13.00 Rates of Materials for the Program 2021-2022			
1	**UPVC Pipes ISI marked- IS 4985**	Unit	Rate (In Rs.)
a	315mm dia class-I	Mtr	1799
b	315mm dia class-II	Mtr	2791
c	200mm dia class-I	Mtr	712
d	140mm dia class-I	Mtr	345
e	140mm dia class-II	Mtr	576
f	160mm dia class-II	Mtr	742
g	110mm dia class-I	Mtr	219
h	110mm dia class-II	Mtr	334
	uPVC Fittings ISI marked - IS 10124		
2	**FTP**		Rate (In Rs.)
a	315 mm FTP	nos	5743
b	200 mm FTP	nos	1657
c	160 mm FTP	nos	838
d	140 mm FTP	nos	578
e	110 mm FTP	nos	387
3	**Bend**		
a	315mm dia 90/60 bend	nos	9492
b	200mm dia 60 Bend	nos	2220
c	200mm dia 90 Bend	nos	2220
d	140mm dia 60 Bend	nos	809
e	140mm dia 90 Bend	nos	809
f	110mm dia 60 Bend	nos	472
g	110mm dia 90 Bend	nos	472
4	**Reducer**		
a	200x140 mm Reducer	Nos	1243
b	200x160 mm Reducer	Nos	946
c	160x140 mm Reducer	Nos	298
d	140x110 mm Reducer	Nos	354
5	**Tee**		
a	200 mm TEE	Nos	1853
b	140 mm TEE	Nos	890
c	110 mm TEE	Nos	434

13.00 Rates of Materials for the Program 2021-2022			
6	**End Cap CI-III**		
a	110 mm End Cap	Nos	209
b	140 mm End Cap	Nos	413
c	200 mm End Cap	Nos	944
7	**Coupler**		
a	315 mm Coupler	Nos	1482
b	200 mm Coupler	Nos	274
c	160 mm Coupler	Nos	218
d	140 mm Coupler	Nos	118
e	110 mm Coupler	Nos	67
8	**Solvent Cement**	Ltr	425
9	**Casing Pipes ISI marked- IS 12818**		Rate (In Rs.)
a	250 mm dia 12.5 thick CM	mtr	4212
b	150MM N.B. 7.5 MM -Medium	mtr	1405
c	100 mm dia 5 mm thick CM	mtr	637
d	150 mm dia 7.5 mm thick Sreen Ribbed (Medium)	mtr	2274
e	100 mm dia 5 mm thick Sreen Ribbed (Medium)	mtr	1021
f	250x150 Socket (CD)	nos	5400
g	150x100 Socket (CD)	nos	1335
10	**P.V.C.Flexible Hose pipe, ISI marked - IS 15265**		Rate (In Rs.)
a	150 mm dia Suction Hose	Mtr	1768
b	100mm dia Suction Hose	Mtr	911
c	100 mm dia Lay Flat Hose (Non-ISI)	Mtr	200
d	75 mm dia Lay Flat Hose (Non-ISI)	Mtr	132
e	65 mm dia Lay Flat Hose (Non-ISI)	Mtr	115
11	**E.R.W.Casing & Blank Pipe ISI marked-IS 4270**		Rate (In Rs.)
a)	350 mm N.B. (8.0mm) 68.57 Kg/m	mtr	7007
b)	250 mm N.B.(7.1mm) 46.57 Kg / m	mtr	4580
c)	200 mm N.B.(6.4mm) 33.1Kg / m	mtr	3214
e)	150 mm N.B. (5.4mm) 21.6 Kg / m	mtr	2069

13.00 Rates of Materials for the Program 2021-2022			
f)	150 mm N.B. (5.0mm) 20.13 Kg / m	mtr	1929
12	**G.I Pipe, IS:1239(part-I), Galv- IS 4736**		Rate (In Rs.)
a	150 mm dia ,5.4mm (Socketed)	mtr	2547
b	100mm	mtr	1925
13	**Galv. MS Flanged Pipe ISI marked- IS: 1239, Galv- IS 4736**		Rate (In Rs.)
a)	150mm.dia (4.8mm)	mtr	3800
b)	100mm.dia.	mtr	2474
14	**Galv. M S Column pipe, ISI marked -1239, Galv- IS 4736**		Rate (In Rs.)
a	150 mm dia one end screwed & other end non-std flange 3 mt long (bottom)	nos	12218
b	150 mm dia both end with non-std flange 3 m long (middle)	nos	13058
c	150 mm dia one end std& other end non std flange (top) 3m long	nos	13461
d	125 mm dia (bottom) 3m long	nos	10355
e	125 mm dia (middle) 3m long	nos	10682
f	125 mm dia (top) 3m long	nos	11434
g	80 mm dia both end screwed & one end socketted 3m long (bottom)	nos	4800
h	80 mm dia screwed at one end & std flanged at other 3m long (top)	nos	5500
15	**90 degree G.I Bend (both end flanged)-ISI marked-IS 1239, Galv- IS 4736**		Rate (In Rs.)
a)	150 mm dia	nos	8175
b)	150 mm dia long bend (with priming)	nos	8393
c)	100 mm dia long bend (with priming)	nos	3951
d)	100 mm dia long bend	nos	3600
e)	80 mm dia	nos	2800

13.00 Rates of Materials for the Program 2021-2022			
16	**GI. Holding Clamp- IS 1239, Galv- IS 4736**		Rate (In Rs.)
a)	150 mm dia	Pair	3253
b)	125 mm dia	Pair	3100
c)	80 mm dia	Pair	2185
17	**GI Set for Distribution Chamber , All material ISI marked (As per appvd. existing drawing & tech. spec.)**		Rate (In Rs.)
a)	Quadruped Set for Major RLI	set	875000
b)	Quadruped Set for Midi RLI	set	421500
c)	Quadruped Set for HDTW	set	405000
d)	Tripod Set for Mini RLI	set	202000
e)	Tripod Set for MDTW	set	200500
18	**Valves & Other Accessories**		Rate (In Rs.)
	C.I. Sluice Valve with hand wheel, ISI marked, IS:14846		
a)	150 mm dia	nos	9950
b)	100 mm dia	nos	6300
c)	80 mm dia	nos	4800
	Alfa Alfa Valve (nipple type) with handwheel 01 no. for 04 nos valve.(As per appvd. existing dwg.)		
a)	150 mm (type-C)	nos	4435
b)	100 mm (type-D)	nos	3300
19	**Submersible pump sets, ISI marked- IS 8034**		Rate (In Rs.)
a	[180-125m³/hr, 20-35m](25 HP) 150mm outlet (350mm)	nos	97240
b	[150-115m³/hr, 17-28m] (20 HP) 150mm outlet (350mm)	nos	89752
c	[100-70m³/hr, 30-39m] (17.5 HP) 125mm outlet (250mm)	nos	74827
d	[100-60 m³/hr, 30-42m] (15 HP) 125mm outlet (250mm)	nos	69944
e	[80-60 m³/hr, 30-39m] (12.5 HP) (250mm)	nos	67766
f	[38-30m³/hr, 30-45m] (7.5 HP) with 80mm outlet (150mm)	nos	42952
g	[36-25m³/hr, 24-30m] (5 HP) 80mm outlet (100mm)	nos	39483

13.00 Rates of Materials for the Program 2021-2022			
20	**MOTOR CONTROLLER, IS 60947**		Rate (In Rs.)
a	3 HP Motor-Pump Controller comprising of 3Ø DOL Electromagnetic Starter with single hasing preventer and normal protective features,MCB,Capacitor,Indicators,push buttons Ammeter &Voltmeter	nos	9822
b	5 HP Motor-Pump Controller comprising of 3Ø DOL Electromagnetic Starter with single hasing preventer and normal protective features,MCB,Capacitor,Indicators,push buttons Ammeter&Voltmeter	nos	10548
c	7.5 HP Motor-Pump Controller comprising of 3Ø DOL Electromagnetic Starter with single hasing preventer and normal protective features,MCB,Capacitor,Indicators,push buttons Ammeter&Voltmeter	nos	10791
d	3Ø electromagnetic Star- Delta starters for 7.5HP motor	nos	14820
e	3Ø electromagnetic Star- Delta starters for 10HP motor	nos	17932
f	3Ø electromagnetic Star- Delta starters for 15HP motor	nos	19656
g	3Ø electromagnetic Star- Delta starters for 17.5HP motor	nos	22230
h	3Ø electromagnetic Star- Delta starters for 20HP motor	nos	24700
1	3Ø electromagnetic Star- Delta starters for 25HP motor	nos	27820

13.00 Rates of Materials for the Program 2021-2022			
21	**Electro motor pump sets, ISI marked , IS 12615 & IS 6595**		Rate (In Rs.)
b	200 m^3/hr,24 m head. (25HP)	nos	307375
d	200 m^3/hr,18 m head. (20HP)	nos	122000
f	100 m^3/hr,24 m head. (15 HP)	nos	91988
h	100 m^3/hr,18 m head. (10 HP)	nos	66125
j	50 m^3/hr,24 m head. (7.5 HP)	nos	64225
k	50 m^3/hr,18 m head (5 HP)	nos	41125
l	30 m^3/hr, 16 m head. (3.5 HP) MONOBLOCK with pump	nos	28938
22	**Electrical Materials, IS 60947**		Rate (In Rs.)
	Bus Bar Chambers (As per appvd. existing dwg)		
a)	200 A	nos	9697
b)	63 A	nos	6980
	Switch Fuse Unit, ISI marked, IS 60947		
a)	16A Switch Fuse Unit TPN	nos	3255
b)	32A Switch Fuse Unit TPN	nos	4198
c)	63A Switch Fuse Unit TPN	nos	8418
d)	200A Switch Fuse Unit TPN (Conforming to IS)	nos	16260
e)	100A Switch Fuse Unit TPN	nos	15267
23	**3C Flat water proof Cu.cables ISI marked-IS 694**		Rate (In Rs.)
a)	3C X 1.5 sq. mm	mtr	101
b)	3C X 2.5 sq. mm	mtr	163
c)	3C X 4 sq. mm	mtr	239
d)	3C X 6.0 Sq.mm	mtr	352
e)	3C X 10.0 Sq.mm	mtr	595
f)	4C X 16.0 Sq.mm	mtr	925

All prices are incl. of GST@18%

8/9/21

Chief Engineer-II
Water Resources Dev. Directorate
Chairman, SRC

TECHNICAL SPECIFICATION

uPVC PIPES:

The pipes shall be of un-plasticized PVC, both ends plain strictly as per IS: 4985/2000 with latest amendment thereof and the PVC pipes shall be duly marked with standard ISI certification marks. The PVC pipes shall be of class as per chart below:

	Nominal outside diameter of P.V.C pipe in mm	Class
1.	315mm dia.	Class-I (0.25 MPA)
2.	200mm dia.	Class-I (0.25 MPA)
3.	140mm dia.	Class-I (0.25 MPA)
4.	110mm dia.	Class-I (0.25 MPA)
5.	160mm dia	Class-II (0.4 MPA)
6.	140mm dia.	Class-II (0.4 MPA)
7.	110mm dia.	Class-II (0.4 MPA)

Length of Pipes: The pipes shall be supplied in straight length of 6 mts with tolerance of +10mm and -0mm with both ends plain.

Marking: As per IS 4985:2000 with latest amendments and "WRIDD" (each letter of 1 inch) to be marked at every 2 (two) mtr

Colour of pipes: Colour of pipes shall be Grey.

PVC Pipes and coupler to be supplied with PVC Pipes: One loose coupler of equivalent diameter of each length of pipe and solvent Cement required for jointing shall have to be supplied with PVC pipes.

Coupler to be supplied with PVC Pipes shall be strictly as per IS 10124:2009 with latest amendments and shall be duly marked with ISI certification Mark and shall be of Class-II (0.4MPA)

Solvent cement should be supplied in sealed container (fire proof) of 20 lts /5lts capacity and shall conform to I.S :14182/1994 with latest amendments for no. of joints as follow:

Sl. No.	Dia. Of Pipe	No. of joints per lt.
1.	315 mm	5
2.	200 mm	15
3.	160 mm	30
4.	140 mm	36
5.	110 mm	54

uPVC Fittings : (REDUCERS, BENDS, TEE, COUPLERS, FLANGED TAIL PIECE& END CAP)

The fittings to be supplied are to be manufactured from unplasticised PVC pipes (Class-II/III) as per **IS-10124/2009** and shall be duly marked with standard ISI certification marks. The fittings shall be of sizes and class as per chart below:

	Size	Class
1. **Flanged Tail Piece**		
	a) 315mm nominal dia.	Class-II (0.40 MPA)
	b) 200mmnominal dia.	Class-II(0.40 MPA)
	c) 160mmnominal dia.	Class-II (0.40 MPA)
	d) 140mmnominal dia.	Class-II (0.40 MPA)
	e) 110mmnominal dia.	Class-II (0.40 MPA)
2. **Bends**		
	a)315mmnominal dia. 90°bend	Class-II(0.40 MPA)
	b)200mmnominal dia. 60°bend	Class-II(0.40 MPA)
	c)200mmnominal dia. 90°bend	Class-II(0.40 MPA)

d) 160mmnominal dia.90°bend	Class-II(0.40 MPA)
e) 140mmnominal dia.90°bend	Class-II(0.40 MPA)
c) 140mmnominal dia.60°bend	Class-II(0.40 MPA)
d)110mmnominal dia.90°bend	Class-II(0.40 MPA)
e) 110mmnominal dia.60°bend	Class-II (0.40 MPA)
3. Straight Reducer	
a) 200 x 140mm	Class-II(0.40 MPA)
b) 200 x160mm	Class-II(0.40 MPA)
c)160 x 140mm	Class-II(0.40 MPA)
d)160 x 110mm	Class-II(0.40 MPA)
d)140 x 110mm	Class-II(0.40 MPA)
4. Tee	
a) 200mm nominal dia. Equal Tee	Class-II (0.40 MPA)
b) 140mm nominal dia. Equal Tee	Class-II (0.40 MPA)
c) 110mmnominal dia. Equal Tee	Class-II (0.40 MPA)
5. Couplers	
a) 315mm	Class-II (0.40 MPA)
b) 200mm	Class-II(0.40 MPA)
c) 160mm	Class-II(0.40 MPA)
d) 140mm	Class-II (0.40 MPA)
e) 110mm	Class-II(0.40 MPA)
6. **End Cap**	
a)140mm nominal dia.	Class-III(0.60 MPA)
b) 200mmnominal dia.	Class-III (0.60 MPA)

Marking: As per IS: 10124/2009 with latest amendments.

TECHNICAL SPECIFICATION (BLUE PIPE)

uPVC Medium Well Screen(RMS) Pipes with Ribs:

The pipes shall be of unplasticised PVC, both ends threaded(male & female) strictly as per IS: 12818 with latest amendment thereof and the pipes shall be duly marked with standard ISI certification marks. The Screen PVC pipes shall be of specification as below:

1.Nominal dia.	: 100mm , 150mm
2. Wall Thickness	: min.5.0mm(for 100mm) , min.7.5mm(for 150mm)
3.Ribbed or Plain	: Ribbed with smooth edges.
4.Length of Pipes	: The pipes shall be supplied in effective straight length of 3 meters with tolerance of +10mm and -0mm.
5.Slots	: The dimensions and layout of the screens shall be as indicated in IS: 12818/2010 with latest amendments.
6.Marking	: As specified in IS: 12818/2010 with latest amendments.
7.Colour of pipes	: Colour of pipe shall be blue.
8.Threading	: The screen and casing pipes shall have male threads at spigot end protected with plastic protector and female threads at the socket end as per IS code.
9.Visual appearance	: The internal and external surfaces of the pipe shall be smooth, clean and free from other defects.

uPVC Medium well Casing (CM) pipes:

The pipes shall be of unplasticised PVC, both ends threaded(male & female) strictly as per IS: 12818/2010 with latest amendment thereof and the pipes shall be duly marked with standard ISI certification marks. The Screen PVC pipes shall be of specification as below:

1.Nominal dia.	: 100mm ,150mm , 250 mm.
2.Wall Thickness	: min.5.0mm(for 100mm) , min.7.5mm(for 150mm) , min.12.5 mm (for 250mm)
4.Length of Pipes	: The pipes shall be supplied in effective straight length of 3 mts with tolerance of +10mm and -0mm.
5.Marking	: As specified in IS: 12818/2010.
6.Colour of pipes	: Colour of pipe shall be blue.
7.Threading	: The screen and casing pipes shall have male threads at spigot end protected with plastic protector and female threads at the socket end as per IS code.
8.Visual appearance	: The internal and external surfaces of the pipe shall be smooth, clean and free from other defects.

Reducer

The no. of the reducer for each set of pipes for each type shall be 1 (one) and should match with the thread of casing and strainer. The reducer should be manufactured from **ISI 12818** marked **CD pipe** whose licence has to be submitted with the tender.

Marking

The screen pipes are to be marked with colour bands as follows :-

Slot Size.	Colour band.
0.30 mm.	Red.
0.50 mm.	Yellow.
0.75 mm.	White

TECHNICAL SPECIFICATION

PVC Suction Hose pipe:

The suction hose pipe shall have to be ISI marked as per IS 15625 read with latest amendment. The testing of the hose pipe shall be done according to the specification of IS 15625, with latest amendment. Each roll should be of 20 meters in length with tolerance of ± 10mm. The hose pipe should be marked in every .3 meter length with auto printer with the following information. Sticker of any form not allowed.

(1) Date of manufacturing, (2) Diameter, (3)Brand name.

Lay Flat Hose pipe:

The pipes shall be of un-plasticised PVC, Polyester reinforced heavy duty and as per following specification:

1. Nominal size : 100mm and 75mm
2. Wall thickness: 1.8mm for 100mm and 1.3mm for 75mm.
3. Working Pressure : 3.0 Kg/cm^2
4. Bursting Pressure : 9.0 kg/ cm^2
5. Standard length : 100m coil.

Marking: WRDD letters to be printed in every 3 mt interval

TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATION FOR GALVANIZED MILD STEEL QUADRUPED / TRIPOD SETS & BENDS (FOR MAJOR, MIDI, MINI RLI & HDTW, MDTW SCHEMES)

Standards:

The material shall comply with the latest edition of relevant Indian standards. The following Indian Standards shall be complied with:

IS:1239(Part-1)	:Steel Tubes, Tubular and other wrought steel fittings.(For Tube)
IS:1239(Part-2)	: Steel Tubes, Tubular and other wrought steel fittings.(For Fittings)
IS:6392	:Steel Pipe Flanges
IS:3589	:Steel Pipes for water and sewage.
IS:2062	:Hot rolled medium and High Tensile structural steel.
IS:11428(Part-II)	:Wrought carbon steel Butt-Welding Pipe Fittings.
IS: 4759-1979	: Specification for Hot Dip Zinc Coatings on Structural Steel and other allied Products.
IS: 209-1979	: Specification for zinc.
IS: 2629-1966	: Recommended Practice for Hot Dip Galvanizing of Iron and Steel.
IS: 6158-1971	: Recommended Practice for Safe-guarding against Embrittlement of Hot Dip Galvanized Iron & Steel Product.
IS: 2633-1972	: Method of Testing Uniformity of Coating on Zinc Coated Articles.
IS: 6745-1972	: Method for Determination of weight of Zinc Coating on Zinc coated iron and steel articles.
IS: 4736-1986	:SPECIFICATIONFOR HOT-DIP ZINC COATINGS ON MILD STEEL TUBES.

All above IS codes are to be read with latest amendments.

1.GalvanisedM.S. Pipes

i)M.S Pipes upto and including 150 mm(NB) to be used for fabrication of parts will be as per IS:1239(Part-1)/2004 with latest amendments and duly ISI marked of medium class.

ii)E.R.W, M.S. Pipe of 200 N.B, (219.1mm, Dia,) 300 N.B. (323.9mm.Dia.) and 500 N.B (508mm Dia) used for fabrication will be of IS:3589/ 2001 with latest amendments duly marked with "ISI" certification mark. Thickness of 200 (NB) pipe shall be 4.5mm, and that for 300 N.B.shall be 5.6mm and 500 N.B shall be 6.3mm.

2.GalvanisedM.S. Bend and Elbow:

150 (NB) 90° Bend and Elbow to be manufactured from corresponding ERW Pipe, Bend will be as per IS:1239 (Part-II)/2011 duly ISI Marked plain end and Long Radius Elbow will be as per IS: 11428 /85 (Part-II) Table-1,

3.GalvanisedMS Reducer& manifold

i)Reducer/Expander (wherever shown in drg): To be manufactured from M.S. Pipe as per Technical Specification
& drawing and as per IS:11428 (Part-II) 1985.
ii)Manifold:500 N.B(508mm,dia),6mm thick, 100mm X 100mm X 150mm manifold to be fabricated from M.S Plate as per IS:2062 /2011 with latest amendments and duly ISI Marked.

4.GalvanisedM.S. Flange:
All Flanges shall be as per ISI 6392/ 1971 with latest amendments and duly ISI Marked(stenciled/ punched/ transfixed) as per Tables mentioned in the drawings.

5.Welding:
i)Welding shall be done inside and outside of Flanges and in case of other parts where inside welding will be possible.
ii)Flanges to be welded in positions of drill off Center basis, if otherwise not mentioned in the drawing,
iii)Flanges to be welded for Flanged Pipe with position of drill in parallel line.
iv)Deposit of welding materials shall be below the working faces of Flanges.

6.Dimensions: All dimensions are in millimeter, unless otherwise stated.

7.Tolerance: Tolerance as per relevant Standards.

8. Galvanization:**The materials are to be hot dip galvanized as per IS 4736-1986only after complete fabrication of materials. No welding is allowed after fabrication.** All the materials are to be fabricated as per drawing including component parts has to be hot dip zinc coating as per relevant standards mentioned above.

QUALITY OF ZINC: Zinc conforming to at least grade Zn 98.5% specified in IS: 209 shall be used for the purpose of galvanizing.

SURFACE PREPARATION AND GALVANISING: Surface shall be cleaned and prepared as per clause 4& 5 of IS: 2629.

TEST METHODS

VISUAL INSPECTION: The material shall be inspected visually to observe that it is smooth, reasonably bright,

continuous and free from such imperfections as flux/ash/dross inclusions, bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits and blisters. The stains of flux, usually white in colour, shall not be regarded as flux intrusions.

ADHESION OF GALVANISED COATING: Coating shall withstand the knife tests as prescribed in IS: 2629-1985 (with latest amendment) When cut or pried into, such as with a stout knife applied with considerable pressure, in a manner tending to remove a portion of the coating, it shall only be possible to remove small particles of the coating; and it shall not be possible to peel any portion of the coating so as to expose iron or steel underneath.

UNIFORMITY OF GALVANISED COATING: Should be in conformity with IS 2633

MASS OF ZINC COATING: :Should be in conformity with IS 4736-1986. Measurement of coating thickness at a number of places by magnetic thickness gauge shall be taken as a uniformity test. At least 5 readings may be taken at convenient locations nearly in the centre. Thickness, in micron, when multiplied by 7.047 would give the average mass of zinc coating (g/m^2).

Minimum average mass of zinc coating on different kinds of articles shall be 560gm/m^2

9. **Test Bench**: Manufacturers should have arrangement of test bench to assemble the finished components(after galvanizing) to check the alignment of the assembled set.

10.Hydraulic Test:
The fitted materials shall be subjected to atmospheric hydraulic pressure test in the test bench to check any leakage from the complete assembled set(after galvanizing).

11. Marking: Identification mark of 25mm height to be provided on each component in the following manner:

a. Brand Name:
b. Department Name: WRIDD
c. Item no.(as mentioned in BOM):
d. Type of scheme (Major/Midi/Mini/HDTW/MDTW) :

12. Weight: The materials shall be weighed and the minimum weight should be as stipulated in the Bill of materials of respective drawing

13. Colour Coding:Prominentcolour coding for each type of structure to be provided on the outer vertical face of flange in the following manner:

Sl. No	Galvanised MS Set	Colour of Flange
1.	Quadripod Set for Major R.L.I	Yellow
2.	Quadripod Set for Midi R.L.I	Orange
3.	Tripod set for Mini R.L.I	Red
4.	Quadripod set for HDTW	Green
5.	Tripod set for MDTW	Blue

TECHNICAL SPECIFICATION FOR GALVANISED MS BEND , PRIMING BEND & ELBOWS (BOTH END FLANGED)

Standards:

The Mid Steel material shall comply with the latest edition of relevant Indian standards. The following Indian Standards shall be complied with:

IS:1239(Part-1)	:Steel Tubes, Tubular and other wrought steel fittings.(For Tube)
IS:1239(Part-2)	: Steel Tubes, Tubular and other wrought steel fittings.(For Fittings)
IS:6392	:Steel Pipe Flanges
IS:3589	:Steel Pipes for water and sewage.
IS:2062	:Hot rolled medium and High Tensile structural steel.
IS:11428(Part-II)	:Wrought carbon steel Butt-Welding Pipe Fittings.
IS:4736	:Hot dip zinc coatings on mild steel tubes.

1.GalvanisedM.S. Pipes

M,S, Pipes upto and including 150 mm(NB) to be used for fabrication of parts will be as per IS:1239 (Part-1)/2004 with latest amendments and duly ISI marked of medium class.

2.GalvanisedM.S. Bend and Elbow:

90° Bend and Elbow upto and including 150(NB) are to be manufactured from corresponding ERW Pipe. Bend will be as per IS:1239 (Part-II)/2011 duly ISI Marked plain end and Long Radius Elbow will be as per IS: 11428 /85 (Part-II) Table-1.

3.Galvanised M.S. Flange:

All Flanges will be ISI 6392/ 1971 with latest amendments and duly ISI Marked as per Tables mentioned in the drawings.

4.Galvanised M.S.Socket: The sockets should be as per IS:1239(part-II)(latest amendment) and duly ISI marked.

4.Welding:
i)Welding shall be done inside and outside of Flanges and in case of other parts where inside welding will be possible.
ii)Flanges to be welded in positions of drill off Center basis, if otherwise not mentioned in the drawing,
iii)Flanges to be welded for Flanged Pipe with position of drill in parallel line.
iv)Deposit of welding materials shall be below the working faces of Flanges.

5.Dimensions: All dimensions are in millimeter, unless otherwise stated.

6.Tolerance: Tolerance for Parts as per IS:1239 (Part-II)/2011 where applicable, for pipes as per corresponding Standards.

7.Weight: The materials shall be weighed and the minimum weight should be as stipulated in the Bill of materials of respective drawing.

8.Galvanization: **The materials are to be hot dip galvanised as per IS 4736-1986only after complete fabrication of materials. No welding is allowed after fabrication.** All the materials are to be fabricated as per drawing including component parts has to be hot dip zinc coating as per relevant standards mentioned above.

QUALITY OF ZINC: Zinc conforming to at least grade Zn 98.5% specified in IS: 209 shall be used for the purpose of galvanizing.

SURFACE PREPARATION AND GALVANISING: Surface shall be cleaned and prepared as per clause 4& 5 of IS: 2629.

TEST METHODS

VISUAL INSPECTION: The material shall be inspected visually to observe that it is smooth, reasonably bright,

continuous and free from such imperfections as flux/ash/dross inclusions, bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits and blisters. The stains of flux, usually white in colour, shall not be regarded as flux intrusions.

ADHESION OF GALVANISED COATING: Coating shall withstand the knife tests as prescribed in IS: 2629-1985 (with latest amendment) When cut or pried into, such as with a stout knife applied with considerable pressure, in a manner tending to remove a portion of the coating, it shall only be possible to remove small particles of the coating; and it shall not be possible to peel any portion of the coating so as to expose iron or steel underneath.

UNIFORMITY OF GALVANISED COATING: Should be in conformity with IS 2633

MASS OF ZINC COATING: :Should be in conformity with IS 4736-1986. Measurement of coating thickness at a number of places by magnetic thickness gauge shall be taken as a uniformity test. At least 5 readings may be taken at convenient locations nearly in the centre. Thickness, in micron, when multiplied by 7.047 would give the average mass of zinc coating (g/m^2).

Minimum average mass of zinc coating on different kinds of articles shall be 560gm/m^2

9. Marking: Identification mark of 25mm height to be provided on each component in the following manner:

a. Brand Name:

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b. Department Name: WRIDD
c. Item no.(as mentioned in BOM):
d. Type of scheme (Major/Midi/Mini/HDTW/MDTW) :

10.Hydraulic Test:

The flanged bends does not require hydraulic test. However, a replaceable warranty certificate valid for 1(one) year against each supply should be submitted if any defect, leakages due to bad workmanship is detected within the warranty period

TECHNICAL SPECIFICATION FOR GALVANISED MS COLUMN PIPE & CLAMP

Standards:

The Mild Steel material shall comply with the latest edition of relevant Indian standards. The following Indian Standards shall be complied with:

IS:1239(Part-1)	:Steel Tubes, Tubular and other wrought steel fittings.(For Tube)
IS:1239(Part-2)	: Steel Tubes, Tubular and other wrought steel fittings.(For Fittings)
IS:6392	:Steel Pipe Flanges
IS:11428(Part-II)	:Wrought carbon steel Butt-Welding Pipe Fittings.
IS:2062	:Hot rolled medium and High Tensile structural steel.
IS:1363	:Hexagon head bolts, screws and nuts.

1.Galvanised M.S. Pipes

M.S Pipes upto and including 150 mm(NB), to be used for fabrication of parts will be as per IS:1239 (Part-1)/2004 with latest amendments and duly ISI marked of heavy class.

2.Galvanised M.S. Flange(Std.):

All Std. Flanges shall be duly ISI Marked (stenciled/ punched/ transfixed) as per ISI 6392/ 1971 with latest amendments and as per Tables mentioned in the drawings.

3.Galvanised M.S Flange(Non-Std.): All non- Std. Flanges shall as per dimension mentioned in drawing.

4. Galvanised M.S.Socket: The sockets should be as per IS:1239(part-II)(latest amendment) and duly ISI marked.

5.Galvanised M.S Clamps: The Clamps are to be fabricated from 12mm thick m.s plate conforming to IS 2062 read with latest ammendments.

6. Galvanised Nuts and Bolts: The Clamps are to be supplied in pairs and bolted with nuts, conforming to IS-1363

7.Welding:

i)Welding shall be done inside and outside of Flanges and in case of other parts where inside welding will be possible.
ii)Flanges to be welded in positions of drill off Center basis, if otherwise not mentioned in the drawing,
iii)Flanges to be welded for Flanged Pipe with position of drill in parallel line.

iv)Deposit of welding materials shall be below the working faces of Flanges.

8.Dimensions
All dimensions are in millimeter, unless otherwise stated.

9.Weight: The materials shall be weighed and the minimum weight should be as stipulated in the Bill of materials of respective drawing.

10.Tolerance: Toleranceasper relevant Standards.

11.Galvanization: **The materials are to be hot dip galvanised as per IS 4736-1986only after complete fabrication of materials. No welding is allowed after fabrication.** All the materials are to be fabricated as per drawing including component parts has to be hot dip zinc coating as per relevant standards mentioned above.

QUALITY OF ZINC: Zinc conforming to at least grade Zn 98.5% specified in IS: 209 shall be used for the purpose of galvanizing.

SURFACE PREPARATION AND GALVANISING: Surface shall be cleaned and prepared as per clause 4& 5 of IS: 2629.

TEST METHODS

VISUAL INSPECTION: The material shall be inspected visually to observe that it is smooth, reasonably bright,

continuous and free from such imperfections as flux/ash/dross inclusions, bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits and blisters. The stains of flux, usually white in colour, shall not be regarded as flux intrusions.

ADHESION OF GALVANISED COATING: Coating shall withstand the knife tests as prescribed in IS: 2629-1985 (with latest amendment) When cut or pried into, such as with a stout knife applied with considerable pressure, in a manner tending to remove a portion of the coating, it shall only be possible to remove small particles of the coating; and it shall not be possible to peel any portion of the coating so as to expose iron or steel underneath.

UNIFORMITY OF GALVANISED COATING: Should be in conformity with IS 2633

MASS OF ZINC COATING: :Should be in conformity with IS 4736-1986. Measurement of coating thickness at a number of places by magnetic thickness gauge shall be taken as a uniformity test. At least 5 readings may be taken at convenient locations nearly in the centre. Thickness, in micron, when multiplied by 7.047 would give the average mass of zinc coating (g/m^2).

Minimum average mass of zinc coating on different kinds of articles shall be 560gm/m^2

TECHNICAL SPECIFICATION FOR M.S/ERW BLACK PIPES FOR HDTW SCHEMES

Standards:
The Mild Steel material shall comply with the latest edition of relevant Indian standards. The following Indian Standards shall be complied with: **IS:4270:Steel Pipes for water and sewage.**

1. 350mm dia(NB),8.0 mm nominal wall thickness, MS ERW Pipe, duly ISI certification marked ,both ends plain as per IS:4270:2001 (Reaffirmed Nov,2006) with amendments no.1 , 6.00 mtr. in length.

2. 250mm dia(NB),7.1 mm nominal wall thickness, MS ERW Pipe, duly ISI certification marked ,both ends plain as per IS:4270:2001 (Reaffirmed Nov,2006) with amendments no.1 , 6.00 mtr. in length

3. 200mm dia(NB), 6.4 mm nominal wall thickness, MS ERW Pipe,duly ISI certification marked ,both ends plain as per IS:4270:2001 (Reaffirmed Nov,2006) with amendments no.1 , 6.00 mtr. in length.

4. 150mm dia(NB),5.4 mm nominal wall thickness, MS ERW Pipe,duly ISI certification marked ,both ends plain as per IS:4270:2001 (Reaffirmed Nov,2006) with amendments no.1 , 6.00 mtr. in length.

5. Tolerance: As per relevant Standard

GENERAL SPECIFICATION OF G.I Pipes

G.I. Pipes, duly ISI marked to IS:1239 (Part-I) /2004 with amendments no.1 to 3, 6.00 mtr. in length with a tolerance as per IS.screwed at both ends as per IS:554/1999.socketted at one end and other end protected with plastic protector. Socket should be IS Marked as per IS:1239 (Part-II)/1994 with latest amendments.

150 mm(NB) Dia,5.4 mm thick,

GENERAL SPECIFICATION OF ALL WELDED STAINLESS STEEL – 304 (SS – 304) CAGE TYPE WIRE WOUND SCREEN PIPE

Electric Resistance Welded (ERW) Stainless Steel Cage type Vee Wire wound Screens as per IS: 8110 – 2000. The Screen is of continuous trapezoidal wire spirally wound around fabricated cage. The screen must consist of 'V' shaped (wedge) profile wire, resistance welded to a cylindrical body made of number of longitudinal special high tensile support rods to provide smooth unrestricted bore which are in turn welded into cylindrical ring couplings at both ends.

1. Cylindrical Steel Rings to be welded on both sides of the screen such that it will not affect the total tensile strength.
2. End ring to be threaded with 11 TPI male thread at one end and threaded socket at the other.
3. Screens should have evenly distributed slot opening so that it has minimum turbulence and loss of energy.
4. Open area of the screen must be designed such that entrance velocity is less than 0.03 metre per second as per IS 8110 and water enters the well more easily and less energy needed to pump the water.
5. Slot to be smooth, clean edges rounded off so that it gives better hydraulic performance and may reduce encrustation.
6. The 'V' shape inwardly widening slots should be non-clogging so that sediments have only point contact which will give longer effective well life.

7. The wrapping wire having a wedge profile with flat surface on the outside and producing expanding slots on the inside. This shape must facilitate jetting and back washing operation and also avoids the screens being clogged by fine particles.
8. The number and cross section of the vertical support rods and the size of the wrapping wire shall be such as to give specified tensile load.
9. All screen have 'V' shaped inwardly widening slots and available slot width to be 0.25 mm & 0.50mm.

DETAIL SPECIFICATION

TEM NO.	SCREEN SIZE IN MM	SLOT SIZE IN MM	ID MM	OD MM	PROFILE WIRE HEIGHT MM	SUPPORT Rod DIA IN MM	TENSILE LOAD IN TONS	COLLAPSE PRESSURE IN Kg/Cm2	% OPEN AREA	WEIGH IN Kg / Mt
1.	75	0.50	76	86.5	2.57	3.18	4.9	47	18	4.2

A. Overall length of screen 3 Meter without any circumferential joints in screen section. Tolerance in length ± 0.50 mm & screen will measure from Ring end to Ring end.
B. The end rings to be threaded with 11 TPI threads as per IS 554 and one end fitted with socket
C. Tolerance on thickness of end ring will be as per IS 3589 – 1991: ± 10%
D. Tolerance on O.D. and I.D. for Well Screen and Ring will be allowed: ± 1%

TECHNICAL SPECIFICATION

Sluice Valves:

The Sluice Valves are to be manufactured from Cast iron and as per **IS-14846/2000** with amendments 1,2,3, and shall be duly marked with standard ISI certification marks. The fittings shall be of sizes and class as per the IS Specification:

Bodies and bonnets shall be so designed as to withstand the test pressure specified. The bodies of the valves shall be fitted with seat rings securely fixed in machined recesses. The manufacturer shall provide a reasonable clearance behind the rear face of the flange on body and bonnet to provide free access to use spanners for assembling and dismantling. The portions of bonnet (gland and stuffing box) which come in contact with spindle shall be provided with bushings of minimum 3 mm thickness and of material as specified in table 1 of IS: 14846 as a anti-frictional devices.

1. Nominal Size	: 100mm, 150mm, 80mm
2. Material of construction, Dimension,Tolerance & Testing	: As per IS 14846 read with latest amendment.
3. Pressure Designation	: PN 1.6
4. Handwheel	: Provided for individual valve

Alfa-Alfa Valves:

Alfa-Alfa Valve with angular control arrangement shall be used for agricultural purpose and are to be manufactured from cast iron as per IS210/1239 with latest amendments. Tolerance of the Dimensions can be allowed within ±1 mm. The casting shall be accurately in accordance with the pattern or working drawings supplied by the TIA. The castings shall be sound, clean and free from porosity, blow holes, hard spots, and cracks. Hot tears, cold blasts, distortion, sand and slag inclusions and other harmful defects. They shall be well dressed and be readily machine able. The valves shall be of specification as below:

1. Nominal Size	: 100mm, 150mm
2. Dimension & Tolerance	: As per drawing
3. Material of body	: As per IS:210/2009
4. Operating Position	: Horizontal.
5. Material of components	: As mentioned in Drawing
6. Machining	: All contact faces should be machine finished.
7. Painting	: All coatings shall be carried out after satisfactory testing of the valves prior to despatch. All exposed machined ferrous surfaces shall be painted with one coat of red oxide metal primer. Two coats of black Japan conforming to Type B of IS 341 shall be applied by brush or spray for exterior application.
10. Identification mark	: Each valve should be marked with identification mark of the manufacturer.
11. Hydraulic Test	:The valves shall be subjected to atmospheric pressure test and shall show no leakage when pressure is applied at the inlet end.
12. Weight (Minimum)	: 24 Kgs for 150mm (type-C) : 15.3 Kgs for 100mm (type-D)
13.Handwheel	: 01(One) no. for 04(four) nos valve.
13. Drawings	: attached.

TECHNICAL SPECIFICATION

A) ELECTRO MOTOR PUMP SET

For ISI marked electromotor centrifugal pump sets as per IS-12615 (read with latest amendment)for motor and IS-6595 (read with latest amendment) for pump."

1. General:

The Pump shall be horizontal and of single stage, split casing and having suitable arrangement for inlet and outlet connection in the suction & delivery side as specified below. The Pump sets shall be of sturdy construction for the unfavorable & not the ideal site condition as regards to storage, handling, running, maintenance and repairs of Pump sets. The Motor and Pump should be directly coupled with Tyre type flexible coupling (as per IS 14285:1995) and mounted on a common fabricated M.S. Base frame. Centrifugal pump shall confirm to IS: 6595(Part-I)/2002 and motor to IS-12615:2011 with latest amendments thereof and must have ISI certification mark.

2. **Motor Pump set operating condition:**

2.1 Speed:

The Pump sets will be operated at a speed of 1450 r.p.m. (approx) depending on Motor rating corresponding to synchronous speed of 1500 r.p.m.

2.2 Delivery conditions:

Discharge leading from the Pump will be directly released in the field through a delivery pipe or into an underground pipe distribution system or into an overhead reservoir located in close proximity of the installation point. The rated discharge shall be at specified head as below:

Sl. No.	Motor rating	Duty point Total Head	Duty point Discharge	Type of installation	Delivery pipeline size	Mode of operation	To match with Inlet & outlet pipe size
1.	5 HP	18 m	50m³/hr	Shore	100mm	DOL	100mm X 100mm
2.	7.5 HP	24 m	50m³/hr	Shore	100mm	Star Delta	100mm X 100mm
3.	10 HP	18 m	100m³/hr	Shore	100mm	Star Delta	100mm X 100mm
4.	15HP	24 m	100m³/hr	Shore	100mm	Star Delta	100mm X 100mm
5.	20 HP	18 m	200m³/hr	Shore	150 mm	Star Delta	150mm x 150mm
6	25 HP	24 m	200m³/hr	Shore	150 mm	Star Delta	150mm x 150mm

Note: Suitable fitting has to be provided with the electromotor pump set to match with the inlet and outlet pipe size mentioned in the table above.

2.3 Site conditions:

(i) Elevation of sites from mean sea level:- will not exceed 255 meters.

(ii) Quality of water:- Clear, cold and fresh water and the characteristics are within the limits specified in para-4 of IS- 6595(Part-I)/2002 with latest amendment.

(iii) Size of delivery pipeline arrangement: mentioned in above table.

(iv) Nature of power available:- Pump will be driven by electric Motors suitable for operation on terminal Voltage 415V ±10%, 50HZ ±5% Frequency, 3-phase, A.C. supply. However the Motor shall be capable

of delivering the rated output under the conditions mentioned in related clause of IS-12615/2011 with latest amendment.

3. **Motor:**

The Motor must have **ISI certification mark** and shall confirm to IS-12615:2011 with latest amendments and suitable for operation on terminal Voltage 415V ±10%, 50HZ ±5% Frequency , 3-phase, A.C. supply. It should be screen protected drip proof, TEFC, Squirrel cage induction Motor with class 'F' insulation as per IS-1271/2012 and suitable for Direct On Line/Star-Delta starting as mentioned in table 2.2.

4. **Pump**:

The Pump must have **ISI certification mark** and shall confirm to IS-6595(Part-I)/2002 with latest amendments thereof. The Pump shall be provided with arrangement for inlet and outlet connection as specified above.

B) ISI marked Electric Monoset Pump as per IS-9079

1. **General**:

The equipment shall be Electromotor monoset, horizontal, single stage centrifugal pumps and having suitable arrangement for outlet connection in the delivery side. The Monoblock Pump set should of sturdy construction for the unfavourable & not the ideal site condition as regards storage, handling, running, maintenance and repairs of Pump sets. The composite unit shall confirm to IS:9079/2002 with latest amendments must be ISI marked.

Relevant standards:

1. IS:9079 :Electric monoset Pumps for clear cold water for agricultural and water supply purpose.
2. IS:5120 : Technical requirements for rotodynamic special purpose pumps

2. **Pump operating conditions**:

Site conditions:

Quality of water:- Clear, cold and fresh water and the characteristics are within the limits specified in to IS:9079 (latest amendment).

Nature of power available:- Pump will be driven by suitable electromotor capable of delivering the rated output under the conditions

3. **Electromotor**:

The Motor should be designed for 415V+6% and –15%, 3-Phase, 50 Hz/Sec +3% and –3%, A.C. supply and shall have a speed of 3000 r.p.m(synchronous speed). It should be screen protected drip proof, TEFC, Squirrel cage induction Motor with class 'F' insulation , suitable for Direct On Line starting and must have ISI Certification mark. The required parameters for Electric monoset pump is as below:

Sl. No.	Motor rating	Duty point Total Head	Duty point Discharge	Type of installation	Delivery pipeline size	Mode of operation	To match with inlet & outlet pipe size
1.	3/3.5 HP	16 m	30m³/hr	Shore	100mm	DOL	80 X 65/75mm.

Note: Suitable fitting has to be provided with the electromotor pump set to match with the inlet and outlet pipe size mentioned in the table above.

5. Guarantee of Performance-

The pumpset shall be guaranteed for their performance of the nominal volume rate of flow and the nominal head at the guaranteed point The overall efficiency of the pumpset shall be guaranteed at the declared point only. The overall efficiency of the pumpset declared by manufacturer shall not be less than those given in Fig 3 to 6 of IS:9079 (latest amendment)

Tenderers are to submit the particulars in **TSP-I (Electromotor Pump)/ TSP-II(Monoset Pump)** with the tender and failure to comply with the above requirements will render the tender incomplete and will not be considered.

AUTOMATIC STAR DELTA MOTOR CONTROLLERS

General Description

Automatic Star Delta motor controllers shall be suitable for operation of submersible electromotor pumps as well as motors for surface lift centrifugal agricultural pump operating at 415V(+%6 to -10%) and 50Hz(±3%) .The equipment shall comply with IS-60947/2000(Part-4, Sec-1)and its latest amendments. Starter shall comprise of overload protective device, main and auxiliary contacts, Single phasing preventer, timer and on/off controls .It shall be of utilization categories suitable for the particular application as shown in Table I of IS/IEC 60947-4-1 , for electrical motor circuits unless otherwise specified and display of voltage & current as well as ON-OFF-TRIP position.

Star- Delta automatic motor controllers shall be of following ratings:

Sl. No.	Motor Rating	Type of Starter	Equipment to be operated
1.	7.5H.P	Star Delta	Surface motor for Agricultural centrifugal pump
2.	10 HP	Star Delta	Do
3.	15 H.P	Star Delta	-Do -
4.	20 H.P	Star Delta	-Do -
5.	25 H.P	Star Delta	-Do -

1. **Power Contactors:**

Starters shall consist of 4 pole heavy duty magnetic power contactor with encapsulated wide band operating coil voltage range 210-440V AC suitable for motors of following ratings with required no. of NO and NC auxiliary contacts. The contactor shall meet the requirements of IS : 60947. The contactors shall have minimum making and breaking capacity in accordance with utilization category AC 3 . They shall be replaceable without removing the line, load, or control wiring from the starter.
The contacts shall be of silver alloy and with coils of following ratings:

a) Pick-up volt >250Volts.
b) Drop out volt < 250 Volts.

2. **MCB**: for service entrance(TPN) protection with
   a. High Short circuit withstanding capacity.
   b. Minimum duty rating as per IS :60947 (Part-II)with D/K curve.

3. **Single Phasing Preventer:** Separate Single Phasing Preventer has to be provided with on delay timer (30 sec-5min) or nearest range with over voltage and under voltage protection.

4. **Motor Circuit Protectors**:
   The trip mechanism shall be sensitive to under voltage(range as per relevant IS), single phasing, phase reversal , phase unbalance, overload protection etc. The relays shall be tamperproof and should not affect by vibration. Overload relay shall be able to operate at the conditions stated in relevant IS.

5. **Meters:** Flush mounted voltmeter(0-500V) and ammeters(0-30/50A) to be provided on front panel door. The instruments shall be conforming to IS: 1248 (latest amendment) and with accuracy class index of 1.5.

6. Enclosure:

1. Enclosures shall be of Ingress Protection class 54.
2. Enclosure shall be of min 16 swg C R sheet steel , thoroughly cleaned and factory primed prior to 10 tank process powder coat painted to make it weatherproof. It shall be equipped with full-sized, gasket door with suitable latch and stainless steel hinges.
3. The front on the cabinet shall be equipped with voltage and current displays, ON-OFF indicators, push buttons etc.

7. Wiring.

All wiring shall meet National Electrical Code standards. Internal device wiring shall be furnished by the manufacturer of the device. All interconnecting wiring and wiring to terminals for external connection shall be flexible copper, insulated for not less than 750 volts, with a moisture-resistant and flame-retardant covering. All wiring shall be grouped and firmly supported to the cabinet.
For external connections, terminal blocks shall be rated for the amperes required for mentioned HP of the motor at not less than 750 volts. Terminals shall be labeled to agree with identification shown on the wiring diagram.

8. Earthing:

The enclosure shall be provided with 2 nos 10mm dia earth terminals, each complete with two plain and one spring washer, nuts etc. These terminals shall be effectively bonded to the common sheet steel frame work.

9.Name Plate:

Each unit shall be provided with a name plates marked in a durable manner the followings:

a) "WRIDD - 18-19"
a) Manufacturer's name.
b) Rated operational current and motor rating

10. Information to be furnished regarding various components to be used in the motor controller: (to be provided for major components- contactor, relay & MCB)

1.Make:
2.Applicable standard:
3.Utilisation Category:
4.Accuracy Class (in case of metering instruments)

11.Manuals: (to be submitted before inspection)

Submit, simultaneously with the shop drawings- technical data sheets, wiring diagrams, and information for ordering replacement parts.

Additional features provided besides specified above, shall also be allowed.

Test Certificates from Central Power Research Institute (CPRI)/ Electrical Research and Development Association (ERDA)/ Bureau of Indian Standards (BIS) recognized test laboratories shall have to be produced indicating relevant IS conformity of major components(contactor, relay & MCB) & enclosure.

DOL MOTOR CONTROLLERS

General Description

Motor controllers shall be suitable for operation of submersible electromotor pumps as well as motors for surface lift centrifugal agricultural pump sets operating at 415V(+%6 to -10%) and 50Hz(±3%) .The equipment shall comply with IS-60947/2000(Part-4, Sec-1)and its latest amendments. Motor controllers shall be combination type with electromagnetic contactors as noted below and with Isolator , relays, ON-OFF-TRIP position and display of voltage & current.

1. **Power Contactors:**

Starters shall consist of magnetic contactor suitable for motors of following ratings with required no. of NO and NC auxiliary contacts.The contactor The contactor shall meet the requirements of IS : 60947. The contactors shall have minimum making and breaking capacity in accordance with utilization category AC 3 and shall be suitable for minimum class II intermittent duty. They shall be replaceable without removing the line, load, or control wiring from the starter.

Sl. No.	Motor Rating	Type of Contactors	Equipment to be operated
1.	5 H.P	DOL(electromagnetic)	-Do-
2.	3/3.5 H.P	DOL(electromagnetic)	-Do-

The contacts shall be of silver alloy and with coils of following ratings:

a) Pick-up volt >250Volts.
b) Drop out volt < 250 Volts.

2. **MCB**: for service entrance(TPN) protection with
   a. High Short circuit withstanding capacity.
   b. Minimum duty rating as per IS :60947 (Part-II)with D/K curve.

3. **Single Phasing Preventer:** Separate Single Phasing Preventer has to be provided with on delay timer (30 sec-5min) or nearest range with over voltage and under voltage prevention.

4. **Motor Circuit Protectors:**

The trip mechanism shall be sensitive to under voltage(range as per relevant IS), single phasing, phase reversal , phase unbalance overload protection etc.. The relays shall be tamperproof, and should not affect by vibration. Overload relay shall be able to operate at the conditions stated in relevant IS.

Overload relays shall be matched to nameplate full-load current of protected motor and with appropriate adjustment for duty cycle .

5. **Meters:** Flush mounted voltmeter(0-500V) and ammeters(0-30/50A) to be provided on front panel door. The instruments shall be conforming to IS: 1248 (latest amendment) and with accuracy class index of 1.5.

6. **Enclosure:**
   1. Enclosures shall be of Ingress Protection class 54.

2. Enclosure shall be of min 16 swg C R sheet steel , thoroughly cleaned and factory primed prior to 10 tank process powder coat painted to make it weatherproof. It shall be equipped with full-sized, gasket door with suitable latch and stainless steel hinges.
3. The front on the cabinet shall be equipped with voltage and current displays, ON-OFF indicators, push buttons etc.

7. Wiring.

All wiring shall meet National Electrical Code standards. Internal device wiring shall be furnished by the manufacturer of the device. All interconnecting wiring and wiring to terminals for external connection shall be stranded copper, insulated for not less than 750 volts, with a moisture-resistant and flame-retardant covering. Wiring for control circuits shall have different colours to match the control schematic on the wiring diagrams and shall be integrated in the starter. All wiring shall be grouped and firmly supported to the cabinet.

For external connections, terminal blocks shall be rated for the amperes required for mentioned HP of the motor at not less than 750 volts. Terminals shall be labelled to agree with identification shown on the wiring diagram.

8. Earthing:

The enclosure shall be provided with 2 nos 10mm dia earth terminals, each complete with two plain and one spring washer, nuts etc. These terminals shall be effectively bonded to the common sheet steel frame work.

9.Name Plate:

Each unit shall be provided with a name plates marked in a durable manner the followings:

a) "WRIDD - 18-19"
a) Manufacturer's name.
b) Rated operational current and motor rating

10. Information to be furnished regarding various components to be used in the motor controller: (to be provided for major components- contactor, relay & MCB)

1.Make:
2.Applicable standard:
3.Utilisation Category:
4.Accuracy Class (in case of metering instruments):

11.Manuals: (to be submitted at the time of inspection)

Submit, simultaneously with the shop drawings- technical data sheets, wiring diagrams, and information for ordering replacement parts.

Additional features provided besides specified above, shall also be allowed.

Test Certificates from Central Power Research Institute (CPRI)/ Electrical Research and Development Association (ERDA)/ Bureau of Indian Standards (BIS) recognized test laboratories shall have to be submitted with the tender indicating relevant IS conformity of major components(contactor, relay & MCB) .

TECHNICAL INFORMATION TO BE PROVIDED BY THE BIDDER (TSP-I)

(All Tenderers shall have to furnish required Technical Specification/Information as per format below, failing which their tender may be cancelled

Item	ELECTRO-MOTOR													WATER PUMP										Applicable Standard		IS No.		Remarks
	Make & Model.	Frame size & type designation	Rated output at 50°C outside air ambient temp (KW)	Max. power input to the driven equipment at design duty point.(KW)	Rated voltage & frequency	Rated current and power factor at design duty point.	Rated speed in R.P.M & Direction of rotation.	Class & type of insulation.	Type of enclosure and method of cooling.	Type of terminal box for stator lead.	Bearing type (Ball / roller)	Dimension of Motor in mm(approx) Drawing to be enclosed	Connection & rating (Cont./intermittent)	Make Model	Rated head in Meter	Rated discharge in m3/hr.	Rated speed in r.p.m.	Overall efficiency			Pump efficiency			Discharge at the rated Duty Head in m3/hr.		Motor	Pump	Motor	Pump	
																		At 100% load (at duty point)	At -25% of the rated Duty point	At +10% of the rated Duty Head	At 100% load (at duty point)	At -25% of the rated Duty point	At +10% of the rated Duty Head	+ 10 %	- 25 %					
1	2a	2b	2c	2d	2e	2f	2g	2h	2i	2j	2k	2l	2m	3a	3b	3c	3d	3e	3f	3g	3h	3i	3j	3k		4a	4b	5a	5b	6
As per BOQ																														

The Tenderers must furnish the following Curves authenticated by the Manufacturers (a) Head –Vs-Discharge, (b)Discharge-Vs- Overall efficiency, (c) Discharge-Vs- Pump Efficiency.

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TECHNICAL INFORMATION TO BE PROVIDED BY THE BIDDER (TSP-II)

(All Tenderers shall have to furnish required Technical Specification/Information as per format below, failing which their tender may be cancelled

As per BOQ	1	Item			ELECTRIC MONOSET PUMP
	2	Make & Model.			
	3	Rated output at 50°C outside air ambient temp (KW)			
	4	Max. power input to the driven equipment at design duty point.(KW)			
	5	Rated voltage & frequency			
	6	Rated current and power factor at design duty point.			
	7	Rated speed in R.P.M & Direction of rotation.			
	8	Class & type of insulation.			
	9	Type of enclosure and method of cooling.			
	10	Dimension of Motor in mm(approx) Drawing to be enclosed			
	11	Rated head in Meter			
	12	Rated discharge in m3/hr at Duty head.			
	13	Rated speed in r.p.m.			
	14	At 100% load (at duty point)		Overall efficiency	
	15	At -25% of the rated Duty point			
	16	At +10% of the rated Duty Head			
	17	+ 10 %	Discharge at the rated Duty Head in m3/hr.		
		- 25 %			
	18	Monoset Pump			Applicable Standard
	19	Monoset Pump			IS No.

The Tenderers must furnish the following Curves authenticated by the Manufacturers (a) Head –Vs-Discharge, (b)Discharge-Vs- Overall efficiency, (c) Discharge-Vs- Pump Efficiency.

TECHNICAL SPECIFICATION

SUBMERSIBLE PUMP MOTOR SET

The submersible pump motor set must have **IS certification mark as per IS 8034** and should be **BEE 5 (five) star** rated / **ISI marked** as specified below:

1. Site operating condition :- i) The pump is supposed to handle water conforming IS 9283-1995
   ii) The site condition is favourable or ideal as regards storage,handling, running maintenance and repair of pump set.
2. Reference to IS Standards :- i)IS 9283-1995 for Motors of Submersible pump motor Set.
   ii) IS 8034/ 2002 for pump of Submersible pump motor set.
3. Diameter of housing Bore:- HDTW – 350 mm (NB)
   MDTW – 250 mm (NB)
   LDTW – 150mm (NB)
4. Minimum submergence required :- 1.5 mt.
5. Type of duty :- S1(continuous) .
6. Frequency in Hz :- 50 ± 3 %
7. Number of phases :- 3 phase.
8. Rated voltage & permitted variation :- 415 V with ±6% variation.
9. **ADDITIONAL INFORMATION:-**

i.The motor should be wet type, water filled submersible Motor. It should be totally enclosed squirrel cage, induction motor, water cooled and water lubricated.

ii. Particulars :-

Sl.No	Type of Well	Length in mt.	Rating (in HP)	Duty point Discharge range (in m^3/hr)	Duty point Head Range (in m)	Mode of operation	To match with col. Pipe of	BEE star rating with IS mark/ IS marked.
1.	HDTW	48 mt	25	180- 125	20-35	Star Delta	150mm	IS marked
2.	HDTW / MDTW	48 mt	20	140 - 115	17-28	Star Delta	150mm	IS marked
3.	MDTW	39 mt	17.5	100 - 70	30-39	Star Delta	125mm	IS marked
4.	MDTW	39 mt	15	100 - 60	20-42	Star Delta	125mm	BEE 3 Star
5.	LDTW	45m	7.5	38-30	40-45	DOL	80mm	BEE 4 Star
6.	LDTW	42 mt	5	36 - 25	30 - 24	DOL	80mm	BEE 4 Star
7.	LDTW	42 mt	3	18	27	DOL	80mm	BEE 4 Star

Note: Suitable fitting has to be provided with the submersible pump set to match the outlet size of pump with the column pipe mentioned in the table.

iii). Performance and Guarantees:-

The overall efficiency in the operating range and at rated capacity at duty point should be as given in IS 8034-2002(latest amendment).

iv). The grade of material : as per Para 6 0f IS 8034 (latest amendment).

v) Sample Performance curves to be provided with the tender:

a) Discharge vs head curve,

b) Discharge vs overall efficiency,

c) Discharge vs current

IS marked Submersible pump motor sets shall be of standard material of construction.

All bidders should specify the model no. of pumps they are offering, in the technical application and put a 'tick' mark against the said item in the IS document as well as BEE document.

TECHNICAL INFORMATION TO BE PROVIDED BY THE BIDDER (TSP-I)

The Tenderers must furnish the Curves as mentioned in point no. 9(v) of tech. specification

	1	Item		
	2a	Make & Model.		ELECTRO-MOTOR
	2b	Rated output at 50°C outside air ambient temp (KW)		
	2c	Max. power input to the driven equipment at design duty point.(KW)		
	2d	Rated voltage & frequency		
	2e	Rated current and power factor at design duty point.		
	2f	Rated speed in R.P.M & Direction of rotation.		
	2g	Class & type of insulation.		
	2h	Dimension of Motor in mm(approx) Drawing to be enclosed		
	2i	Connection & rating (Cont./intermittent)		
	3a	Make Model		Water Pump
	3b	Rated head in Meter		
	3c	Rated discharge in m3/hr.		
	3d	Rated speed in r.p.m.		
	3e	At 100% load (at duty point)	Overall efficiency	
	3f	At -25% of the rated Duty point		
	3g	At +10% of the rated Duty Head		
	3h	At 100% load (at duty point)	Pump efficiency	
	3i	At -25% of the rated Duty point		
	3j	At +10% of the rated Duty Head		
	3k	10%	Discharge at the rated Duty Head in m3/hr.	
		-25%		

AUTOMATIC STAR DELTA MOTOR CONTROLLERS

General Description

Automatic Star Delta motor controllers shall be suitable for operation of submersible electromotor pumps as well as motors for surface lift centrifugal agricultural pump operating at 415V(+%6 to -10%) and 50Hz(±3%) .The equipment shall comply with IS-60947/2000(Part-4, Sec-1)and its latest amendments. Starter shall comprise of overload protective device, main and auxiliary contacts, Single phasing preventer, timer and on/off controls .It shall be of utilization categories suitable for the particular application as shown in Table I of IS/IEC 60947-4-1 , for electrical motor circuits unless otherwise specified and display of voltage & current as well as ON-OFF-TRIP position.

Star- Delta automatic motor controllers shall be of following ratings:

Sl. No.	Motor Rating	Type of Starter	Equipment to be operated
1.	15 H.P	Star Delta	Submersible electromotor pump
2.	17.5HP	Star Delta	-Do -
3.	22.5 H.P	Star Delta	-Do -
4.	25 H.P	Star Delta	-Do -

1. **Power Contactors:**

Starters shall consist of 4 pole heavy duty magnetic power contactor with encapsulated wide band operating coil voltage range 210-440V AC suitable for motors of following ratings with required no. of NO and NC auxiliary contacts. The contactor shall meet the requirements of IS : 60947. The contactors shall have minimum making and breaking capacity in accordance with utilization category AC 3 and shall be suitable for minimum class II intermittent duty. They shall be replaceable without removing the line, load, or control wiring from the starter.

The contacts shall be of silver alloy and with coils of following ratings:

a) Pick-up volt >250Volts.
b) Drop out volt < 250 Volts.

2. **MCB**: for service entrance(TPN) protection with
   a. High Short circuit withstanding capacity.
   b. Minimum duty rating as per IS :60947 (Part-II)with D/ K curve.

3. **Single Phasing Preventer:** Separate Single Phasing Preventer has to be provided with on delay timer (30 sec- 5min) or nearest range with over voltage and under voltage protection.

4. **Motor Circuit Protectors**:
   The trip mechanism shall be sensitive to under voltage(range as per relevant IS), single phasing, phase reversal , phase unbalance, overload protection etc. The relays shall be tamperproof and should not affect by vibration. Overload relay shall be able to operate at the conditions stated in relevant IS.

5. Meters: Flush mounted voltmeter(0-500V) and ammeters(0-30/50A) to be provided on front panel door. The instruments shall be conforming to IS: 1248 (latest amendment) and with accuracy class index of 1.5.

6. Enclosure:

1. Enclosures shall be of Ingress Protection class 54.
2. Enclosure shall be of min 16 swg C R sheet steel , thoroughly cleaned and factory primed prior to 10 tank process powder coat painted to make it weatherproof. It shall be equipped with full-sized, gasket door with suitable latch and stainless steel hinges.
3. The front on the cabinet shall be equipped with voltage and current displays, ON-OFF indicators, push buttons etc.

7. Wiring.

All wiring shall meet National Electrical Code standards. Internal device wiring shall be furnished by the manufacturer of the device. All interconnecting wiring and wiring to terminals for external connection shall be flexible copper, insulated for not less than 750 volts, with a moisture-resistant and flame-retardant covering. All wiring shall be grouped and firmly supported to the cabinet.

For external connections, terminal blocks shall be rated for the amperes required for mentioned HP of the motor at not less than 750 volts. Terminals shall be labeled to agree with identification shown on the wiring diagram.

8. Earthing:

The enclosure shall be provided with 2 nos 10mm dia earth terminals, each complete with two plain and one spring washer, nuts etc. These terminals shall be effectively bonded to the common sheet steel frame work.

9.Name Plate:

Each unit shall be provided with a name plates marked in a durable manner the followings:

a) "WRIDD - 18-19"
a) Manufacturer's name.
b) Rated operational current and motor rating

10. Information to be furnished regarding various components to be used in the motor controller: (to be provided for major components- contactor, relay & MCB)

1.Make:
2.Applicable standard:
3.Utilisation Category:
4.Accuracy Class (in case of metering instruments)

11.Manuals: (to be submitted before inspection)

Submit, simultaneously with the shop drawings- technical data sheets, wiring diagrams, and information for ordering replacement parts.

Additional features provided besides specified above, shall also be allowed.

Test Certificates from Central Power Research Institute (CPRI)/ Electrical Research and Development Association (ERDA)/ Bureau of Indian Standards (BIS) recognized test laboratories shall have to be produced indicating relevant IS conformity of major components(contactor, relay & MCB).

DOL MOTOR CONTROLLERS

General Description

Motor controllers shall be suitable for operation of submersible electromotor pumps as well as motors for surface lift centrifugal agricultural pump sets operating at 415V(+%6 to -10%) and 50Hz(±3%) .The equipment shall comply with IS-60947/2000(Part-4, Sec-1)and its latest amendments. Motor controllers shall be combination type with electromagnetic contactors as noted below and with Isolator , relays, ON-OFF-TRIP position and display of voltage & current.

1. **Power Contactors:**

Starters shall consist of magnetic contactor suitable for motors of following ratings with required no. of NO and NC auxiliary contacts.The contactor The contactor shall meet the requirements of IS : 60947. The contactors shall have minimum making and breaking capacity in accordance with utilization category AC 3 and shall be suitable for minimum class II intermittent duty. They shall be replaceable without removing the line, load, or control wiring from the starter.

Sl. No.	Motor Rating	Type of Contactors	Equipment to be operated
1.	7.5 HP	DOL (electromagnetic)	submersible motor pump sets
2.	5 H.P	DOL(electromagnetic)	-Do-
3.	3/3.5 H.P	DOL(electromagnetic)	-Do-

The contacts shall be of silver alloy and with coils of following ratings:

a) Pick-up volt >250Volts.
b) Drop out volt < 250 Volts.

2. **MCB**: for service entrance(TPN) protection with
   a. High Short circuit withstanding capacity.
   b. Minimum duty rating as per IS :60947 (Part-II) with D/K curve.

3. **Single Phasing Preventer:** Separate Single Phasing Preventer has to be provided with on delay timer (30 sec- 5min) or nearest range with over voltage and under voltage prevention.

4. **Motor Circuit Protectors**:
   The trip mechanism shall be sensitive to under voltage(range as per relevant IS), single phasing, phase reversal , phase unbalance overload protection etc.. The relays

shall be tamperproof, and should not affect by vibration. Overload relay shall be able to operate at the conditions stated in relevant IS.

Overload relays shall be matched to nameplate full-load current of protected motor and with appropriate adjustment for duty cycle .

5. Meters: Flush mounted voltmeter(0-500V) and ammeters(0-30/50A) to be provided on front panel door. The instruments shall be conforming to IS: 1248 (latest amendment) and with accuracy class index of 1.5.

6. Enclosure:

1. Enclosures shall be of Ingress Protection class 54.
2. Enclosure shall be of min 16 swg C R sheet steel , thoroughly cleaned and factory primed prior to 10 tank process powder coat painted to make it weatherproof. It shall be equipped with full-sized, gasket door with suitable latch and stainless steel hinges.
3. The front on the cabinet shall be equipped with voltage and current displays, ON-OFF indicators, push buttons etc.

7. Wiring.

All wiring shall meet National Electrical Code standards. Internal device wiring shall be furnished by the manufacturer of the device. All interconnecting wiring and wiring to terminals for external connection shall be stranded copper, insulated for not less than 750 volts, with a moisture-resistant and flame-retardant covering. Wiring for control circuits shall have different colours to match the control schematic on the wiring diagrams and shall be integrated in the starter. All wiring shall be grouped and firmly supported to the cabinet.

For external connections, terminal blocks shall be rated for the amperes required for mentioned HP of the motor at not less than 750 volts. Terminals shall be labelled to agree with identification shown on the wiring diagram.

8. Earthing:

The enclosure shall be provided with 2 nos 10mm dia earth terminals, each complete with two plain and one spring washer, nuts etc. These terminals shall be effectively bonded to the common sheet steel frame work.

9.Name Plate:

Each unit shall be provided with a name plates marked in a durable manner the followings:

a) "WRIDD - 18-19"
a) Manufacturer's name.
b) Rated operational current and motor rating

10. Information to be furnished regarding various components to be used in the motor controller: (to be provided for major components- contactor, relay & MCB)

1.Make:
2.Applicable standard:
3.Utilisation Category:
4.Accuracy Class (in case of metering instruments):

11.Manuals: (to be submitted at the time of inspection)

Submit, simultaneously with the shop drawings- technical data sheets, wiring diagrams, and information for ordering replacement parts.

Additional features provided besides specified above, shall also be allowed.

Test Certificates from Central Power Research Institute (CPRI)/ Electrical Research and Development Association (ERDA)/ Bureau of Indian Standards (BIS) recognized test laboratories shall have to be submitted with the tender indicating relevant IS conformity of major components(contactor, relay & MCB) .

A:-REWIREABLE SWITCH FUSE UNIT

GENERAL REQUIREMENTS

Heavy duty rewireable Switch Fuse Units with fuse base and carrier, shall comply with and be tested to the latest IS: 10027-2000 and IS/IEC 60947-3 **marked with standard ISI certification mark** and shall have air-break type contacts which are designed for uninterrupted duties. They shall be triple-pole with neutral link and shall each be fitted with earthing facilities. All live parts shall be efficiently shrouded with insulating materials. The rating of switch fuse units to be supplied are:**16A, 32A, 63A & 100A** for 3Φ, 415 Volts. Switches shall be of utilization category 23A suitable for the particular application as shown in Table I of IS/IEC 60947-4-1, for electrical motor circuits, unless otherwise specified.

200A 3Φ, 415 Volts. Rewire able Switches shall be conforming to IS/IEC 60947-3 and shall of utilization category 22A and **CPRI/ERDA** tested certified.

Construction:

Switches shall be constructed with an interlocked front cover to prevent access to the interior parts of the equipment when the contacts are in the CLOSE position, and to prevent the contacts from being switched to close when the front cover is opened. However, facilities shall be provided to allow the checking of the contact alignments. The fastening devices for the front cover shall be of captive type.

Insulation material used shall be of non-hygroscopic and non-ignitable type. The contacts shall be self-aligning so that contact pressure can be maintained at all times. All live parts shall be adequately shielded from the front of the unit but easily accessible for maintenance by using a tool.

All contacts shall be of electrolytic copper tin plated and cable terminals shall be suitable for both copper as well as aluminum conductors.

Enclosure:

1.The enclosure shall be of totally enclosed type of with degree of protection IP-23 made up of 16 swg rust proofed C R sheet steel . It shall be factory primed and preheated prior to be powder coat painted with seven tank system.

2. The enclosure shall be suitable for conduit/ armoured cable entries and also for connection to busbar chamber/ Motor starters from top or bottom.

3.Each switch shall be supplied in complete unit consisting of fuse carriers mounted within the enclosure. Adequate space shall be provided in the enclosure for proper cable termination in fuses and neutral link.

4.There shall be provision of external double earthing on either side of the enclosure.

Rewireable Fuse holder

Fuse holder(Fuse base + Fuse Carrier) shall conform to the latest amendment of IS: 2086(latest amendment).It should be of utilization category AC 23 A for 16A,32 A, 63 A,100 A and AC22A for 200A for electrical motor circuits, unless otherwise specified.

Fuse base and carrier shall be constructed of ceramic porcelain . The Fuse carrier shall be so designed that there is no risk of touching live parts when the fuse is being withdrawn. The maximum rating of a fuse(plain or tinned copper) inserted in a fuse holder shall not be greater than the rating for which the holder is designed.

Operating Mechanism

Switch Fused Units shall be of the quick-make and quick break type. The switching mechanism shall be of independent manual operation with suitable means such as accelerating springs. The operating performance of the switches and switch fuse units shall be tested in accordance with IEC 60947-3. The number of operating cycles corresponding to the rated operational current shall not be less than the values given in Table IV of IS: 60947-3.

For 200 A Rewireable switch fuse unit

TEST CERTIFICATES/CERTIFICATES FROM CENTRAL POWER RESEARCH INSTITUTE (CPRI)/ ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION (ERDA)/ BUREAU OF INDIAN STANDARDS (BIS) APPROVED TEST LABORATORIES SHALL HAVE TO BE PRODUCED INDICATING RELEVANT IS CONFORMITY , OTHERWISE THE TENDER SHALL NOT BE CONSIDERED.

B:-BUS BAR CHAMBER

63/200 Amps, 500Volts bus bar Unit conforming to latest IS 8623:1993 & IS/IEC: 60947, with detachable front cover and undrilled detachable end plates with 2nos inlet holes of 1.5" size and 4 way/6way outlets, suitable for mounting on wall and designed for uninterrupted duties. The enclosure should be of adequate size to provide minimum clearance as mentioned in technical specification to accommodate 4 nos copper bar with at least 6 nos tap off points of 6mm dia at 30mm apart supplied with requisite brass nuts & bolts equivalent to bore size with spring washer including arrangement of double earthling by 10 SWG GI wires.

GENERAL REQUIREMENTS

Bus Bar Chamber shall be heavy duty , totally enclosed with sheet steel, conforming to latest IS 8623 & IS/IEC: 60947, with detachable front cover and undrilled detachable/integrated end plates, suitable for mounting on wall and designed for uninterrupted duty. Busbars shall be three phase and full rated neutral made of hard drawn, high conductivity solid copper bars. The rating of BUS BAR CHAMBERS to be supplied are: **63 A and 200A.**

Construction:

The Chamber Unit shall be of adequate size to accommodate the 4 nos busbars with at least 6 nos tap off points of 6mm dia at 30mm apart and provided with requisite brass/S.S. nuts & bolts equivalent to bore size with Belleville washers.

The depth of B.B.C. shall be 110 mm (minimum). Minimum clearance of phase bars to earth shall be 26 mm and between bus bars shall be minimum 32 mm

Enclosures:

1.The enclosure shall be of totally enclosed type of with degree of protection IP-42 and made up of 16 swg rust proofed C R sheet steel . It shall be factory primed and preheated prior to be powder coat painted with seven tank system.

2. The enclosure shall be suitable for 2nosconduit/ armoured cable entries of 1.5" size and also 4way/6way connection to Switches / Motor starters from top or bottom, and also from sides.

3. Adequate space shall be provided in the enclosure for proper cable termination in phases and neutral link.

4.There shall be provision of external double earthing on either side of the enclosure.

BUS BARS

1. The bus – bars shall be of hard drawn high conductivity(H.C) electrolytic grade copper flats with a minimum copper content of 99.90% , properly silvered/ tinned and to be rated at 1000 Amps. per sq. in conforming to relevant I.S. specification. The bus- bars shall be of uniform cross section along its entire length. No tapering of the bus bars' cross-section is allowed.

2. The busbars shall be of adequate size to carry the rated current continuously at ambient temperature of 40°C without exceeding the temperature rise in accordance with Clause 7.3 of latest IS:8623. Neutral busbars are to be rated to carry 100% of phase current .

3.The bars shall be mounted on ceramic/porcelain/DMC/SMC supports of proper dielectric and mechanical strength and shall be appropriately colour coded for identification of Phase with PVC sleeves of 1.1 KV grade.

4.Thebusbar supports shall be mechanically strong enough to withstand the force between busbars produced by a short circuit of negligible impedance between two or more busbars.

Busbar Rating Test Current

The busbar insulation shall be tested in accordance with Sub-section 8.2.2 of latest IS: 8623.

Name Plate:

Each unit shall be provided with a name plate marked in a durable manner the followings:

a) The manufacturer's name or trade mark.
b) IS/ I EC Publication .
c) Rated operational current ,voltage and frequency.
d) Rated insulation voltages.
e) Degree of protection.

Test Certificates/Certificates from Central Power Research Institute (CPRI)/ Electrical Research and Development Association (ERDA)/ Bureau of Indian Standards (BIS) approved test laboratories shall have to be produced indicating relevant IS conformity , otherwise the tender shall not be considered.

TECHNICAL SPECIFICATION / INFORMATION

ARMOURED CABLES :

3.5C X 50, 3.5C X 25 & 3C X 10 Sq mm Aluminium PVC insulated (Heavy Duty) armoured electric cable suitable for working upto and including 1100 Volts ,confirming to IS no. 1554(part-I),1988 with latest amendments there of and must have ISI Certification mark.

The List of following Indian standards are also to be referred

1. 5831 : 1984 Specification for PVC insulation and sheath of electric cables (latest amendment)
2. 8130 :1984 Specification for conductors for insulated electric cables and flexible cords(*Latest ammendment*)
3. 10418 :1982 Specification for drums for electric cables(Latest amendment)
4. 10810 : 1984 Methods of test for cables(amendment)
5. 3961(Part-2), 1967- Current ratings for for PVC insulated and PVC sheathed heavy duty cables.

UNARMOURED FLAT CABLES

1.5 , 4 & 10 Sq mm Copper PVC insulated (Heavy Duty) weather proof flat electric cable suitable for working upto and including 1100 Volts ,confirming to IS no.694/1990 with latest amendments thereof and must have ISI Certification mark.

The List of following Indian standards are also to be referred

1. 5831 : 1984 Specification for PVC insulation and sheath of electric cables (latest amendment)
2. 8130 :1984 Specification for conductors for insulated electric cables and flexible cords(*Latest ammendment*)
3. 10418 :1982 Specification for drums for electric cables(Latest amendment)
4. 10810 : 1984 Methods of test for cables(amendment)
5. 3961(Part-2), 1967- Current ratings for for PVC insulated and PVC sheathed heavy duty cables

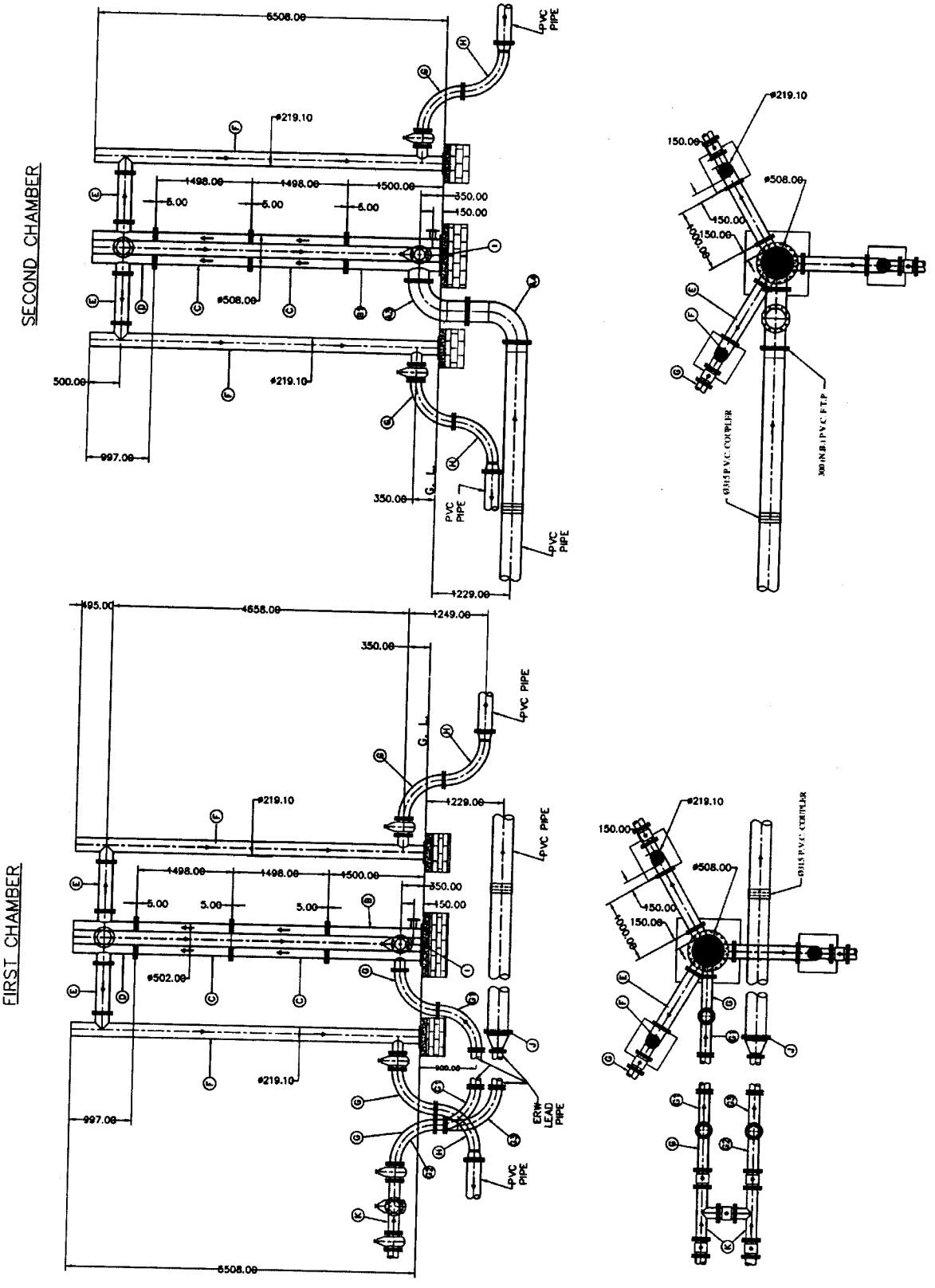
The cables shall be with stranded copper conductors, as specified

SET OF GALV. M.S. QUADRUPED INLET & OUTLET PIPE FITTINGS

FOR

MAJOR R.L.I.
(GALVANIZED)

GENERAL ARRANGEMENT & DETAIL DRAWINGS



GENERAL ARRANGEMENT	DWG. NO. – 1 (MAJOR R.L.I.).	
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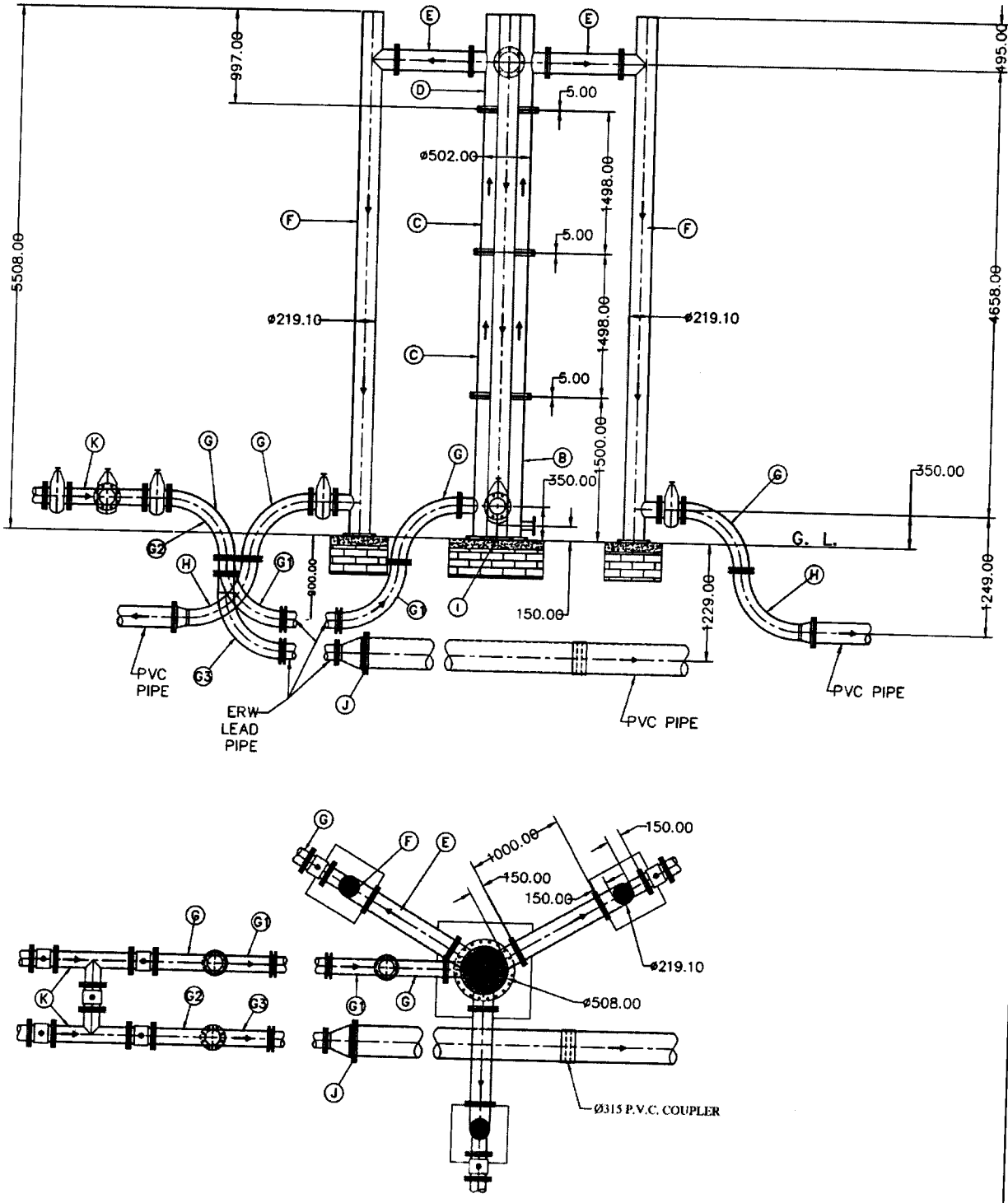
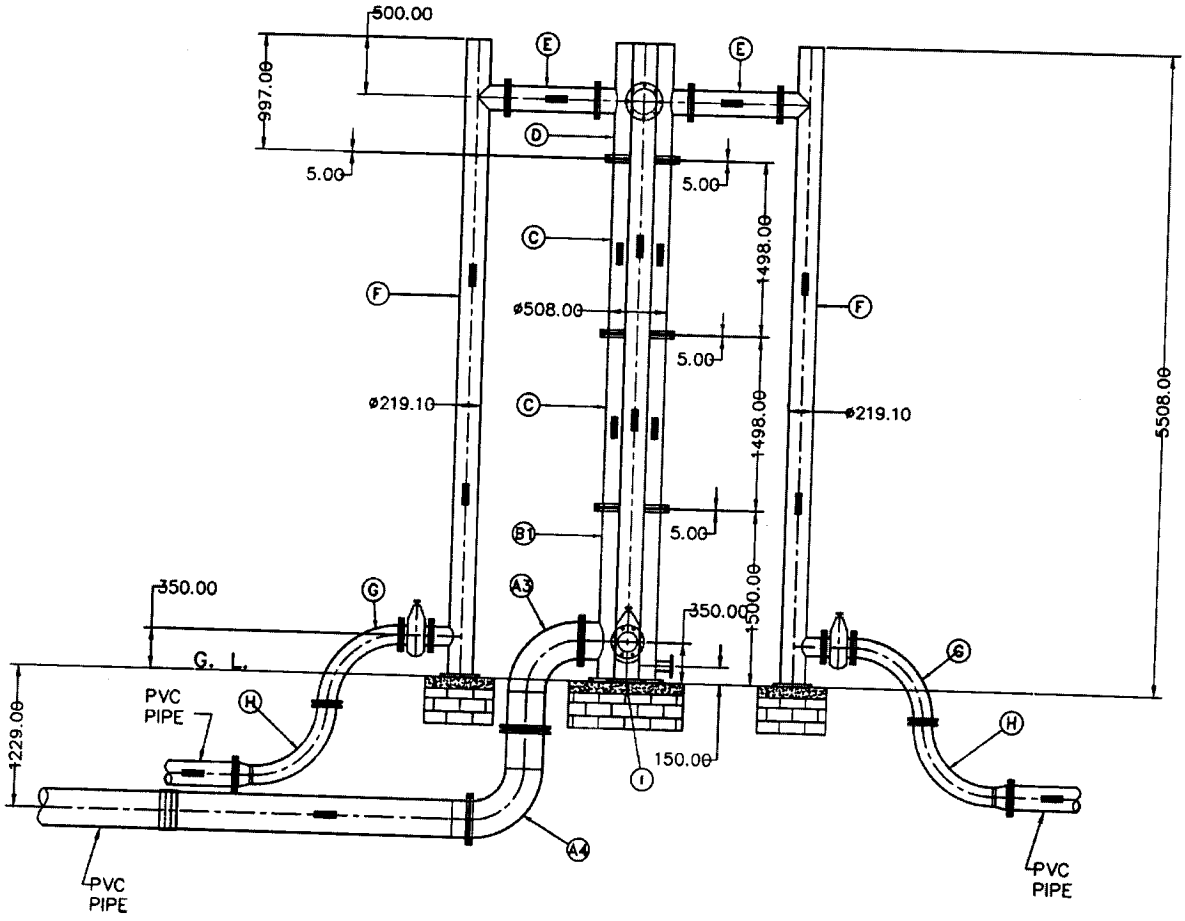
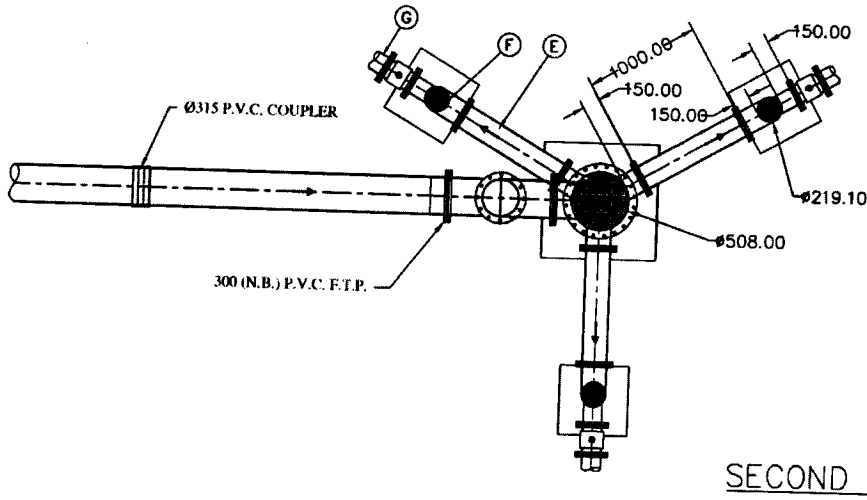


FIRST CHAMBER

GENERAL ARRANGEMENT OF FIRST CHAMBER	DWG. NO. – 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.





SECOND CHAMBER

GENERAL ARRANGEMENT OF SECOND CHAMBER	DWG. NO. – 1 (MAJOR R.L.I.).	
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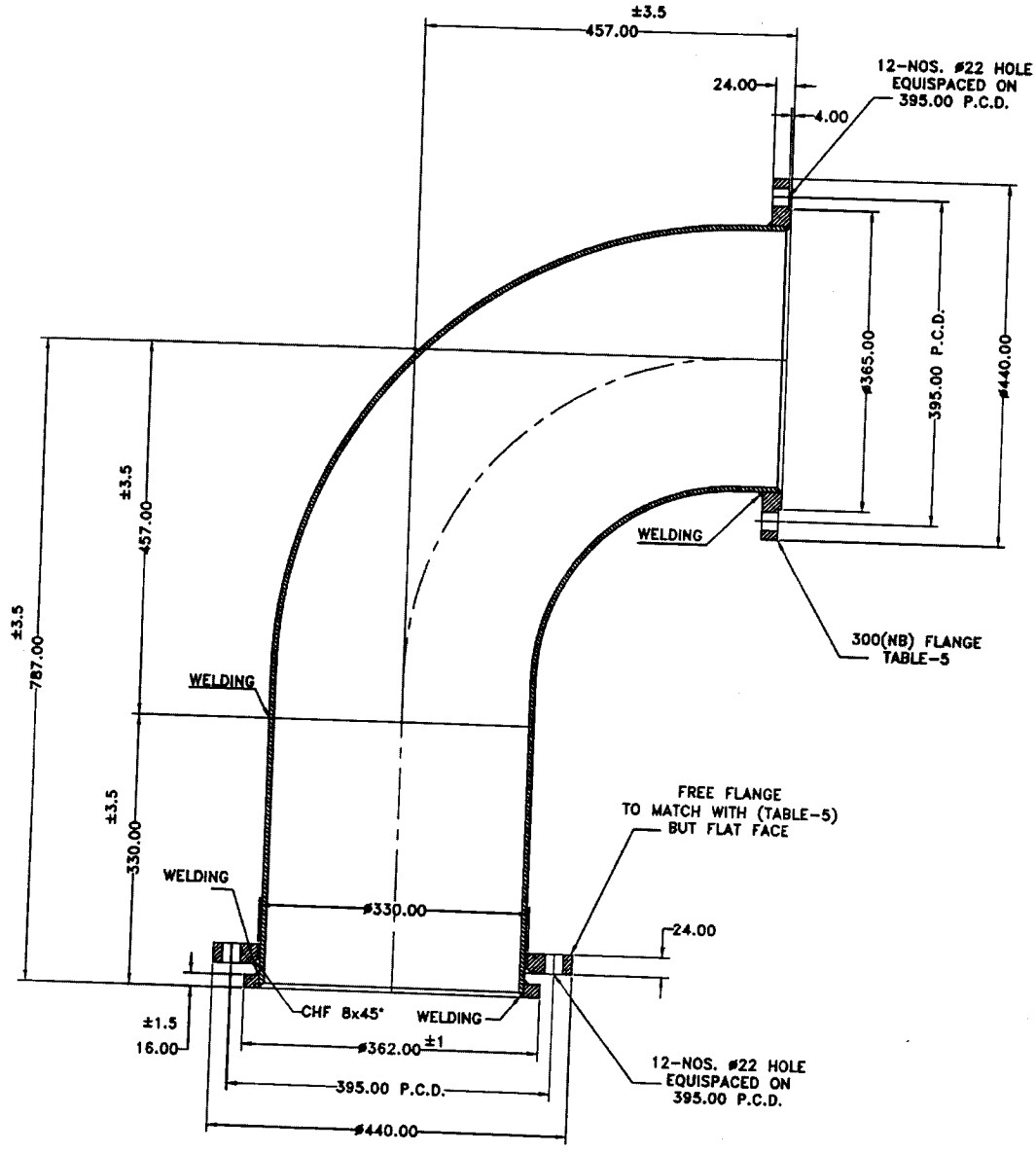
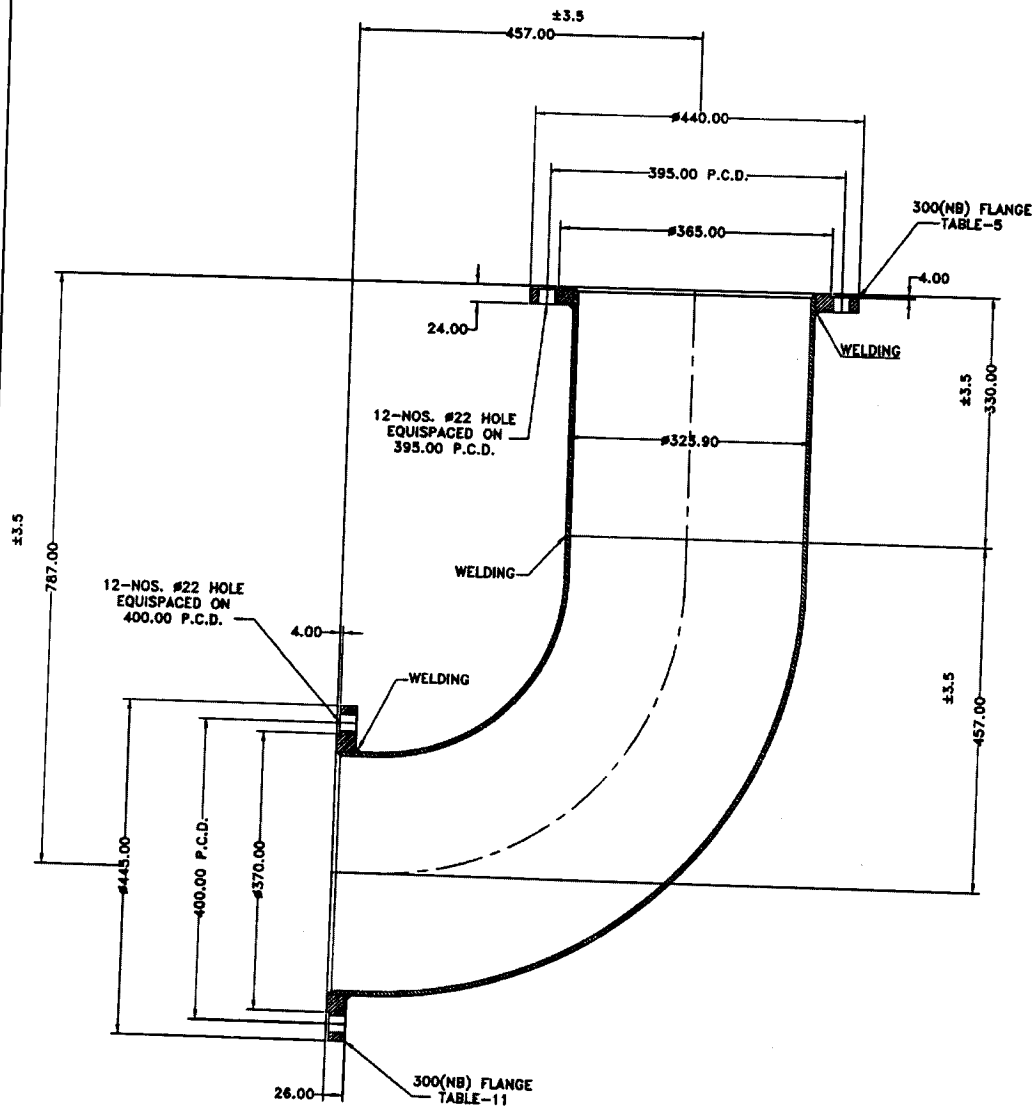


300(NB) 90°G.I. M.S. ELBOW, ONE END FLANGE WELDED OTHER END SHORT PIECE WITH END RING WELDED FOR FREE BACKING FLANGE.

ITEM NO.- (A3)

	DWG. NO. - 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



300(NB) 90° G.I. M.S. ELBOW,ONE END FLANGE WELDED AND OTHER END SHORT PIECE WITH END FLANGE WELDED.

ITEM NO.- (A4)

	DWG. NO. - 1 (MAJOR R.L.I.).	
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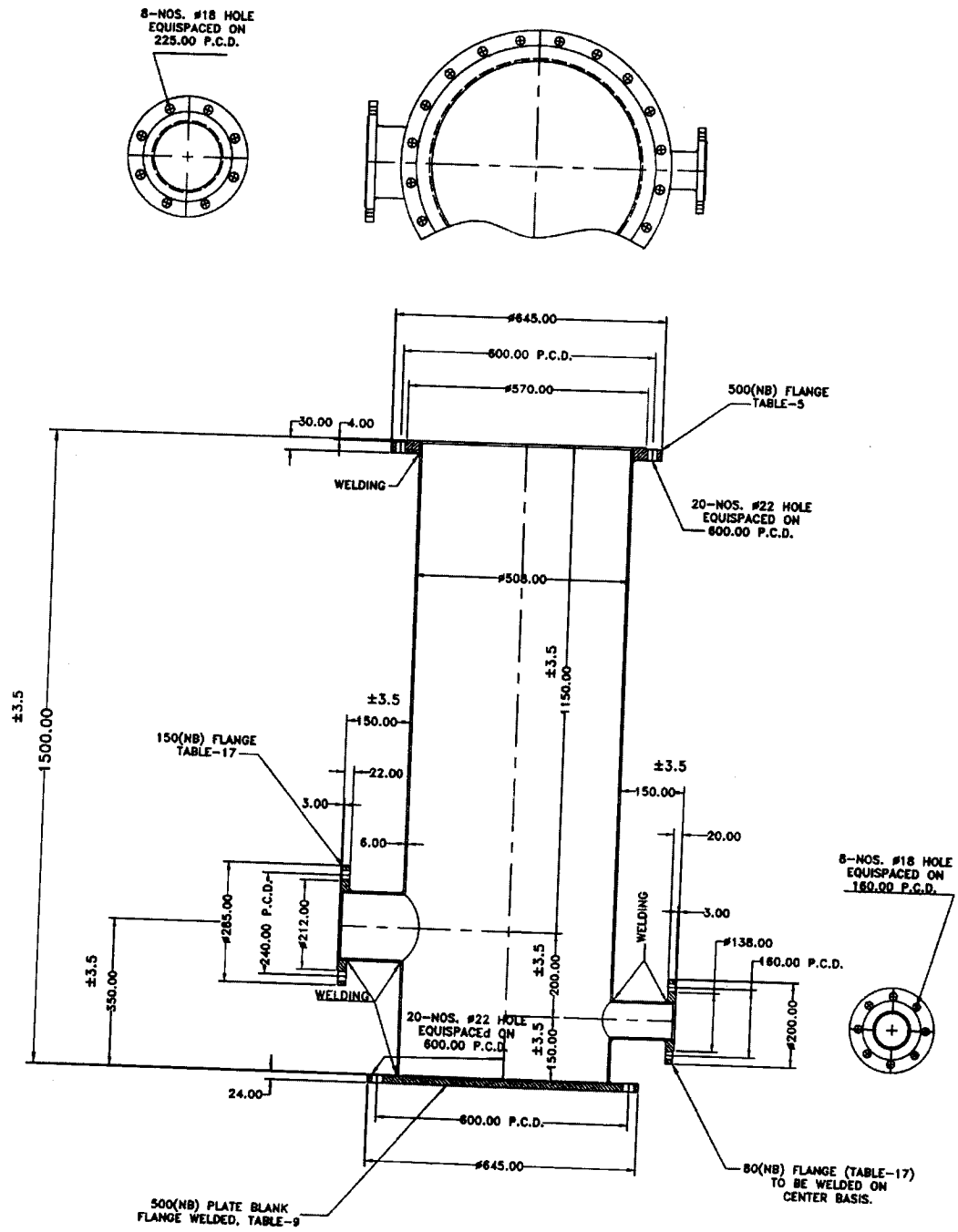
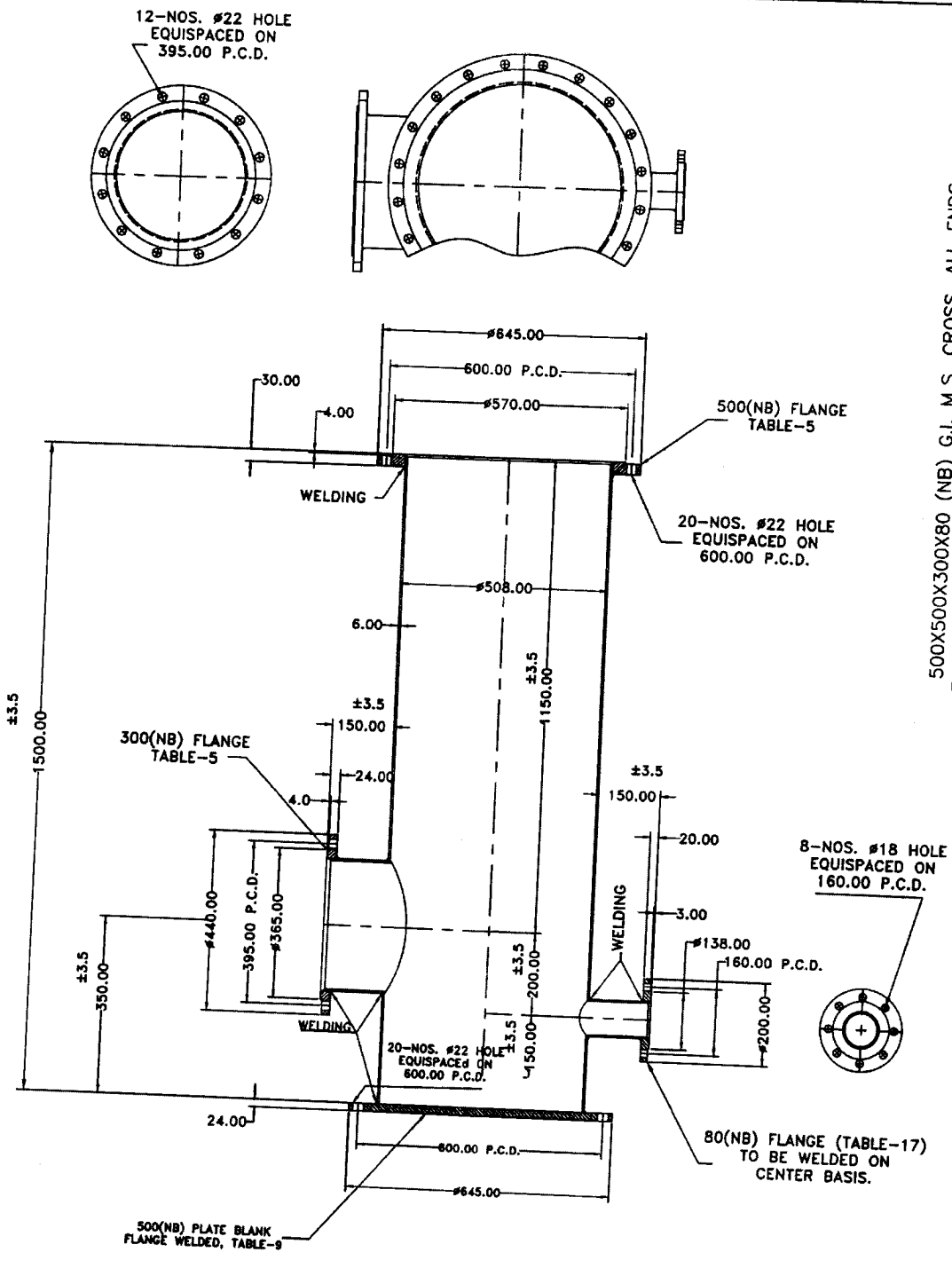


500X500X150X80 (NB) G.I. M.S. CROSS, ALL ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.

ITEM NO.- (B)

DETAILS OF PART DRAWING	DWG. NO. - 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



DETAILS OF PART DRAWING	DWG. NO. – 1 (MAJOR R.L.I.).	
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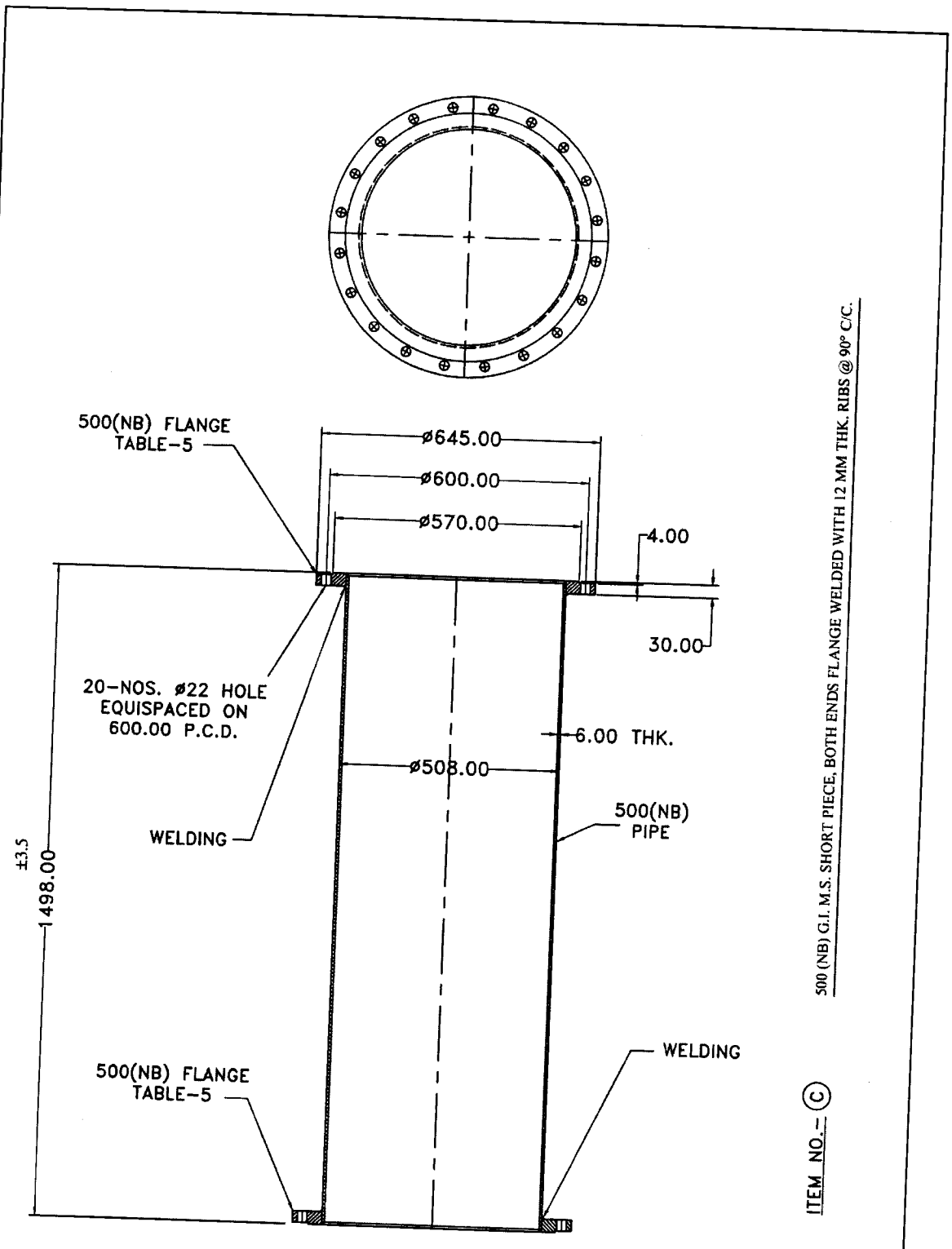
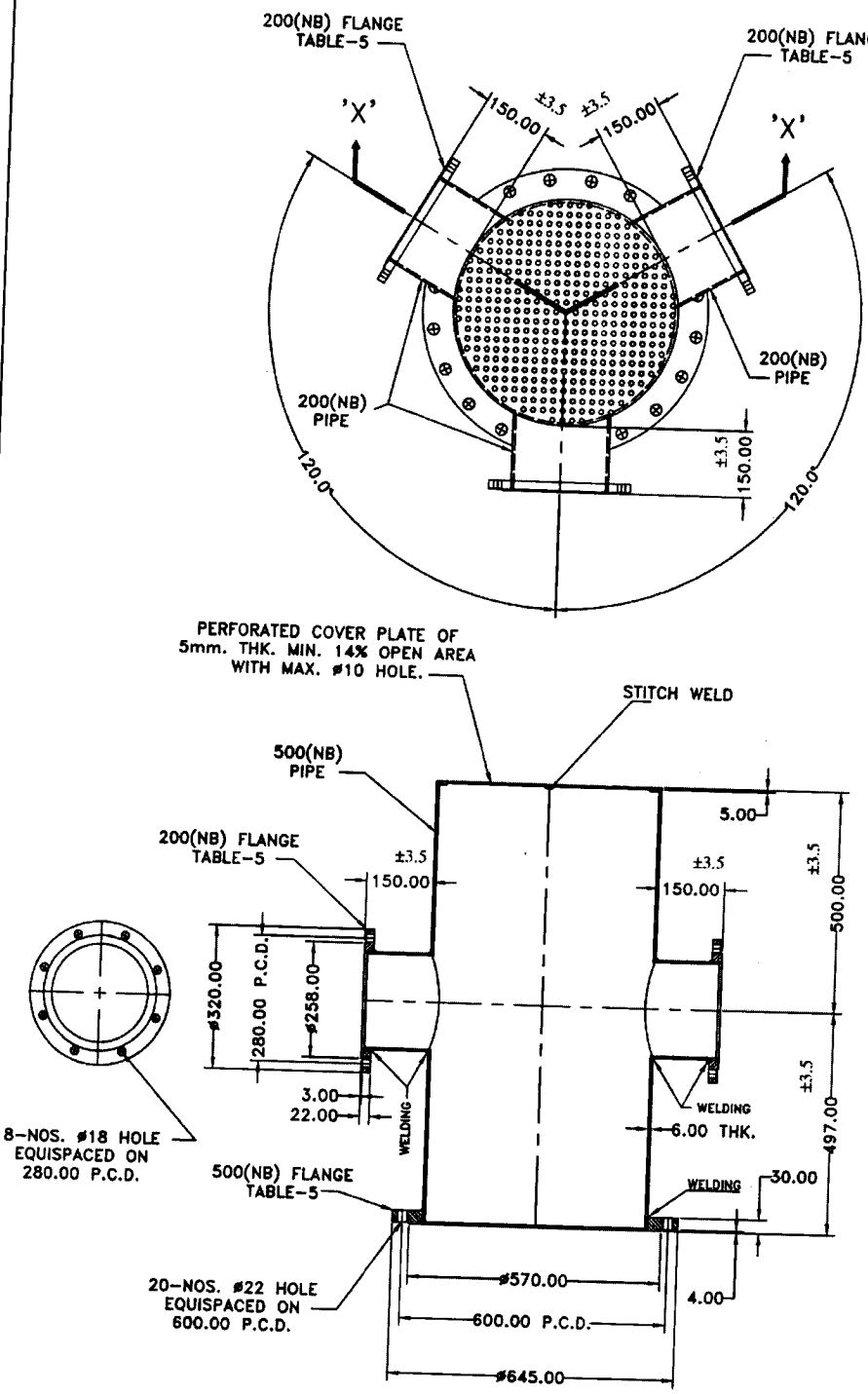


DETAILS OF PART DRAWING	DWG. NO. - 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



SECTIONAL VIEW AT 'XX'

500X200X200X200 (NB) FABRICATED G.I. M.S. CROSS, ALL ENDS FLANGE WELDED AND TOP END WITH PERFORATED PLATE STITCH WELDED, BOTTOM END FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.

ITEM NO.- (D)

DETAILS OF PART DRAWING	DWG. NO. - 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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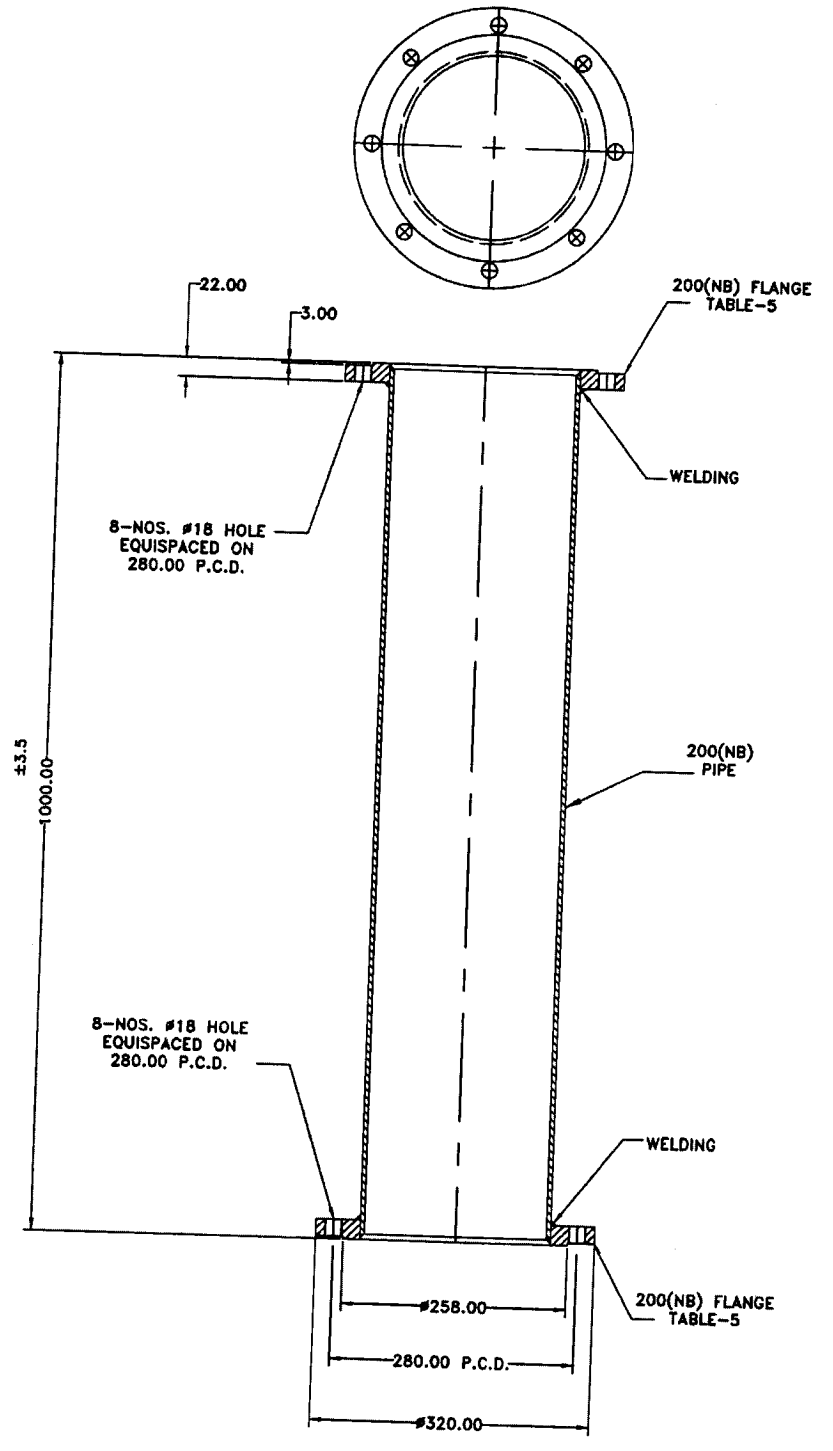
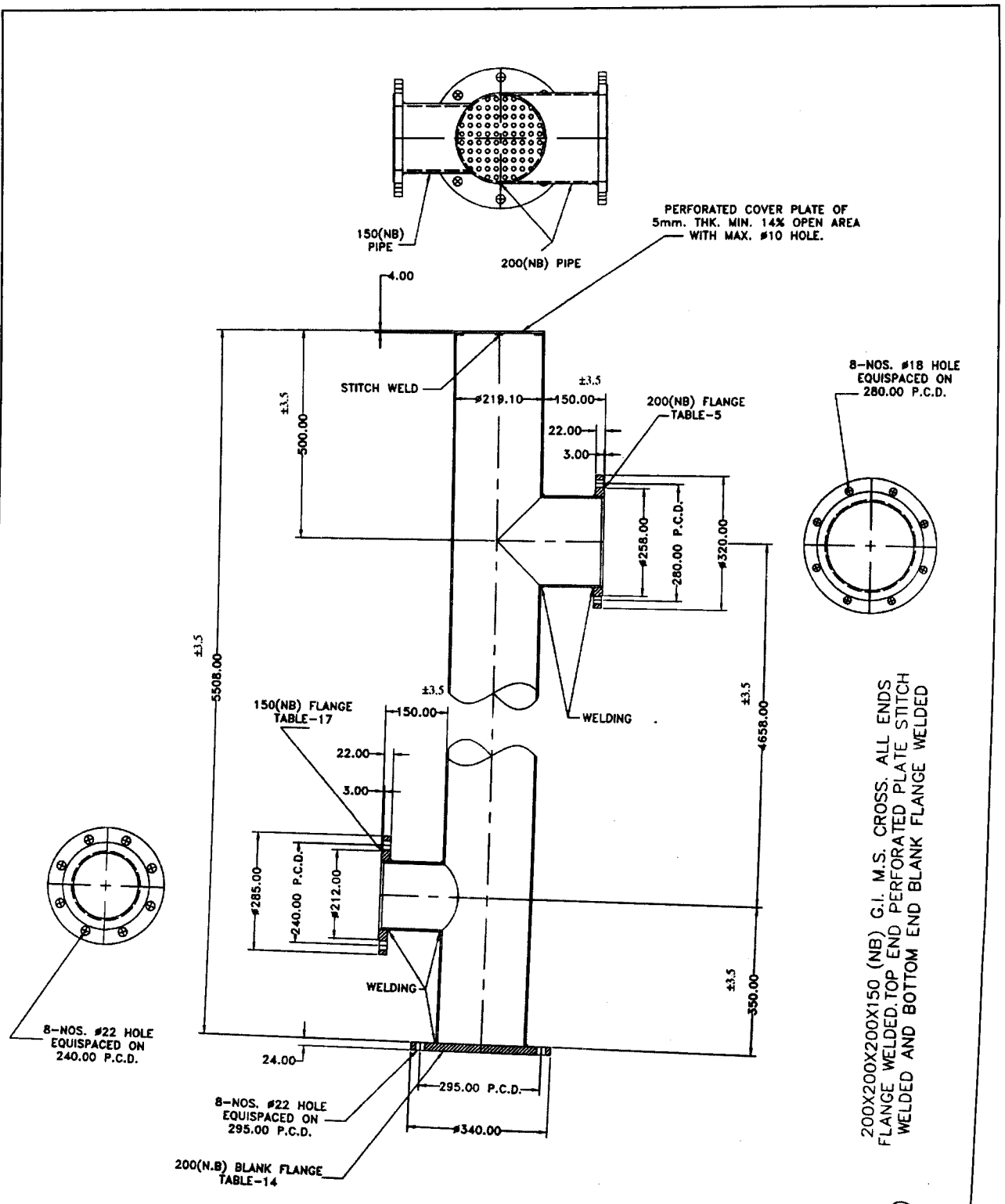


DETAILS OF PART DRAWING	DWG. NO. - 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



200X200X200X150 (NB) G.I. M.S. CROSS. ALL ENDS FLANGE WELDED.TOP END PERFORATED PLATE STITCH WELDED AND BOTTOM END BLANK FLANGE WELDED

ITEM NO.- (F)

DETAILS OF PART DRAWING	DWG. NO. - 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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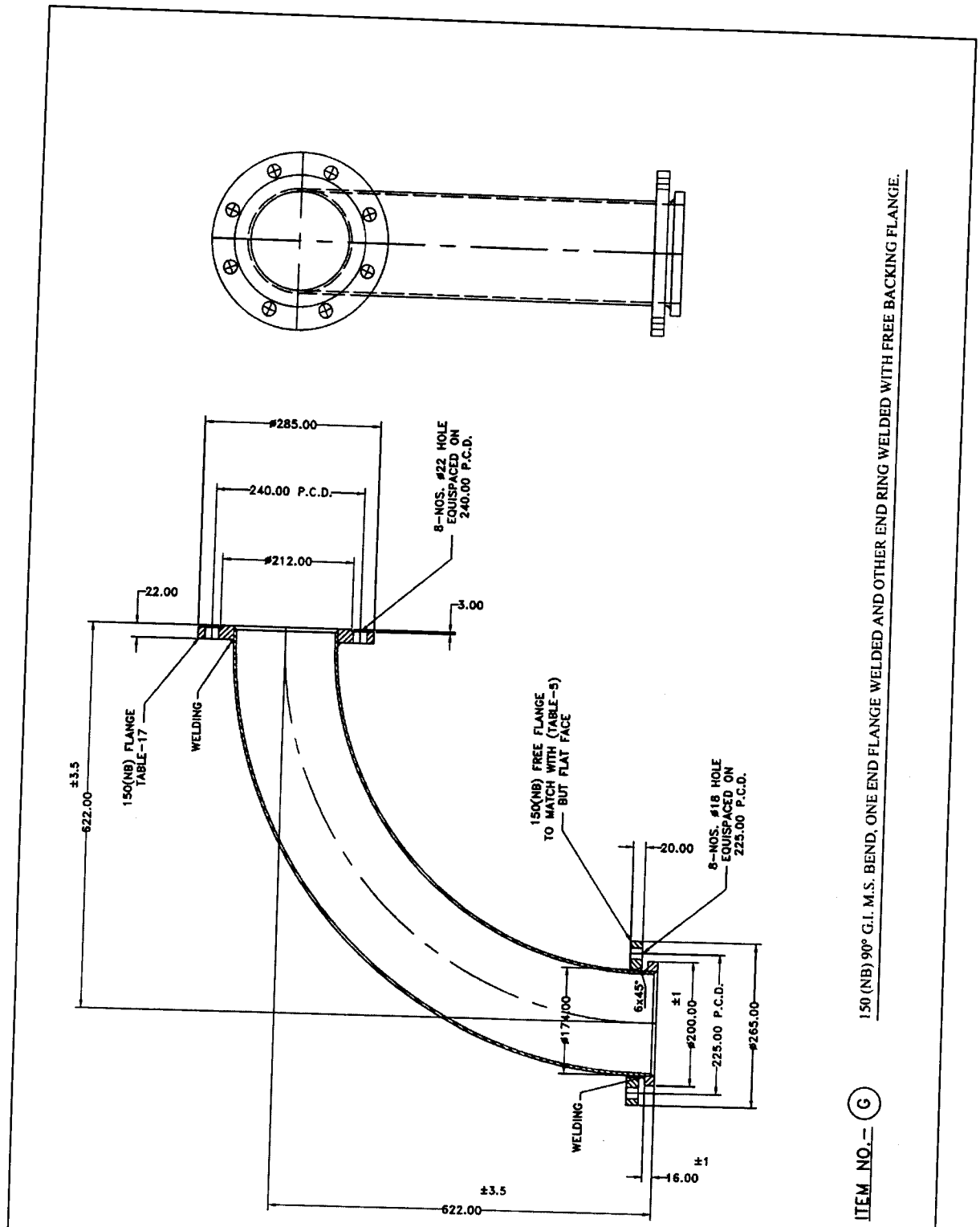

150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.

ITEM NO.- (6)

DETAILS OF PART DRAWING	DWG. NO. - 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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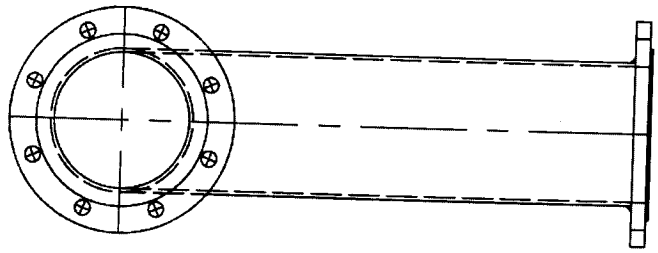

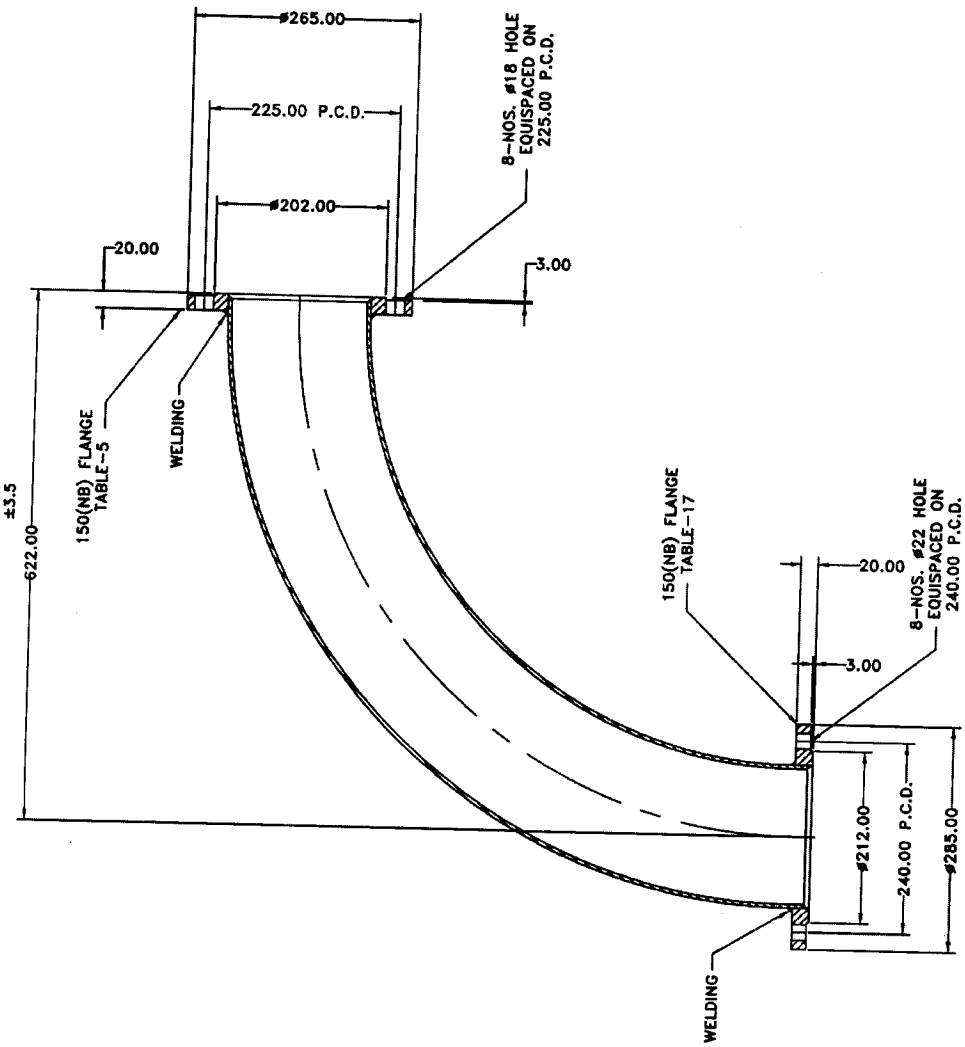

150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.

ITEM NO.- (G1)

DETAILS OF PART DRAWING	DWG. NO. – 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

DETAILS OF PART DRAWING

DWG. NO. - 1 (MAJOR R.L.I.).

ALL DIMENSIONS ARE IN MM., U. O. STATED.

SCALE- N.T.S.

ITEM NO.- (G2)

150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END SHORT PIECE WITH RING WELDED FOR FREE BACKING FLANGE.

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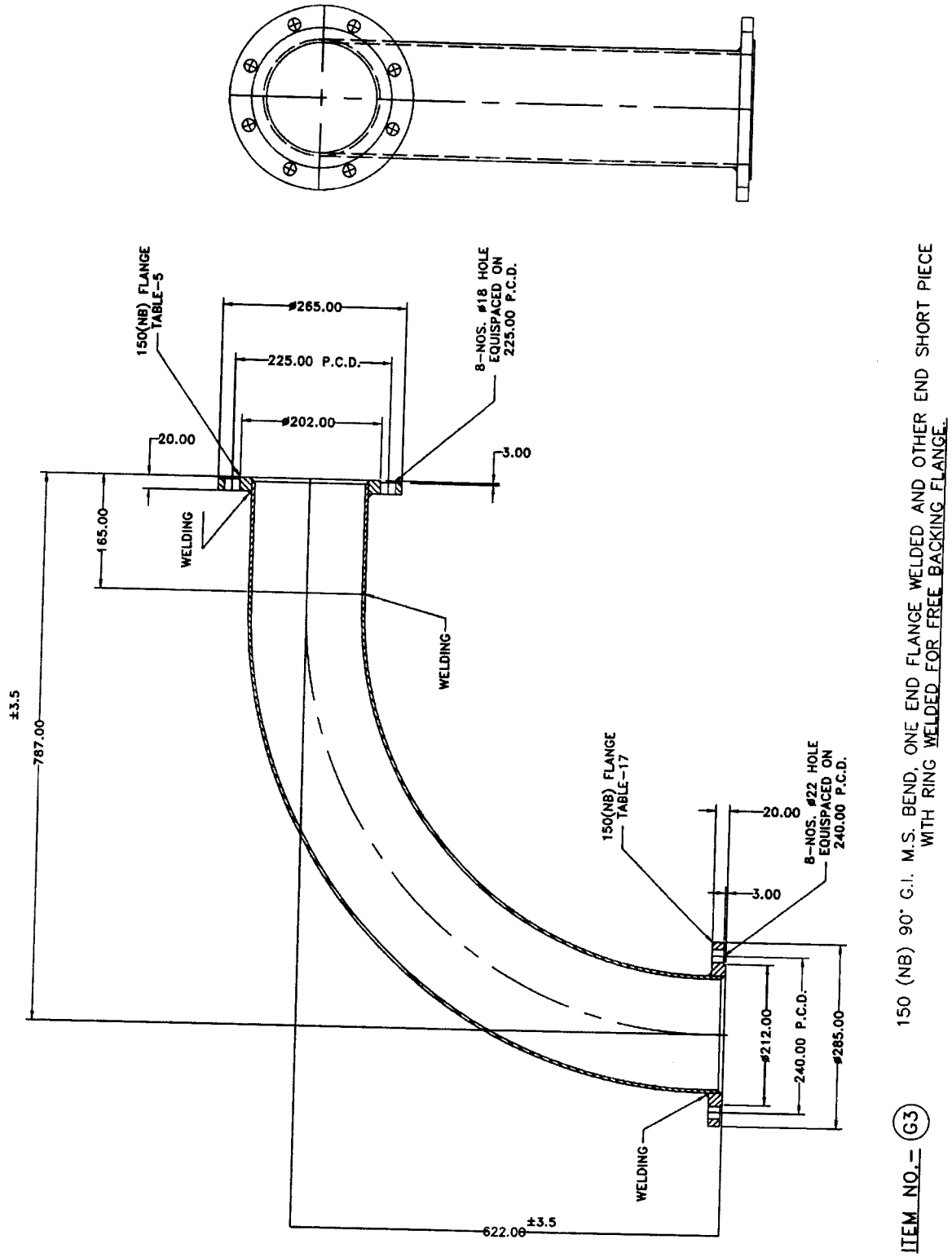


ITEM NO.- (G3) 150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END SHORT PIECE WITH RING WELDED FOR FREE BACKING FLANGE.

DETAILS OF PART DRAWING	DWG. NO. – 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

DETAILS OF PART DRAWING

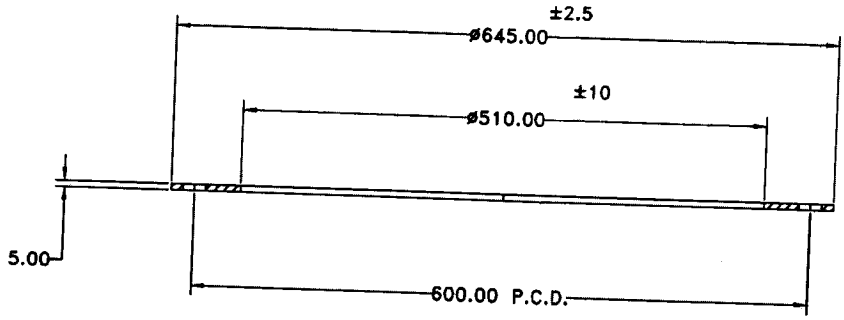
DWG. NO. - 1 (MAJOR R.L.I.).

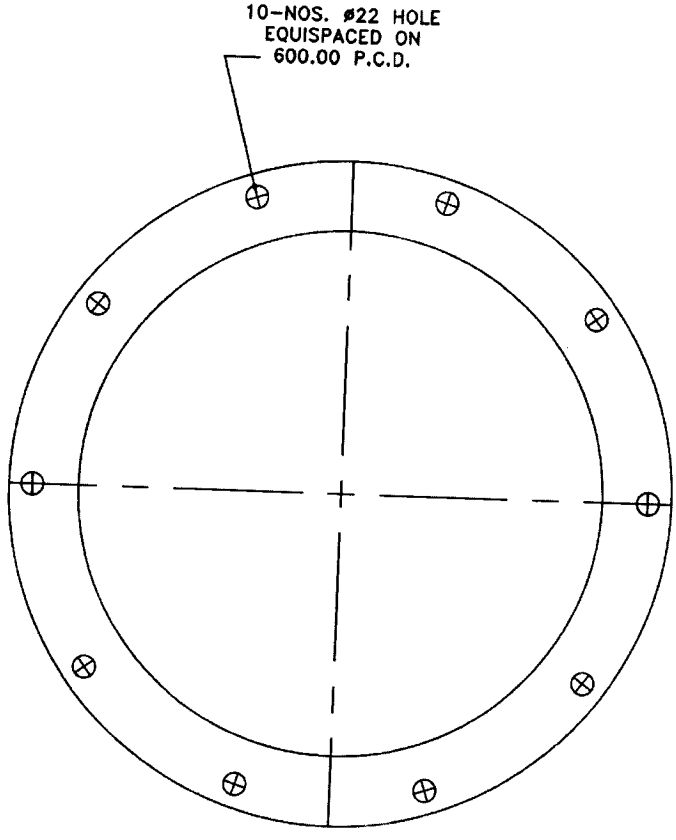
ALL DIMENSIONS ARE IN MM., U. O. STATED.

SCALE- N.T.S.

ITEM NO.- (H)

150 (NB) 90° G.I. M.S. BEND, ONE END WELDED WITH 150(NB) FLANGE OTHER END WELDED WITH 150(NB)x200(NB) EXPANDER WITH ONE END FLANGE WELDED.

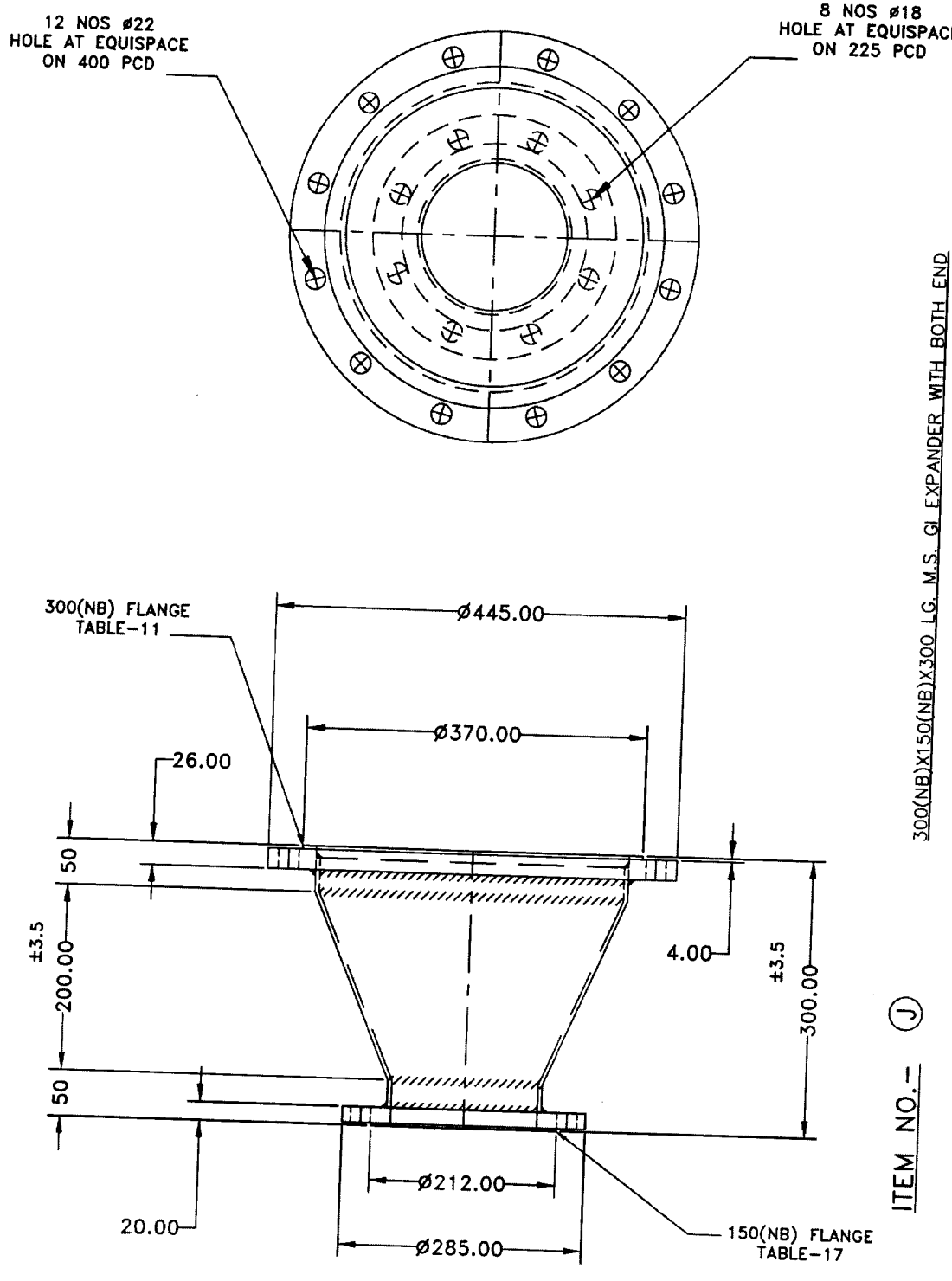




500 (NB) M.S. PLATE FLANGE FOR FOUNDATION.
NOTE: ZINC COATING NOT REQUIRED.

ITEM NO.- (1)

DETAILS OF PART DRAWING	DWG. NO. - 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



300(NB)X150(NB)X300 LG. M.S. GI EXPANDER WITH BOTH END

ITEM NO.- (J)

LAYOUT & PARTS DRAWING OF H.D.T.W..	DWG. NO. – 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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ITEM NO.– (K) 150x150x150 TEE FABRICATED FROM 150 (NB) & 150 (NB) PIPE. ALL ENDS FLANGE WELDED.

DWG. NO. - 1 (MAJOR R.L.I.).

ALL DIMENSIONS ARE IN MM., U. O. STATED.

SCALE- N.T.S.

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SET OF GALVANIZED M.S. QUADRUPED INLET & OUTLET PIPE FITTINGS FOR MAJOR RLI SCHEME

BILL OF MATERIALS FOR 1st AND 2nd DIST. CHAMBER

ITEM NO.	DESCRIPTION OF ITEM	QTY.	MIN WT. (kg)	TOTAL WT (kg)
A3	300(NB) 90°G.I. M.S. ELBOW, ONE END FLANGE WELDED OTHER END SHORT PIECE WITH END RING WELDED FOR FREE BACKING FLANGE.	1	64.500	64.500
A4	300(NB) 90° G.I. M.S. ELBOW,ONE END FLANGE WELDED AND OTHER END SHORT PIECE WITH END FLANGE WELDED.	1	62.500	62.500
B	500X500X150X80 (NB) G.I. M.S. CROSS, ALL ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C. FITTED WITH 500 (NB) BLANK FLANGE WITH NECESSARY G.I. BOLT & ASBESTOS GASKET.	1	226.000	226.000
B1	500X500X300X80 (NB) G.I. M.S. CROSS, ALL ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90 ° C/C. FITTED WITH 500 (NB) BLANK FLANGE WITH NECESSARY G.I. BOLT & ASBESTOS GASKET.	1	230.000	230.000
C	500 (NB) G.I. M.S. SHORT PIECE, BOTH ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.	4	153.000	612.000
D	500X200X200X200 (NB) FABRICATED G.I. M.S. CROSS, ALL ENDS FLANGE WELDED AND TOP END WITH PERFORATED PLATE STITCH WELDED, BOTTOM END FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.	2	123.500	247.00
E	200 (NB) G.I. M.S. SHORT PIECE, BOTH ENDS FLANGE WELDED.	6	33.500	201.00
F	200X200X200X150 (NB) G.I. M.S. CROSS. SIDE PROJECTION FLANGE WELDED.TOP END PERFORATED PLATE STITCH WELDED AND BOTTOM FITTED WITH END BLANK FLANGE WITH NECESSARY GI BOLTS & GASKET	6	157.500	945.00
G	150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.	8	28.500	228.000
G1	150 (NB) 90° G.I. M.S. BEND, BOTH END FLANGE WELDED.	2	28.800	57.600
G2	150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END SHORT PIECE WITH RING WELDED FOR FREE BACKING FLANGE	1	31.000	31.000
G3	150 (NB) 90° G.I. M.S. BEND, BOTH END FLANGE WELDED.	1	28.500	28.500
H	150 (NB) 90° G.I. M.S. BEND, ONE END WELDED WITH 150(NB) FLANGE OTHER END WELDED WITH 150(NB)x200(NB) EXPANDER WITH FLANGE.	6	33.000	198.000
I	500 (NB) M.S. PLATE FLANGE FOR FOUNDATION.	2	4.500	9.000
J	300(NB)X150(NB)X350 LG. EXPANDER WITH BOTH END FLANGE WELDED.	1	27.000	27.000
K	150x150x150 G.I. M.S. TEE FABRICATED FROM 150 (NB) & 150 (NB) PIPE. ALL ENDS FLANGE WELDED.	2	33.200	66.400

TOTAL –3233.500 kg

	DWG. NO. – 1 (MAJOR R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

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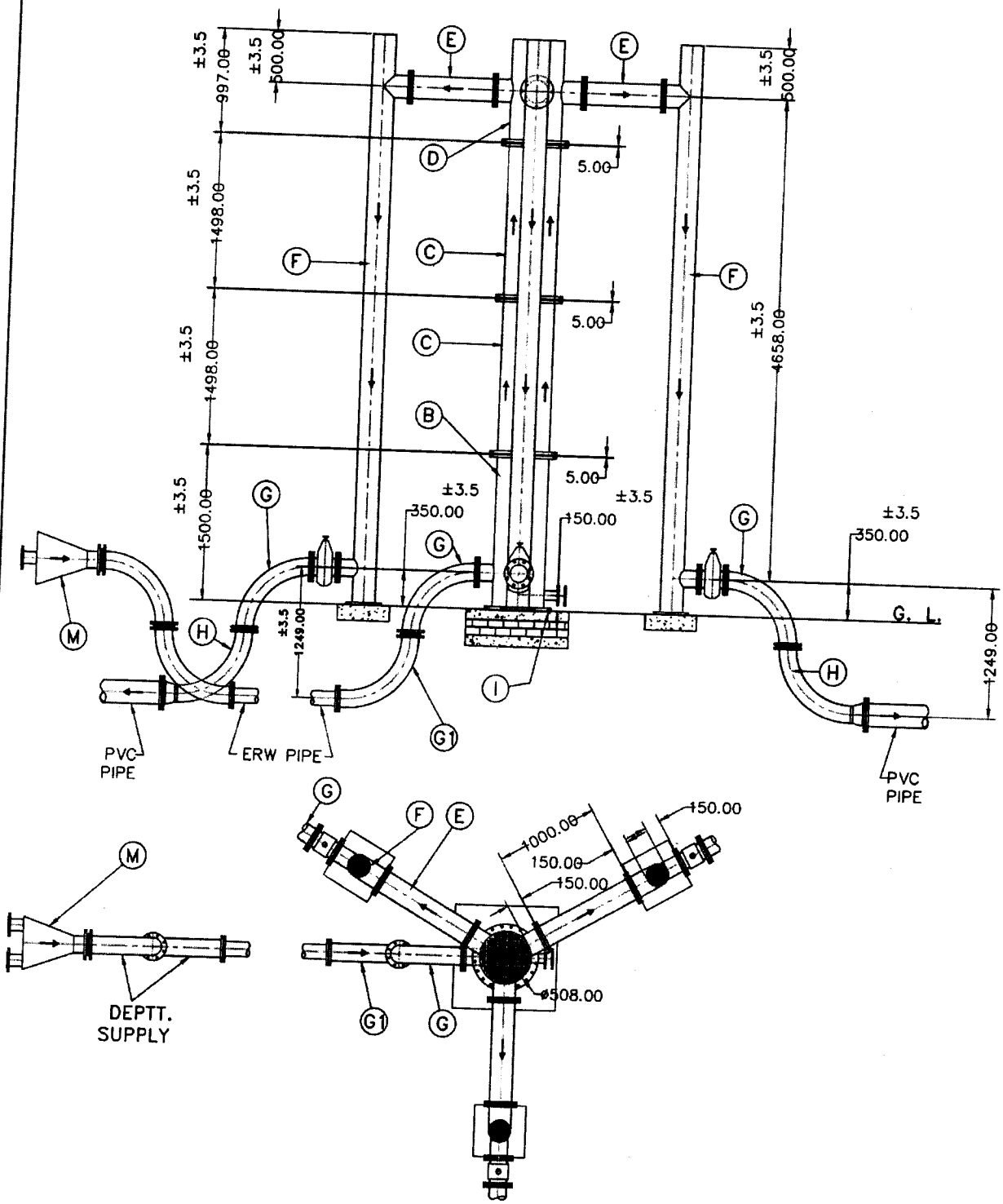
SET OF GALV. M.S. QUADRUPED INLET & OUTLET PIPE FITTINGS

FOR

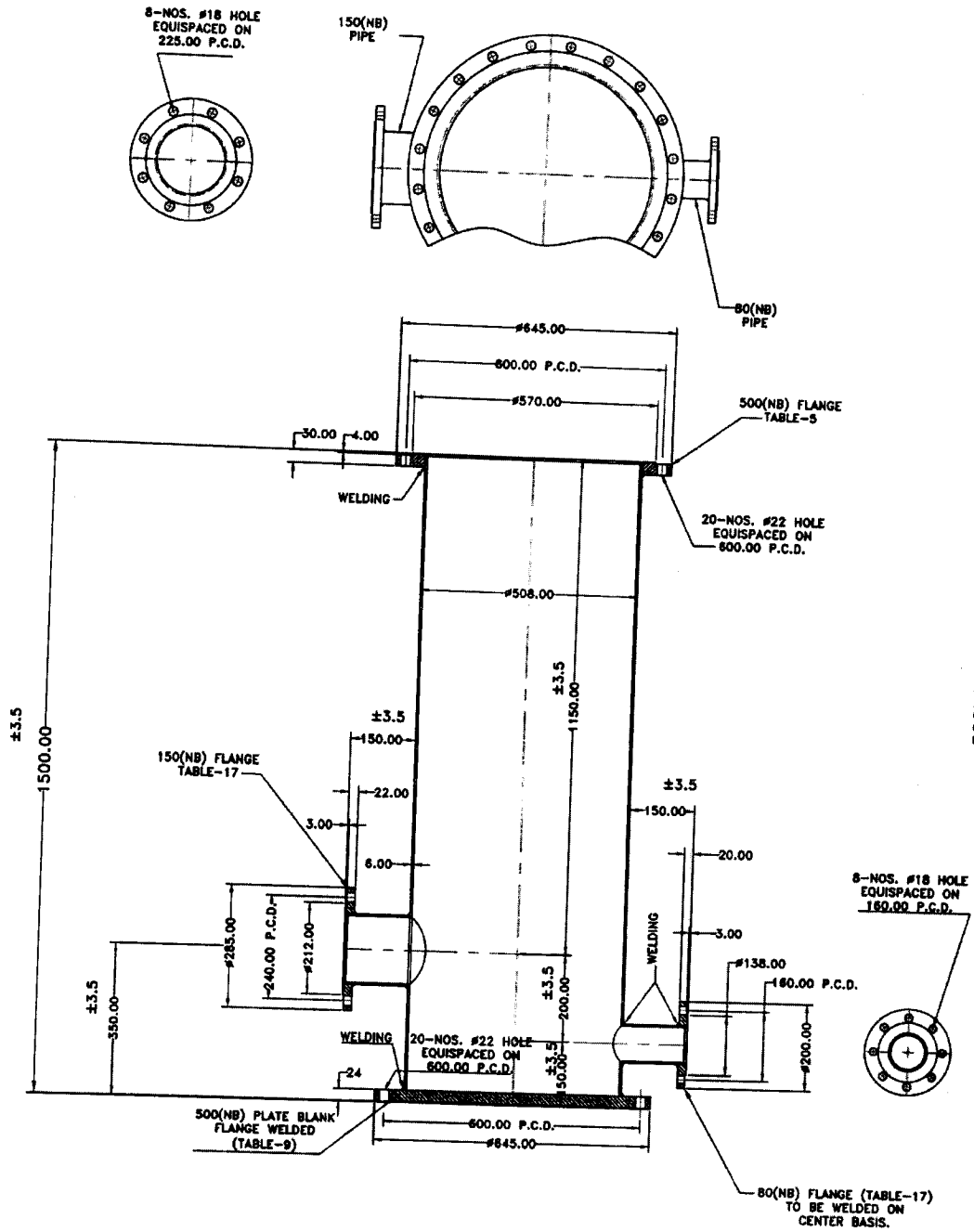
MIDI R.L.I.

(GALVANIZED)

GENERAL ARRANGEMENT & DETAIL DRAWINGS



GENERAL ARRANGEMENT	DWG. NO. – 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.



500X500X150X80 (NB) G.I. M.S. CROSS, ALL ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.

ITEM NO.- (B)

DETAILS OF PART DRAWING	DWG. NO. - 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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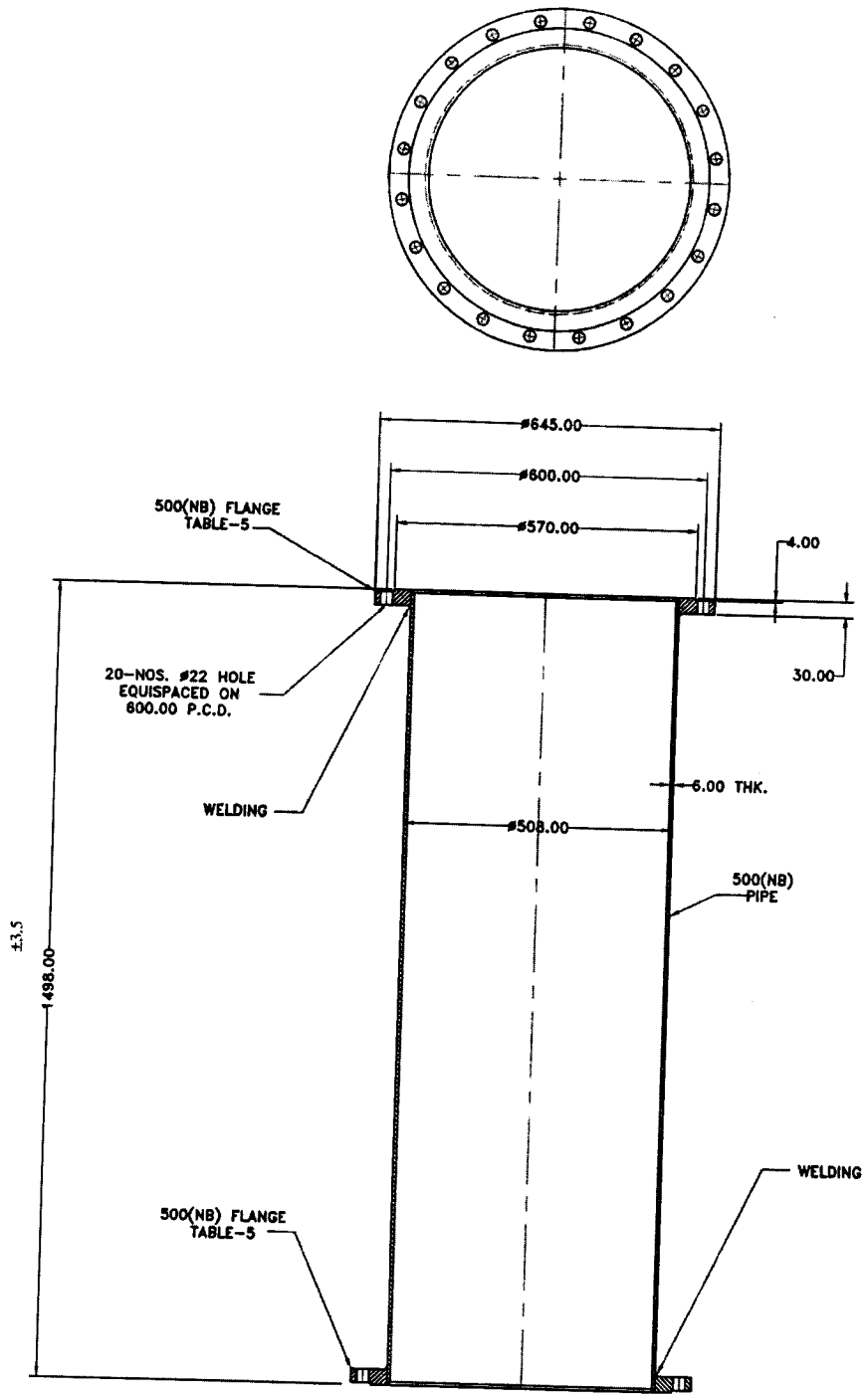

500 (NB) G.I. M.S. SHORT PIECE, BOTH ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.

ITEM NO.- (C)

DETAILS OF PART DRAWING	DWG. NO. - 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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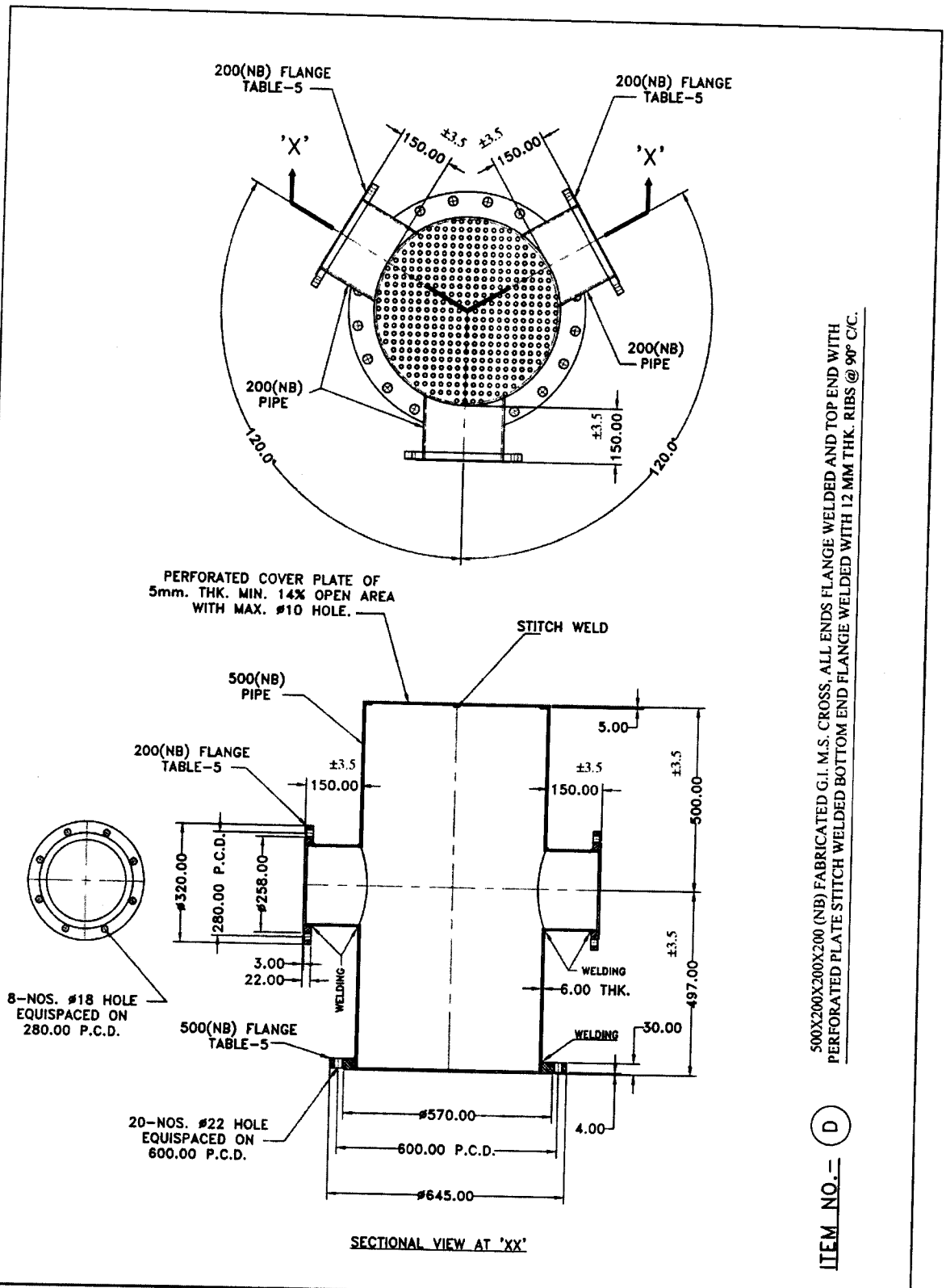

SECTIONAL VIEW AT 'XX'

500X200X200X200 (NB) FABRICATED G.I. M.S. CROSS, ALL ENDS FLANGE WELDED AND TOP END WITH PERFORATED PLATE STITCH WELDED BOTTOM END FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.

ITEM NO.- (D)

DETAILS OF PART DRAWING	DWG. NO. - 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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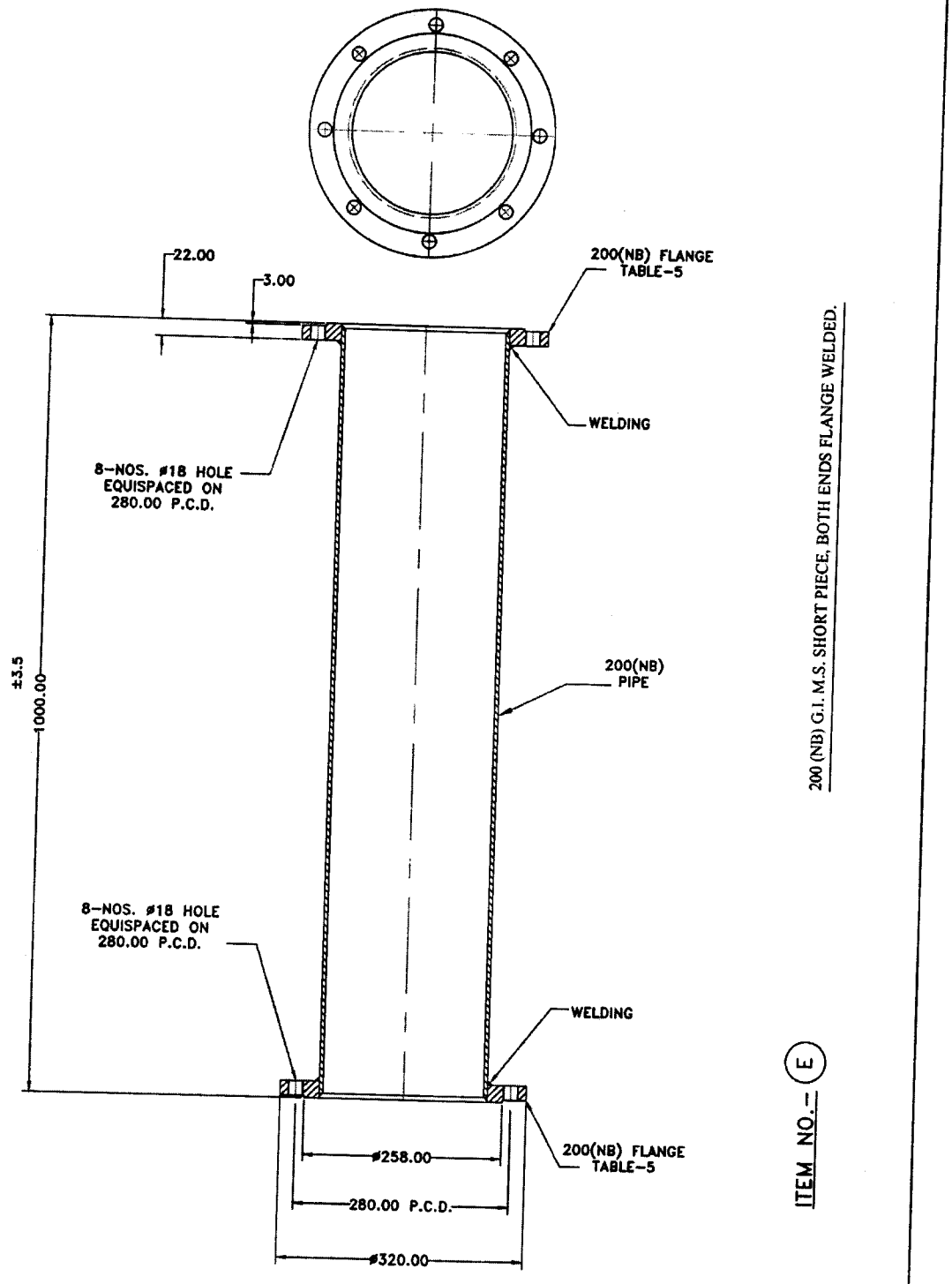
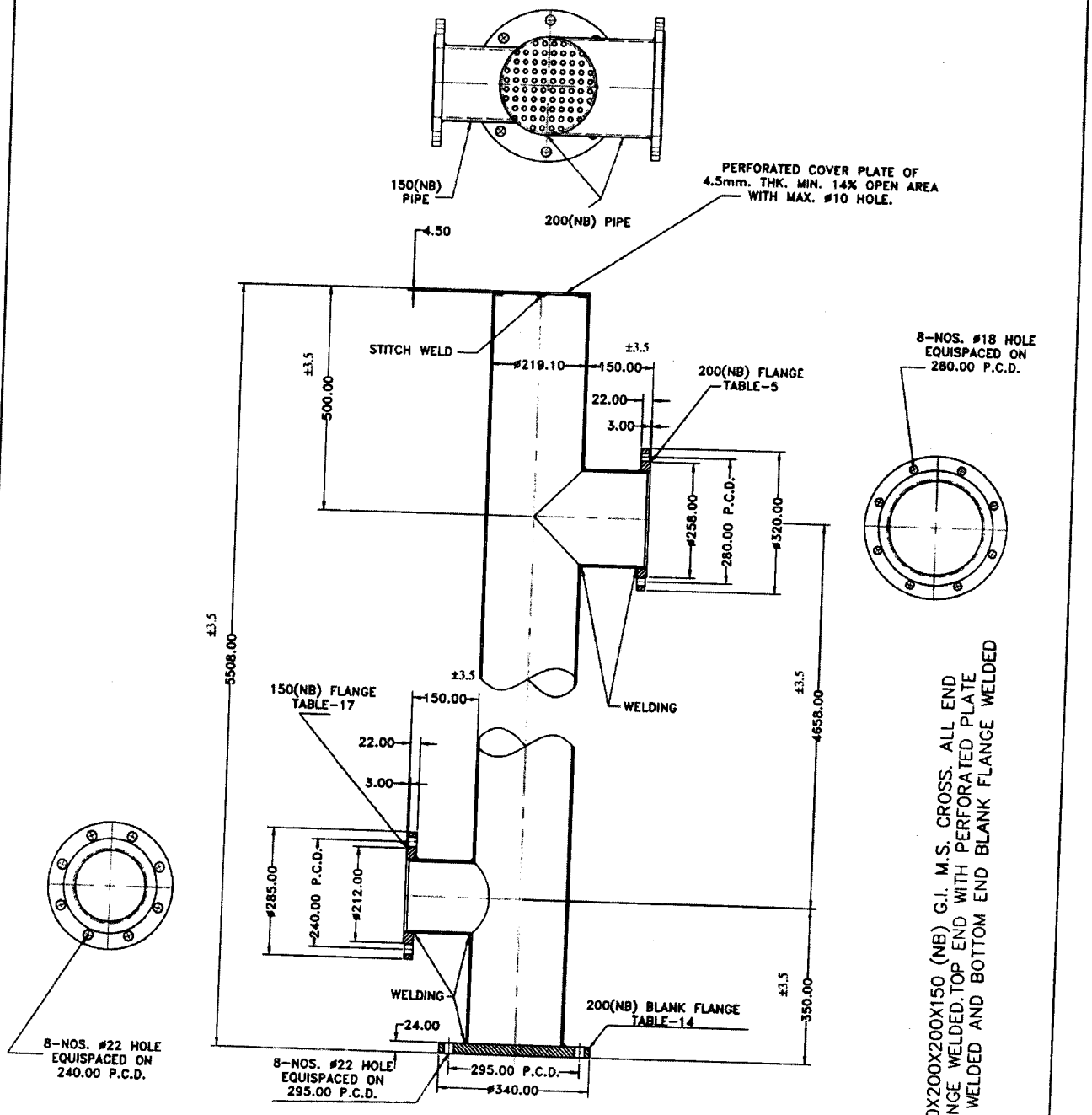
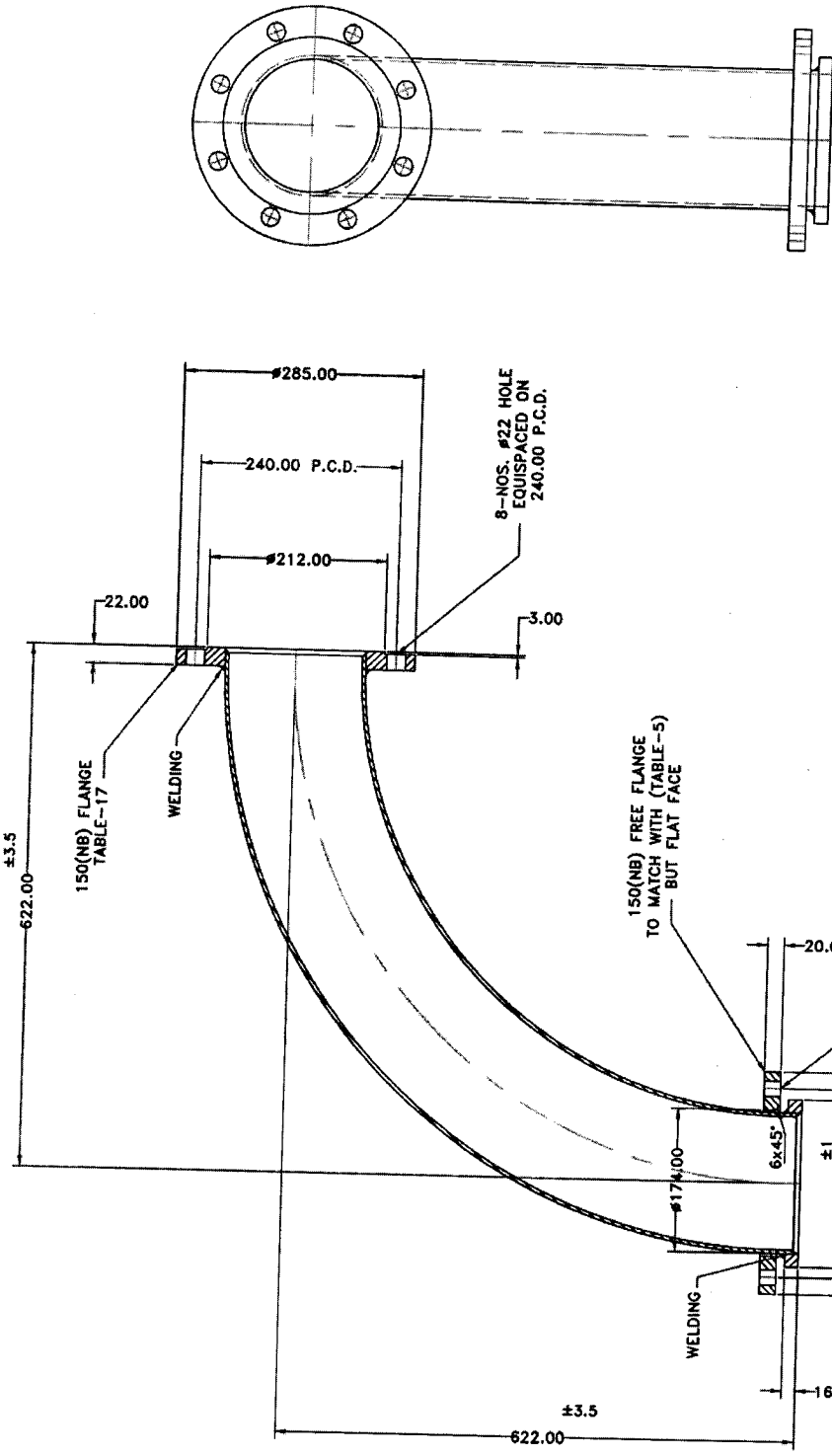


DETAILS OF PART DRAWING	DWG. NO. - 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



ITEM NO.- (F) 200X200X200X150 (NB) G.I. M.S. CROSS. ALL END FLANGE WELDED.TOP END WITH PERFORATED PLATE STITCH WELDED AND BOTTOM END BLANK FLANGE WELDED

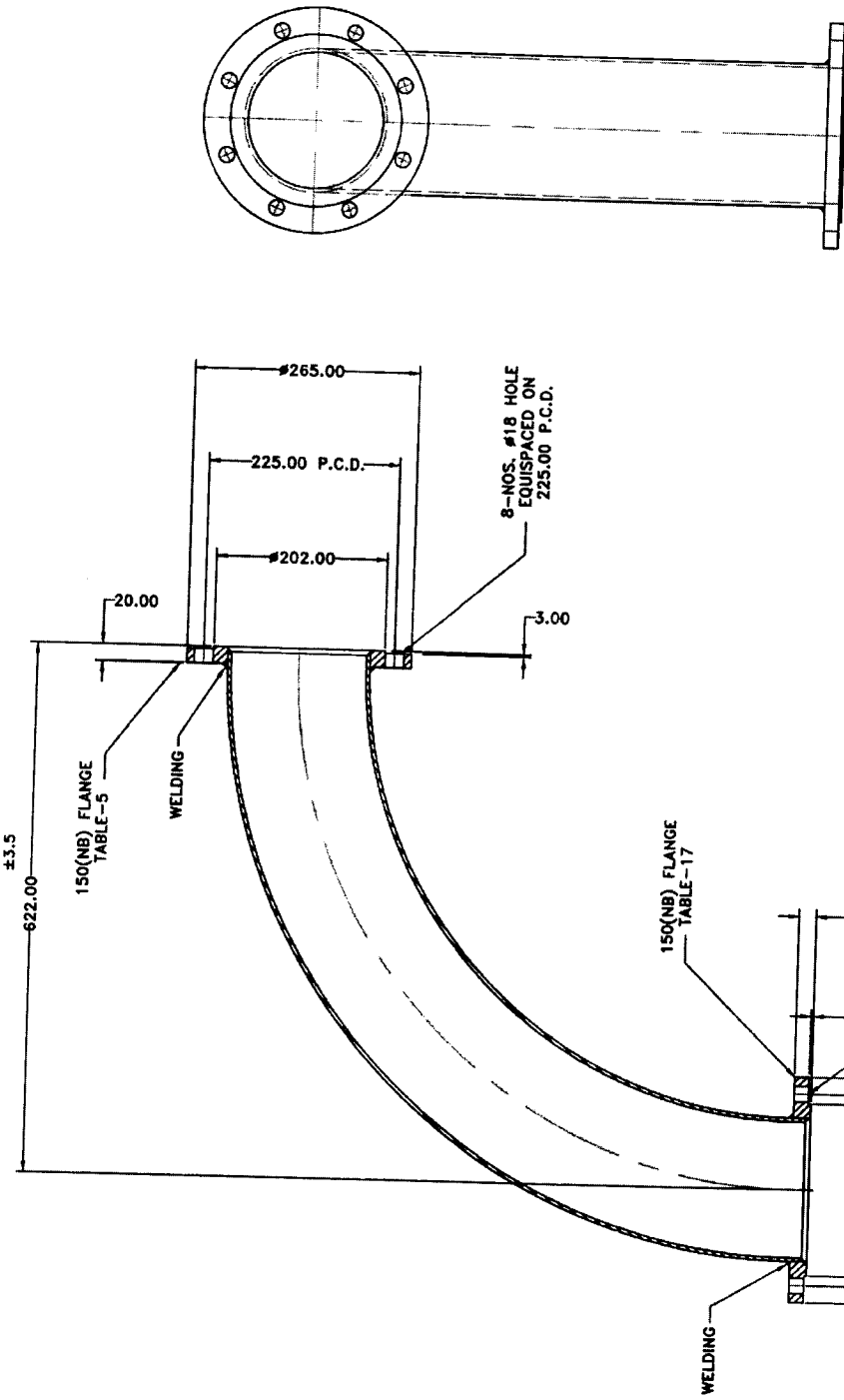
DETAILS OF PART DRAWING	DWG. NO. – 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.



150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.

ITEM NO.- (G)

DETAILS OF PART DRAWING	DWG. NO. – 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.

ITEM NO.- (G1)

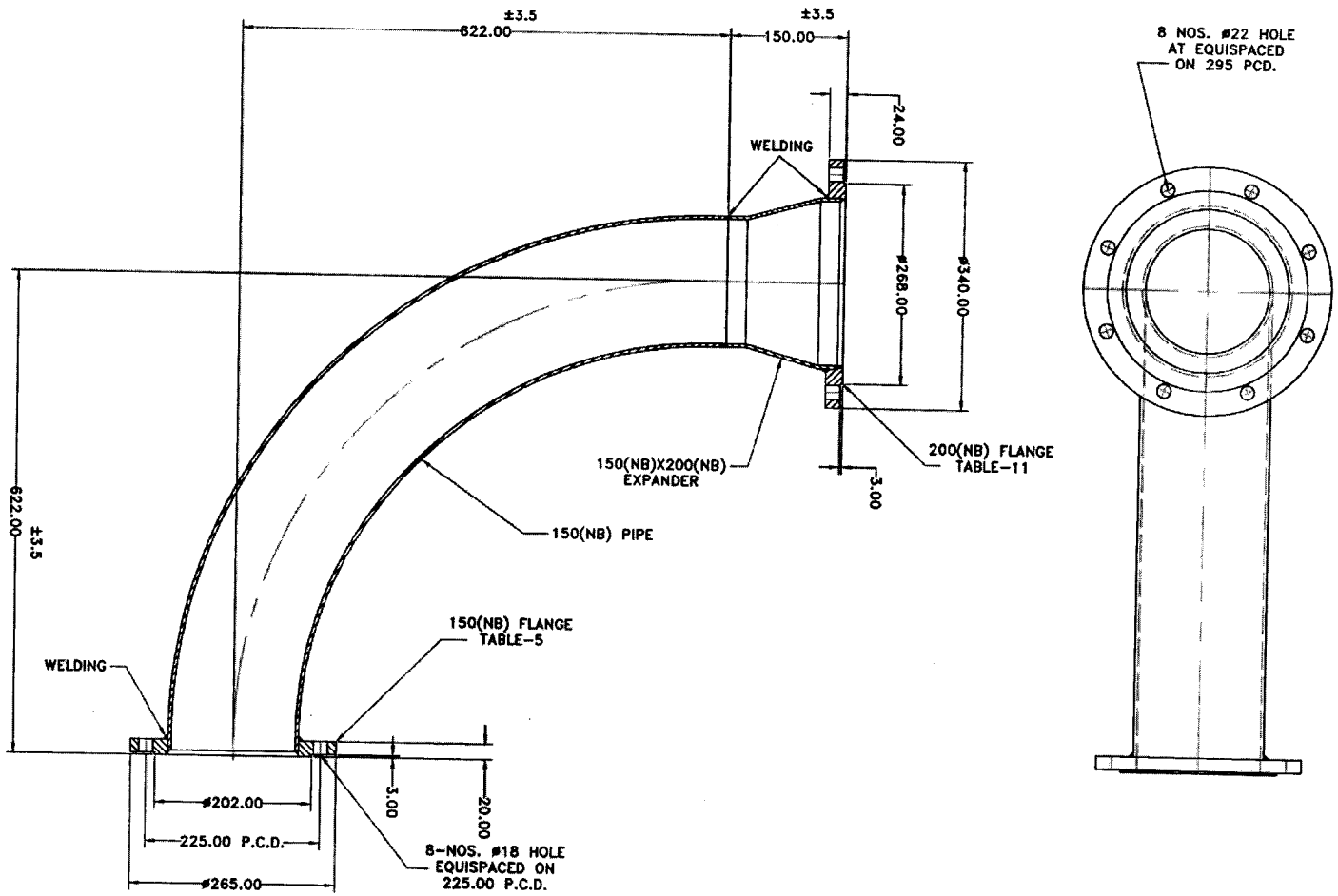
DETAILS OF PART DRAWING	DWG. NO. – 1 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

DETAILS OF PART DRAWING

DWG. NO. – 2 (MIDI R.L.I.).

ALL DIMENSIONS ARE IN MM., U. O. STATED.

SCALE– N.T.S.



ITEM NO.– (H)

150 (NB) 90° G.I. M.S. BEND, ONE END WELDED WITH 150(NB) FLANGE OTHER END WELDED WITH 150(NB)x200(NB) EXPANDER WITH FLANGE.

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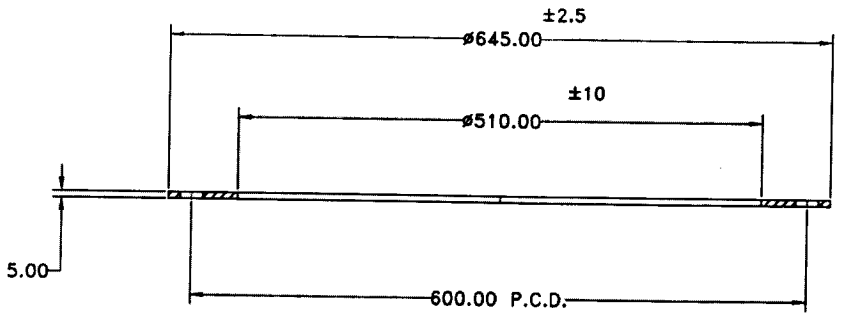
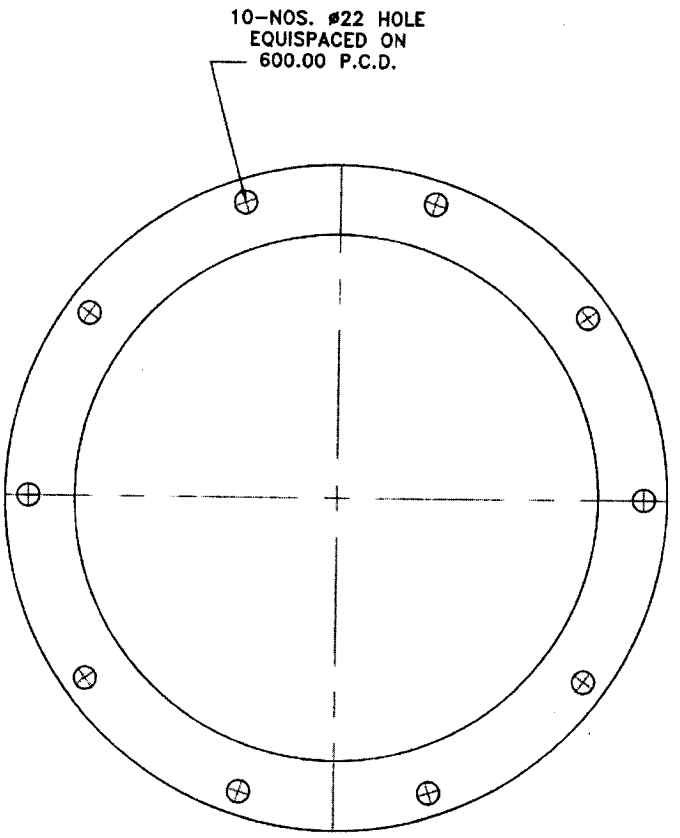


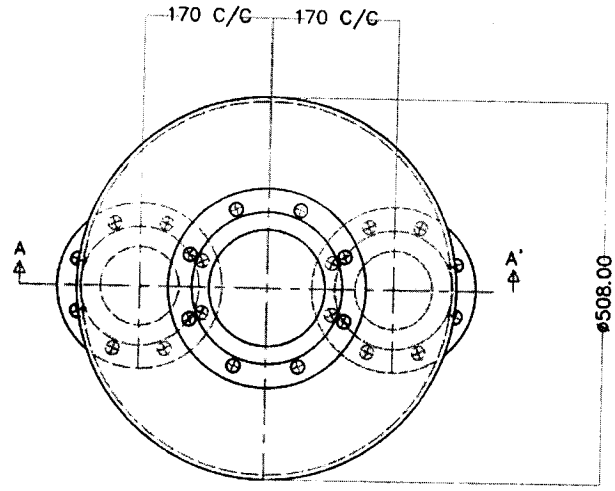


500 (NB) M.S. PLATE FLANGE FOR FOUNDATION.
NOTE: ZINC COATING NOT REQUIRED.

ITEM NO.– (1)

DETAILS OF PART DRAWING	DWG. NO. – 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

500X150X100X100(MB) REDUCING MANIFOLD IN TWO HUB WITH 100(NB) 2 NOS. INLET FLANGE WELDED HORIZONTALLY AND 150 (NB) 1 NO. OUTLET WITH FLANGE WELDED HORIZONTALLY AT 180° APART.



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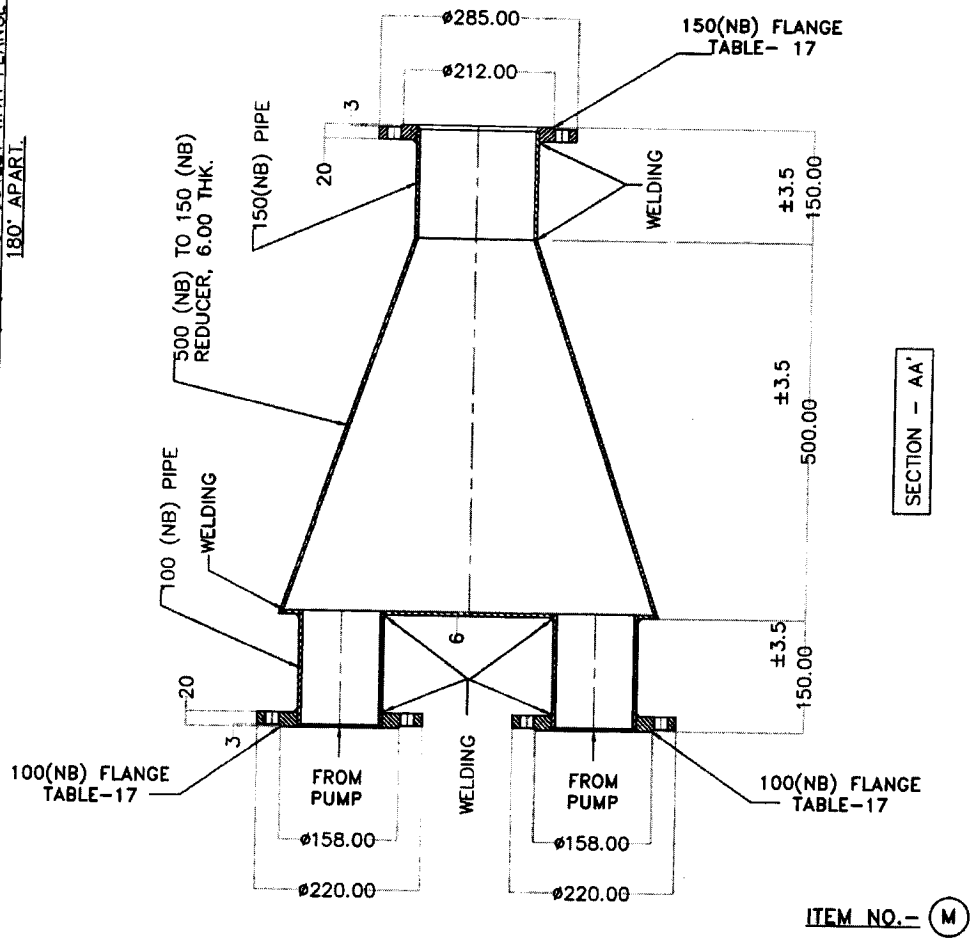


SECTION - AA'

ITEM NO.- (M)

DETAIL OF PART DRAWING	DWG. NO. - 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

SET OF GALVANIZED M.S. QUADRUPED INLET & OUTLET PIPE FITTINGS FOR MIDI RLI SCHEME

BILL OF MATERIALS

ITEM NO.	DESCRIPTION OF ITEM	QTY.	MIN WT (kg).	TOT WT. (kg)
B	500X500X150X80 (NB) G.I. M.S. CROSS, ALL ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C FITTED WITH 500 (NB) BLANK FLANGE WITH NECESSARY G.I. BOLT & ASBESTOS GASKET.	1	226.000	226.000
C	500 (NB) G.I. M.S. SHORT PIECE, BOTH ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.	2	153.000	306.000
D	500X200X200X200 (NB) FABRICATED G.I. M.S. CROSS, ALL ENDS FLANGE WELDED AND TOP END WITH PERFORATED PLATE STITCH WELDED BOTTOM END FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.	1	123.500	123.500
E	200 (NB) G.I. M.S. SHORT PIECE, BOTH ENDS FLANGE WELDED.	3	33.500	100.500
F	200X200X200X150 (NB) G.I. M.S. CROSS. SIDE PROJECTION FLANGE WELDED.TOP END PERFORATED PLATE STITCH WELDED AND BOTTOM END FITTED WITH 200 (NB) BLANK FLANGE WITH NECESSARY G.I. BOLT & ASBESTOS GASKET.	3	157.500	472.500
G	150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.	4	28.800	115.200
H	150 (NB) 90° G.I. M.S. BEND, ONE END WELDED WITH 150(NB) FLANGE OTHER END WELDED WITH 150(NB)x200(NB) EXPANDER WITH ONE END FLANGE WELDED.	3	33.000	99.000
I	500 (NB) M.S. PLATE FLANGE FOR FOUNDATION.	1	4.500	4.500
M	500X150X100X100(MB) REDUCING MANIFOLD IN TWO HUB WITH 100(NB) 2 NOS. INLET FLANGE WELDED HORIZONTALLY AND 150 (NB) 1 NO. OUTLET WITH FLANGE WELDED HORIZONTALLY AT 180° APART.	1	31.000	31.000
G1	150 (NB) 90° G.I. M.S. BEND, BOTH END FLANGE WELDED.	1	28.500	28.500

TOTAL –1506.700 kg

	DWG. NO. – 2 (MIDI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

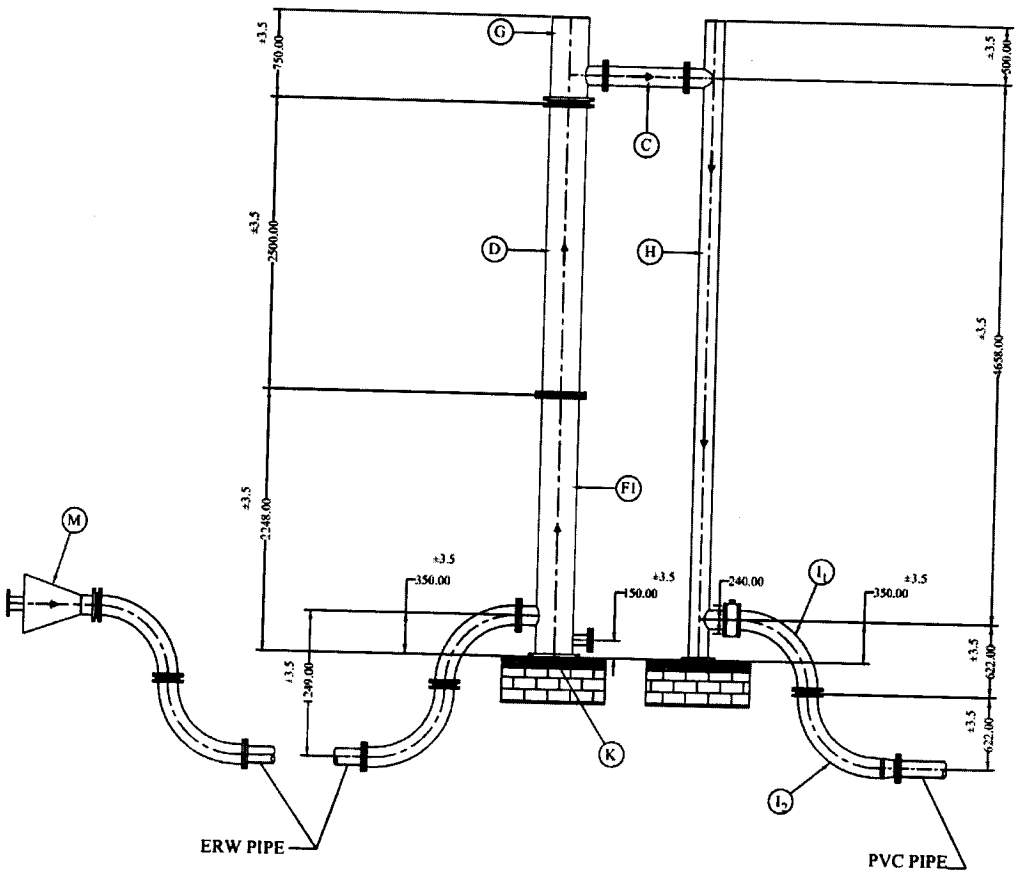
SET OF GALV. M.S. TRIPOD INLET & OUTLET PIPE FITTINGS

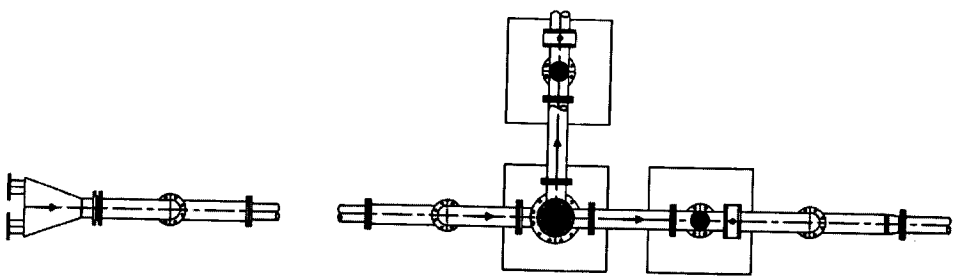
FOR

MINI R.L.I.

(GALVANIZED)

GENERAL ARRANGEMENT & DETAIL DRAWINGS





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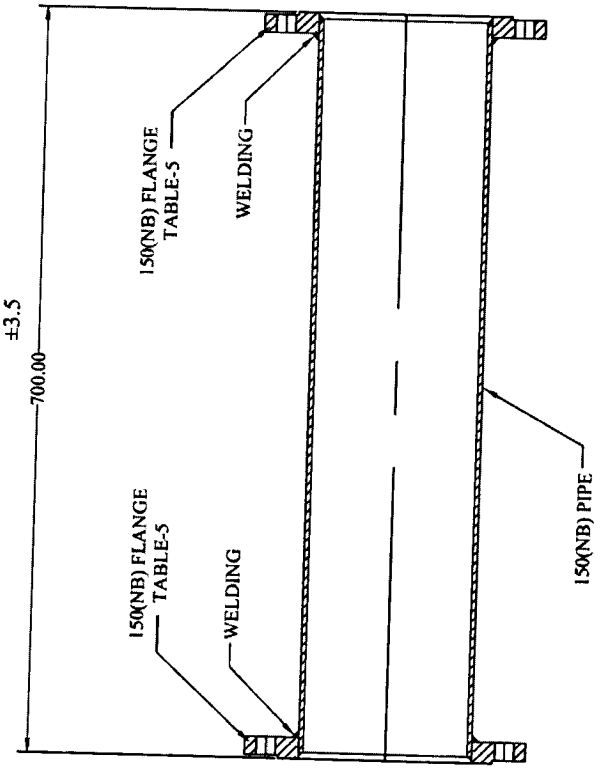
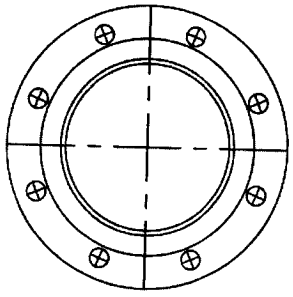
GENERAL ARRANGEMENT DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



ITEM NO.- (C)

150(NB) SHORT PIECE 700MM LONG BOTH END FLANGE WELDED.



DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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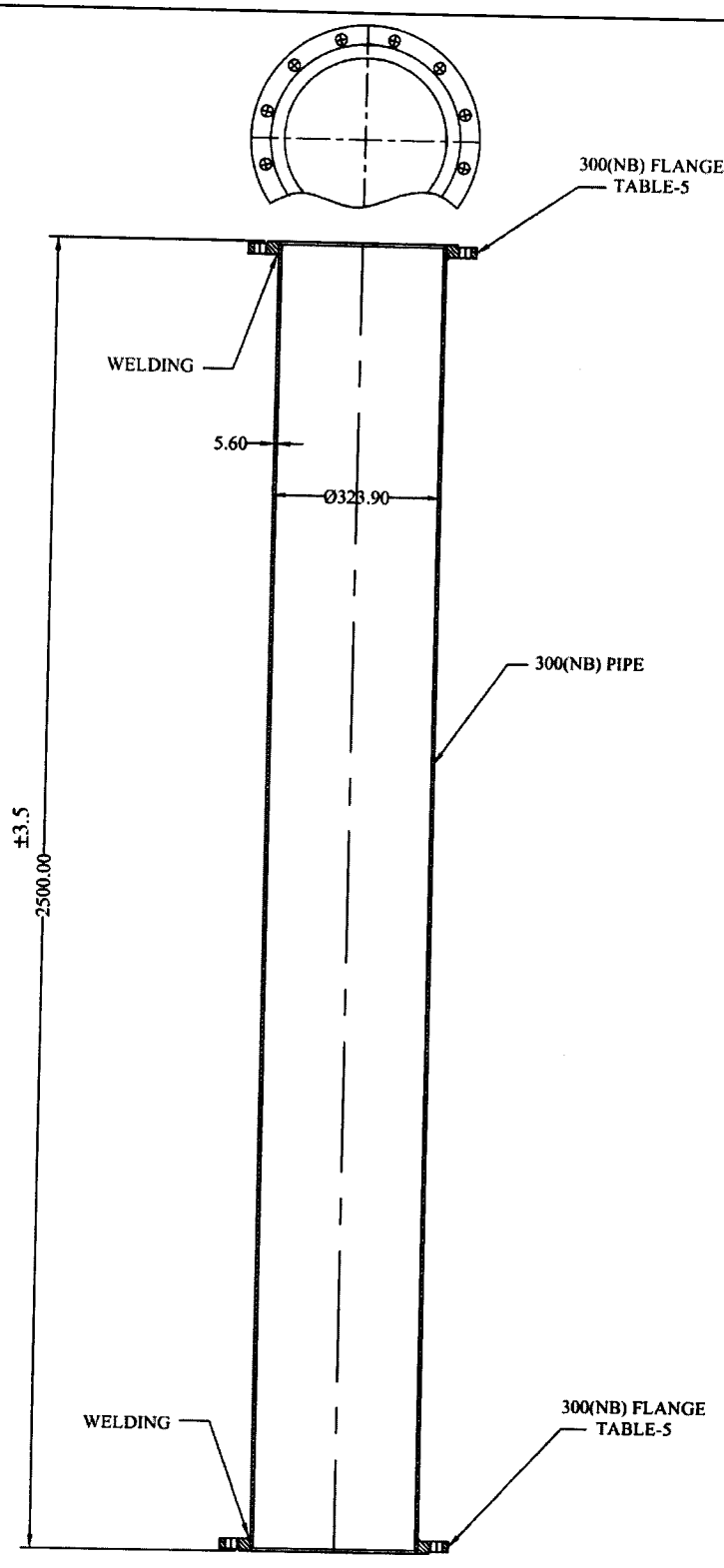
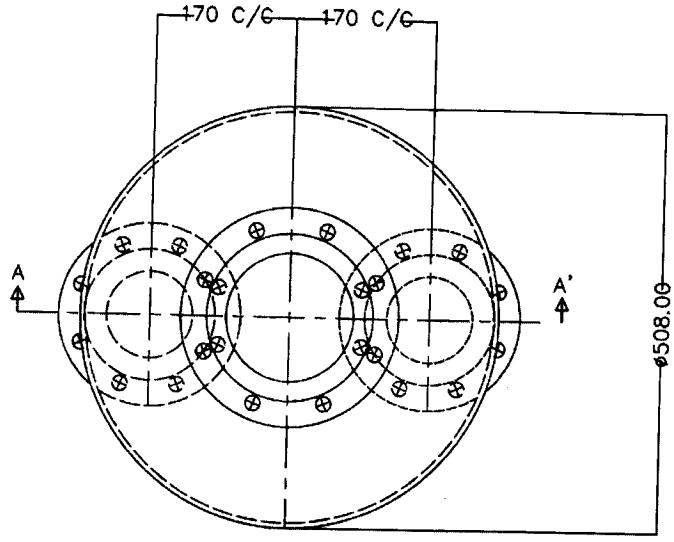


ITEM NO.- (D)

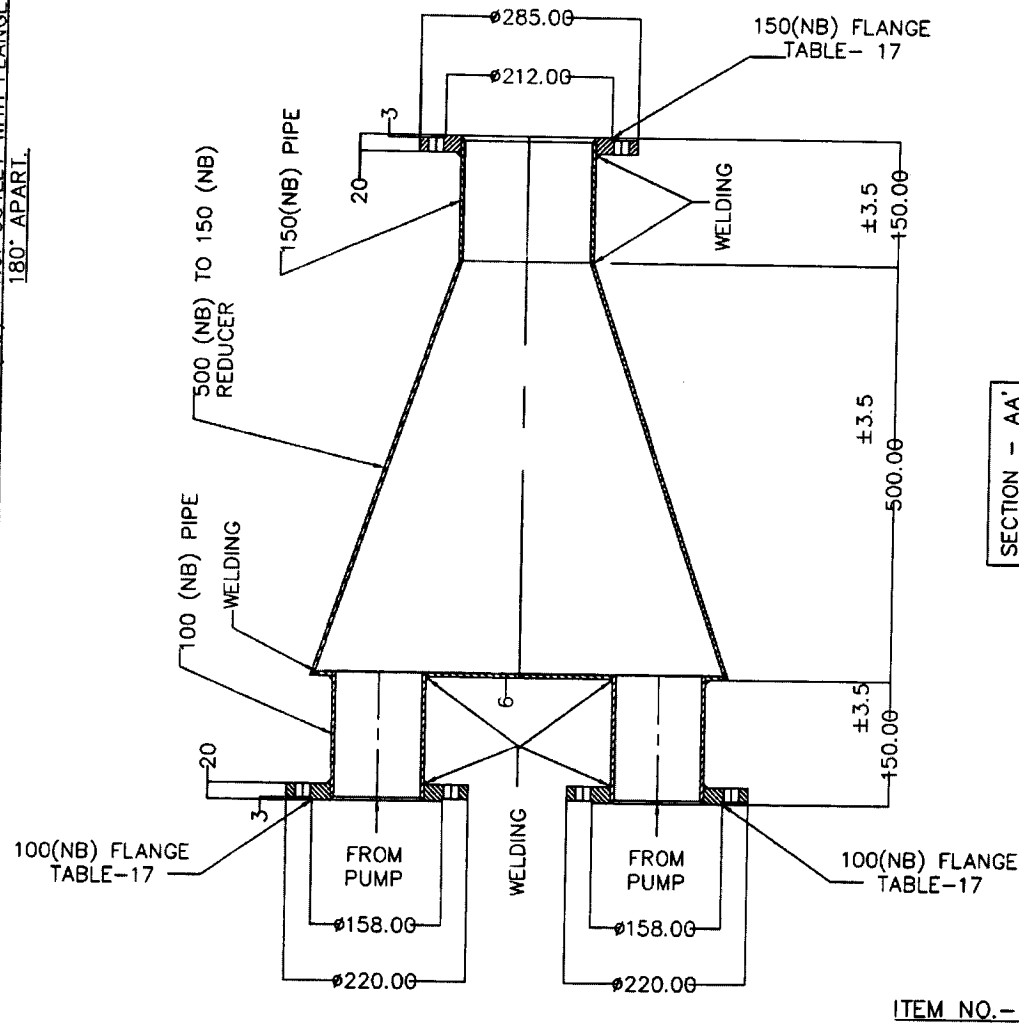
300(NB) SHORT PIECE BOTH END FLANGE WELDED WITH 12MM. THK. RIBS@ 90° C/C.

DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

500X150X100X100(MB) REDUCING MANIFOLD IN TWO HUB WITH 100(NB) 2 NOS. INLET FLANGE WELDED HORIZONTALLY AND 150 (NB) 1 NO. OUTLET WITH FLANGE WELDED HORIZONTALLY AT 180° APART.



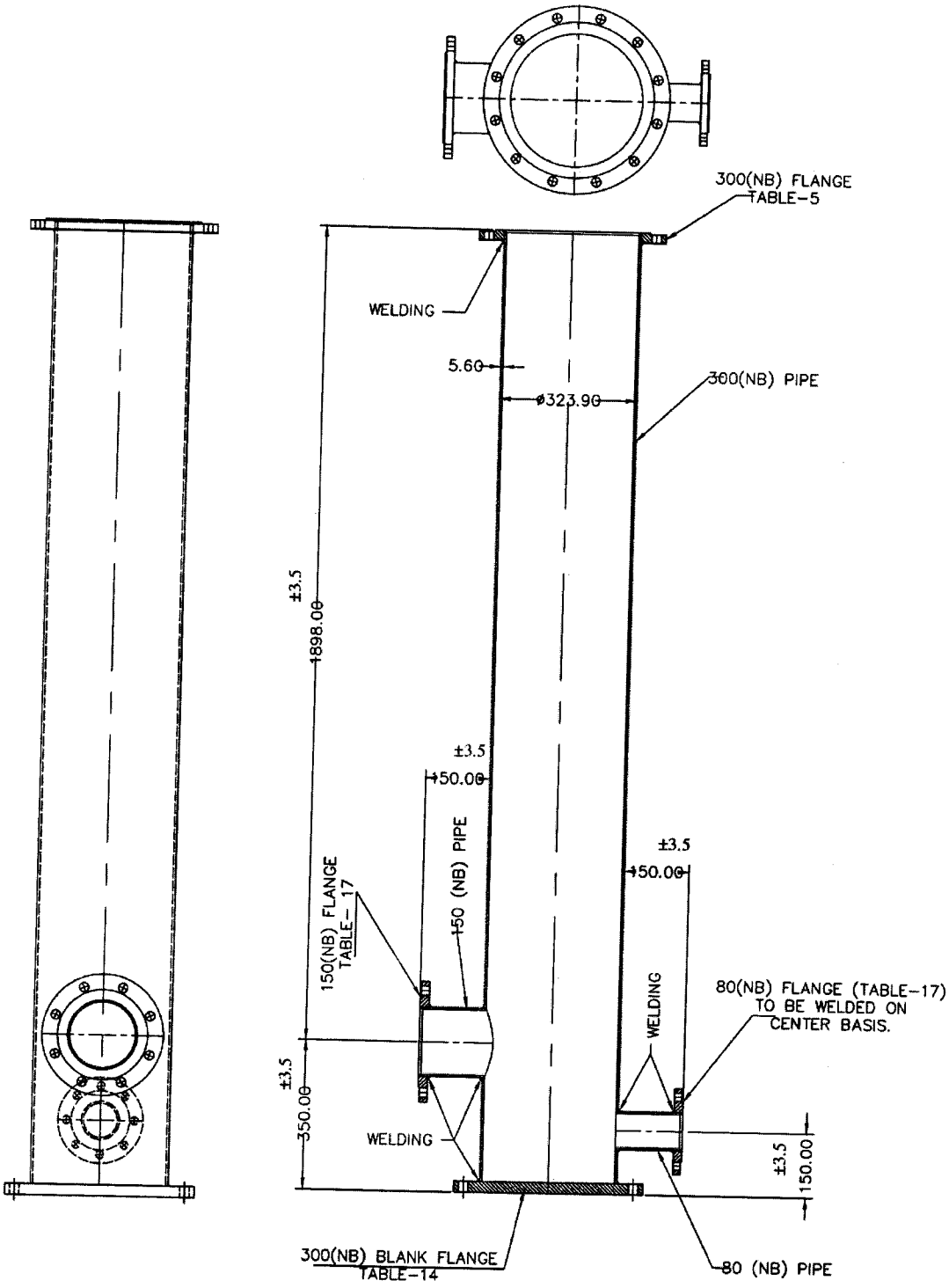
PLAN



SECTION - AA'

ITEM NO.- (M)

DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



300X300X150X80MM CROSS, ALL ENDS
FLANGE WELDED, 300 (NB) FLANGE WELDED
WITH 12 MM THK. RIBS @ 90° C/C.

ITEM NO.- (F1)

DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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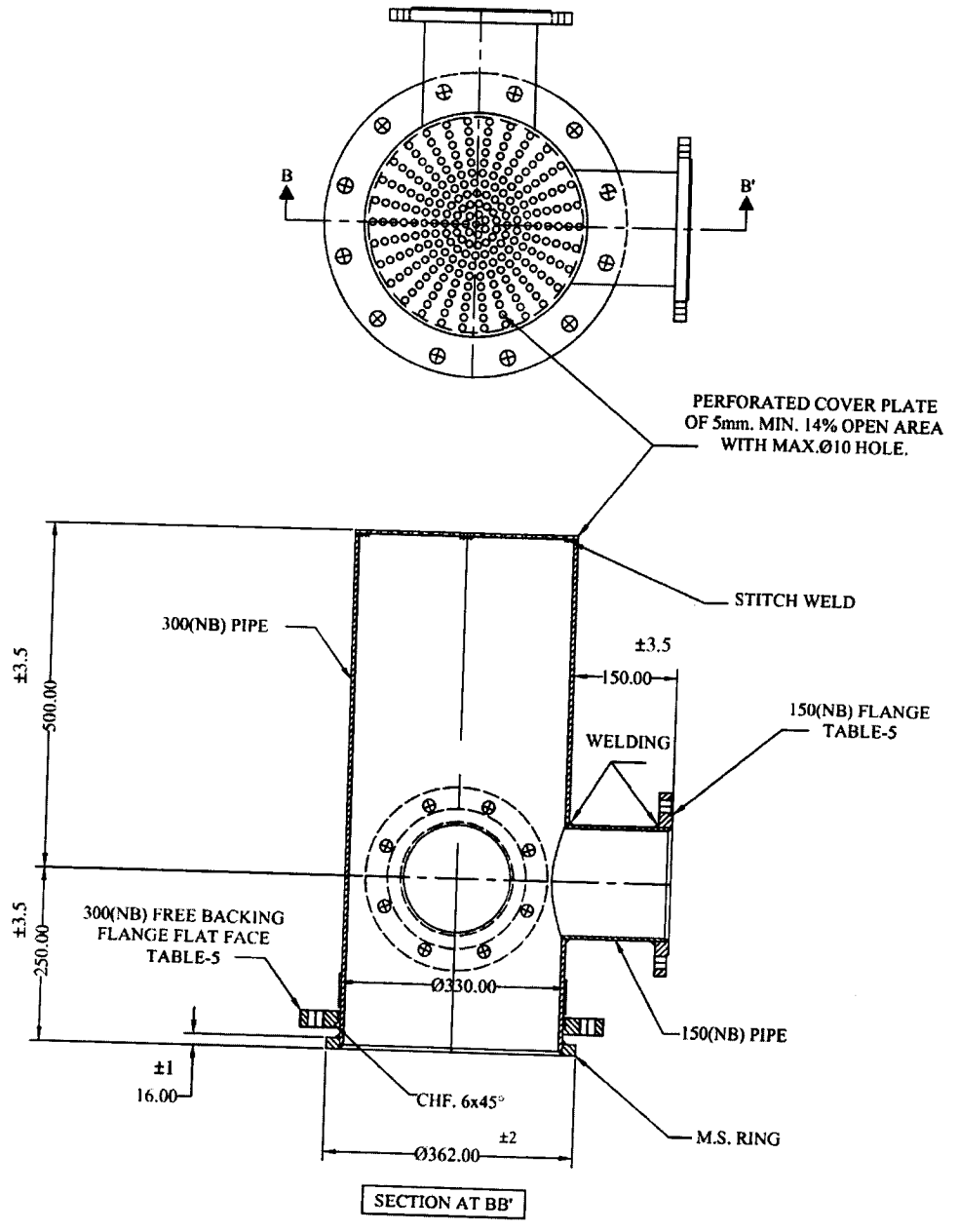
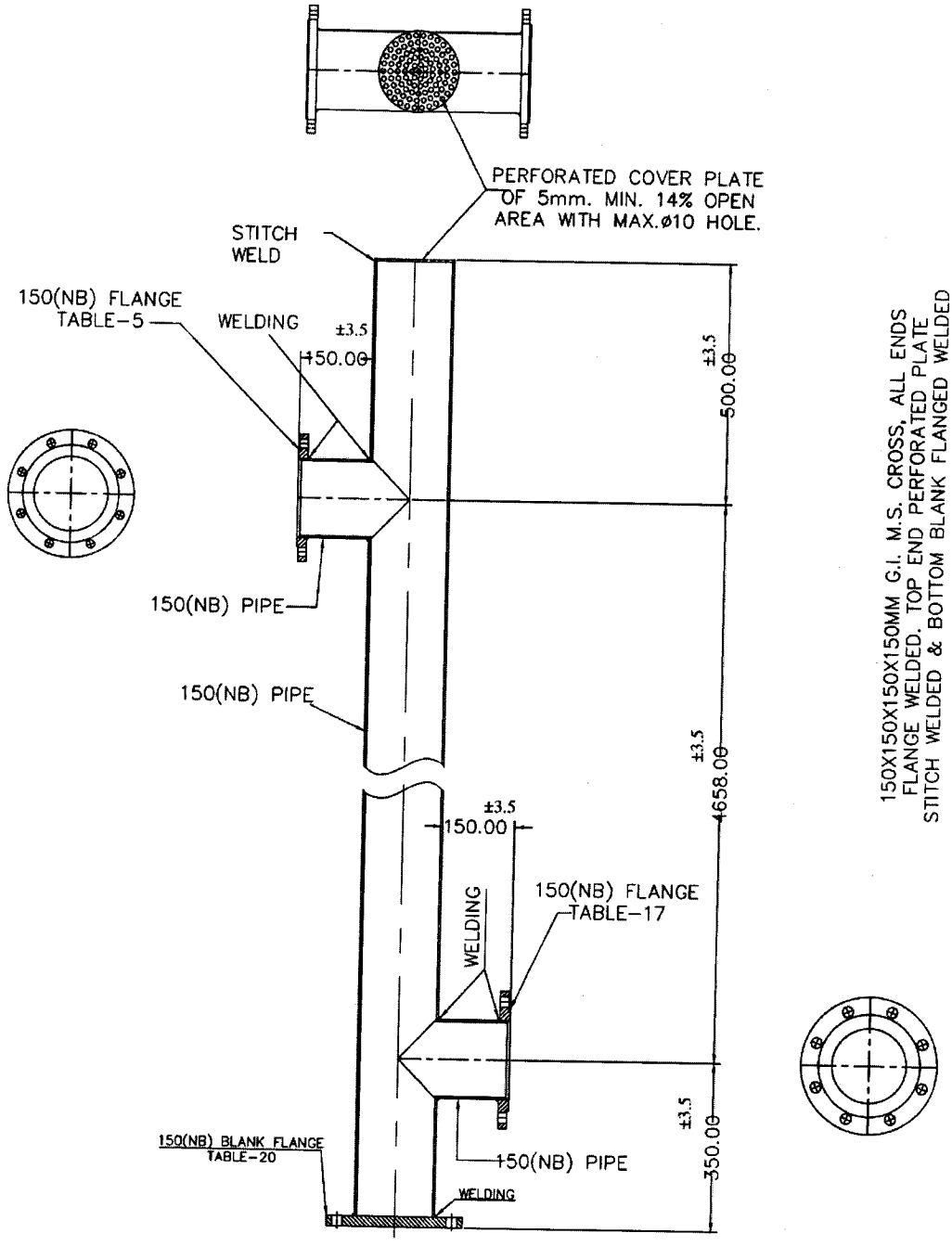


SECTION AT BB'

300X300X150X150MM CROSS, 2 NOS. AXIS OF OUTLET AT 90° END RING WELDED WITH FREE BACKING FLANGE AND TOP PERFORATED PLATE STITCH WELDED.

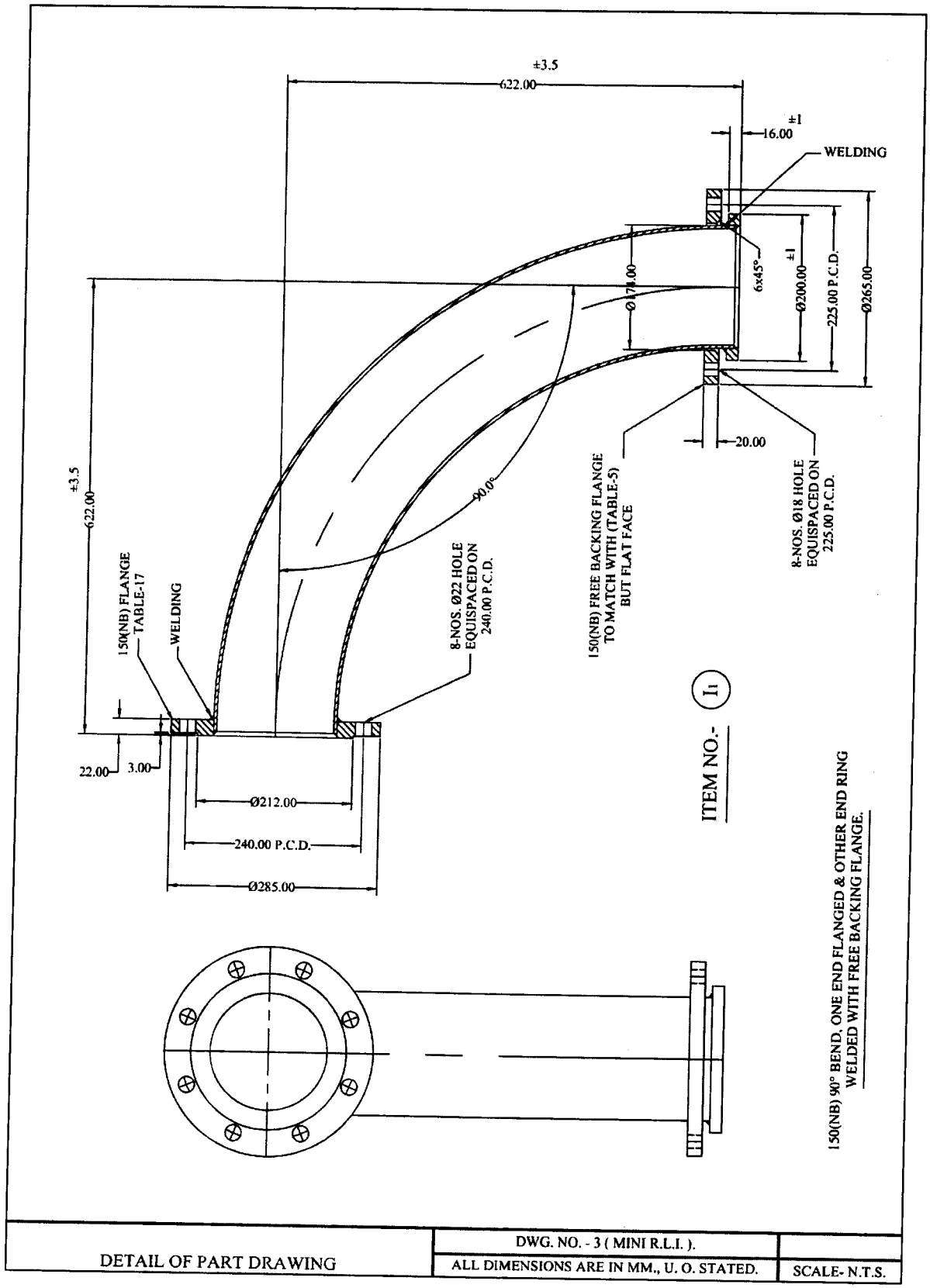
ITEM NO.- (G)

DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

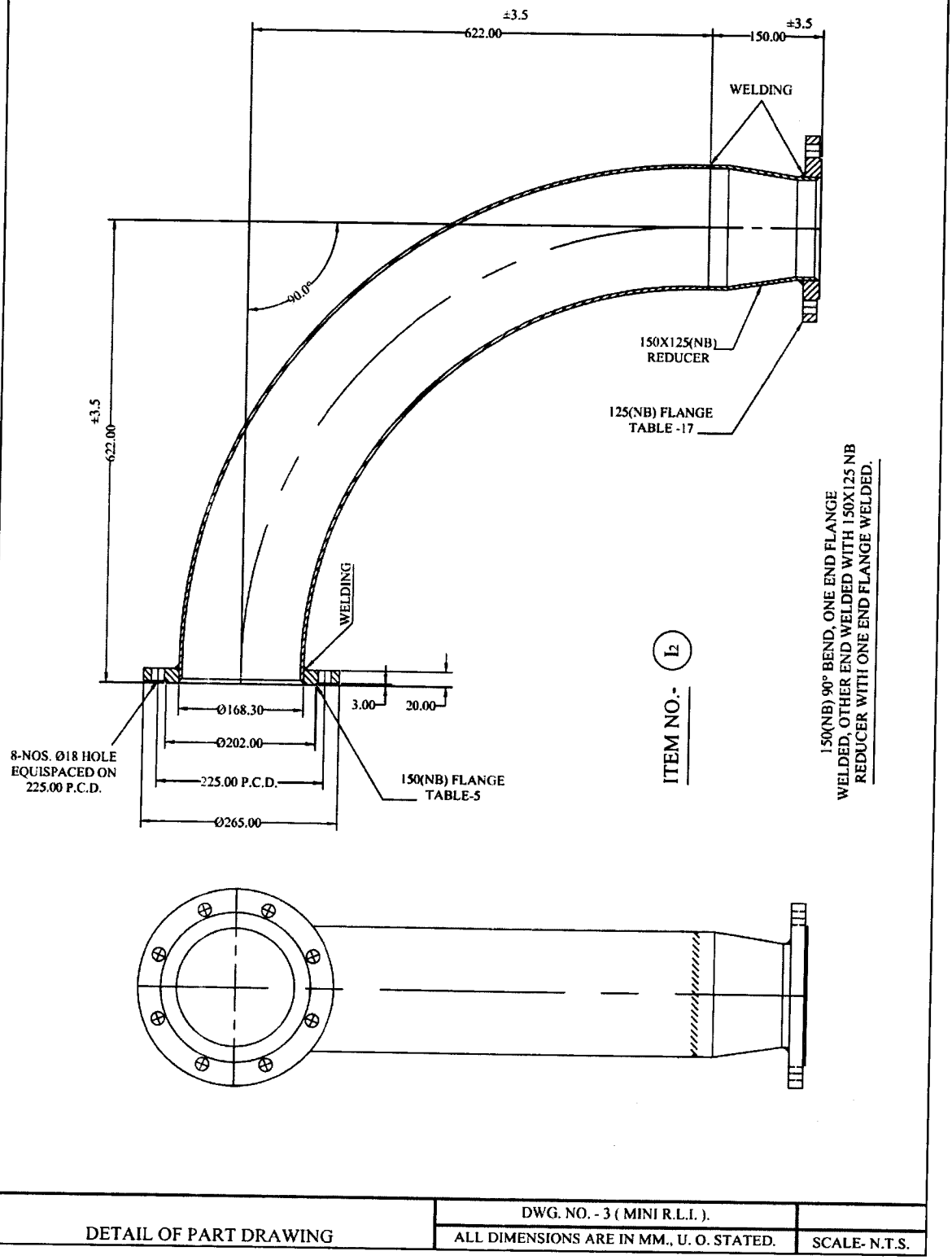


ITEM NO.- (H)

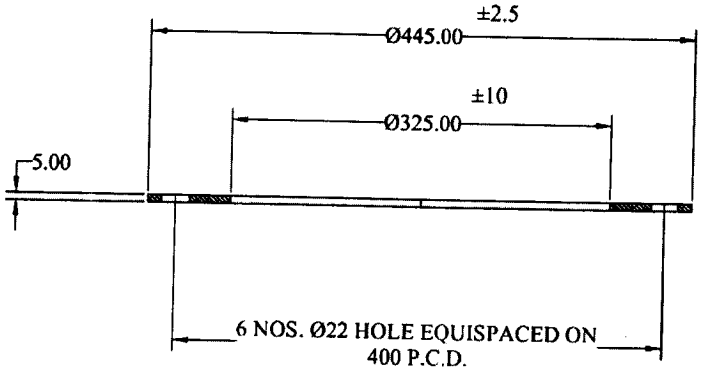
DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

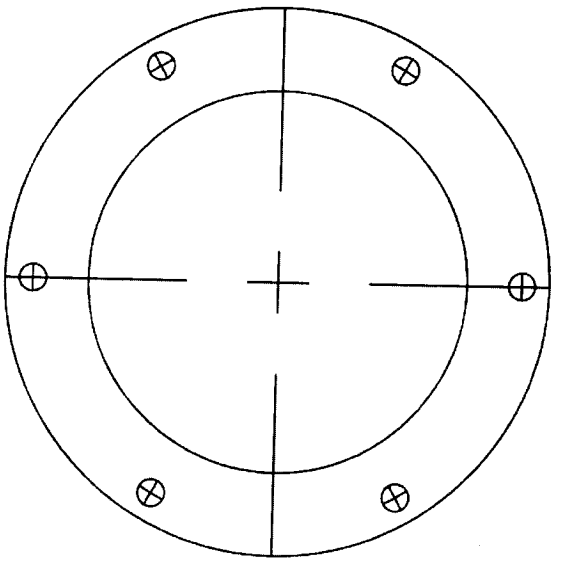


DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.





300(NB) PLATE FLANGE FOR FOUNDATION PURPOSE.

NOTE: ZINC COATING NOT REQUIRED.

ITEM NO.- (K)

DETAIL OF PART DRAWING	DWG. NO. - 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

SET OF GALVANIZED M.S. TRIPOD INLET & OUTLET PIPE FITTINGS FOR MINI R.L.I. SCHEMES

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	QTY.	MIN WT (kg).	TOT WT (kg).
C	150(NB) SHORT PIECE 700MM LONG BOTH END FLANGE WELDED.	2	20.500	41.000
D	300(NB) SHORT PIECE BOTH END FLANGE WELDED WITH 12MM. THK. RIBS@ 90° C/C.	1	121.000	121.000
F1	300X300X150X80MM CROSS, ALL ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C FITTED WITH 300 NB BLANK FLANGE WITH NECESSARY G.I. BOLT AND ASBESTOS GASKET	1	152.000	152.000
G	300X300X150X150MM CROSS, 2 NOS. AXIS OF OUTLET AT 90° END RING WELDED WITH FREE BACKING FLANGE AND TOP PERFORATED PLATE STITCH WELDED.	1	57.000	57.000
H	150X150X150X150MM CROSS, SIDE PROJECTION FLANGE WELDED. TOP END PERFORATED PLATE STITCH WELDED & BOTTOM END FITTED WITH 150(NB) BLANK FLANGE WITH NECESSARY G.I. BOLT & ASBESTOS GASKET.	2	123.000	246.000
I_1	150(NB) 90° BEND, ONE END FLANGED & OTHER END RING WELDED WITH FREE BACKING FLANGE.	2	28.500	57.000
I_2	150(NB) 90° BEND, ONE END FLANGE WELDED, OTHER END WELDED WITH 150X125 NB REDUCER WITH ONE END FLANGE WELDED.	2	28.200	56.400
K	300(NB) PLATE FLANGE FOR FOUNDATION PURPOSE.	1	2.800	5.600
M	500X150X100X100(MB) REDUCING MANIFOLD IN TWO HUB WITH 100(NB) 2 NOS. INLET FLANGE WELDED HORIZONTALLY AND 150 (NB) 1 NO. OUTLET WITH FLANGE WELDED HORIZONTALLY AT 180° APART.	1	31.000	31.000
		TOTAL		766.6 Kg

	DWG. NO. – 3 (MINI R.L.I.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

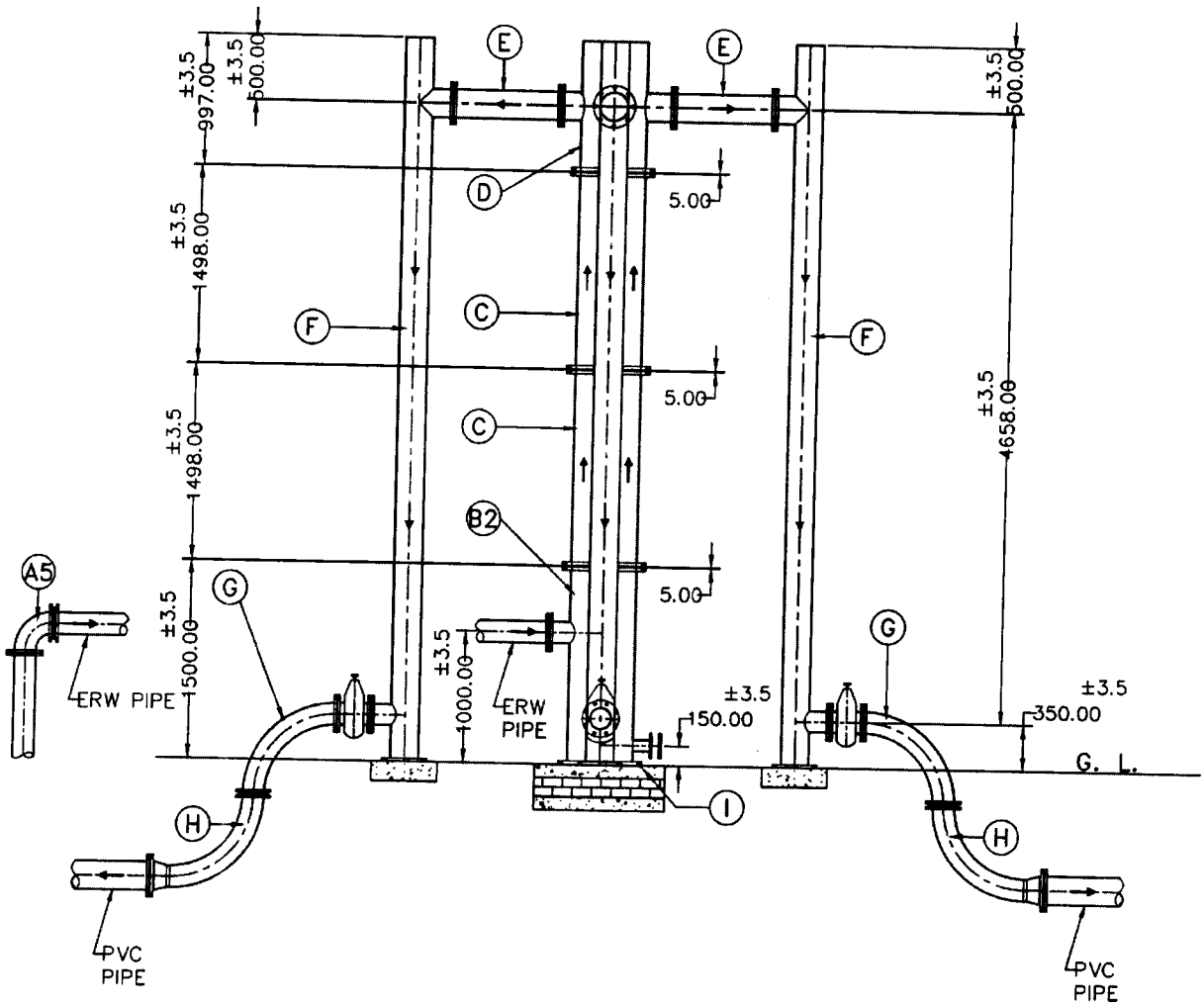
SET OF GALV. M.S. QUADRUPED INLET & OUTLET PIPE FITTINGS

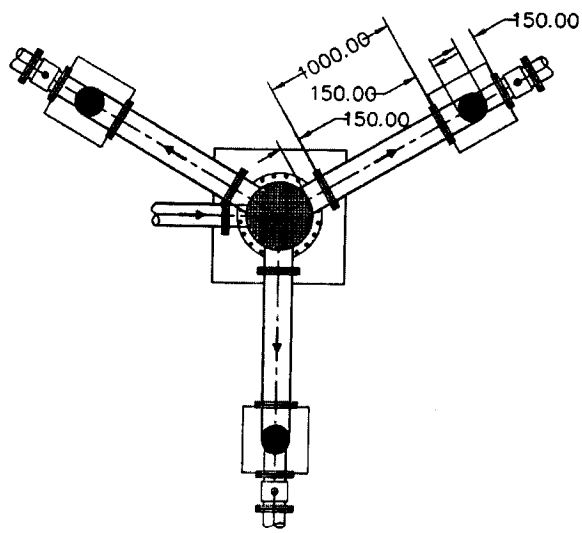
FOR

H.D.T.W.

(GALVANIZED)

GENERAL ARRANGEMENT & DETAIL DRAWINGS





GENERAL ARRANGEMENT	DWG. NO. – 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

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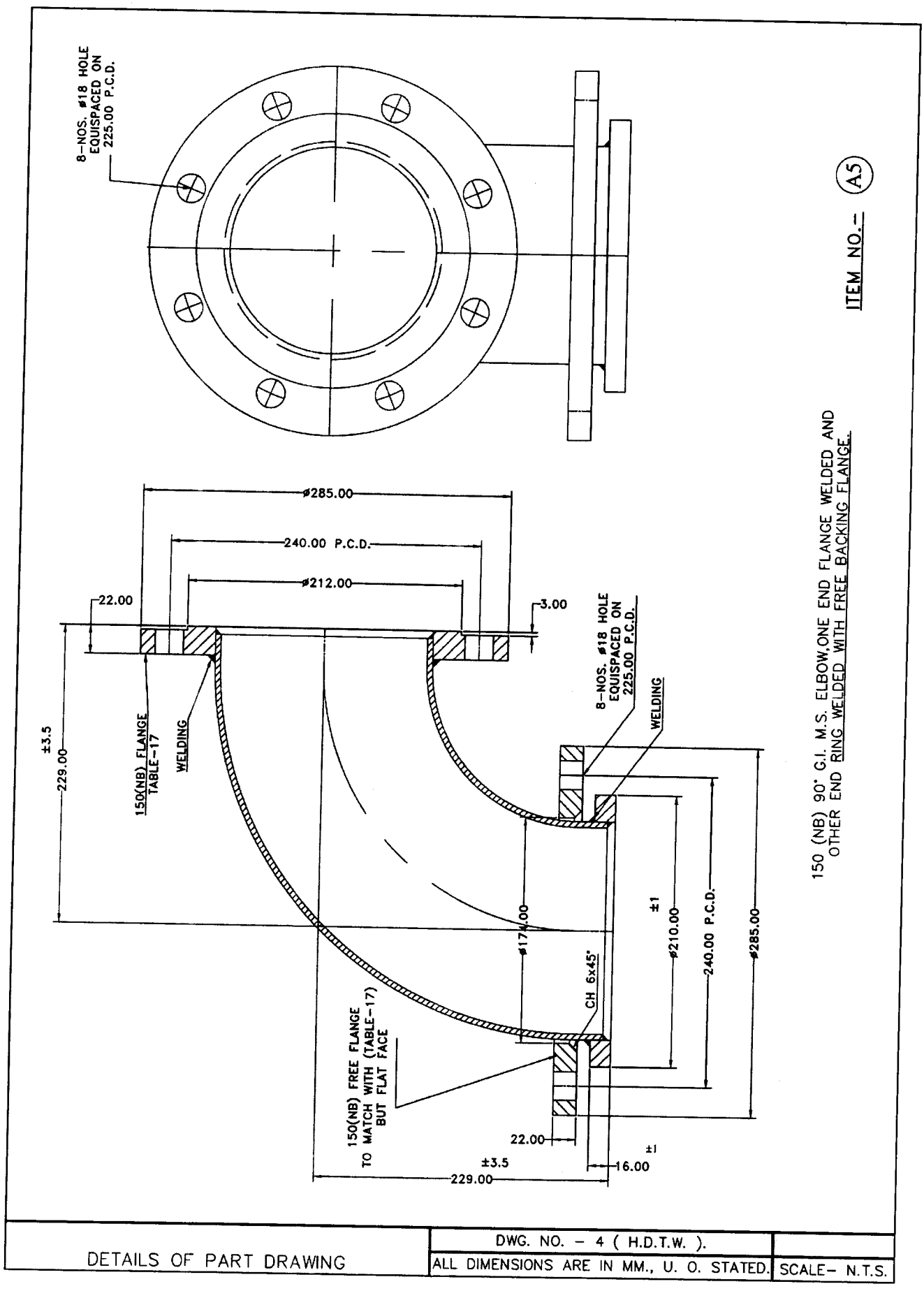
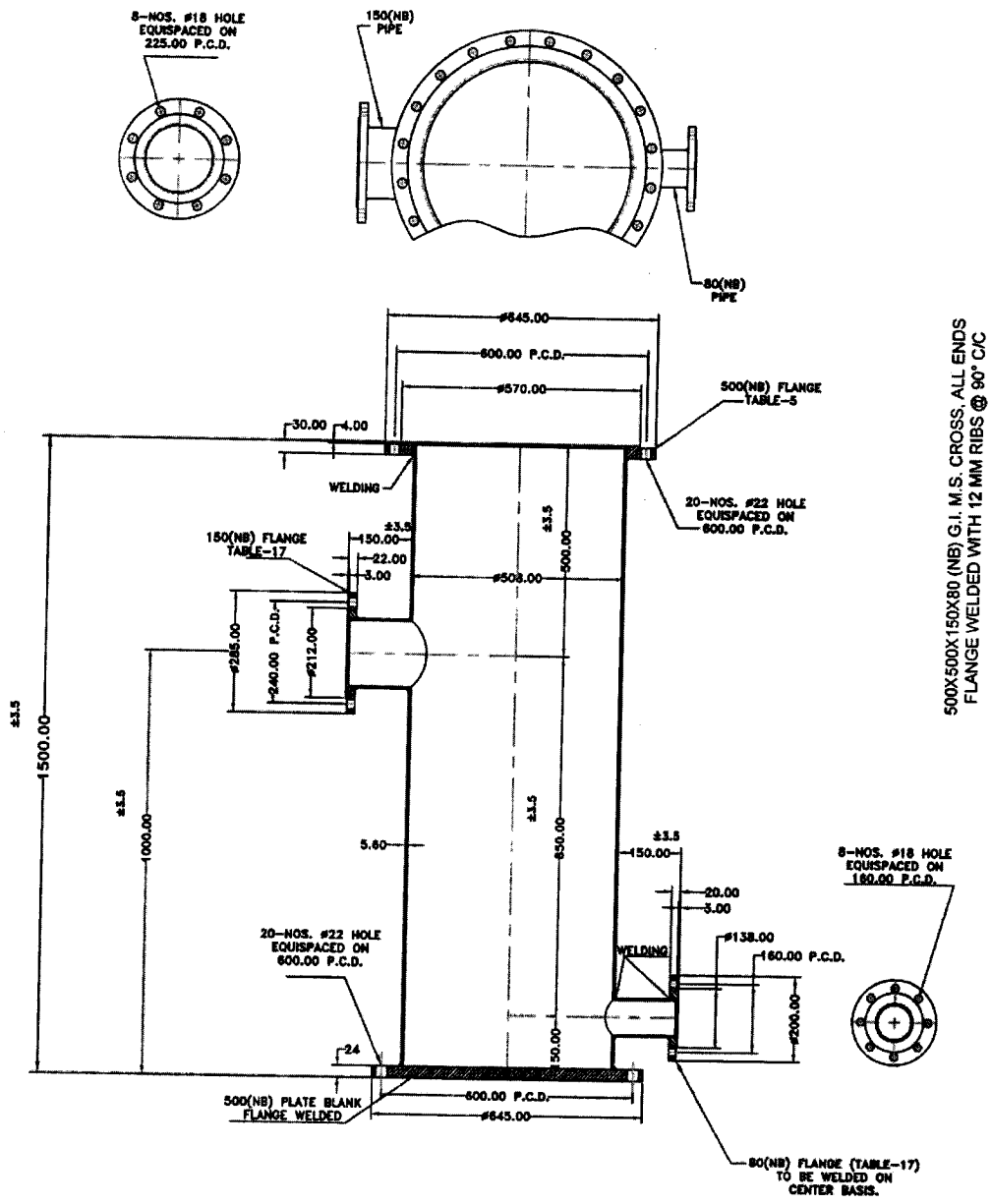


ITEM NO.- (A5)

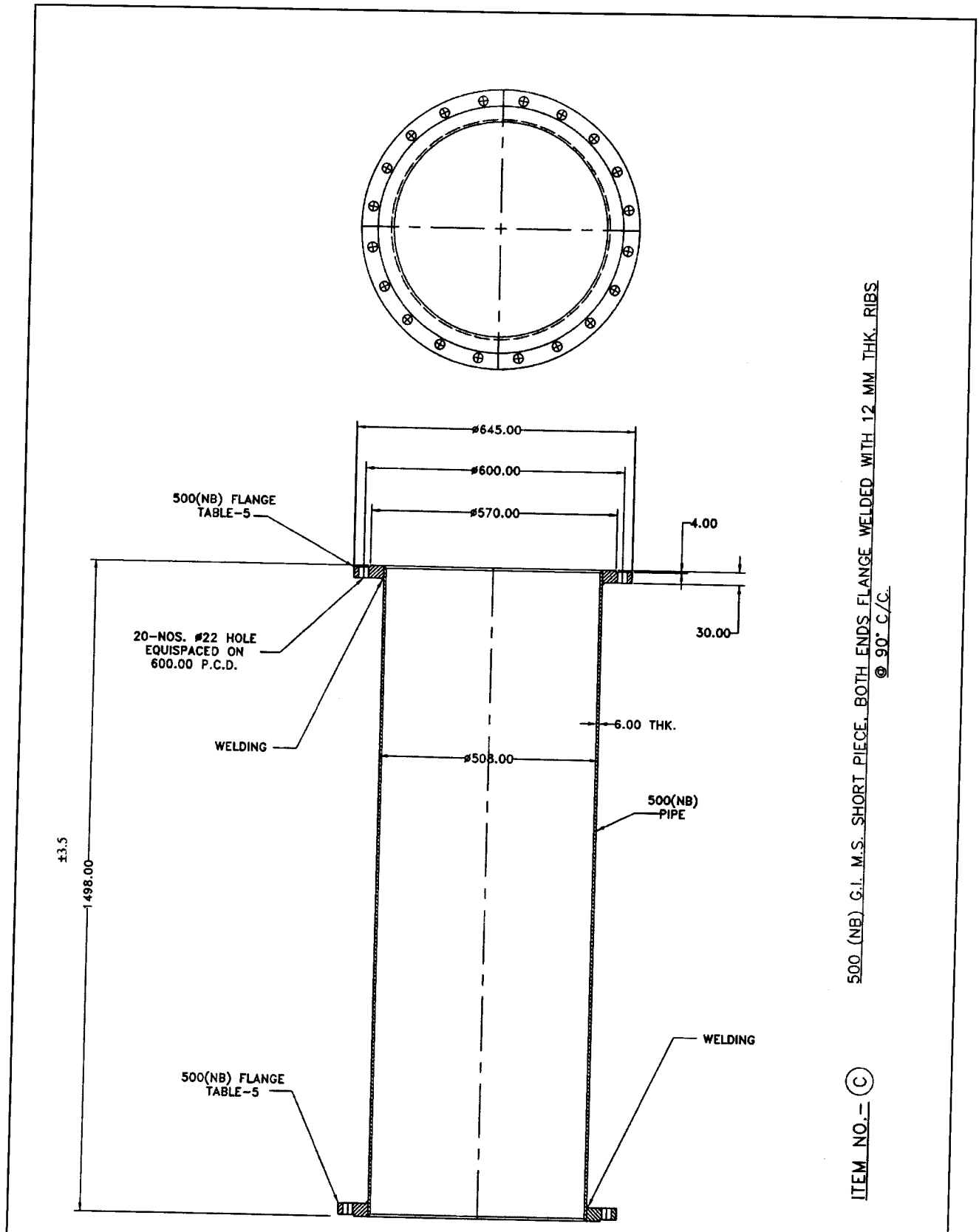
150 (NB) 90° G.I. M.S. ELBOW, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.

DETAILS OF PART DRAWING	DWG. NO. – 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

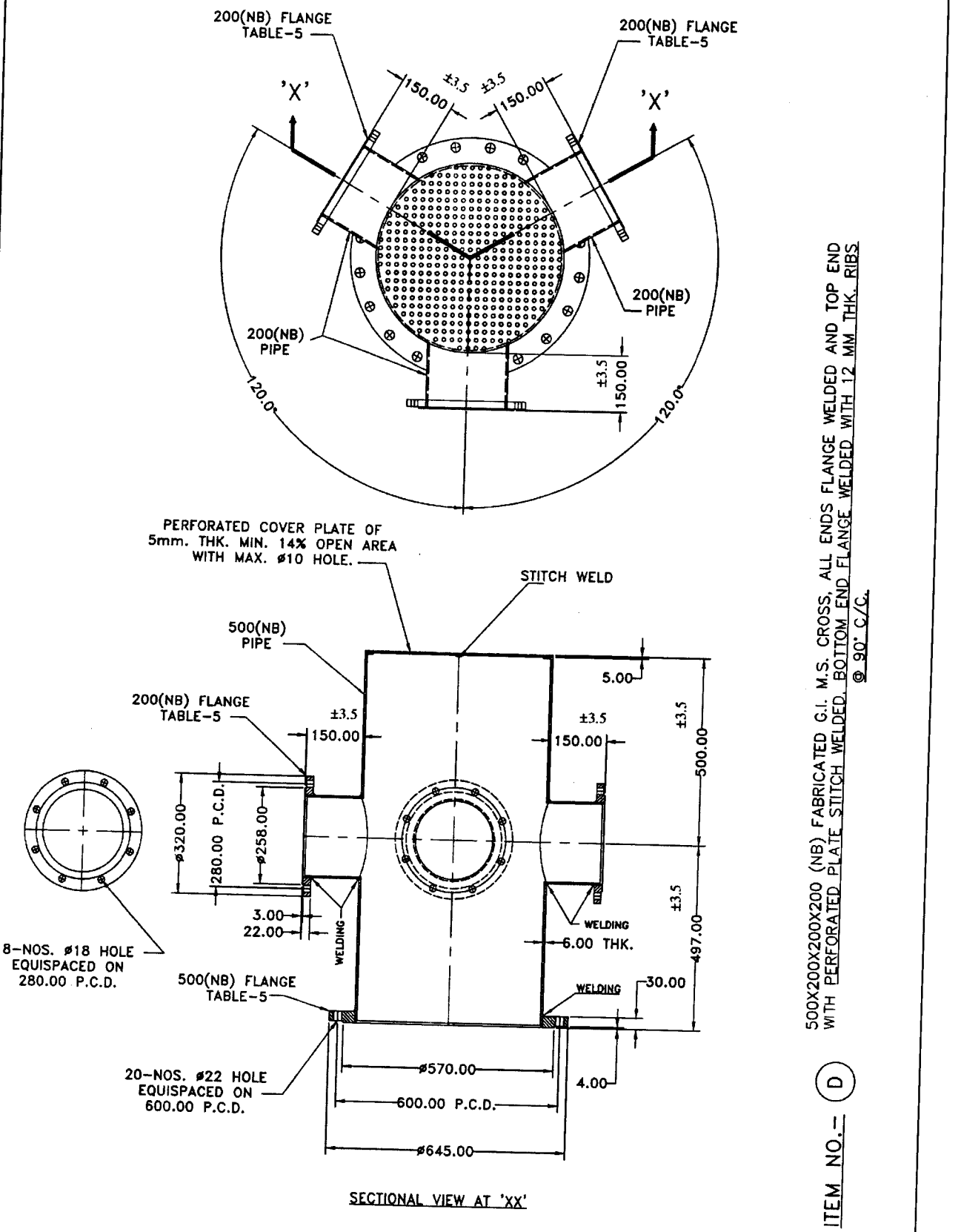


ITEM NO.- (B2)

DETAILS OF PART DRAWING	DWG. NO. - 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



DETAILS OF PART DRAWING	DWG. NO. - 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



500X200X200X200 (NB) FABRICATED G.I. M.S. CROSS, ALL ENDS FLANGE WELDED AND TOP END WITH PERFORATED PLATE STITCH WELDED, BOTTOM END FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.

ITEM NO.- (D)

DETAILS OF PART DRAWING	DWG. NO. - 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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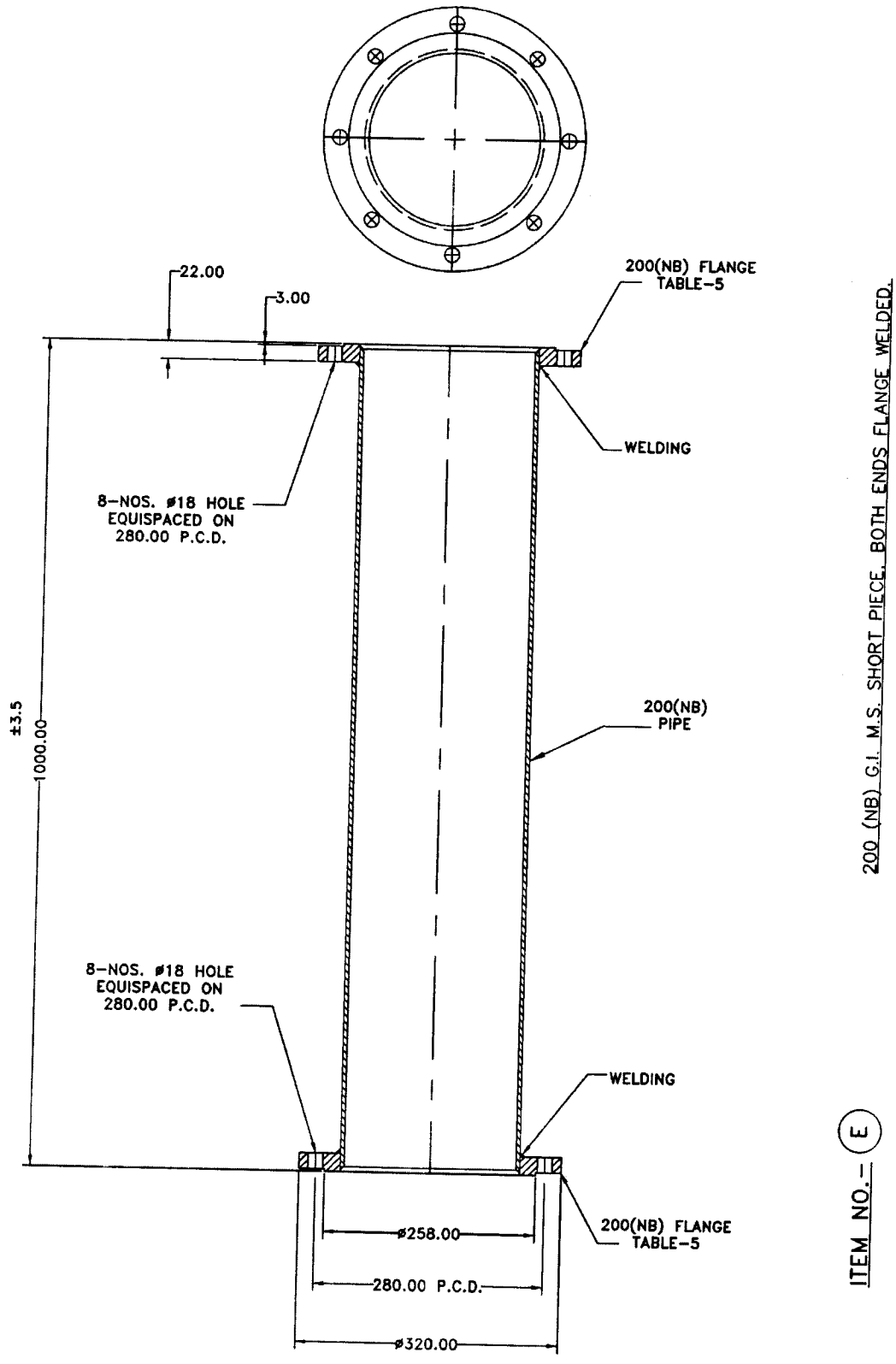
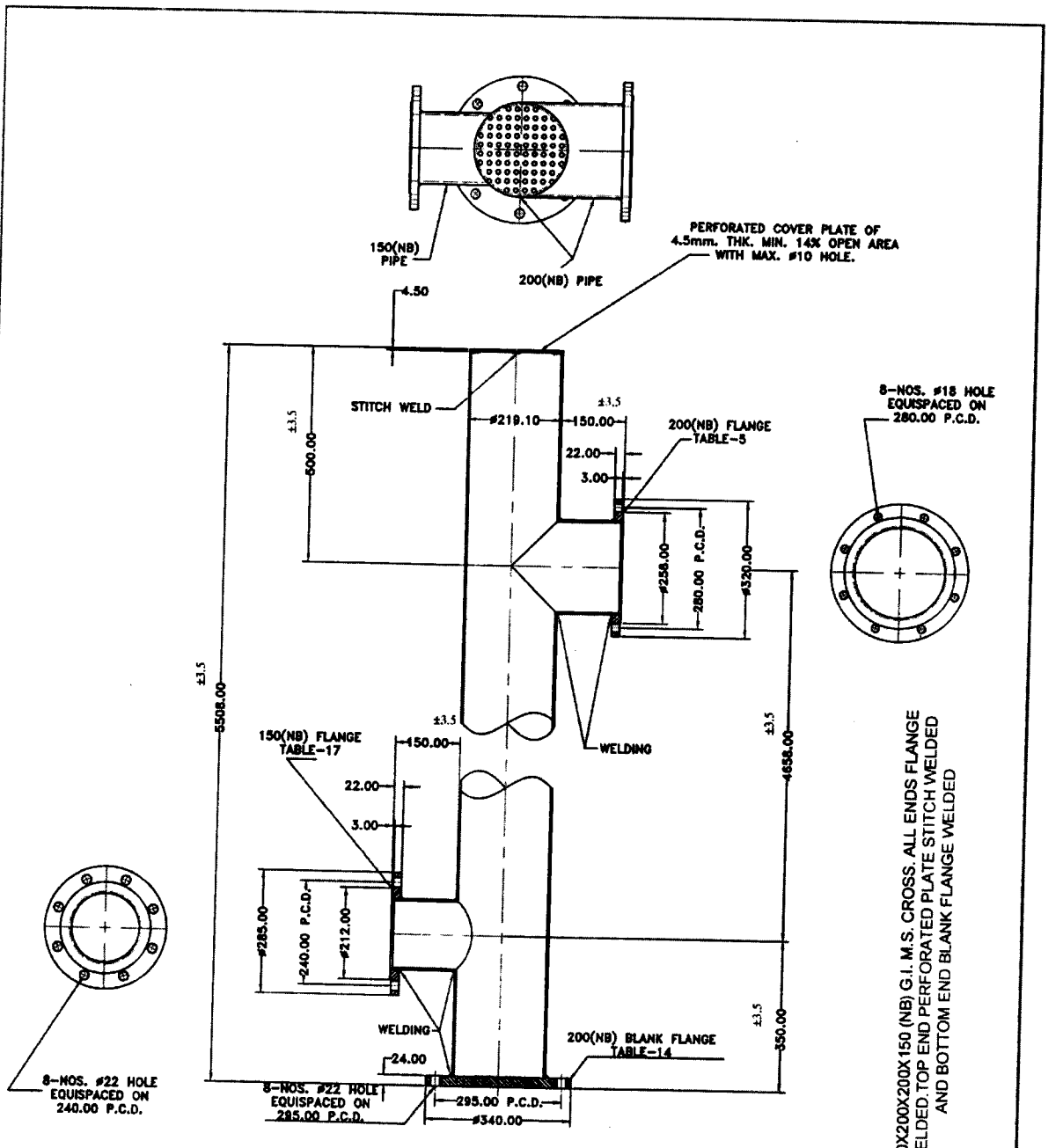
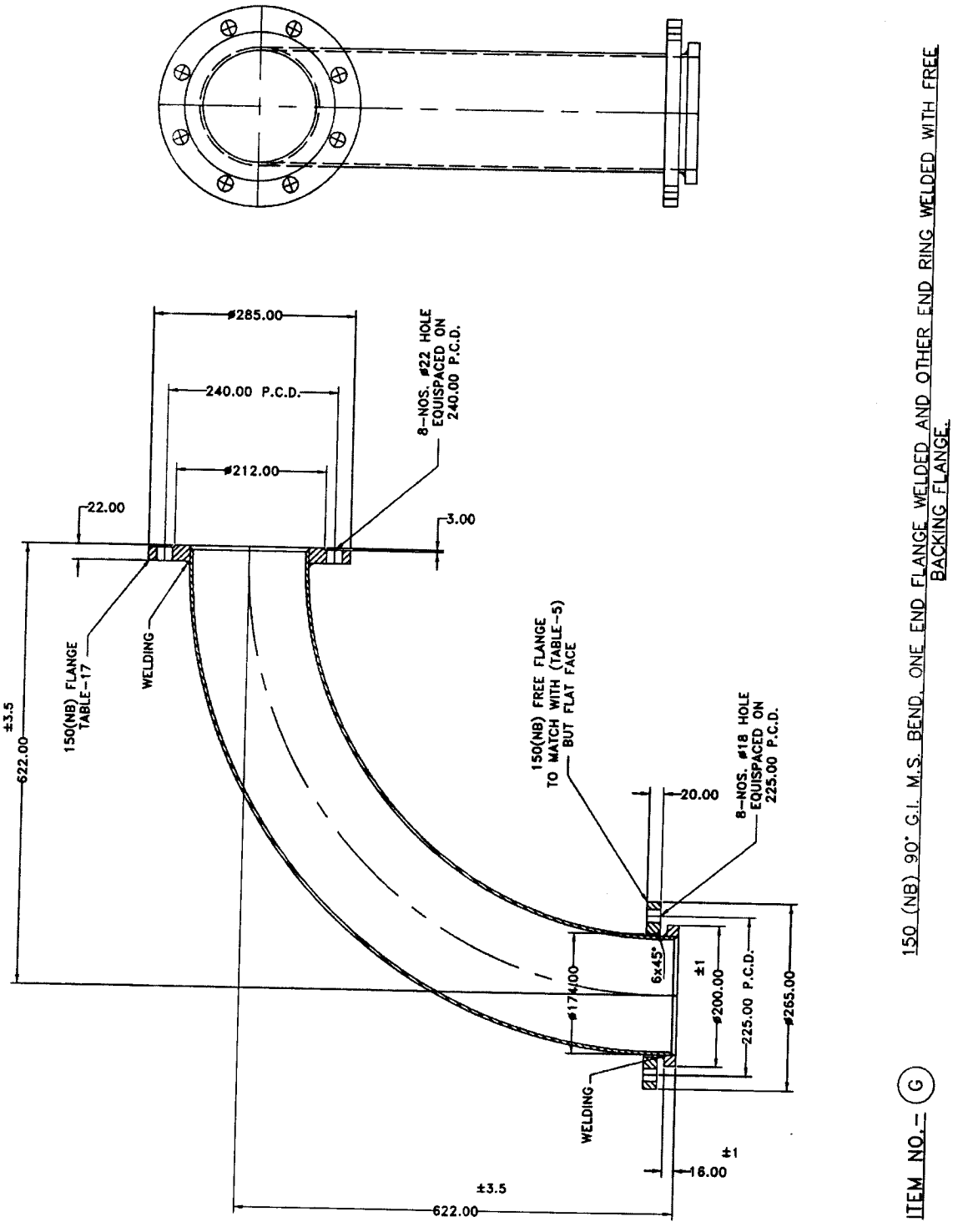


DETAILS OF PART DRAWING	DWG. NO. - 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



DETAILS OF PART DRAWING	DWG. NO. - 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.



ITEM NO.- (G)

150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.

DETAILS OF PART DRAWING	DWG. NO. - 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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DETAILS OF PART DRAWING

DWG. NO. - 4 (H.D.T.W.).

ALL DIMENSIONS ARE IN MM., U. O. STATED.

SCALE- N.T.S.

ITEM NO.- (H)

150 (NB) 90° G.I. M.S. BEND, ONE END WELDED WITH 150(NB) FLANGE OTHER END WELDED WITH 150(NB)x200(NB) EXPANDER WITH FLANGE.

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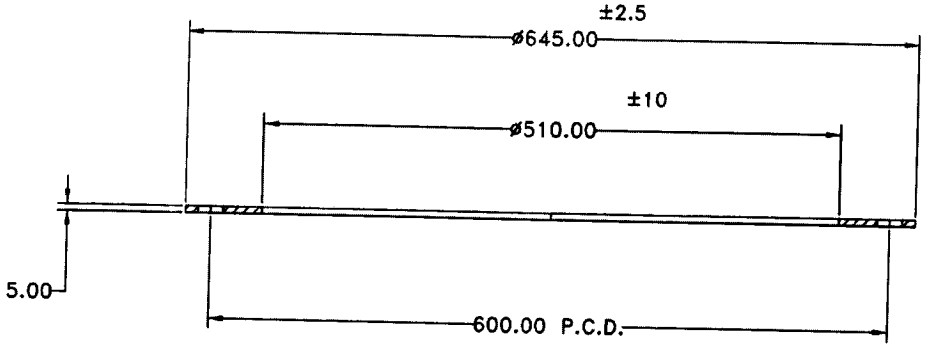

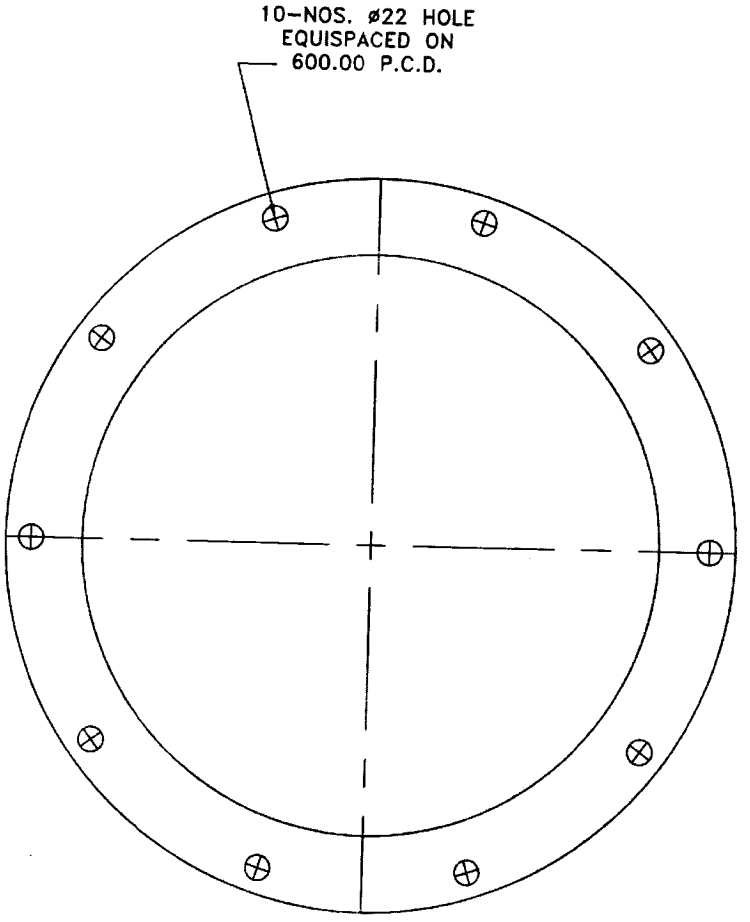

500 (NB) M.S. PLATE FLANGE FOR FOUNDATION.
NOTE: ZINC COATING NOT REQUIRED.

ITEM NO.- (1)

DETAILS OF PART DRAWING	DWG. NO. - 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

SET OF GALVANIZED M.S. QUADRUPED INLET & OUTLET PIPE FITTINGS FOR HDTW SCHEME

BILL OF MATERIALS

ITEM NO.	DESCRIPTION OF ITEM	QTY.	MIN WT (kg).	TOT. WT (kg)(min)
A5	150 (NB) 90° G.I. M.S. ELBOW,ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.	1	19.500	19.500
B2	500X500X150X80 (NB) G.I. M.S. CROSS, ALL ENDS FLANGE WELDED WITH 12 MM RIBS @ 90° C/C FITTED WITH 500 (NB) BLANK FLANGE WITH NECESSARY G.I. BOLT & ASBESTOS GASKET.	1	226.000	226.000
C	500 (NB) G.I. M.S. SHORT PIECE, BOTH ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.	2	153.000	306.000
D	500X200X200X200 (NB) FABRICATED G.I. M.S. CROSS, ALL ENDS FLANGE WELDED AND TOP END WITH PERFORATED PLATE STITCH WELDED, BOTTOM END FLANGE WELDEDWITH 12 MM THK. RIBS @ 90° C/C.	1	123.500	123.500
E	200 (NB) G.I. M.S. SHORT PIECE, BOTH ENDS FLANGE WELDED.	3	33.500	100.500
F	200X200X200X150 (NB) G.I. M.S. CROSS. SIDE PROJECTION FLANGE WELDED.TOP END PERFORATED PLATE STITCH WELDED AND BOTTOM END FITTED WITH 200(NB) BLANK FLANGE, WITH NECESSARY G.I. BOLT & GASKET.	3	157.500	472.500
G	150 (NB) 90° G.I. M.S. BEND, ONE END FLANGE WELDED AND OTHER END RING WELDED WITH FREE BACKING FLANGE.	3	28.500	85.500
H	150 (NB) 90° G.I. M.S. BEND, ONE END WELDED WITH 150(NB) FLANGE OTHER END WELDED WITH 150(NB)x200(NB) EXPANDER WITH FLANGE .	3	33.000	99.000
I	500 (NB) M.S. PLATE FLANGE FOR FOUNDATION.	1	4.500	4.500
		TOTAL		1436.5Kg

	DWG. NO. – 4 (H.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

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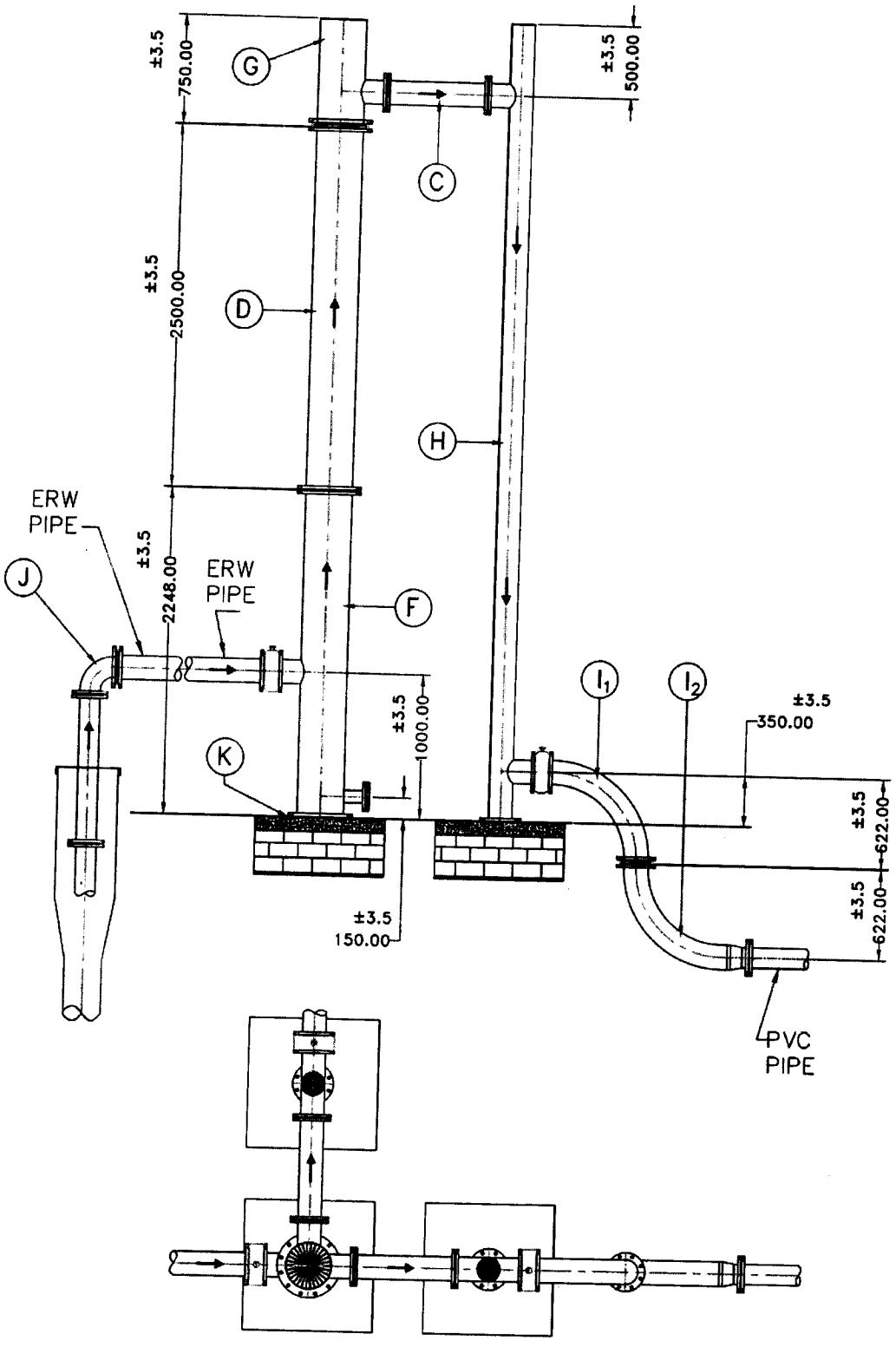
SET OF GALV. M.S. TRIPOD INLET & OUTLET PIPE FITTINGS

FOR

M.D.T.W.

(GALVANIZED)

GENERAL ARRANGEMENT & DETAIL DRAWINGS



PLAN

GENERAL ARRANGEMENT	DWG. NO. – 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

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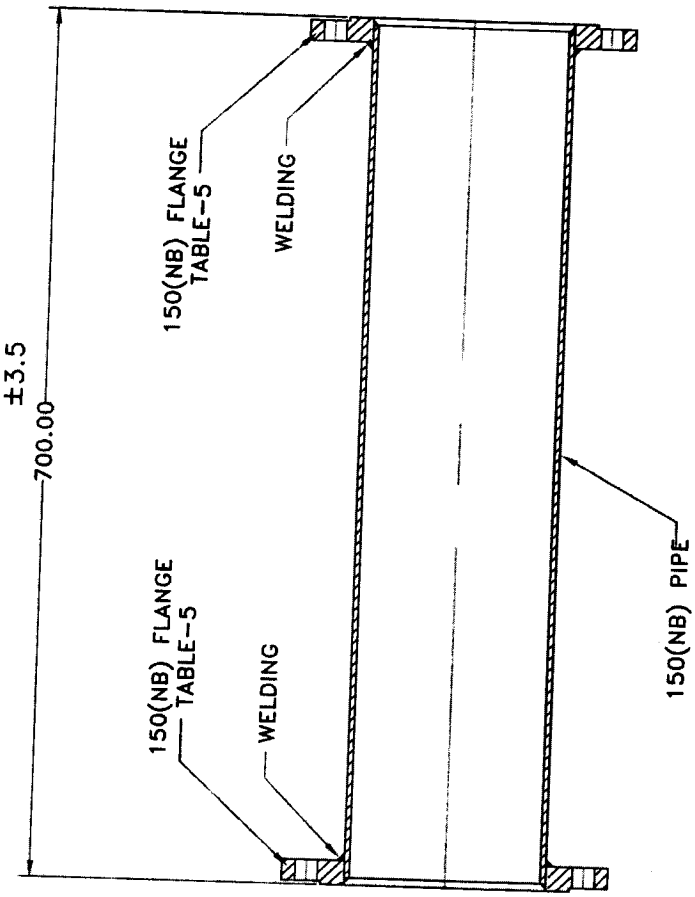
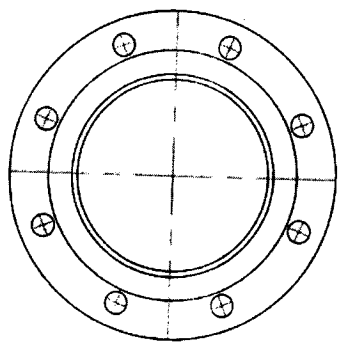
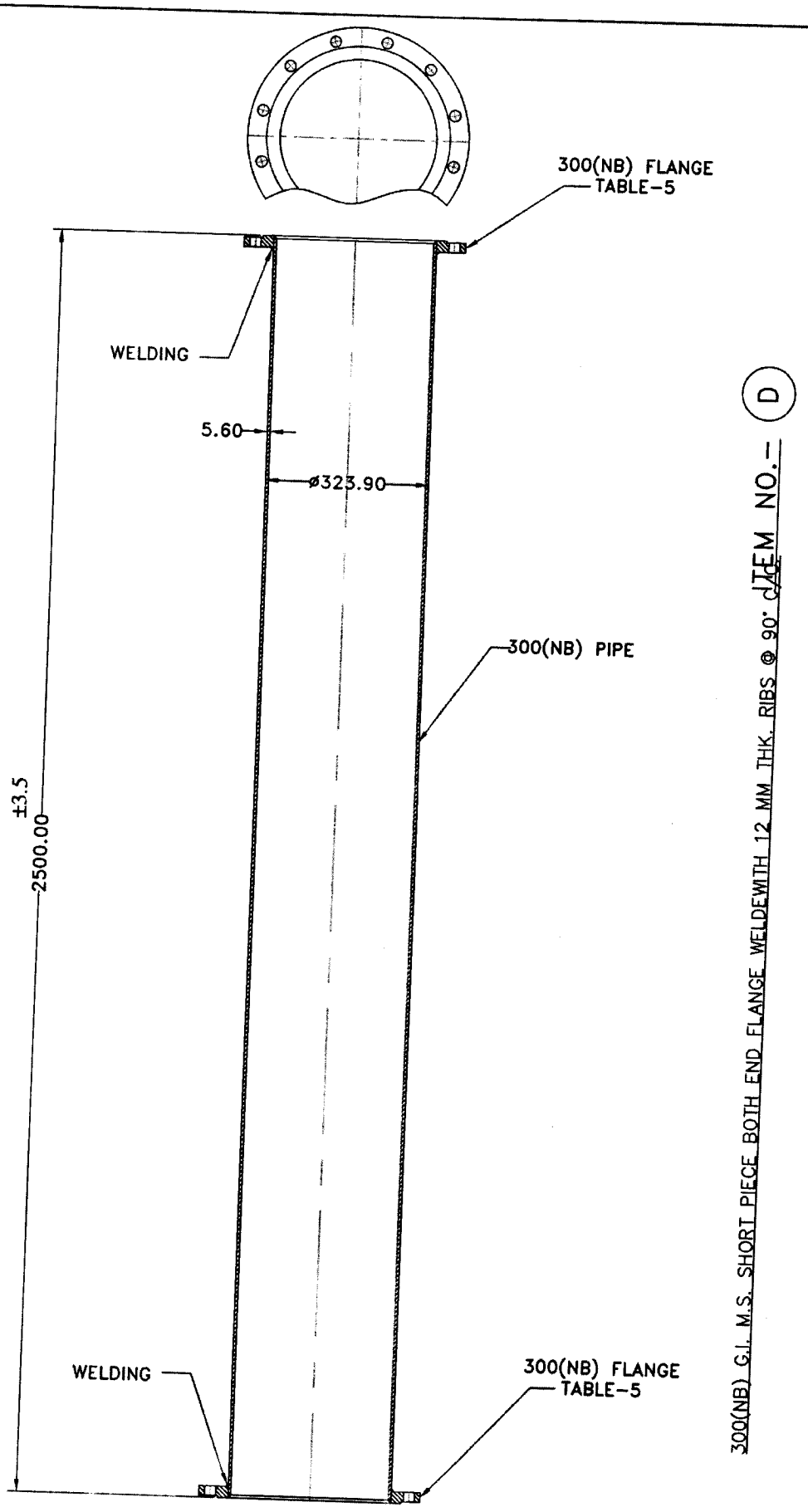




ITEM NO.- (C)

150MM G.I M.S. SHORT PIECE 700MM LONG BOTH END FLANGE WELDED.

DETAIL OF PART DRAWING	DWG. NO. – 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.



300(NB) G.I. M.S. SHORT PIECE BOTH END FLANGE WELDEWITH 12 MM THK. RIBS @ 90° C/C ITEM NO.- (D)

DETAIL OF PART DRAWING	DWG. NO. – 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

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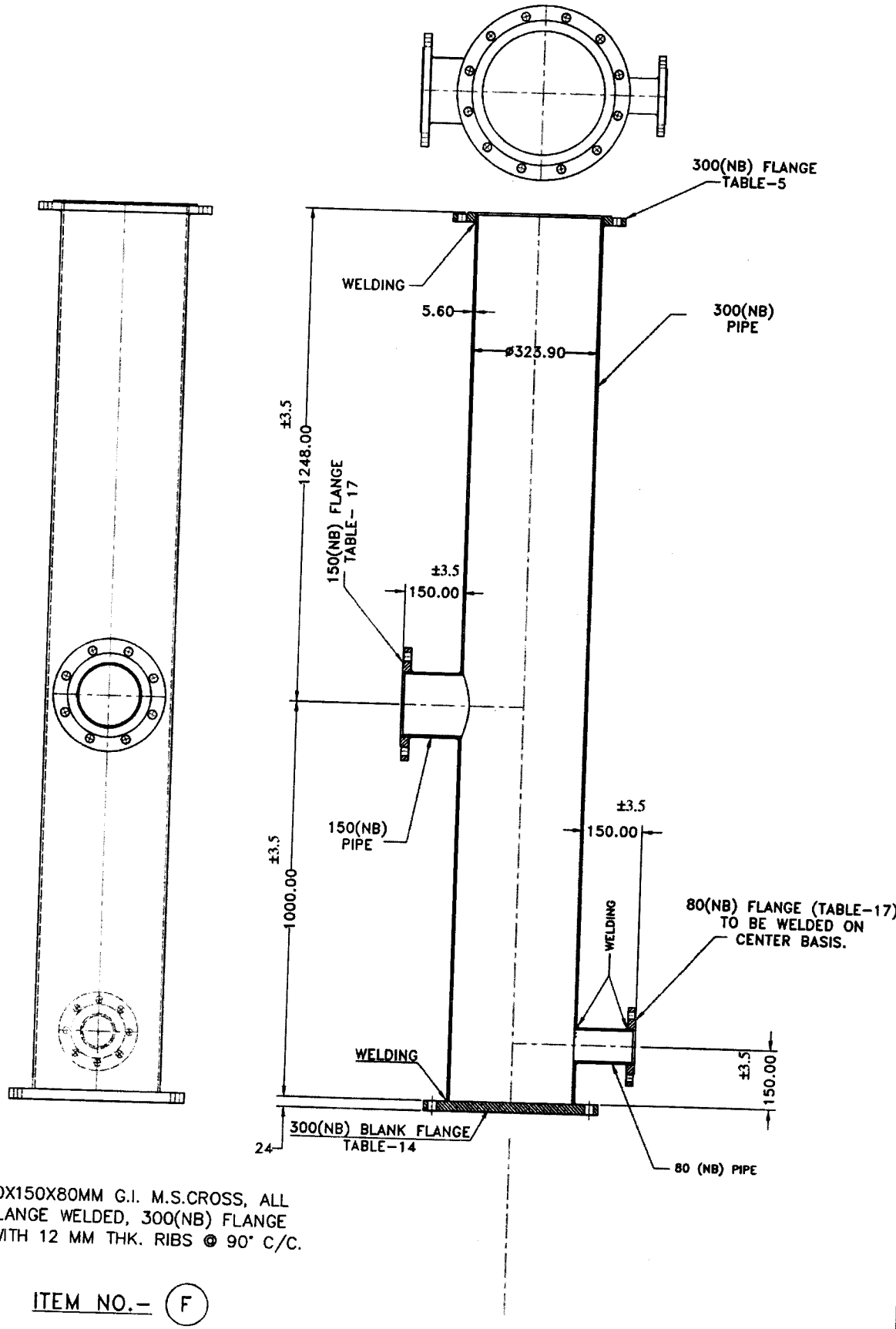

300X300X150X80MM G.I. M.S.CROSS, ALL ENDS FLANGE WELDED, 300(NB) FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C.

ITEM NO.- (F)

DETAIL OF PART DRAWING	DWG. NO. - 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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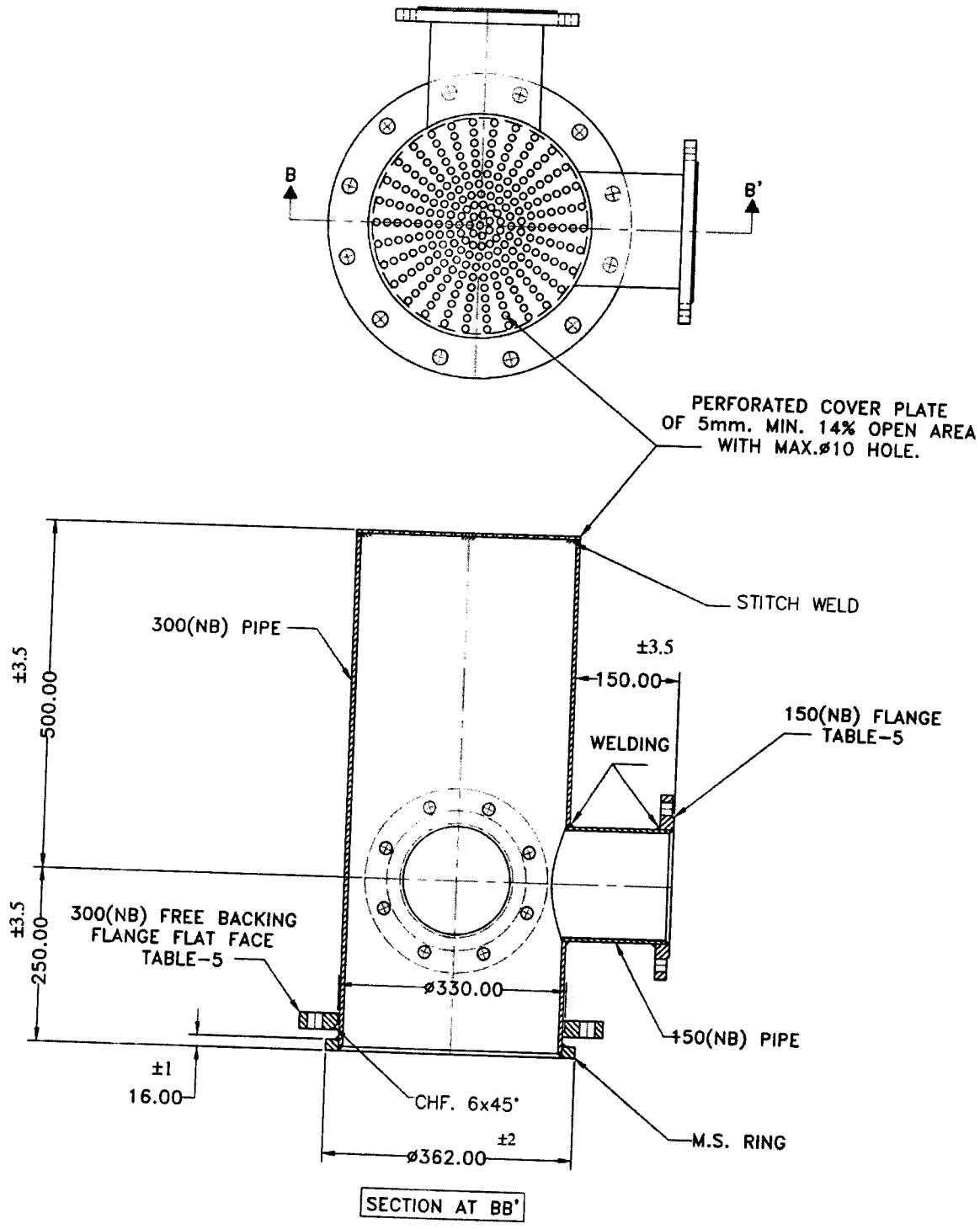

SECTION AT BB'

300X300X150X150MMG.I. M.S. CROSS, 2 NOS. AXIS OF OUTLET AT 90° END RING WELDED WITH FREE BACKING FLANGE AND TOP PERFORATED PLATE STITCH WELDED.

ITEM NO.- (G)

DETAIL OF PART DRAWING	DWG. NO. - 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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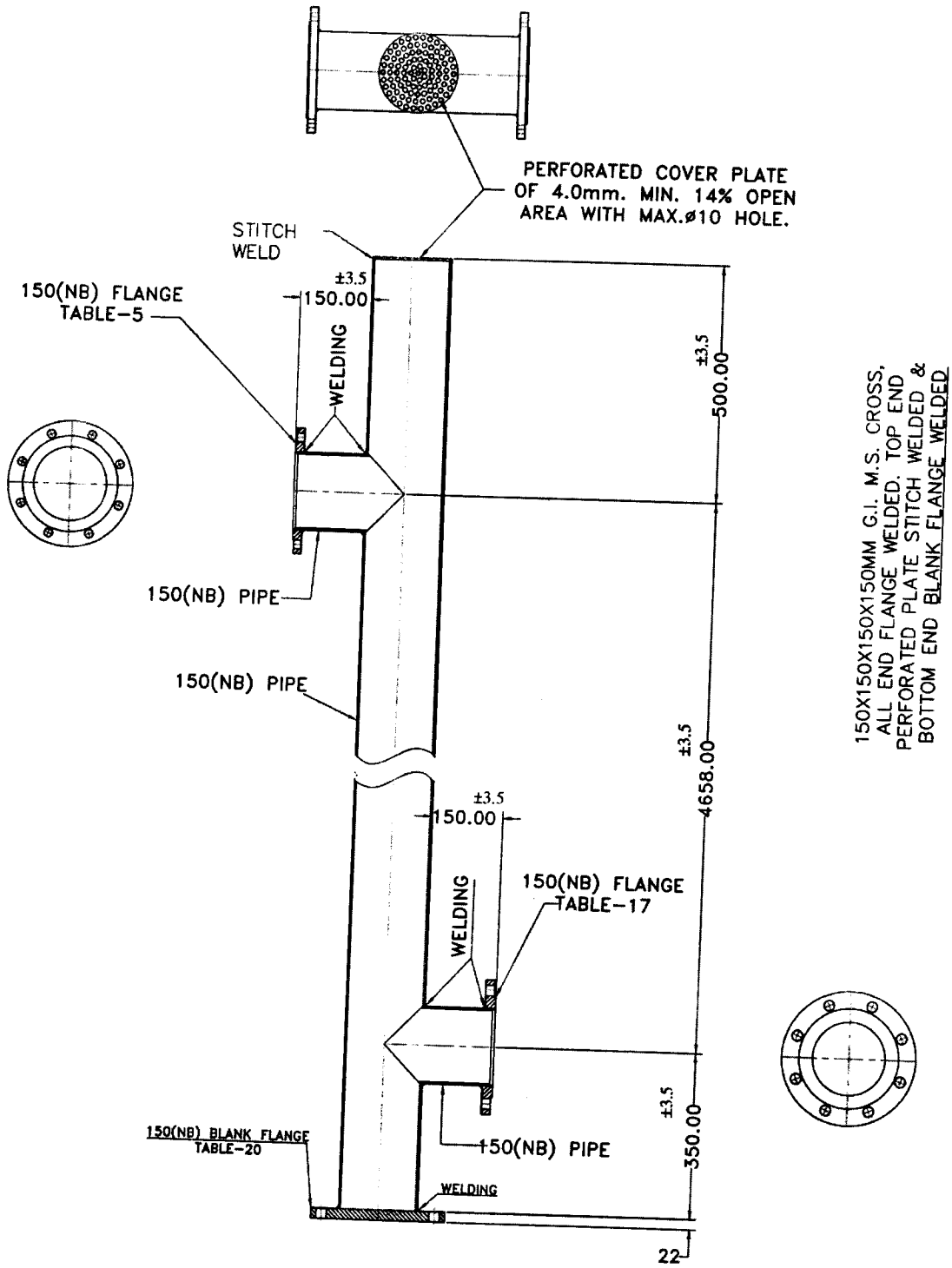

150X150X150X150MM G.I. M.S. CROSS, ALL END FLANGE WELDED. TOP END PERFORATED PLATE STITCH WELDED & BOTTOM END BLANK FLANGE WELDED

ITEM NO.- (H)

DETAIL OF PART DRAWING	DWG. NO. - 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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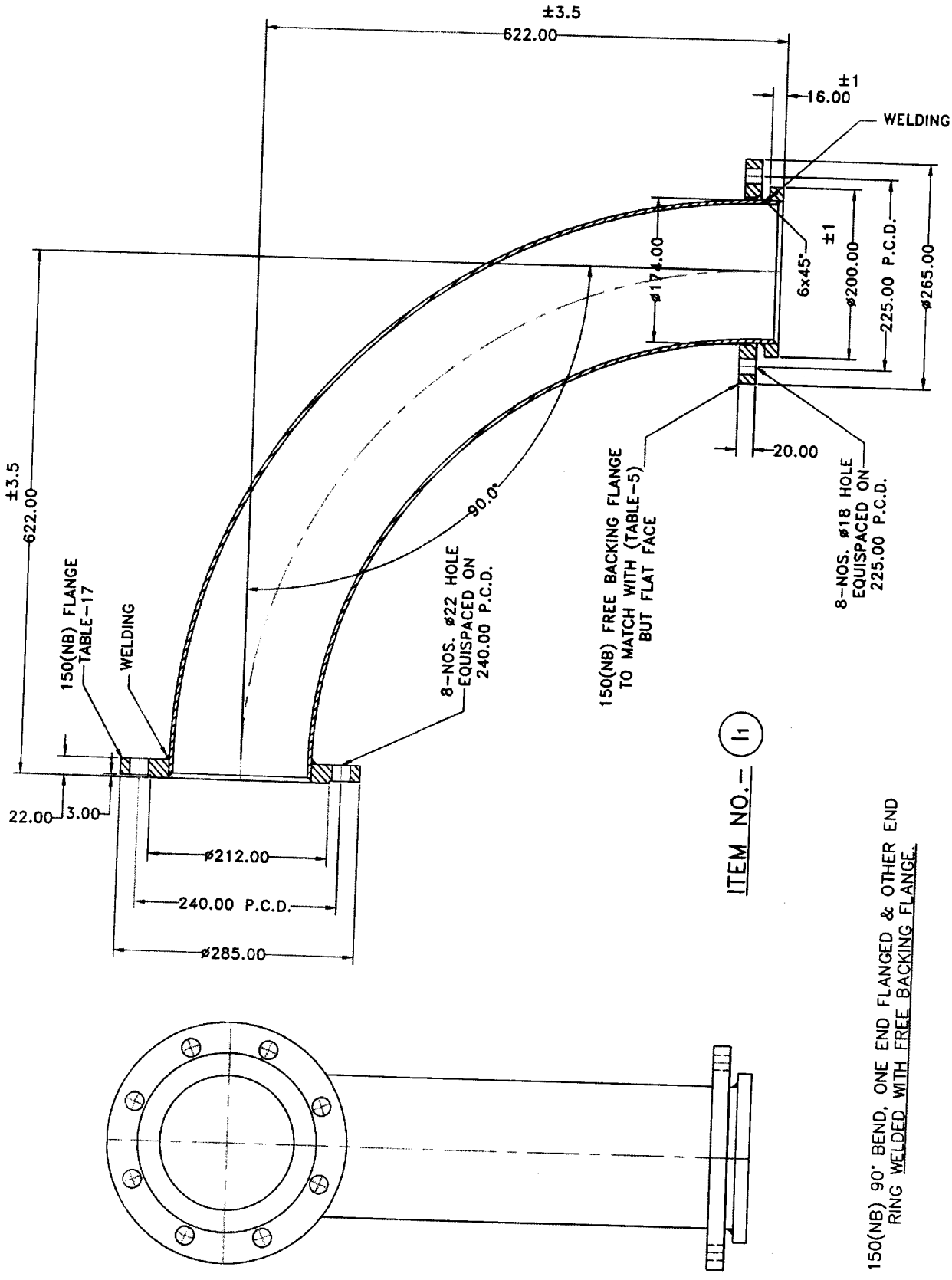

DETAIL OF PART DRAWING	DWG. NO. – 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

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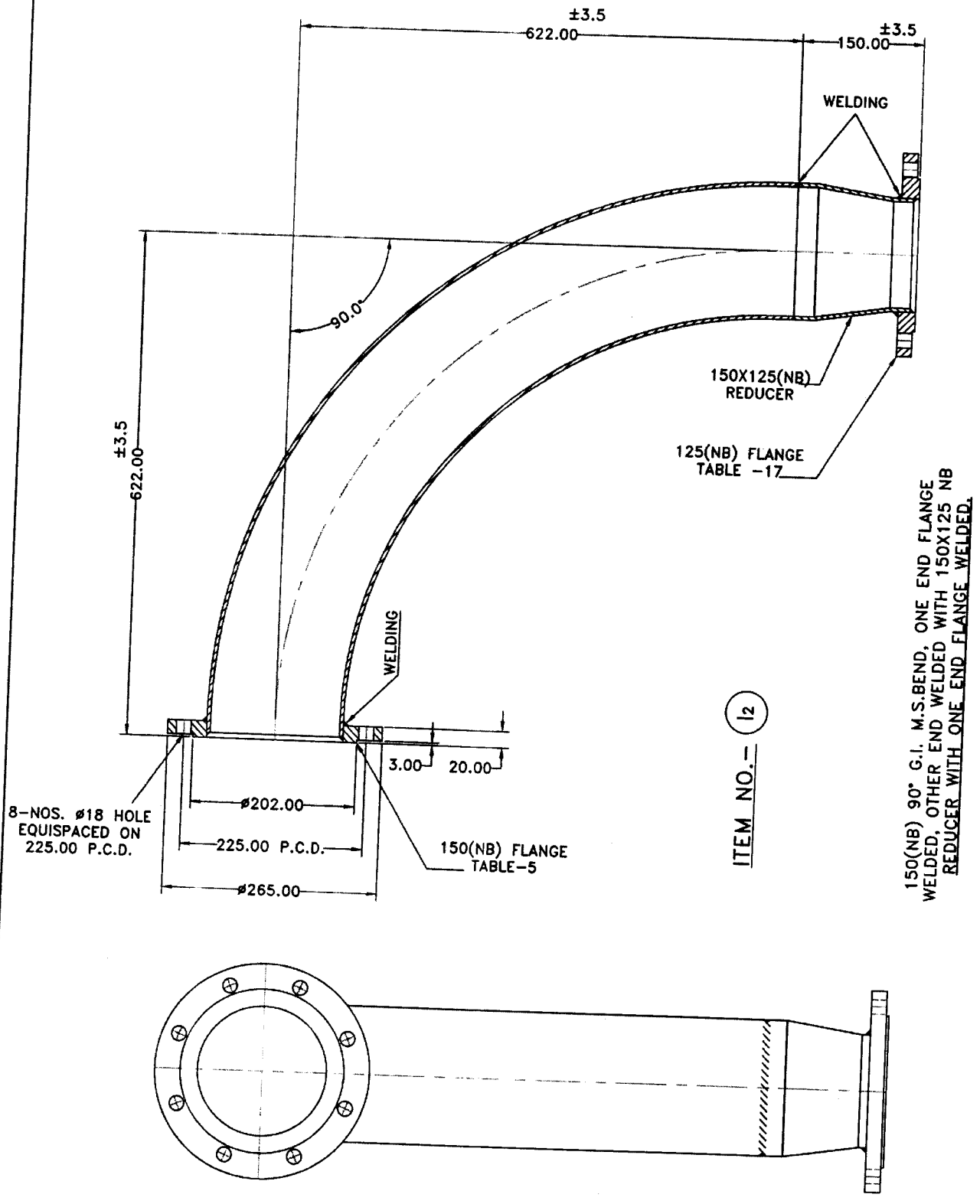

DETAIL OF PART DRAWING	DWG. NO. - 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

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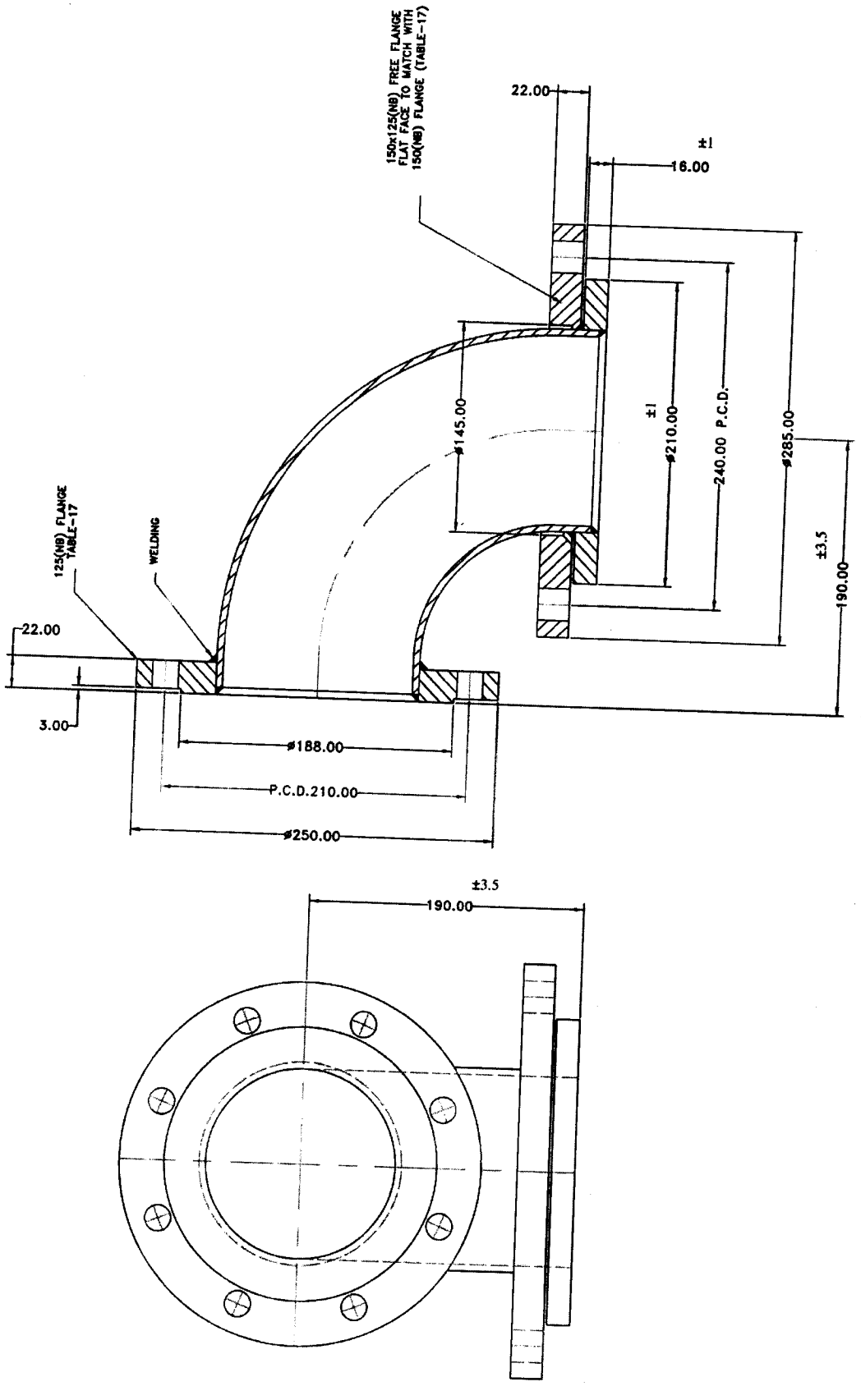

ITEM NO.- (J)

125(NB) 90° G.I. M.S. ELBOW, ONE END 125(NB) FLANGE WELDED & OTHER END RING WELDED WITH 150x125(NB) FREE BACKING FLANGE.

LAYOUT & PARTS DRAWING OF MINI R.L.I.	DWG. NO. – 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

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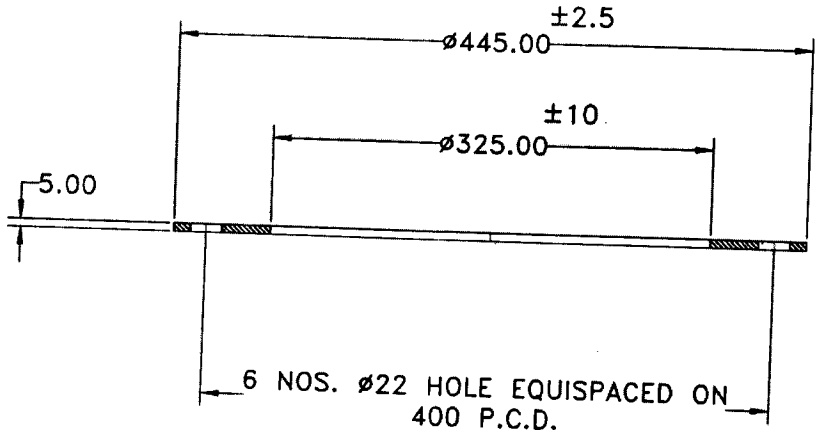

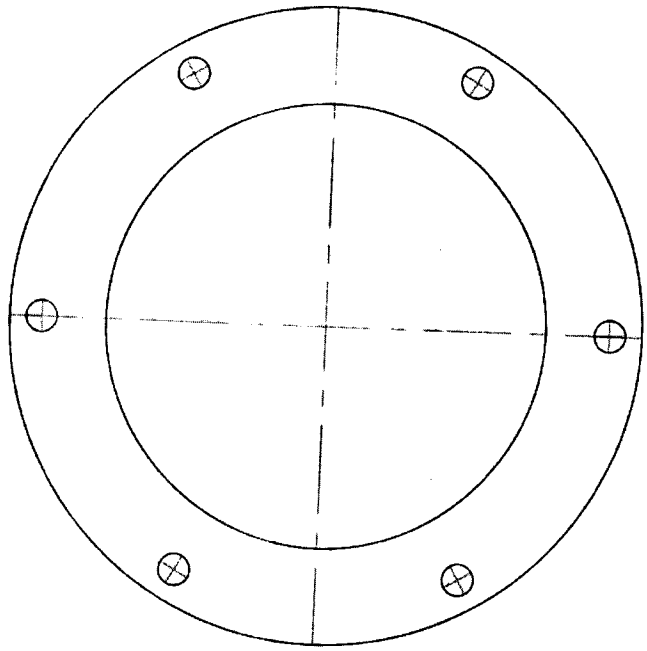

300(NB) M.S. PLATE FLANGE FOR FOUNDATION PURPOSE.

NOTE: ZINC COATING NOT REQUIRED.

ITEM NO.- (K)

DETAIL OF PART DRAWING	DWG. NO. - 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE- N.T.S.

SET OF GALVANIZED M.S. TRIPOD INLET & OUTLET PIPE FITTINGS FOR M.D.T.W. SCHEMES

BILL OF MATERIALS

ITEM NO.	DESCRIPTION	QTY.	MIN WT (kg)	TOT WT. (kg)(min)
C	**150MM SHORT PIECE 700MM LONG BOTH END FLANGE WELDED.**	2	20.500	41.000
D	300(NB) SHORT PIECE BOTH END FLANGE WELDEWITH 12 MM THK. RIBS @ 90° C/C.	1	121.000	121.000
F	300X300X150X80MM CROSS, ALL ENDS FLANGE WELDED WITH 12 MM THK. RIBS @ 90° C/C. FITTED WITH 300 NB BLANK FLANGE WITH NECESSARY G.I. BOLT AND ASBESTOS GASKET	1	152.000	152.000
G	300X300X150X150MM CROSS, 2 NOS. AXIS OF OUTLET AT 90° END RING WELDED WITH FREE BACKING FLANGE AND TOP PERFORATED PLATE STITCH WELDED.	1	57.000	57.000
H	150X150X150X150MM CROSS, SIDE PROJECTION FLANGE WELDED. TOP END PERFORATED PLATE STITCH WELDED & BOTTOM END FITTED WITH 150(NB) BLANK FLANGE WITH NECESSARY G.I. BOLT & ASBESTOS GASKET.	2	123.000	246.000
I_1	150(NB) 90° BEND, ONE END FLANGED & OTHER END RING WELDED WITH FREE BACKING FLANGE.	2	28.500	57.000
I_2	150(NB) 90° BEND, ONE END FLANGE WELDED, OTHER END WELDED WITH 150X125 NB REDUCER WITH ONE END FLANGE WELDED.	2	28.200	56.400
J	125(NB) 90° M.S. ELBOW,ONE END 125(NB) FLANGE WELDED & OTHER END RING WELDED WITH 150x125(NB) FREE BACKING FLANGE.	1	18.700	18.700
K	**300(NB) PLATE FLANGE FOR FOUNDATION PURPOSE.**	1	2.800	2.800
			TOTAL	751.9 Kg

	DWG. NO. – 5 (M.D.T.W.).	
	ALL DIMENSIONS ARE IN MM., U. O. STATED.	SCALE– N.T.S.

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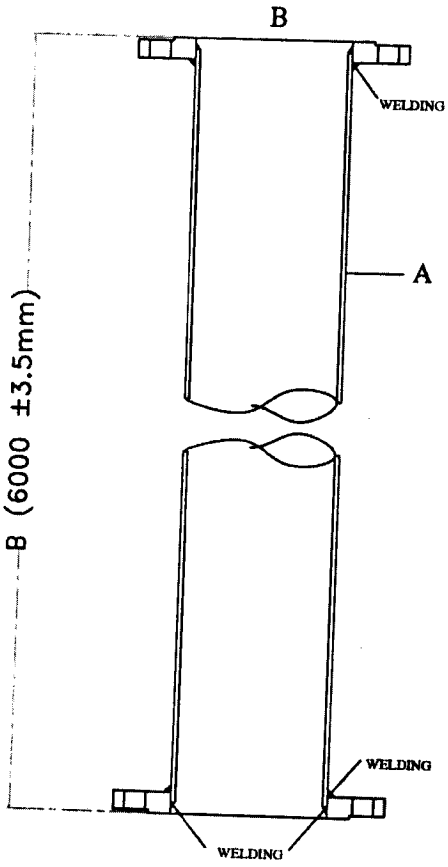
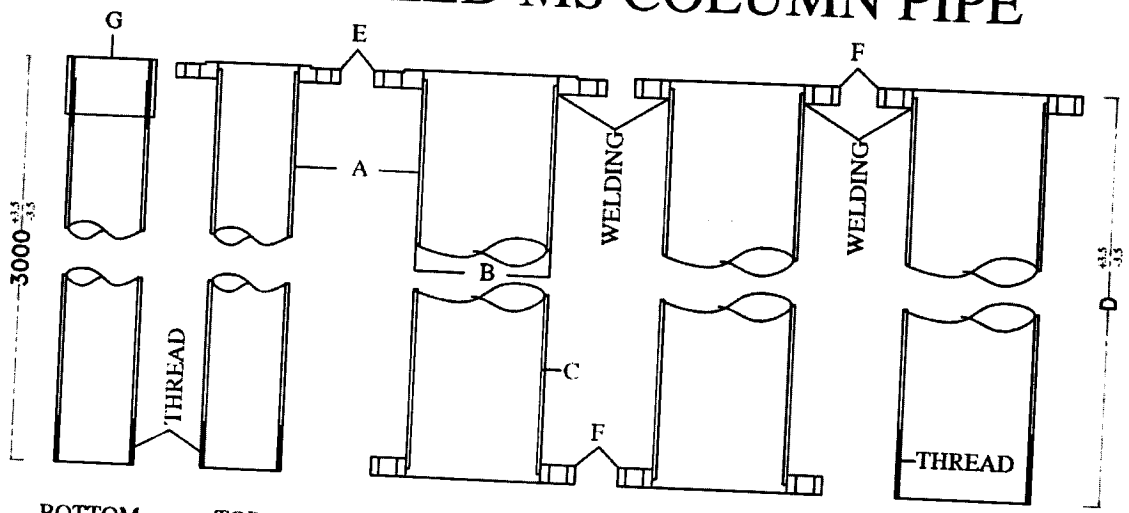
GALVANIZED MS FLANGED PIPE



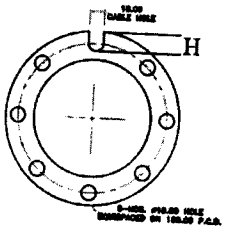
NB	PIPE	LENGTH	FLANGE	WEIGHT (kg)
	A	B	C	
100	IS : 1239 PART-I, MEDIUM CLASS	6000±3.5mm	IS:6392 TABLE-17	72.500
150	IS : 1239 PART-I, MEDIUM CLASS	6000±3.5mm	IS:6392 TABLE-17	114.000

GALVANIZED MS COLUMN PIPE



For 80NB Column Pipe

For 150 & 125NB Column Pipe



80NB Column Pipe Top	30.000kg
80NB Column Pipe Bottom	27.700kg
125NB Column Pipe Top	56.100kg
125NB Column Pipe Middle	53.700kg
125NB Column Pipe Bottom	50.900kg
150NB Column Pipe Top	67.500kg
150NB Column Pipe Middle	64.900kg
150NB Column Pipe Bottom	61.100kg

NB	PIPE	PIPE OD Max/Min (in mm)	Pipe Thickness (in mm)	LENGTH	STANDARD FLANGE	NON-STD. FLANGE				SOCKET	
						OD	TH	PCD	HOLE		
	A	B	C	D	E	F				G	H
						a	b	c	d		
80	IS;1239, PART-I HEAVY CLASS	89.5/ 88	4.8	3000±3.5	IS:6392 TABLE-17	200	20	160	18mm 8Nos	IS:1239 PART-II	-
125	IS;1239, PART-I HEAVY CLASS	140.8 / 138.5	5.4	3000±3.5	IS:6392 TABLE-17	210	22	180	18mm 8Nos	-	24
150	IS;1239, PART-I HEAVY CLASS	166.5 / 163.9	5.4	3000±3.5	IS:6392 TABLE-17	250	22	210	18mm 8Nos	-	29

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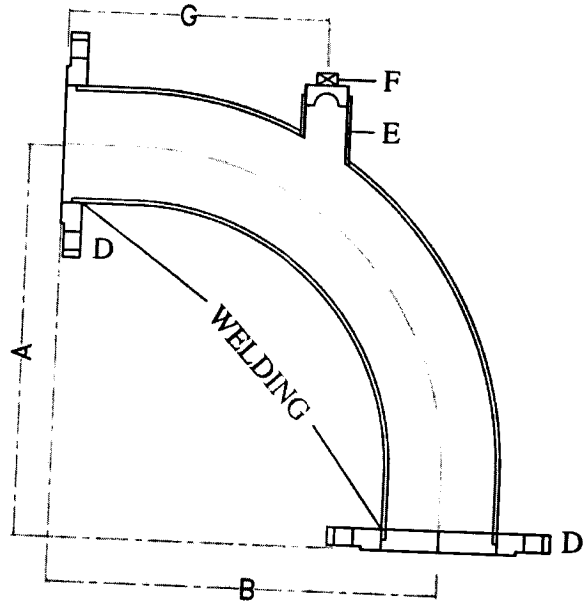
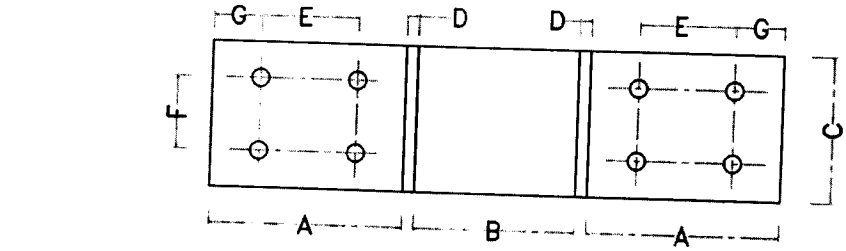
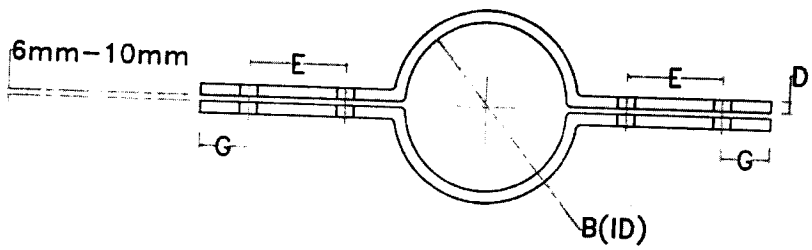
90° PRIMING BEND



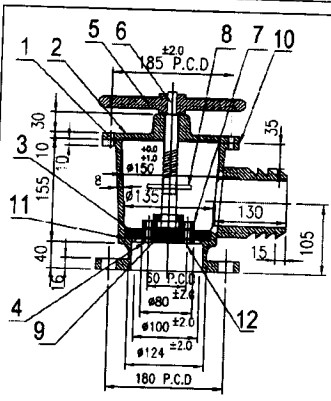
NB	PIPE	CENTR TO FACE	BEND	FLANGE	SOCKET	PLUG	CENTR TO FACE
	A	B	C	D	E	F	G
80	292	292	IS:1239 PART-II	IS:6392 TABLE-17	IS:1239 PART-II	IS:1239 PART-II	200
100	381	381	IS:1239 PART-II	IS:6392 TABLE-17	IS:1239 PART-II	IS:1239 PART-II	250
125	540	540	IS:1239 PART-II	IS:6392 TABLE-17	IS:1239 PART-II	IS:1239 PART-II	300
150	622	622	IS:1239 PART-II	IS:6392 TABLE-17	IS:1239 PART-II	IS:1239 PART-II	400

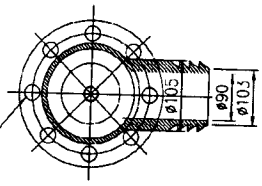
GALVANIZED MS SUPPORTING CLAMP



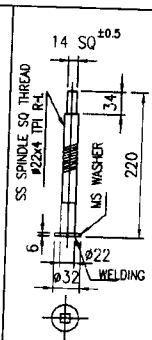


NB	DIMENSIONS				DRILL & BOLTING DIMENSIONS					Wt. in kg
	A	B	C	D	E	F	G	HOLE	BOLT	
80	200	88.9	100±2	12±1	100	65	50	14	M12	10.200
125	200	139.7	150±2	12±1	100	75	50	18	M16	17.500
150	200	165.1	150±2	12±1	100	75	50	18	M16	19.000

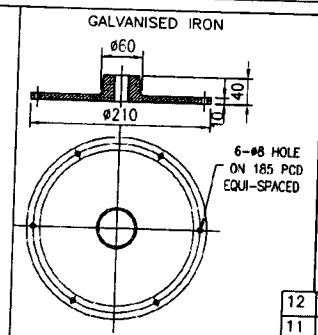




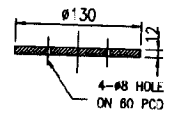
FLANGE O.D 220 P.C.D180
AS PER (IS:1538-1976)/
IS:6392 TABLE17



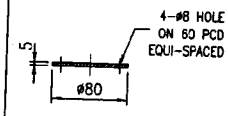
ITEM NO - 6



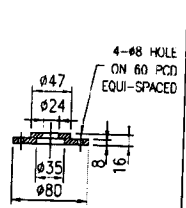
ITEM NO - 2



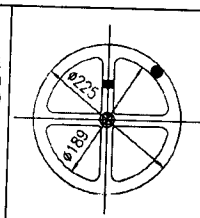
ITEM NO - 3



ITEM NO - 4



ITEM NO - 7



ITEM NO - 5

S.NO.	DESCRIPTION	MATERIAL	QTY	REMARKS
12	NUT & BOLT	M.S	4	–
11	RUBBER PAD (3mmTHK)	NEOPRENE	1	-DO-
10	RUBBER GASKET (2mmTHK)	NEOPRENE	1	-DO-
9	RUBBER GASKET (2mmTHK)	NEOPRENE	1	-DO-
8	RUBBER 'O' RING ø5mm	NEOPRENE	1	HARDNESS 50-65
7	GLAND	C.I	1	GR. FG.150.05:210/78
6	SPINDLE (SQ.R.H.THD)	S.S	1	AISI-410
5	HAND WHEEL	C.I	FOR 4 NOS. VALVE	-DO-
4	RING PLATE	C.I	1	-DO-
3	VALVE SEAT	C.I	1	GR. FG.150.05:210/78
2	G.I. COVER PLATE WITH BOSS AND 6Nos. NUTS AND BOLTS	M.S	1	-CL-
1	BODY	C.I	1	GR. FG.150.05:210/78

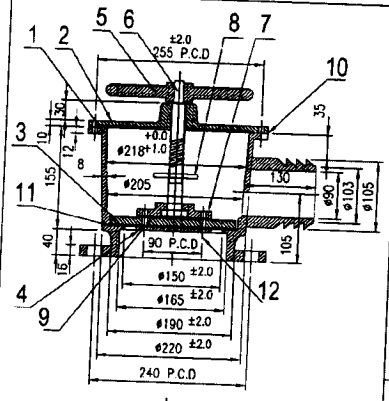
NOTE:

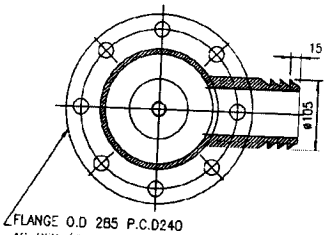
1. ALLABLE TOLERANCE ± 1mm MATCHING CLEARANCE
2. ALL BOLTS OF SUITABLE SIZES HOLES MUST BE MCH. FINISHED
3. INTERCHANGEBILITY OF THE COMPONENTS SHALL BE STRICTLY MAINTAINED.
4. ALL EDGES SHOULD BE ROUNDED.
5. MACHINED FINISH FACES ▽ △
6. TOLERANCE AS PER IS : 1538 (PART-I)76
7. OPERATIONAL DIRECTION TO BE INDICATE.
8. FINISHED MATERIALS ARE TO BE TESTED AT ATMOSPHERIC PRESSURE.
9. ALL DIMENSION ARE IN mm.
10. PERMANENT BRAND MARKING IN THE BODY TO BE PROVIDED.
11. NO FABRICATION ALLOWED AFTER GALVANISATION IN THE TOP COVER PLATE.
12. THE VALVE SHOULD BE PAINTED WITH ONE COAT OF RED OXIDE PRIMER AND TWO COAT OF BLACK JAPAN PAINT.

DGN		
DRN	A GUHA	
CHD		
APV.		
SCALE	NTS	
ALL DIMENSION ARE IN mm.		

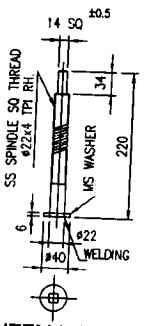
TITLE

100 M.M. DIA ALFA - ALFA VALVE NIPPLE TYPE - 'D'

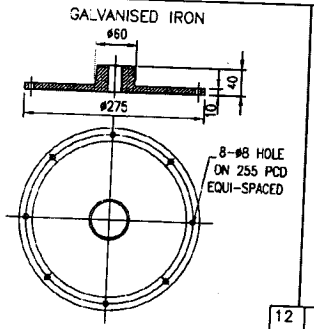




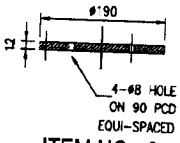
FLANGE O.D 285 P.C.D240
AS PER (IS:1538-1976)/
IS:6392 TABLE17



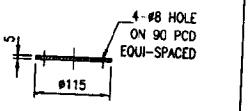
ITEM NO - 6



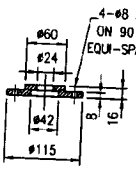
ITEM NO - 2



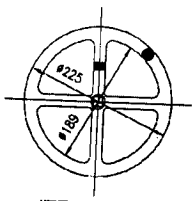
ITEM NO - 3



ITEM NO - 4



ITEM NO - 7



ITEM NO - 5

S... NO.	DESCRIPTION	MATERIAL	QTY	REMARKS
12	NUT & BOLT	M.S	4	–
11	RUBBER PAD (3mmTHK)	NEOPRENE	1	-DO-
10	RUBBER GASKET (2mmTHK)	NEOPRENE	1	-DO-
9	RUBBER GASKET (2mmTHK)	NEOPRENE	1	-DO-
8	RUBBER 'O' RING ø5mm	NEOPRENE	1	HARDNESS 50-65
7	GLAND	C.I	1	GR. FG.150:IS:210/78
6	SPINDLE (SQ.RH.THD)	S.S	1	AISI-410
5	HAND WHEEL	C.I	1 FOR 4 NOS VALVE	-DO-
4	RING PLATE	C.I	1	-DO-
3	VALVE SEAT	C.I	1	GR. FG.150:IS:210/78
2	G.I. COVER PLATE WITH BOSS AND 8 NOS NUTS AND BOLTS	M.S	1	-GI.-
1	BODY	C.I	1	GR. FG.150:IS:210/78

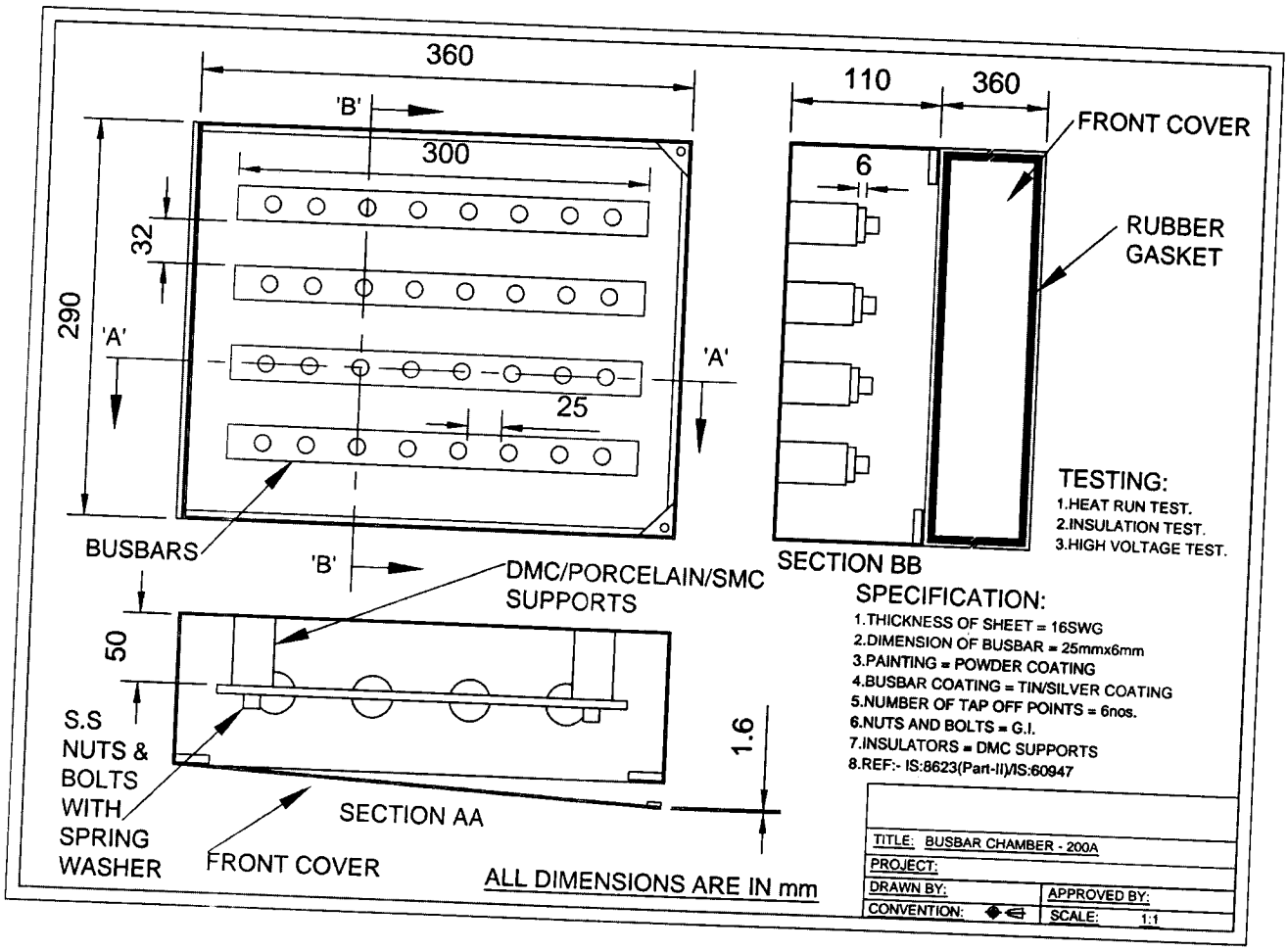
NOTE:

1. ALLABLE TOLERANCE ± 1mm MATCH NG CLEARANCE
2. ALL BOLTS OF SUITABLE SIZES HOLES MUST BE MCH. FINISHED
3. INTERCHANGEBILITY OF THE COMPONENTS SHALL BE STRICTLY MAINTAINED.
4. ALL EDGES SHOULD BE ROUNDED.
5. MACHINED FINISH FACES ▽ ▽
6. TOLERANCE AS PER IS : 1538 (PART-I)76
7. OPERATIONAL DIRECTION TO BE INDICATE.
8. FINISHED MATERIALS ARE TO BE TESTED AT ATMOSPHERIC PRESSURE.
9. ALL DIMENSION ARE IN mm.
10. PERMANENT BRAND MARKING IN THE BODY TO BE PROVIDED.
11. NO FABRICATION ALLOWED AFTER GALVANISATION IN THE TOP COVER PLATE.
12. THE VALVE SHOULD BE PAINTED WITH ONE COAT OF RED OXIDE PRIMER AND TWO COAT OF BLACK JAPAN PAINT.

DGN		
DRN	A GUHA	
CHD		
APV.		
SCALE	NTS	
ALL DIMENSION ARE IN mm.		

TITLE

150 M.M. DIA ALFA - ALFA VALVE NIPPLE TYPE - 'C'


360
'B'
300
32
290
'A'
25
BUSBARS
'B'
DMC/PORCELAIN/SMC
SUPPORTS
50
S.S
NUTS &
BOLTS
WITH
SPRING
WASHER
FRONT COVER
SECTION AA
1.6
ALL DIMENSIONS ARE IN mm
110
360
FRONT COVER
6
RUBBER
GASKET
SECTION BB
TESTING:
1.HEAT RUN TEST.
2.INSULATION TEST.
3.HIGH VOLTAGE TEST.
SPECIFICATION:
1.THICKNESS OF SHEET = 16SWG
2.DIMENSION OF BUSBAR = 25mmx6mm
3.PAINTING = POWDER COATING
4.BUSBAR COATING = TIN/SILVER COATING
5.NUMBER OF TAP OFF POINTS = 6nos.
6.NUTS AND BOLTS = G.I.
7.INSULATORS = DMC SUPPORTS
8.REF:- IS:8623(Part-II)/IS:60947
TITLE: BUSBAR CHAMBER - 200A
PROJECT:
DRAWN BY:
APPROVED BY:
CONVENTION:
SCALE: 1:1

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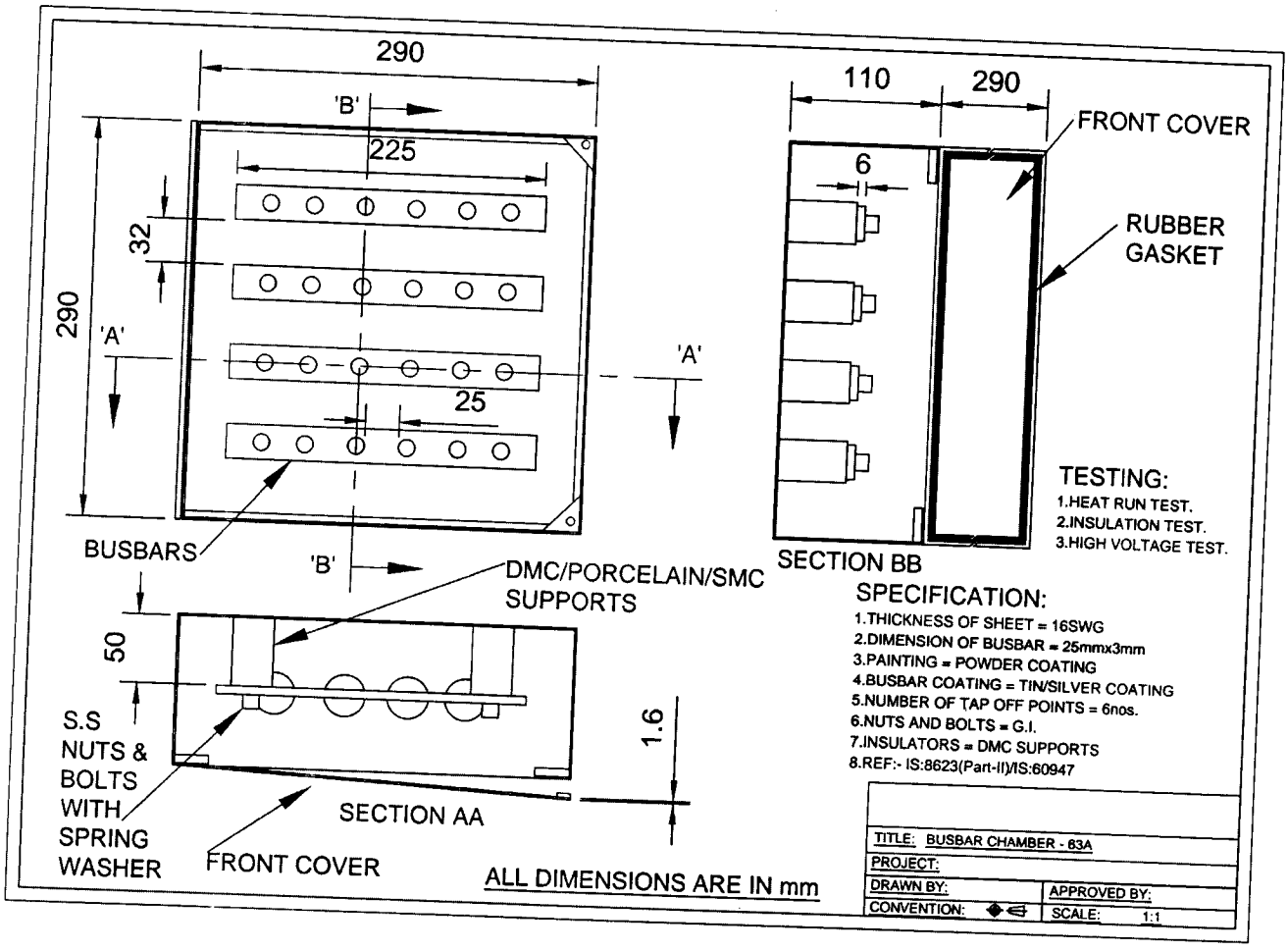
290
'B'
225
32
290
'A'
'A'
25
BUSBARS
'B'
DMC/PORCELAIN/SMC
SUPPORTS
50
S.S
NUTS &
BOLTS
WITH
SPRING
WASHER
FRONT COVER
SECTION AA
1.6
ALL DIMENSIONS ARE IN mm
110
290
FRONT COVER
6
RUBBER
GASKET
SECTION BB
TESTING:
1.HEAT RUN TEST.
2.INSULATION TEST.
3.HIGH VOLTAGE TEST.
SPECIFICATION:
1.THICKNESS OF SHEET = 16SWG
2.DIMENSION OF BUSBAR = 25mmx3mm
3.PAINTING = POWDER COATING
4.BUSBAR COATING = TIN/SILVER COATING
5.NUMBER OF TAP OFF POINTS = 6nos.
6.NUTS AND BOLTS = G.I.
7.INSULATORS = DMC SUPPORTS
8.REF:- IS:8623(Part-II)/IS:60947
TITLE: BUSBAR CHAMBER - 63A
PROJECT:
DRAWN BY:
APPROVED BY:
CONVENTION:
SCALE: 1:1

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