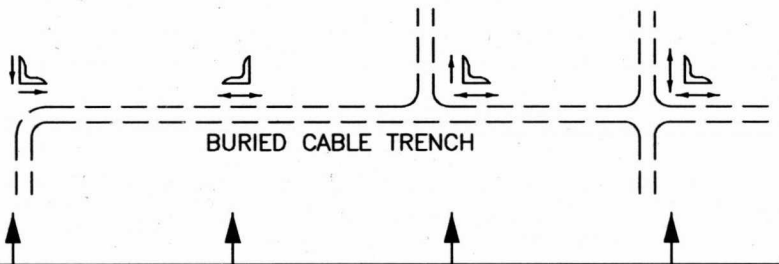


TYPICAL ARRANGEMENT OF MARKER

(SEE NOTE–2)



	ANGLE 65x65x6 1100 MM LONG	ANGLE 65x65x6 1100 MM LONG	ANGLE 65x65x6 1100 MM LONG	ANGLE 65x65x6 1100 MM LONG
ASSEMBLY CONSISTING OF	SIGN.–A–1 NO. SIGN.–C–2 NOS.	SIGN.–A–1NO. SIGN.–B–1NO.	SIGN.–A–1NO. SIGN.–B–1NO. SIGN.–C–1NO.	SIGN.–A–1NO. SIGN.–B–2NOS.

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. TRENCHES SHALL BE MARKED AT ALL DIRECTION CHANGES, INTERSECTIONS AND STRAIGHT RUNS.
3. SIGN BOARDS SHALL BE MADE OF 14 GAUGE ENAMELLED STEEL PLATE. WHITE LETTERING SHALL BE ON JADE GREEN BACKGROUND.

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					Approved by	
6	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
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4	21.11.13	REAFFIRMED & ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	SC

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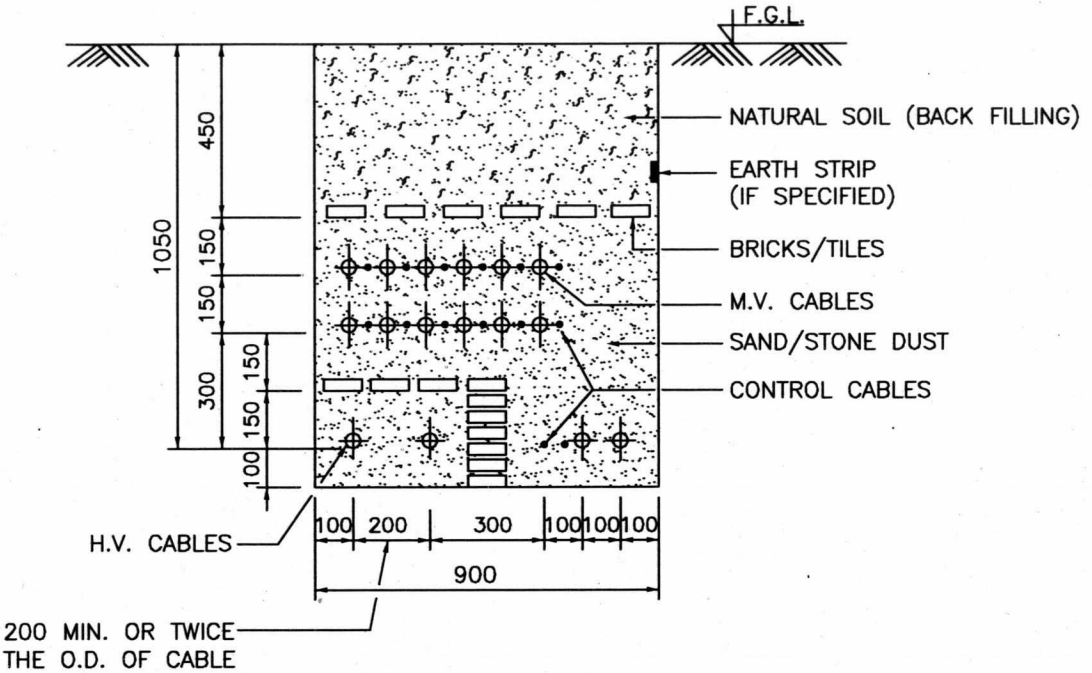
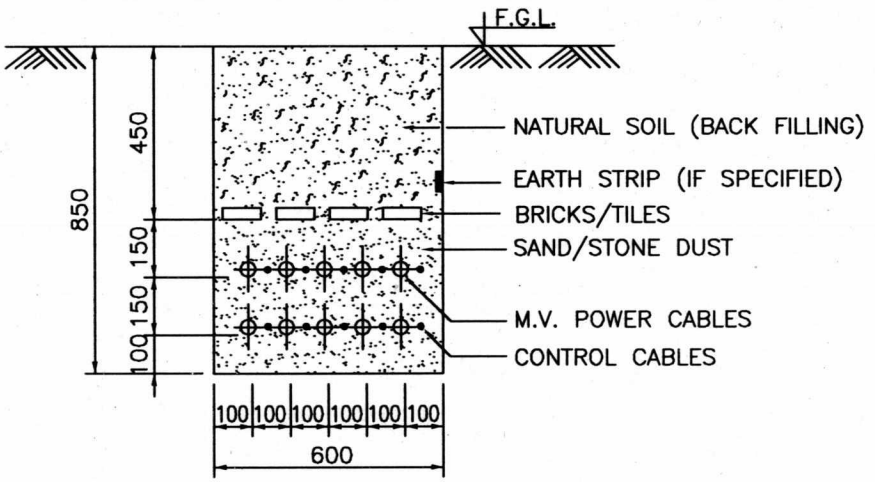


TYPICAL SECTION WITH H.V. AND M.V. CABLES



TYPICAL SECTION WITH M.V. CABLES

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. LEAVE SPACE FOR LATER ADDITION OF AT LEAST 2 CABLES OR 15% AVERAGE SPARE SPACE FOR FUTURE EXPANSION.
3. IF FIRE ALARM AND COMMUNICATION CABLES ARE LAID IN THE SAME TRENCH, A CLEARANCE OF 300 MM (MIN.) FROM ELECTRIC POWER CABLES SHALL BE PROVIDED.

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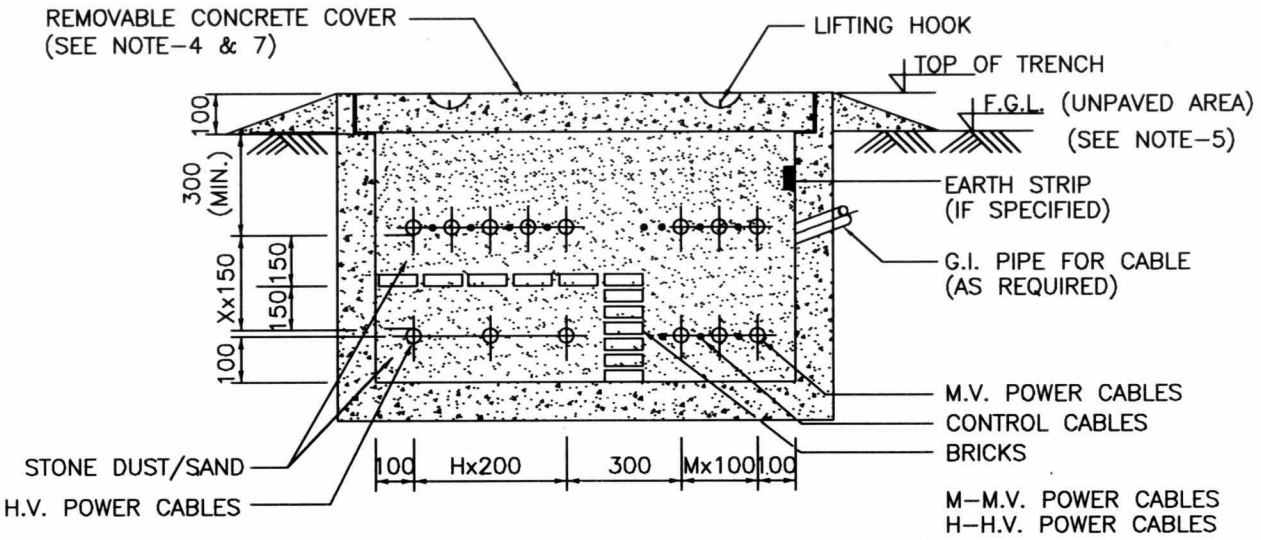
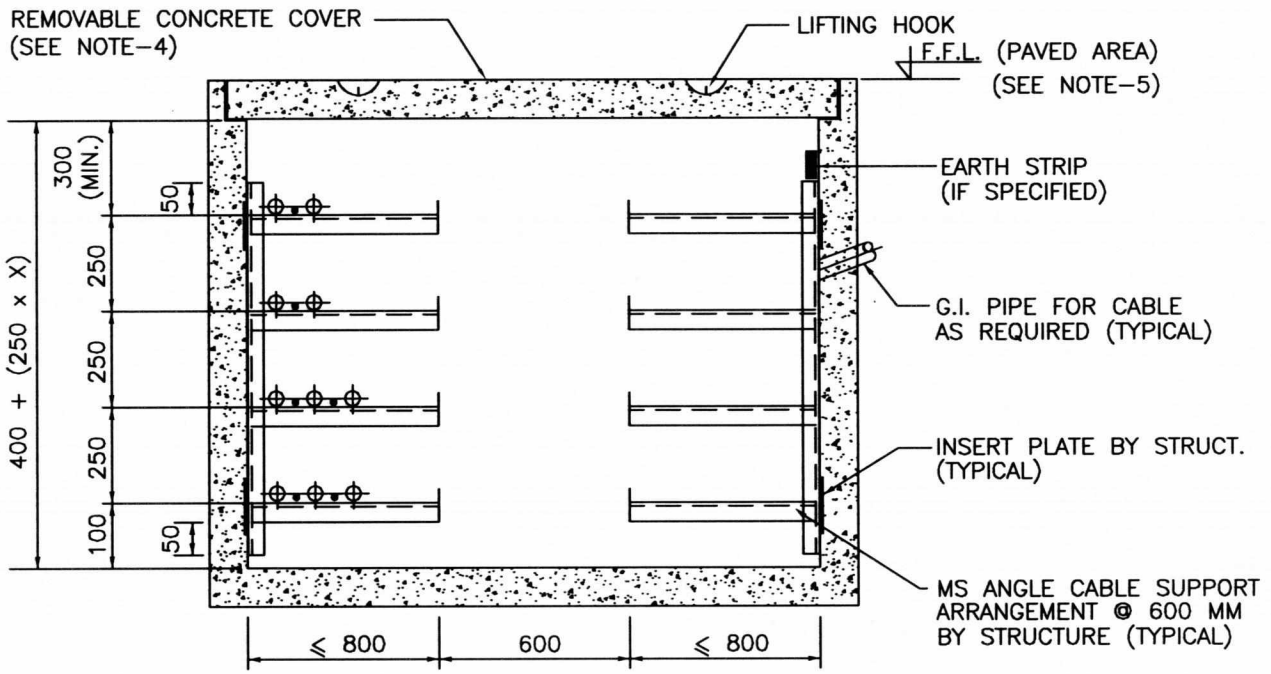
TYPICAL SECTION OF RCC CABLE TRENCH



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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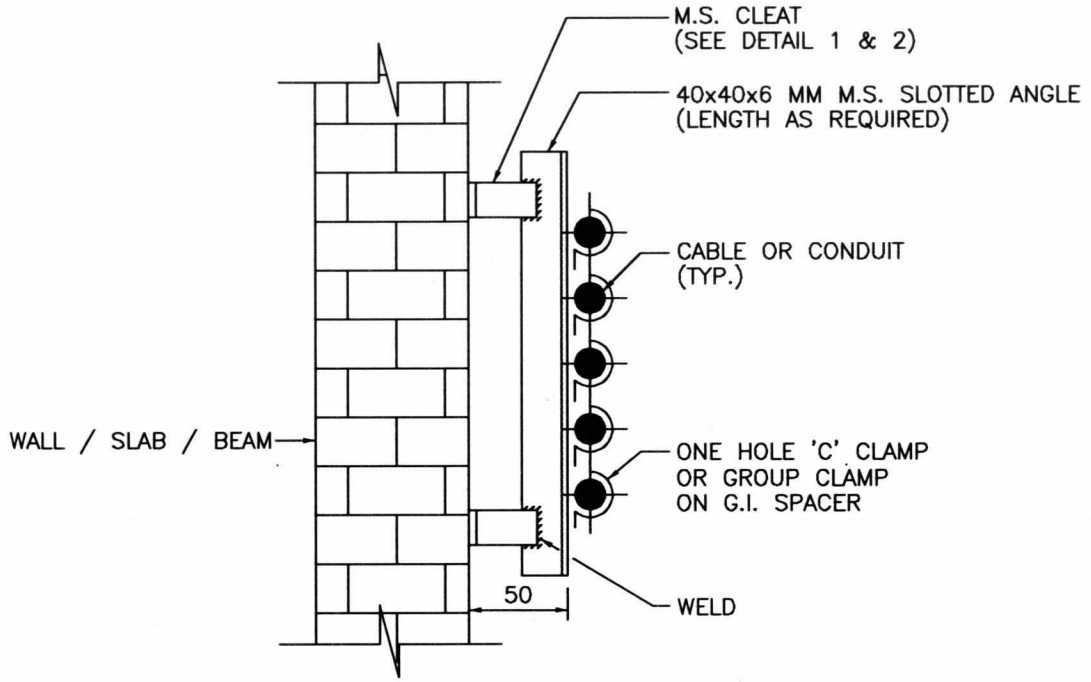
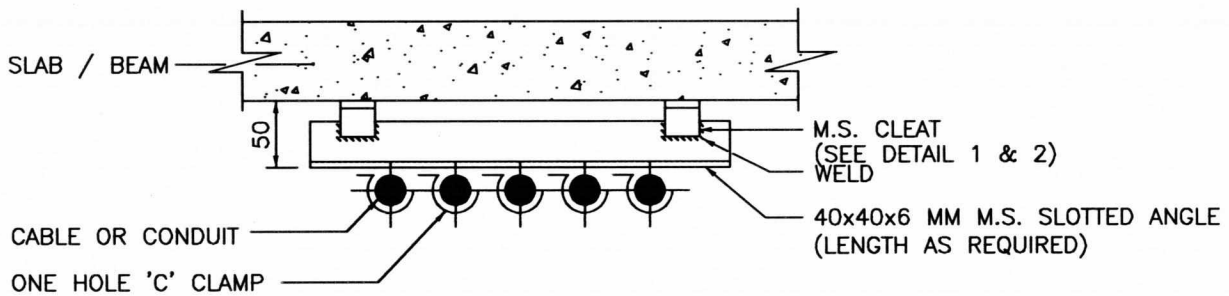
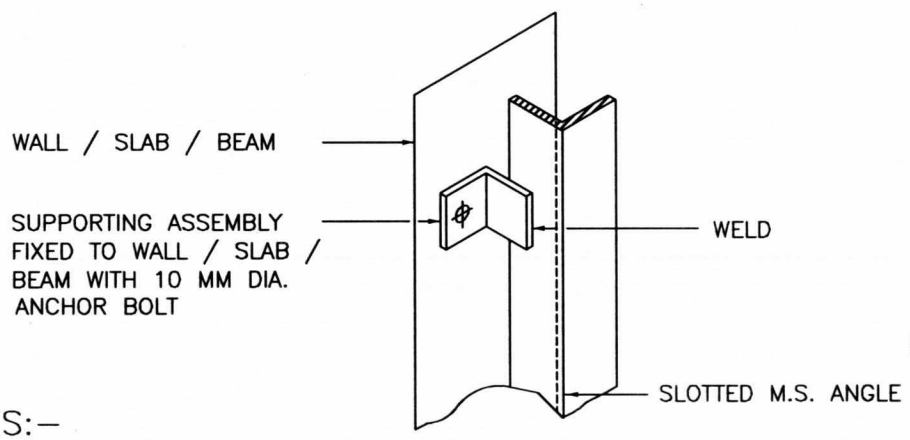


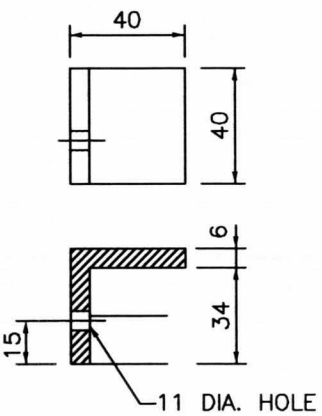
SUPPORT ON WALL



SUPPORT ON SLAB / BEAM



DETAIL–1



DETAIL–2
M.S. CLEAT

NOTES:–

1. ALL DIMENSIONS ARE IN MM.

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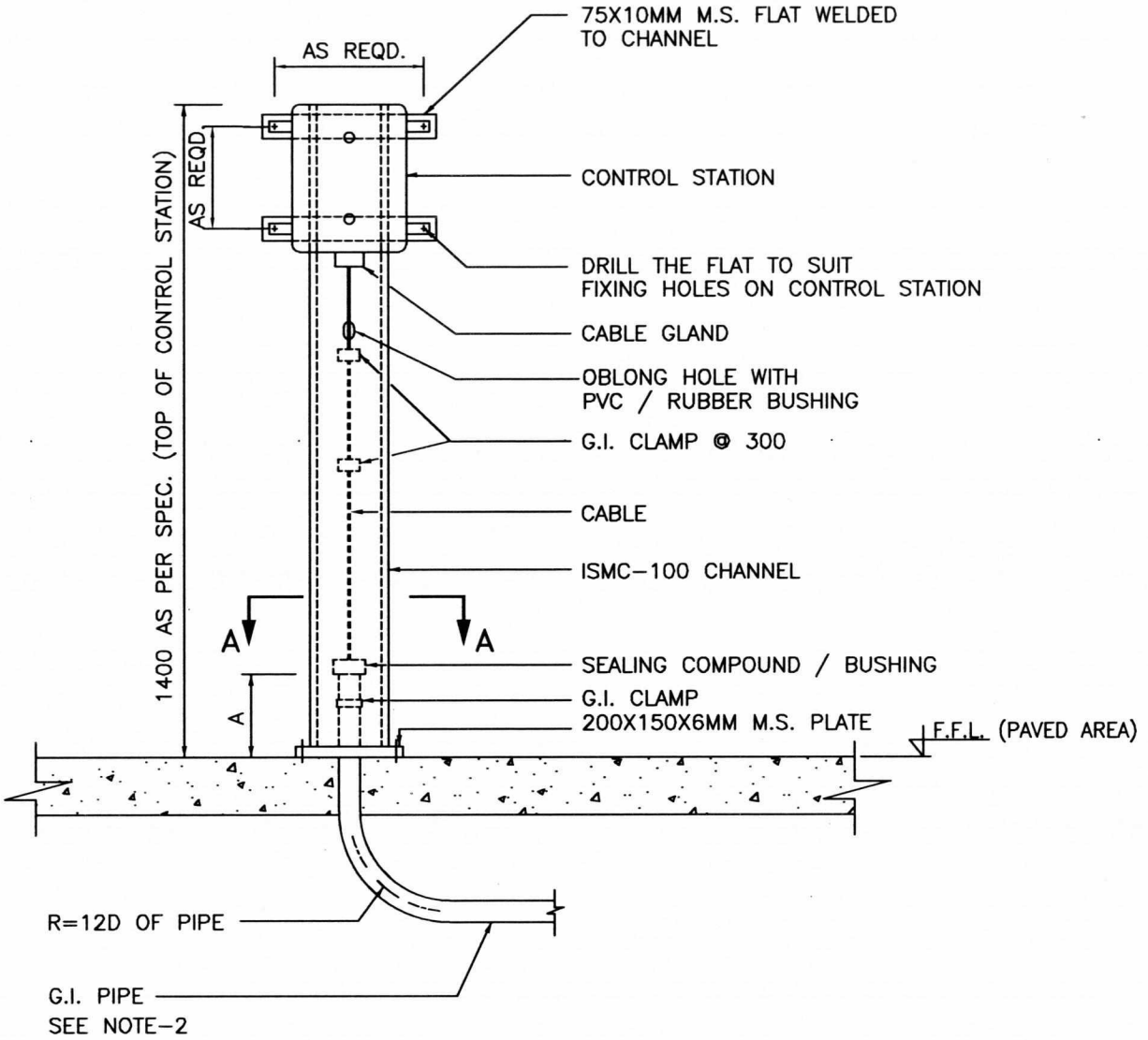
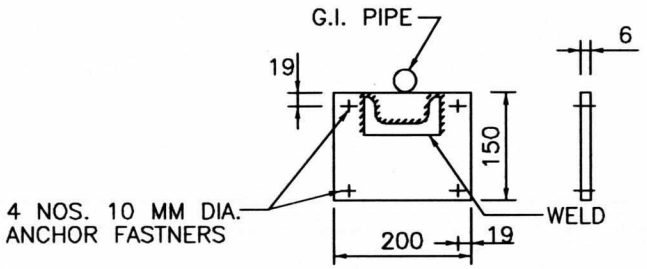


A= { 150 MM (MIN.) FOR INDOOR LOCATION
300 MM (MIN.) FOR OUTDOOR LOCATION



SECTION-AA

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. SIZE OF PIPE SLEEVE SHALL BE AS PER LAYOUT DRAWINGS.

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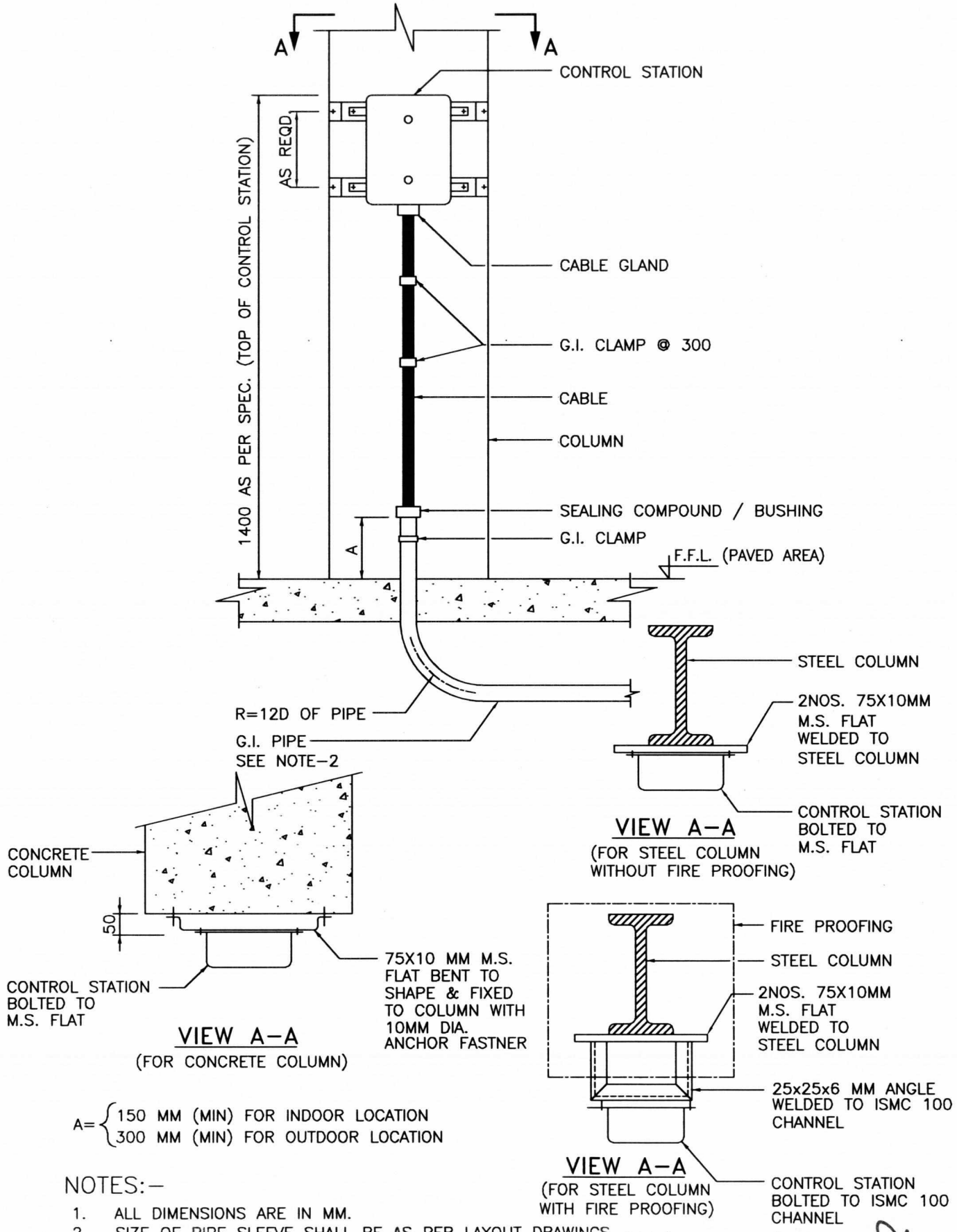

A= { 150 MM (MIN) FOR INDOOR LOCATION
300 MM (MIN) FOR OUTDOOR LOCATION

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. SIZE OF PIPE SLEEVE SHALL BE AS PER LAYOUT DRAWINGS.

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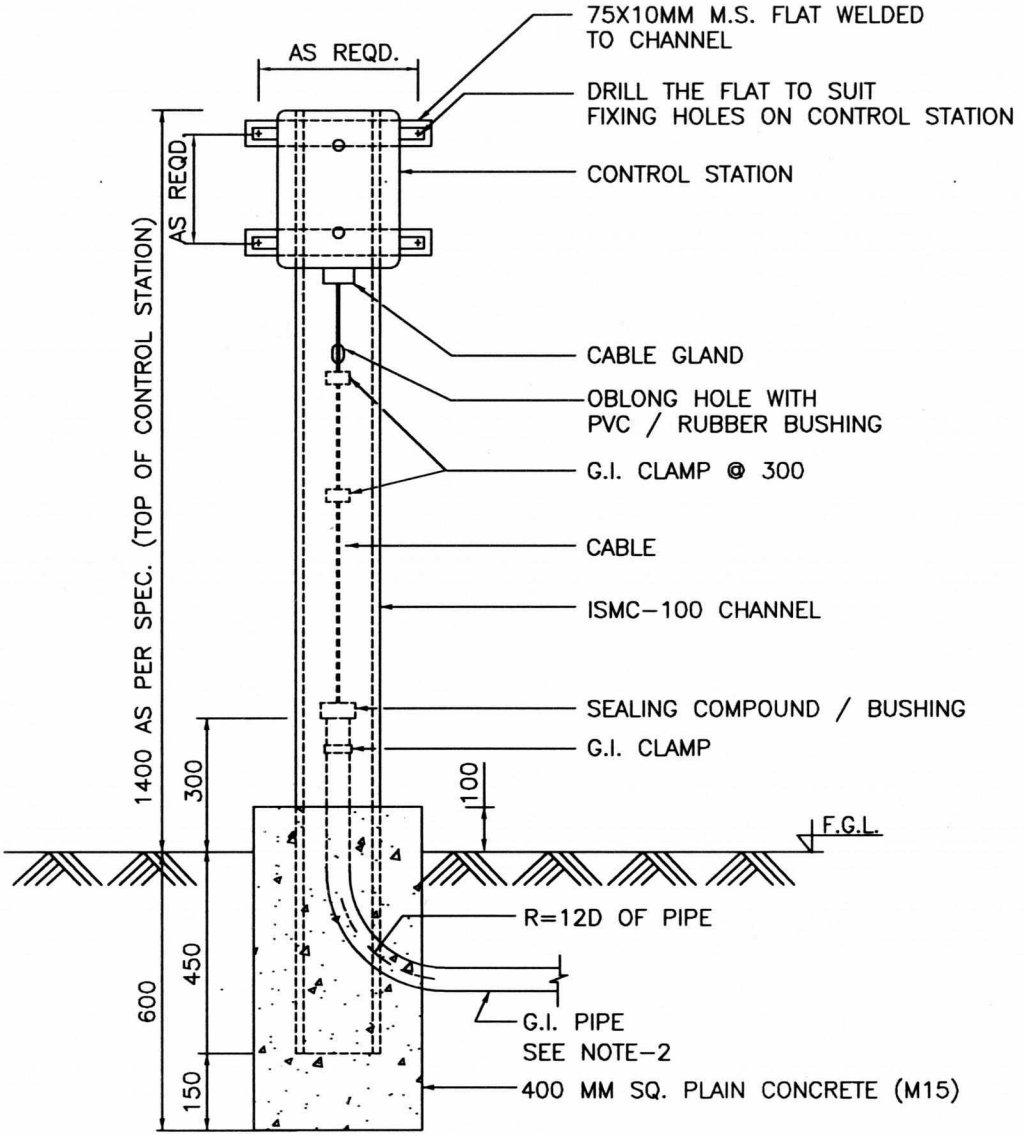

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. SIZE OF PIPE SLEEVE SHALL BE AS PER LAYOUT DRAWINGS.

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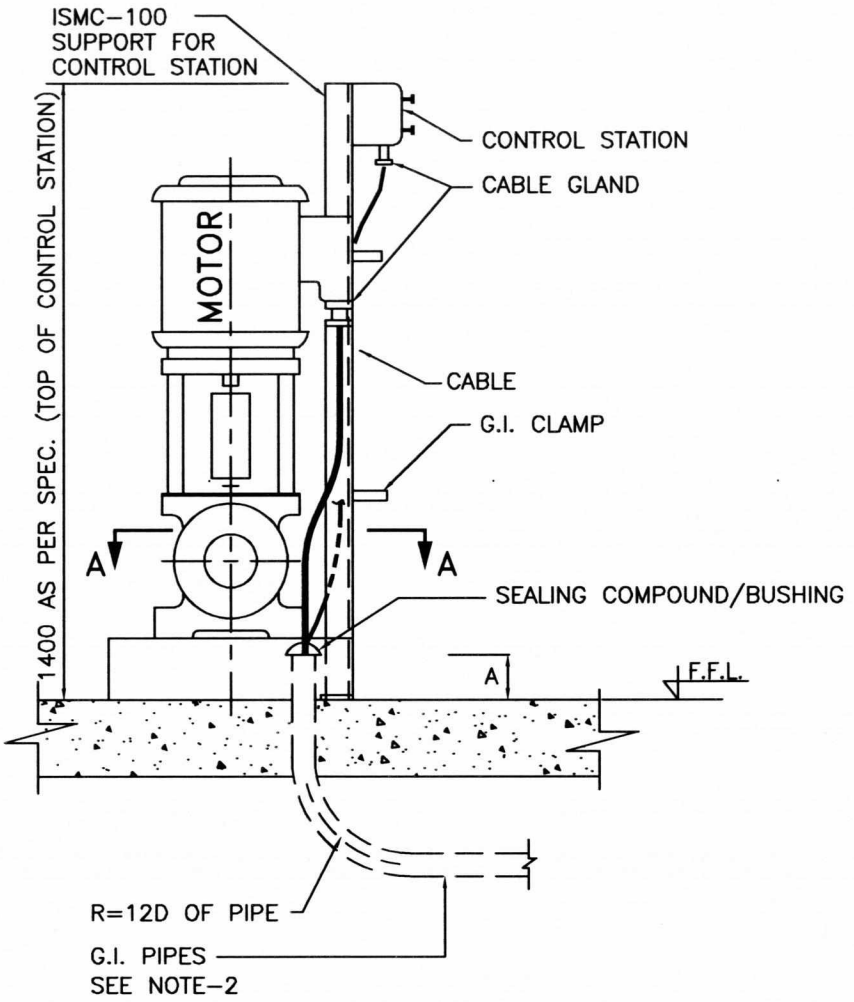
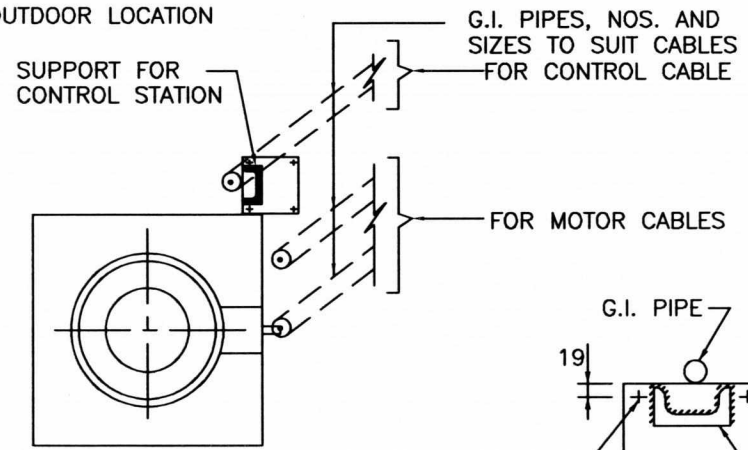
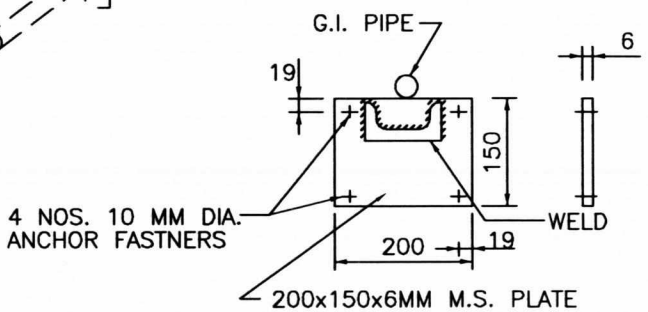


A= { 150 MM (MIN.) FOR INDOOR LOCATION
300 MM (MIN.) FOR OUTDOOR LOCATION



SECTION-AA



DETAIL OF CONTROL STN. SUPPORT

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. QUANTITY AND SIZE OF PIPE SLEEVE SHALL BE AS PER LAYOUT DRAWINGS.

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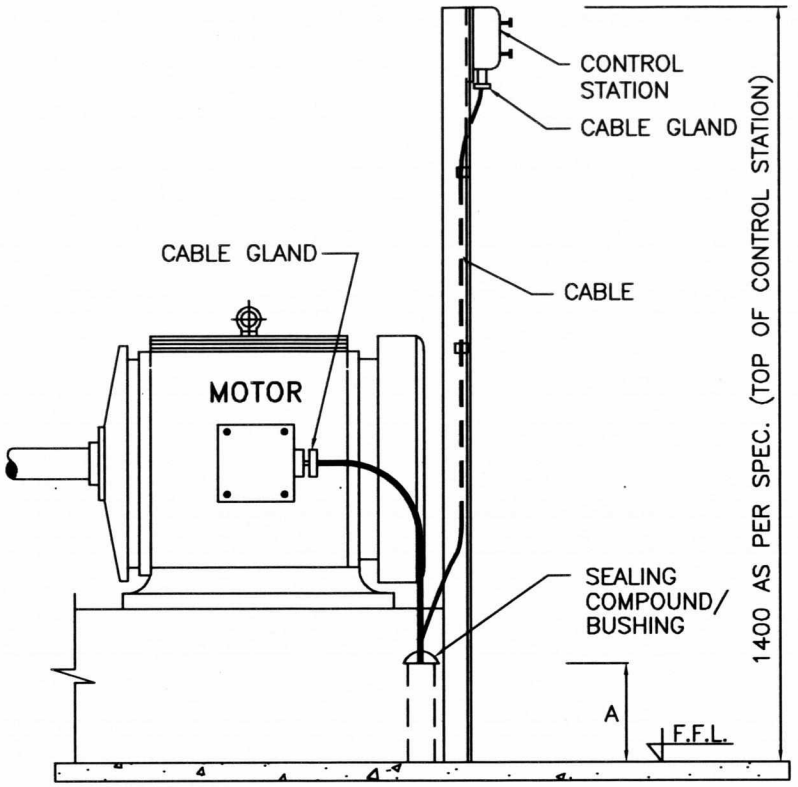
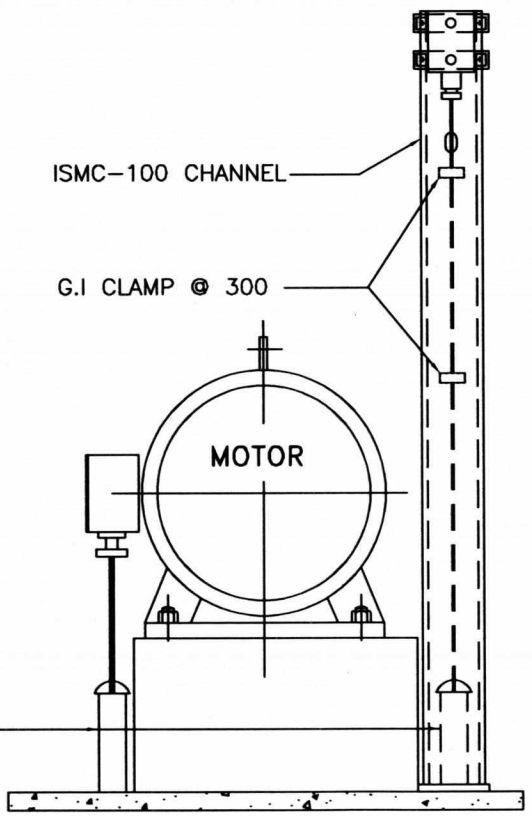


CABLE TO MOTOR TERMINAL BOX (SIDE ENTRY)



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

CABLE TO MOTOR TERMINAL BOX (BOTTOM ENTRY)

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. QUANTITY AND SIZE OF PIPE SLEEVE SHALL BE AS PER LAYOUT DRAWINGS.

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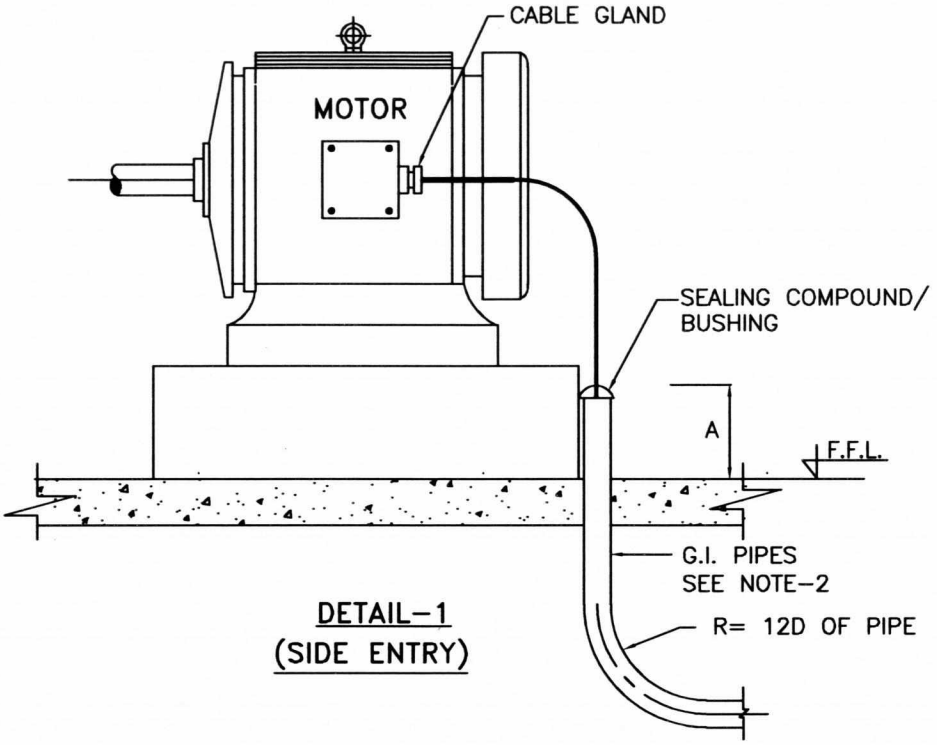
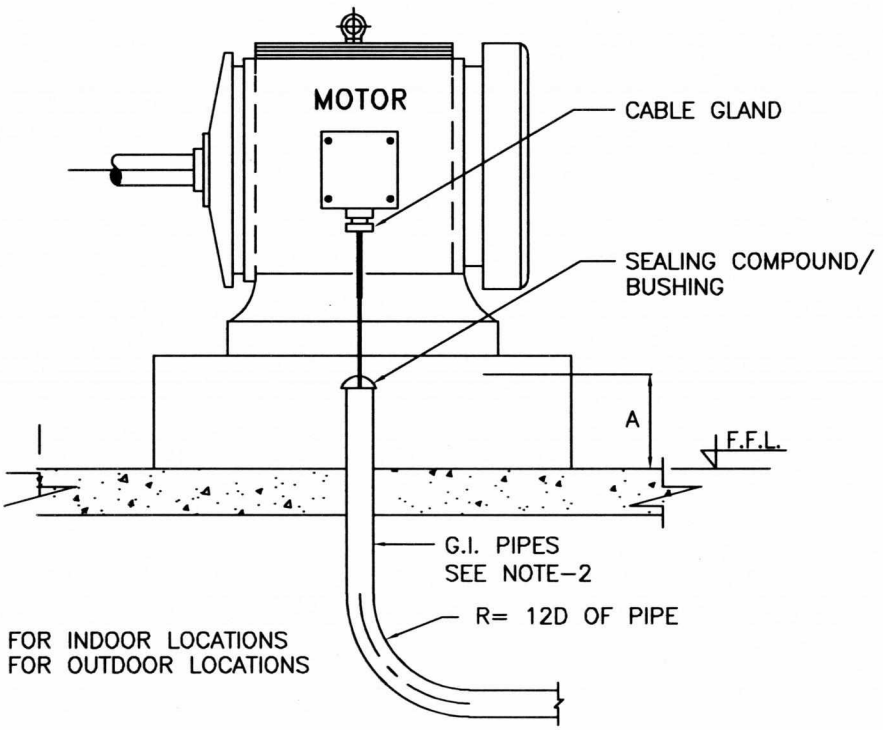


DETAIL-1
(SIDE ENTRY)



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

DETAIL-2
(BOTTOM ENTRY)

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. QUANTITY AND SIZE OF PIPE SLEEVE SHALL BE AS PER LAYOUT DRAWINGS.
3. UNDER NORMAL CONDITION DETAIL-1 SHALL BE FOLLOWED. ONLY IN EXCEPTIONAL CASES DETAIL-2 SHALL BE FOLLOWED.

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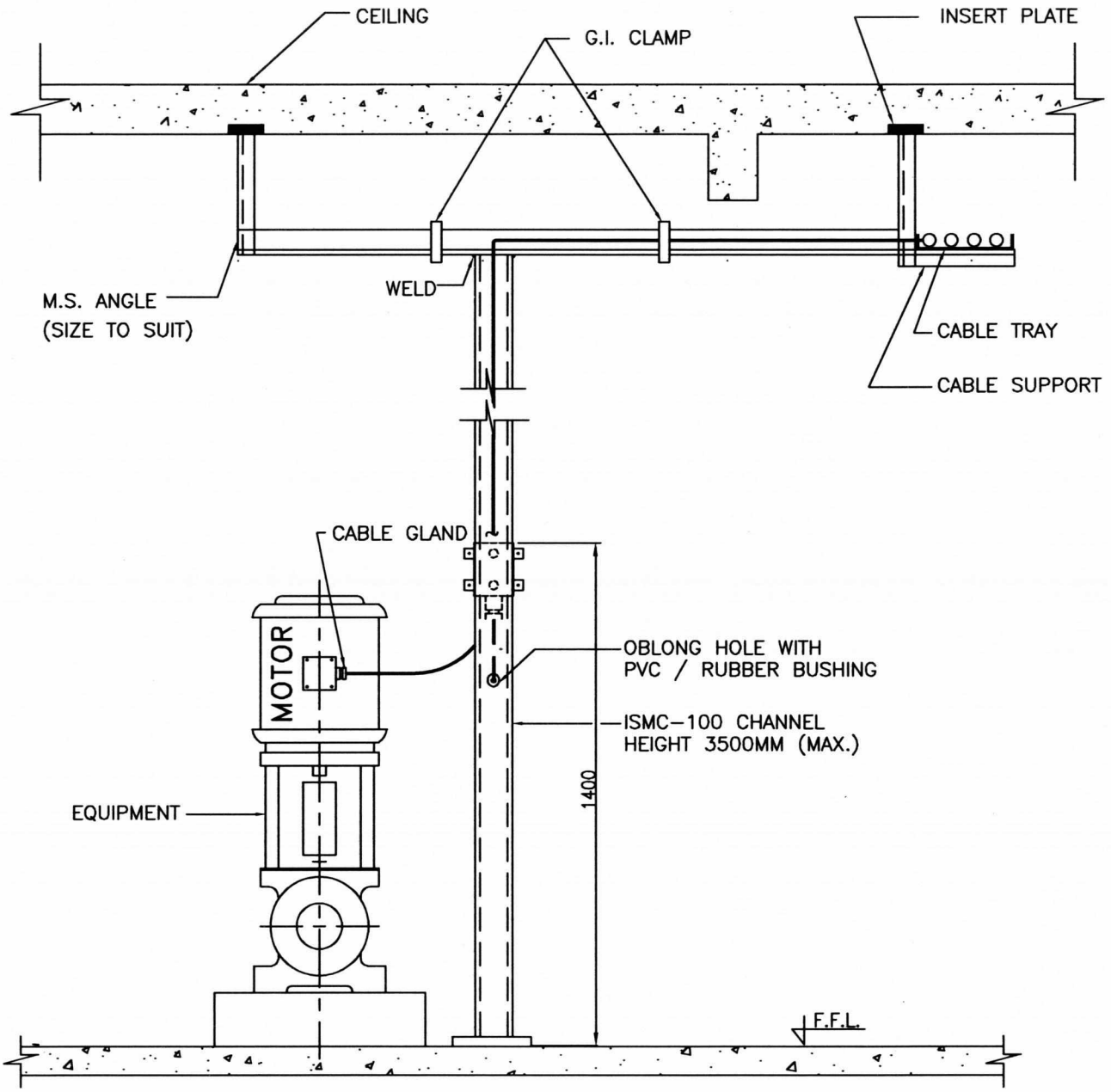

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. WHEREVER FEASIBLE, MAIN CABLE TRAY CAN BE ROUTED IN SUCH A WAY THAT ISMC CHANNEL CAN BE DIRECTLY WELDED TO TRAY SUPPORT.

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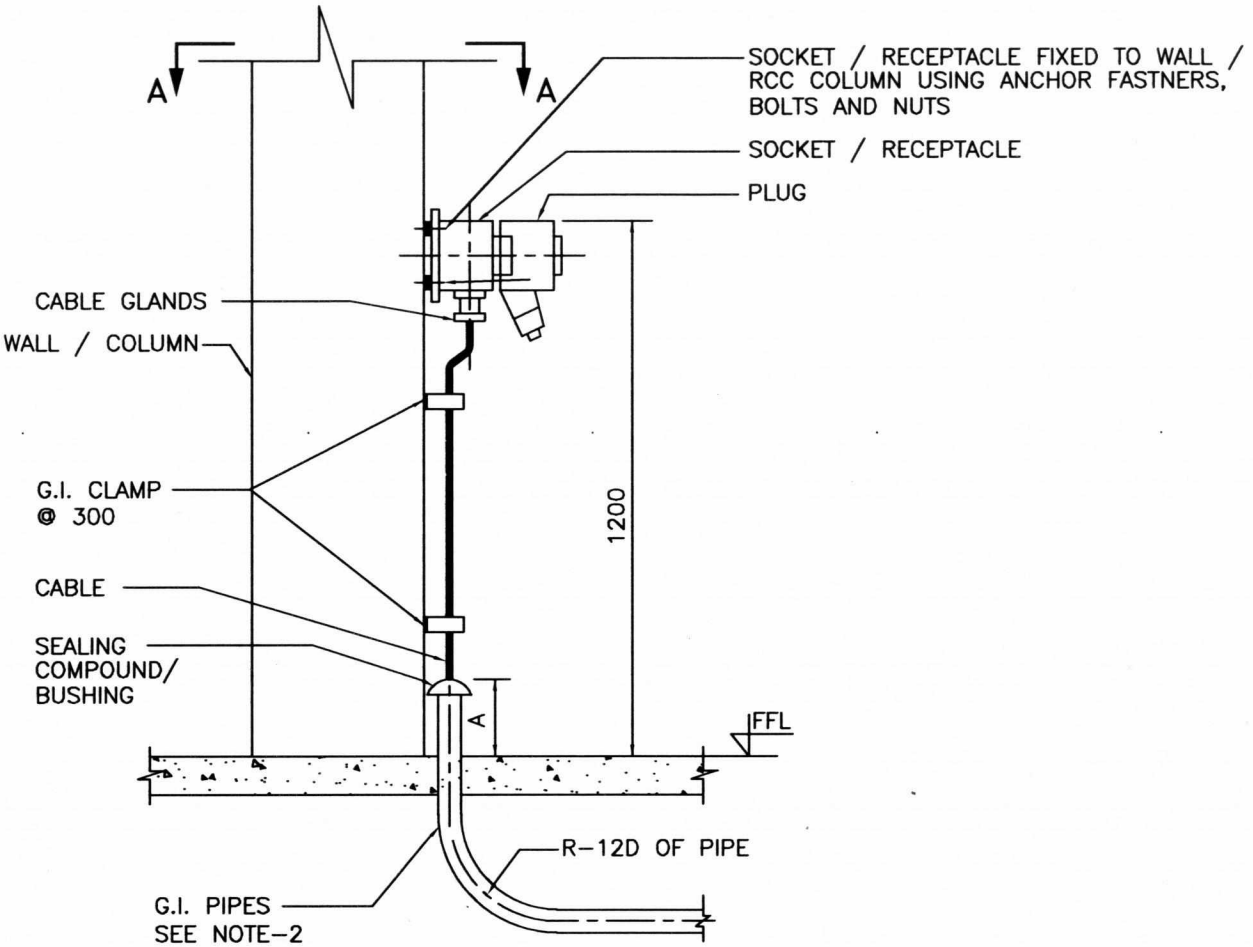
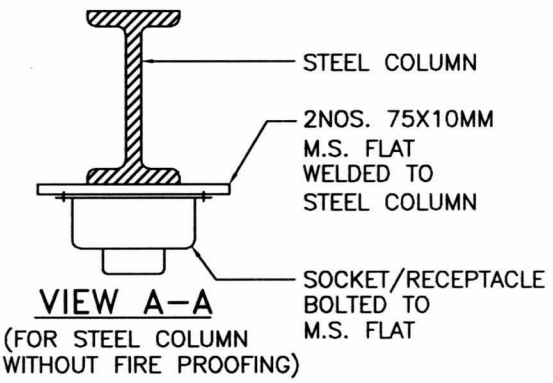
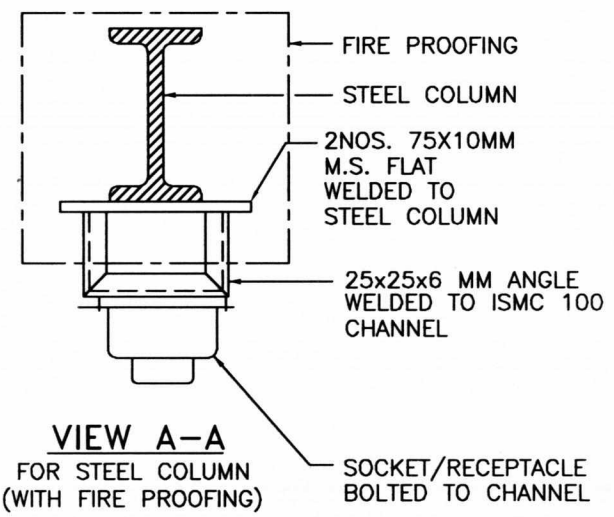




VIEW A-A
(FOR STEEL COLUMN WITHOUT FIRE PROOFING)

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



VIEW A-A
FOR STEEL COLUMN (WITH FIRE PROOFING)

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. QUANTITY AND SIZE OF PIPE SLEEVES SHALL BE AS PER LAYOUT DRAWINGS.
3. WHERE STEEL STRUCTURES ARE ENCOUNTERED, SOCKET / RECEPTACLE SHALL BE MOUNTED ON SUITABLE ANGLE IRON FRAME WELDED TO STEEL STRUCTURE.
4. WHERE FIRE PROOFING COLUMNS / STRUCTURES ARE ENCOUNTERED SOCKET / RECEPTACLE AND CABLE SHALL BE INSTALLED ON A SUITABLE DEEP LEGGED ANGLE IRON FRAME / DISTANCE BRACKET.

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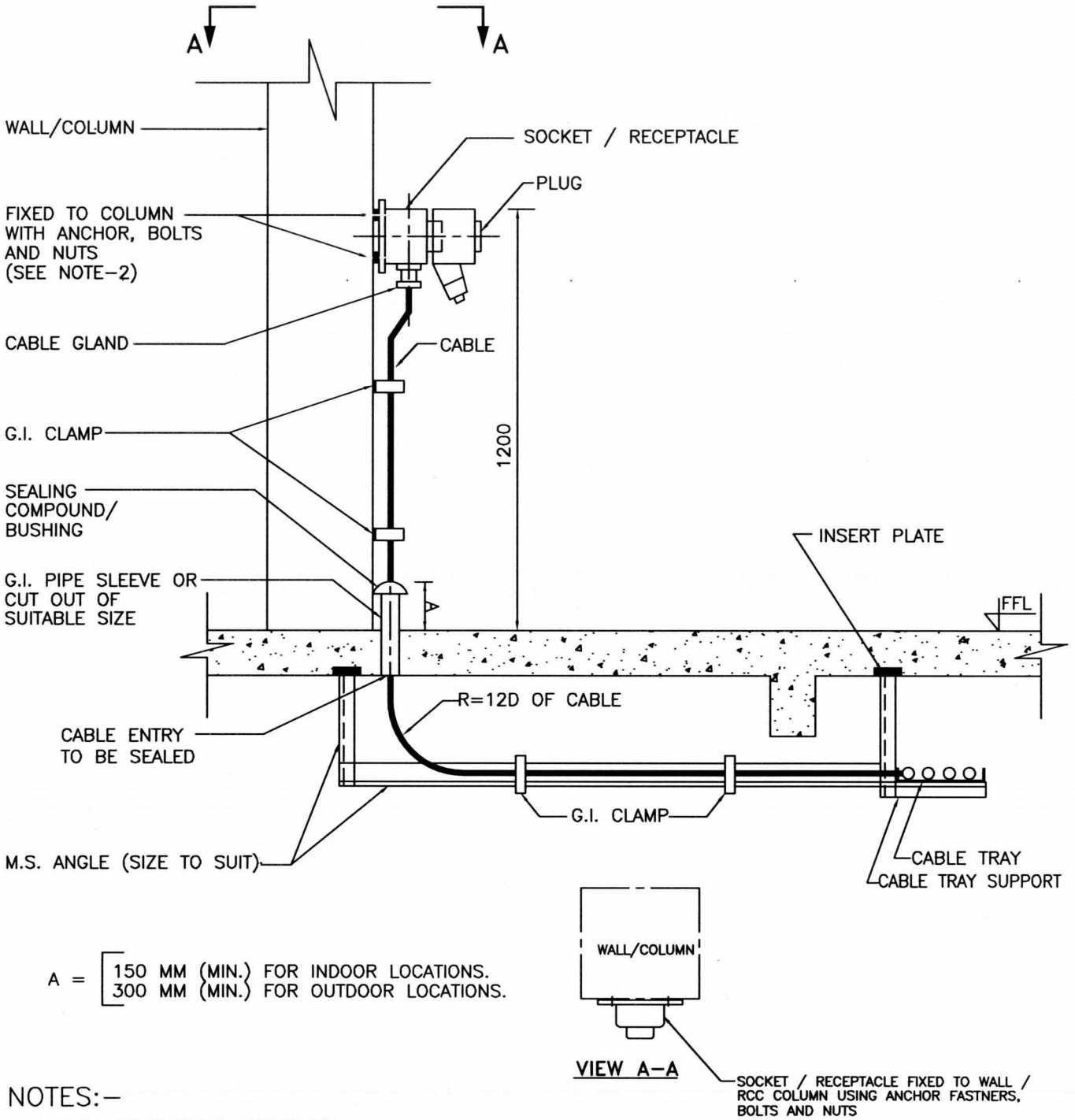

A = 150 MM (MIN.) FOR INDOOR LOCATIONS.
300 MM (MIN.) FOR OUTDOOR LOCATIONS.

VIEW A-A

NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. WHERE STEEL STRUCTURES ARE ENCOUNTERED, SOCKET / RECEPTACLE SHALL BE MOUNTED ON SUITABLE ANGLE IRON FRAME WELDED TO STEEL STRUCTURE.
3. WHERE FIRE PROOFING COLUMNS / STRUCTURES ARE ENCOUNTERED SOCKET / RECEPTACLE AND CABLE SHALL BE INSTALLED ON A SUITABLE DEEP LEGGED ANGLE IRON FRAME / DISTANCE BRACKET.
4. QUANTITY AND SIZE OF PIPE SLEEVES SHALL BE AS PER LAYOUT DRAWINGS.

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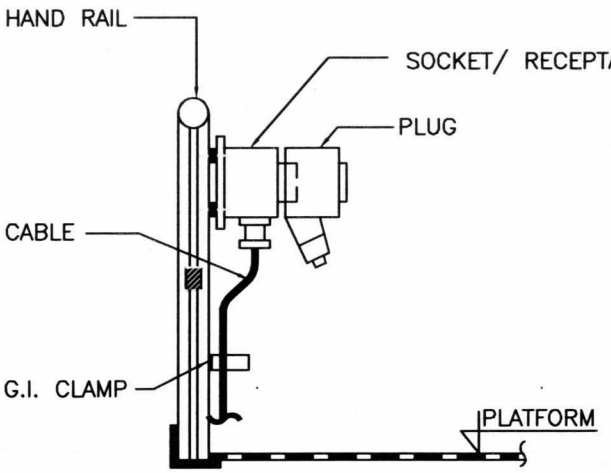

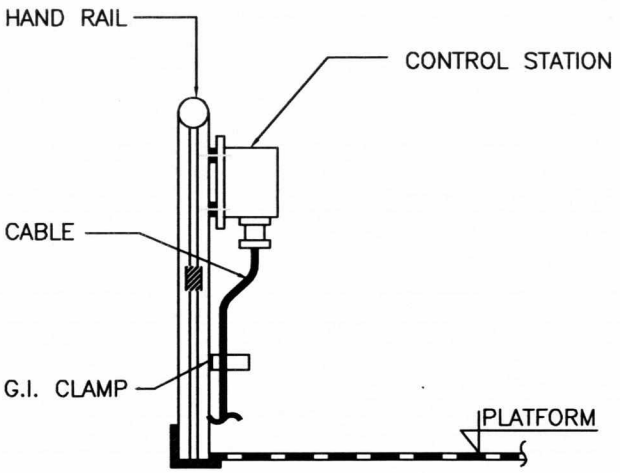

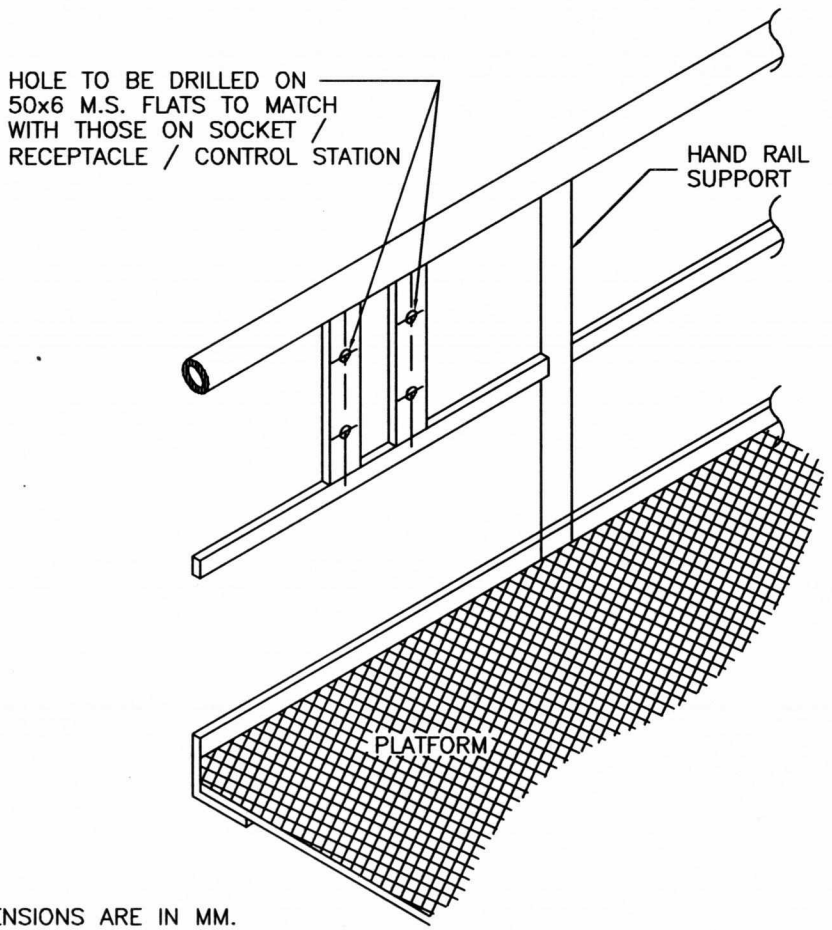

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. CABLE SHALL NOT BE ROUTED ALONG HAND RAIL.

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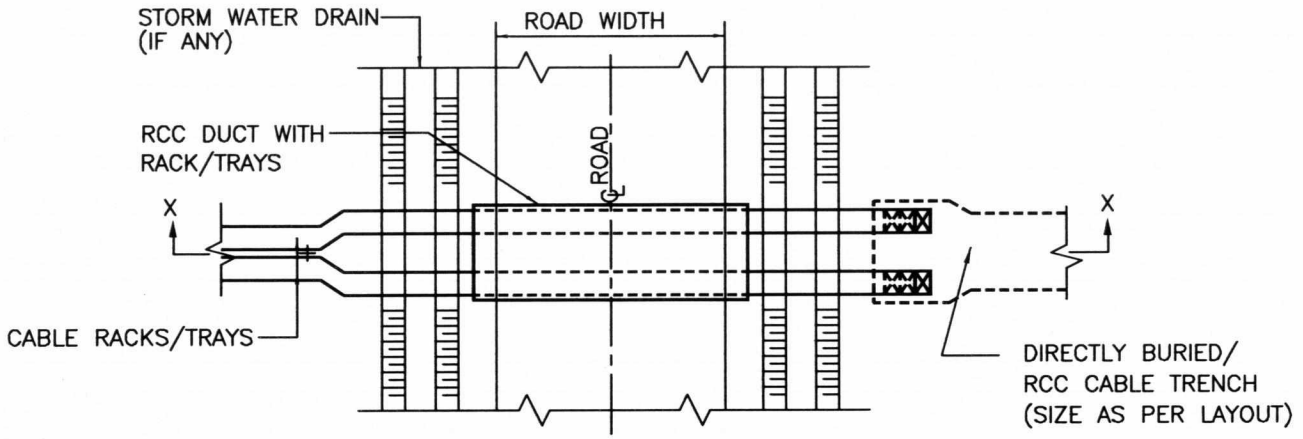
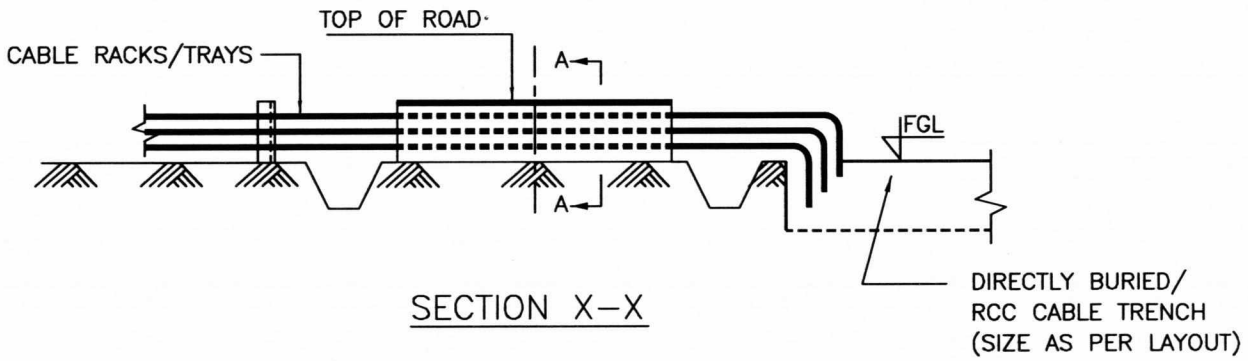
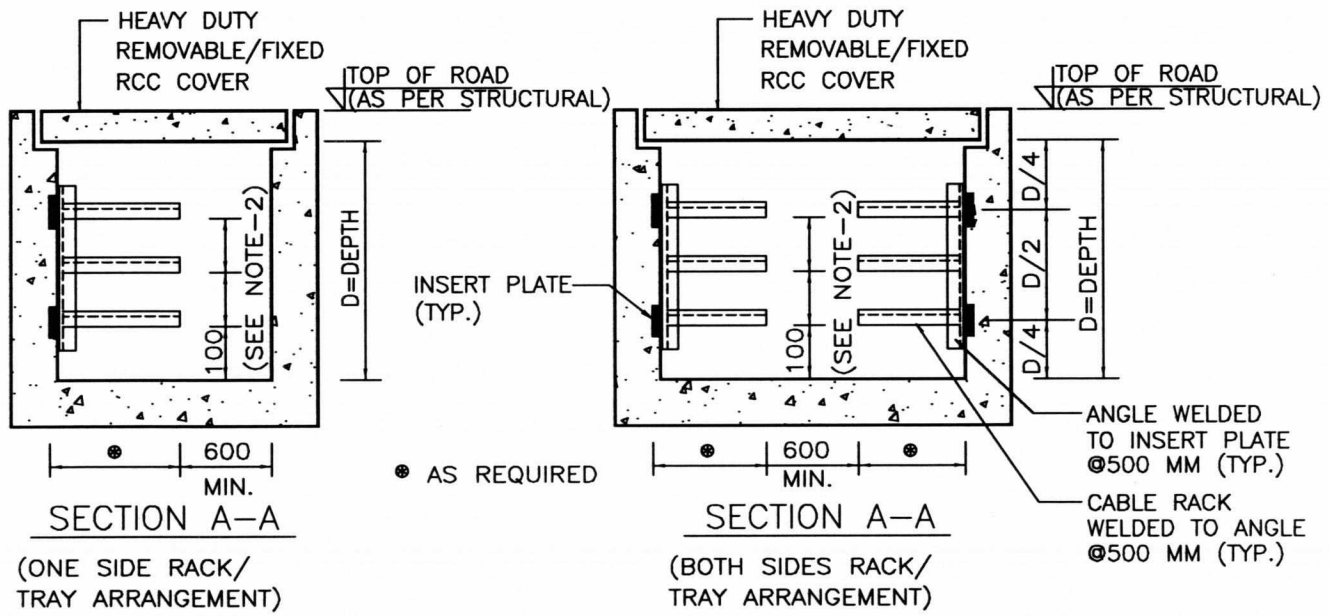


PLAN



SECTION X–X



SECTION A–A
(ONE SIDE RACK/
TRAY ARRANGEMENT)

SECTION A–A
(BOTH SIDES RACK/
TRAY ARRANGEMENT)

NOTES:–

1. ALL DIMENSIONS ARE IN MM.
2. CABLE SUPPORT ARRANGEMENT SHALL MATCH WITH THE ARRANGEMENT OF OUTSIDE TRAY / TRENCH ON THE SIDES.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
5	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
4	14.03.18	UPDATED & ISSUED AS STANDARD	RSD	VKS/HK	BRB	RN
3	21.11.13	REVISED & REISSUED AS STANDARD	BP	FA/SA	UAP/JMS	SC

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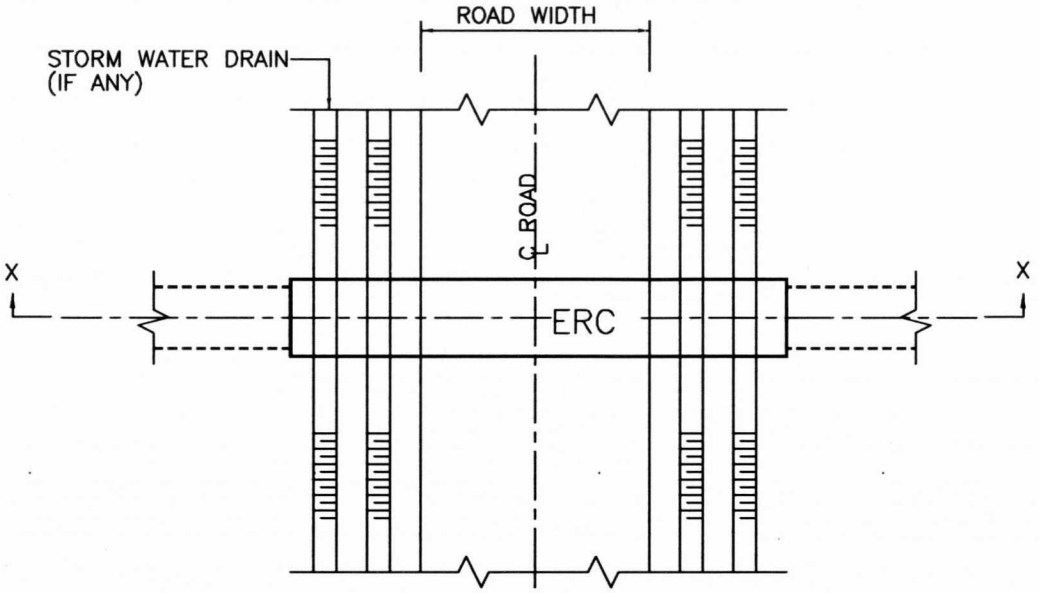

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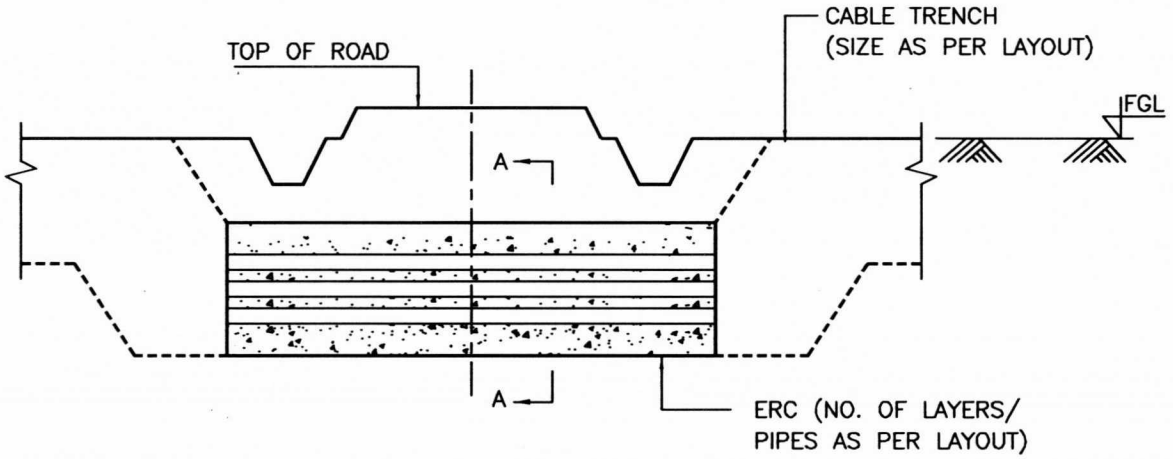
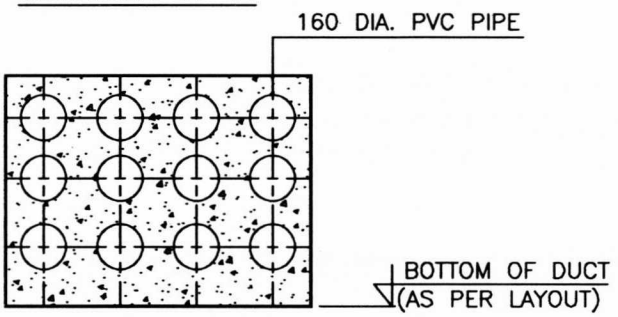


SECTION X–X



SECTION A–A (ERC)

(AS PER STRUCTURAL STD.)

NOTES:–

1. ALL DIMENSIONS ARE IN MM.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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5	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
4	14.03.18	UPDATED & ISSUED AS STANDARD	RSD	VKS/HK	BRB	RN
3	21.11.13	REVISED & REISSUED AS STANDARD	BP	FA/SA	UAP/JMS	SC

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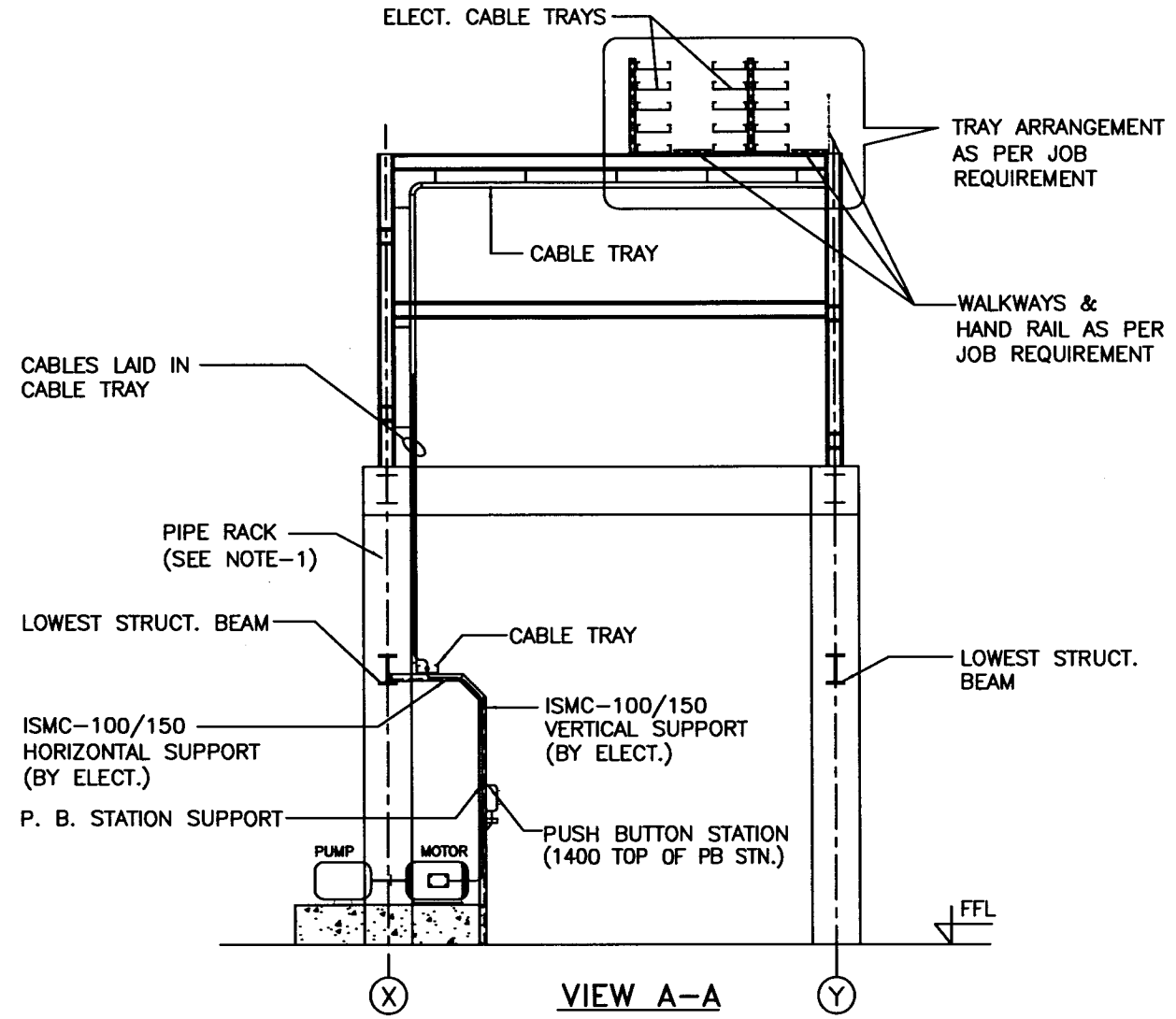
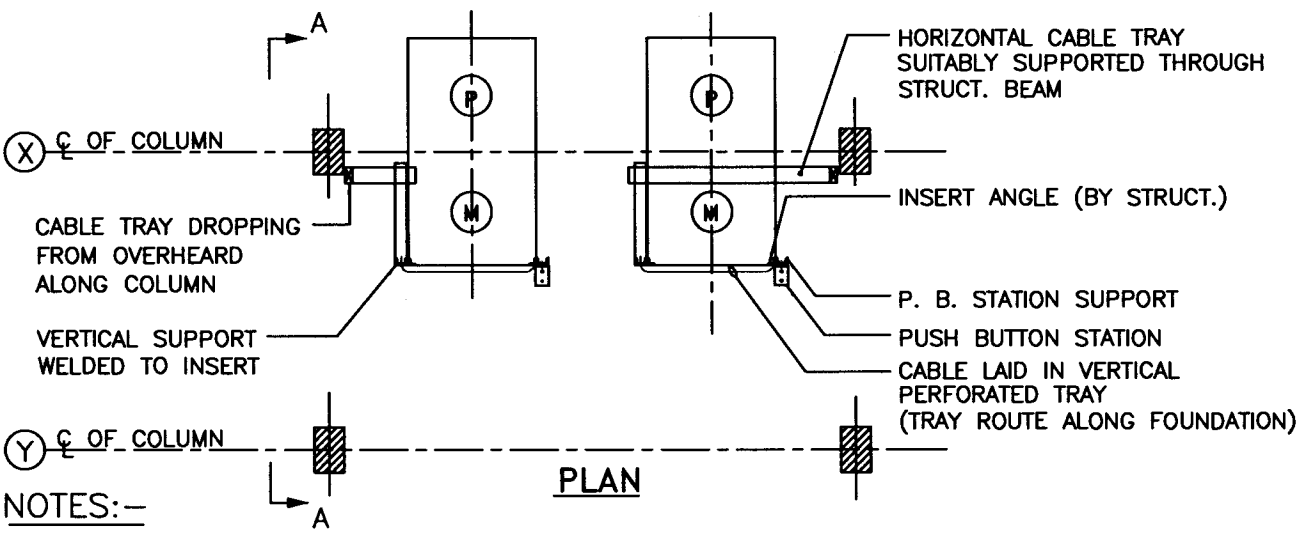


VIEW A-A



PLAN

NOTES:-

1. IN CASE OF COMPLETE STEEL PIPE RACK, SUITABLE CLEATS FOR CABLE TRAY SUPPORTS SHALL BE PROVIDED AT SUITABLE INTERVALS BEFORE FIRE PROOFING.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
5	16.06.21	REVISED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
4	04.04.16	REVISED & ISSUED AS STANDARD	BP	FA/SA	BRB	RN
3	21.11.13	REVIED & REISSUED AS STANDARD	BP	FA/SA	UAP/JMS	SC

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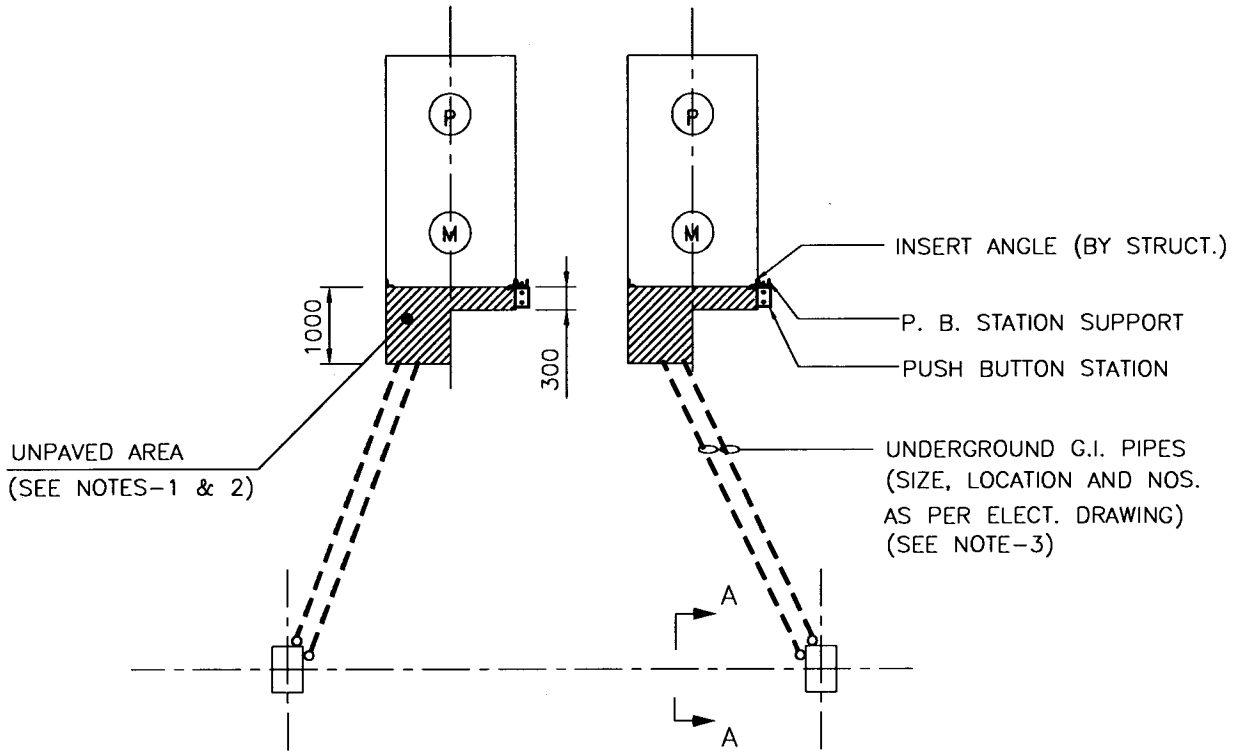

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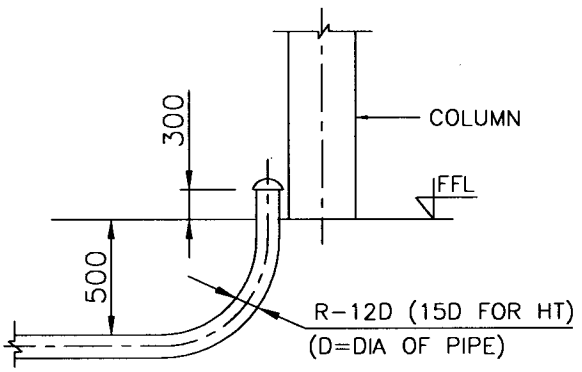

SECTION A-A

NOTES:-

1. AREA SHOWN AS HATCHED NEAR EACH PUMP MOTOR FOUNDATION SHALL BE LEFT UNPAVED BY PAVEMENT CONTRACTOR.
2. CABLE LAYING & SAND / LEAN CONCRETE FILLING IN THIS UNPAVED AREA SHALL BE DONE BY ELECTRICAL CONTRACTOR.
3. CIVIL CONTRACTOR SHALL PROVIDE G.I PIPES AND PLUG AT BOTH ENDS OF THE PIPES WITH PVC BUSHINGS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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5	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
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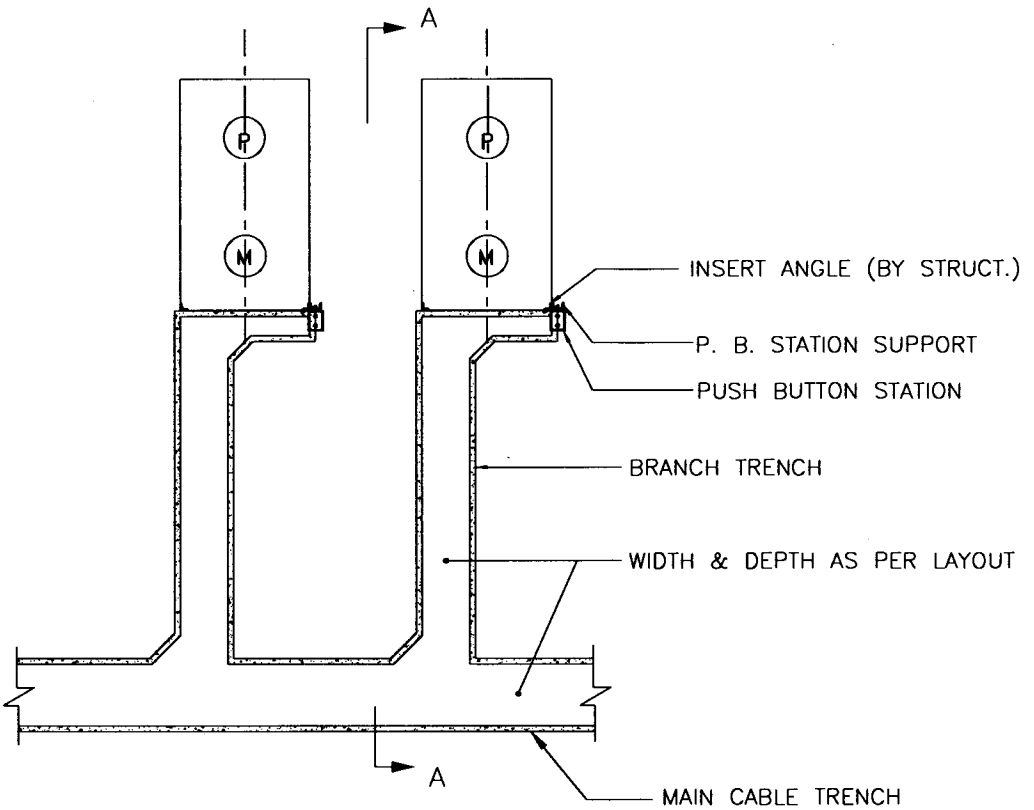

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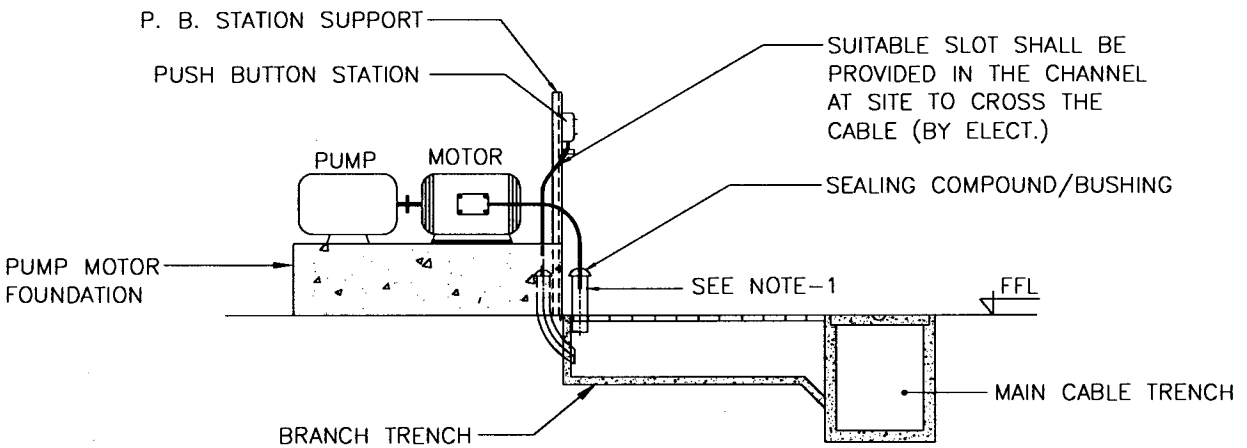

SECTION A-A

NOTES:-

1. CABLE SHALL BE LAID IN SUITABLE SIZE OF G.I. PIPES .
2. CABLE TRENCH SHALL BE FILLED WITH SAND AFTER LAYING OF CABLES IN HAZARDOUS AREA (BY THE ELECTRICAL CONTRACTOR).

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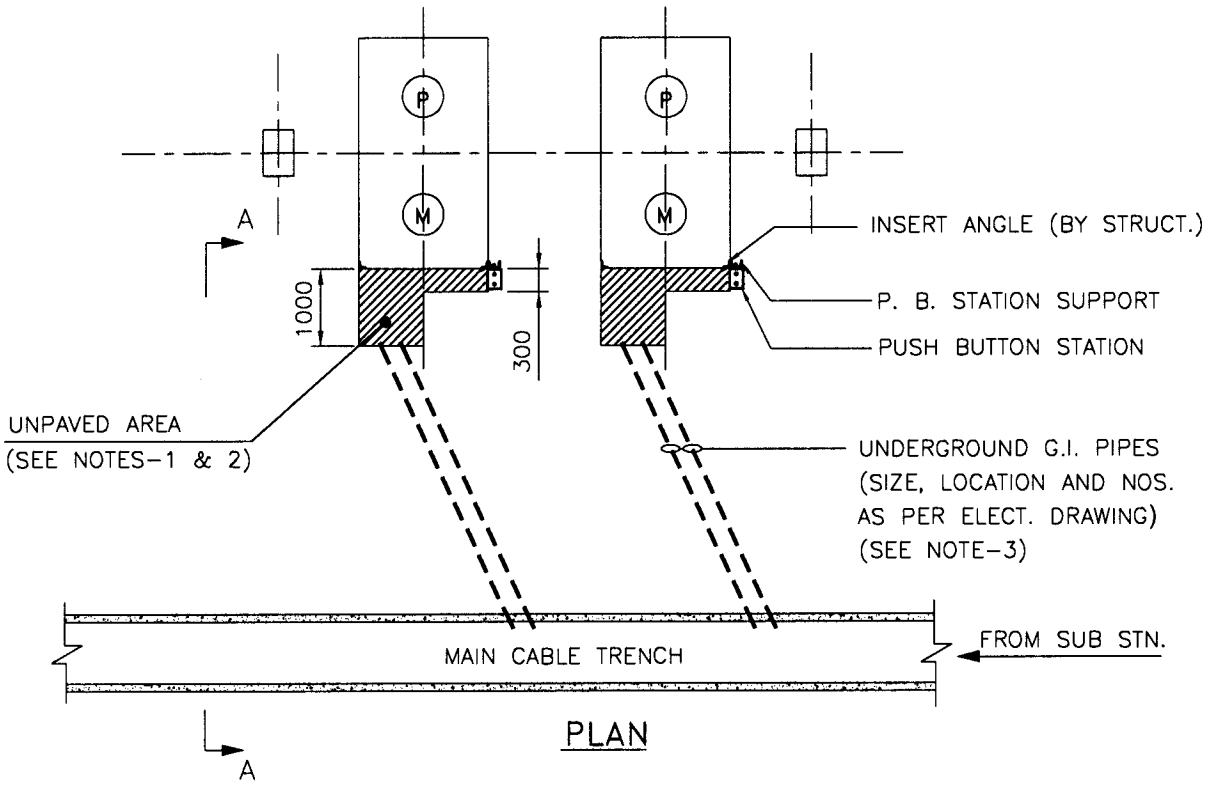

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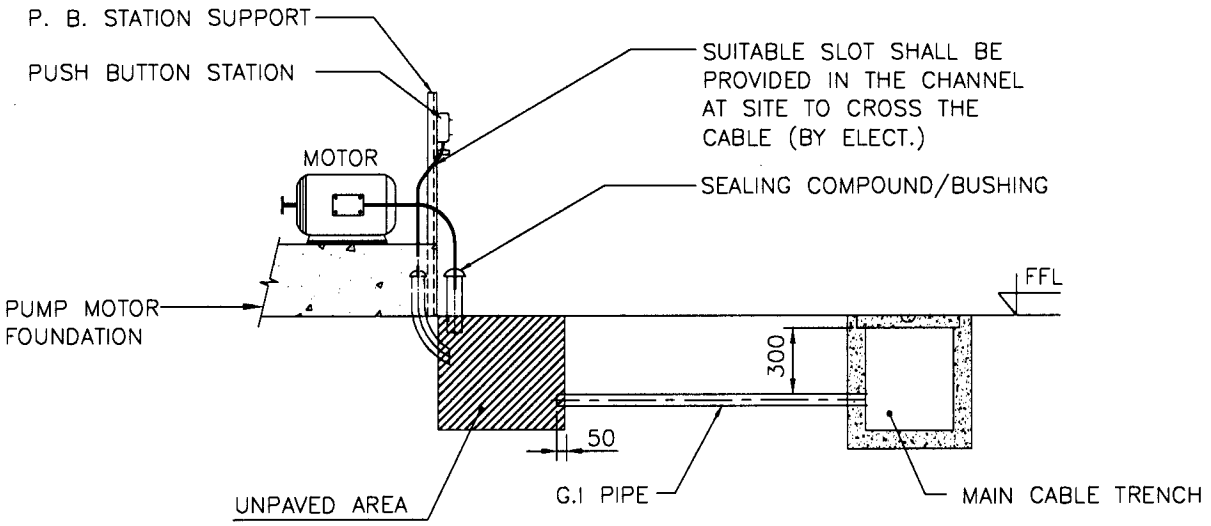

SECTION A-A

NOTES:-

1. AREA SHOWN AS HATCHED NEAR EACH PUMP MOTOR FOUNDATION SHALL BE LEFT UNPAVED BY PAVEMENT CONTRACTOR.
2. CABLES LAYING & SAND / LEAN CONCRETE FILLING IN THIS UNPAVED AREA SHALL BE DONE BY ELECTRICAL CONTRACTOR.
3. CIVIL CONTRACTOR SHALL PROVIDE G.I PIPES AND PLUG BOTH ENDS OF THE PIPES WITH PVC BUSHINGS.

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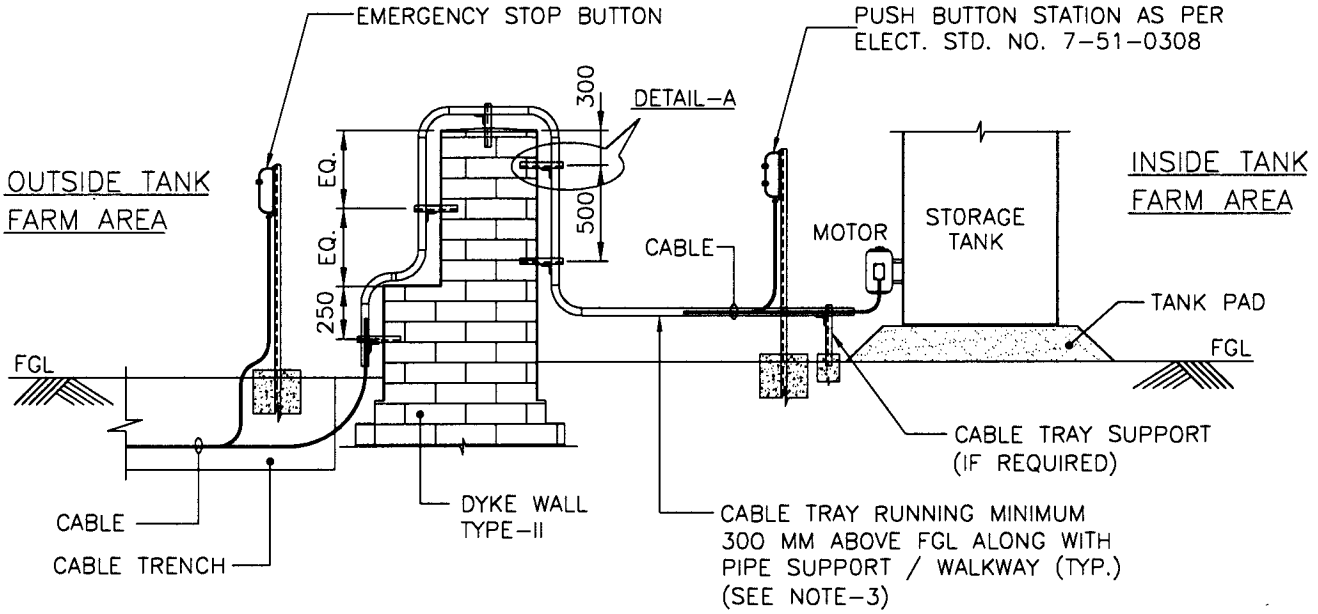
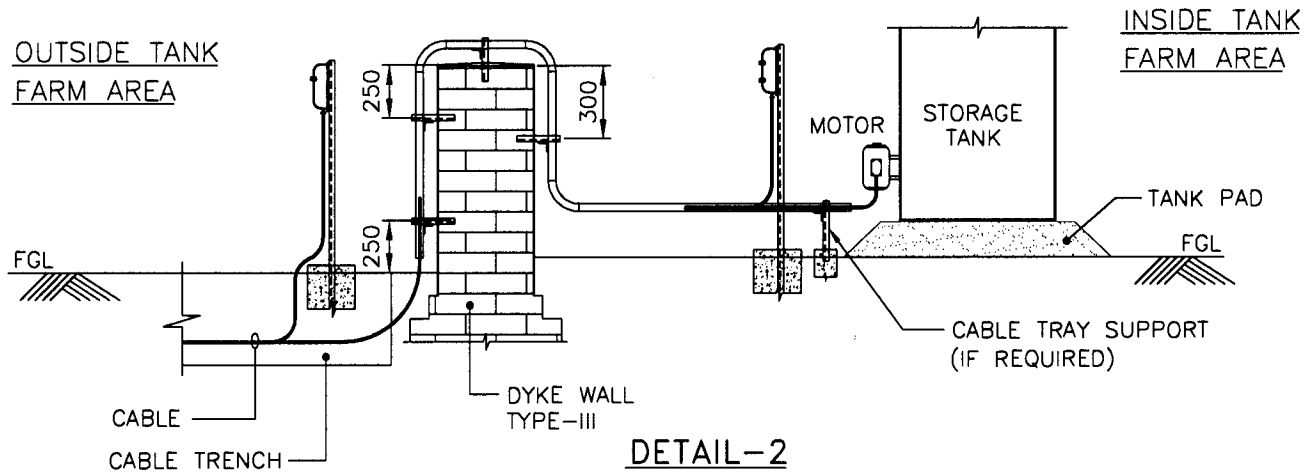


DETAIL-1



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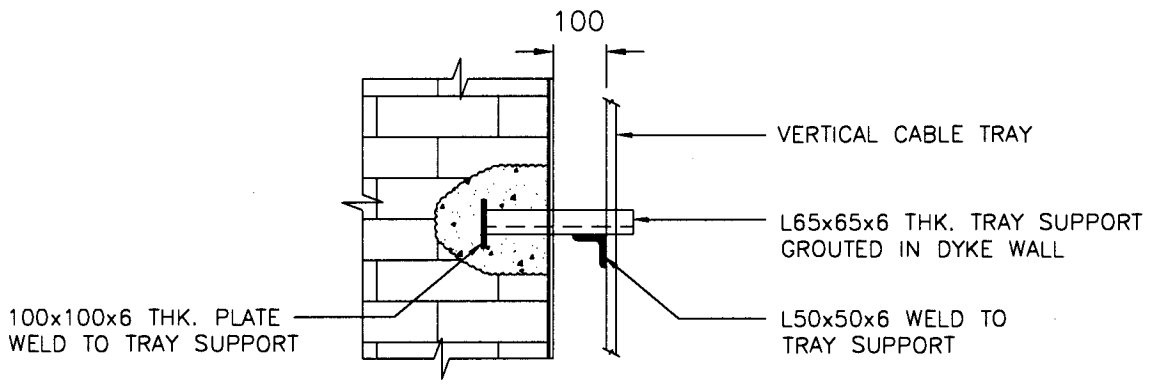

DETAIL-A

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. CABLE TRAY SHALL BE PROVIDED WITH REMOVABLE TRAY COVER.
3. IN CASE OF UNPAVED AREA INSIDE TANK FARM, BURIED CABLE TRENCH CAN BE PROVIDED AS PER PROJECT PHILOSOPHY.

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					Approved by	
1	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
0	28.10.15	ISSUED AS STANDARD	BP	FA/SA	BRB	SC

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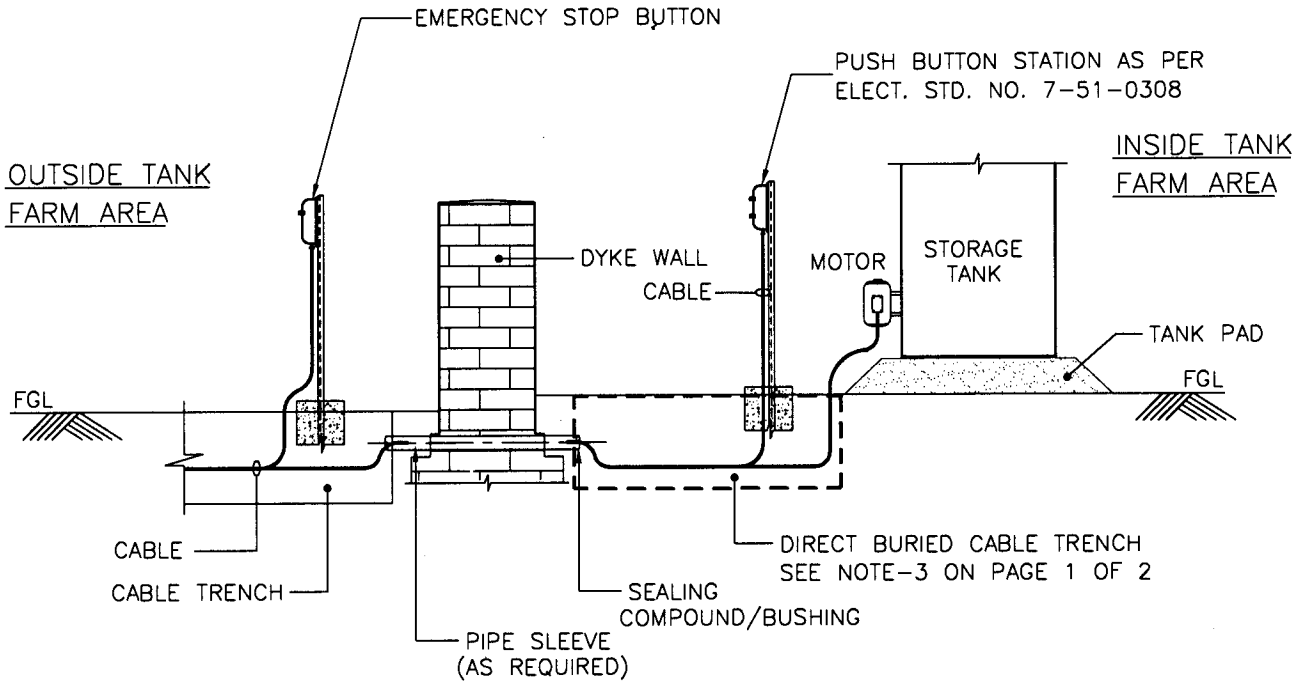
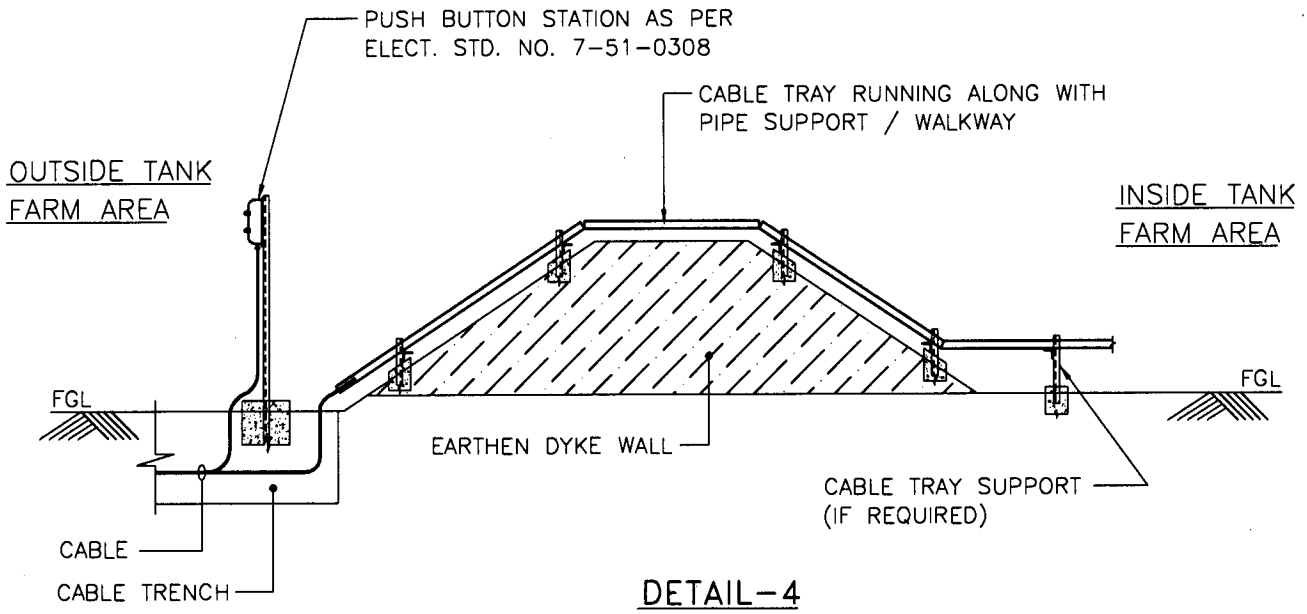


DETAIL-3



DETAIL-4

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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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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4	07.12.21	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
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2	02.03.12	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP/JMS	DM

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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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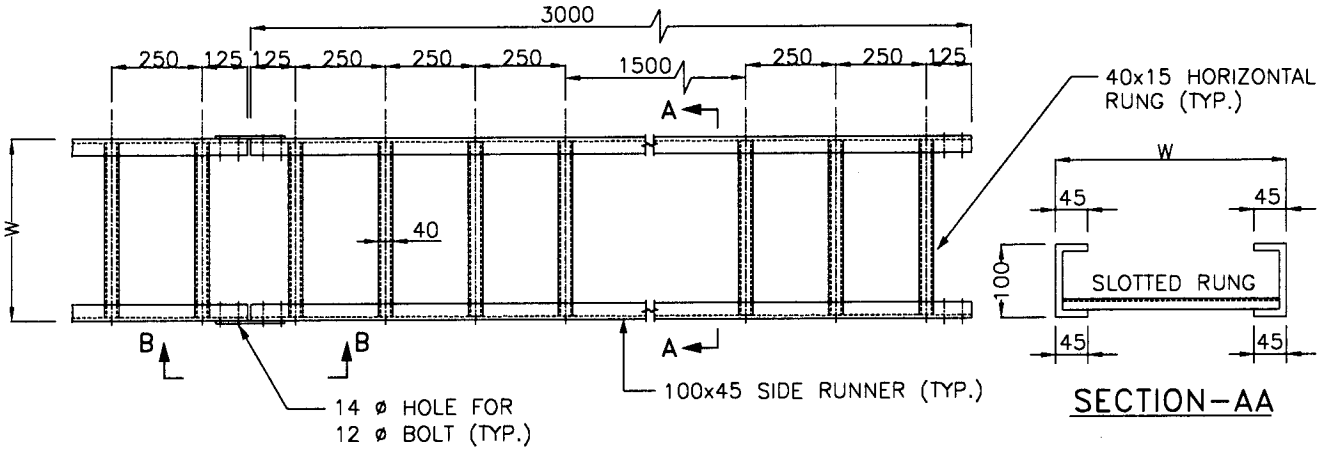
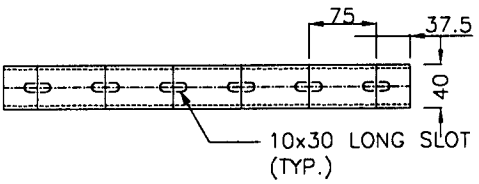


LADDER TYPE CABLE TRAY
(W=300/450/600/750/1000)



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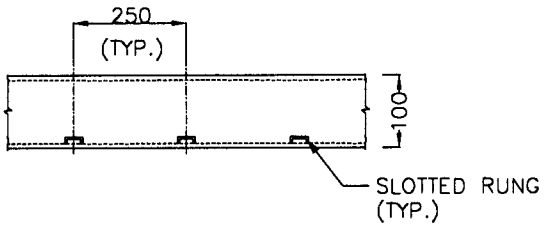
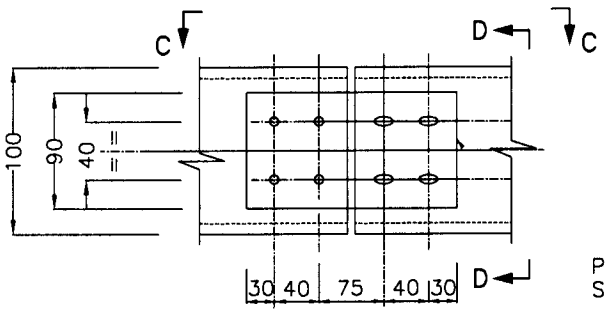
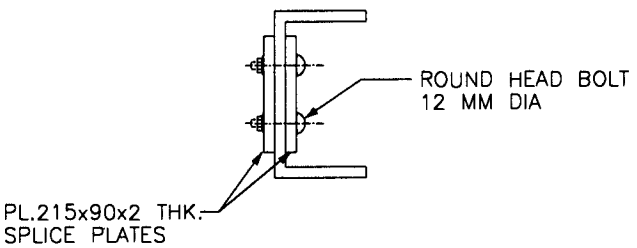


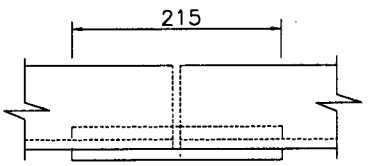
SIDE RUNNER



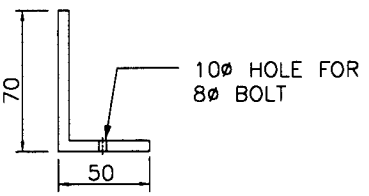
VIEW B–B



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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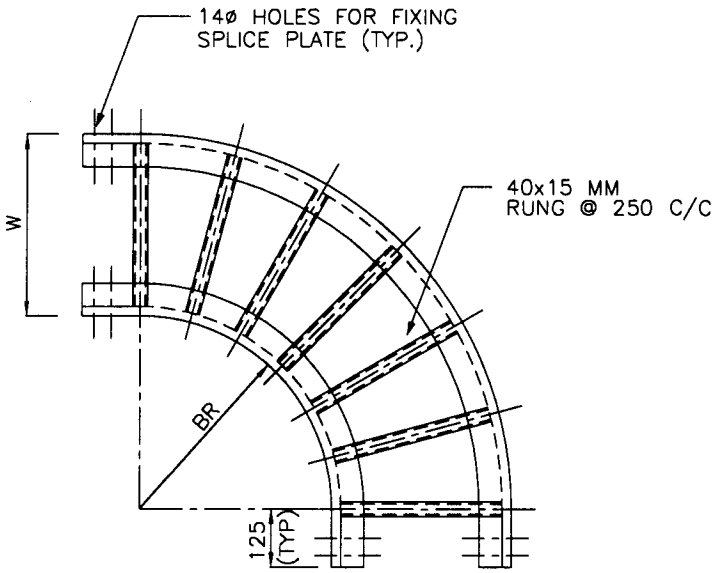
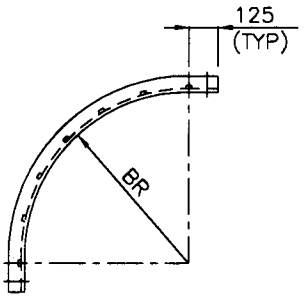
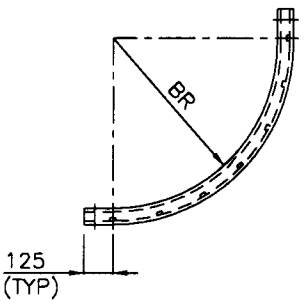


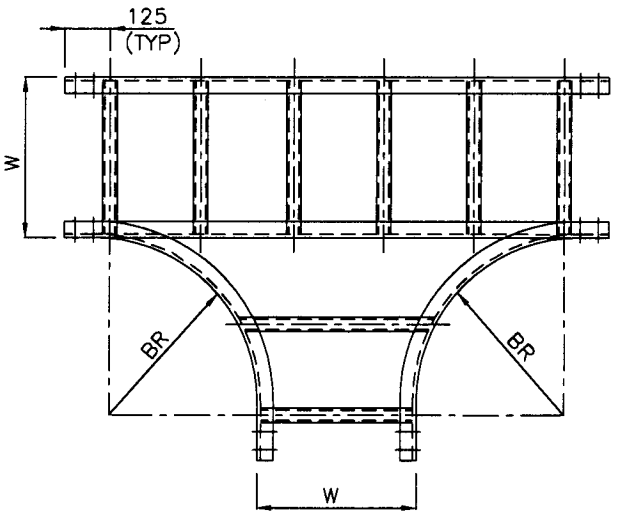
HORIZONTAL BEND



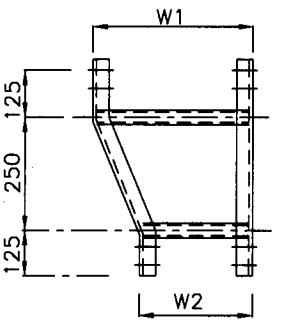
VERTICAL OUTSIDE BEND



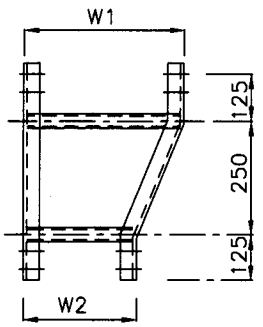
VERTICAL INSIDE BEND



'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)

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
3	10.07.17	REAFFIRMED & ISSUED AS STANDARD	BP	FA/HK	BRB	RN

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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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4	29.09.20	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	SA	SM
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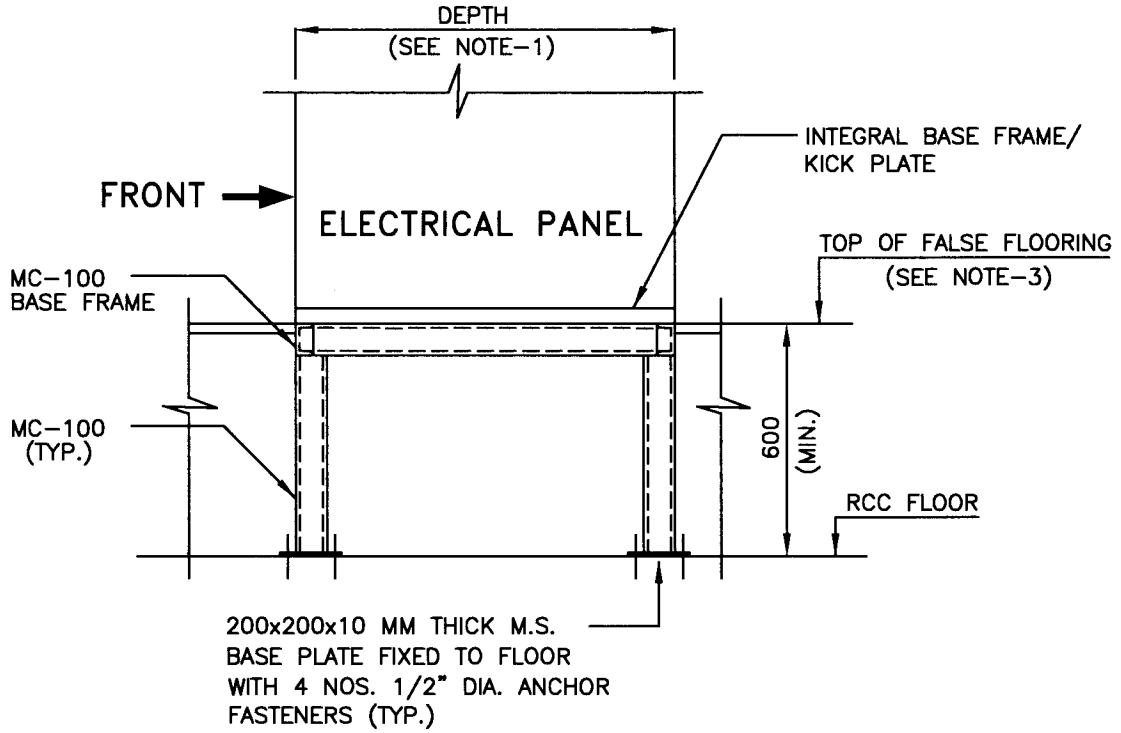
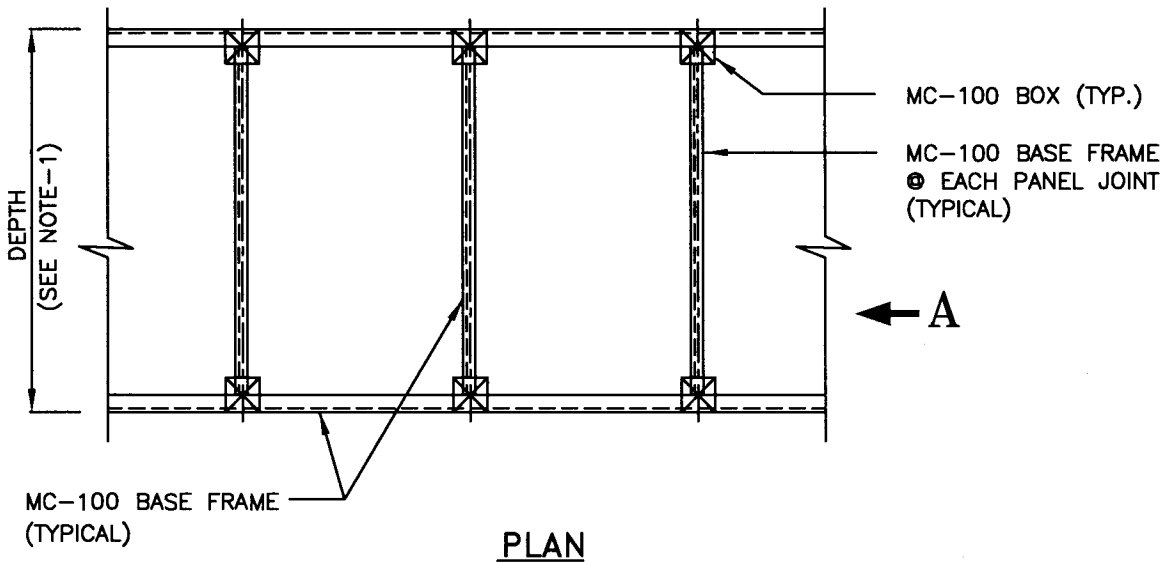


ELEVATION
(VIEW-A)



PLAN

NOTES:-

1. FOR PANELS DEPTH UPTO 800 MM SUPPORTING ARRANGEMENT AS SHOWN SHALL BE FOLLWED. FOR PANELS DEPTH MORE THAN 800 MM ADDITIONAL SUPPORTS AS PER VENDOR'S FDN. PLAN SHALL BE PROVIDED.
2. ALL PANELS SHALL BE TACK WELDED WITH BASE FRAME OF SWITCHBOARD.
3. SUPPORTING ARRANGEMENT FOR FALSE FLOORING SHALL BE AS PER ARCHITECTURAL DRAWINGS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	01.11.21	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
3	08.11.16	REAFFIRMED & ISSUED	BP	FA/HK	BRB	RN
2	02.03.12	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP/JMS	DM

Approved by

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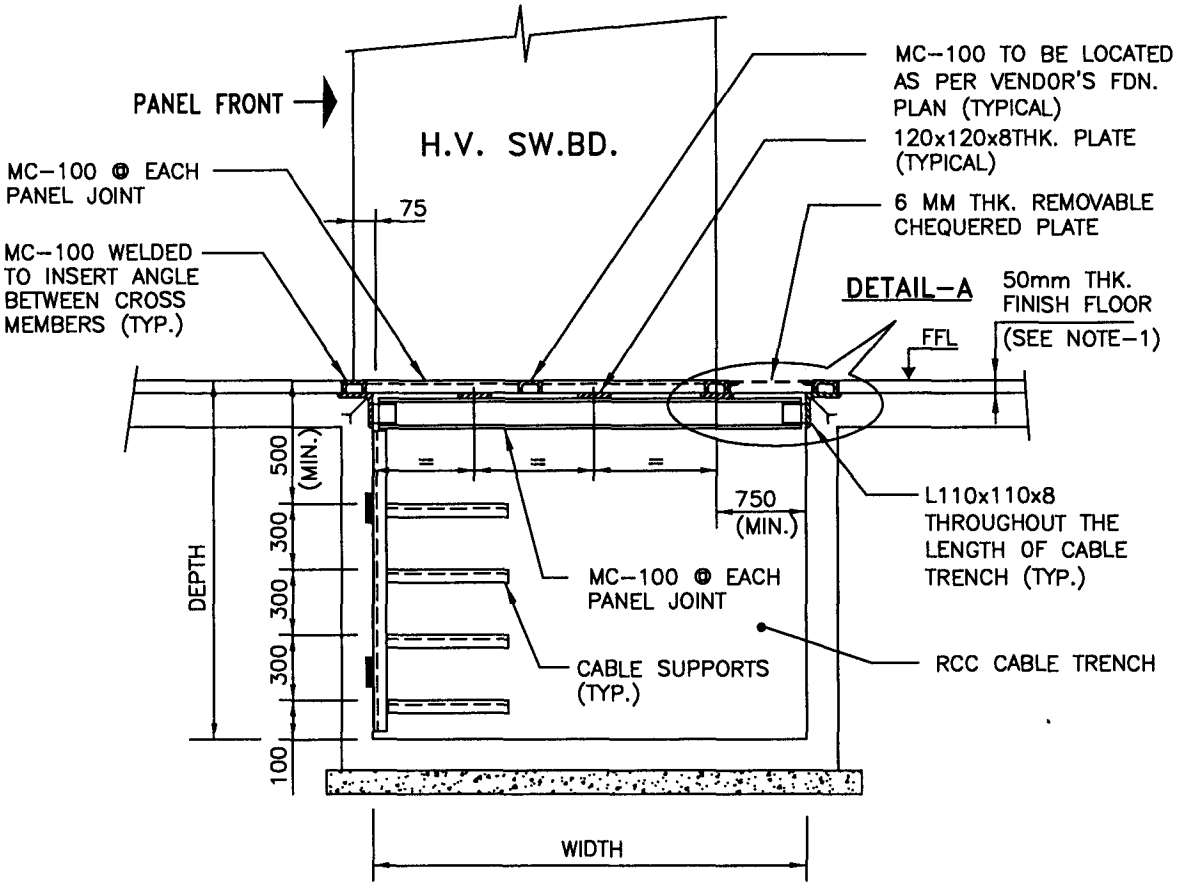
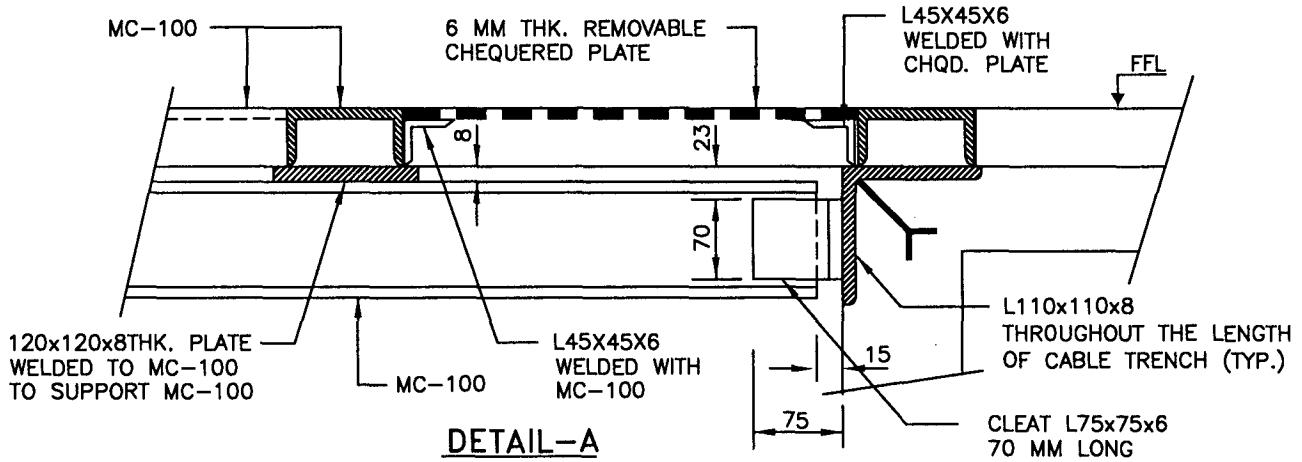


TYPICAL INSTALLATION DETAIL OF H.V. SWITCHBOARD (FOR REMOTE LOCATION SUB STATION)

(UPTO 11KV AND FOR MAXIMUM 3 CABLES PER PHASE)



NOTES:-

1. 50 THICK FINISH FLOORING SHALL BE DONE ONLY AFTER INSTALLATION OF BASE FRAME
2. ALL PANELS SHALL BE TACK WELDED WITH BASE FRAME OF SWITCHBOARD.
3. UNUSED PORTION OF CUTOUTS SHALL BE COVERED WITH 6 MM THICK CHEQUERED PLATES.
4. WIDTH OF TRENCH TO SUIT THE DIMENSIONS OF SWITCHBOARD SHALL BE AS PER AFC DRAWING OF THE PROJECT.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	29.11.21	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
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2	02.03.12	REAFFIRMED & ISSUED	BP	RKS/RSC	UAP/JMS	DM

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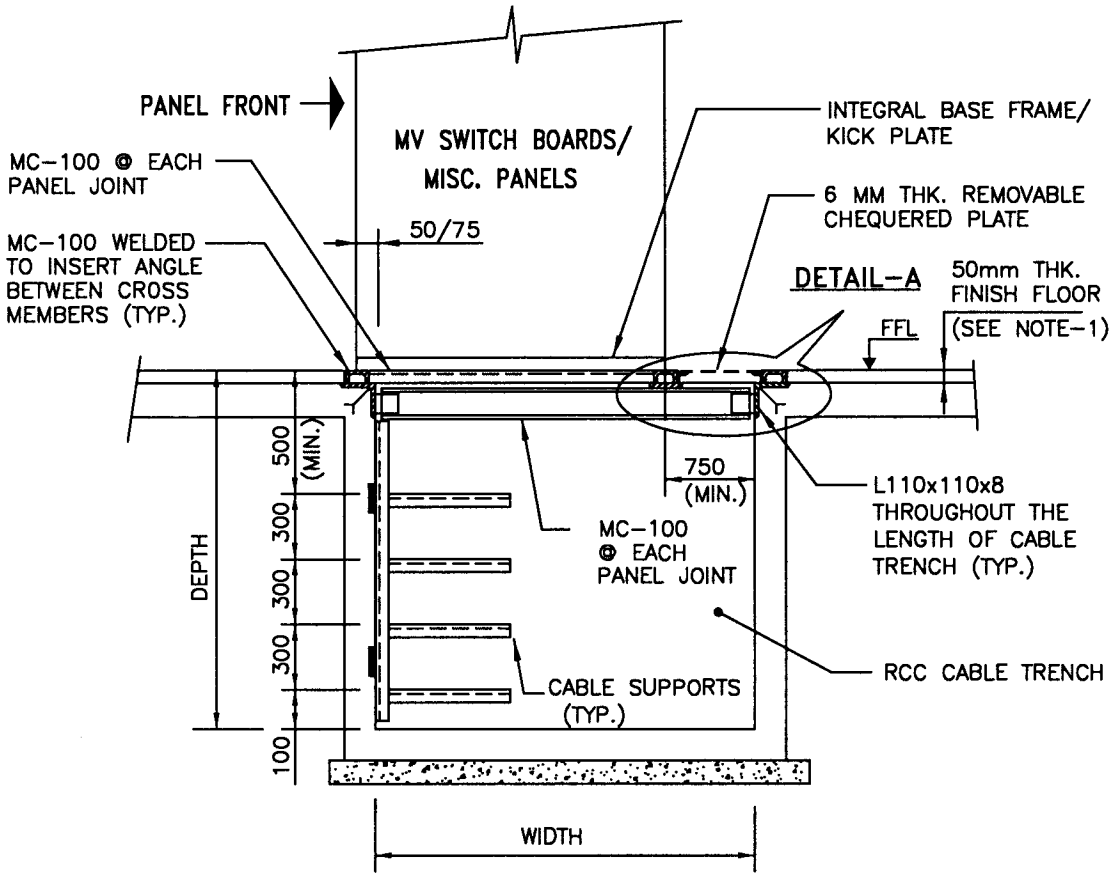
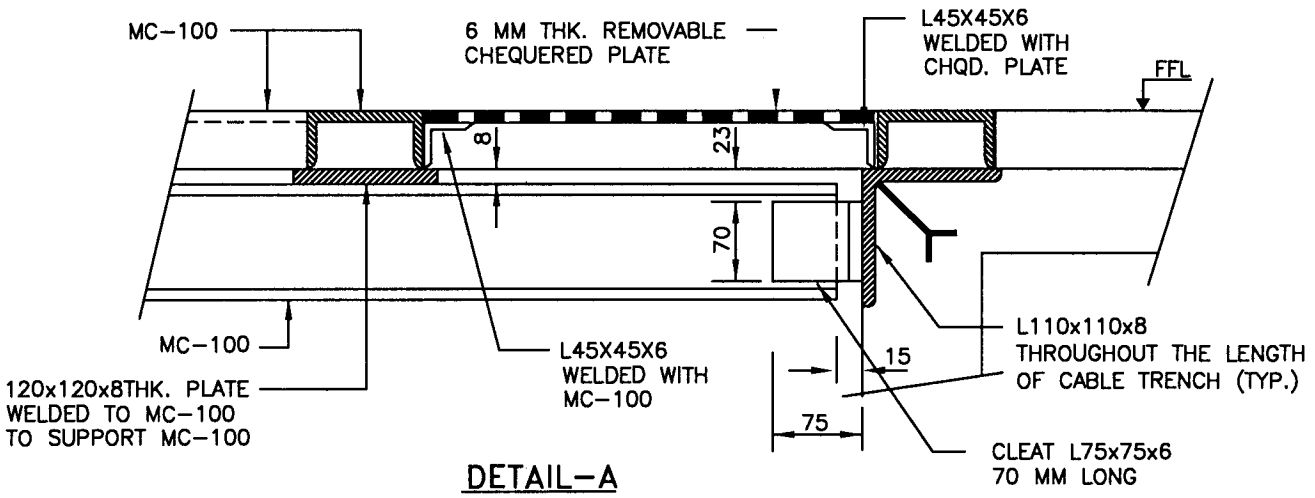


TYPICAL INSTALLATION DETAIL OF M.V. PANELS ON CABLE TRENCH



DETAIL–A

NOTES:–

1. 50 THICK FINISH FLOORING SHALL BE DONE ONLY AFTER INSTALLATION OF BASE FRAME
2. ALL PANELS SHALL BE TACK WELDED WITH BASE FRAME OF SWITCHBOARD.
3. UNUSED PORTION OF CUTOUTS SHALL BE COVERED WITH 6 MM THICK CHEQUERED PLATES.
4. WIDTH OF TRENCH TO SUIT THE DIMENSIONS OF SWITCHBOARD SHALL BE AS PER AFC DRAWING OF THE PROJECT.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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4	29.11.21	UPDATED & ISSUED AS STANDARD	JSK	VKS/HK	PG	SM
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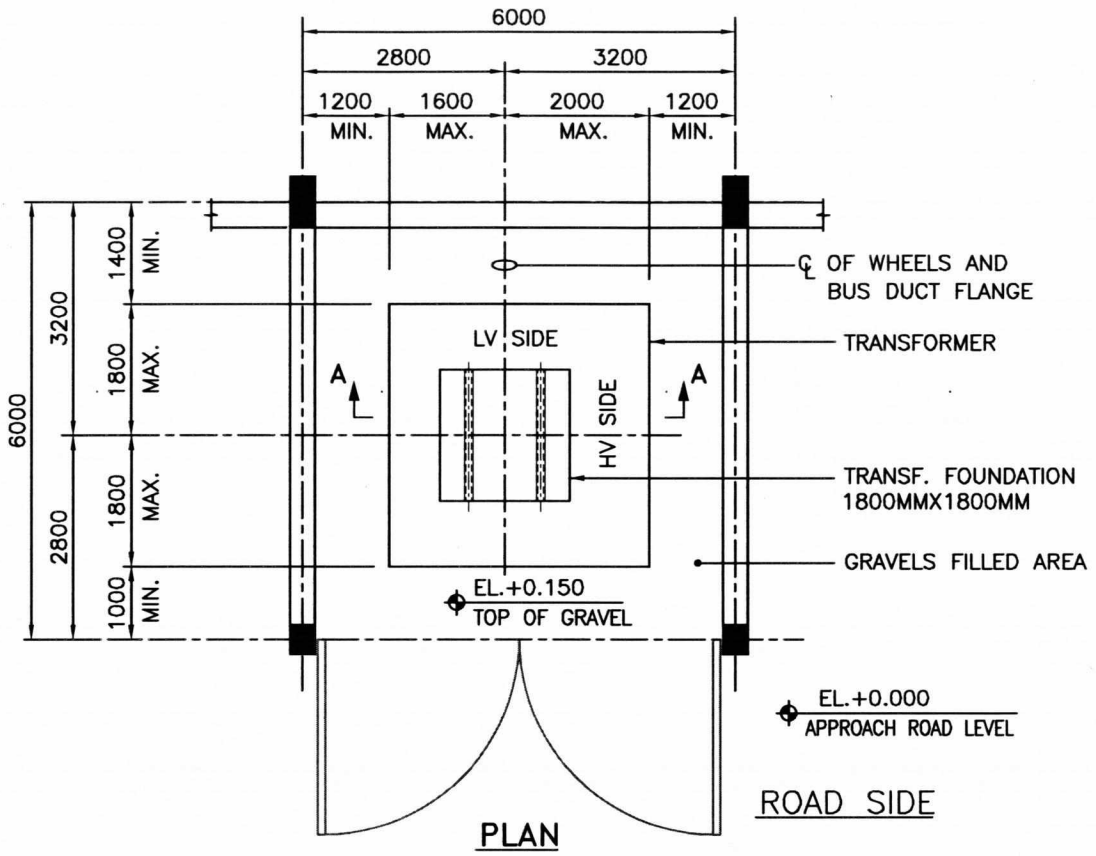
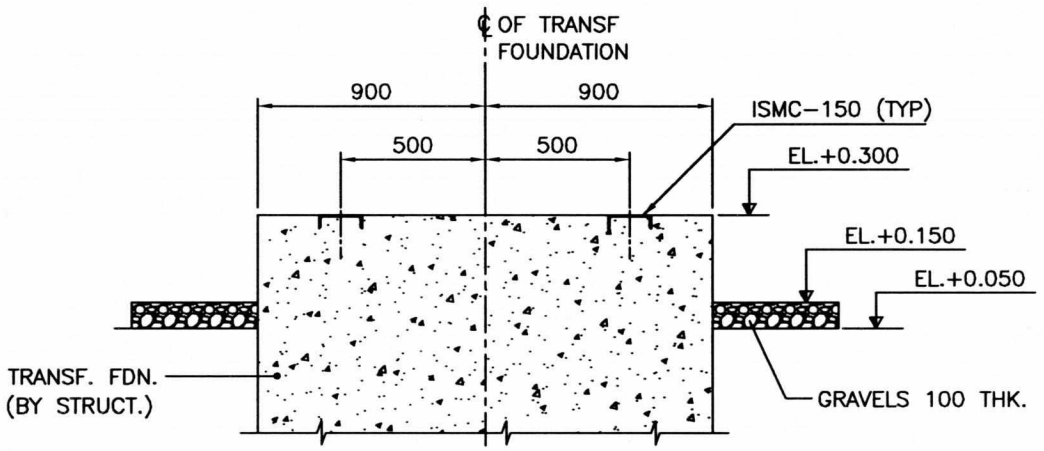
SUB STATION/SW. GR. ROOM SIDE





SECTION A–A
(TRANSFORMER FOUNDATION DETAIL)

NOTES:–

1. ALL DIMENSIONS ARE IN MM.

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2	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MKS	SM
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0	01.05.13	ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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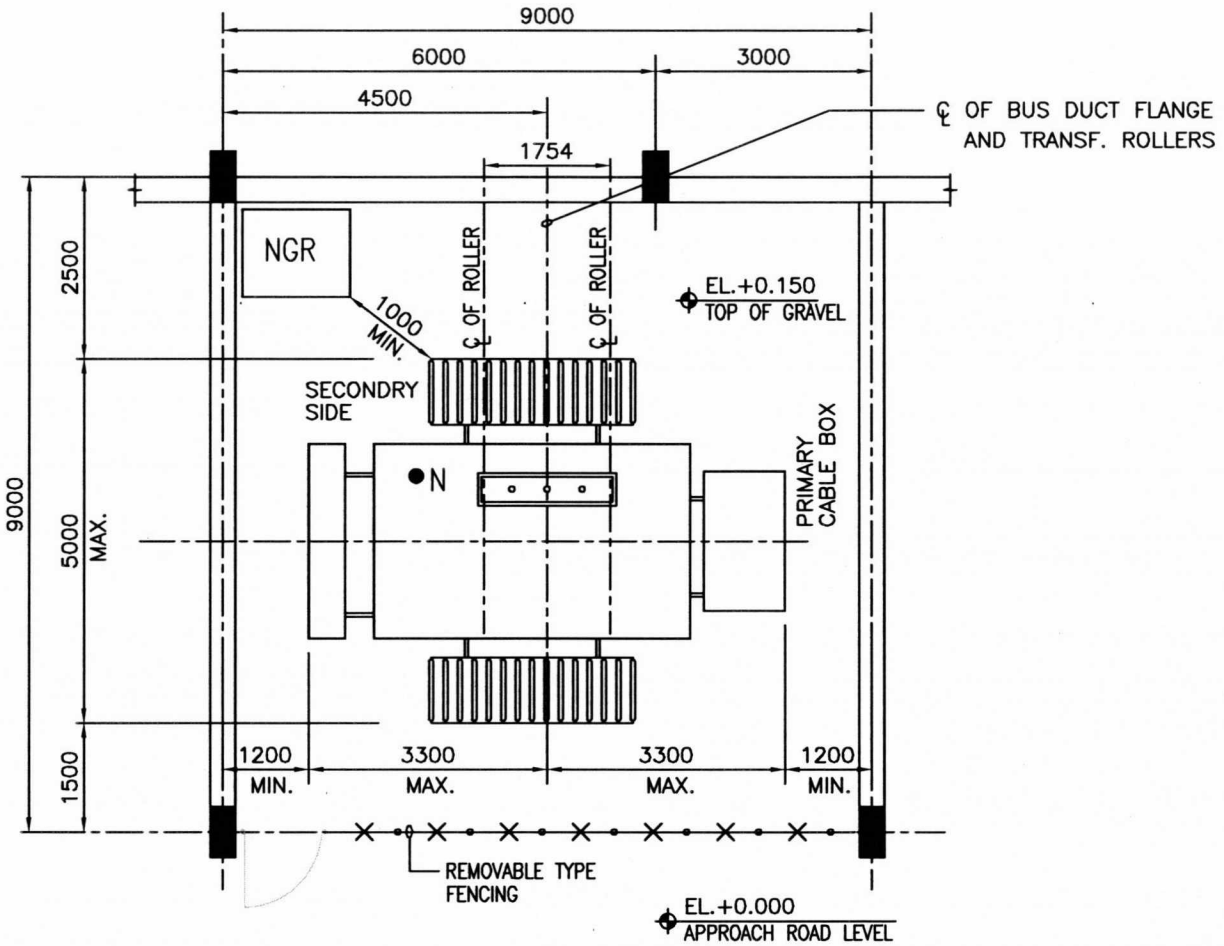
SUB STATION/SW. GR. ROOM SIDE



ROAD SIDE

NOTES:–

1. DIEMENSIONS OF TRANSFOMER ARE MAXIMUM WHICH CAN BE ACCOMODATED IN 9M X 9M BAY.
2. VENDOR TO ADJUST OVERALL TRANSFORMER DIEMENSION WITHIN ABOVE MENTIONED SPACE ONLY.
3. N.G.R. SIZE SHALL BE 1500 X1200 MM AND SHALL HAVE MINIMUM CLEARANCE OF 1000MM FROM TRANFORMER.
4. ALL WALLS ARE 345 MM THICK.
5. FLAT ROLLERS SHALL BE PROVIDED IN TRANSFORMER.

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2	15.09.22	REAFFIRMED & ISSUED AS STANDARD	JSK	VKS/HK	MRS	SM
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0	01.05.13	ISSUED AS STANDARD	BP	FA/SA	UAP/JMS	DM

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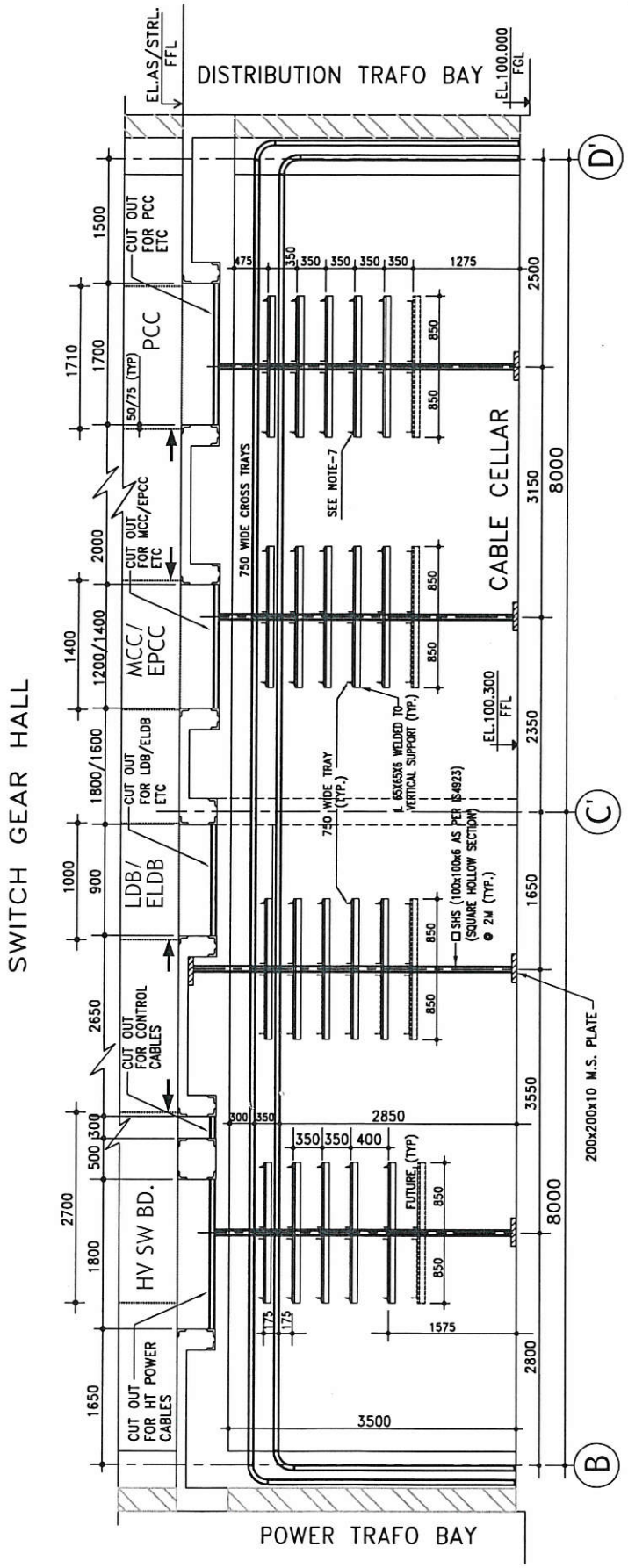

TYPICAL SECTION (SUB STN. CELLAR)

NOTES:-

1. ALL DIMENSIONS ARE IN MM. THIS STANDARD IS FOR GUIDANCE ONLY. EXACT ARRANGEMENT MAY VARY TO SUIT JOB REQUIREMENT.
2. ↑ DENOTES PANEL FRONT.
3. FOR EXACT NUMBER OF TRAYS & OTHERS DETAILS REFER RESPECTIVE SUB STN. CABLE LAYOUT.
4. FOR EHV CABLES (66KV & ABOVE) RCC TRENCH SHALL BE PROVIDED IN CELLAR.
5. LOCATION & DIMENSIONS OF EQUIPMENTS & CUT-OUTS SHOWN ARE TENTATIVE. FOR EXACT LOCATION & DIMENSIONS OF EQUIPMENTS/CUT-OUTS REFER SUB STATION EQUIPMENT LAYOUT.
6. SUPPORTS FOR CROSS TRAYS SHALL BE SUITABLY DECIDED AT SITE.
7. MS ANGLE CLEATS SHALL BE WELDED TO THE HORIZONTAL SUPPORT AT THE END OF CABLE TRAYS.
8. IN CASE OF 3 CORE CABLE BEING USED INSTEAD OF SINGLE CORE CABLE, THE AREA BELOW THE 33KV SWITCH BOARD SHALL BE KEPT FREE OF CABLE TRAYS TO HAVE ADEQUATE CLEARANCE FOR BENDING & TERMINATION OF CABLE.

NOT TO SCALE , ASK IF IN DOUBT

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
0	20.08.20	ISSUED AS STANDARD	VKS	HK / PG	SA	SM

Approved by

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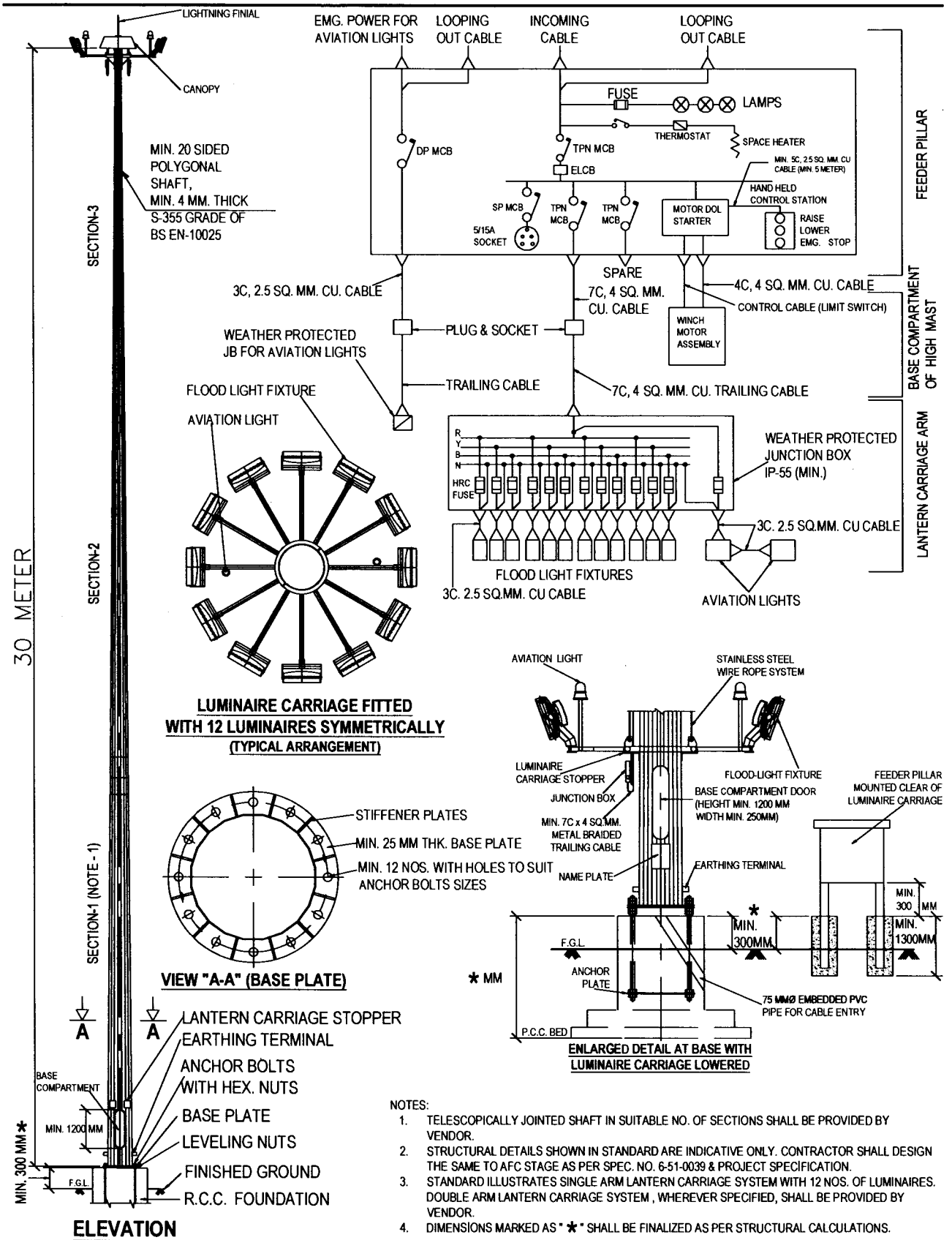

NOTES:

1. TELESCOPICALLY JOINTED SHAFT IN SUITABLE NO. OF SECTIONS SHALL BE PROVIDED BY VENDOR.
2. STRUCTURAL DETAILS SHOWN IN STANDARD ARE INDICATIVE ONLY. CONTRACTOR SHALL DESIGN THE SAME TO AFC STAGE AS PER SPEC. NO. 6-51-0039 & PROJECT SPECIFICATION.
3. STANDARD ILLUSTRATES SINGLE ARM LANTERN CARRIAGE SYSTEM WITH 12 NOS. OF LUMINAIRES. DOUBLE ARM LANTERN CARRIAGE SYSTEM , WHEREVER SPECIFIED, SHALL BE PROVIDED BY VENDOR.
4. DIMENSIONS MARKED AS " * " SHALL BE FINALIZED AS PER STRUCTURAL CALCULATIONS.

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0	31.12.20	ISSUED AS STANDARD	DR	VK/HK	PG	SM

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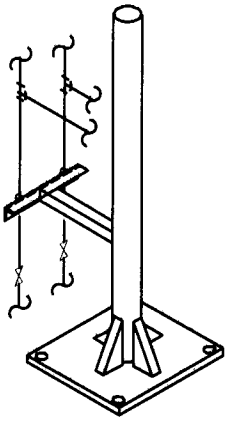
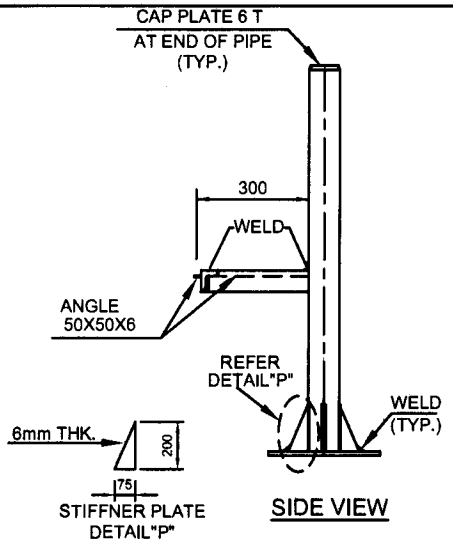
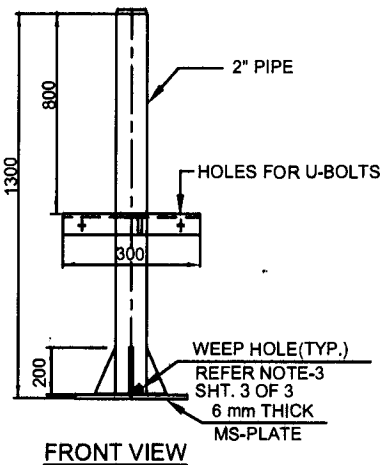
TYPE 11 — SINGLE INSTRUMENT SUPPORT - GENERAL ARRANGEMENT



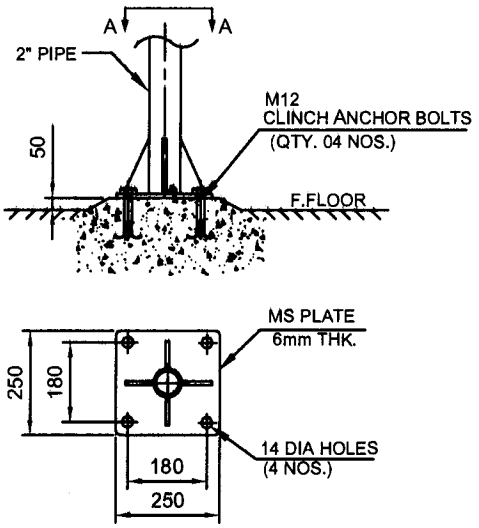


SIDE VIEW



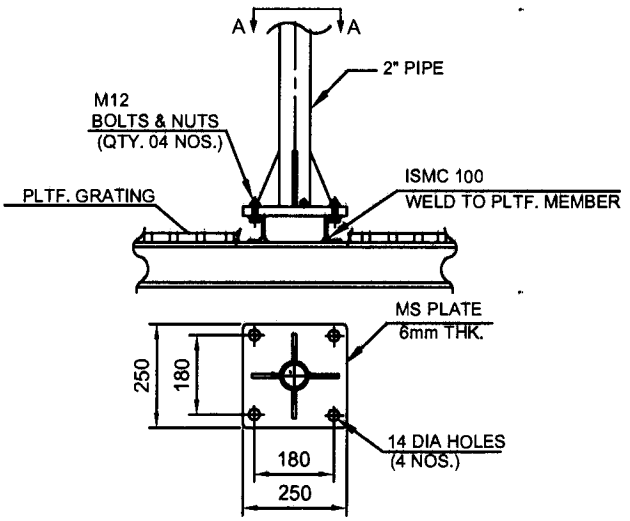
FRONT VIEW

TYPE 11-1



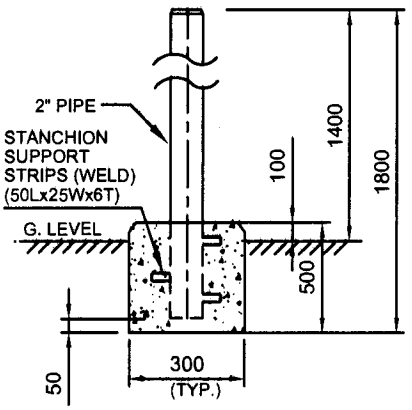
VIEW A-A
PAVED AREA MOUNTING

TYPE 11-2



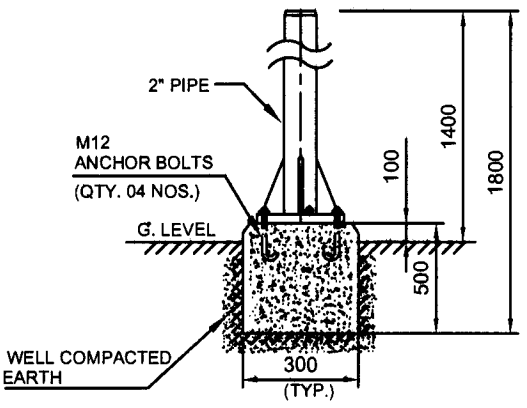
VIEW A-A
PLATFORM MOUNTING

TYPE 11-3



UNPAVED AREA MOUNTING
(WITH INTEGRAL CONC. BLOCK)

TYPE 11-4



UNPAVED AREA MOUNTING
(WITH SEPARATE CONC. BLOCK)

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4	22.03.22	Revised & Reissued	SM / Manoj	AS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

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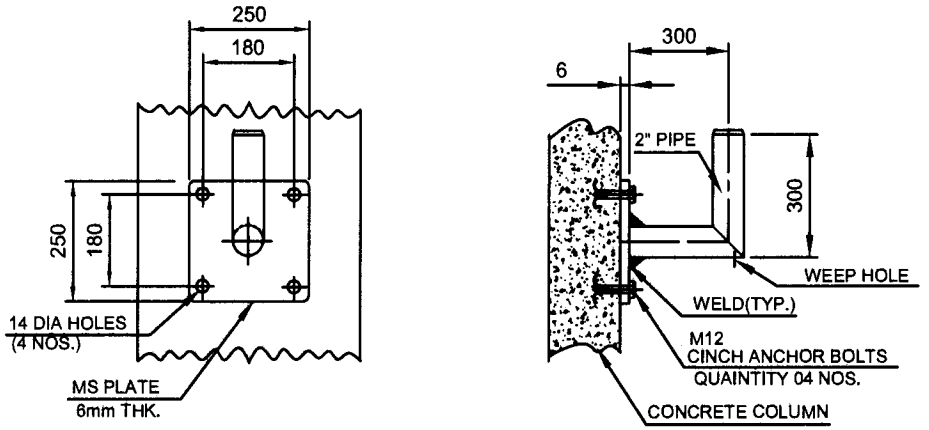
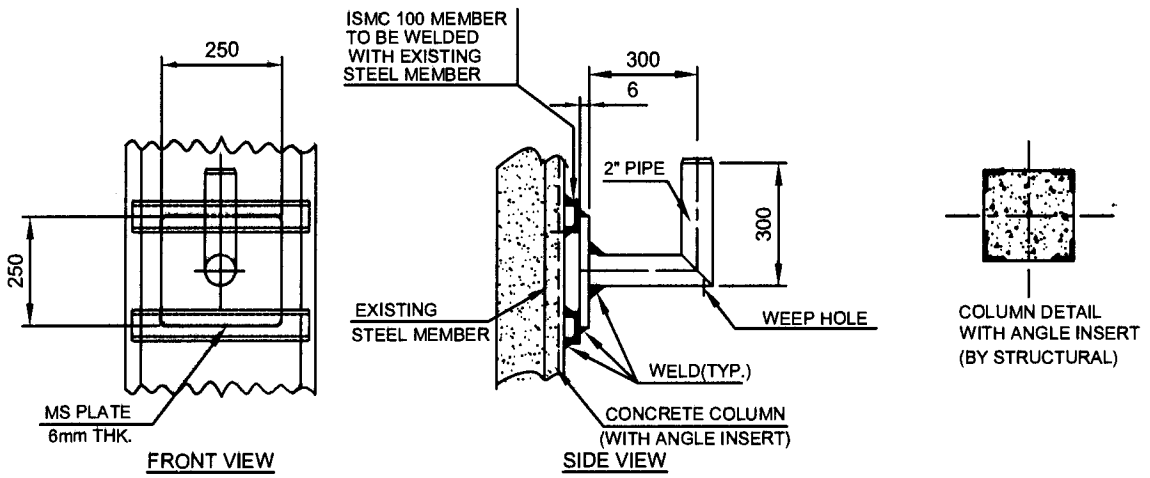
TYPE 12 CONCRETE COLUMN MOUNTING



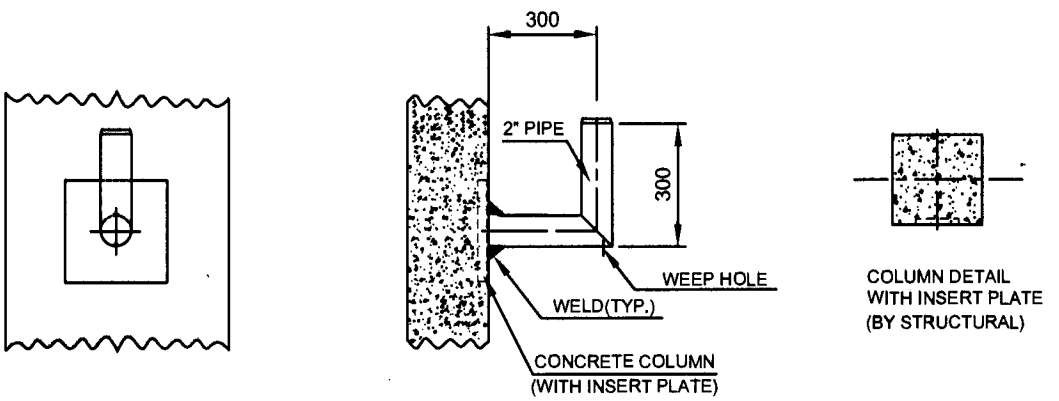
FRONT VIEW SIDE VIEW

TYPE 13 CONCRETE COLUMN (WITH ANGLE INSERT) MOUNTING



FRONT VIEW SIDE VIEW

TYPE-14 CONCRETE COLUMN (WITH INSERT PLATE) MOUNTING



FRONT VIEW SIDE VIEW

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					Approved by	
4	22.03.22	Revised & Reissued	SM / Manoj	AS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

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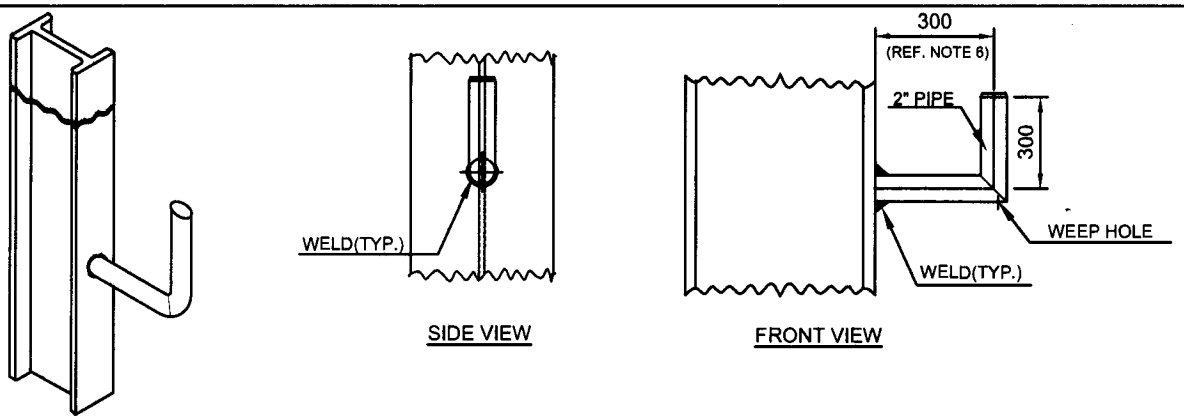
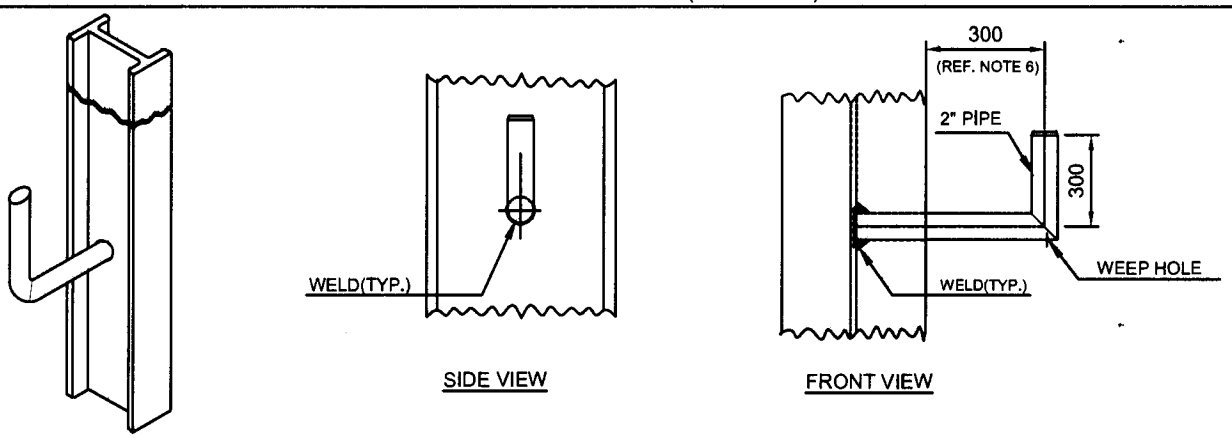
TYPE 15 STEEL COLUMN MOUNTING (FLANGE FACE)

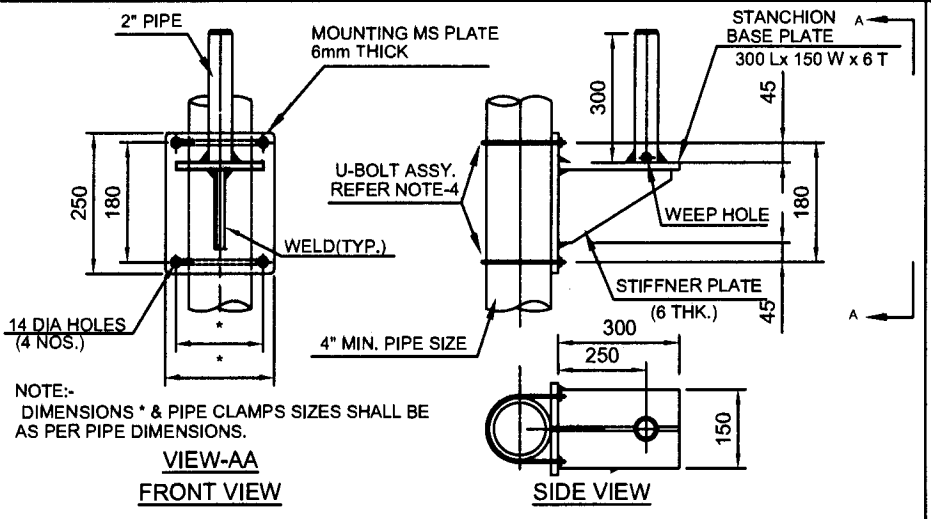


TYPE 16 STEEL COLUMN MOUNTING (WEB FACE)

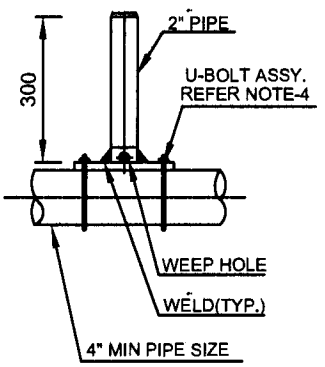


TYPE 17 PIPE BRACKET MOUNTING

TYPE 17.1 (VERTICAL PIPE)



TYPE 17.2 (HORIZONTAL PIPE)



(HORIZONTAL PIPE)

NOTES:-

1. ALL DIMENSIONS ARE IN M.M. UNLESS OTHERWISE SPECIFIED.
2. PIPE MATERIAL SHALL BE IS:1239 HEAVY GRADE AS A MINIMUM.
3. 6 mm DIA WEEP HOLE SHALL BE PROVIDED AT LOW POINT.
4. U-BOLT ASSEMBLY SHALL BE OF MINIMUM M12 SIZE WITH NUTS AND SPRING WASHERS.
5. ALL WELD SHALL BE 3mm FILLET WELD FULL STRENGTH.
6. ADD 50mm WHERE-EVER FIRE INSULATION IS PROVIDED.
7. BOLT SHALL BE TURNED FROM M.S. ROUNDS CONFIRMING TO IS : 432 GRADE 1.
8. NUTS AND WASHERS SHALL CONFIRM TO IS : 1363 AND IS : 3138.
9. GALVANISED PLATES SHAL BE CONSIDERED FOR MOUNTING OF INSTRUMENT SUPPORT ON PIPES.

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Approved by

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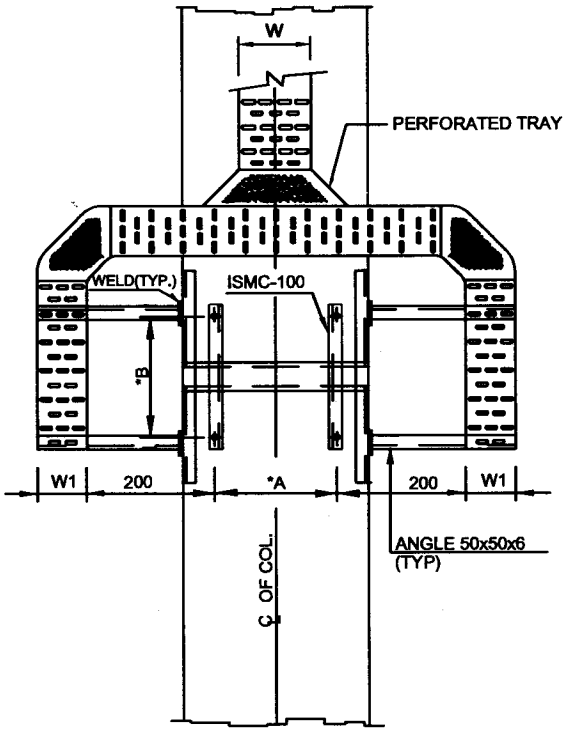
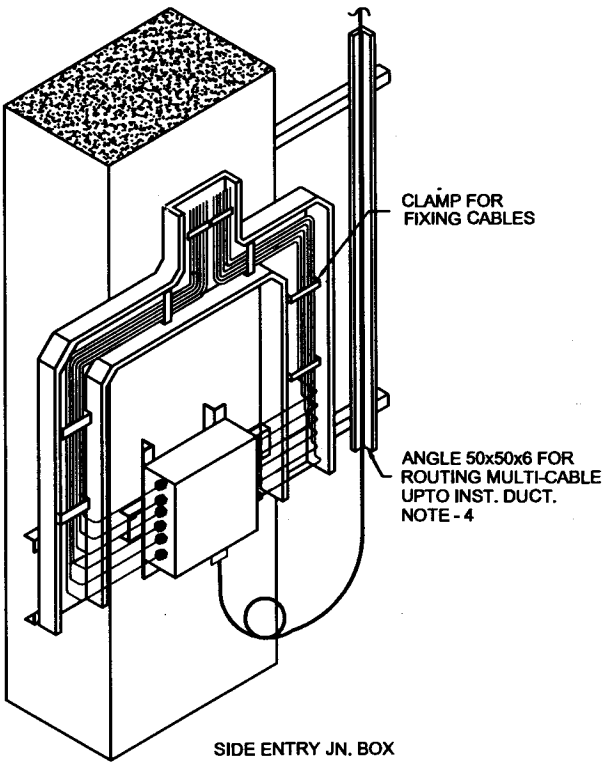
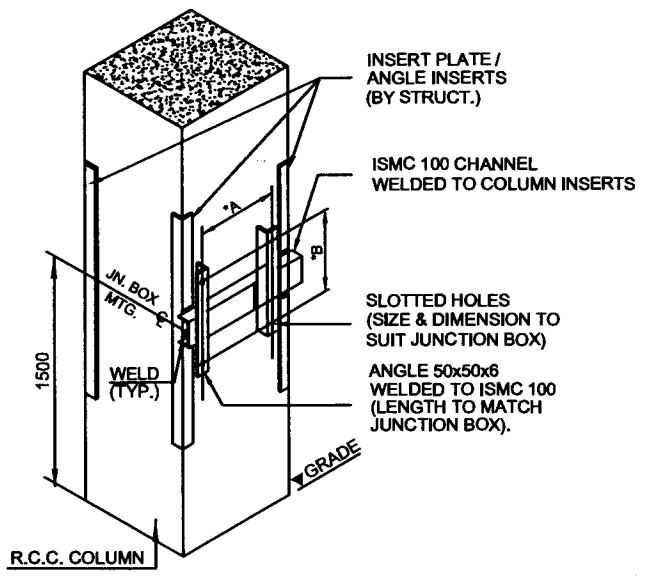
TRAY ARRANGEMENT FOR JUNCTION BOXES



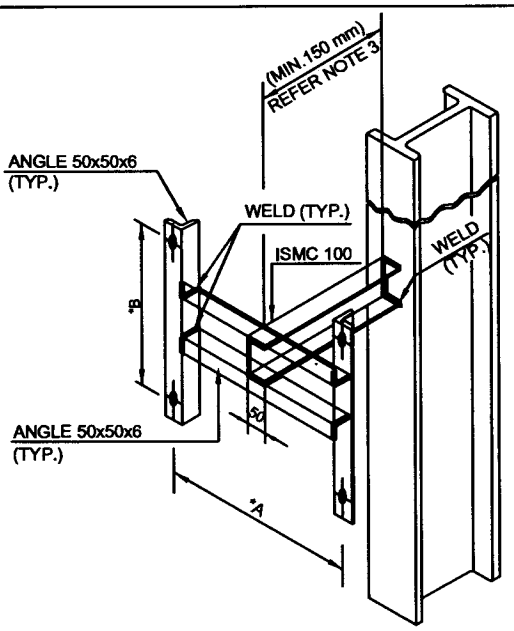
CABLE ROUTING FOR JUNCTION BOXES.



JN. BOX MOUNTING FRAME (R.C.C. COLUMN)



JN. BOX MOUNTING FRAME (STEEL COLUMN)



* DIMENSION `A and B' TO SUIT JUNCTION BOX.

NOTE:
1. ALL DIMENSIONS ARE IN mm.
2. CLAMP MULTICABLE ON ANGLE WITH 25mm WIDE PVC COVERED ALLUMINIUM STRIP.
3. ADD 50 mm WHERE-EVER FIRE INSULATION IS PROVIDED.
4. COMMON TRAY FOR MULTIPLE MULTICABLE CAN BE USED FOR JBs LOCATED TOGETHER. TRAY HEIGHT SHALL BE MINIMUM 40 mm FOR RUNNING MULTIPAIR.

TRAY WIDTH

JN. BOX	W	W1
12 PAIR	300	150
8 TRIAD	300	150
6 PAIR	150	100

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	03.11.21	Revised & Reissued	Saurav	~~AJS~~	MN	SM
3	28.03.17	Revised & Reissued	Manoj	MN	RG	RN

Approved by

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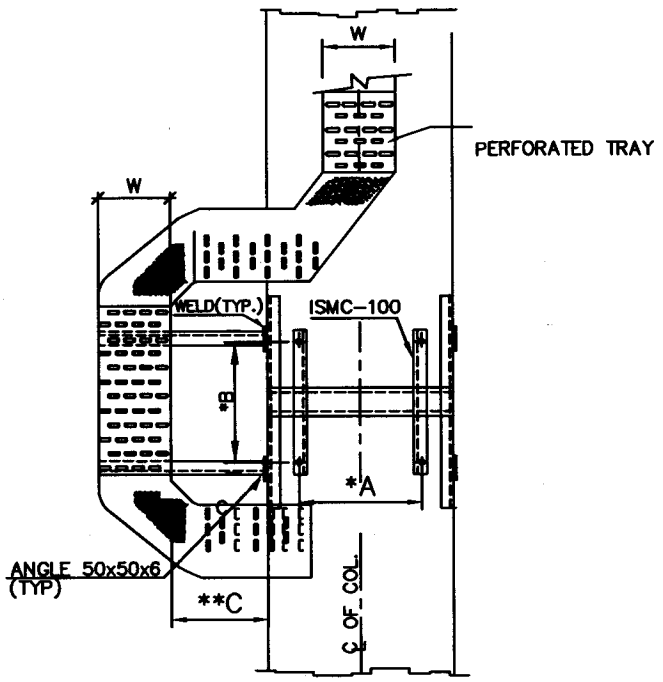
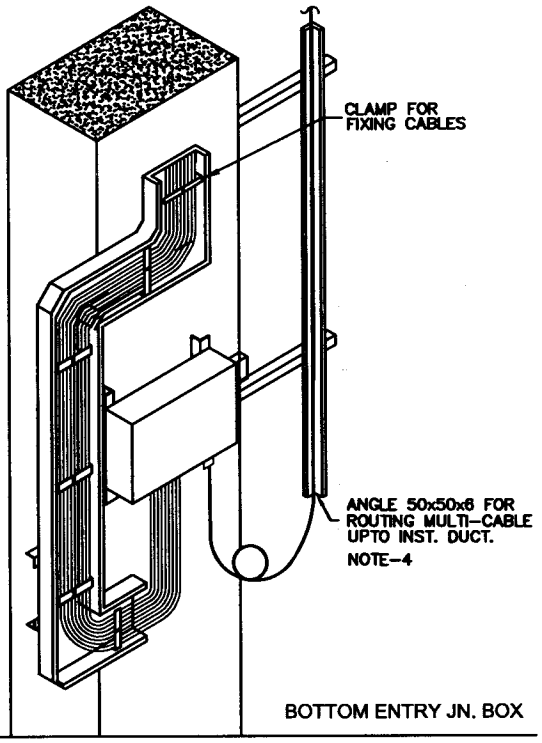
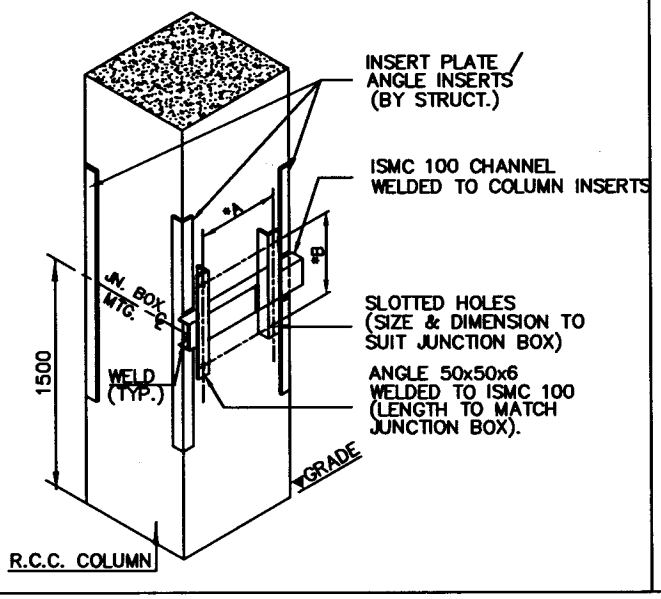
TRAY ARRANGEMENT FOR JUNCTION BOXES



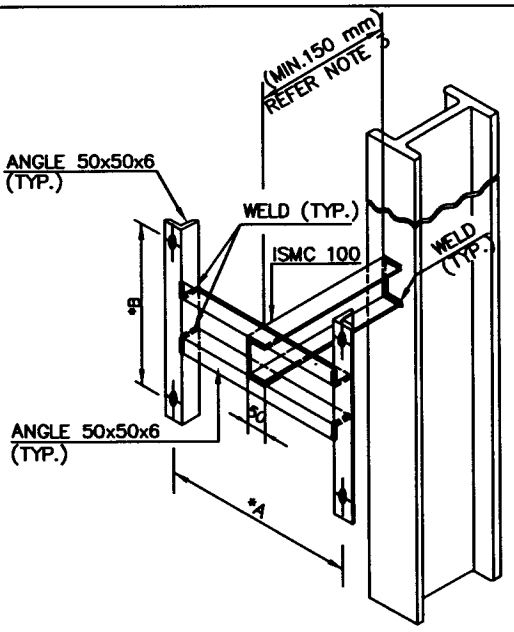
CABLE ROUTING FOR JUNCTION BOXES.



JN. BOX MOUNTING FRAME (R.C.C. COLUMN)



JN. BOX MOUNTING FRAME (STEEL COLUMN)



* DIMENSION 'A and B' TO SUIT JUNCTION BOX.

** DIMENSION 'C' SHALL BE 150 TYPICAL, MAY VARY TO SUIT THE REQUIREMENT.

TRAY WIDTH

JN. BOX	W
12 PAIR	300
8 TRIAD	300
6 PAIR	150

NOTE:
1. ALL DIMENSIONS ARE IN mm.
2. CLAMP MULTICABLE ON ANGLE WITH 25mm WIDE PVC COVERED ALLUMINIUM STRIP.
3. ADD 50 mm WHERE-EVER FIRE INSULATION IS PROVIDED.
4. COMMON TRAY FOR MULTIPLE MULTICABLE CAN BE USED FOR JBs LOCATED TOGETHER. TRAY HEIGHT SHALL BE MINIMUM 40mm FOR RUNNING MULTIPAIR.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	03.11.21	Revised & Reissued	Saurav	AJS	MN	SM
3	28.03.17	Revised & Reissued	Manoj	MN	RG	RN

Approved by

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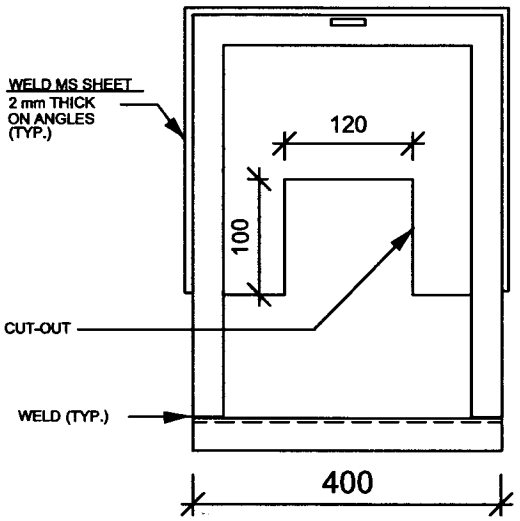
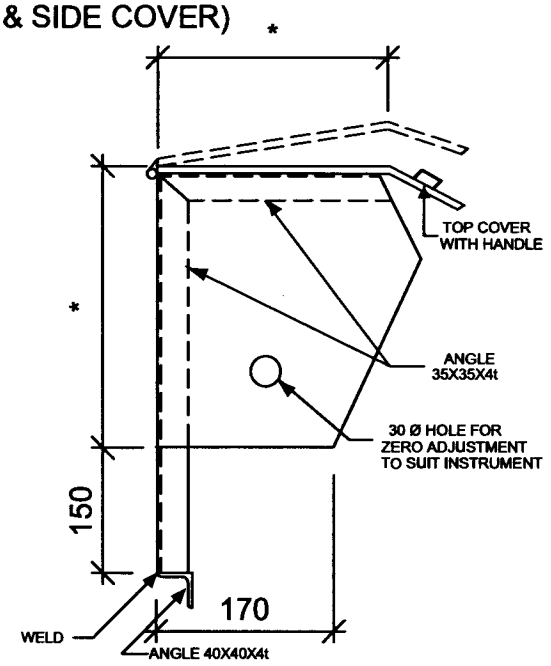
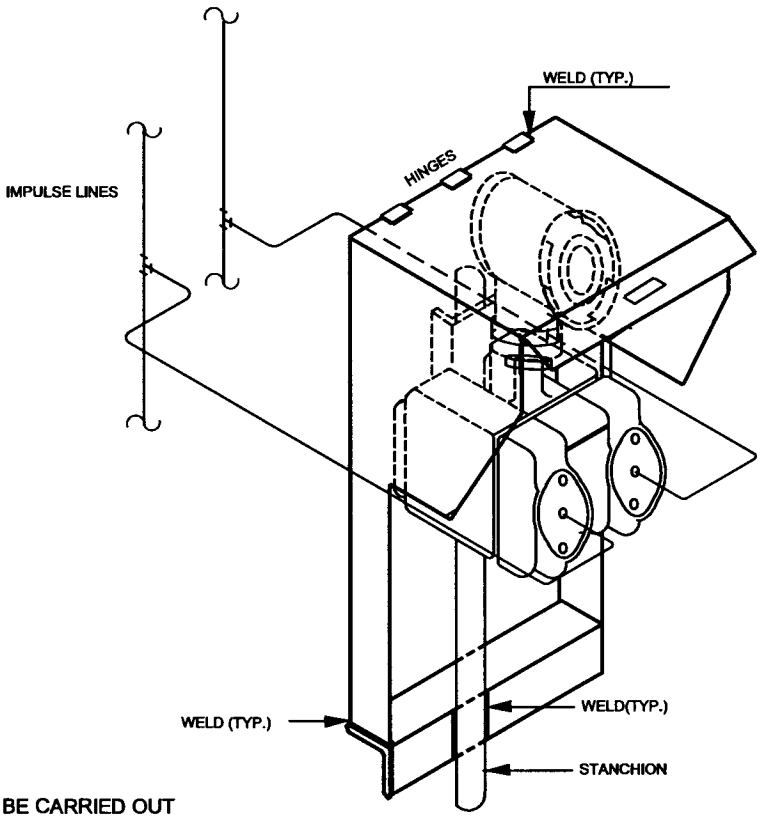
TYPE : MS PAINTED (TOP & SIDE COVER)



TOP VIEW



SIDE VIEW



FRONT VIEW

NOTES :

1. ALL DIMENSIONS ARE IN mm
2. * TO SUIT INSTRUMENT DIMENSIONS
3. HINGES SHALL BE OF STAINLESS STEEL.
4. A MINIMUM OF TWO COATS PAINTING SHALL BE CARRIED OUT AFTER A MINIMUM OF ONE COAT OF RED OXIDE ZINC CHROMATE PRIMER. THE COLOUR OF THE PAINT SHALL BE AS PER IS-5.
5. ALL EDGES/CORNERS SHALL BE PROPERLY SMOOTHENED AND ENSURE THAT NO SHARP EDGES EXIST.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	17.08.21	Revised & Reissued	Saurav	AJS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

Approved by

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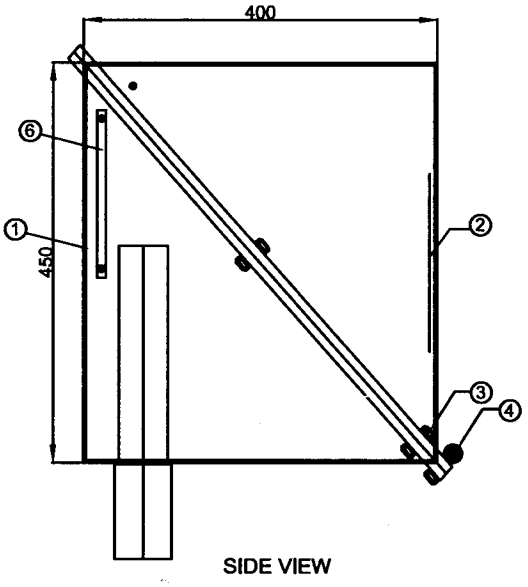
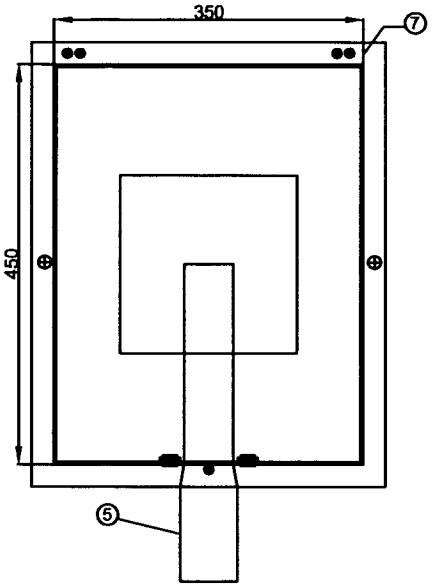
TYPE : FRP CANOPY (ALL SIDE CLOSED) - FIELD INSTRUMENTS

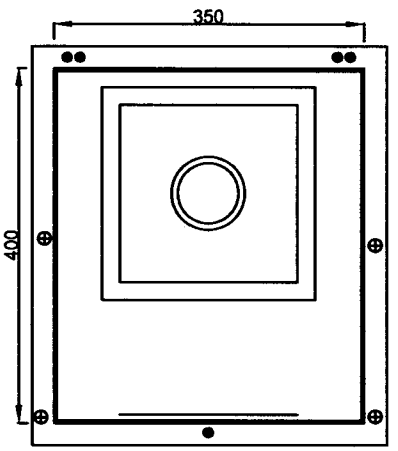


SIDE VIEW



FRONT VIEW

SPECIFICATIONS	
FRP Enclosure	Resin: Iso-phthalic fire retardant UV resistant polyester as per IS-10192
Glass Content	Min. 60%
Flammability	Rating Class I, as per IS 6746
Pigments	Resin pigmented grey
Thickness	3mm, +1.0mm / -0.25mm
Finish	Smooth Outside Finish in Glaze & Gloss
Colour	RAL 7040 PU (GREY)
Window	3mm thick acrylic window for viewing
Others	Canopy shall have chemical resistance, high mechanical strength, antistatic and low moisture absorption.



TOP VIEW

(Canopy bottom Cut-out for entry)

ITEM	DESCRIPTION
①	FRP Canopy of internal size 394mm (D) x 444mm (H) x 344mm (W)
②	Acrylic window of clear size 200mm x 200mm Abrasion Resistant, Impact Anodized
③	SS knob with plastic butterfly grip
④	SS knob
⑤	SS Clamp • ID X L: 56mm x 225mm; Thickness: 2.0mm • ID X L: 64mm x 65mm; Thickness: 2.0mm • Plate Size: 200mm x 200mm x 2.0mm • Holes: For M6 SS Bolts
⑥	Lid holding clamp, SS
⑦	SS hinges with SS screws

NOTE :

1. THIS IS TYPICAL DRAWING. THE DIMENSIONS SHALL BE FIRMED UP WITH THE ACTUAL INSTALLATION OF FIELD INSTRUMENTS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	17.08.21	Revised & Reissued	Saurav	AJS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

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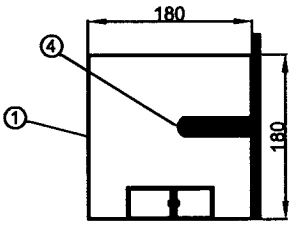
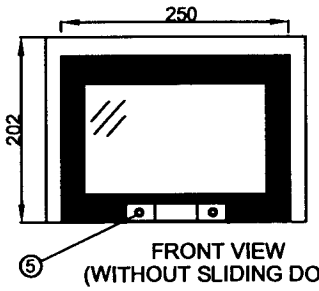
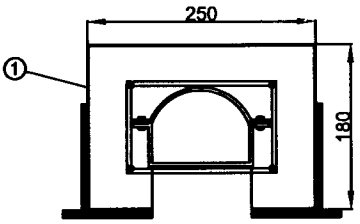
TYPE: FRP CANOPY (ALL SIDE CLOSED) - NECK MOUNTED INSTRUMENTS



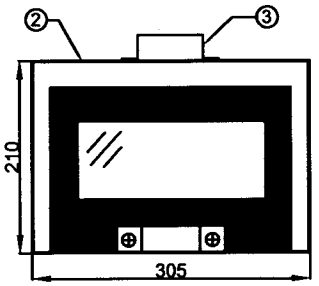
SIDE VIEW
(WITHOUT SLIDING DOOR)



FRONT VIEW
(WITHOUT SLIDING DOOR)



BOTTOM VIEW
(CANOPY BOTTOM SLOT FOR ENTRY WITH SS CLAMP AND SCREW SET)



FRONT VIEW
(WITH SLIDING DOOR)

SPECIFICATIONS	
FRP Enclosure	Resin: Iso-phthalic fire retardant UV resistant polyester as per IS-10192
Glass Content	Min. 60%
Flammability	Rating Class I, as per IS 6746
Pigments	Resin pigmented grey
Thickness	3mm, +1.0mm / -0.25mm
Finish	Smooth Outside Finish In Glaze & Gloss
Colour	RAL 7040 PU (GREY)
Sliding Door	3mm, with smooth aluminium (light grey) sliding channel
Window	3mm thick acrylic window for viewing, 200mm(W) x 100mm(H) Abrasion resistant, Impact Anodized
Dimension	Overall dimesional tolerance shall be +/-6 mm
Others	Canopy shall have chemical resistance, high Mechanical strength. Antistatic and low moisture absorption.

ITEM	DESCRIPTION
①	FRP Canopy of internal size 177mm(D) x 177mm(H) x 244mm(W)
②	FRP Sliding door of external size 25mm(D) x 210mm(H) x 305mm(W)
③	SS handle, riveted to door
④	Neoprene rubber channel gasket, 2 nos , shall confirm to ASTM D395- 18 requirements
⑤	SS Clamp • ID X L: 62mm x 30mm; Thickness:2.0mm • Plate Size: 160mm x 100mm x 1.5mm • Holes: For M6 SS Bolts

NOTE :

1. THIS IS A TYPICAL DRAWING. THE DIMENSIONS SHALL BE FIRMED UP WITH THE ACTUAL INSTALLATION OF FIELD INSTRUMENTS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	17.08.21	Revised & Reissued	Saurav	AJS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

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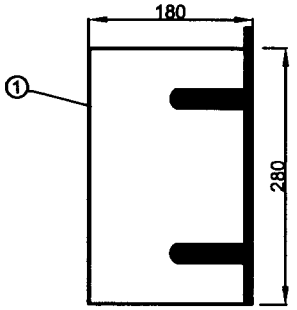
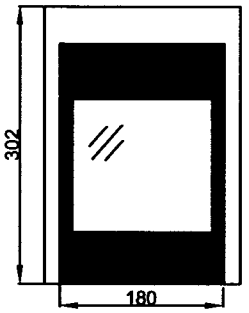
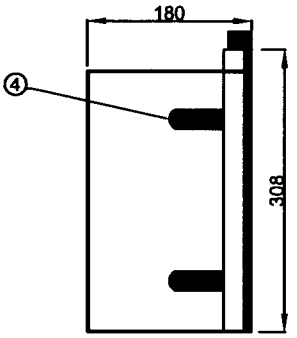
TYPE: FRP CANOPY (ALL SIDE CLOSED) - TEMPERATURE TRANSMITTER AND LOOP POWERED INDICATOR



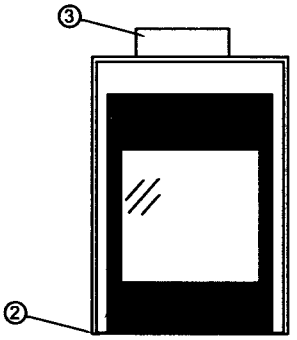
SIDE VIEW
(WITHOUT SLIDING DOOR)



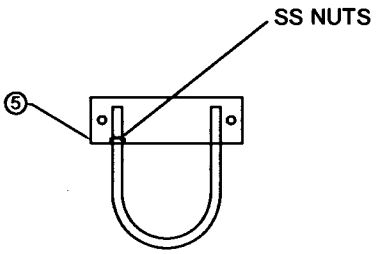
FRONT VIEW
(WITHOUT SLIDING DOOR)



SIDE VIEW
(WITH SLIDING DOOR)



FRONT VIEW - WITH SLIDING DOOR
(CANOPY BOTTOM OPEN FOR
CABLE ENTRY)



SS U- CLAMP
WITH ANGLE

SPECIFICATIONS	
FRP Enclosure	Resin: Iso-phthalic fire retardant UV resistant polyester as per IS-10192
Glass Content	Min. 60%
Flammability	Rating Class I, as per IS 6746
Pigments	Resin pigmented grey
Thickness	3mm, +1.0mm / -0.25mm
Finish	Smooth Outside Finish in Glaze & Gloss
Colour	RAL 7040 PU (GREY)
Sliding Door	3mm, with smooth aluminium sliding channel
Window	3mm thick acrylic window for viewing, 150mm x 150mm Abrasion resistant, Impact Anodized
Dimension	Overall dimesional tolerance shall be +/-6 mm
Others	Canopy shall have chemical resistance, high mechanical strength, antistatic and low moisture absorption.

ITEM	DESCRIPTION
①	FRP Canopy of internal size 177mm(D) x 277mm(H) x 174mm(W)
②	FRP Sliding door of external size 25mm(D) x 310mm(H) x 190mm(W)
③	SS handle, riveted to door
④	Neoprene rubber channel gasket, 2 nos shall confirm to ASTM D395-18 requirements
⑤	SS U- Clamp • ID X L: 60mm x 85mm; Thickness:6.0mm • Angle Size: 30mm x 30mm x 3.0mm • Holes: For M6 SS Bolts 2 SS Hardware for tightening with canopy, M6

NOTE :

1. THIS IS A TYPICAL DRAWING. THE DIMENSIONS SHALL BE FIRMED UP WITH THE ACTUAL INSTALLATION OF FIELD INSTRUMENTS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	17.08.21	Revised & Reissued	Saurav	AJS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

Approved by

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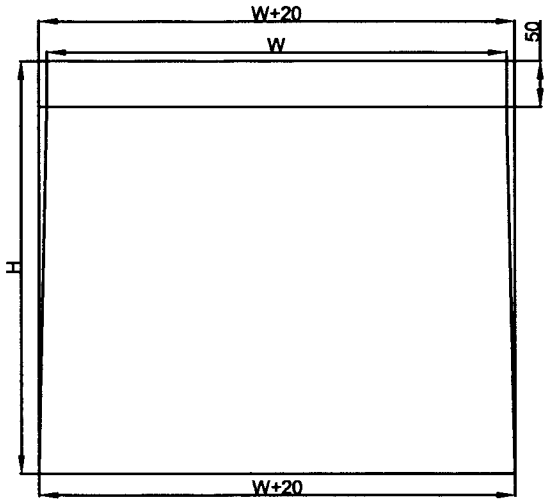
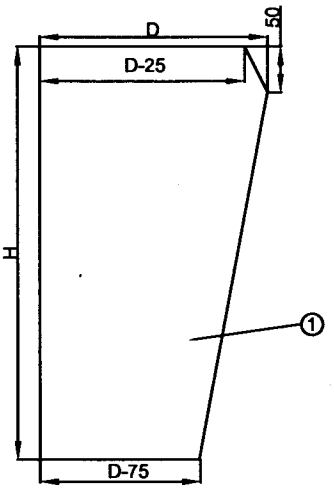
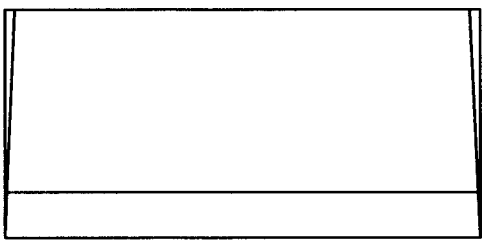
TYPE: FRP CANOPY FOR JUNCTION BOX - FRONT SIDE OPEN



FRONT VIEW



SIDE VIEW



TOP VIEW

SPECIFICATIONS	
FRP Enclosure	Resin: Iso-phthalic fire retardant UV resistant polyester as per IS-10192
Glass Content	Min. 60%
Flammability	Rating Class I, as per IS 6746
Pigments	Resin pigmented grey
Thickness	3mm, +1.0mm / -0.25mm
Finish	Smooth Outside Finish in Glaze & Gloss
Colour	RAL 7040 PU (GREY)
Others	Canopy shall have chemical resistance, high strength, antistatic and low moisture absorption.

ITEM	DESCRIPTION
①	FRP Junction box canopy of size 250mm(D) x 450mm(H) x 500mm(W)
	Cable entry from bottom side
D	250mm
H	450mm
W	500mm

NOTE :

1. THIS IS A TYPICAL DRAWING. THE DIMENSIONS SHALL BE FIRMED UP WITH THE ACTUAL INSTALLATION OF JUNCTION BOX AND ITS SIZE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
4	17.08.21	Revised & Reissued	Saurav	AJS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

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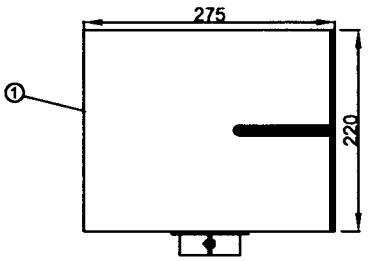
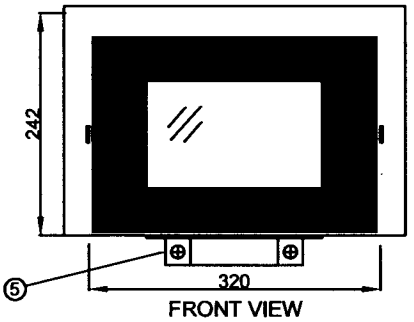
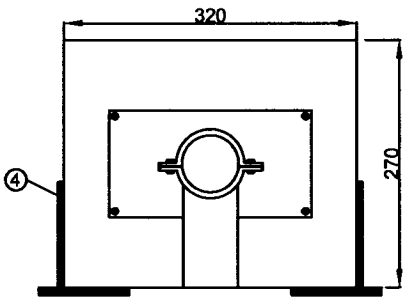
TYPE : FRP CANOPY (ALL SIDE CLOSED) - GUIDED WAVE , MASS FLOW METER



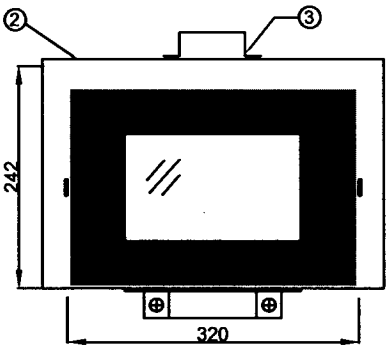
SIDE VIEW
(WITHOUT SLIDING DOOR)



FRONT VIEW
(WITHOUT SLIDING DOOR)



BOTTOM VIEW
(CANOPY BOTTOM SLOT FOR ENTRY
WITH SS CLAMP AND SCREW SET)



FRONT VIEW
(WITH SLIDING DOOR)
(CANOPY BOTTOM SLOT FOR ENTRY)

SPECIFICATIONS	
FRP Enclosure	Resin: Iso-phthalic fire retardant UV resistant polyester as per IS-10192
Glass Content	Min. 60%
Flammability	Rating Class I, as per IS 6746
Pigments	Resin pigmented grey
Thickness	3mm, +1.0mm / -0.25mm
Finish	Smooth Outside Finish in Glaze & Gloss
Colour	RAL 7040 PU (GREY)
Sliding Door	3mm, with smooth aluminium sliding channel
Window	3mm thick acrylic window for viewing, 150mm(W) x 100mm(H) Abrasion Resistant, Impact Anodized
Dimension	Overall dimesional tolerance shall be +/-6 mm
Others	Canopy shall have chemical resistance, high mechanical strength, antistatic and low moisture absorption.

ITEM	DESCRIPTION
①	FRP Canopy of internal size 269mm(D) x 214mm(H) x 314mm(W)
②	FRP Sliding door of external size 25mm(D) x 250mm(H) x 375mm(W)
③	SS handle, riveted to door
④	Neoprene rubber channel gasket, 2 No.s shall confirm to ASTM D395-18 requirements
⑤	SS Clamp • ID X L: 55mm x 25mm; Thickness:2.0mm • Plate Size: 150mm x 100mm x 1.5mm • Holes: For M6 SS Bolts 2 SS bolt set for tightening , M6

NOTE :
1. THIS IS A TYPICAL DRAWING. THE DIMENSIONS SHALL BE FIRMED UP WITH THE ACTUAL INSTALLATION OF INSTRUMENTS.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	17.08.21	Revised & Reissued	Saurav	AJS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

Approved by

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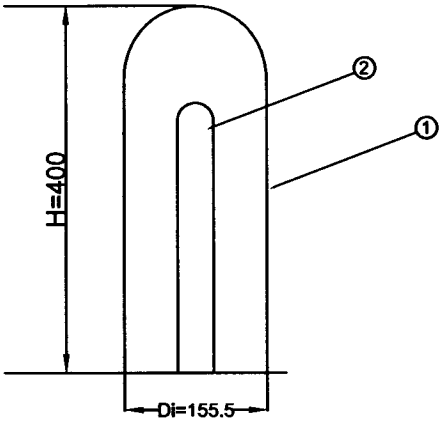
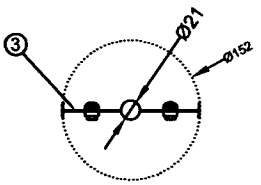
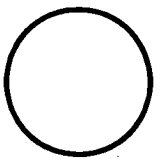
TYPE : FRP CANOPY FOR RTD / THERMOCOUPLE



FRONT VIEW



SS HOLDING CLAMP



BOTTOM VIEW

SPECIFICATIONS	
FRP Enclosure	Resin: Iso-phthalic fire retardant UV resistant polyester as per IS-10192
Glass Content	Min. 60%
Flammability	Rating Class I, as per IS 6746
Pigments	Resin pigmented grey
Thickness	3mm
Finish	Smooth Outside Finish
Colour	Grey, PU, RAL 7040 (GREY)
Dimension	Overall dimensional tolerance shall be +/- 6mm
Quantity	As required
Others	Canopy shall have chemical resistance, high mechanical strength, antistatic and low moisture absorption.

ITEM	DESCRIPTION
①	FRP Canopy of size 161.5mm(OD) x 400mm(H)
②	Neoprene channel type gasket shall confirm to ASTM D395-18 requirements
③	SS clamp • Thickness tolerance of +/- 0.2 mm • Taper maximum 2 Deg. • Size of slot 32mm wide x 300mm

NOTE :

1. THIS IS A TYPICAL DRAWING. THE DIMENSION SHALL BE FIRMED UP WITH THE ACTUAL INSTALLATION OF THERMOCOUPLE / RTD ASSEMBLY.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	17.08.21	Revised & Reissued	Saurav	AJS	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

Approved by

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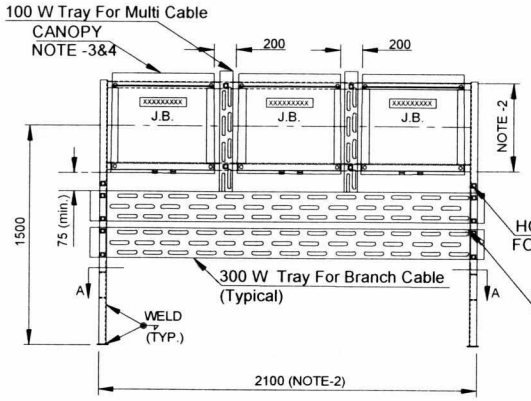
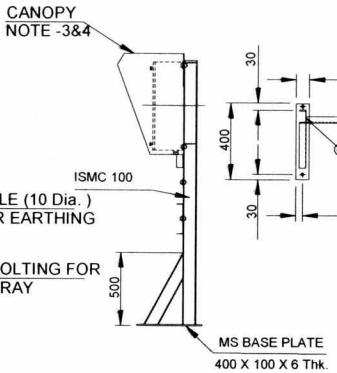
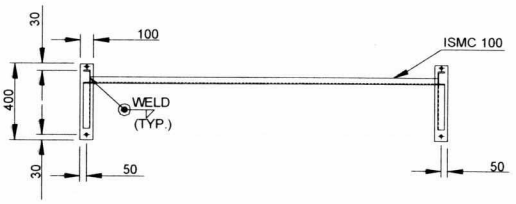
A. SUPPORT DETAILS FOR THREE JUNCTION BOXES



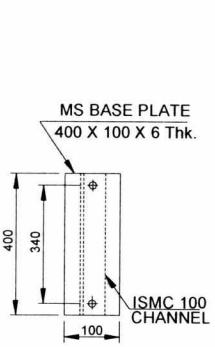
FOR THREE JB



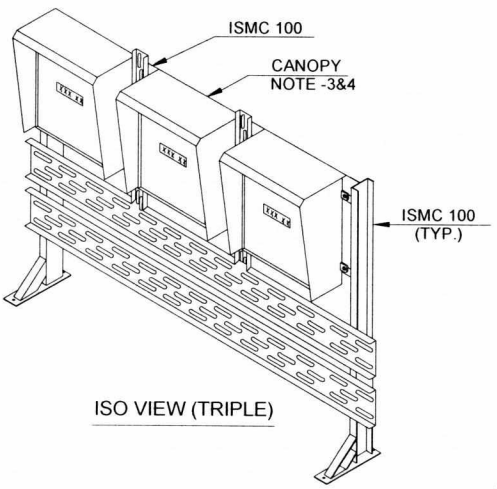
SIDE VIEW



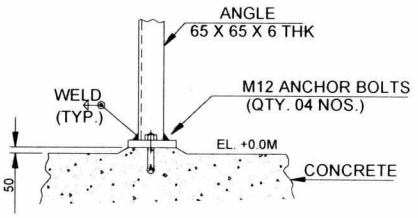
SECTION "A-A"



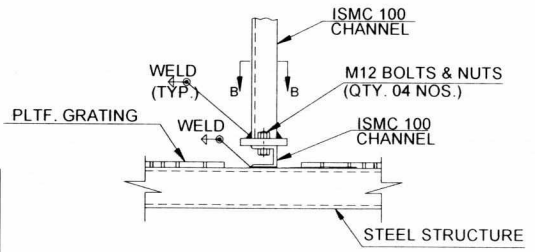
SECTION B-B MOUNTING
ON PLATFORM



ISO VIEW (TRIPLE)



MOUNTING ON PAVED AREA
(WITH ANCHOR FASTNER)
TYPE - A



MOUNTING ON PLATFORM
TYPE-B

BOM:-

S. NO.	ITEM DESCRIPTION	QTY.	UOM
1	ISMC 100 M.S. CHANNEL	9.5	Meter
2	CABLE TRAY (300 W x 40 D)	4.2	Meter
3	CABLE TRAY (100 W x 40 D)	1.15	Meter
4	MS BASE PLATE (400 x 100 x 6 thk.)	2	NOs.

NOTE:
1. ALL DIMENSIONS ARE IN mm.
2. CURRENT LENGTH ESTIMATE DONE CONSIDERING CANOPY WIDTH OF 500mm.
   ACTUAL LENGTH SHALL BE FINALIZED BASED ON ACTUAL JUNCTION BOX & CORRESPONDING CANOPY DIMENSIONS.
3. PREFARBRICATED FRP CANOPY SHALL BE USED.
4. CANOPY SHALL BE SUITABLE FOR JB FRAME. REFER FABRICATED CANOPY FOR INSTRUMENT, STANDARD NO. 7-52-0105.
5. IN CASE THE JB SUPPORTS ARE MOUNTED ON GROUND IN UNPAVED AREA, LOCAL FOUNDATION SHALL BE PROVIDED.
6. CANOPY FABRICATOR SHALL ENSURE THAT WIDTH AND LENGTH OF CANOPY IS HIGHER THAN THAT OF JUNCTION BOX WIDTH AND LENGTH AND SHALL COVER JUNCTION BOX APPROPRIATELY.
7. THE WELDING SHALL BE FULL LENGTH ONLY. STITCH WELDING IS NOT ACCEPTABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
0	10.03.2023	ISSUED AS STANDARD	MJ/SM	AJS	MN	SM

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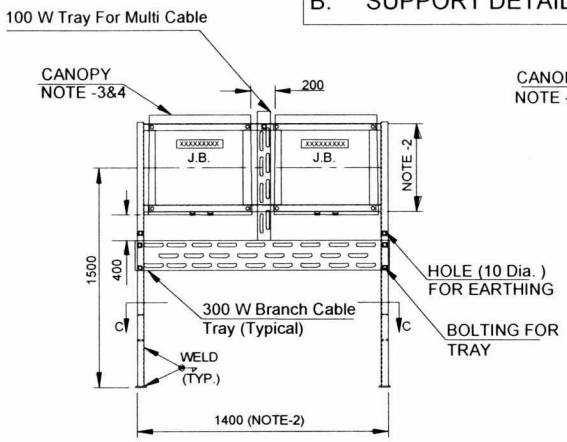
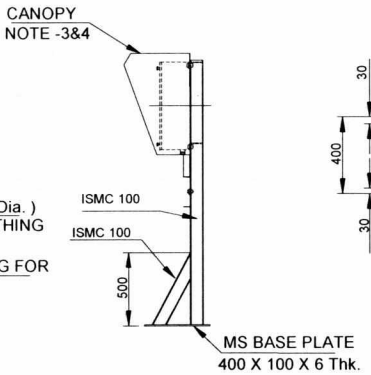
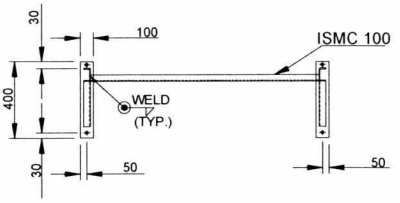
B. SUPPORT DETAILS FOR TWO JUNCTION BOXES



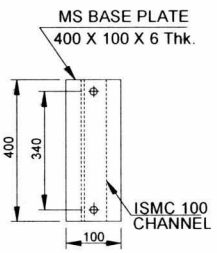
FOR DOUBLE JB



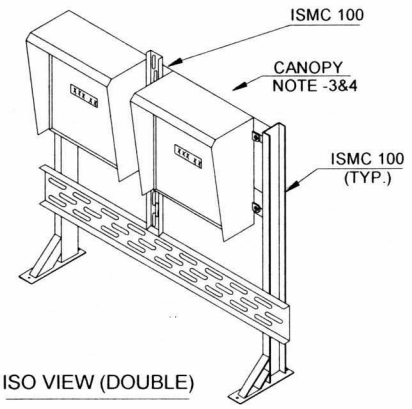
SIDE VIEW



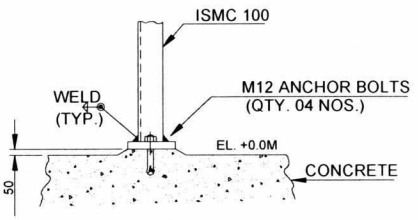
SECTION "C-C"



SECTION D-D MOUNTING
ON PLATFORM



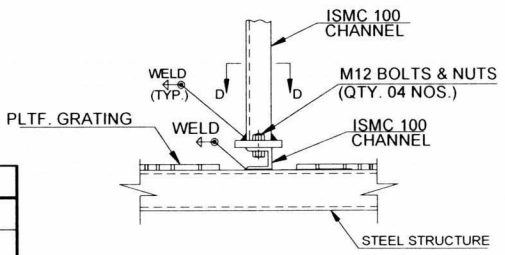
ISO VIEW (DOUBLE)



MOUNTING ON PAVED AREA
(WITH ANCHOR FASTNER)
TYPE - A

BOM:-

S. NO.	ITEM DESCRIPTION	QTY.	UOM
1	ISMC 100 M.S. CHANNEL	8.1	Meter
2	CABLE TRAY (300 W x 40 D)	1.4	Meter
3	CABLE TRAY (100 W x 40 D)	0.9	Meter
4	MS BASE PLATE (400 x 100 x 6 thk.)	2	NOs.



MOUNTING ON PLATFORM
TYPE-B

NOTE:
1. ALL DIMENSIONS ARE IN mm.
2. CURRENT LENGTH ESTIMATE DONE CONSIDERING CANOPY WIDTH OF 500mm.
   ACTUAL LENGTH SHALL BE FINALIZED BASED ON ACTUAL JUNCTION BOX & CORRESPONDING CANOPY DIMENSIONS.
3. PREFARBRICATED FRP CANOPY SHALL BE USED.
4. CANOPY SHALL BE SUITABLE FOR JB FRAME. REFER FABRICATED CANOPY FOR INSTRUMENT, STANDARD NO. 7-52-0105.
5. IN CASE THE JB SUPPORTS ARE MOUNTED ON GROUND IN UNPAVED AREA, LOCAL FOUNDATION SHALL BE PROVIDED.
6. CANOPY FABRICATOR SHALL ENSURE THAT WIDTH AND LENGTH OF CANOPY IS HIGHER THAN THAT OF JUNCTION BOX WIDTH AND LENGTH AND SHALL COVER JUNCTION BOX APPROPRIATELY.
7. THE WELDING SHALL BE FULL LENGTH ONLY. STITCH WELDING IS NOT ACCEPTABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
0	10.03.2023	ISSUED AS STANDARD	MJ/SM	AJS	MN	SM

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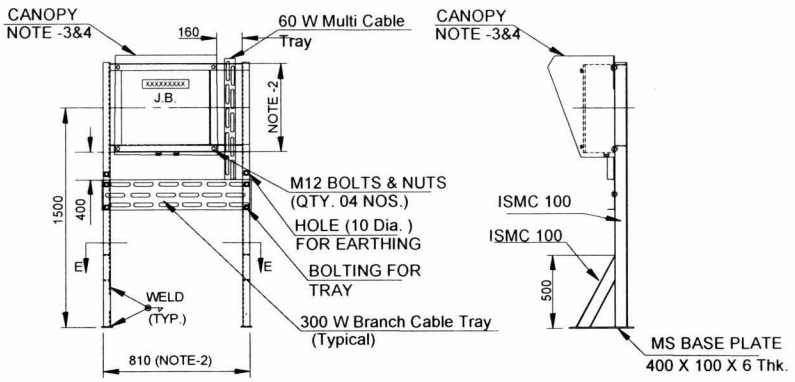
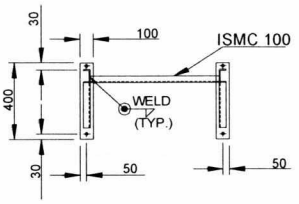
C. SUPPORT DETAILS FOR SINGLE JUNCTION BOX

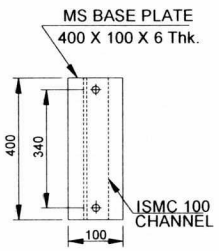


FOR SINGLE JB

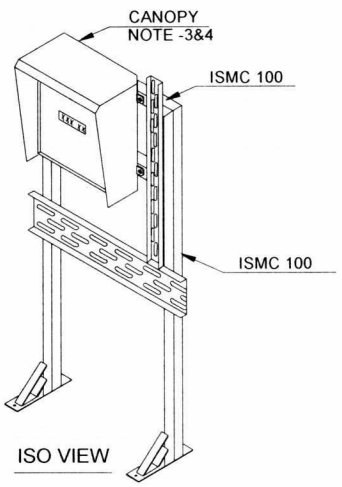
SIDE VIEW



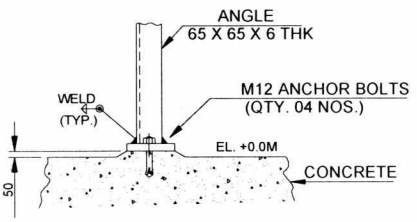
SECTION "E-E"



SECTION D-D MOUNTING
ON PLATFORM



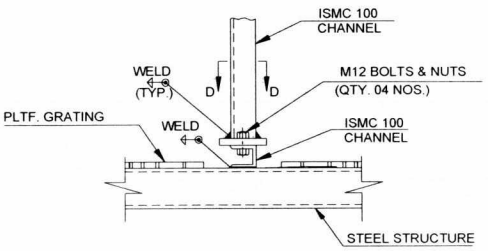
ISO VIEW



MOUNTING ON PAVED AREA
(WITH ANCHOR FASTNER)
TYPE - A

BOM:-

S. NO.	ITEM DESCRIPTION	QTY.	UOM
1	ISMC 100 M.S. CHANNEL	6.92	Meter
2	CABLE TRAY (300 W x 40 D)	0.81	Meter
3	CABLE TRAY (60 W x 40 D)	0.9	Meter
4	MS BASE PLATE (400 x 100 x 6 thk.)	2	NOs.



MOUNTING ON PLATFORM
TYPE-B

NOTE:
1. ALL DIMENSIONS ARE IN mm.
2. CURRENT LENGTH ESTIMATE DONE CONSIDERING CANOPY WIDTH OF 500mm.
   ACTUAL LENGTH SHALL BE FINALIZED BASED ON ACTUAL JUNCTION BOX & CORRESPONDING CANOPY DIMENSIONS.
3. PREFARBRICATED FRP CANOPY SHALL BE USED.
4. CANOPY SHALL BE SUITABLE FOR JB FRAME. REFER FABRICATED CANOPY FOR INSTRUMENT, STANDARD NO. 7-52-0105.
5. IN CASE THE JB SUPPORTS ARE MOUNTED ON GROUND IN UNPAVED AREA, LOCAL FOUNDATION SHALL BE PROVIDED.
6. CANOPY FABRICATOR SHALL ENSURE THAT WIDTH AND LENGTH OF CANOPY IS HIGHER THAN THAT OF JUNCTION BOX WIDTH AND LENGTH AND SHALL COVER JUNCTION BOX APPROPRIATELY.
7. THE WELDING SHALL BE FULL LENGTH ONLY. STITCH WELDING IS NOT ACCEPTABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
0	10.03.2023	ISSUED AS STANDARD	MJ/SM	AJS	MN	SM

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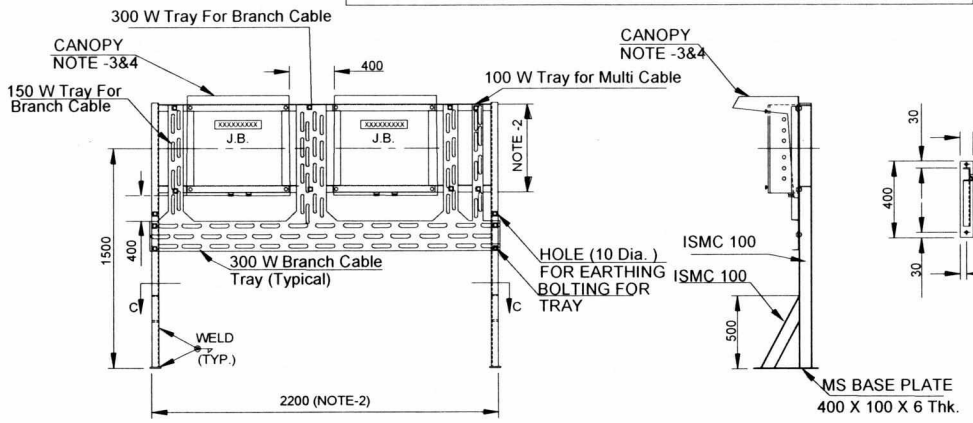
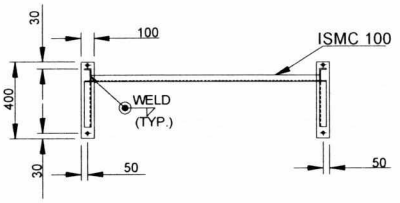
D. SUPPORT DETAILS FOR TWO JUNCTION BOXES

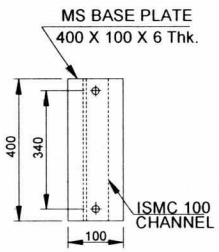


FOR DOUBLE JB

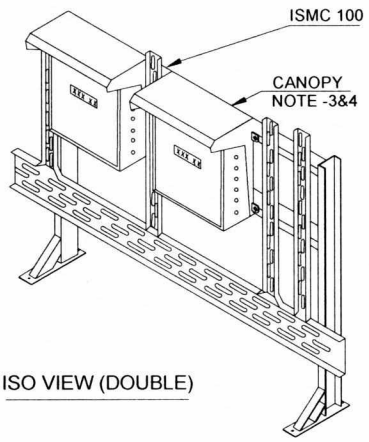
SIDE VIEW



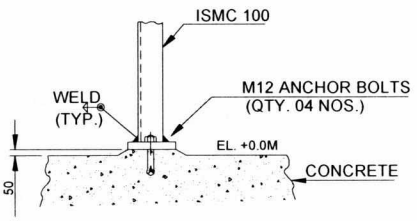
SECTION "C-C"



SECTION D-D MOUNTING
ON PLATFORM



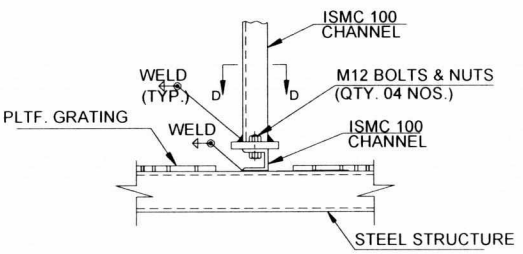
ISO VIEW (DOUBLE)



MOUNTING ON PAVED AREA
(WITH ANCHOR FASTNER)
TYPE - A

BOM:-

S. NO.	ITEM DESCRIPTION	QTY.	UOM
1	ISMC 100 M.S. CHANNEL	9.7	Meter
2	CABLE TRAY (300 W x 40 D)	3.1	Meter
3	CABLE TRAY (150 W x 40 D)	1.8	Meter
4	CABLE TRAY (100 W x 40 D)	0.9	Meter
5	MS BASE PLATE (400 x 100 x 6 thk.)	2	NOs.



MOUNTING ON PLATFORM
TYPE-B

NOTE:
1. ALL DIMENSIONS ARE IN mm.
2. CURRENT LENGTH ESTIMATE DONE CONSIDERING CANOPY WIDTH OF 500mm.
ACTUAL LENGTH SHALL BE FINALIZED BASED ON ACTUAL JUNCTION BOX & CORRESPONDING CANOPY DIMENSIONS.
3. PREFARBRICATED FRP CANOPY SHALL BE USED.
4. CANOPY SHALL BE SUITABLE FOR JB FRAME. REFER FABRICATED CANOPY FOR INSTRUMENT, STANDARD NO. 7-52-0105.
5. IN CASE THE JB SUPPORTS ARE MOUNTED ON GROUND IN UNPAVED AREA, LOCAL FOUNDATION SHALL BE PROVIDED.
6. CANOPY FABRICATOR SHALL ENSURE THAT WIDTH AND LENGTH OF CANOPY IS HIGHER THAN THAT OF JUNCTION BOX WIDTH AND LENGTH AND SHALL COVER JUNCTION BOX APPROPRIATELY.
7. THE WELDING SHALL BE FULL LENGTH ONLY. STITCH WELDING IS NOT ACCEPTABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
0	10.03.2023	ISSUED AS STANDARD	MJ/SM	AJS	MN	SM

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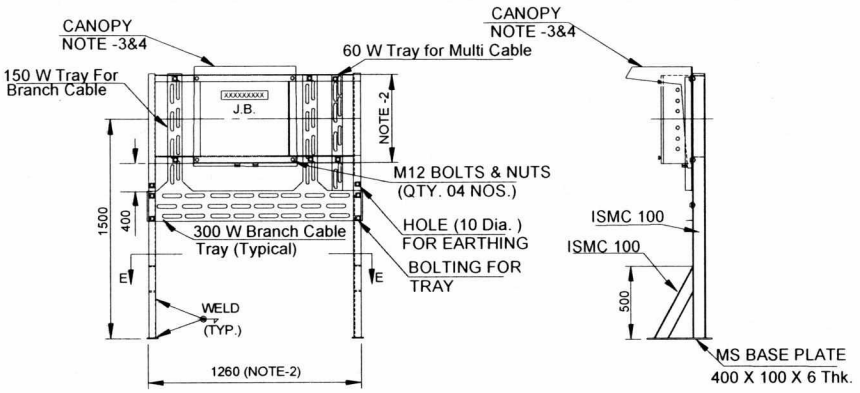
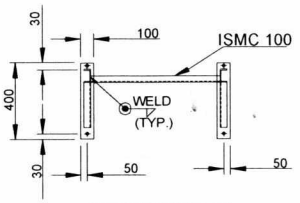
E. SUPPORT DETAILS FOR SINGLE JUNCTION BOX

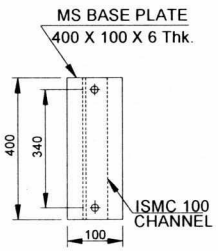


FOR SINGLE JB

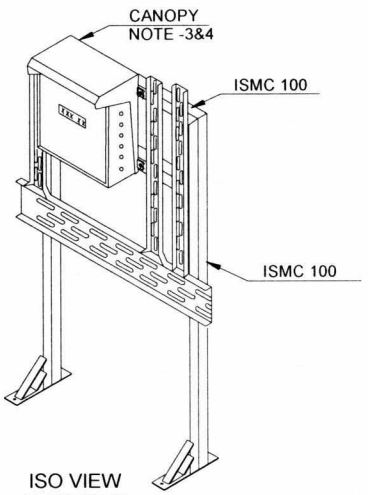
SIDE VIEW



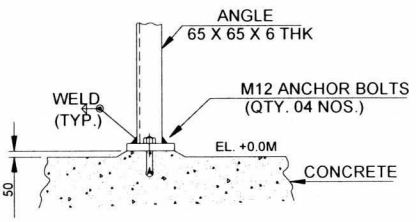
SECTION "E-E"



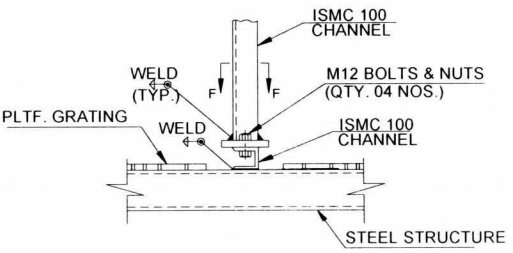
SECTION F-F MOUNTING
ON PLATFORM



ISO VIEW



MOUNTING ON PAVED AREA
(WITH ANCHOR FASTNER)
TYPE - A



MOUNTING ON PLATFORM
TYPE-B

BOM:-

S. NO.	ITEM DESCRIPTION	QTY.	UOM
1	ISMC 100 M.S. CHANNEL	6.82	Meter
2	CABLE TRAY (300 W x 40 D)	1.26	Meter
3	CABLE TRAY (150 W x 40 D)	1.8	Meter
5	CABLE TRAY (60 W x 40 D)	0.9	Meter
4	MS BASE PLATE (400 x 100 x 6 thk.)	2	NOs.

NOTE:
1. ALL DIMENSIONS ARE IN mm.
2. CURRENT LENGTH ESTIMATE DONE CONSIDERING CANOPY WIDTH OF 500mm.
   ACTUAL LENGTH SHALL BE FINALIZED BASED ON ACTUAL JUNCTION BOX & CORRESPONDING CANOPY DIMENSIONS.
3. PREFARBRICATED FRP CANOPY SHALL BE USED.
4. CANOPY SHALL BE SUITABLE FOR JB FRAME. REFER FABRICATED CANOPY FOR INSTRUMENT, STANDARD NO. 7-52-0105.
5. IN CASE THE JB SUPPORTS ARE MOUNTED ON GROUND IN UNPAVED AREA, LOCAL FOUNDATION SHALL BE PROVIDED.
6. CANOPY FABRICATOR SHALL ENSURE THAT WIDTH AND LENGTH OF CANOPY IS HIGHER THAN THAT OF JUNCTION BOX WIDTH AND LENGTH AND SHALL COVER JUNCTION BOX APPROPRIATELY.
7. THE WELDING SHALL BE FULL LENGTH ONLY. STITCH WELDING IS NOT ACCEPTABLE.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
0	10.03.2023	ISSUED AS STANDARD	MJ/SM	AJS	MN	SM

Approved by

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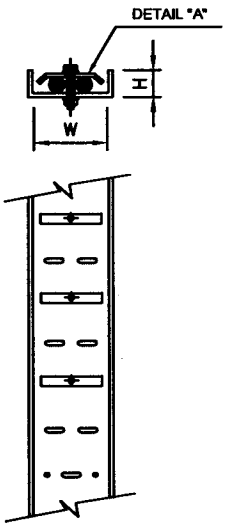
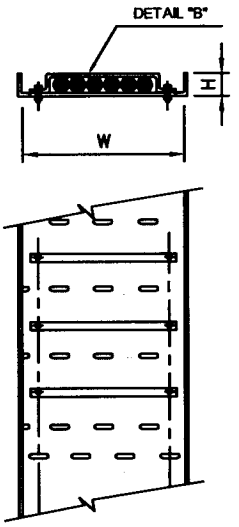
CABLE CLAMPING ON PERFORATED TRAYS (GALVANISED MILD STEEL / ANODIZED ALUMINIUM)

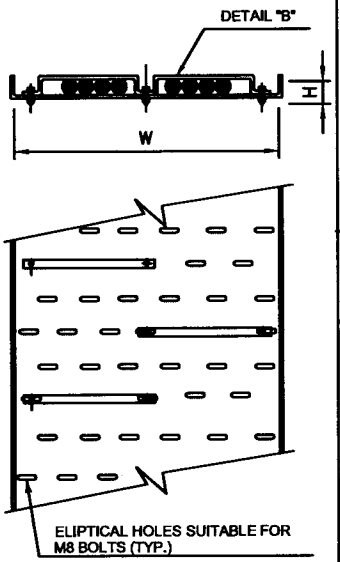
SINGLE CLAMPING FOR TWO CABLES



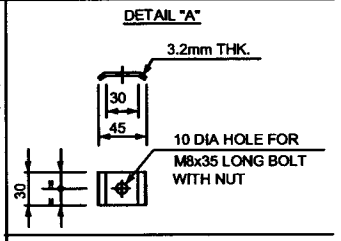
SINGLE CLAMPING FOR MULTIPLE CABLES

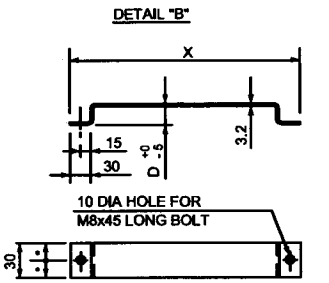


DUAL CLAMPING FOR MULTIPLE CABLES



CABLE CLAMPS DETAIL





"WHERE "W" DENOTES THE INSIDE WIDTH OF TRAY

D = CABLE OVERALL DIA.

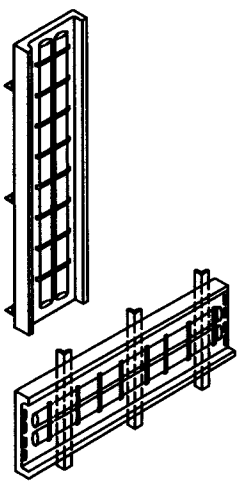
WHERE

X = W-10 FOR SINGLE CLAMPING

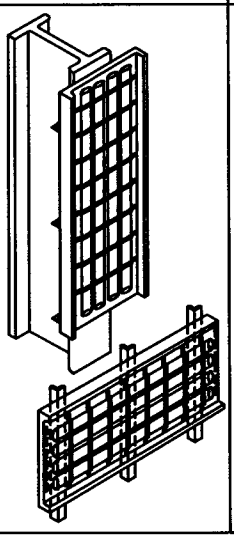
= $\frac{W}{2}$ - 10 FOR DUAL CLAMPING

PERFORATED TRAY - SUPPORTING DETAILS

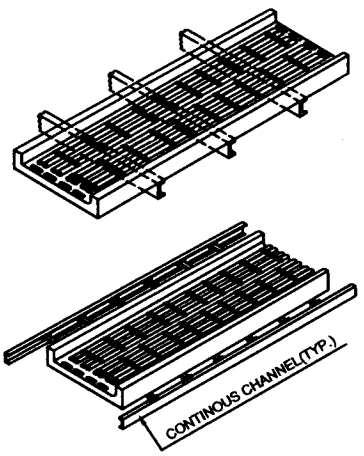
TRAY ROUTING EDGEWISE HOR. / VER. RUNS



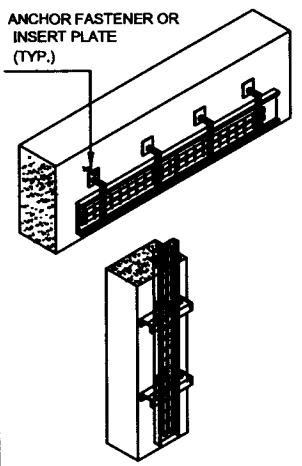
TRAY ROUTING EDGEWISE IN HOR. / VER. RUNS



TRAY ROUTING WIDTHWISE IN HORIZONTAL RUNS



TRAY ROUTING CONCRETE BEAM/COLUMN IN HOR. / VER. PLANE



NOTES :-

1. ALL DIMENSIONS ARE IN mm.
2. PERFORATED TRAYS SHALL BE SUPPORTED AT EVERY 1000 mm (TYP.) INTERVAL FOR HORIZONTAL AS WELL AS VERTICAL RUNS USING MINIMUM ANGLE SIZE AS 50x50x6 OR CONTINOUS CHANNEL SUPPORT MC50
3. CLAMPING OF CABLES ON PERFORATED TRAYS SHALL BE AT EVERY 500 mm ON VERTICAL RUNS AND EVERY 1000 mm ON HORIZONTAL RUNS.
4. PERFORATED TRAYS SHALL BE SUPPLIED WITH CLAMPS, BOLTS/NUTS AND DOUBLE WASHERS OF GALVANISED MILD STEEL DR ALUMINIUM AS PER TRAY MATERIAL.
5. GALVANISING SHALL BE AS PER IS 4759 (66 µm/ 460 g / m2) AND ALUMINIUM ANODIZING SHALL BE MINIMUM 20µm THICK.
6. THE PERFORATED TRAY THICKNESS SHALL BE 2.5 mm.
7. TRAY STANDARD LENGTH SHALL BE 2.5 mtr.

CAPACITY OF PERFORATED TRAYS

TRAY WIDTH (W)	FLANGE HEIGHT (H)	NO. OF CABLES		
		1 PAIR/ 1 TRIAD	6 PAIR/ 6 TRIAD	12 PAIR/ 8TRIAD
60	30	2	1	-
60	40	-	-	1
100	40	4	2	2
150	40	6	4	3
300	40	15	8	6

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
4	03.11.21	Revised & Reissued	Saurav	MN	MN	SM
3	28.03.17	Reaffirmed & Reissued	Manoj	MN	RG	RN

Approved by

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DUCT FABRICATION DETAILS FOR
INSTRUMENTATION CABLES

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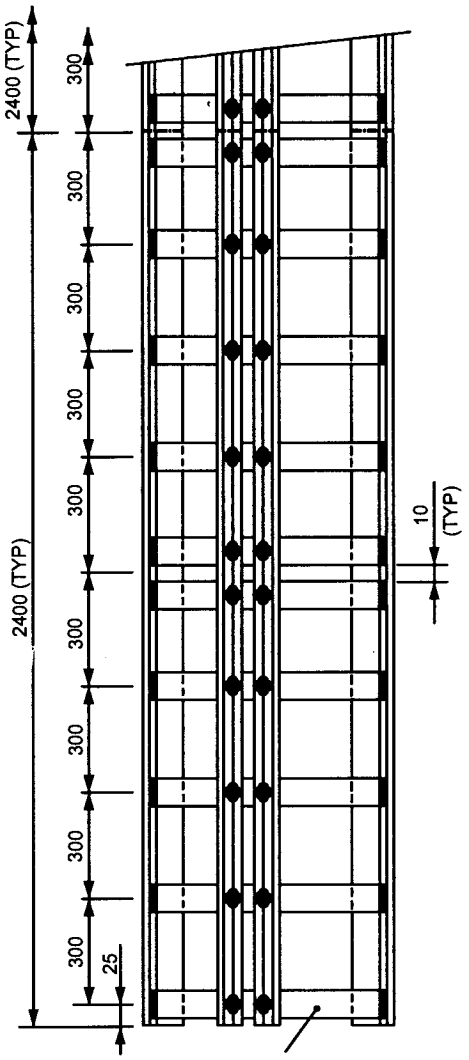
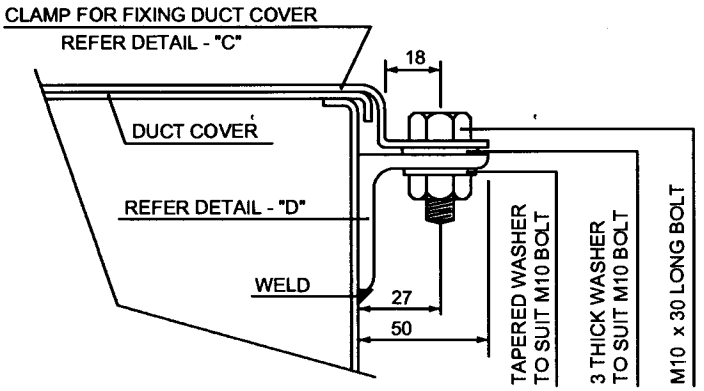
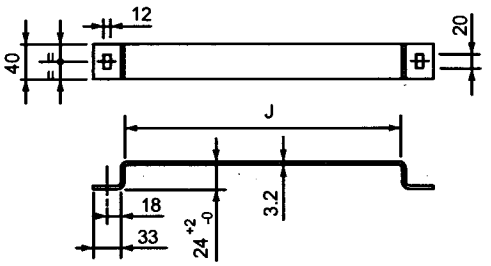


FLAT 40W x 6t FOR W 800 mm
FLAT 50W x 10t FOR W 1000 mm

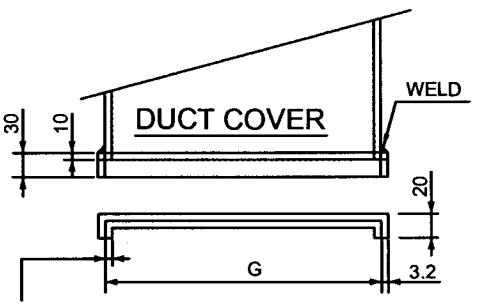
VIEW A-A



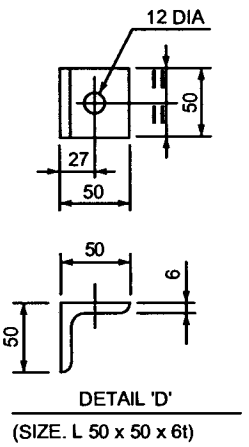
ASSEMBLY OF DUCT BODY WITH COVER



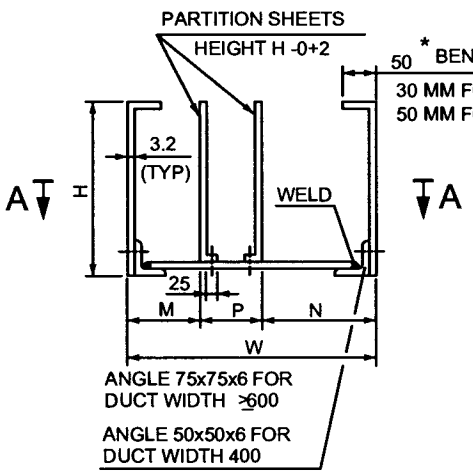
CLAMP FOR FIXING DUCT COVER
DETAIL 'C'



COVER SHEET THICKNESS :
2.3 FOR DUCT WIDTH 400, 600
3.2 FOR DUCT WIDTH 800 AND ABOVE



DETAIL 'D'
(SIZE. L 50 x 50 x 6t)



DUCT BODY

STRAIGHT RUN OF DUCT

DETAIL 1A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	DM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	DM

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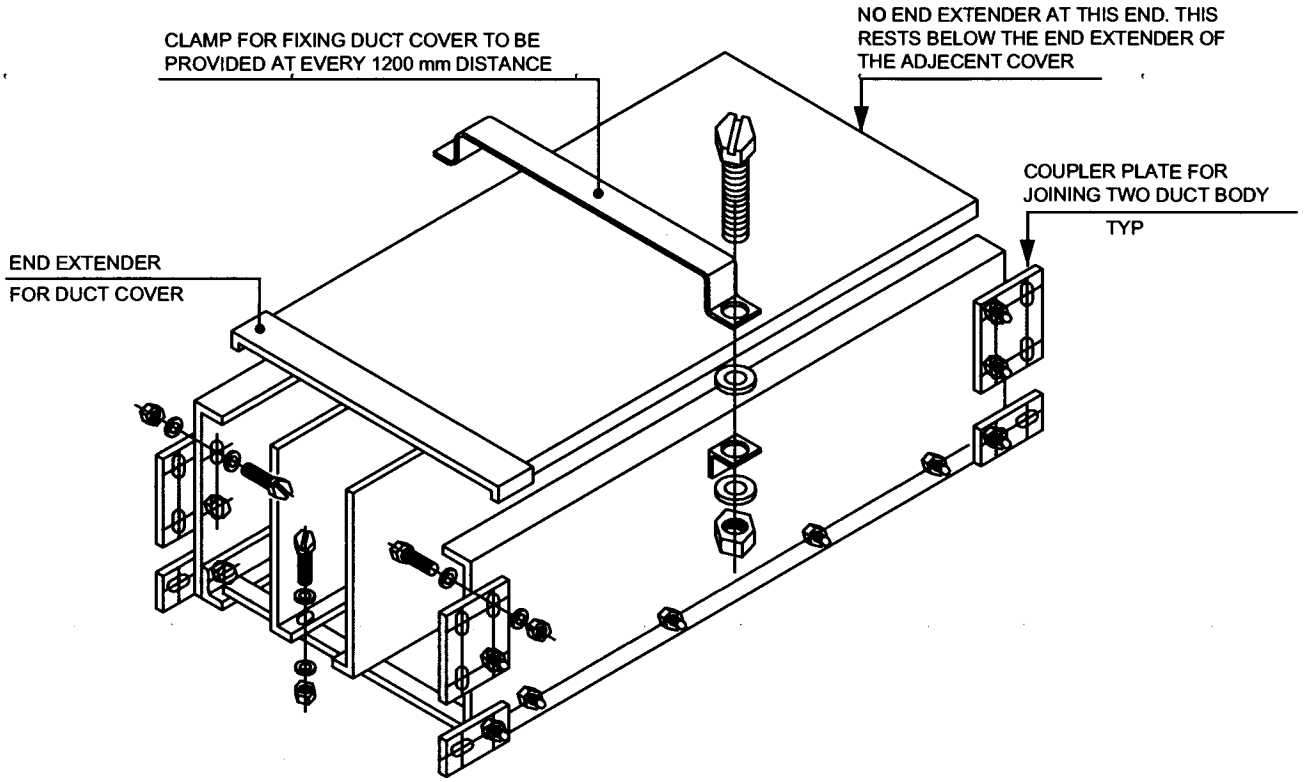

FIXING OF COVER TO DUCT BODY

TABLE – A FOR CABLES ONLY

DETAIL NO.	W	H	M	N	P	G	J
D1-101	1200	400	300	750	150	1210 $^{+0}_{-2}$	1212 $^{+1}_{-}$
D1-102	1000	400	250	600	150	1010 $^{+0}_{-2}$	1012 $^{+1}_{-}$
D1-103	800	300	200	450	150	810 $^{+0}_{-2}$	812 $^{+1}_{-}$
D1-104	600	300	150	300	150	610 $^{+0}_{-2}$	612 $^{+1}_{-}$
D1-105	400	200	100	150	150	410 $^{+0}_{-2}$	412 $^{+1}_{-}$

TABLE - B FOR TUBES / CABLES ONLY

DETAIL NO.	W	H	M	N	P
D1-201	1200	400	200	450	550
D1-202	1000	400	150	350	500
D1-203	800	300	150	300	350
D1-204	600	300	125	200	275
D1-205	400	200	100	150	150

DIMENSIONS G and J AS PER TABLE - A

DIMENSIONAL DETAILS FOR 1A

DETAIL 1B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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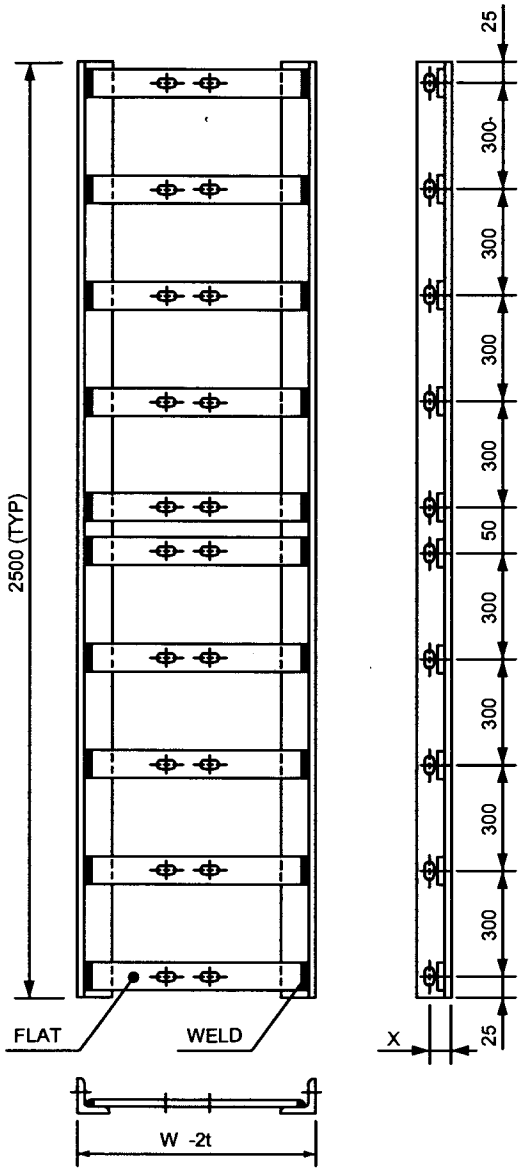
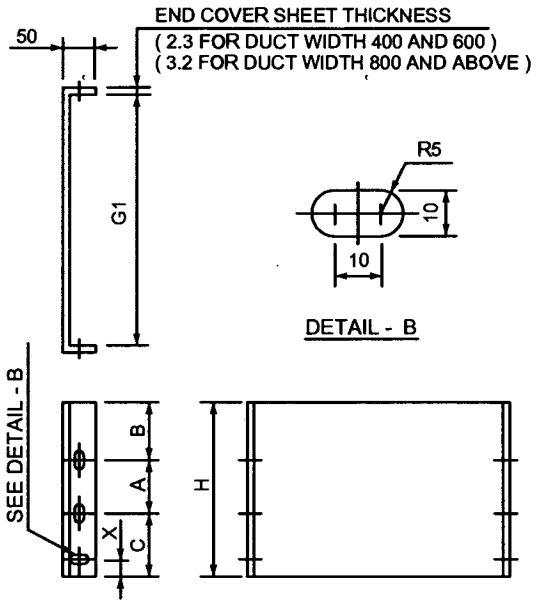
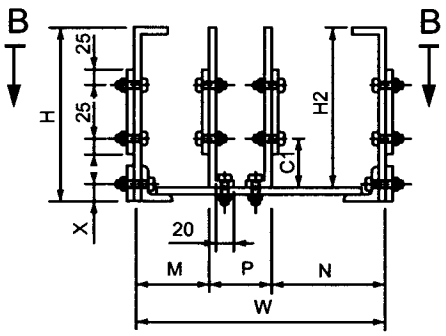


SECTIONAL VIEW P-P



END COVER DETAIL



DUCT BODY BOLTED ASSY.

SECTIONAL VIEW B-B

TABLE FOR FIXING COUPLER PLATES
WITH DUCT SIDES/PARTITION SHEETS

W	A	B	C	F	H2	C1	G1	X
1200	200	80	120	250	384	104	1203	37.5
1000	200	80	120	250	384	104	1003	37.5
800	150	50	100	200	288	88	803	37.5
600	150	50	100	200	288	88	603	37.5
400	75	50	75	125	188	63	403	25

GENERAL BOLTING DETAILS

DETAIL 1C

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
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2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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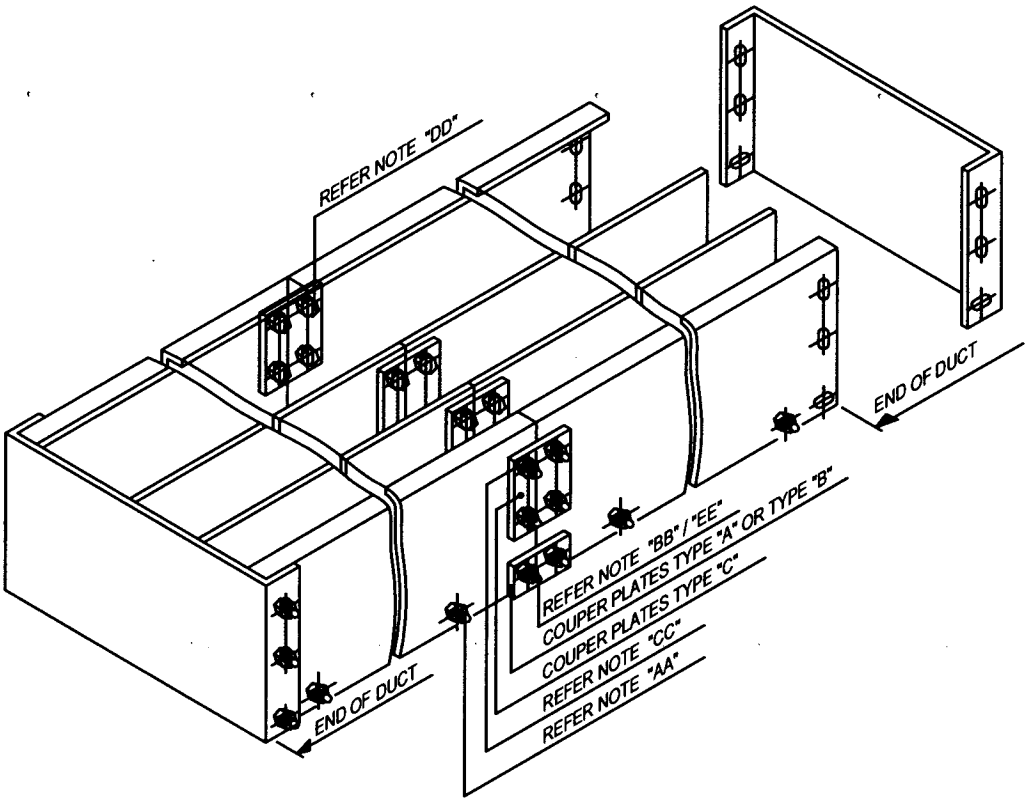
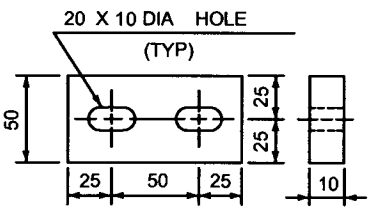
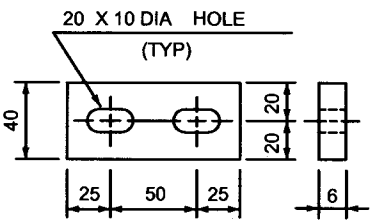


FIXING OF DUCT END COVER BY BOLTING



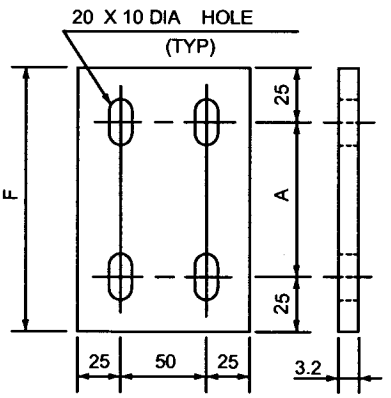
COUPLER PLATE TYPE - A

(FOR DUCT 1000W AND 1200W)



COUPLER PLATE TYPE - B

(FOR DUCT 400W, 600W AND 800W)



COUPLER PLATE TYPE - C

SIZES OF COUPLER PLATE

NOTE "AA" USE GALV. M8X20mm LONG BOLTS WITH SUITABLE NUTS/WASHERS.
NOTE "BB" USE GALV. M8X30mm LONG BOLTS WITH SUITABLE NUTS/WASHERS.
NOTE "CC" USE GALV. M8X20mm LONG BOLTS WITH SUITABLE NUTS/WASHERS.
NOTE "DD" USE GALV. M8X20mm LONG BOLTS WITH SUITABLE NUTS/WASHERS.
NOTE "EE" USE GALV. M8X30mm LONG BOLTS WITH SUITABLE NUTS/WASHERS.

DETAIL 1D

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

Approved by

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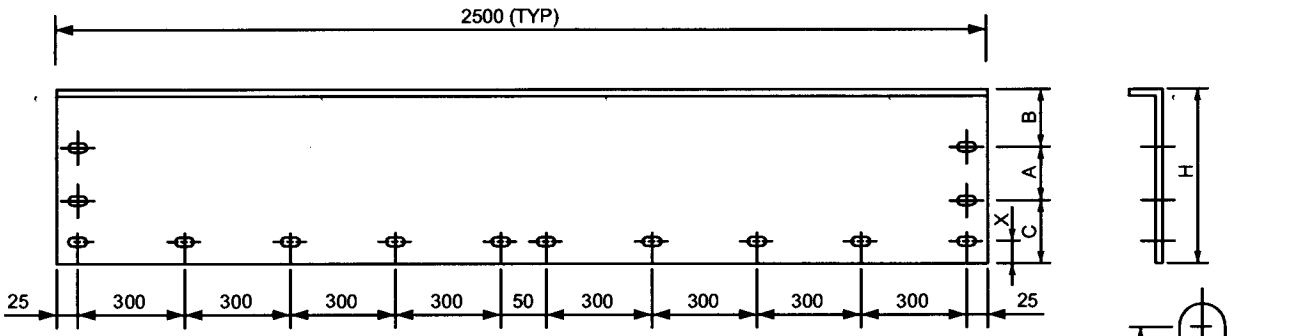
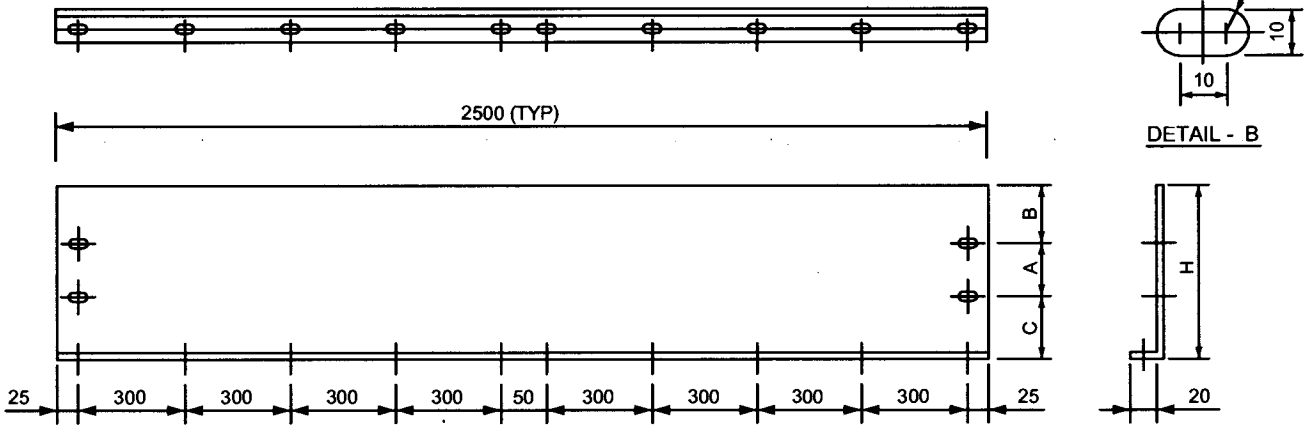
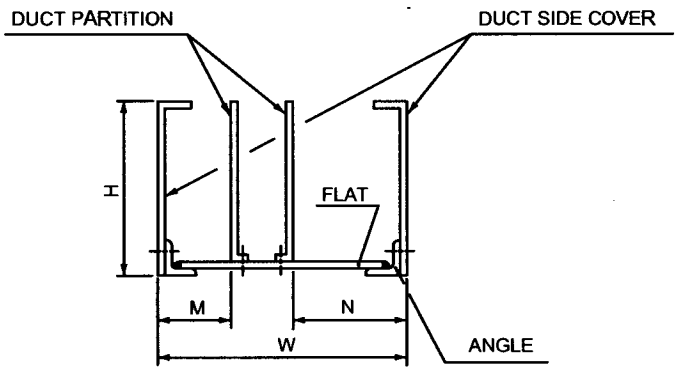


HOLES FOR SIDE COVER DETAIL

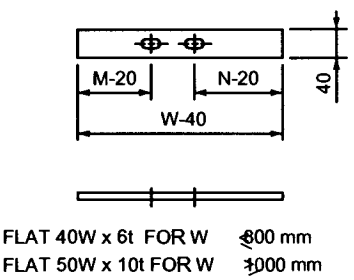
DETAIL - B



HOLES FOR PARTITION SHEET



DUCT BODY



FLAT 40W x 6t FOR W ≤800 mm
FLAT 50W x 10t FOR W >1000 mm

FLAT DETAIL

DETAIL 1E

GENERAL BOLTING DETAILS

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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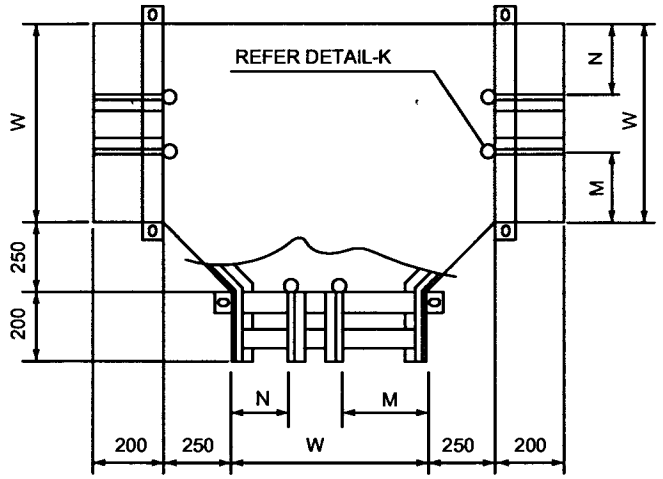
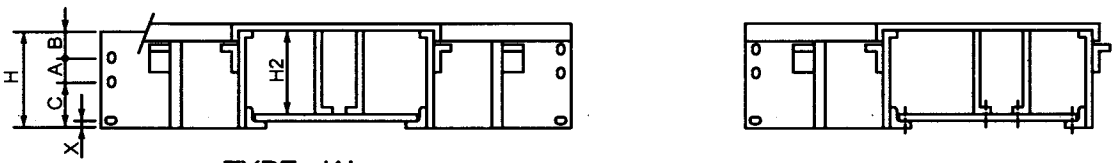
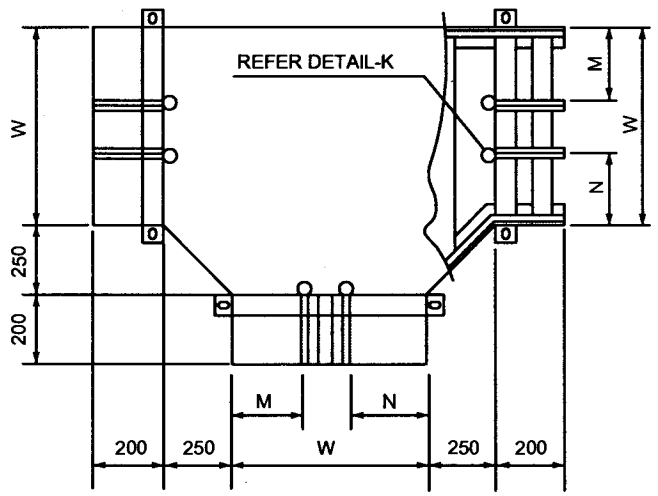
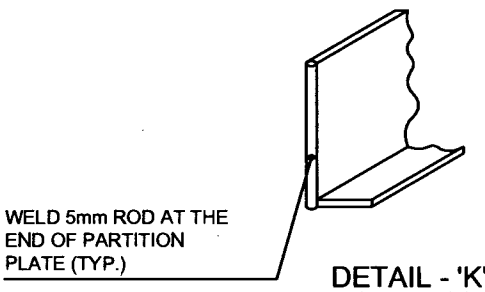




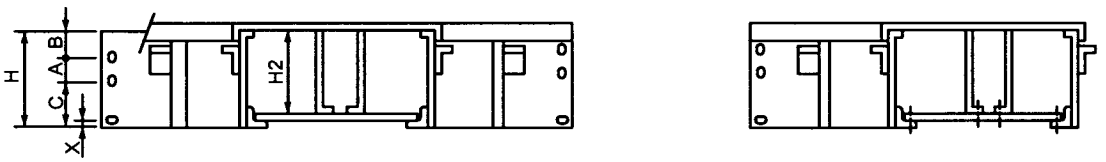
TYPE - 'A'

BRANCH NEAR 'M' PATH





DETAIL - 'K'



TYPE - 'B'

BRANCH NEAR 'N' PATH

DETAIL 2A

DUCT EQUAL TEE

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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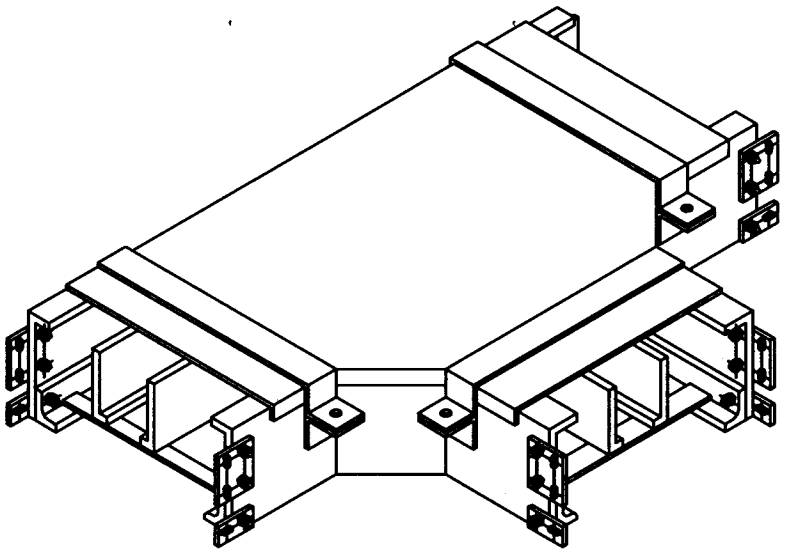

TYPE - A

DETAIL NO.	D2A-101	D2A-102	D2A-103	D2A-104	D2A-105
W	1200	1000	800	600	400
H	400	400	300	300	200

TYPE - B

DETAIL NO.	D2A-201	D2A-202	D2A-203	D2A-204	D2A-205
W	1200	1000	800	600	400
H	400	400	300	300	200

DETAIL 2B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1		REVISED AND REISSUED	Manoj	MN	RG	RN

Approved by

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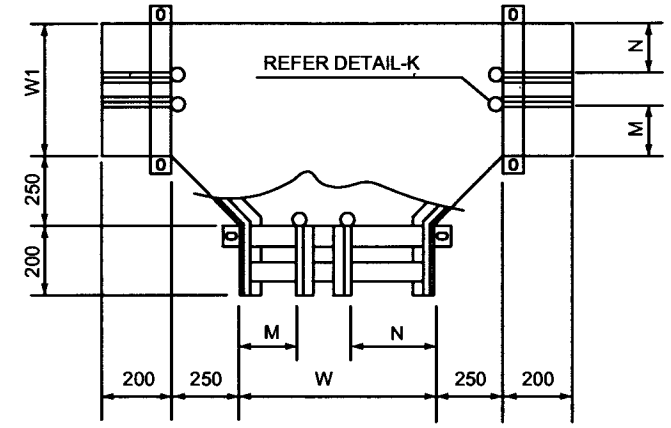
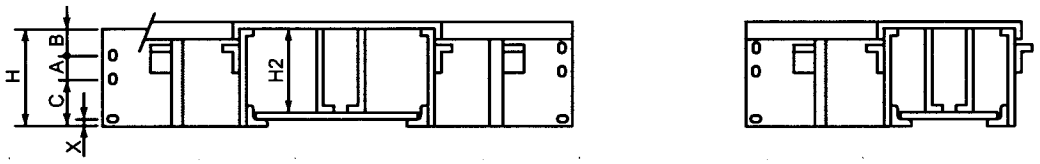
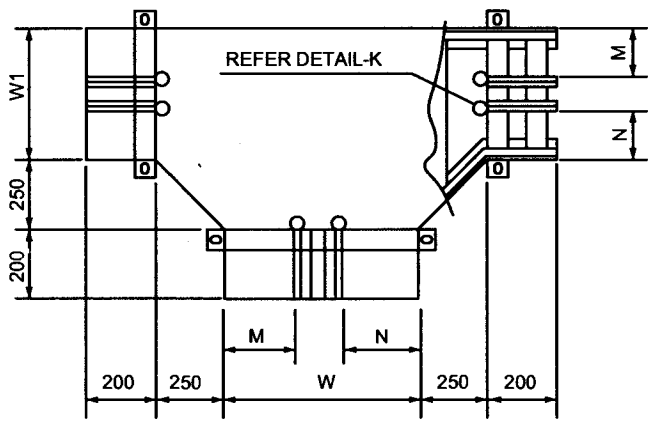
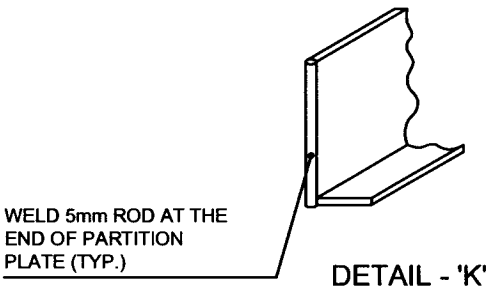




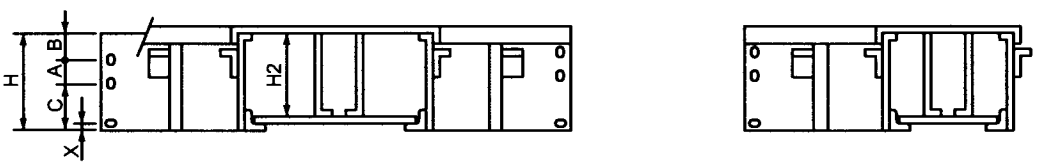
TYPE - 'A'

BRANCH NEAR 'M' PATH





DETAIL - 'K'



TYPE - 'B'

BRANCH NEAR 'N' PATH

DUCT EXPANDER TEE

DETAIL 3A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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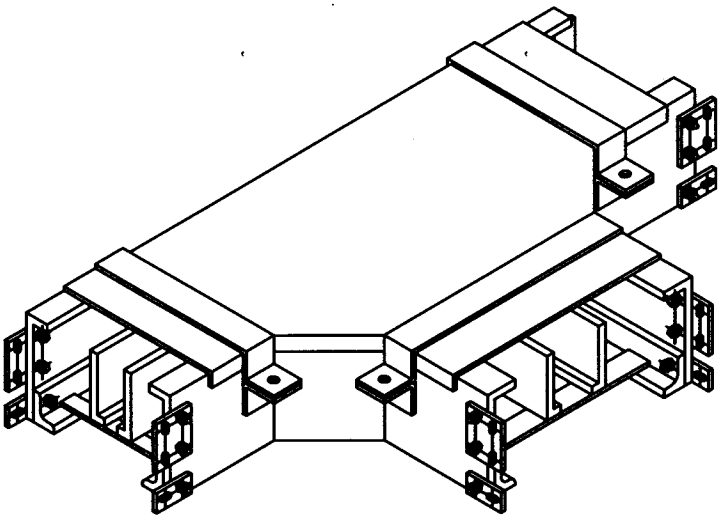

TYPE - A

DETAIL NO.	D2-101	D2-102	D2-103	D2-104	D2-105
W	1200	1200	1000	800	600
W1	800	600	600	400	400
H	400	400	400	300	300

TYPE - B

DETAIL NO.	D2-201	D2-202	D2-203	D2-204	D2-205
W	1200	1200	1000	800	600
W1	800	600	600	400	400
H	400	400	400	300	300

DIMENSIONAL DETAILS FOR 3A

DETAIL 3B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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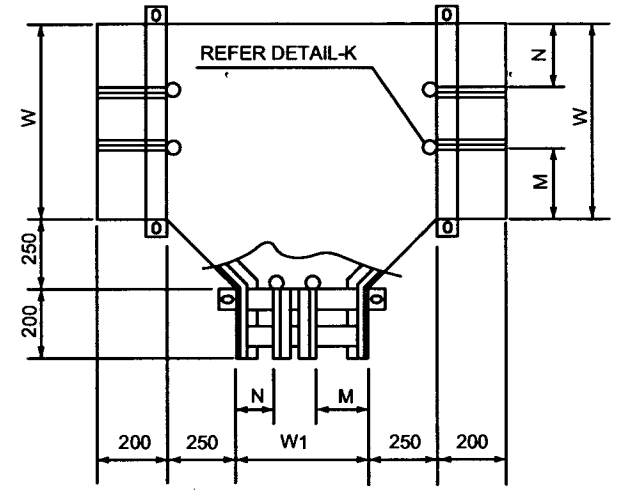
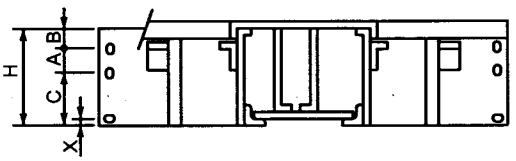
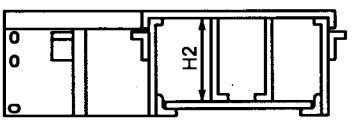
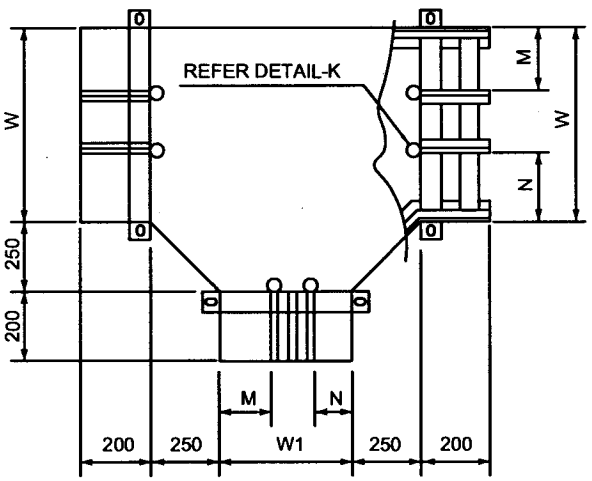


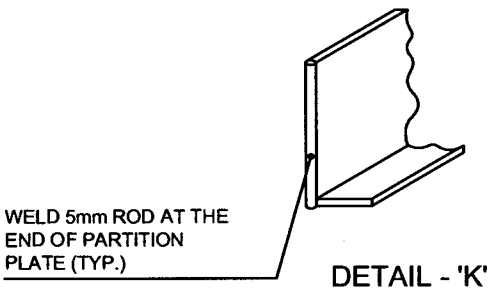




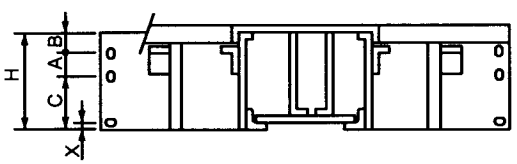
TYPE - 'A'

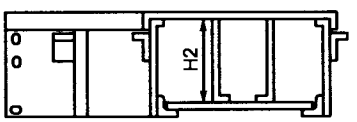
BRANCH NEAR 'M' PATH





DETAIL - 'K'





TYPE - 'B'

BRANCH NEAR 'N' PATH

DUCT REDUCER TEE

DETAIL 4A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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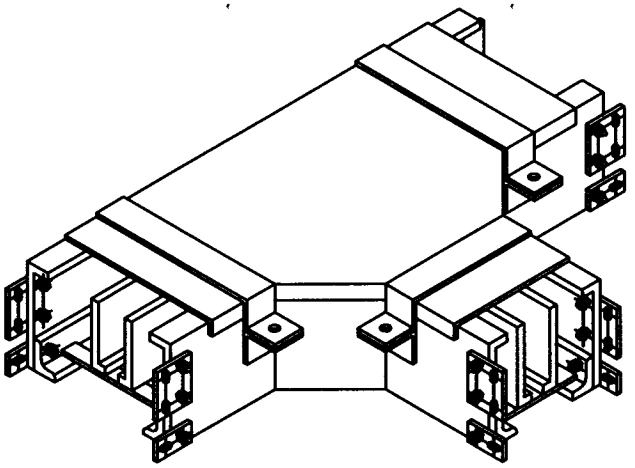

TYPE - A

DETAIL NO.	D3-101	D3-102	D3-103	D3-104	D3-105	D3-106	D3-107
W	1200	1200	1200	1000	1000	800	600
W1	800	600	400	600	400	400	400
H	400	400	400	400	400	300	300

TYPE - B

DETAIL NO.	D3-201	D3-202	D3-203	D3-204	D3-205	D3-206	D3-207
W	1200	1200	1200	1000	1000	800	600
W1	800	600	400	600	400	400	400
H	400	400	400	400	400	300	300

DETAIL 4B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	RJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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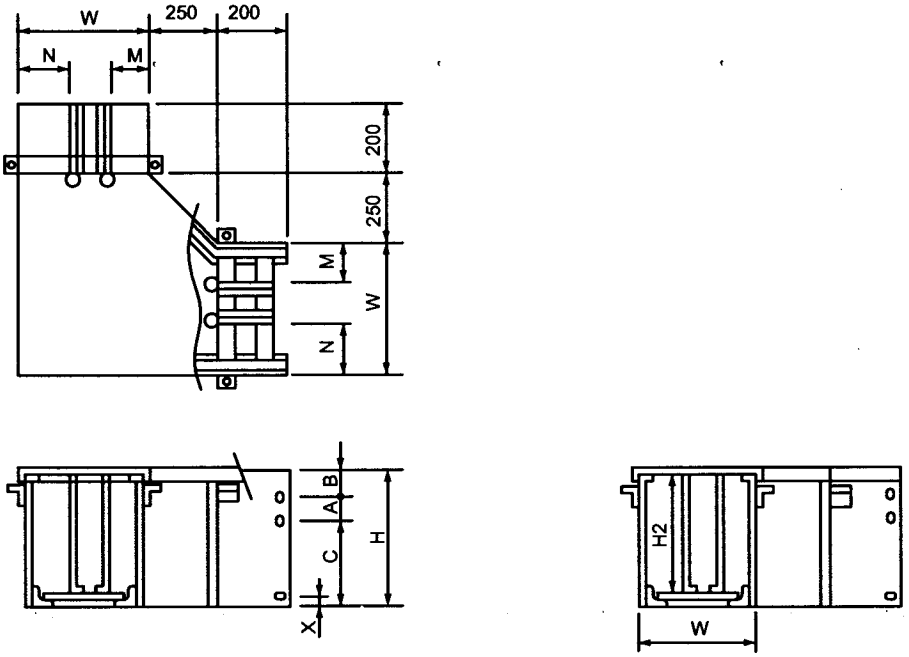
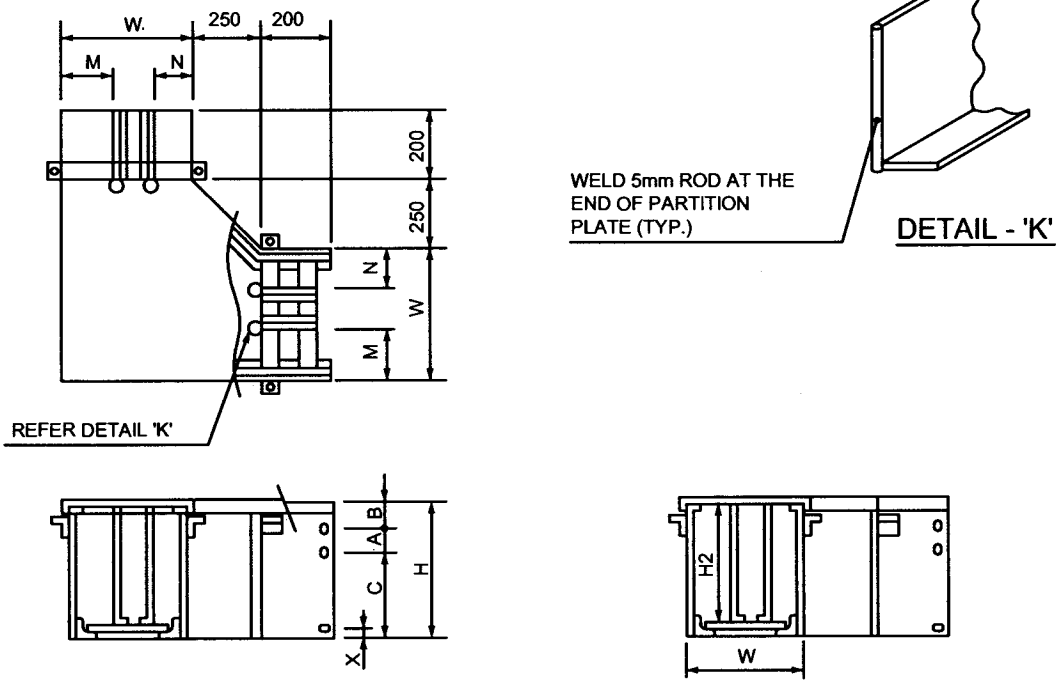


TYPE 'A'



TYPE 'B'

DUCT ELBOW (HORIZONTAL PLANE)

DETAIL 5A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

Approved by

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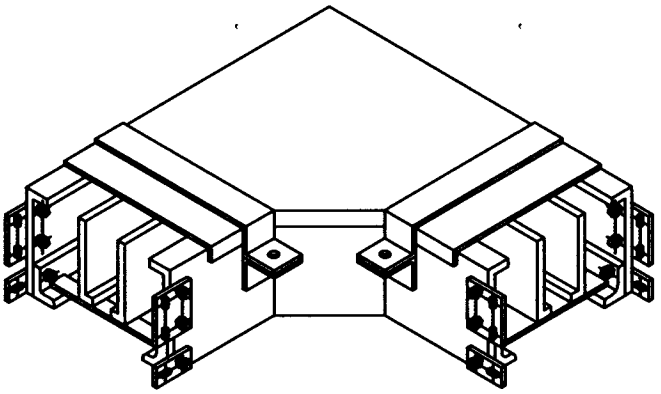

TYPE - A

DETAIL NO.	D5-101	D5-102	D5-103	D5-104	D5-105
W	1200	1000	800	600	400
H	400	400	300	300	200

TYPE - B

DETAIL NO.	D5-201	D5-202	D5-203	D5-204	D5-205
W	1200	1000	800	600	400
H	400	400	300	300	200

DIMENSIONAL DETAILS FOR 5A

DETAIL 5B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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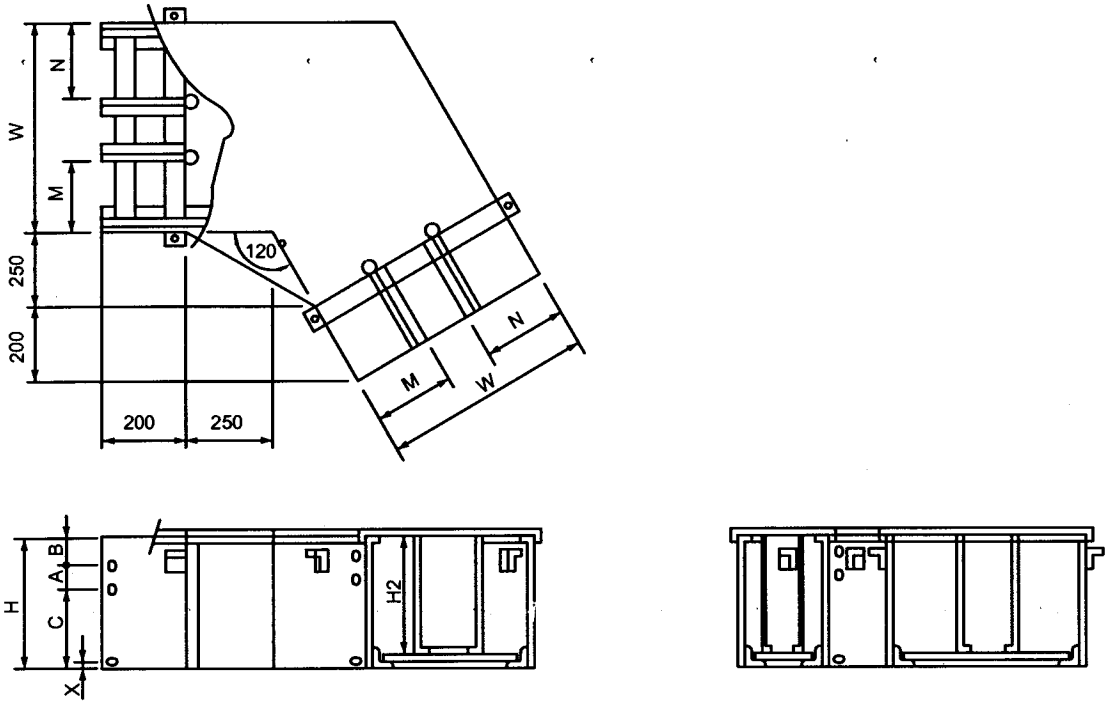
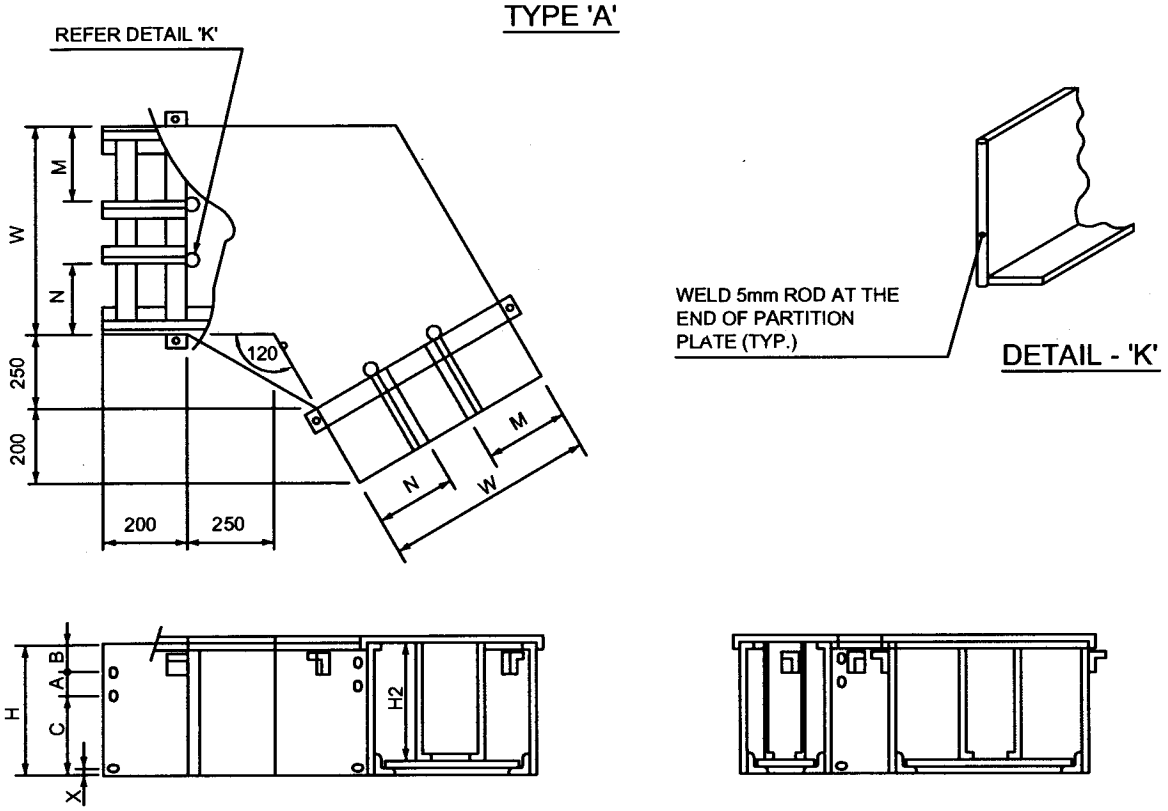


TYPE 'A'



DETAIL - 'K'

TYPE 'B'

DUCT OFFSET BEND

DETAIL 6A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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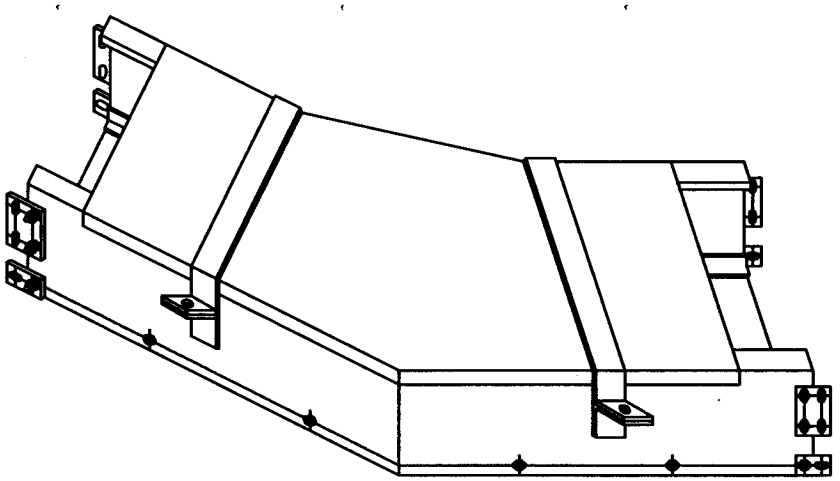

TYPE - A

DETAIL NO.	D8-101	D8-102	D8-103	D8-104	D8-105
W	1200	1000	800	600	400
H	400	400	300	300	200

TYPE - B

DETAIL NO.	D8-201	D8-202	D8-203	D8-204	D8-205
W	1200	1000	800	600	400
H	400	400	300	300	200

DIMENSIONAL DETAILS FOR 6A

DETAIL 6B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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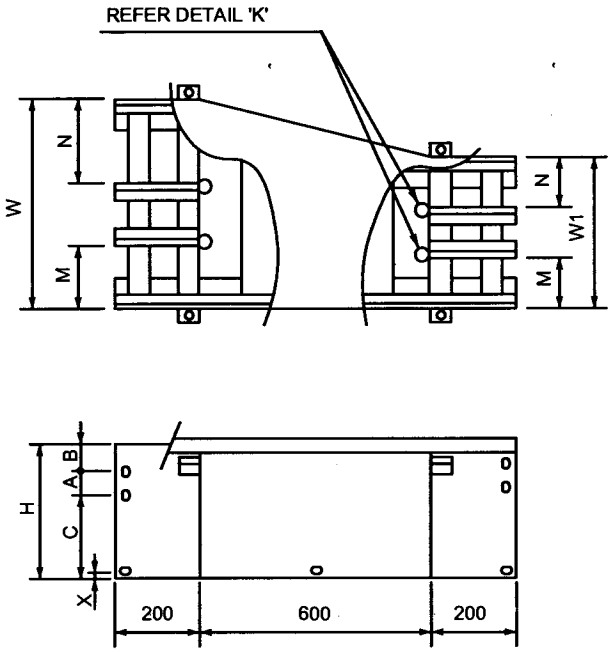
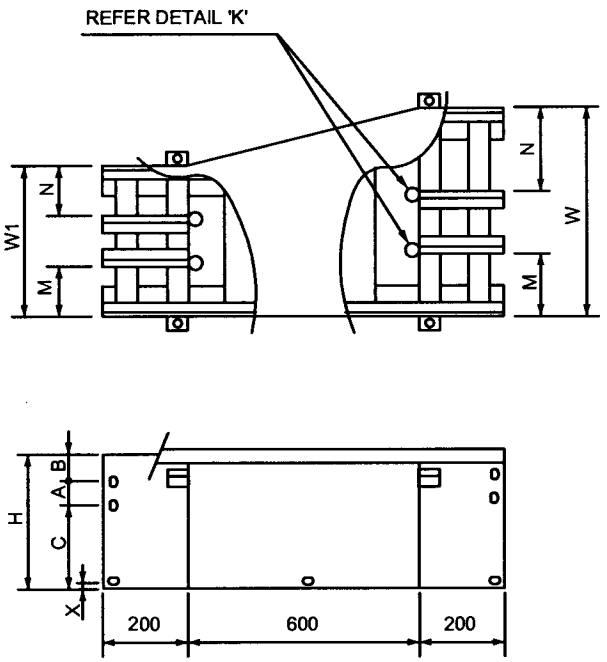
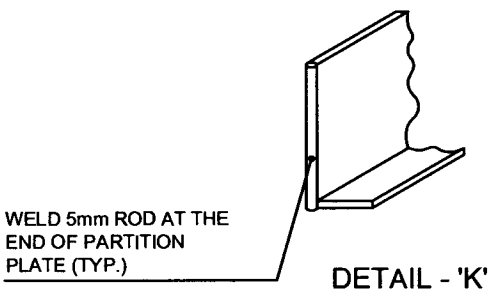


TYPE 'A'





DETAIL - 'K'

TYPE 'B'

DETAIL 7A

DUCT WIDTH REDUCER - 'M' PATH STRAIGHT

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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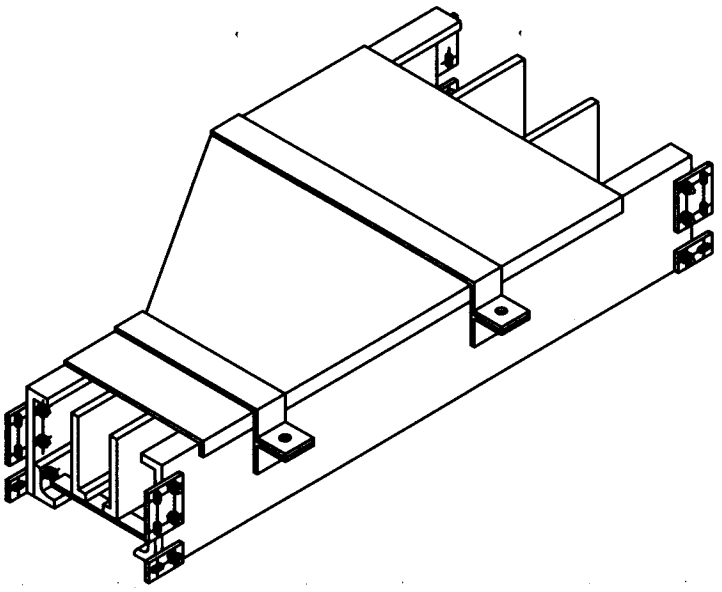

TYPE - A

DETAIL NO.	D7-101	D7-102	D7-103	D7-104	D7-105	D7-106	D7-107
W	1200	1200	1200	1000	1000	800	600
W1	800	600	400	600	400	400	400
H	300	300	200	300	200	200	200

TYPE - B

DETAIL NO.	D7-201	D7-202	D7-203	D7-204	D7-205	D7-206	D7-207
W	1200	1200	1200	1000	1000	800	600
W1	800	600	400	600	400	400	400
H	300	300	200	300	200	200	200

DIMENSIONAL DETAILS FOR 7A

DETAIL 7B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	RJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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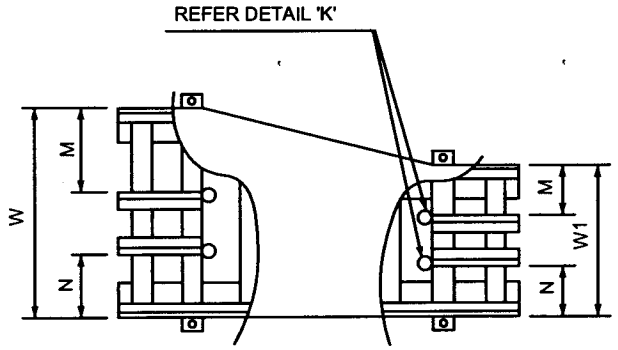
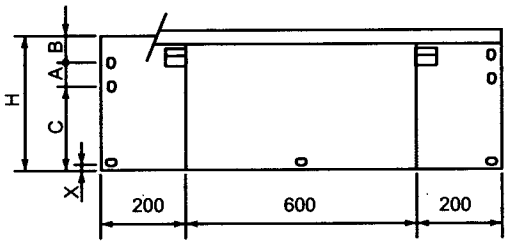
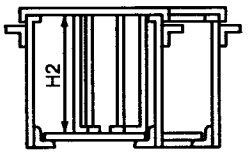
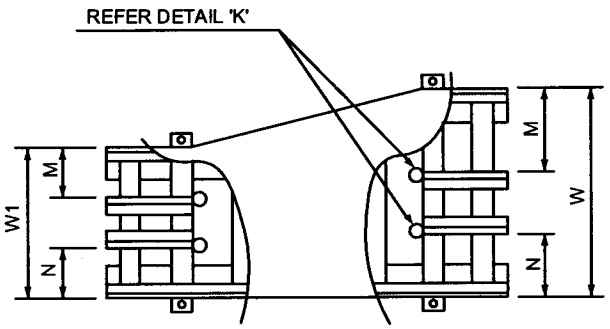
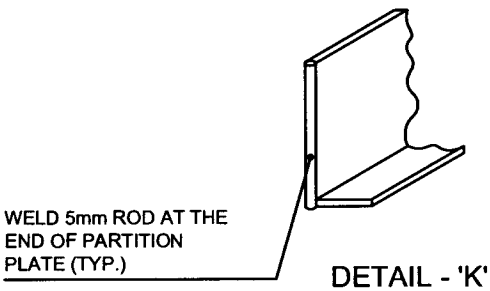




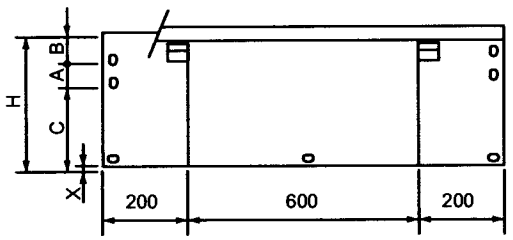


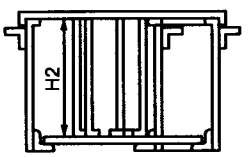
TYPE 'A'





DETAIL - 'K'





TYPE 'B'

DETAIL 7C

DUCT WIDTH REDUCER - 'N' PATH STRAIGHT

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	ABS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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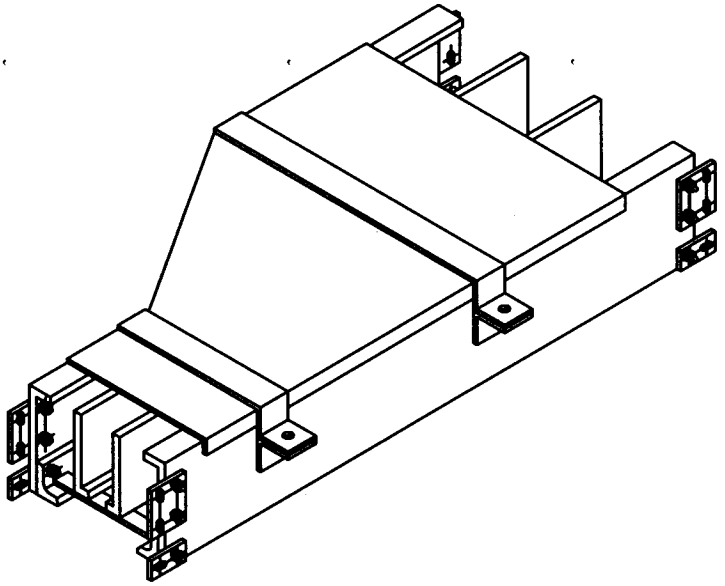

TYPE - A

DETAIL NO.	D7A-101	D7A-102	D7A-103	D7A-104	D7A-105	D7A-106	D7A-107
W	1200	1200	1200	1000	1000	800	600
W1	800	600	400	600	400	400	400
H	300	300	200	300	200	200	200

TYPE - B

DETAIL NO.	D7A-201	D7A-202	D7A-203	D7A-204	D7A-205	D7A-206	D7A-207
W	1200	1200	1200	1000	1000	800	600
W1	800	600	400	600	400	400	400
H	300	300	200	300	200	200	200

DIMENSIONAL DETAILS FOR 7C

DETAIL 7D

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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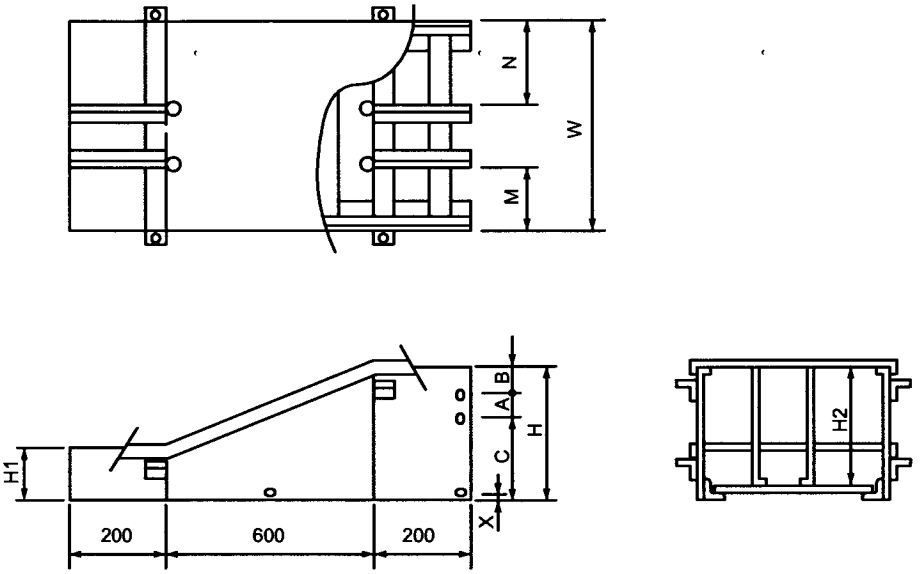
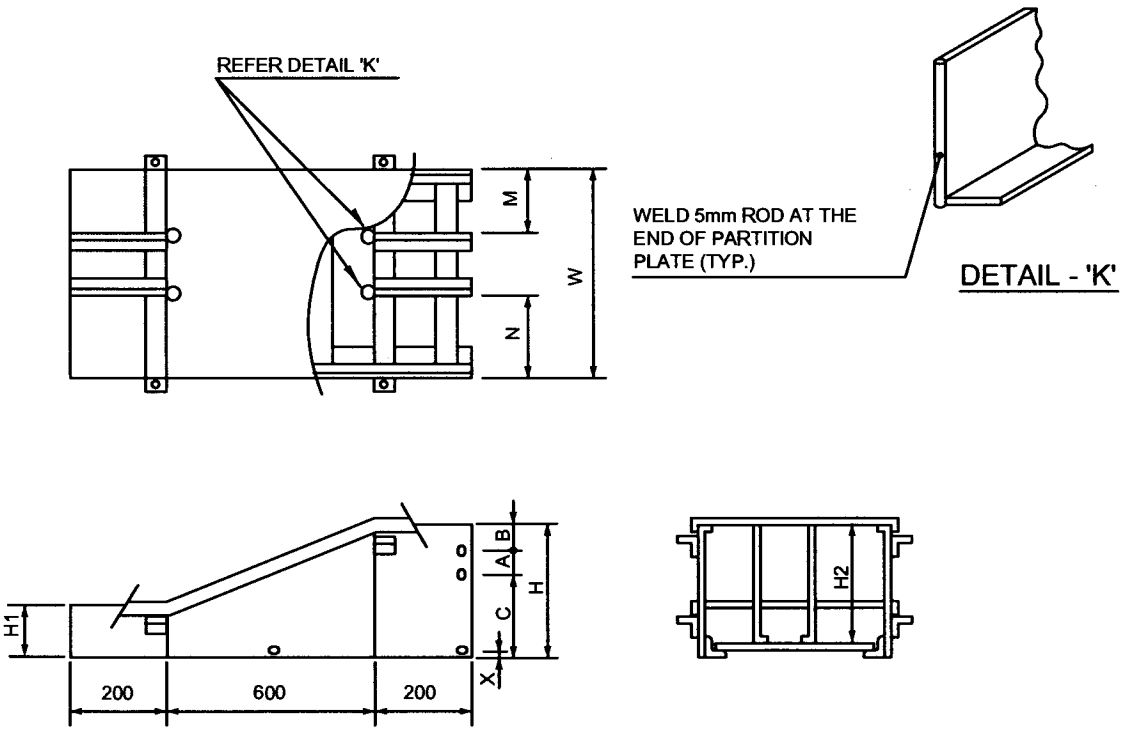


TYPE 'A'



TYPE 'B'

DUCT HEIGHT REDUCER

DETAIL 8A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

Approved by

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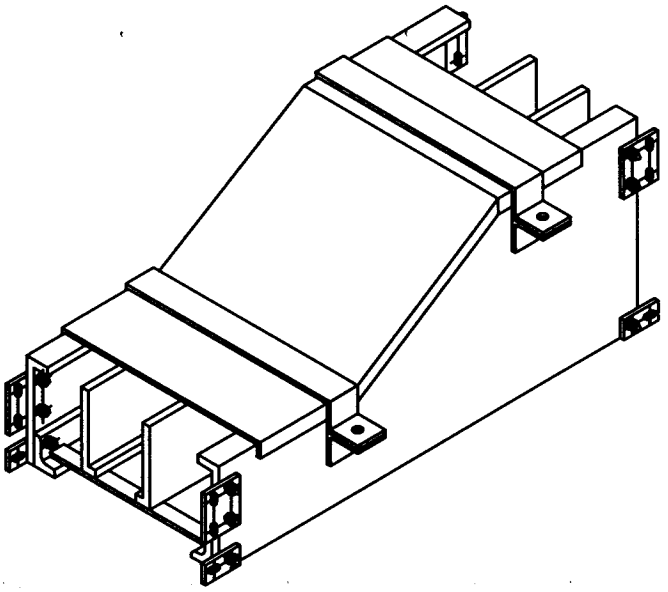

TYPE - A

DETAIL NO.	D6-101	D6-102	D6-103	D6-104	D6-105	D6-106	D6-107
W	1200	1200	1000	1000	800	600	400
H	400	400	400	400	300	300	300
H1	300	200	300	200	200	200	200

TYPE - B

DETAIL NO.	D6-201	D6-202	D6-203	D6-204	D6-205	D6-206	D6-207
W	1200	1200	1000	1000	800	600	400
H	400	400	400	400	300	300	300
H1	300	200	300	200	200	200	200

DIMENSIONAL DETAILS FOR 8A

DETAIL 8B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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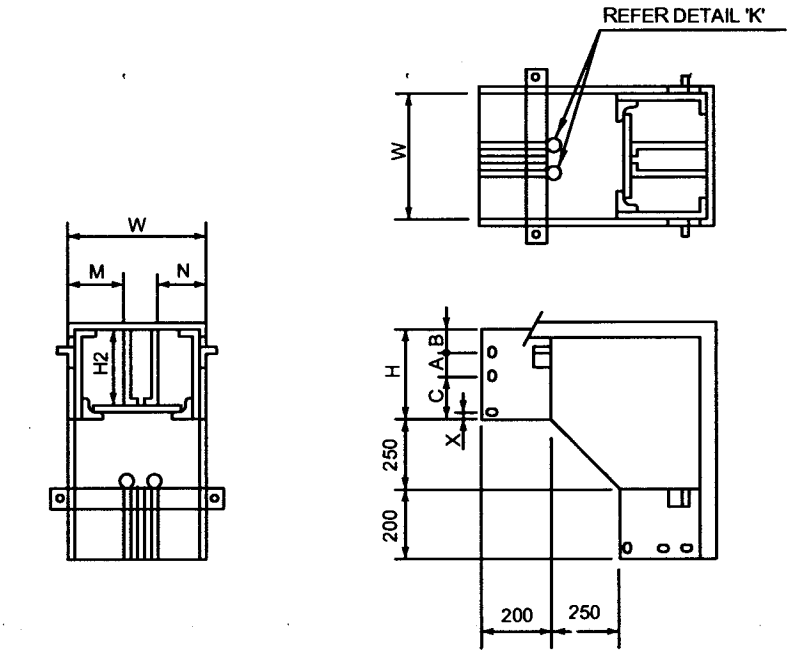
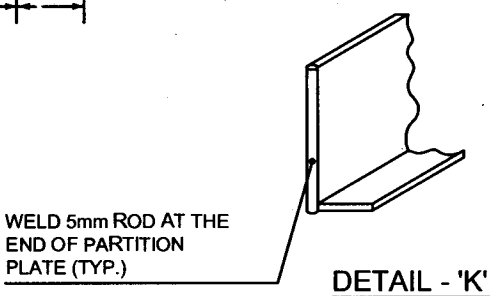
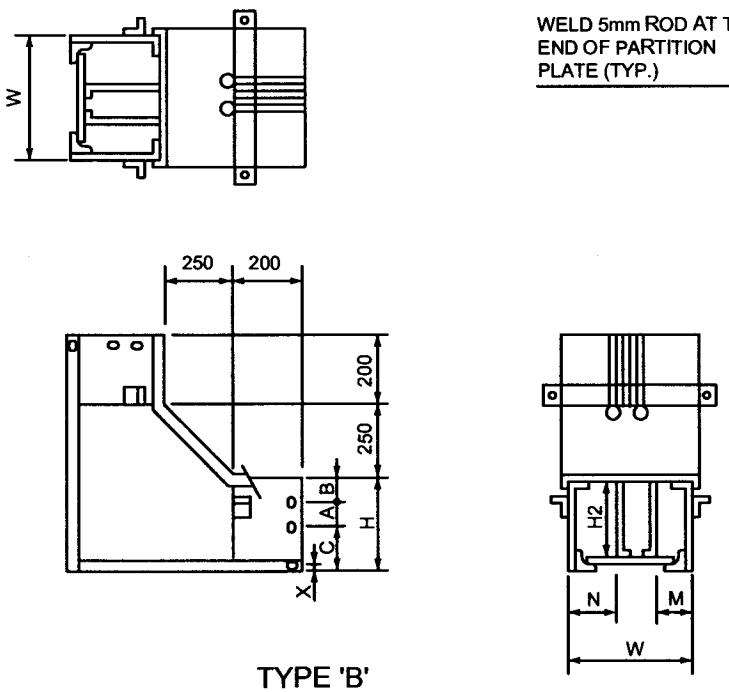


TYPE 'A'



DETAIL - 'K'



TYPE 'B'

VERTICAL PLANE ELBOW

DETAIL 9A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

Approved by

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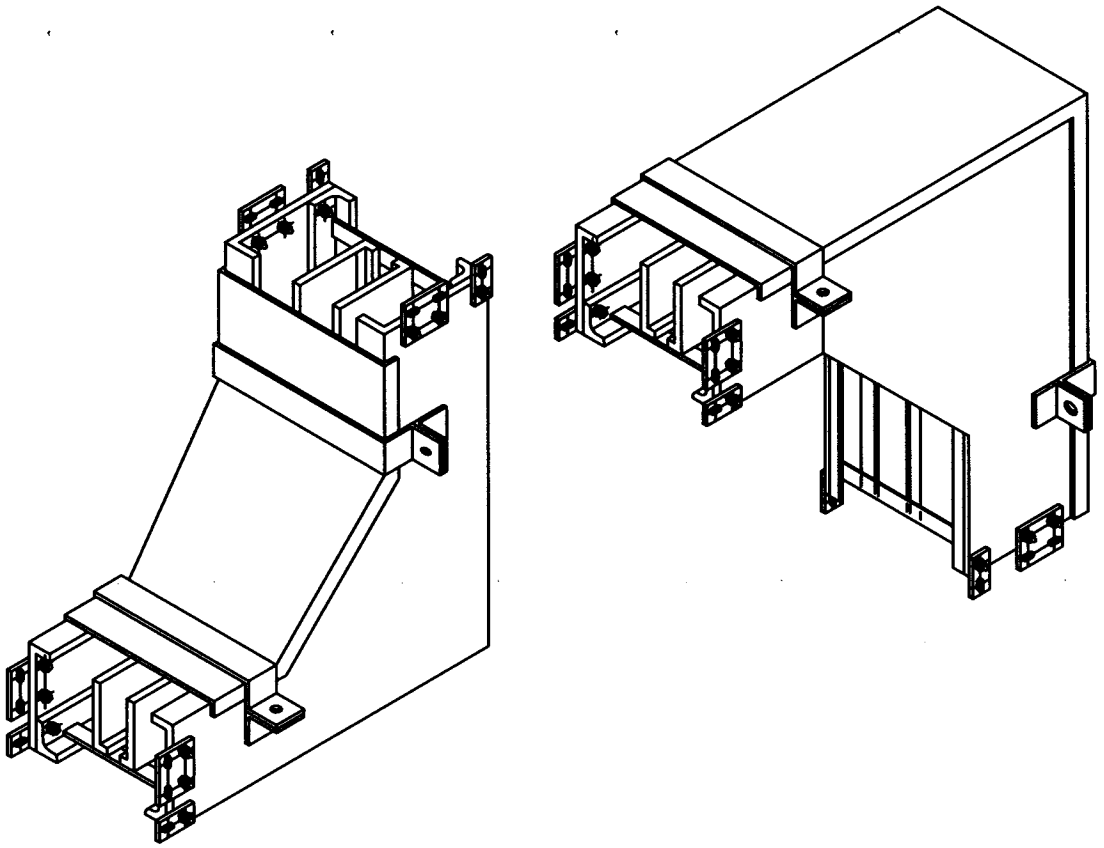

TYPE - A

DETAIL NO.	D4-101	D4-102	D4-103	D4-104	D4-105
W	1200	1000	800	600	400
H	400	400	300	300	200

TYPE - B

DETAIL NO.	D4-201	D4-202	D4-203	D4-204	D4-205
W	1200	1000	800	600	400
H	400	400	300	300	200

DIMENSIONAL DETAILS FOR 9A

DETAIL 9B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED		MN	RG	RN

Approved by

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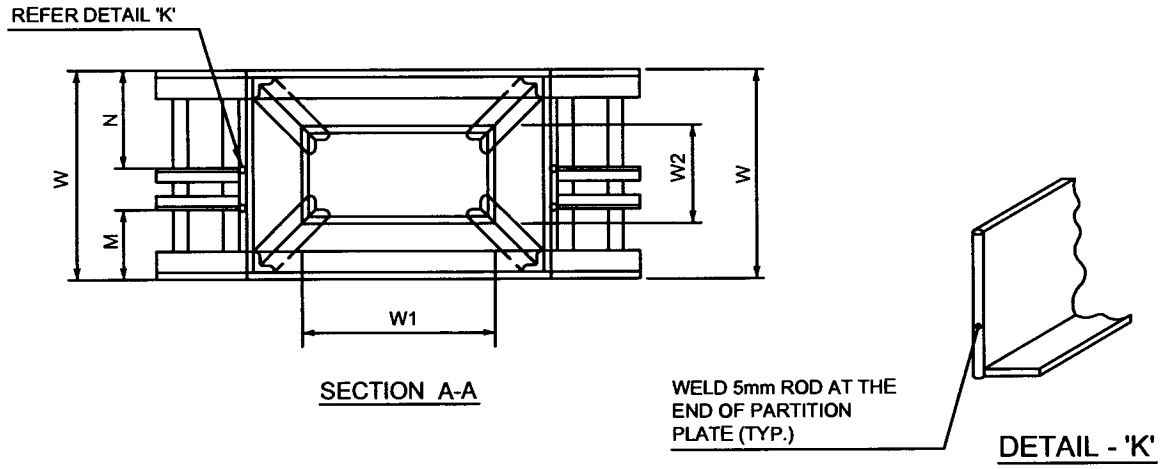

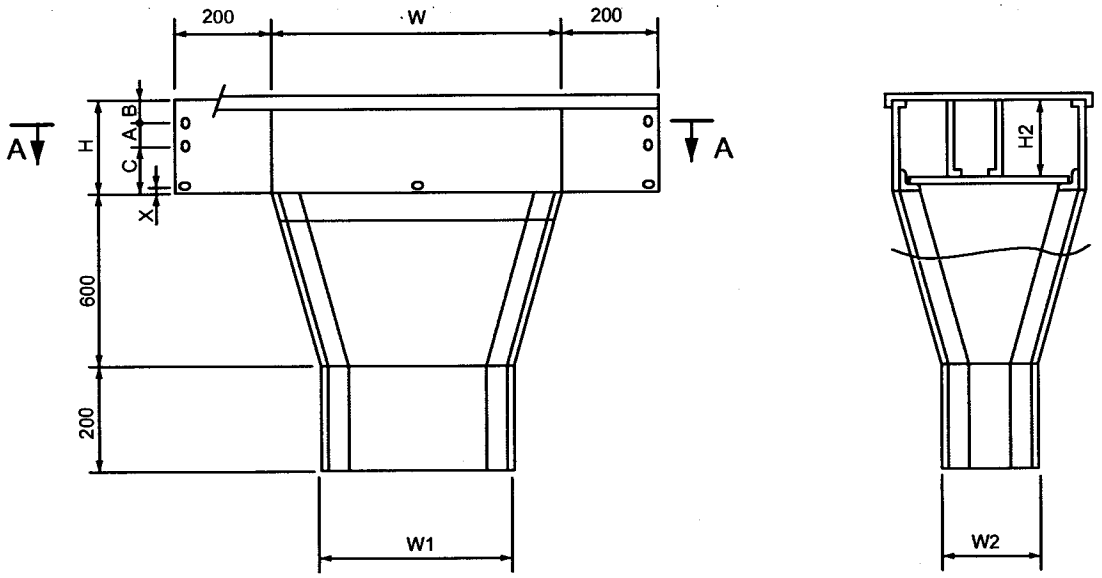

NOTE :-

COVER PLATE TO BE DECIDED BASED ON FURTHER CONTINUATION OF THE DUCT.

VERTICAL PLANE TEE, JOINS UP

DETAIL 10A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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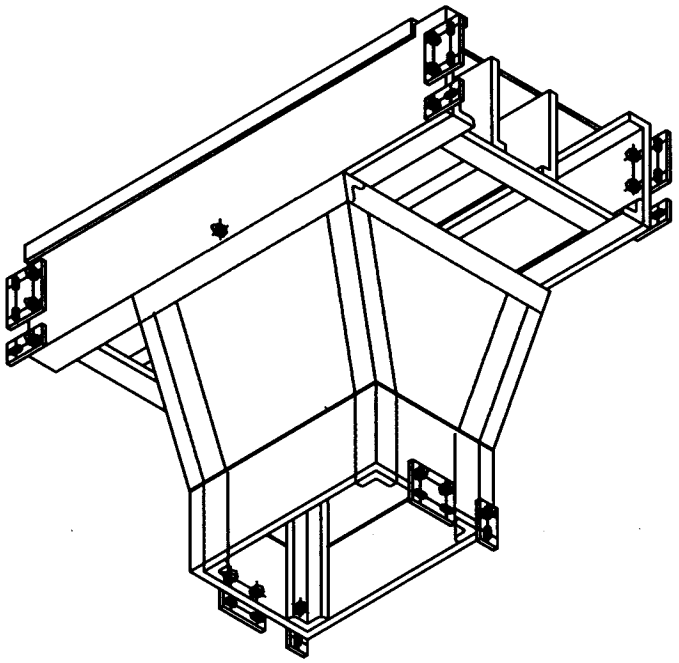

DETAIL NO.	D9-101	D9-102	D9-103	D9-104	D9-105	D9-106	D9-107
W	1200	1200	1200	1000	1000	800	600
H	400	400	400	400	400	300	300
W1	800	800	400	600	400	400	400
W2	300	300	200	300	200	200	200

DIMENSIONAL DETAILS FOR 10A

DETAIL 10B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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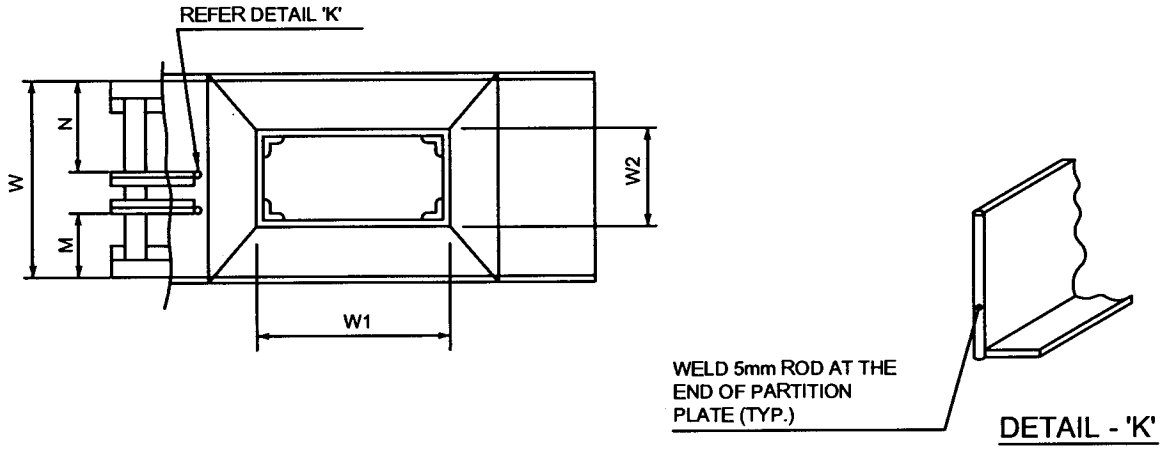

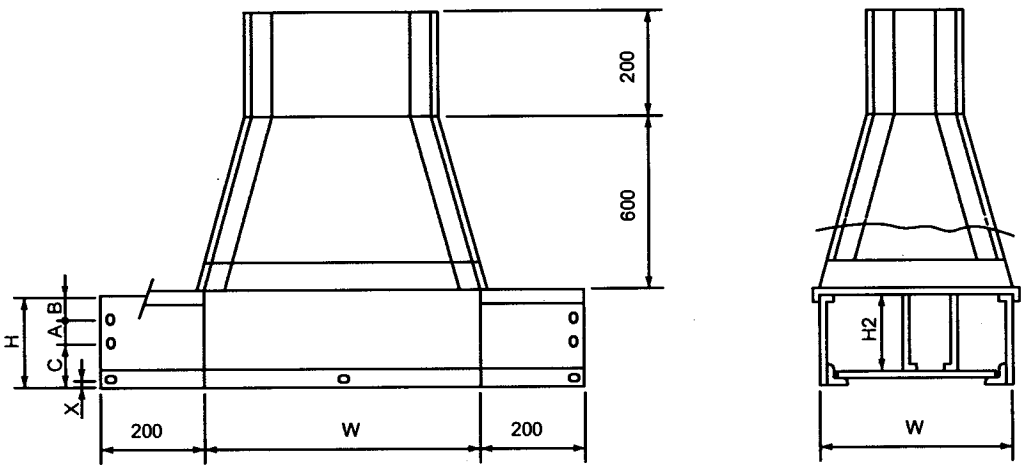

NOTE :-

COVER PLATE TO BE DECIDED BASED ON FURTHER CONTINUATION OF THE DUCT.

VERTICAL PLANE TEE, JOINS DOWN

DETAIL 10C

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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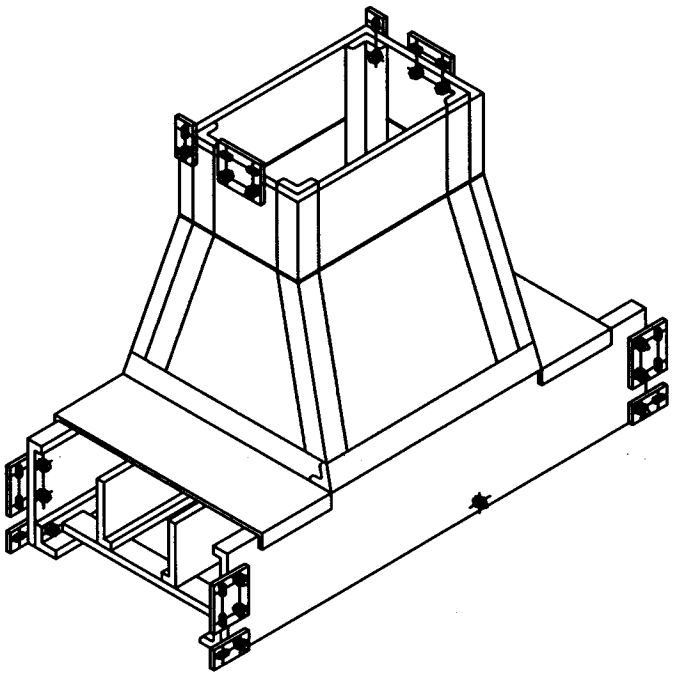

DETAIL NO.	D10-101	D10-102	D10-103	D10-104	D10-105	D10-106	D10-107
W	1200	1200	1200	1000	1000	800	600
H	400	400	400	400	400	300	300
W1	800	600	400	600	400	400	400
W2	300	300	200	300	200	200	200

DETAIL 10D

DIMENSIONAL DETAILS FOR 10C

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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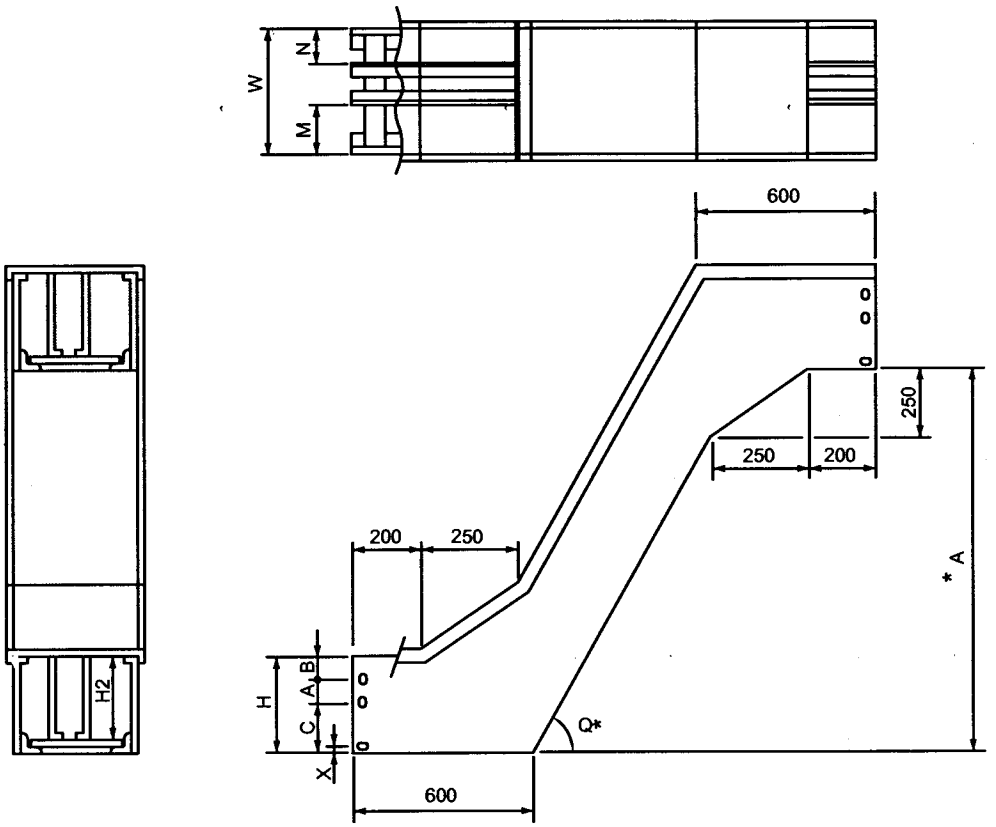
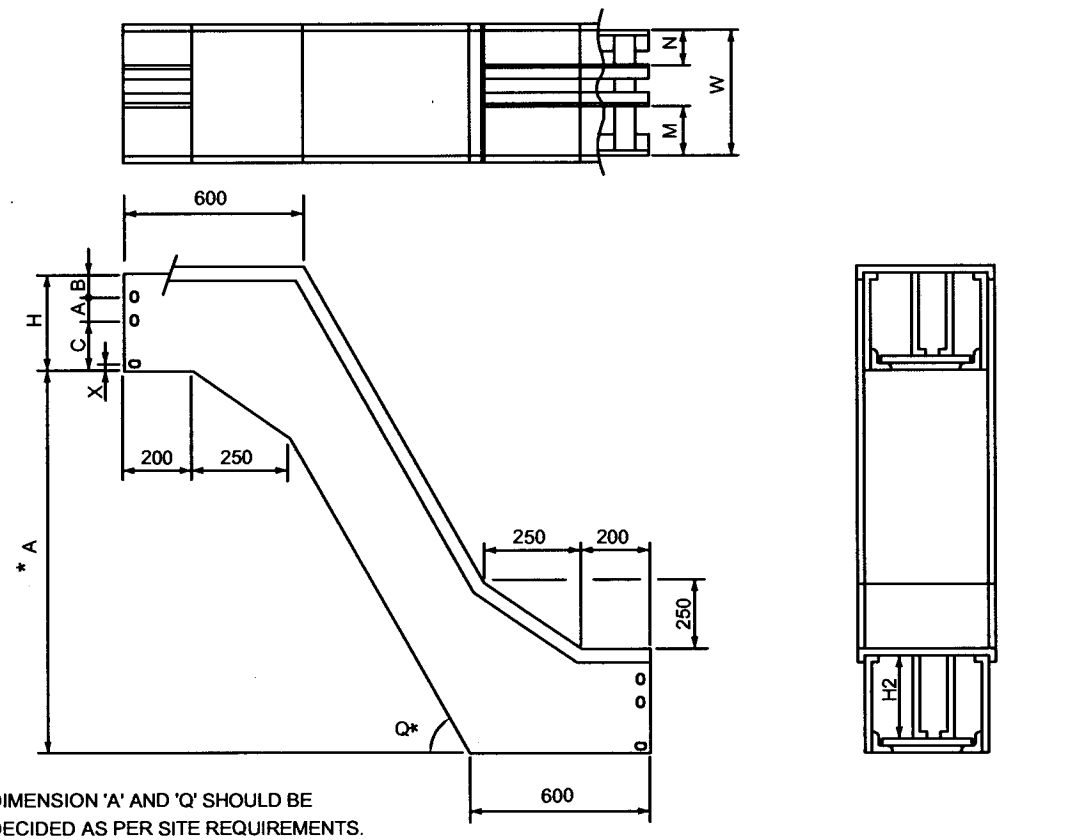


TYPE 'A'



TYPE 'B'

* DIMENSION 'A' AND 'Q' SHOULD BE DECIDED AS PER SITE REQUIREMENTS.

DUCT BRIDGE (JUMP-OVER)

DETAIL 11A

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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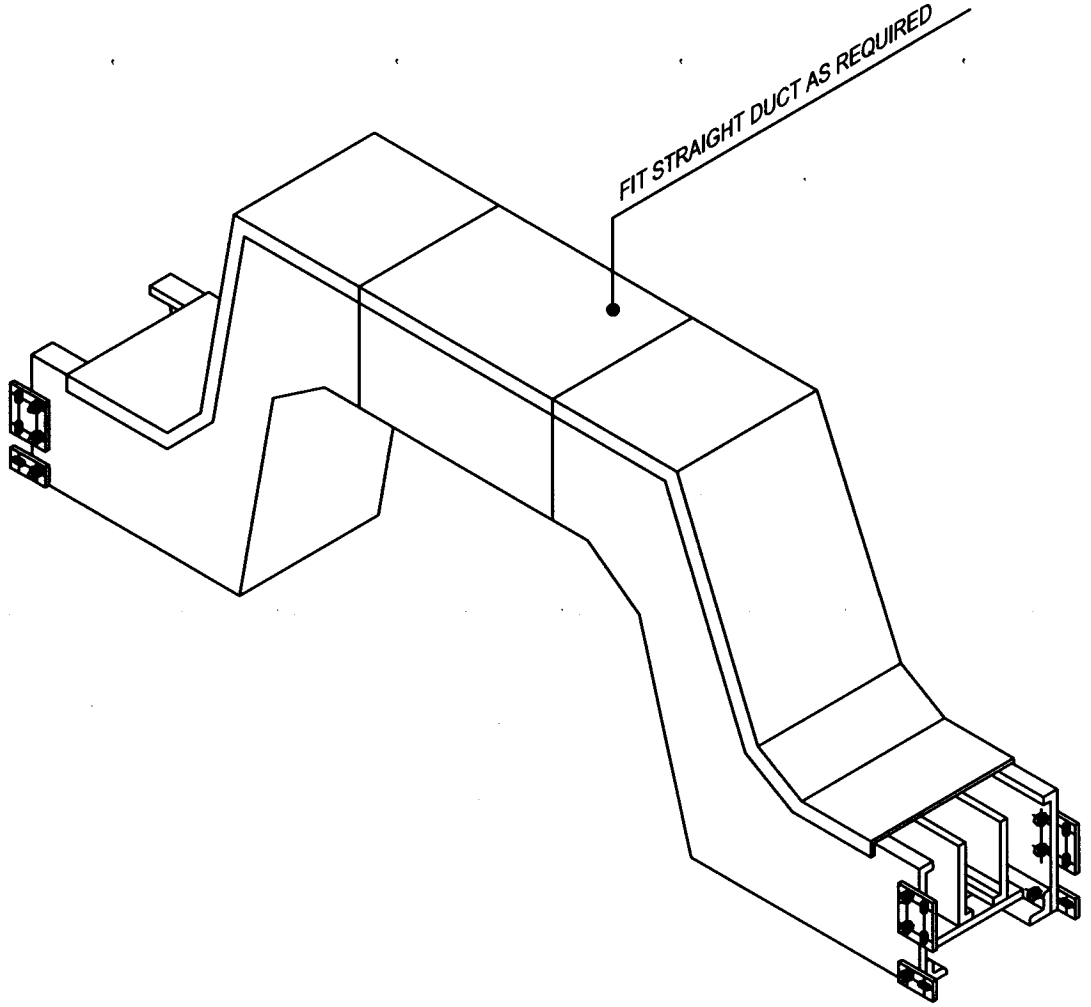

TYPE - A

DETAIL NO.	D11-101	D11-102	D11-103	D11-104	D11-105
W	1200	1000	800	600	400
H	400	400	300	300	200

TYPE - B

DETAIL NO.	D11-201	D11-202	D11-203	D11-204	D11-205
W	1200	1000	800	600	400
H	400	400	300	300	200

DIMENSIONAL DETAILS FOR 11A

DETAIL 11B

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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GENERAL NOTES

1 ALL DIMENSIONS ARE SHOWN IN mm.

2 MINIMUM STRAIGHT LENGTH OF DUCT AND COVER SHALL BE 2500 mm AS STANDARD.

3 DUCT SHALL BE FABRICATED OUT OF STANDARD SIZE OF ANGLES, FLATS, RODS AND SHEETS / PLATES.

4 MATERIAL FOR COUPLER PLATES, BOLTS, NUTS AND WASHERS USED IN THE GI DUCT SHALL BE SS.

5 STRAIGHT PORTION OF DUCT SHALL BE PRE-FABRICATED. HOWEVER SECTIONS LIKE TEES, BENDS REDUCERS ETC. MAY BE SITE FABRICATED AS PER ACTUAL SITE CONDITIONS, MEETING THE REQUIREMENT OF GALVANISING.

6 GALVANISING SHALL BE CARRIED OUT ONLY AFTER COMPLETION OF DRILLING, WELDING AND ANY OTHER FABRICATION WORK. NO WELDING AND DRILLING IS ALLOWED AFTER GALVANISATION.

GALVANISING AS PER IS 4759/1984.
FOR SHEET THICKNESS UPTO 5mm, 66 µm/460 g/m2 ,
FOR SHEET THICKNESS 5mm and ABOVE, 86 µm/610 g/m2 .

7 DUCT SHALL BE FREE OF ANY BURRS / SHARP EDGES AND WELDING SHALL BE OF GOOD QUALITY.

8 ALL MEMBERS, SHEETS AND OTHER MATERIAL SHALL BE GALVANISED ONLY. EXCEPT COUPLER PLATES, BOLTS, NUTS AND WASHERS.

9 IMPORTANT :

WITHIN THE DUCT, THE PARTITION HEIGHT SHALL BE UPTO THE DUCT COVER, PROVIDING BOTTOM SUPPORT TO THE COVER TO PREVENT SAGGING.

Rev. No.	Date	Purpose	Prepared by	Checked by	Stds. Committee Convenor	Stds. Bureau Chairman
					Approved by	
2	21.03.22	REAFFIRMED & REISSUED	Manoj	AJS	MN	SM
1	28.03.17	REVISED AND REISSUED	Manoj	MN	RG	RN

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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

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

Approved by

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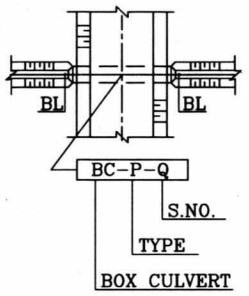
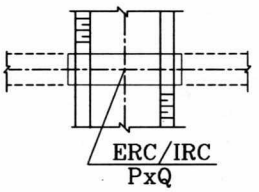
LEGENDS

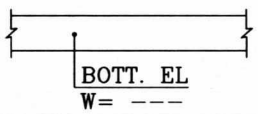
○	NATURAL GROUND LEVEL
●	FINISHED GROUND LEVEL
⊖	ROAD TOP LEVEL/ PAVEMENT TOP LEVEL
⊕	FINISHED FLOOR LEVEL OF BUILDING
—·—·—	CENTRE LINE
— — —	LAND ACQUISTION LIMIT
▬▬▬	COMPOUND WALL
———	BATTERY LIMIT
—·—·—	MATCHING LINE
ROAD-A	ROAD-A REPRESENTATION ON LAYOUTS (A=COORDINATE OF ROAD ℄)
ROAD-A	ROAD-A REPRESENTATION IN AREA DRAWINGS (A=COORDINATE OF ROAD ℄)
HIGHER EDGE / LOWER EDGE	SIDE SLOPE
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.
BL BL PC/BC---	PIPE CULVERT BOX CULVERT REPRESENTATION ON LAYOUT DRG.
BL BL ℄ OF ROAD S.NO. PC-PXQ-R PIPE DIA. NO. OF PIPES PIPE CULVERT	PIPE CULVERT REPRESENTATION ON AREA DRAWING



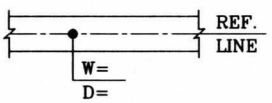
BOX CULVERT REPRESENTATION ON AREA DRAWING



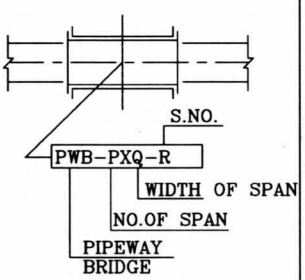
ERC-ELELCTRIC CABLE
PxQ ROAD CROSSING
NO.OF PIPE IN EACH LAYER
NO. OF LAYERS



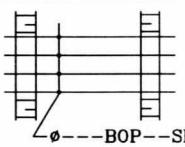
R.C.C. CABLE TRENCH



BURIED CABLE TRENCH
D=DEPTH
W=WIDTH



PIPEWAY BRIDGE



PIPE SLEEVES

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

Approved by

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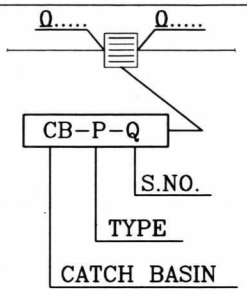
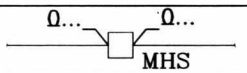
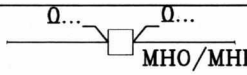
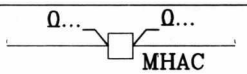
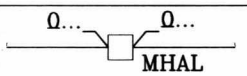
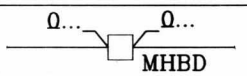
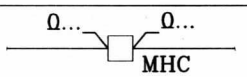
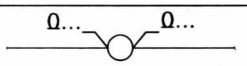
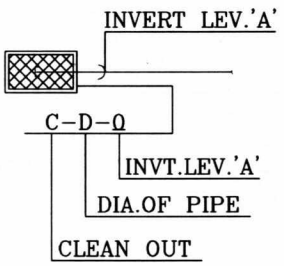
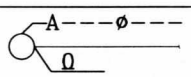
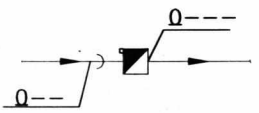
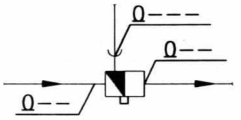
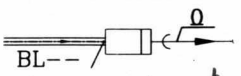
ø--- -WCS-PIPE CLASS---	COOLING WATER SUPPLY PIPE		45° BEND (TURNED DOWN)
ø--- -WCR-PIPE CLASS---	COOLING WATER RETURN PIPE		CATCH BASIN
ø--- -WF-PIPE CLASS---	FIRE WATER PIPE LINE		
ø--- -WH-PIPE CLASS---	HORTICULTURE WATER PIPE LINE		
ø--- -WS-PIPE CLASS---	SERVICE WATER PIPE LINE		
ø--- -SS-PIPE CLASS---	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

Approved by

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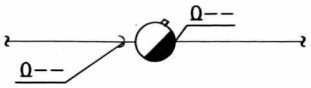
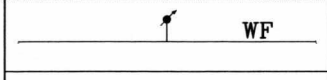
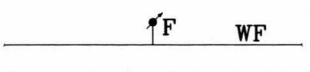
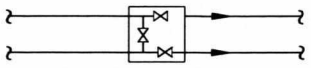
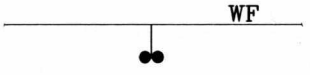
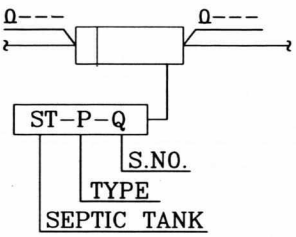
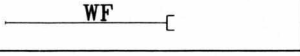
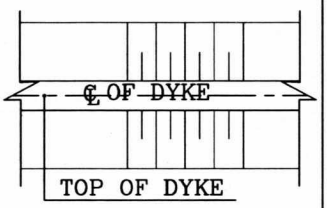
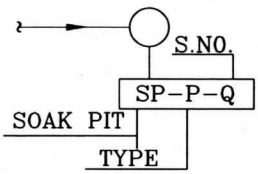
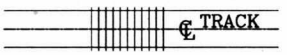
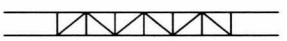
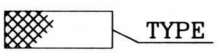
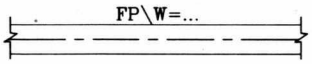
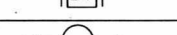
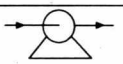
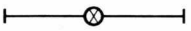
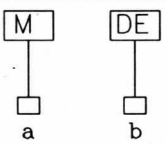
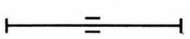
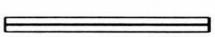
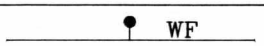
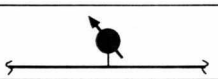
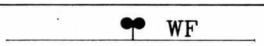
	SEALED MANHOLE (CIRCULAR)		WATER MONITOR FOR FOR FIRE WATER SYST.
			FOAM MONITOR FOR FOR FIRE WATER SYST.
	THREE WAY VALVE PIT (VALVE PITS OUTSIDE TANKFARM AREA FOR DRAINAGE)		DOUBLE HEADED FIRE HYDRANT AWAY FROM HEADER
	SEPTIC TANK		FIRE HOSE COUPLING
			EARTHEN DYKE
	SOAK PIT		RAILWAY TRACK REPRESENTATION 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		

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

Approved by

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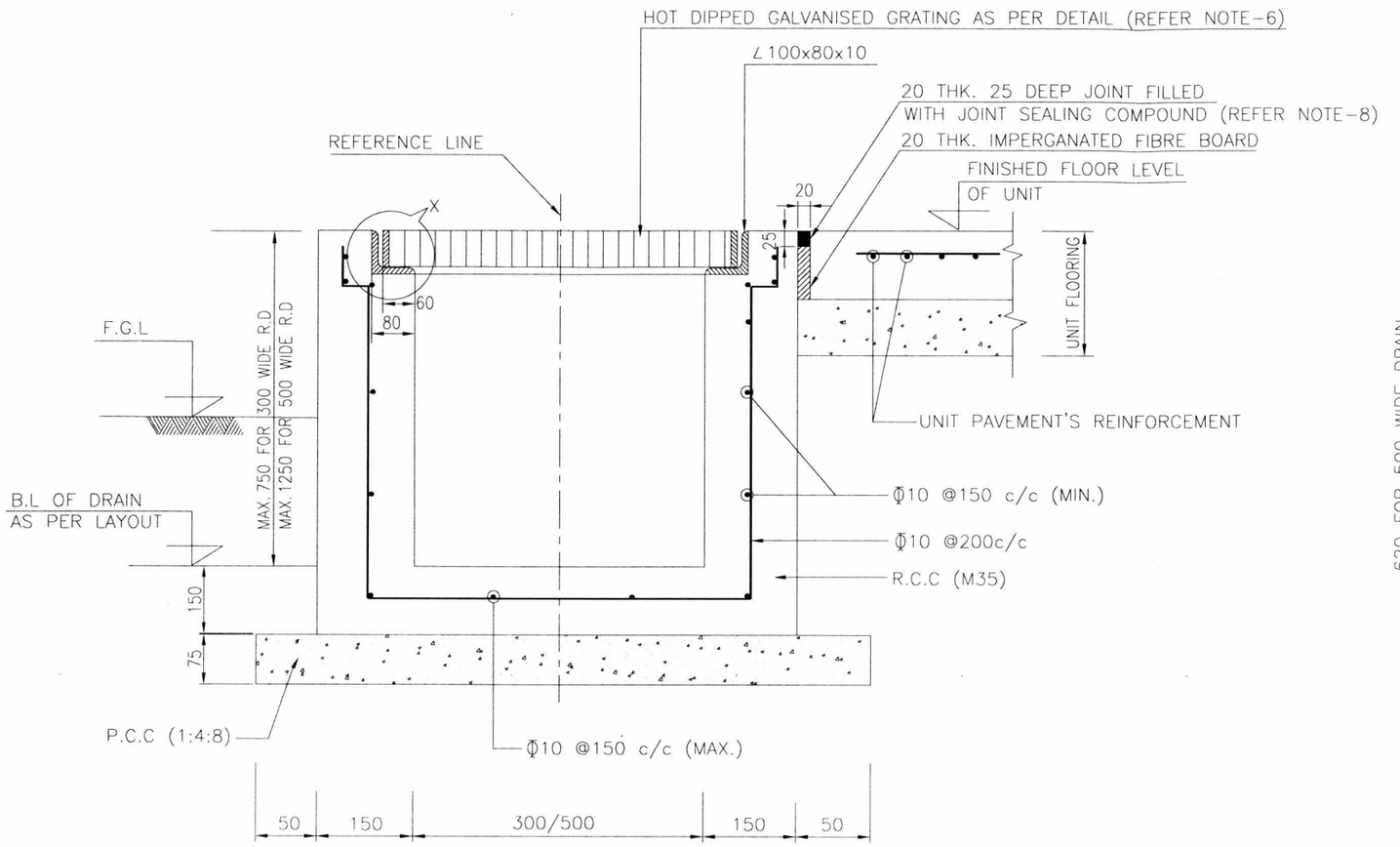
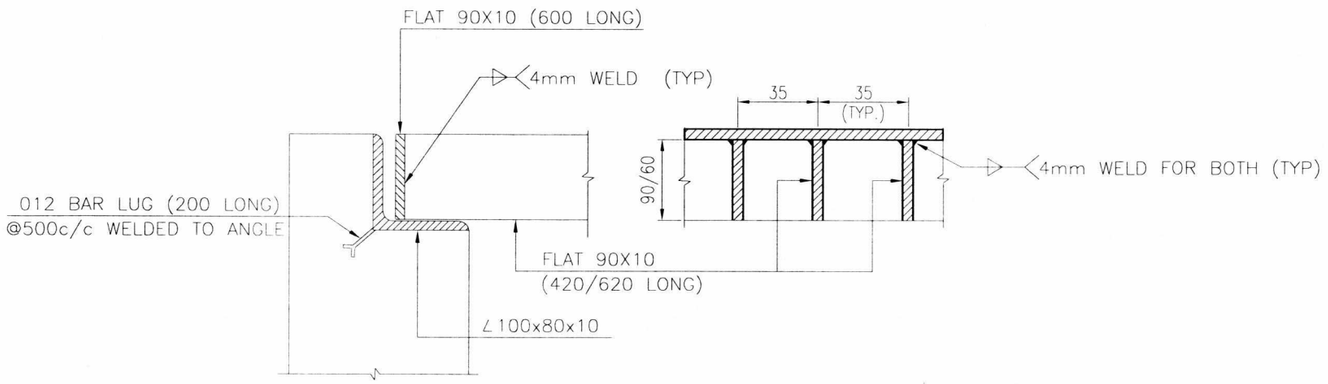
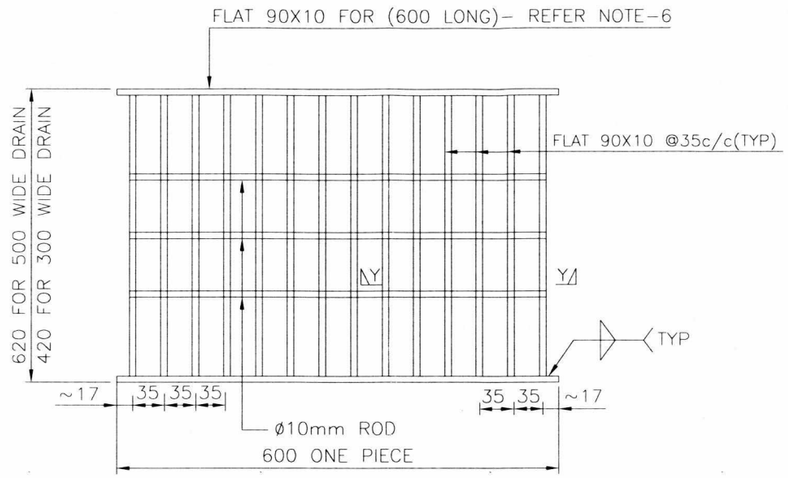


CROSS SECTION OF DRAIN.



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.

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(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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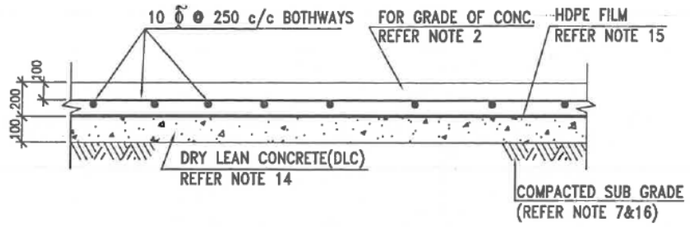
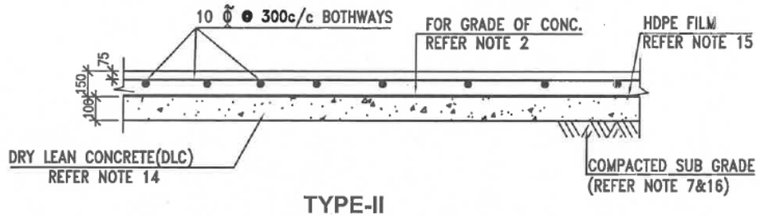
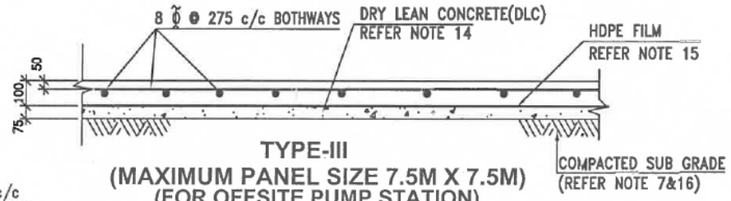


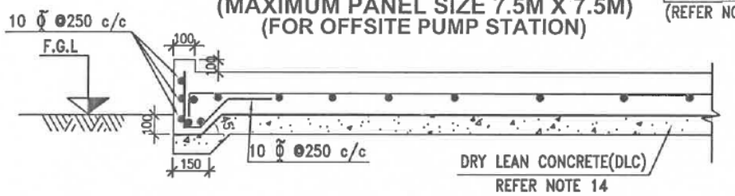
TYPE-I
(MAXIMUM PANEL SIZE 14M X 14M)
(FOR VEHICULAR MOVEMENT AREA)



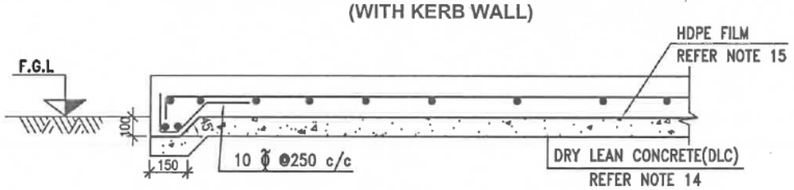
TYPE-II
(MAXIMUM PANEL SIZE 13M X 13M)
(FOR UNIT PAVEMENT)



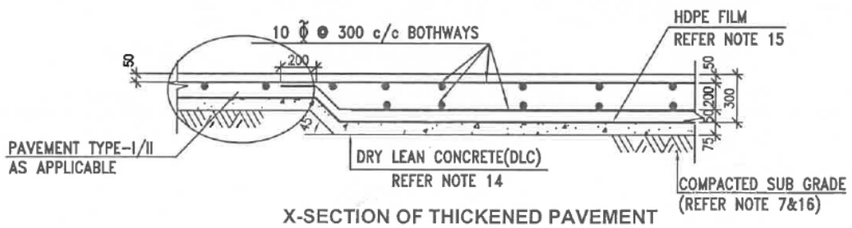
TYPE-III
(MAXIMUM PANEL SIZE 7.5M X 7.5M)
(FOR OFFSITE PUMP STATION)



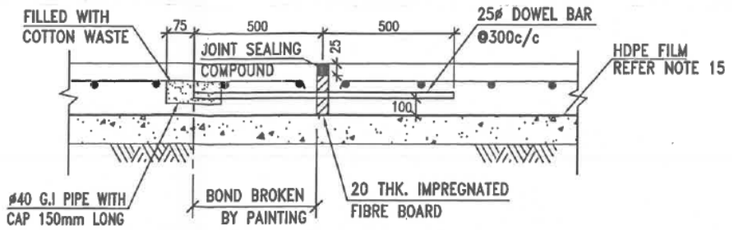
TYP. EDGE DETAIL DEPENDING ON TYPE OF PAVEMENT
(WITH KERB WALL)



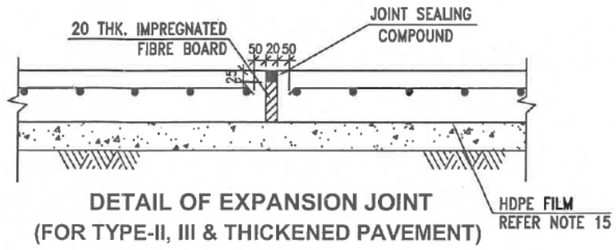
TYP. EDGE DETAIL DEPENDING ON TYPE OF PAVEMENT
(WITHOUT KERB WALL)



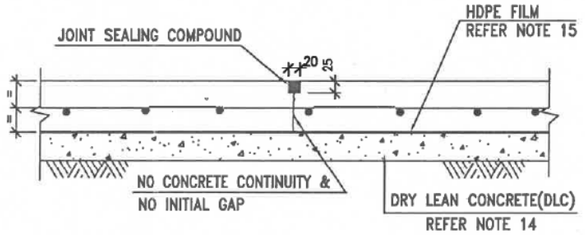
X-SECTION OF THICKENED PAVEMENT



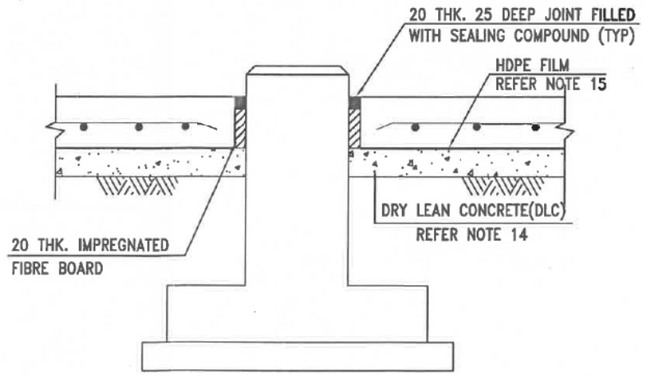
DETAIL OF EXPANSION JOINT
(FOR TYPE-I PAVEMENT)
(REFER NOTE-8 & 9)



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.

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

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RCC PAVEMENT DETAILS

STANDARD No.
7-65-0404 Rev. 5
Page 1 of 1

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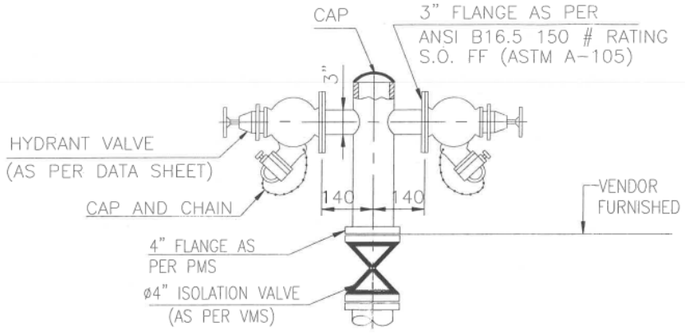
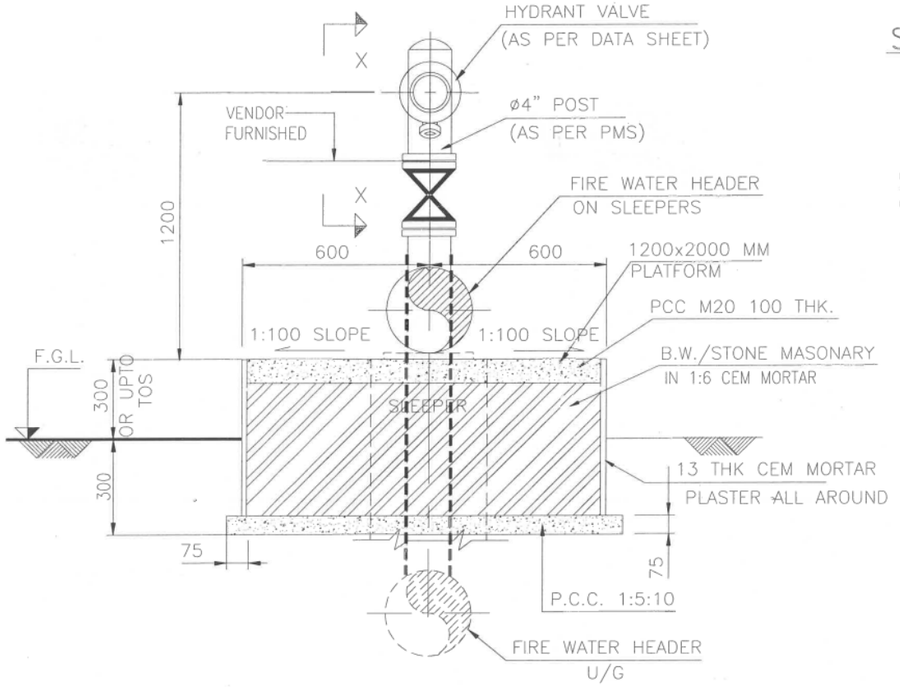
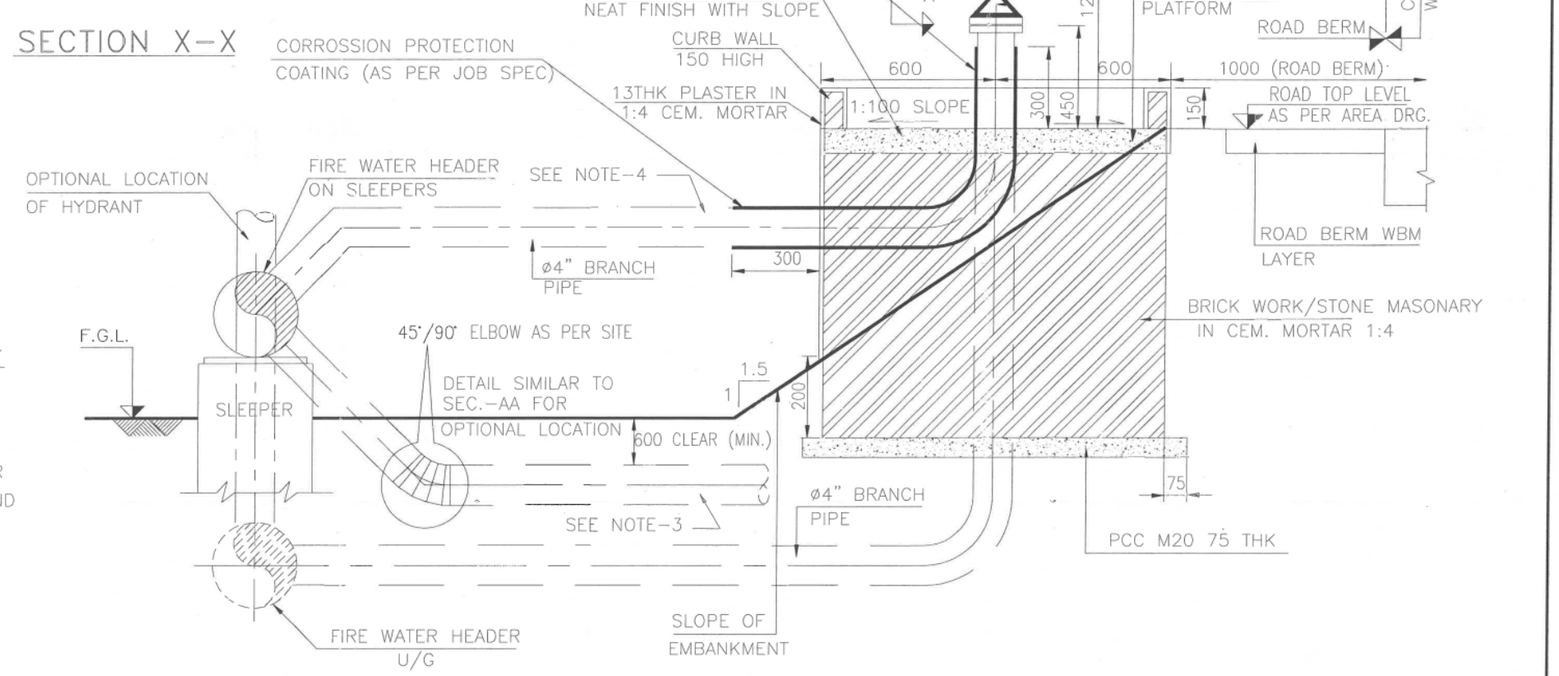
NOTES:–

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.

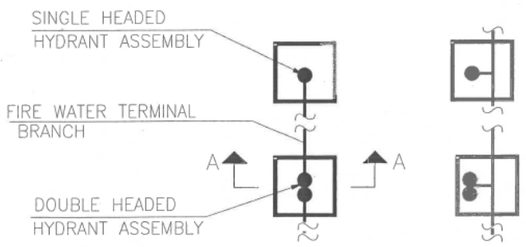




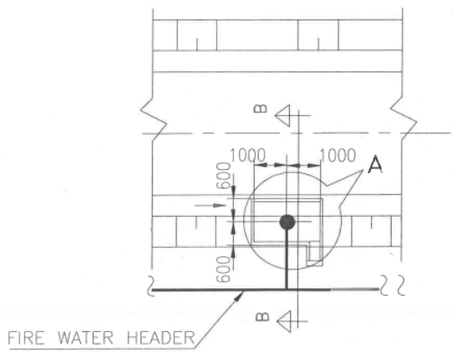
SECTION X–X



SECTION–AA

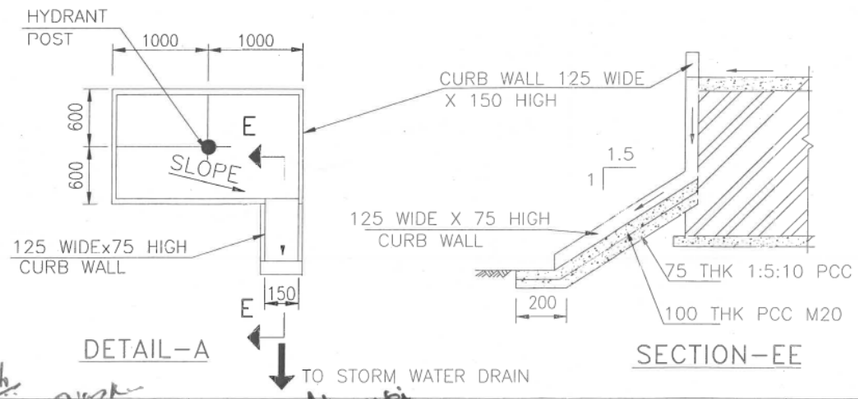


HYDRANT ON FIRE WATER TERMINAL BRANCH
(REPRESENTATION ON AREA DRG.)



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

SECTION–BB



DETAIL–A

SECTION–EE

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

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

INSTALLATION DETAILS OF FIRE WATER HYDRANT

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

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

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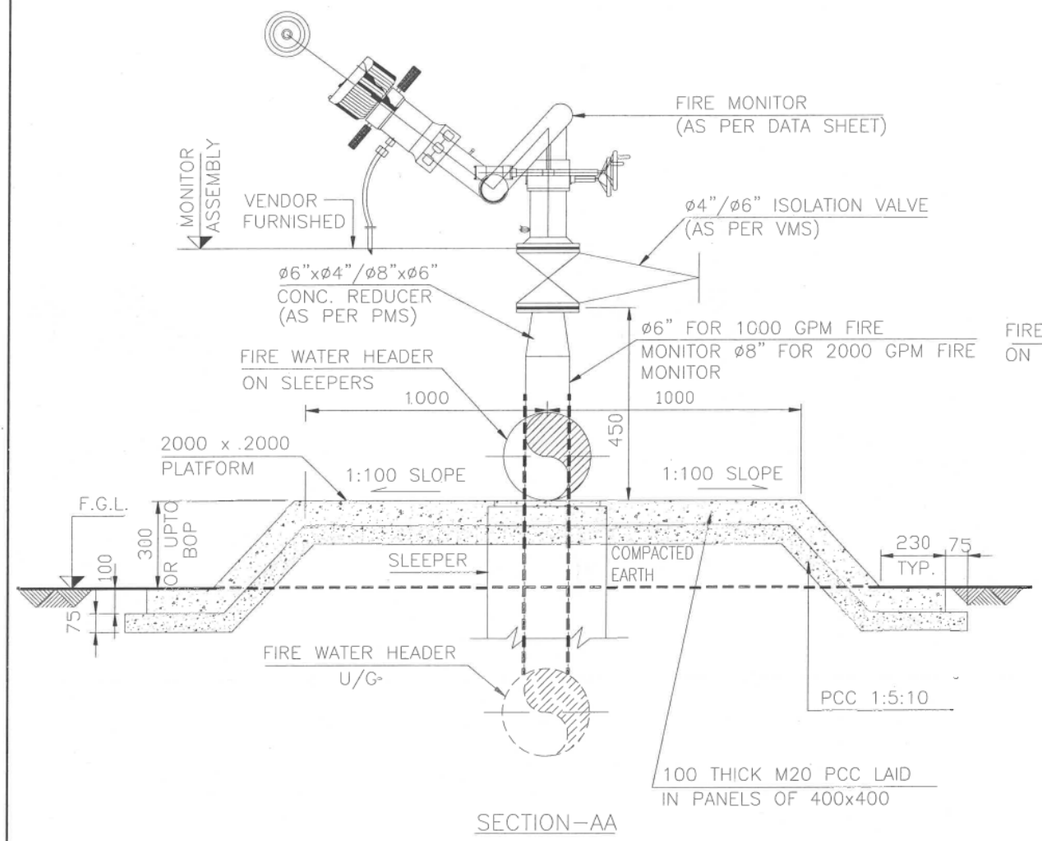
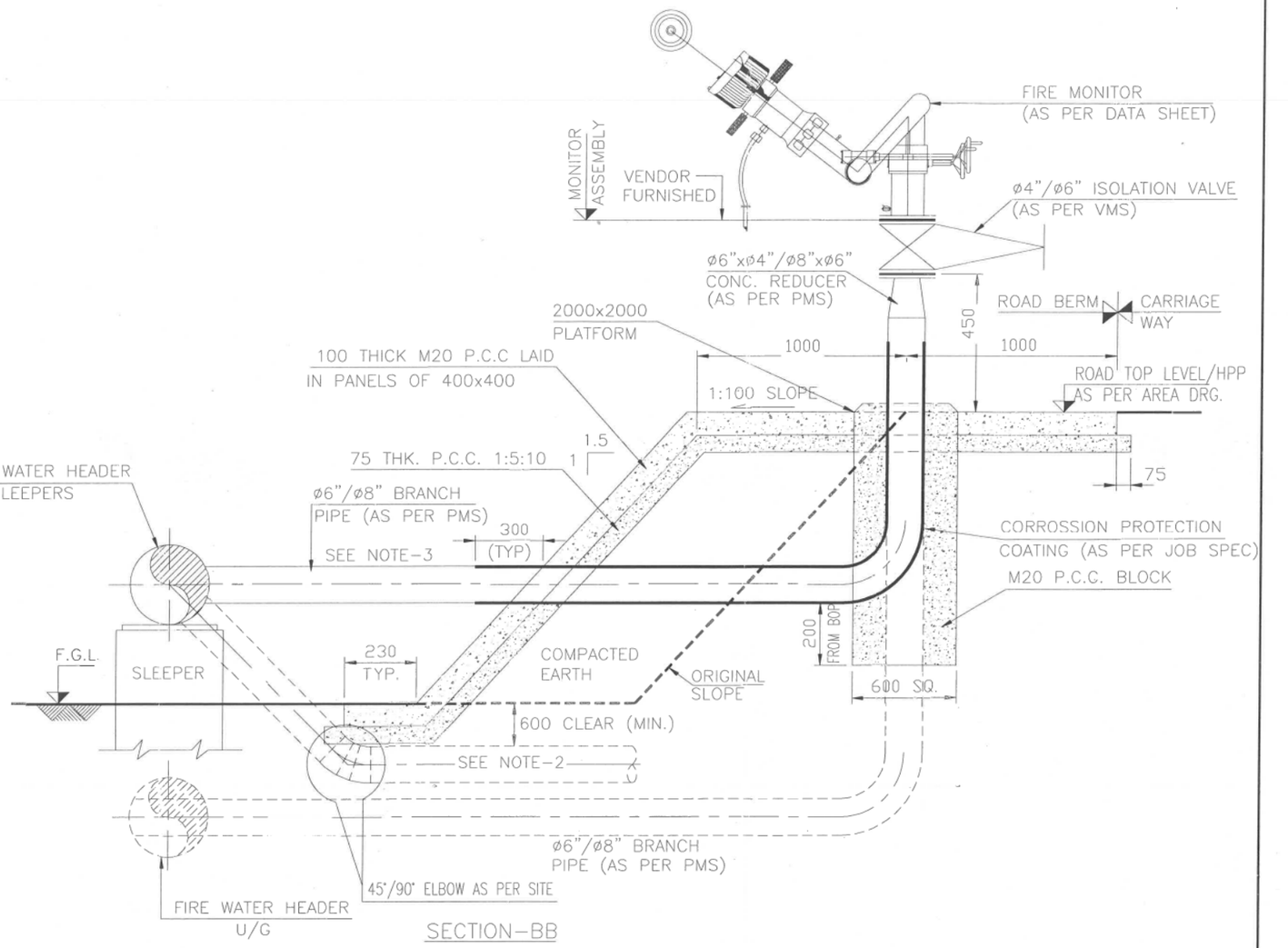
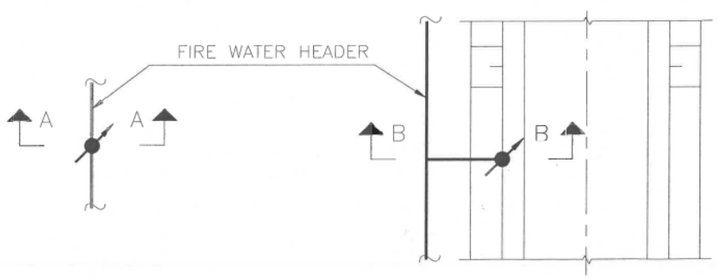


SECTION–AA



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

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

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

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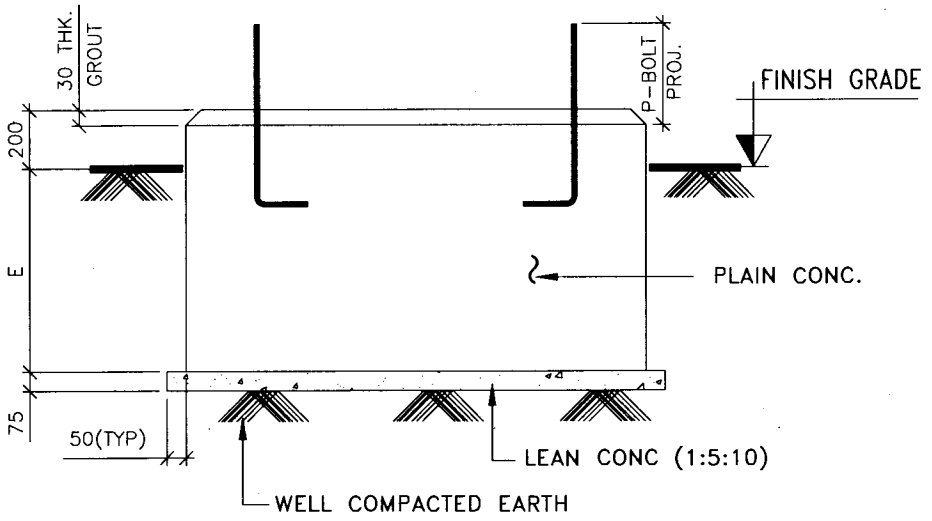
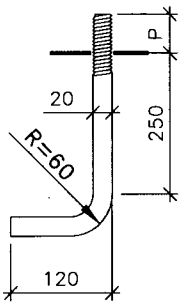
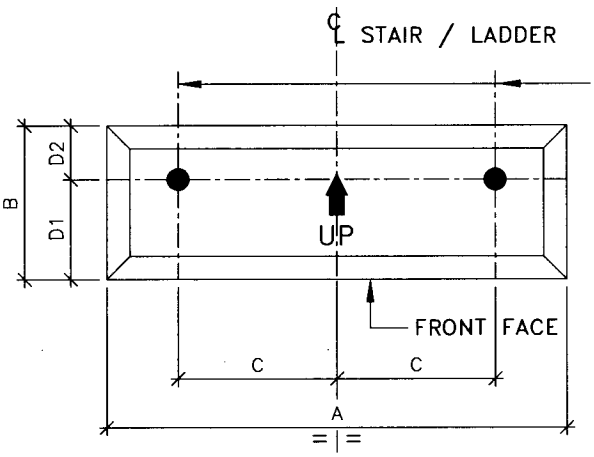


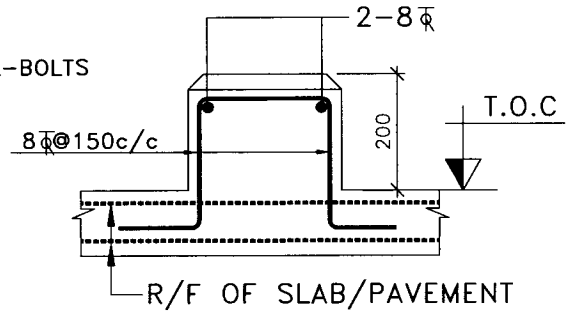
PEDESTAL FOR UNPAVED AREA



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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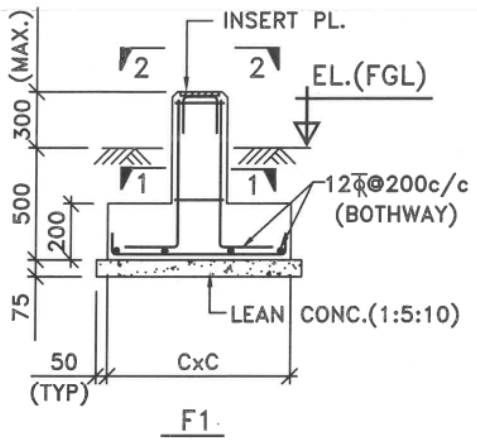
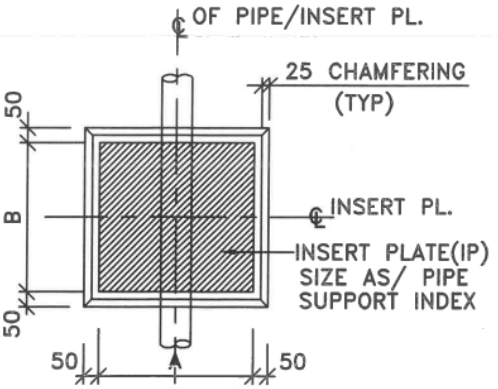
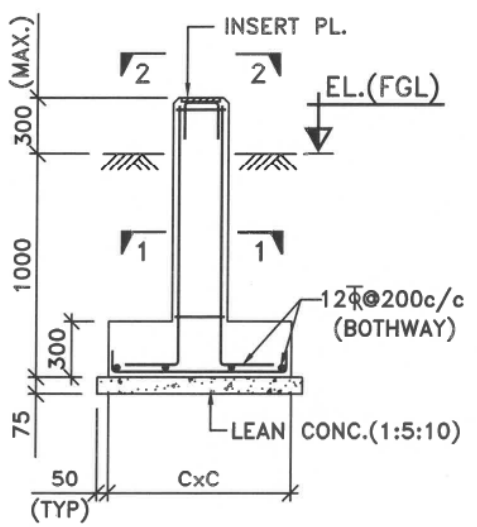


F1



VEIW 2-2



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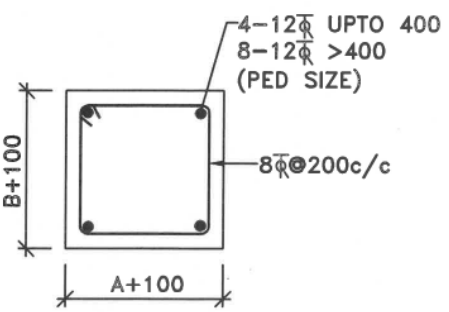
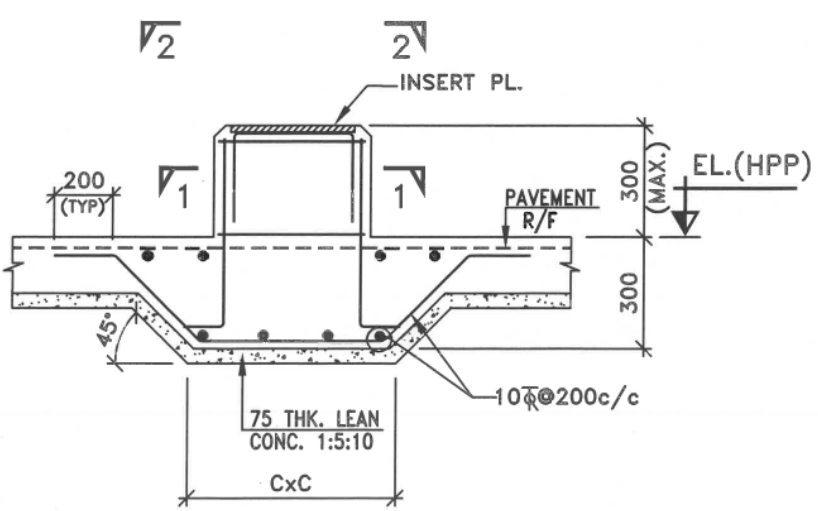
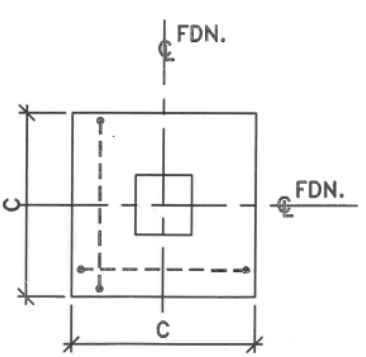


SEC. 1-1



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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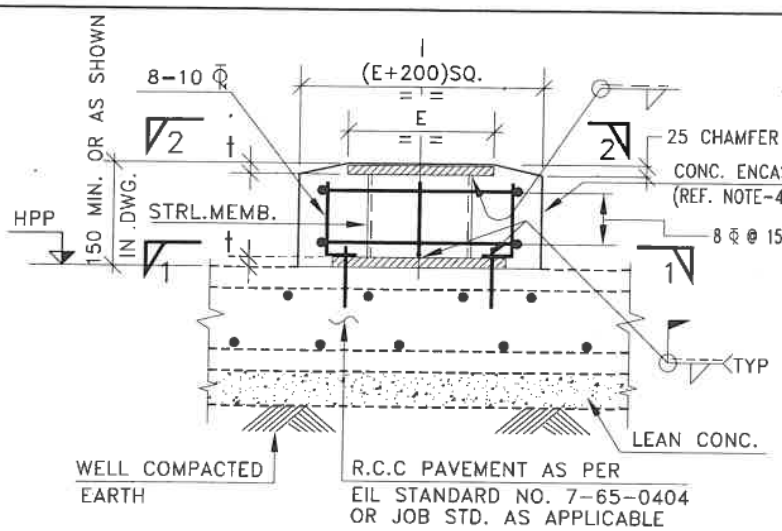
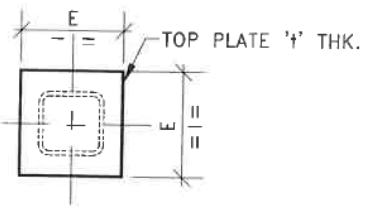
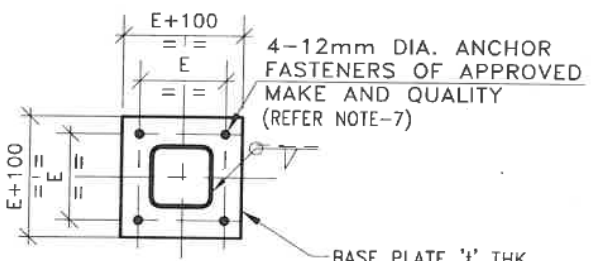


TYP. CROSS SECTION OF PIPE SUPPORT



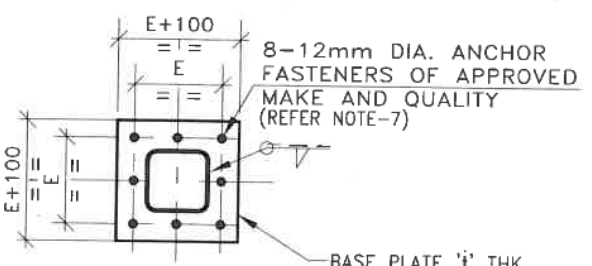
VIEW 2-2



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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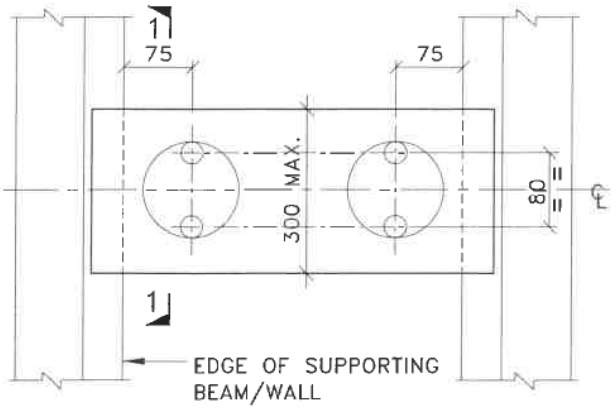
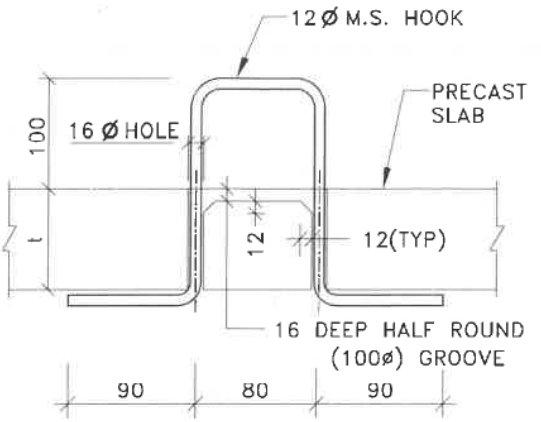
STANDARD LIFTING HOOKS IN PRECAST SLABS AND CHEQ. PLATES

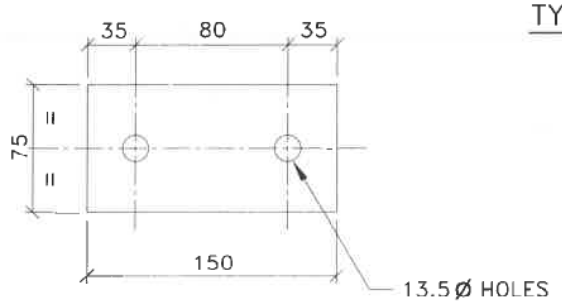


PLAN

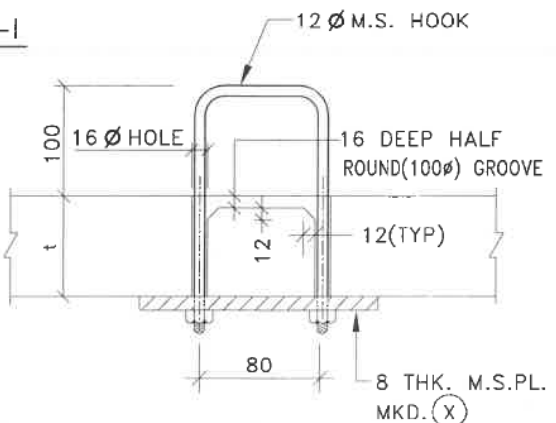


SECTION:1–1

TYPE–I

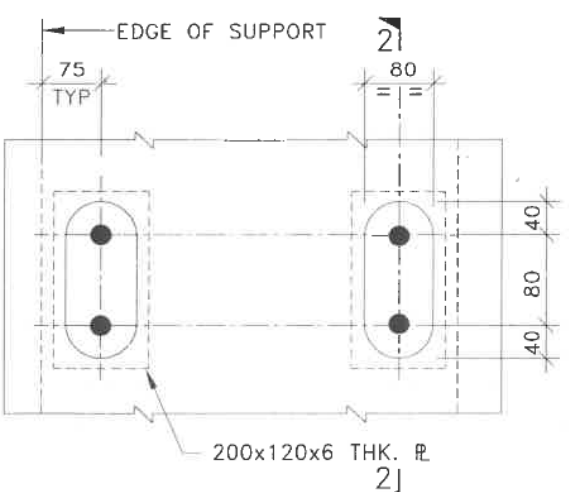


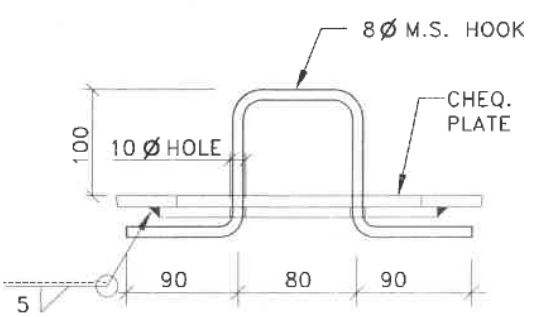
DETAIL OF M.S. PLATE MKD. (X)



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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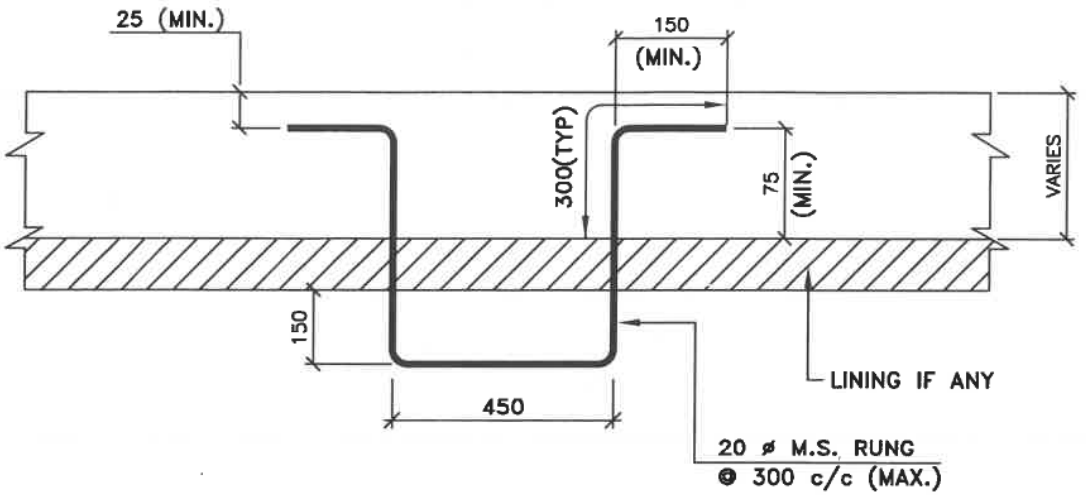
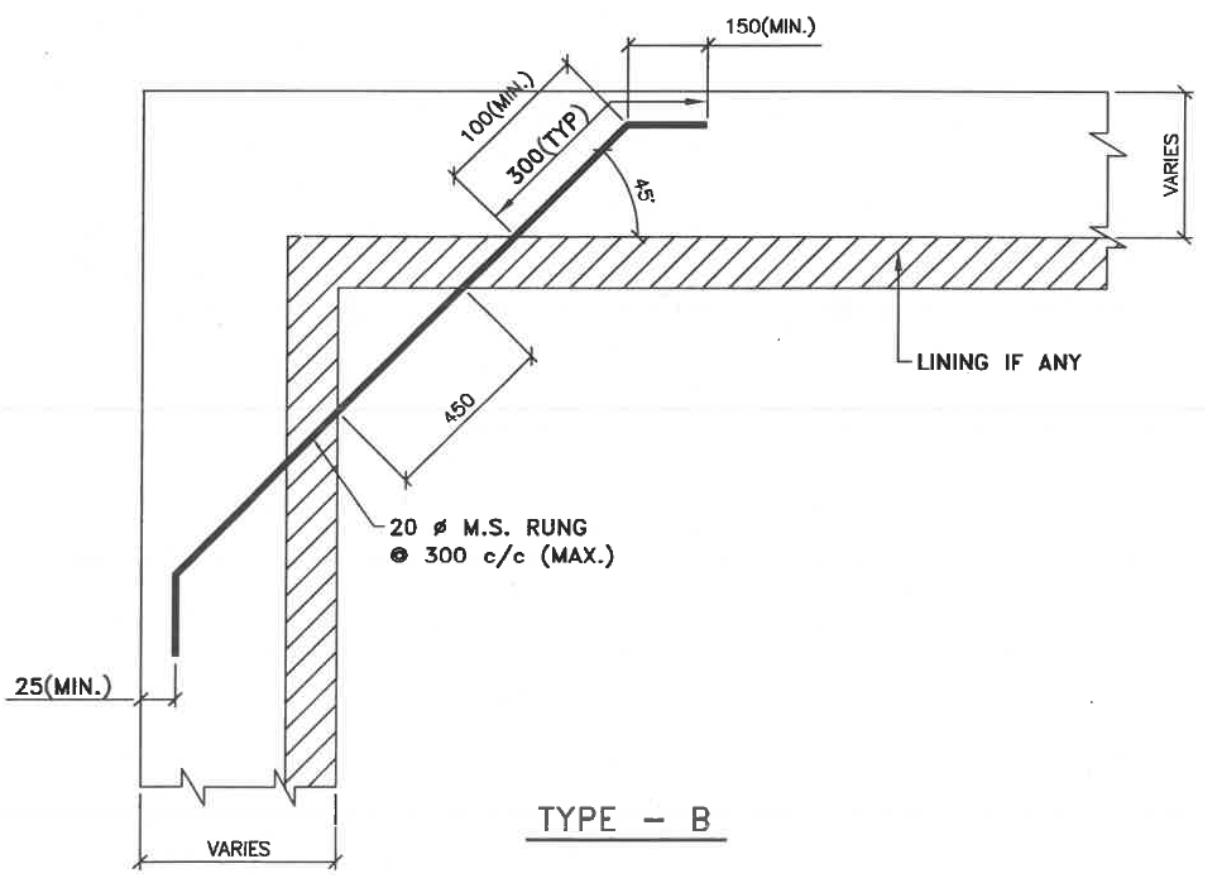


TYPE – A



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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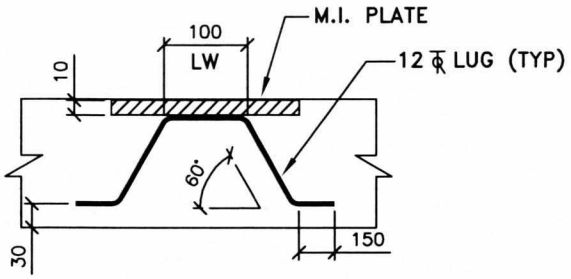
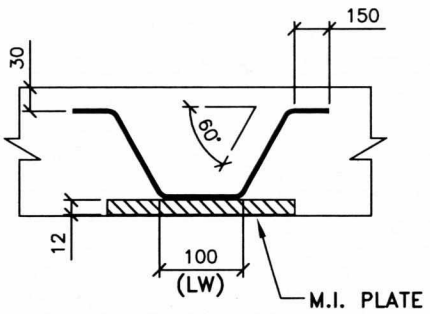
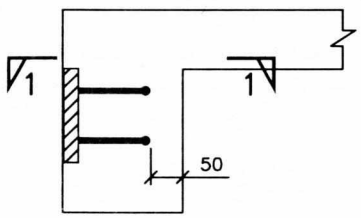
LUG BENDING DETAILS



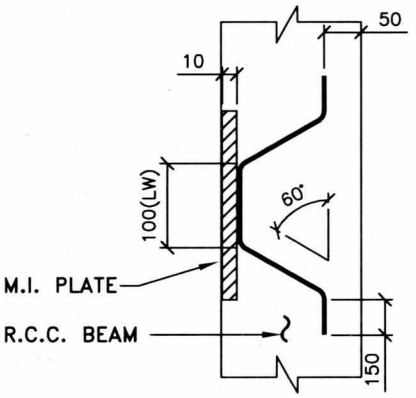
METAL INSERT DETAIL
ON TOP OF SLAB



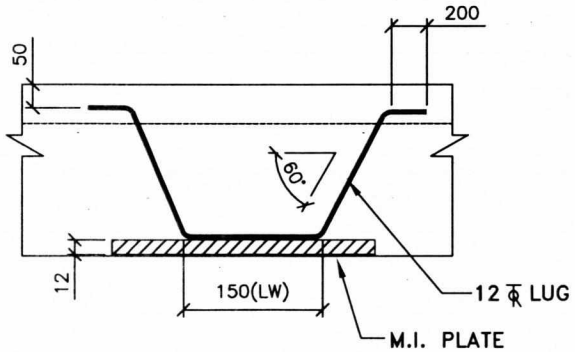
METAL INSERT DETAIL
ON BOTTOM OF SLAB



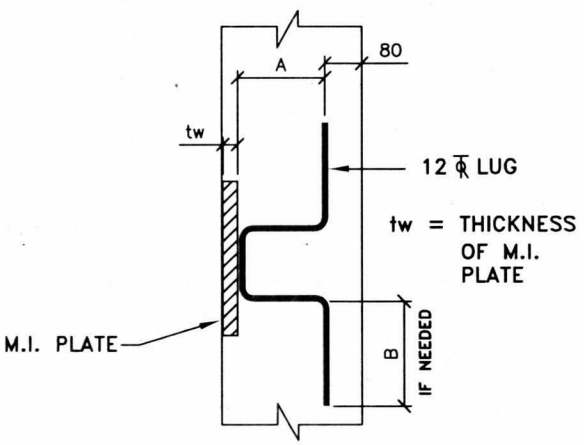
METAL INSERT DETAIL
ON SIDE OF BEAM



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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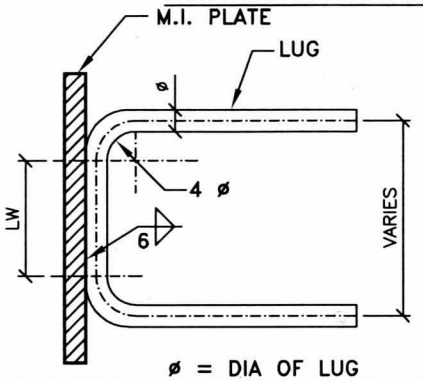
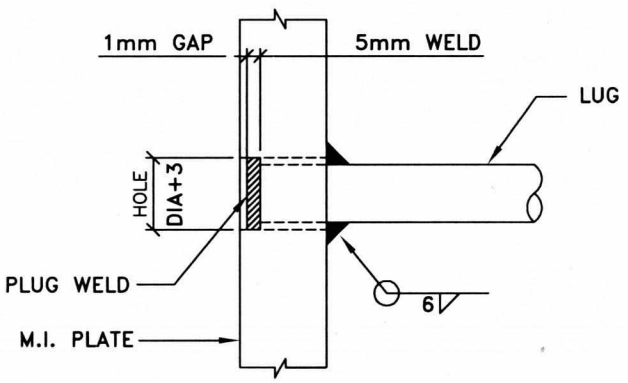
LUG BENDING DETAILS



ø = DIA OF LUG
LW = WELD LENGTH AVAILABLE

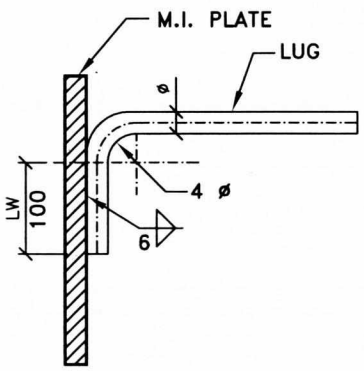
BENDING DIMENSIONS FOR 12ϕ & 16ϕ LUGS

(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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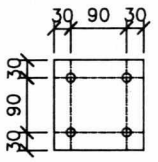
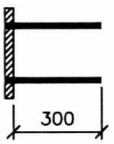
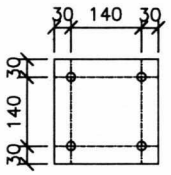
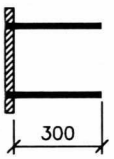
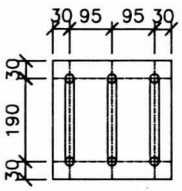
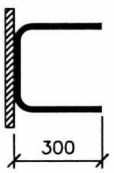
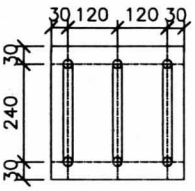
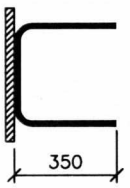
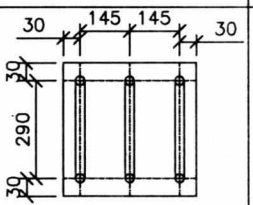
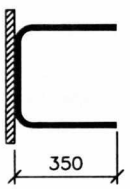
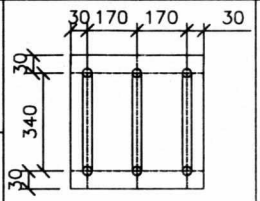
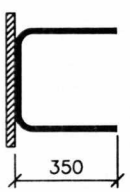
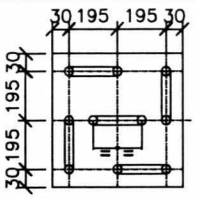
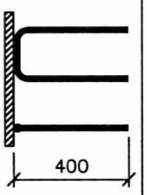
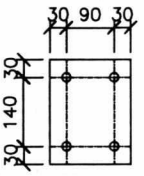
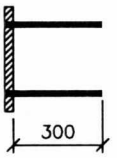
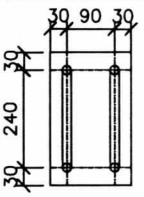
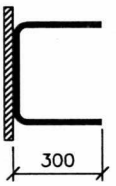
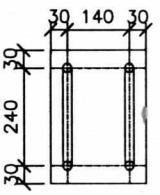
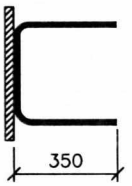
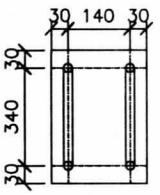
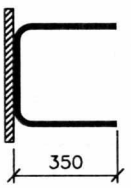
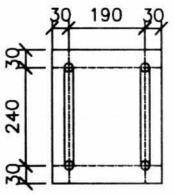
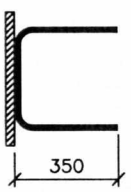
S/R DESIGNATES

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	
	R3b	16	16		
11.	R4a	12	12	 SIZE 200x400	
	R4b	16	16		
12.	R5a	12	12	 SIZE 250x300	
	R5b	16	16		

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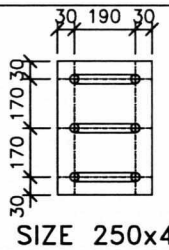
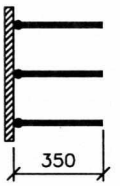
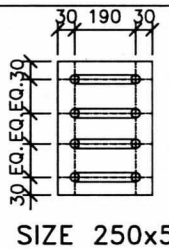
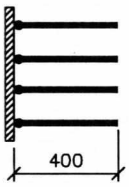
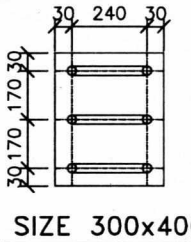
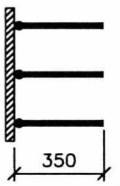
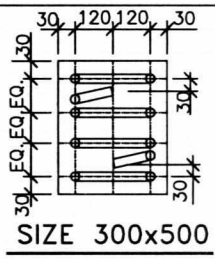
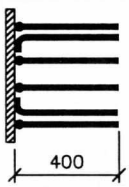
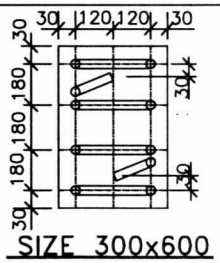
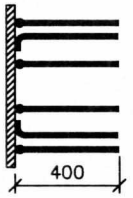
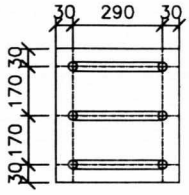
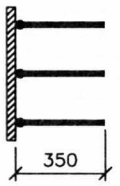
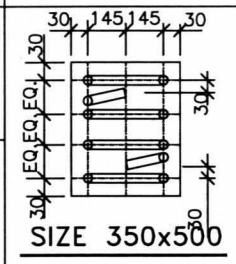
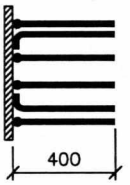
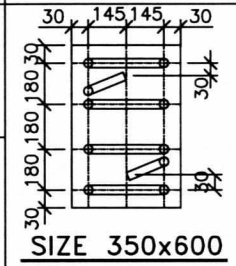
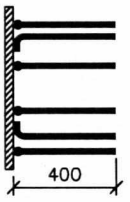
R DESIGNATES

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

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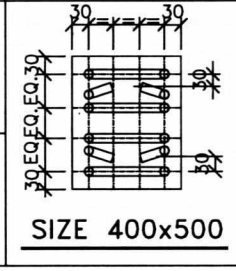
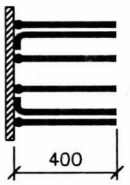
21.	R14a	12	12		
	R14b	16	16		

Signature Not Verified
Digitally signed by ARITRA DE
Date: 2026.05.18 17:53:30 IST
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