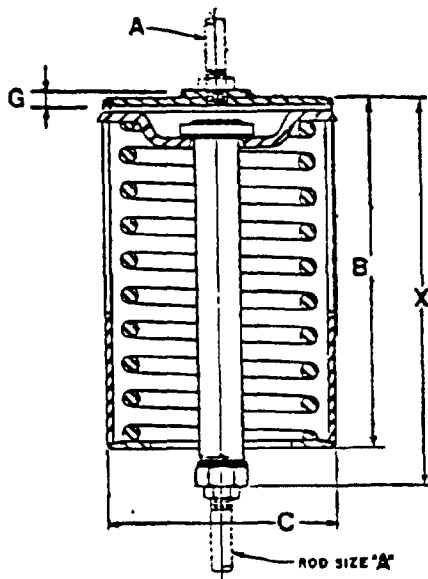
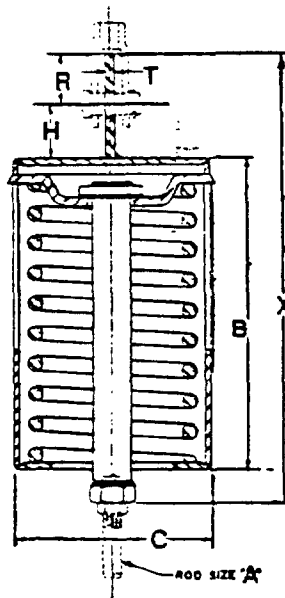


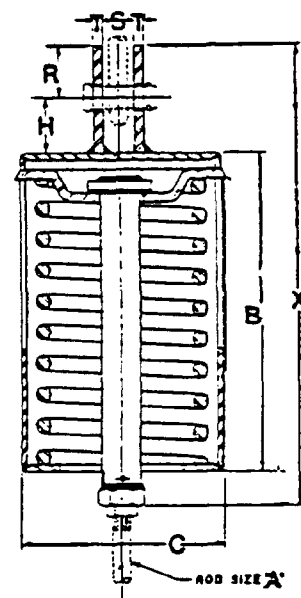
FIG. 2680
 TYPE-A



TYPE-B



TYPE-C



ST0409429

Type A springs are furnished with a threaded bushing in the top plate, providing for a simple roll attachment for the upper connection.

Type B and C springs are furnished with one or two lugs as shown, welded to the top cap of spring.

hanger size	rated load lb	wgt (approx) each lb	rod size A	R.H. thd lgth	lug hole size	casing length B	casing diam C	thread depth G	height of pin H	shipping length X	R	device opening S	thick-ness T	loaded length	
														min	max
00	69	7	1/2	5	11/16	8 11/16	4	7/16	1 1/2	10 11/16	1 1/4	1/2	1/4	10 7/16	13 1/16
10	100	8	1/2	5	11/16	7 7/16	4	7/16	1 1/2	10 13/16	1 1/4	7/8	1/4	11 13/16	13 13/16
20	128	9	1/2	5	11/16	8 3/16	4	7/16	1 1/2	11 3/16	1 1/4	7/8	1/4	12 1/16	14 7/16
30	166	12	1/2	5	11/16	7 7/16	5 7/16	7/16	1 1/2	10 13/16	1 1/4	7/8	1/4	11 13/16	13 13/16
40	223	14	1/2	5	11/16	7 13/16	5 7/16	7/16	1 1/2	11 13/16	1 1/4	7/8	1/4	11 13/16	14 3/16
50	299	15	1/2	5	11/16	8 3/16	5 7/16	7/16	1 1/2	12 1/16	1 1/4	7/8	1/4	12 3/16	15 1/16
60	399	24	3/4	5	1 1/16	8 13/16	6 3/4	3/4	1 1/2	12 3/16	1 1/4	1 1/16	1/4	12 7/16	15 1/2
70	532	27	3/4	5	1 1/16	9 3/4	6 3/4	3/4	1 1/2	13 3/16	1 1/4	1 1/16	1/4	13 7/16	16 3/16
80	713	29	3/4	5	1 1/16	10 1/4	6 3/4	3/4	1 1/2	13 7/16	1 1/4	1 1/16	1/4	14 3/16	16 7/16
90	950	56	3/4	6	1 1/16	10 7/8	8 3/4	1	1 1/2	14 1/2	1 1/4	1 1/16	3/8	15	17 1/2
100	1235	62	3/4	6	1 1/16	12 1/8	8 3/4	1	1 1/2	15 1/4	1 1/4	1 1/16	3/8	16 1/4	18 3/4
110	1615	56	7/8	6	1 1/8	9 15/16	8 3/4	1	2	14 7/8	1 1/4	1 1/16	3/8	15 3/4	17 7/8
120	2138	61	1	6	1 1/4	10 9/16	8 3/4	1	2	15 7/16	1 1/2	1 1/8	1/2	15 13/16	18 7/16
130	2850	79	1 1/8	7	1 3/8	13 3/8	8 3/4	1	3	18 7/16	1 1/2	1 1/2	1/2	18 13/16	21 7/16
140	3800	84	1 1/8	7	1 3/8	13 1/2	8 3/4	1	3	18 7/16	1 1/2	1 1/2	1/2	18 13/16	21 7/16
150	5130	100	1 1/4	7	1 1/2	13 3/4	8 3/4	1 1/4	3	20 11/16	2	2	3/4	21 3/16	23 11/16
160	7125	124	1 1/2	8	1 3/4	16 1/16	9 3/4	1 3/4	3	23 13/16	2 1/2	2 1/4	3/4	24 7/16	26 13/16
170	9500	154	1 3/4	8	2	18 1/4	9 3/4	1 3/4	3	26 3/16	2 1/2	2 3/4	3/4	26 11/16	29 3/16
180	12645	301	2	9	2 1/4	18 3/4	12 3/4	2 1/4	4	28 11/16	3	2 3/4	3/4	28 3/16	31 1/16
190	16805	343	2 1/4	9	2 3/4	20 3/4	12 3/4	2 3/4	4 1/2	31 3/16	3	3 1/4	3/4	31 11/16	34 3/16
200	22325	456	2 1/2	10	3	23 3/4	12 3/4	2 3/4	4 1/2	35 11/16	4	3 3/4	1	36 3/16	38 11/16
210	29688	529	2 3/4	10	3 1/4	25 1/4	12 3/4	2 3/4	4 1/2	38 13/16	4	3 3/4	1	39 3/16	41 13/16
220	39591	684	3	11	3 3/4	32 3/4	12 3/4	3	5	45 11/16	4	3 3/4	1	46 3/16	48 11/16

PLAINTIFF'S EXHIBIT

DOW-2541

ST0409429

5505-30132-7-11-10-105 4-30132 44110 5505-30132-7-11-10

5505-30132-7-11-10

PLANT		Direct Neutralizer - 100		FILE JOB NO.			
LOCATION		A-600		CHARGE NO. 32391			
MANUFACTURER		Dyiron		S. MNO.			
		NO. UNITS 2		P.O. NO.			
MODEL		Mark II 4 x 6 13A		NO. UNITS 2 ASA PUMP YES NO ASA DESIGNATION A-80			
SERVICE CONDITIONS	1	Liquid Pumped	Process Liquid		Max. Capacity at P.T.	1200 gpm	
	2	Pumping Temperature (P.T.)	210 °F		Discharge Pressure	64 psia	
	3	Specific Gravity at P.T.	1.34		Suction Pressure	14.7 psia	
	4	Viscosity at P.T.	6 cp		Differential Pressure	49.3 psi	
	5	Vapor Pressure at P.T.	5 psi		Differential Head	86 ft.	
	6	Corrosion or Erosion Factors:			NPSH Available	14.7 ft.	
	7				NPSH Required (Water)	10 ft.	
	8	Arrangement (Horiz.-Vert.-In Line)			Suction: (Single) Double		
CONSTRUCTION DETAILS	9	Direction of Rotation Facing Pump Coupling: (CW) CCW			Speed:	1750 rpm	
	10	Case: Design Pressure	275 psig @ 100°F	Number of Stages	1	Shut-Off Pressure	ft.
	11	Max. Allow. Working Press.	412 psig @ 100°F	Volumetric Efficiency at Rating	81	%	
	12	Split: Horiz.-Vert.-Barrel			Impeller Type	Semi-Open	
	13	Impeller Diameter: Supplied	11 inches	Maximum	13 inches	Minimum	9 inches
	14	Vent and Drain Tapped: (Yes) No			Bearings: (Grist) Type	3105/12	
	15	Nozzles	Size	Rating	Facing	Location	Radial
	16	Suction	6"	150#	FF	Side	Lubrication on Bearings: (Oil) Grease
	17	Discharge	4"	150#	FF	Top	Oiler: (Yes) No: Type
	18	Vents	NONE			Coupling: (Yes) No: Mir.	WOODS SC9H
	19	Drains	NONE			Coupling Guard: (Yes) No	FRP
	20	Cooling H ₂ O			Baseplate: (Yes) No: Type	Steel	
	21	Water Cooling: Casing-Stuff. Box-Bearings-Pedestal (Gland) None			Total Water Required:	APPROX 1-2 gpm	
	22	Smothering Gland: Yes (No) TOP & BOTTOM - 1/4" NPT			Lubrication on Stuffing Box: Oil-Grease (None)		
	23	Packing: (Yes) No: Type	TFE/Asbestos		Sealing Oil Connection: Yes - No		
	24	Mechanical Seal: Yes (No) Furnished by:			Mr.	Type	
	25	Single - Double-Inside-Outside-Balanced-Unbalanced					
	26	Rotary Unit	Seal Ring		Face Material	Shaft Packing	
	27	Insert	Reversible: Yes - No		Face Material		
	28	Insert Mounting: Clamped In - "O" Ring - Press Fit					
	29	Gland	Plains: Yes - No		Throttle Bushing Carbon: Yes - No; Other		
	30	Gland-Stuffing Box Machined & Tapped for: Dead - End Lub. - Circulating Lub. - Quenching - Vent & Drain					
	31	Flushing Seal Faces with Discharge Bypass - Flushing Seal Faces with External Fluid					
	32	Auxiliary Stuffing Box Req'd: Yes (No)	FLAT TEFLON IMPELLER GASKET				
33	Weight of Pump	227	lb	Weight of Base	234 lb		
34	Weight of Driver	610	lb	Shipping Weight	1071 lb		
35	Casing & Covers:	Titanium		Shaft:	SUPERCHLOR		
36	Casing Wear Rings:			Shaft Seals:	INTEGRAL W/HAFT		
37	Impeller:	Titanium		Lintern Rings:	TFE		
38	Impeller Wear Rings:			Glands:	Titanium		
39	Stuffing Box Bushings:	NIP		Gaskets:	ASBESTOS W/ SBR BINDER		
40	Furnished by:	OWNER		Type (Elec. Motor - Steam Turbine - Other)	(Direct) Gear - Belt		
41	Electric Motor: Make	RELIANCE Mounted by Vendor		Steam Turbine: Make	Mounted by		
42	Enclosure	TEFC SF 1.15 Temp Rise 80 °C		Model:			
43	Insulation	F Frame 326 T		Horsepower	hp ; Speed rpm		
44	Estimated BHP Req'd.	47 hp		Inlet Steam Press., psig: Normal	Max		
45	Nominal Motor Size (Non-overloading)	50 hp		Inlet Steam Temp., °F: Normal	Max.		
46	Speed	1750 rpm		Water Rate:	lb/hr		
47	Volts	440 ; Phase 3 ; Hz 60		Vacuum (if any)	mm - in. Hg - psia		
48	Speed Reducer: Integral - Separate			Back Pressure	psig		
49	Mr.	Rating		Nozzles	Size Rating Facing Location		
50	Model	Class		Inlet			
51	See Driver Specification No. RELIANCE PCF-294			Exhaust			
52	Performance Curve: (Yes) No: Curve No.	MII T125BV		Serial Number			
53	Hydraulic Test: (Yes) No: Pressure	412 psig		Outline Drawing			
54	Shut Inspection: Yes (No)			Cross Section Drawing			
55				Bulletin No.			
SPEC. BY		ARM		THE DOW CHEMICAL COMPANY			
CHECKED:		P. 107 A12		ST0409430			
ASD:		PROCESS LIQUID		CENTRIFUGAL PUMP SPECIFICATIONS			
DATE: 12-70		REVISION DATE: 12-70		SPEC. NO. A5-09-30132			

ST0409430

5000-2012-11-00 5000-2012-11-00 5000-2012-11-00 5000-2012-11-00 5000-2012-11-00 5000-2012-11-00 5000-2012-11-00 5000-2012-11-00 5000-2012-11-00 5000-2012-11-00

PUMP		Direct Neutral		r = 100		FILE JOB NO	
LOCATION		A-600		BLEG. NO.		CHARGE NO. 32891	
MATERIAL FACTORY		Duriron		NO. UNITS 2		B. MFG.	
MODEL		Mark II 4 x 6 13A		NO. UNITS 2		ASA PUMP (X) YES () NO ASA DESIGNATION A-80	
SERVICE CONDITIONS	1	Liquid Pumped	Process Liquid			Max. Capacity at P.T.	1200 gpm
	2	Pumping Temperature (P.T.)	200 °F			Discharge Pressure	63 psig 112 ft.
	3	Specific Gravity at P.T.	1.3			Suction Pressure	14.7 psig 2.6 ft.
	4	Viscosity at P.T.	5 cP			Differential Pressure	4.8 psi
	5	Vapor Pressure at P.T.	3.5 PSI			Differential Head	86 ft.
	6	Corrosion or Erosion Factors:				NPSH Available	22.6 ft.
	7					NPSH Required (Water)	10 ft.
	8	Arrangement: (Horiz.)-Vert.-In Line				Suction: (Single) Double	
	9	Direction of Rotation Facing Pump Couplings: (CW) CCW				Speed:	1750 rpm
	10	Case: Design Pressure	275 psig 9100 F			Number of Stages	1
CONSTRUCTION DETAILS	11	Max. Allow. Working Press.	412 psig 9100 F			Shut-Off Pressure	ft.
	12	Split: Horiz.-Vert.-Barrel				Vol. Efficiency at Rating	77 %
	13	Impeller Diameter: Supplied	11 inches			Impeller Type	Semi-Open
	14	Vent and Drain Tapped: (Yes) No				Maximum	13 inches; Minimum 9 inches
	15	Nozzles	Size	Rating	Facing	Location	Bearings: Thrust Type 3105/10
	16	Suction	6"	150#	FF	Side	Radial Type 52104/STD
	17	Discharge	4"	150#	FF	Top	Lubrication on Bearings: (Oil)-Grease
	18	Vents	NONE				Oiler: (Yes) No; Type TP10
	19	Drains	NONE				Coupling: (Yes) No; Mfr. WOODS SC9H
	20	Cooling H ₂ O					Coupling Guard: (Yes) No ERP
MATERIALS	21	Water Cooling: (Casing-Stuff. Box-Bearings-Pedestal-Gland) None				Baseplate: (Yes) No; Type Steel	
	22	Smothering Gland: Yes (No) Taper Bottom - 1/2" NPT				Total Water Required: APPROX 1-2 gpm	
	23	Packing: (Yes) No; Type TFE/Asbestos				Lubrication on Stuffing Box: Oil-Grease (None)	
	24	Mechanical Seal: Yes (No) Furnished by:				Sealing Oil Connection: Yes - No	
	25	Single - Double-Inside-Outside-Balanced-Unbalanced				Mfr. Type	
	26	Rotary Unit				Face Material	
	27	Insert				Reversible: Yes - No	
	28	Insert Mounting: Clamped In - "O" Ring - Press Fit				Face Material	
	29	Gland				Throttle Bushing Carbon: Yes - No; Other	
	30	Gland/Stuffing Box Machines & Tapped for: Dead - End Lub. - Circulating Lub. - Quenching - Vent & Drain					
DRIVER	31	Flushing Seal Faces with Discharge Bypass - Flushing Seal Faces with External Fluid					
	32	Auxiliary Stuffing Box Req'd: Yes (No) FLAT TEFELON IMPELLER GASKET					
	33	Weight of Pump	227 lb			Weight of Base	234 lb
	34	Weight of Driver	110 lb			Shipping Weight	1071 lb
	35	Casing & Covers:	Titanium			Shaft:	SUPER-CHLOD
	36	Casing Wear Rings:				Shaft Sleeves:	INTEGRAL W/SHAFT
	37	Impeller:	Titanium			Lantern Rings:	TFE
	38	Impeller Wear Rings:				Glands:	Titanium
	39	Stuffing Box Bushings:	N/A			Gaskets:	ASBESTOS W/SSK RINGER
	40	Furnished by: OWNER	Type: Elec. Motor - Steam Turbine - Other			(Direct) Gear - Belt	
TESTS	41	Electric Motor: Make RELIANCE Mounted by Vendor				Steam Turbine: Make	Mounted by
	42	Enclosure TEEC	SF 1.15 Temp Rise 80 °C			Model:	
	43	Insulation F	Frame 326T			Horsepower	hp ; Speed rpm
	44	Estimated BHP Req'd.	42.3 hp			Inlet Steam Press., psig: Normal	Max
	45	Nominal Motor Size (Non-overlapping)	50 hp			Inlet Steam Temp., °F: Normal	Max.
	46	Speed	1750 rpm			Water Rate:	lb/hr
	47	Volts 440 ; Phase 3 ; Hz 60				Vacuum (if any)	mm - in. Hg - psia
	48	Speed Reducer: Integral - Separate -				Back Pressure	psig
	49	Mfr. Rating				Nozzles	Size Rating Facing Location
	50	Model Class				Inter	
MISC.	51	See Driver Specifications No. RELIANCE RCP-234				Exhaust:	
	52	Performance Curve: (Yes) No. Curve No. M-2 2125A				Serial Number	
	53	Hydrostatic Test: (Yes) No; Pressure 412 psig				Outline Drawing	
	54	Shear Instructions: Yes (No)				Cross Section Drawing	
	55					Bulletin No.	Page No.

SHEETS		ARM		THE DOW CHEMICAL COMPANY		P. 10A/100	
CHECKED:		SERVICE		PROCESS LIQUID		CENTRIFUGAL PUMP SPECIFICATIONS	
DATE: 12-79		REVISION DATE: 12-79		VENDOR FOR PUMP: 5112-30132		VENDOR FOR MOTOR: 5112-30132	
VENDOR FOR PUMP: 5112-30132		VENDOR FOR MOTOR: 5112-30132		VENDOR FOR PUMP: 5112-30132		VENDOR FOR MOTOR: 5112-30132	

ST0409431

2012/12/12 10:00 AM 2012/12/12 10:00 AM 2012/12/12 10:00 AM

PUMP		Direct Neutral		FILE NO. NO	
LOCATION		A-630		CHARGE NO. 32891	
MANUFACTURER		Durriron		B.M.N.O.	
MODEL		Mark II 4 x 6 13A		P.O. NO.	
NO. UNITS		3		ASA PUMP	
NO. UNITS		3		NO. ASA DESIGNATION A-80	
SERVICE CONDITIONS		Process Liquid		Max. Capacity at P.T. 1200 gpm	
Pumping Temperature (P.T.)		122 °F		Discharge Pressure 55.8 psia 117 ft.	
Specific Gravity at P.T.		1.1		Suction Pressure 14.7 psia 31 ft.	
Viscosity at P.T.		2 cP		Differential Pressure 41.1 psi	
Vapor Pressure at P.T.		1 PSI		Differential Head 86 ft.	
Corrosion or Erosion Factors:				NPSH Available 22.6 ft.	
				NPSH Required (Water) 10 ft.	
Arrangement: (Horiz.-Vert.-In Line)				Suction: (Single) Double	
Direction of Rotation Facing Pump Coupling: (CW) CCW				Speed: 1750 rpm	
Case: Design Pressure 225 psig @ 100°F		Number of Stages 1		Shut-Off Pressure ft.	
Max. Allow. Working Press. 412 psig @ 100°F		Volumetric Efficiency at Rating 81 %			
Split: Horiz.-Vert.-Barrel		Impeller Type Semi-Open			
Impeller Diameter: Supplied 11 inches		Maximum 13 inches; Minimum 9 inches			
Vent and Drain Tapped: (Yes) No		Bearings: Thrust 210-110 Type SINGLE ROW			
Nozzles Size Rating Facing Location		Radial 5310/STD Type DOUBLE ROW			
Suction 6" 150# FF Side		Lubrication on Bearings: (Oil)-Grease			
Discharge 4" 150# FF TOP		Oiler: (Yes)-No: Type TRICO			
Vents NONE		Couplings: (Yes) No: Mfr. WOODS 569			
Drains NONE		Coupling Guard: (Yes) No FRP			
Cooling H2O		Baseplate: (Yes)-No: Type Steel			
Water Cooling: Casing-Stuff. Box-Bearings-Pedestal-Gland/None		Total Water Required: APPROX 1-2 gpm			
Smothering Gland: Yes (No)-Type 1/2" x 1/2"		Lubrication on Stuffing Box: Oil-Grease-None			
Packing: (Yes) No: Type TFE/Asbestos		Sealing Oil Connection: Yes - No			
Mechanical Seal: Yes - No: Furnished by:		Mfr. Type			
Single - Double-Inside-Outside-Balanced-Unbalanced					
Rotary Unit Seal Ring Face Material Shaft Packing					
Insert Reversible: Yes - No Face Material					
Insert Mounting: Clamped In - "O" Ring - Press Fit					
Gland Plain: Yes - No Throttle Bushing Carbon: Yes - No: Other					
Gland/Stuffing Box Machined & Tapped for: Dead - End Lub. - Circulating Lub. - Quenching - Vent & Drain					
Flushing Seal Faces with Discharge Bypass - Flushing Seal Faces with External Fluid					
Auxiliary Stuffing Box Req'd: Yes (No) 1		FLAT TEFLON IMPELLER GASKET			
Weight of Pump 227 lb; Weight of Base 234 lb					
Height of Driver 550 lb; Shipping Weight 1071 lb					
Casing & Covers: Titanium		Shaft: SUPERCHLOR			
Casing Near Rings: Titanium		Shaft Sleeves: INTEGRAL W/ SHAFT			
Impeller: Titanium		Lantern Rings: TFE			
Lantern Near Rings: Titanium		Glands: Titanium			
Stuffing Box Bushings: N/A		Gaskets: ASBESTOS W/ SBR BINDER			
Furnished by: OWNER Type: Elec. Motor - Steam Turbine - Other (Direct) Gear - Belt					
Electric Motor Make: RELIANCE Mounted by Vendor		Steam Turbine Make Mounted by			
Enclosure TFF SF 1.15 Temp Rise 80 °C		Model:			
Insulation F Frame 224T		Horsepower hp : Speed rpm			
Estimated BHP Req'd. 35.6 hp		Inlet Steam Press., psig: Normal : Max.			
Nominal Motor Size (Non-overloading) 40 hp		Inlet Steam Temp., °F: Normal : Max.			
Speed 1750 rpm		Water Rate: lb/hr			
Volts 440 : Phase 3 : Hz 60		Vacuum (If any) mm - in Hg - psia			
Speed Reducer: Integral - Spec. -		Back Pressure psig			
Ratio		Nozzles Size Rating Facing Location			
Modul Class		Inlet			
See Driver Specification No. RELIANCE PGP-224		Exhaust			
Performance Curve (Total Mot. Curve No. M11 SIZE 1)		Serial Number			
Hydraulic Test: (Yes) No: Pressure 412 psig		Outline Drawing			
Shaft Inspection: (Yes) No		Cross Section Drawing			
		Bulletin No. Page No.			
ARM		THE DOW CHEMICAL COMPANY			
PROCESS LIQUID		CENTRIFUGAL PUMP SPECIFICATIONS			
DATE: 12-12-12		REVISION DATE: 12-12-12			
A5-12-30133					

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5112 Comb - 12/1/50

5112-30132-6-13 S502A-30132-7/13- S502-30132-7/13/80

PLANT	DIRECT NEUTRALIZER	FILE/JOB NO.
LOCATION	A-300	CHARGE NO. 50132
MANUFACTURER	LINK BELT	S/N NO.
	NO. UNITS ONE	P. O. NO.

1	
2	VALVE REVERSED SHALL BE A WORM REDR SPEED
3	REDUCER COMPLETE WITH ELECTRIC MOTOR
4	MOTOR COUPLING & COUPLING GUARD
5	
6	SPEED REDUCER SHALL BE HELICAL WORM TYPE
7	
8	SPEED REDUCER SIZE SHALL BE 175
9	
10	MOTOR SHALL BE MOUNTED ON A "SCOOP BRACKET"
11	BY VENDOR
12	
13	ASSEMBLY ARRANGEMENT SHALL BE 18
14	
15	MOTOR SHALL BE 3 HP, 1750 RPM, 3 PH 60 HZ,
16	440 VOLTS, CLASS F INSULATION NEMA
17	DESIGN B, WITH A 1.15 SERVICE FACTOR
18	
19	GEAR RATIO SHALL BE 145:1
20	
21	REQUIRED OUTPUT TORQUE OF SPEED REDUCER
22	IS 1200 FT-LB
23	
24	OPERATIONAL CYCLE IS 180° ROTATION OF
25	SPEED REDUCER'S OUTPUT SHAFT EVERY
26	15 MINUTES
27	
28	SEE SHEET 2 FOR ARRANGEMENT OF
29	OPERATING LINKAGE
30	
31	SPEED REDUCER MODEL NUMBER IS
32	MW-H-175-MB-18-182T-145
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ST0409434

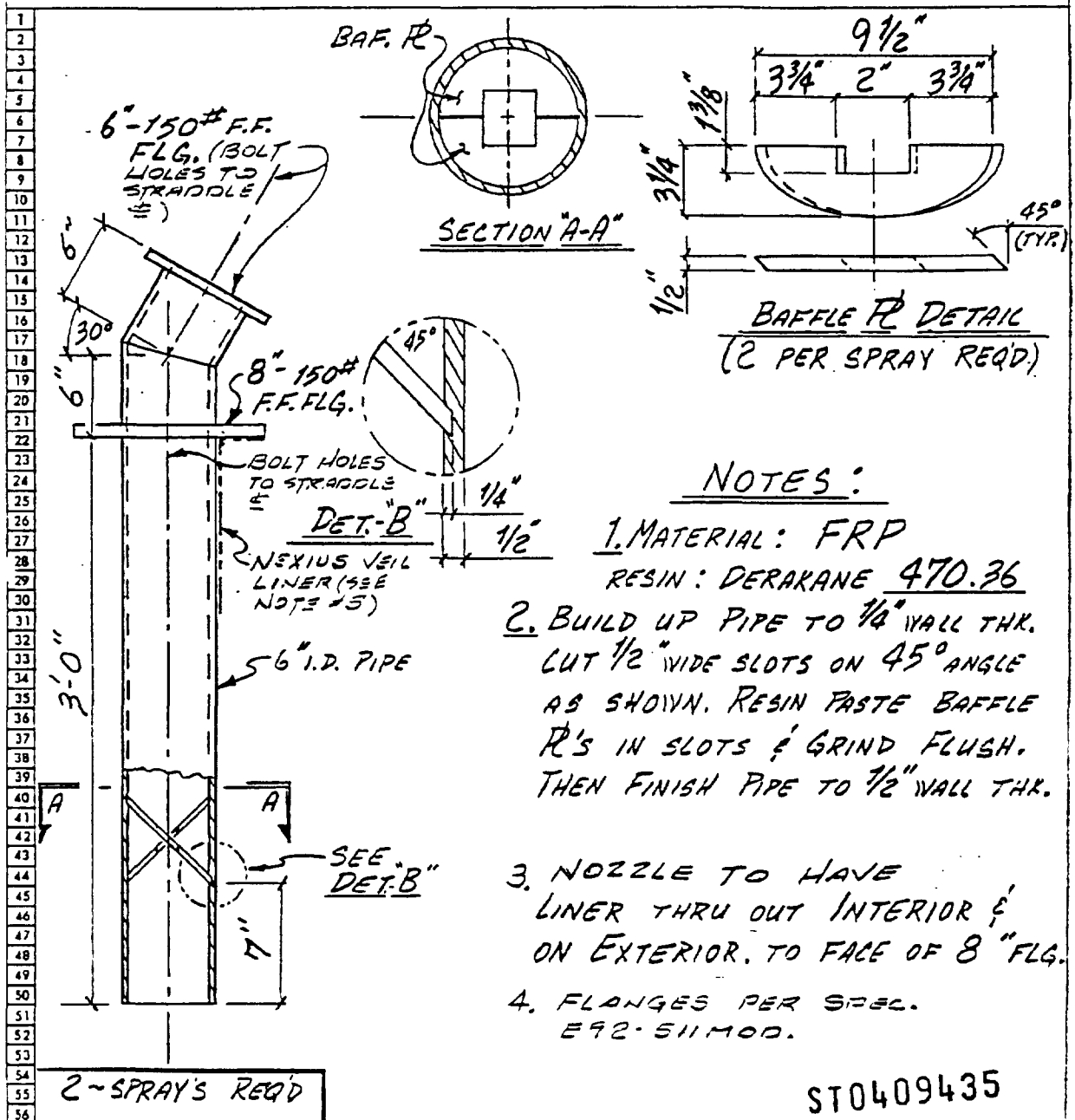
SPEC BY	Q2M	THE DOW CHEMICAL COMPANY	EQUIP. NO.	ME-10
CHECKED		SERVICE	MISCELLANEOUS EQUIPMENT SPECIFICATIONS	
APP'D.		VALVE REVERSER		
DATE	6/12/30	REVISION DATE	Δ	5200 HET-18
VENDOR TO COMPLETE ALL INFORMATION MARKED		SHEET 1 OF 2		SPEC NO. A5-25-30132

152

ST0409434

S112-30132 05-28 12-2-79
 C112-30132-1061R) S5148-30132 2/18/82

PLANT DIRECT NEUTRALIZER	100	FILE/JOB NO.
LOCATION A-600	BLDG. NO.	CHARGE NO. 30132
MANUFACTURER	NO. UNITS	B/M NO. SSS1-30132
		P. O. NO.



SPEC. BY ARM/SVD	DOW THE DOW CHEMICAL COMPANY	EQUIP. NO. SP-107
CHECKED: RPD	SERVICE	
APP'D: ARM	SPRAY NOZZLE T-107	
DATE: 2-13-80	REVISION DATE A 2/11/80	SPECIFICATIONS
VENDOR TO COMPLETE ALL INFORMATION MARKED		NO. A5-27-30132

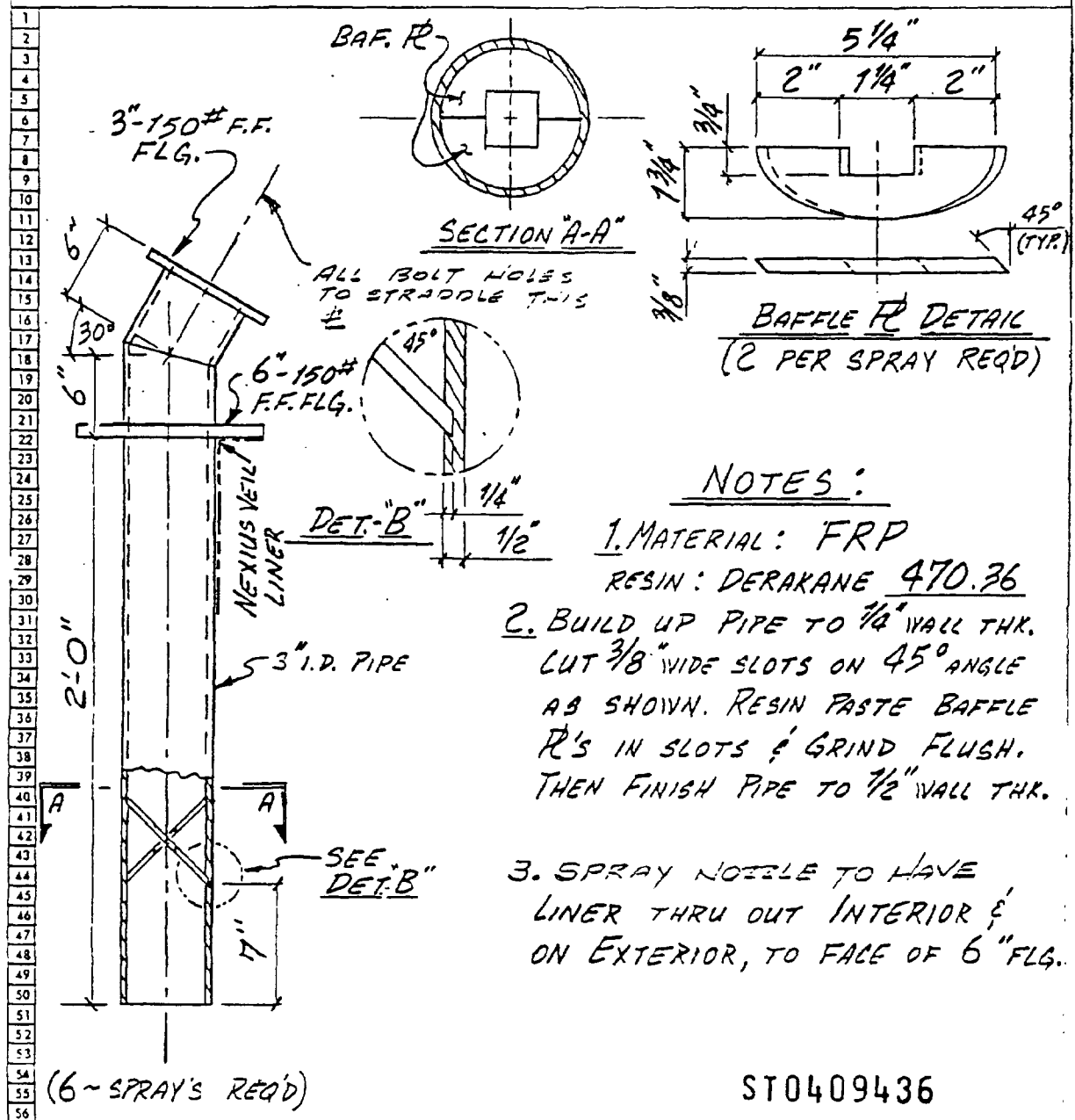
254300 1/73

ST0409435

5112-30132 Cans 17 1/2" x 10"

5112-30132 10/80 S560B-30132 4/80 S560A-30132 4/80

PLANT DIRECT NEUTRALIZER	100	FILE/JOB NO.
LOCATION A-600	BLDG. NO.	CHARGE NO. 30132
MANUFACTURER	NO. UNITS (6)	B/M NO. S560-30132
		P. O. NO.



SPEC. BY ARM/SVD	THE DOW CHEMICAL COMPANY	EQUIP. NO. SP-111
CHECKED: JED	SERVICE	"A-F"
APP'D: ARM	SPRAY NOZZLE T-111	SPECIFICATIONS
DATE: 2-13-80	REVISION DATE A 6/11/80 B C	SPEC. NO. A5-41-30132
VENDOR TO COMPLETE ALL INFORMATION MARKED		SHEET 2 OF 2

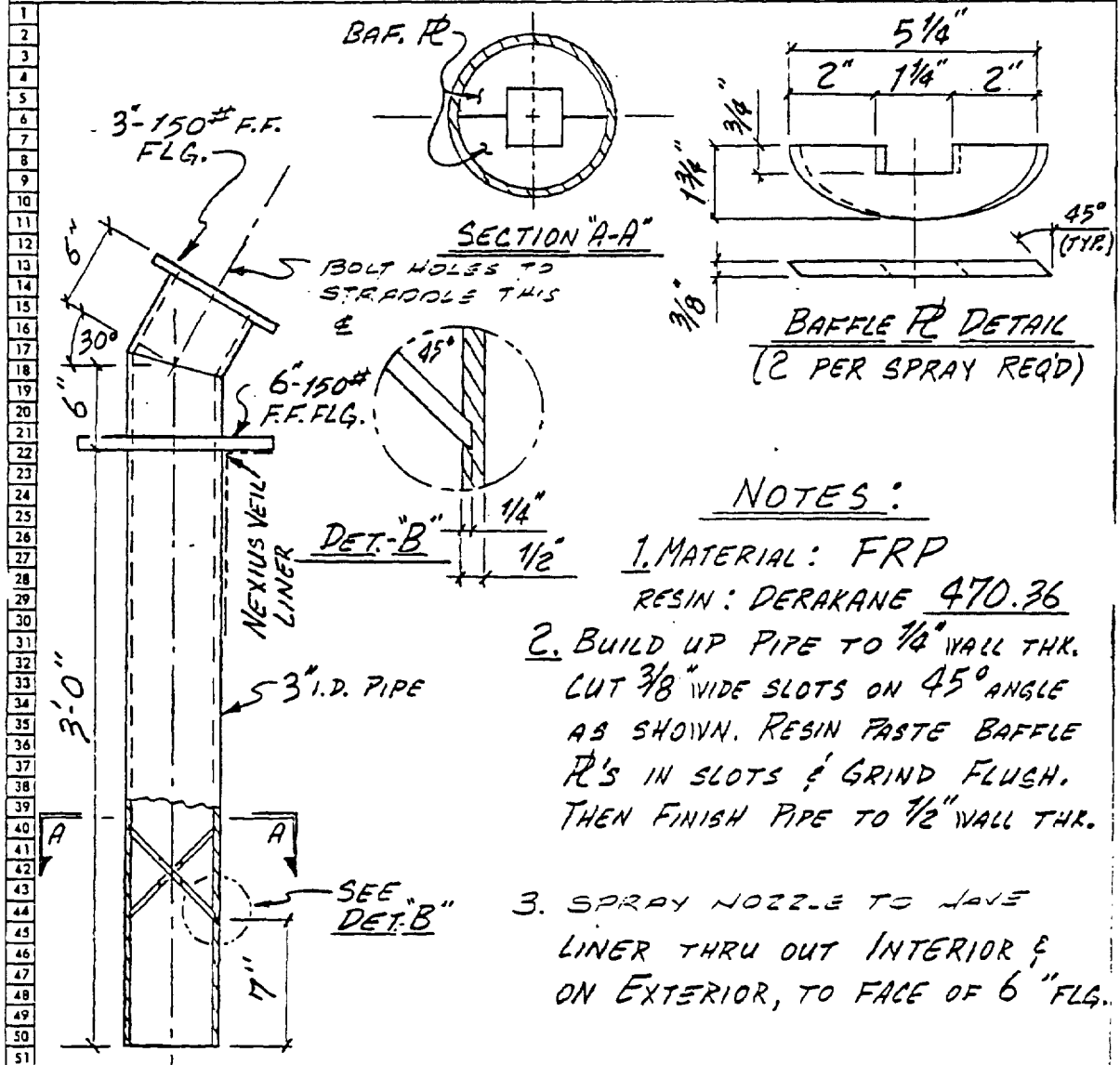
254300 1/73

ST0409436

2-30132 12-8-80

S112-30132 1/6/80 5560A-30132 2/18/81 5560A-30132

PLANT DIRECT NEUTRALIZER	100	FILE/JOB NO.
LOCATION A-600	BLOG. NO.	CHARGE NO. 50152
MANUFACTURER	NO. UNITS	B/M NO. 5560-30132
		P. O. NO.



NOTES:

1. MATERIAL: FRP
RESIN: DERAKANE 470.36
2. BUILD UP PIPE TO 1/4" WALL THK. CUT 3/8" WIDE SLOTS ON 45° ANGLE AS SHOWN. RESIN FASTEN Baffle P's IN SLOTS & GRIND FLUSH. THEN FINISH PIPE TO 1/2" WALL THK.
3. SPRAY NOZZLE TO HAVE LINER THRU OUT INTERIOR & ON EXTERIOR, TO FACE OF 6" FLG.

ST0409437

(6-SPRAYS REQ'D)

SPEC. BY ARM/SVD	THE DOW CHEMICAL COMPANY	EQUIP. NO. SP-113
CHECKED: N/A	SERVICE	"A-F"
APP'D: ARAM	SPRAY NOZZLE @ T-113	SPECIFICATIONS
DATE: 2-13-80	REVISION DATE: 6/11/80	SPEC. NO. A5-42-30132
VENDOR TO COMPLETE ALL INFORMATION MARKED		SHEET 3 OF 3

254300 1/73

ST0409437

9112-30132 4/8/80 S.F. 100E-20132 4/18/80 S.F. 100E-20132 4/18/80

PLANT DIRECT NEUTRALIZER	100	FILE/JOB NO.
LOCATION A-600	BLDG. NO.	CHARGE NO. 30732
MANUFACTURER	NO. UNITS	B/M NO. 5560 30132
		P. O. NO.

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1 1/4" ϕ HOLE-TANGENT TO INSIDE OF 2" ϕ 3" PIPE.

SECTION A-A

3" I.D. PIPE (SPRAY HEAD)

TANGENTIAL INTERSECTION

2" I.D. PIPE

2'-6 1/2"

8" 150# F.F. FLG. X 3/4" THK.

6"

2" 150# F.F. FLG. X 3/8" THK.

SOLTS TO STRADDLE

(5-REQ'D)

1 1/2" ϕ HOLE (STRAIGHT CUT)

SPRAY HEAD DETAIL

NOTES:

1. MATERIAL: FRP, DERAKANE 470.36
2. SPRAY NOZZLE TO BE LINED THRU OUT INTERIOR & ON EXTERIOR, TO FACE OF 8" FLG.

SPECIFICATIONS	
5560 30132	
TOLERANCE	— — — 92-302
LAMINATION SEQUENCE	— 312-57 MOD.
DEFECTS	— — — 312-503
PROPERTIES	— — — 312-503
GEN. NOTES FOR FRP	— 312-512 MOD.
FRP NOZZLES	— — 312-510 MOD.
BARCOL HARDNESS	— — 312-522
CATALYST & PROMOTERS	— — 312-522
JOINT OVERLAP	— 312-503
FRP NOZZ. DIM.	— — 312-510 MOD.
PAINT	— — — 312-522

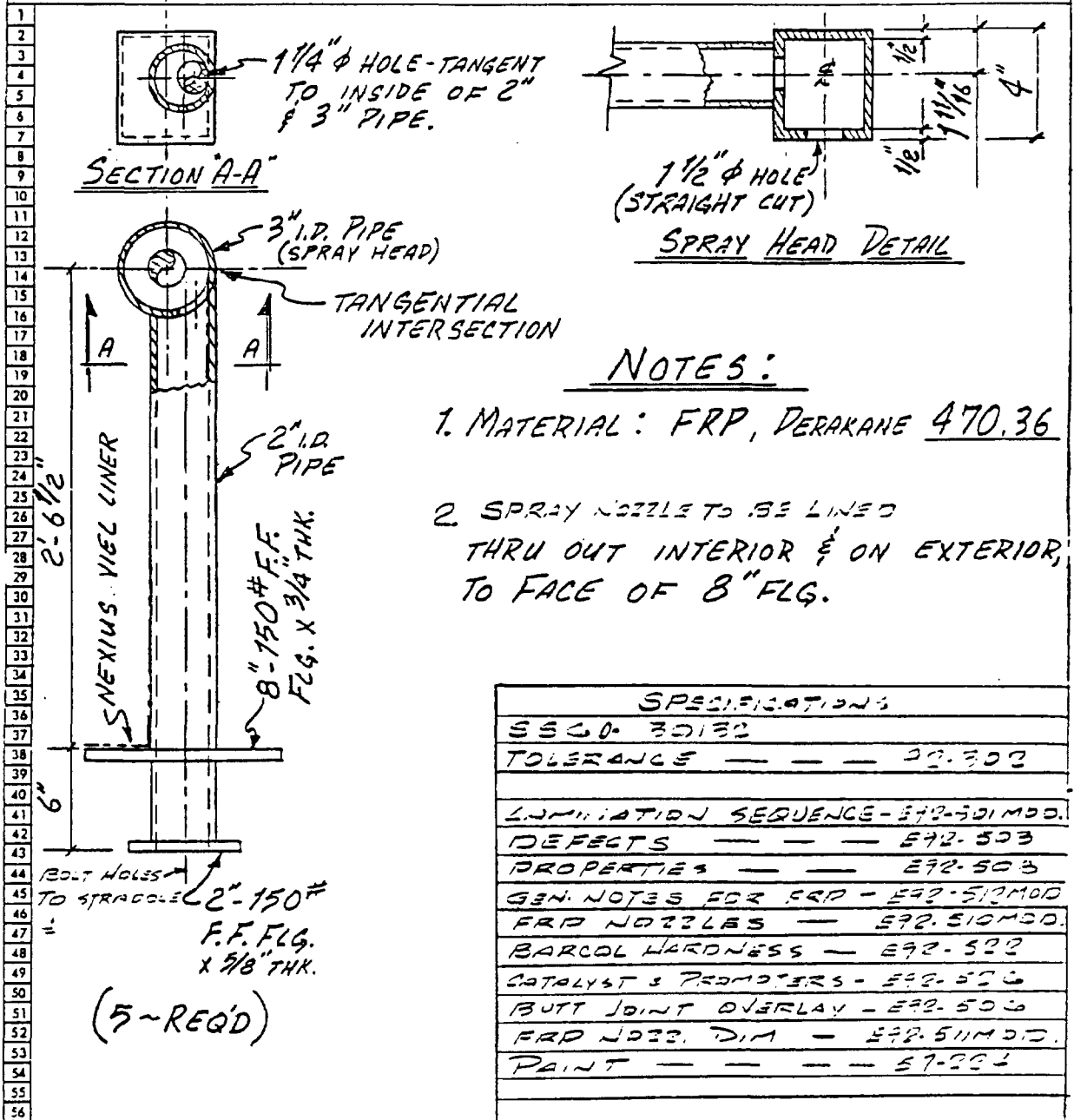
SPEC. BY ARM/SVD	THE DOW CHEMICAL COMPANY	SUP. NO. SP-108
CHECKED: MRP	SERVICE	"A-E" SPECIFICATIONS
APP'D: ARM	SPRAY NOZZLE T-108	
DATE: 2-13-80	REVISION DATE: 4/11/80	SPEC. NO. AF-43-30132
VENDOR TO COMPLETE ALL INFORMATION MARKED		SHEET 1 OF 1

254300 1/73

ST0409438

5112-30132 30132 5560B-30132 4/8/80 5112-30132 30132

PLANT DIRECT NEUTRALIZER 100	FILE/JOB NO.
LOCATION A-600	BLOG. NO.
MANUFACTURER	CHARGE NO. 30732
	B/M NO. 5560 30132
	P. O. NO.



SPEC. BY ARM/SVD	THE DOW CHEMICAL COMPANY	SP. NO. 109
CHECKED: 11/2	SERVICE	"A-E"
APP'D: A.M.	SPRAY NOZZLE@T-109	SPECIFICATIONS
DATE: 2-13-80	REVISION DATE: 6/11/80	SPEC. NO. A5-44-30132
VENDOR TO COMPLETE ALL INFORMATION MARKED		SHEET 1 OF 1

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SAC-3A132 10/6/80

5561B-3012 4/8/70

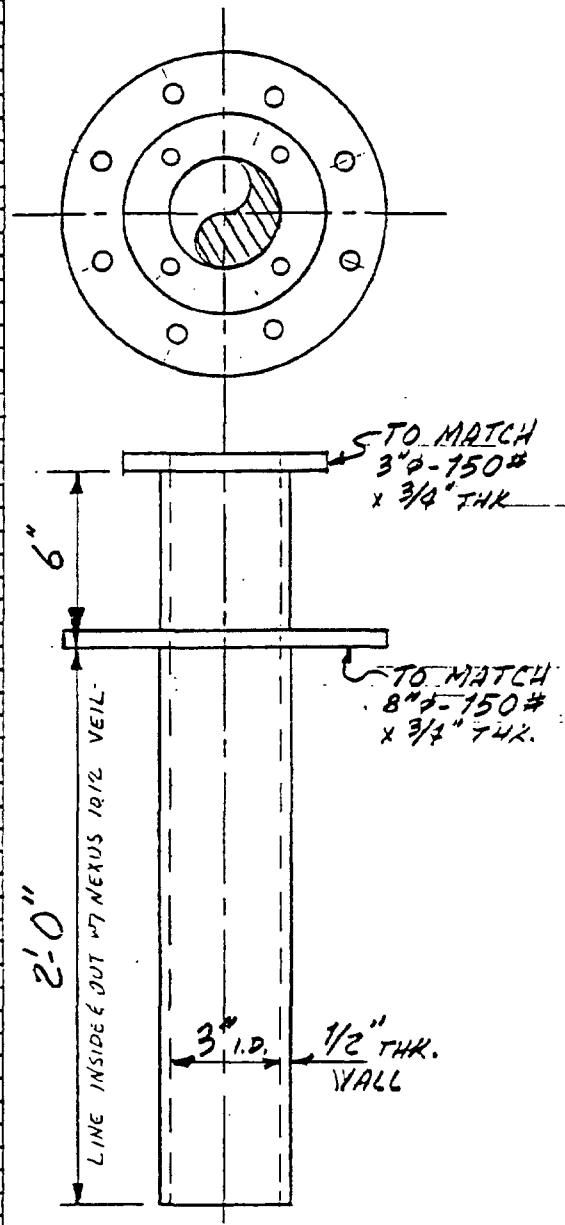
9500-4-30 (3) 2/2

S112-30132 10/80

S112-30132 const 12/81
S460R30132 10/80 S560-30132 10/80

PLANT DIRECT NEUTRALIZER-100	FILE/JOB NO.
LOCATION A-600	CHARGE NO. 30132
MANUFACTURER	B/M NO. S560-30132
BLDG. NO.	P. O. NO.
NO. UNITS	

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NOTES

MATERIAL : FRP
RESIN - DERAKANE 470.36
LINER : 2 LAYERS NEXUS
1012 VEIL
2 LAYERS CHOPPED
STRAND MATTING
USE BPO/DMA CURING SYSTEM
IN LINER ONLY.
USE MEKP-CON CURING SYSTEM
IN STRUCT. LAMINATE.

SPECIFICATIONS
S560-30132
TOLERANCE - - 92-302
LAMINATION SEQUENCE - E92-501MOD.
DEFECTS - - E92-503
PROPERTIES - - E92-503
GEN. NOTES FOR FRP - E92-512MOD
FRP NOZZLES - - E92-515MOD
BARCOL HARDNESS - E92-522
CATALYST & PROMOTERS - E92-523
BUTT JOINT OVERLAY - E92-506
FRP NOZZ. DIM. - E92-511MOD.
PAINT - - - - 57-224

SPEC. BY ARM/SVD		THE DOW CHEMICAL COMPANY		EQUIP. NO. I-107	
CHECKED: KLP		SERVICE		SPECIFICATIONS	
APP'D: A.P.M.		INJECTOR FOR T-107			
DATE: 3-12-80	REVISION DATE	A	B	C	
VENDOR TO COMPLETE ALL INFORMATION MARKED				SHEET 1 OF 1	
				SPEC. NO. A5-47-30132	

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254300 1/73

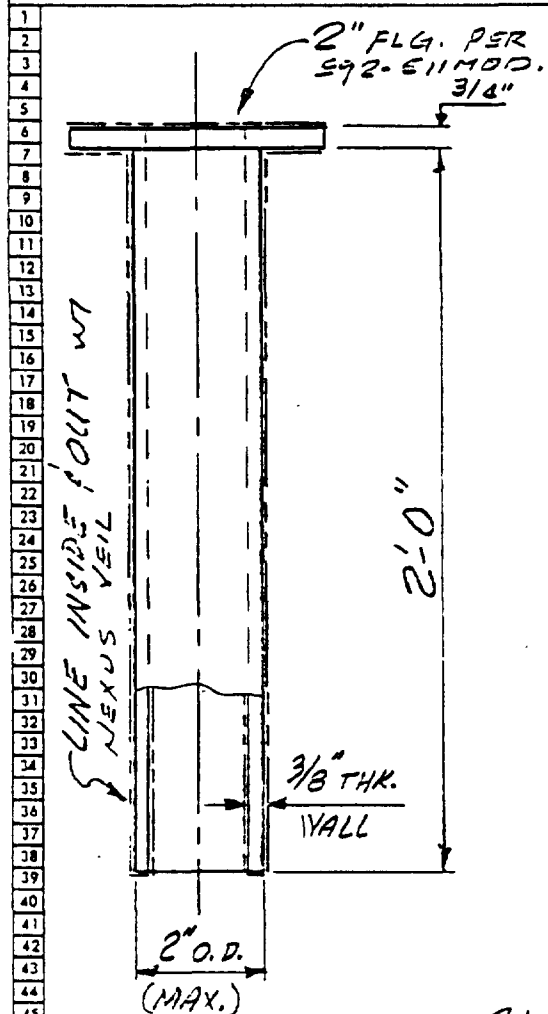
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ST0409442

S112-30132 1/2/80 S560B-30132 8/8/80 S560A-30132 5/8/80

S112-30132 (mat 12/1/80

PLANT DIRECT NEUTRALIZER	100	FILE/JOB NO.
LOCATION 3LK. A-6	BLDG. NO.	CHARGE NO. 30132
MANUFACTURER	NO. UNITS	B/M NO. S560-30132
		P. O. NO.



SPECIFICATIONS	
S560 30132	
TOLERANCE	--- 92-302
LAMINATION SEQUENCE	-E92-301 MOD.
DEFECTS	--- E92-503
PROPERTIES	--- E92-503
GEN. NOTES FOR FRP	-E92-511 MOD.
FRP NOZZLES	--- E92-510 MOD.
BARCEL HARDNESS	-E92-522
CATALYST & PROMOTERS	-E92-520
BUTT JOINT OVERLAY	-E92-520
FRP NOZZ. DIM.	-E92-511 MOD.
PAINT	--- 57-224

ST0409443

ALL MATERIAL TO BE
DERAKANE 470-36

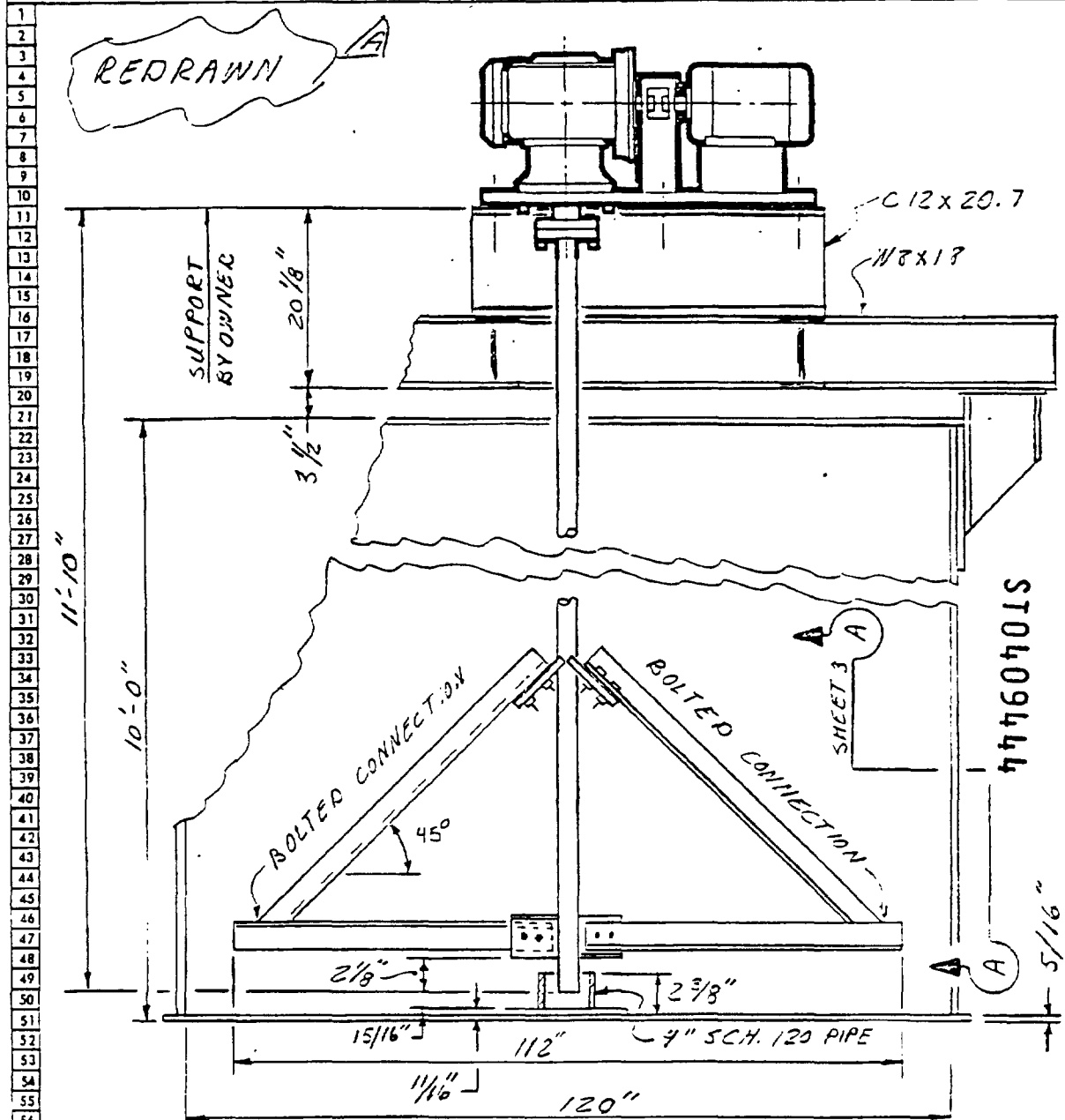
SPEC. BY SVD	THE DOW CHEMICAL COMPANY		EQUIP. NO. I-507
CHECKED: PPD	SERVICE		SPECIFICATIONS
APP'D: H. H. H.	INJECTOR		
DATE: 2-29-80	REVISION DATE	A 6/11/80	SPEC. NO. A5-54-30132
VENDOR TO COMPLETE ALL INFORMATION MARKED			SHEET 1 OF 1

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ST0409443

S112-30132 10-6-80 S501A-30132 7/20/80 S112-30132 CHART 17/1/80
 S112-30132 10-6-80 S501A-30132 7/20/80 S112-30132 7/13/80

PLANT DIRECT NEUTRALIZER 100	FILE/JOB NO.
LOCATION SLR. A-6	BLOG. NO.
MANUFACTURER	NO. UNITS ONE
	CHARGE NO. 50132
	B/M NO.
	P. O. NO.



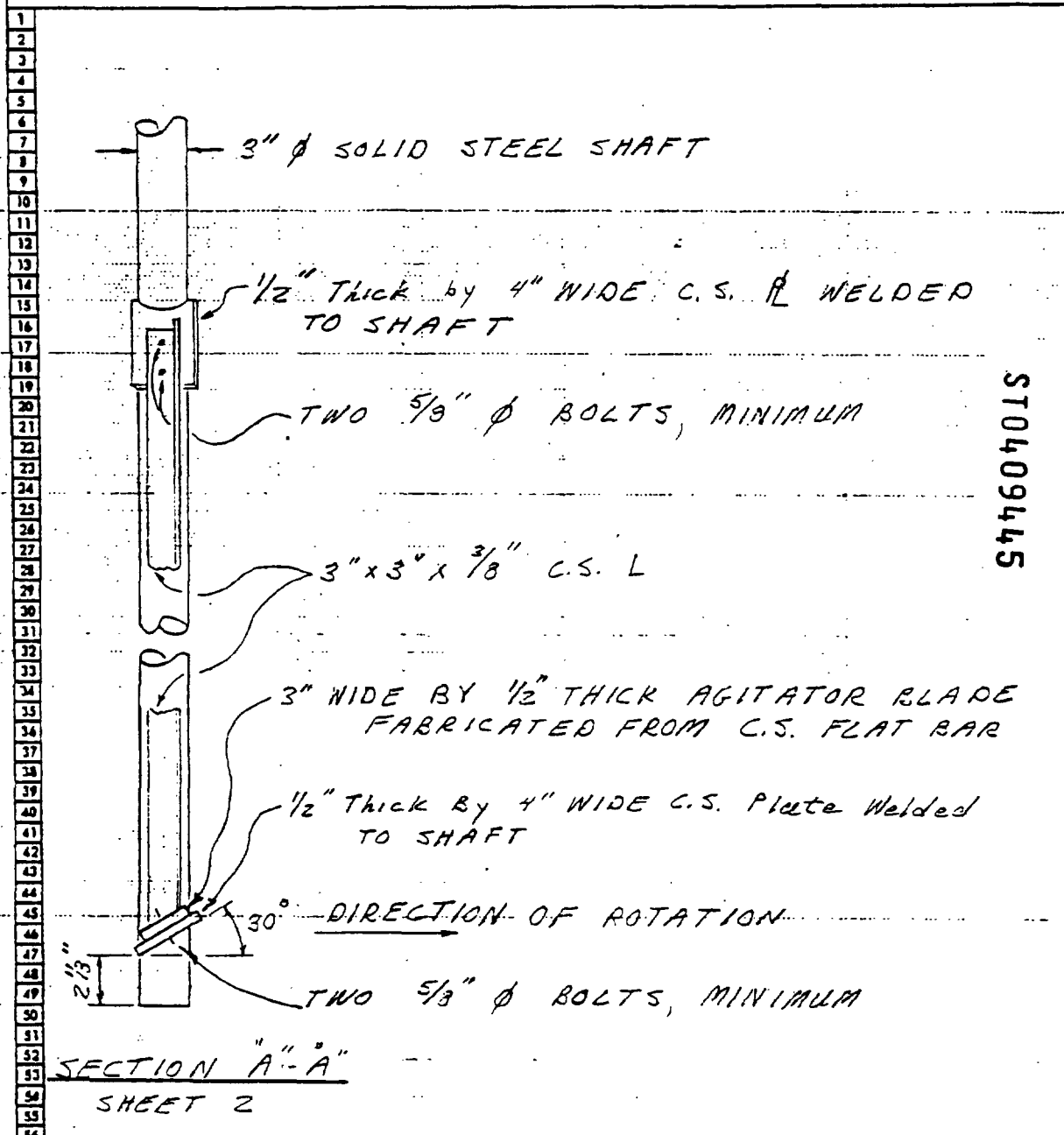
SPEC. BY S112	THE DOW CHEMICAL COMPANY	EQUIP. NO. A-101
CHECKED:	SERVICE	
APPROD: HAVIL	AGITATOR	FOR D-101
DATE: 2-29-80	REVISION DATE: 2/25/80	SPEC. NO. A5-57-30132
VENDOR TO COMPLETE ALL INFORMATION MARKED		SHEET 2 OF 3

25430D 1/73

ST0409444

5/12-30132 12/1/32 12/1/32 12/1/32
S112-30132 12/1/32 S112-30132 12/1/32

PLANT	DIRECT NEUTRALIZER 100		FILE/JOB NO.
LOCATION	BLOCK A-4	BLDG. NO.	CHARGE NO. T30132
MANUFACTURER		NO. UNITS ONE	B/M NO.
			P. O. NO.



ST0409445

SPEC. BY	DOW THE DOW CHEMICAL COMPANY		EQUIP. NO.
CHECKED	SERVICE		A-101
APP'D	AGITATOR FOR D-101		SPECIFICATIONS
DATE: 7/2/32	REVISION	DATE	SPEC. NO. A557-50132
VENDOR TO COMPLETE ALL INFORMATION MARKED			SHEET 3 OF 3

ELECTRICAL WIRE AND CABLE
POWER CABLE - 5000-VOLT

QUANTITY

2500 FT.

DESCRIPTION:

Single conductor, Class B stranded aluminum, semi-conducting strand shield, .090" ethylene-propylene insulation, semi-conducting tape, tinned copper shielding, separator tape, black PVC jacket. Service rating - 90°C, 5000 volts.

STANDARDS AND SPECIFICATIONS:

Latest Edition IPCEA Publications S-19-81

<u>Size</u>	<u>Stranding</u>	<u>Insulation Thickness Mils</u>	<u>Jacket Thickness Mils</u>	<u>Approx. O.D. Inches</u>
1250 mcm	91	90	110	1.89

MANUFACTURERS:

KAISER SPECIFICATION 362
SIMPLEX ANOROC XPR
ROME PS 1000-3

ST0409446

HMM:dew
6-9-80

T30132

S703-30132
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ST0409446

150 PSIG STEAM
150 PSIG 365F

ITEM	SIZE	DESCRIPTION
N-18		ALL CARBON STEEL NIPPLES USED FOR DRAINS AND VENTS SHALL BE MINIMUM SCH 80.
PIPE		
P-288	1/2 THRU 1 1/2	ASTM A-106 GR B, EX STRONG SEAMLESS STEEL PIPE.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTX-66	1/2 THRU 1 1/2	2000-LB THREADED FORGED STEEL FITTINGS, ASTM A-105, ANSI B16.11.
N-234		3000-LB FITTINGS MAY BE SUBSTITUTED FOR 2000-LB FITTINGS.
R-22	1/2 THRU 1 1/2	EX STRONG STEEL SWAGED NIPPLE, ASTM A-106 OR A-53 GR B, OR ASTM A-595 GR B OR C BARSTOCK, THREADED, REVELED, PLAIN, OR ANY COMBINATION OF ENDS.
U-2	1/2 THRU 1 1/2	3000-LB THREADED FORGED STEEL UNION, ASTM A-105, AAR DIMENSIONS, STEEL TO STEEL SEAT, PETRO AAR OR VOGT 1931.
PC-26	1/2 THRU 1 1/2	3000-LB THREADED FORGED STEEL CAP, ASTM A-105, ANSI B16.11.
BRANCH CONNECTIONS		
BC-2S		FOR THREADED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WHEN BRANCH IS SMALLER THAN HEADER, A NIPPLE AND REDUCING COUPLING OR SWAGED NIPPLE MAY BE USED.
JOINT COMPOUND		
JC-21		FEL PRO CS-A.

ST0409447

PIPING SPEC B
DATE 10- 2-80
PAGE 2 OF 2

ITEM	SIZE	DESCRIPTION
VALVES		
V-100	1/2 THRU 1 1/2	600-LB SCREWED BS/Y GATE VALVE. CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM WITH HARD-FACED SEAT RINGS. FULL PORT. BONNEY FORGE H101/F HANCOCK 971-S JENKINS 8888 LUNK 1311-W RP-C FC-56-DE SMITH 882-00000 TRIANGLE 8722V VOGT 13111
N-		TEST CLASS C. TEST PRESSURE 300 PSIG
N-100		INSTRUMENTATION
N-101		THE FOLLOWING SPECIFICATIONS ARE TO BE USED FOR INSTRUMENTATION. FOR ITEMS NOT LISTED, THE PRECEDING PIPING SPECIFICATION IS TO BE USED WHERE APPLICABLE.
INSTRUMENT ITEM		
IVCM-216		GAUGE MANIFOLD VALVE - CARBON STEEL BODY. TEFLON PACKING, 316 S.S. SEAT AND SPINDLE. 3/4" NPTM INLET PORT. 3-FA. 1/2" NPTF OUTLET PORTS. 4000 PSI AT 500F OR 6000 PSI AT 200F. ANDERSON-GREENWOOD #5VHC-46
IVGS-202		GAUGE SIPHON AND VALVE ASSEMBLY - CARBON STEEL VALVE BODY. STAINLESS STEEL VALVE STEM, VALVE SEAT, SIPHON BARREL AND SIPHON INSERT. ASPBESTOS VALVE PACKING. 6000 PSI AT 200F OR 1500 PSI AT 250F. 3/4" NPTM INLET AND 1/2" NPTF OUTLET PORTS. ANDERSON-GREENWOOD #7HC-46
IVGV-213		GAUGE VALVE AND VENT - CARBON STEEL BODY, STAINLESS STEEL STEM, OFLRIN SEAT, TEFLON SEAL. 3000 PSI AT 200F. 1/2" NPTM INLET PORT AND 1/2" NPTF OUTLET PORT WITH BLEED VALVE. ANDERSON-GREENWOOD #9310

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W.A.
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PIPING SPEC. B

T30132

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PIPING SPEC D
DATE 10- 2-80
PAGE 1 OF 4

AIR
100 PSIG-AMBIENT TEMP

ITEM	SIZE	DESCRIPTION
N-18		ALL CARBON STEEL NIPPLES USED FOR DRAINS AND VENTS SHALL BE MINIMUM SCH 80.
N-4		ALL EXTERIOR SURFACES OF FIELD WELDS AND ALL EXPOSED THREADS SHALL BE COATED WITH ZRC, SEALURE COMPANY, OR GALVANOX TYPE 1. SUPOX, INC. APPLICATION SHALL BE MADE AS SPECIFIED BY THE MANUFACTURER.
PIPE		
P-406	1/2 THRU 2	ASTM A-120, STD WEIGHT FURNACE BUTT WELD GALV STEEL PIPE.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTX-26	1/2 THRU 2	150-LB THREADED GALV MALLEABLE IRON FITTINGS. ASTM A-197. ANSI B16.3.
C-266	1/2 THRU 2	150-LB THREADED GALV MALLEABLE IRON LINE COUPLING. ASTM A-197. ANSI B16.3.
U-86	1/2 THRU 2	150-LB THREADED GALV MALLEABLE IRON UNION. ASTM A-197. BRASS SEAT.
BRANCH CONNECTIONS		
BC-2S		FOR THREADED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WHEN BRANCH IS SMALLER THAN HEADER, A NIPPLE AND REDUCING COUPLING OR SWAGED NIPPLE MAY BE USED.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
PC-5	1/2 THRU 2	EX-STRONG THREADED SEAMLESS STEEL BULL PLUG, ASTM A-196 OR A-53 GR B.

HWA

PIPING SPEC. D

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ITEM	SIZE	DESCRIPTION
JOINT COMPOUND		
JC-21		FEL PRO CS-A.
FLANGES		
F-19G-RF	1/2 THRU 2	150-LB GALV RAISED FACE THREADED FLANGE, ASTM A-105, ANSI B16.5.
FLANGE BOLTS		
B-A307B0	1/2 THRU 2	ASTM A-307 GR B HEAVY HEX OR SQUARE HEAD GALV MACHINE BOLTS WITH HEAVY HEX GALV NUTS.
GASKETS		
G-7A	1/2 THRU 2	STD FLAT RING PED RUBBER GASKET, 1/P INCH THICK, JM-107, GARLOCK 22, OR GOODRICH SBR-75.
VALVES		
V-40	1/2 THRU 2	150-LB SCREWED, INSIDE SCREW, RISING STEM GATE VALVE, ALL BRONZE, UNION BONNET, SPLIT WEDGE DISC. CRANE 435UB FAIRBANKS U-0229 HAMMOND IB631 JENKINS 64-U LUNK 3150 NIRCO T-135 POWELL 2714 STOCKHAM 8-121 WALWORTH 11 WALWORTH 12
N-		TEST: IN SERVICE
N-100		INSTRUMENTATION
N-101		THE FOLLOWING SPECIFICATIONS ARE TO BE USED FOR INSTRUMENTATION. FOR ITEMS NOT LISTED, THE PRECEDING PIPING SPECIFICATION IS TO BE USED WHERE APPLICABLE.
INSTRUMENT ITEM		
IPA-300		HOSE ASSEMBLY - HOSE BUNA-N INNER TUBE, REINFORCED FIBER BRAID WITH NEOPRENE COVER, -40F TO +200F WITH 1/4" I.D. AND 1/2" O.D.:

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18 10- 2-80

PIPING SPEC. D

T30132

ST0409450

PIPING SPEC P
DATE 10- 2-80
PAGE 3 OF 4

ITEM	SIZE	DESCRIPTION
		FITTINGS BRASS 1/4" NPT MALE RIGID CONNECTOR AND BRASS 1/4" NPT MALE SWIVEL CONNECTOR. BOTH FITTINGS PERMANENTLY CRIMPED TO HOSE. (SPECIFY LENGTH) WEATHERHEAD NO. 009J4H-104J04
IAF-300		AIR FILTER - 0.5 SCFM AT 75 PSIG AIR. BRASS BODY WITH LAMBS WOOL FILTER. NEOPRENE GASKET AND BRASS PETCOCK TYPE DRAIN VALVE. MAXIMUM PRESSURE 1000 PSI. 1/4" NPT CONNECTIONS. MOORE PRODUCTS CO. PART NO. 2376
IAR-700		AIR REGULATOR - 12.5 SCFM AT 100 PSIG AIR. ALUMINUM HOUSING. NITRILE DIAPHRAGM. WITH S.S. POST AND CAD PLATED STEEL SPRING. RANGE 5-35 PSIG. INLET AND OUTLET PORTS 1/4" NPTF. FURNISHED WITH TIRE TYPE VALVE. FISHER TYPE 67R-468

FITTINGS

E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER
C=COUPLING, S=STUR END, U=UNION, PC=PIPE CAP

ELTR-100A		BRASS SWAGelok TUBING FITTINGS. (FOR COPPER TUBING).
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PIPE

P-103		COPPER SINGLE TUBE WITH SHEATH, ASTM B-68 SOFT ANNEAL COPPER. 1/4 OD BY 0.031 WALL OR 3/8 OD BY 0.032 WALL. AS SPECIFIED. ASTM D-1047 EXTRUDED BLACK PVC SHEATH, 0.032 MINIMUM THICK. DEKORON, CRESCENT OR OKONITE.
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VALVES

V-665	1/2 THRU 1	500-LB SCREWED CARBON STEEL BALL VALVE. TEFLON SEATS AND SEALS. 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE. 1 1/4" AND OVER LEVER OPERATOR. APOLLO SATURN 93-100-15 APOLLO SATURN 93-100 HILLS MC C F602-CS-T-CS/SP-COP HILLS MC C 4502-CS-T-CS JAMESBURY 21-22-MT JENKINS B421 MARFAC CS-880TT-W MARFAC CS-880-TT NIRCO T-560-CS-Y-25
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ST0409451

H.A.
183 10- 2-80

PIPING SPEC. D

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ST0409451

PIPING SPEC D
DATE 10- 2-80
PAGE 4 OF 4

ITEM	SIZE	DESCRIPTION
		SMITH 411-TOV00
		SMITH 411-T000C

ST0409452

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10- 2-80

PIPING SPEC. D

T30132

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ST0409452

PIPING SPEC E
DATE 10- 2-80
PAGE 1 OF 2

POTABLE WATER
50 PSIG AMBIENT

ITEM	SIZE	DESCRIPTION
PIPE		
P-6G	1/2 THRU 1	ASTM A-53 OR API-5L, SCH 40 CONTINUOUS FURNACE BUTT WELD GALV STEEL PIPE.
P-7G	1 1/2 THRU 2	ASTM A-53 OR API-5L, SCH 40 CONTINUOUS FURNACE BUTT WELD GALV STEEL PIPE.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, Y=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTXR-2G	1/2 THRU 2	150-LB THREADED GALV MALLEABLE IRON FITTINGS, ASTM A-197, ANSI B16.3.
R-22G	1/2 THRU 2	EX STRONG GALV STEEL SWAGED NIPPLE, ASTM A-106 OR A-53 GR B, OR ASTM A-696 GR B OR C BARSTOCK, THREADED, BEVELED, PLAIN, OR ANY COMBINATION OF ENDS.
C-26G	1/2 THRU 2	150-LB THREADED GALV MALLEABLE IRON LINE COUPLING, ASTM A-197, ANSI B16.3.
PC-23G	1/2 THRU 2	150-LB THREADED GALV MALLEABLE IRON CAP, ASTM A-197, ANSI B16.3.
U-8G	1/2 THRU 2	150-LB THREADED GALV MALLEABLE IRON UNION, ASTM A-197, BRASS SEAT.
N-4		ALL EXTERIOR SURFACES OF FIELD WELDS AND ALL EXPOSED THREADS SHALL BE COATED WITH ZRC, SEALURE COMPANY, OR GALVANOX TYPE 1. SUPOX, INC. APPLICATION SHALL BE MADE AS SPECIFIED BY THE MANUFACTURER.
BRANCH CONNECTIONS		
BC-2S		FOR THREADED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WHEN BRANCH IS SMALLER THAN HEADER, A NIPPLE AND REDUCING COUPLING OR SWAGED NIPPLE MAY BE USED.

ST0409453

PIPING SPEC E
DATE 10- 2-80
PAGE 2 OF 2

ITEM	SIZE	DESCRIPTION
JOINT COMPOUND		
JC-15		TEFLON TAPE 1/2 INCH BY 3 MIL THICKNESS.
FLANGES		
F-19G-RF	1/2 THRU 2	150-LB GALV RAISED FACE THREADED FLANGE. ASTM A-105, ANSI B16.5.
F-3G-RF	1/2 THRU 2	150-LB GALV RAISED FACE BLIND FLANGE, ASTM A-105, ANSI B16.5.
FLANGE BOLTS		
B-A307B6	1/2 THRU 2	ASTM A-307 GR B HEAVY HEX OR SQUARE HEAD GALV MACHINE BOLTS WITH HEAVY HEX GALV NUTS.
GASKETS		
G-7A	1/2 THRU 2	STD FLAT RING RED RUBBER GASKET, 1/4 INCH THICK, JM-107, GARLOCK 22, OR GOODRICH SPR-75,
VALVES		
V-40	1/2 THRU 2	150-LB SCREWED, INSIDE SCREW, RISING STEM GATE VALVE. ALL BRONZE, UNION BONNET, SPLIT WEDGE DISC. CRANE 435UR FAIRBANKS U-9229 HAMMOND IB631 JENKINS 64-U LUNK 3150 NIPCO T-135 POWELL 2714 STOCKHAM B-121 WALWORTH 11 WALWORTH 12
N-		TEST CLASS L, TEST PRESSURE 75 PSIG

ST0409454

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PIPING SPEC. E

T30132

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ST0409454

PIPING SPEC F
DATE 10-3-80
PAGE 1 OF 2

FUEL GAS
75 PSIG AT 80F

ITEM	SIZE	DESCRIPTION
PIPE		
P-2RB	1/4 THRU 1 1/2	ASTM A-106 GR B. EX STRONG SEAMLESS STEEL PIPE.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTX-46	1/4 THRU 1 1/2	3000-LR THREADED GALV MALLEABLE IRON FITTINGS, ASTM A-197, ANSI B16.3.
R-22G	1/2 THRU 1 1/2	EX STRONG GALV STEEL SWAGED NIPPLE, ASTM A-106 OR A-53 GR B, OR ASTM A-696 GR B OR C BARSTOCK, THREADED, BEVELED, PLAIN, OR ANY COMBINATION OF ENDS.
C-3G	1/4 THRU 1 1/2	3000-LR THREADED GALV FORGED STEEL COUPLING, ANSI B16.11, OR 3000-LR GALV THRODLET, ASTM A-105, FOR WELDING IN.
U-2G	1/4 THRU 1 1/2	3000-LR THREADED GALV FORGED STEEL UNION, ASTM A-105, AAR DIMENSIONS, STEEL TO STEEL SEAT, PETRO AAR OR VOGT 1931.
PC-2G	1/4 THRU 1 1/2	THREADED SOLID GALV STEEL HEX HEAD PLUG, ASTM A-105, ANSI B16.11.
PC-2S	1/4 THRU 1 1/2	FOR THREADED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WHEN BRANCH IS SMALLER THAN HEADER, A NIPPLE AND REDUCING COUPLING OR SWAGED NIPPLE MAY BE USED.
JOINT COMPOUND		
JC-15		TEFLON TAPE 1/2 INCH BY 3 MIL THICKNESS.
VALVES		
V-87	1/4 THRU 1 1/2	300-LR SCREWED CARBON STEEL, LUBRICATED, PLUG VALVE WITH TAPERED PLUG, FRENCH OPERATED. NORD 2024

HA

PIPING SPEC. F

TE1132

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ST0409455

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PIPING SPEC F
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ITEM	SIZE	DESCRIPTION
		WALWORTH 1760
N-		TEST CLASS C, TEST PRESSURE 150 PSIG
V-519	1/4 THRU 1 1/2	800-LB SCREWED, INSIDE SCREW, SOLID WEDGE GATE VALVE, CARBON STEEL BODY, 13 CHROME ALLOY STEEL TRIM, UNION BONNET, JENKINS 8P20 SMITH 820-00000 VOGT 5-9A51
N-100		INSTRUMENTATION
N-101		THE FOLLOWING SPECIFICATIONS ARE TO BE USED FOR INSTRUMENTATION. FOR ITEMS NOT LISTED, THE PRECEDING PIPING SPECIFICATION IS TO BE USED WHERE APPLICABLE.
INSTRUMENT ITEM		
IVGM-216		GAUGE MANIFOLD VALVE - CARBON STEEL BODY, TEFLON PACKING, 316 S.S. SEAT AND SPINDLE, 3/4" NPTM INLET PORT, 3-EA. 1/2" NPTF OUTLET PORTS, 4000 PSI AT 500F OR 6000 PSI AT 200F. ANDERSON-GREENWOOD M5VHC-46
IVGV-213		GAUGE VALVE AND VENT - CARBON STEEL BODY, STAINLESS STEEL STEM, OFLPIN SEAT, TEFLON SEAL, 3000 PSI AT 200F, 1/2" NPTM INLET PORT AND 1/2" NPTF OUTLET PORT WITH BLEED VALVE. ANDERSON-GREENWOOD M931C

ST0409456

PIPING SPEC. C
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PROCESS WATER
70 PSIG AMBIENT

ITEM	SIZE	DESCRIPTION
PIPE		
P-28B	1/4 THRU 1	ASTM A-106 GR B, EX STRONG SEAMLESS STEEL PIPE.
P-27B	1 1/2	ASTM A-106 GR B, STD WEIGHT SEAMLESS STEEL PIPE.
P-38W	2 THRU 4	ASTM A-53 OR API-5L GR B, STD WEIGHT SEAMLESS OR ELEC WELD STEEL PIPE.
N-1		ALL 1/2" NPT NIPPLES USED FOR INSTRUMENT, AND TEST CONNECTIONS SHALL BE HEAVY HEX RAP STOCK WITH A MINIMUM WALL THICKNESS OF 0.151 INCH, (0.400 I.D.).

FITTINGS

E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER
C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP

ELTXR-4G	1/4 THRU 2	300-LB THREADED GALV MALLEABLE IRON FITTINGS, ASTM A-197, ANSI B16.3. (NOTE- 1000-LB DI NOT AVAIL.)
C-3G	1/4 THRU 2	3000-LB THREADED GALV FORGED STEEL COUPLING, ANSI B16.11, OR 3000-LB GALV THREDOLET, ASTM A-105, FOR WELDING IN.
PC-16C	1/4 THRU 2	300-LB THREADED GALV MALLEABLE IRON CAP, ASTM A-197, ANSI B16.3.
PC-2G	1/4 THRU 2	THREADED SOLID GALV STEEL HEX HEAD PLUG, ASTM A-195, ANSI B16.11.
R-22G	1/4 THRU 2	EX STRONG GALV STEEL SWAGED NIPPLE, ASTM A-106 OR A-53 GR B, OR ASTM A-696 GR B OR C BARSTOCK, THREADED, BEVELED, PLAIN, OR ANY COMBINATION OF ENDS.
U-2C	1/4 THRU 2	3000-LB THREADED GALV FORGED STEEL UNION, ASTM A-105, AAR DIMENSIONS, STEEL TO STEEL SEAT, PETRO AAR OR VOGT 1931.

ST0409457

MVA

PIPING SPEC. C

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ITEM	SIZE	DESCRIPTION
ELTR-15B	3 THRU 4	STD WEIGHT SEAMLESS STEEL WELDING FITTINGS, ASTM A-234 GR WPR, ANSI B16.9.
FLANGES		
F-19-RF	1/2 THRU 2	150-LB RAISED FACE THREADED FLANGE, ASTM A-105, ANSI B16.5.
F-1-RF	4	150-LB RAISED FACE SLIP-ON FLANGE, ASTM A-105, ANSI B16.5.
F-3-RF	1/2 THRU 4	150-LB RAISED FACE BLIND FLANGE, ASTM A-105, ANSI B16.5.
BRANCH CONNECTIONS		
BC-2S		FOR THREADED PIPING, USE STRAIGHT SIZE OR REDUCING TEE. WHEN BRANCH IS SMALLER THAN HEADER, A NIPPLE AND REDUCING COUPLING OR SWAGED NIPPLE MAY BE USED.
BC-16W		FOR WELDED PIPING, BRANCH LINES SHALL BE WELDED IN WITHOUT REINFORCEMENT REGARDLESS OF SIZE COMBINATION. FOR THREADED BRANCH CONNECTION, USE 3000-LB FULL COUPLING, THREDOLET, OR NIPPLET WELDED TO HEADER.
GASKETS		
G-9A		STD FLAT RING GASKET, 1/8 INCH THICK ASBESTOS WITH SILICON RELEASING AGENT, JM-60, GARLOCK 7021 OR NIPPLET 225 OR 245.
JOINT COMPOUND		
JC-15		TEFLON TAPE 1/2 INCH BY 3 MIL THICKNESS.
FLANGE BOLTS		
B-A307B6		ASTM A-307 GR B HEAVY HEX OR SQUARE HEAD GALV MACHINE BOLTS WITH HEAVY HEX GALV NUTS.
BOLT LUBRICANT		
BL-1A		ARMITE LEO-PLATE 250.
VALVES		
V-40	1/4 THRU 2	150-LB SCREWED, INSIDE SCREW, RISING STEM GATE VALVE, ALL BRONZE, UNION CONNECTION, SPLIT

H/A

PIPING SPEC. G

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ITEM	SIZE	DESCRIPTION
		WEDGE DISC. CRANE 4350B FAIRBANKS U-0228 HAMMOND 18631 JENKINS 64-U LUNK 3150 NIRCO T-135 POWELL 2714 STOCKHAM R-121 WALWORTH 11 WALWORTH 12
V-1	3 THRU 4	125-LB FLANGED OS/Y GATE VALVE. I28M. CRANE 465-1/2 FAIRBANKS C405 HAMMOND IR-1140 JENKINS 651-A KENNEDY 6020 LUNK 1430 POWELL 1793 NIRCO F-617-2 STOCKHAM G-623 WALWORTH 726F
N-		TEST CLASS L. TEST PRESSURE 100 PSIG
N-100		INSTRUMENTATION
N-101		THE FOLLOWING SPECIFICATIONS ARE TO BE USED FOR INSTRUMENTATION. FOR ITEMS NOT LISTED, THE PRECEDING PIPING SPECIFICATION IS TO BE USED WHERE APPLICABLE.
INSTRUMENT ITEM		
ITF-200		ALL TUBE FITTINGS SHALL BE STEEL FITTINGS AS MANUFACTURED BY SWAGELOK.
ITCM-230		TUBE CONNECTOR MALE - STEEL 3/8 OD BY 1/8, 1/4, 3/8, 1/2 OR 3/4 NPT MALE. AS SPECIFIED. SWAGELOK TYPE S-600-1
ITCM-221X		TUBE CONNECTOR MALE-STEEL 1/4 OD BY 1/8, 1/4, 3/8 OR 1/2 NPT MALE AS SPECIFIED
ITCM-232		TUBE CONNECTOR MALE ELBOW - STEEL 3/8 OD BY 1/8, 1/4, 3/8 OR 1/2 NPT MALE, AS SPECIFIED. SWAGELOK TYPE S-600-2
ITCM-222		TUBE CONNECTOR MALE ELBOW - STEEL 1/4 OD BY

ITEM	SIZE	DESCRIPTION
		1/8, 1/4, 3/8 OR 1/2 NPT MALE, AS SPECIFIED. SWAGelok TYPE S-400-2
ITU-230		TUBE UNION - STEEL 3/8 OD. SWAGelok S-600-6
ITU-220		TUBE UNION - STEEL 1/4 OD. SWAGelok S-400-6
NOTE		ALL PROCESS TUBING SHALL BE CARBON STEEL.
IVXM-211		TRANSMITTER MANIFOLD - 3-VALVE, 1/2" NPT FEMALE INLET AND OUTLET PORTS, 1500-LB., 850F, CARBON STEEL BODY WITH 303 STAINLESS STEEL STEM AND ASBESTOS PACKING. ANDERSON-GREENWOOD M1HC-4
IHA-300		HOSE ASSEMBLY - HOSE BUNA-N INNER TUBE, REINFORCED FIBER BRAID WITH NEOPRENE COVER, -40F TO +200F WITH 1/4" I.D. AND 1/2" O.D.; FITTINGS BRASS 1/4" NPT MALE, RIGID CONNECTOR AND BRASS 1/4" NPT MALE SWIVEL CONNECTOR, BOTH FITTINGS PERMANENTLY CRIMPED TO HOSE. (SPECIFY LENGTH) WEATHERHEAD NO. 00P04H-104J04
VALVES		
V-665	1/2 THRU 1	500-LB SCREWED CARBON STEEL BALL VALVE, TEFLON SEATS AND SEALS. 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE, 1 1/4" AND OVER LEVER OPERATOR. APOLLO SATURN 93-100-15 APOLLO SATURN 93-100 HILLS MC C F602-CS-T-CS/SP-008 HILLS MC C M502-CS-T-CS JAMESBURY 21-22-MT JENKINS 8421 MARPAC CS-880TT-W MARPAC CS-880-TT NIRCO T-560-CS-Y-25 SMITH 411-TGV00 SMITH 411-T0000
INSTRUMENT ITEM		
IBPF-500		BY-PASS KIT - CONSISTING OF 316 STAINLESS STEEL 1/4" WHITEY GLOBE VALVE, SWAGelok CONNECTOR AND CAJON M/F ADAPTERS: WITH 1/4" OD MONEL TUBING FORMED TO MATCH FCBPDC TYPE O/P CELL WITH MOUNTING BRACKET. SPATRIA VALVE AND FITTING CO. MODEL SS-1VBP-4A

ST0409460

4.4A

PIPING SPEC. G

T30132

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ST0409460

MAG, HYDRATE
20 PSIG AMBIENT

ITEM	SIZE	DESCRIPTION
PIPE		
P-28R	1 THRU 1 1/2	ASTM A-106 GR B, EX STRONG SEAMLESS STEEL PIPE.
P-38W	2 THRU 6	ASTM A-53 OR API-5L GR B, STD WEIGHT SEAMLESS OR ELEC WELD STEEL PIPE.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
C-3G	1 THRU 1 1/2	3000-LB THREADED GALV FORGED STEEL COUPLING, ANSI B16.11, OR 3000-LB GALV THREDOLET, ASTM A-105, FOR WELDING IN.
ELTXR-66G	1 THRU 1 1/2	2000-LB THREADED GALV FORGED STEEL FITTINGS, ASTM A-105, ANSI B16.11.
ELTR-15B	2 THRU 6	STD WEIGHT SEAMLESS STEEL WELDING FITTINGS, ASTM A-234 GR WPP, ANSI B16.9.
N-1		ALL 1/2 NPT NIPPLES USED FOR INSTRUMENT, AND TEST CONNECTIONS SHALL BE HEAVY HEX BAR STOCK WITH A MINIMUM WALL THICKNESS OF 0.151 INCH. (0.400 I.D.).
FLANGES		
F-24-RF	1 THRU 6	150-LB RAISED FACE WELDING NECK FLANGE, ASTM A-105, ANSI B16.5, SORE TO MATCH WELDING FITTINGS.
F-3-RF	1 THRU 6	150-LB RAISED FACE BLIND FLANGE, ASTM A-105, ANSI B16.5.
BRANCH CONNECTIONS		
BC-16		FOR WELDED PIPING, BRANCH LINES SHALL BE WELDED IN WITHOUT REINFORCEMENT REGARDLESS OF SIZE COMBINATION. FOR THREADED BRANCH CONNECTION, USE 3000-LB FULL COUPLING, THREDOLET, OR NIPOLET WELDED TO HEADER.

H-2A

PIPING SPEC. H

730132

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ITEM	SIZE	DESCRIPTION
BASKETS		
G-9A		STD FLAT RING GASKET, 1/8 INCH THICK ASBESTOS WITH SILICON RELEASING AGENT. JM-60, GARLOCK 7021 OR NICOLET 225 OR 245.
FLANGE BOLTS		
B-A3078G		ASTM A-307 GR B HEAVY HEX OR SQUARE HEAD GALV MACHINE BOLTS WITH HEAVY HEX GALV NUTS.
BOLT LUBRICANT		
BL-1A		ARMITE LEO-PLATE 250.
VALVES		
V-737B	1 THRU 2	150-LB FLANGED STEEL BALL VALVE WITH 316 STAINLESS STEEL BALL, TFFLON SEATS AND SEALS, 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE, 1 1/4" AND OVER LEVER OPERATOR. CONTRO C-1166-BC CRANE 941TRE-SP-36 HILLS MC C S151-CS-T-S6 HILLS MC C F151-CS-T-S6 JAYEBURY S150-31-2236-TT KTM E0862-32-TT-15-L LUNK 713LT MARPAC CS-8470-12-TT-W MARPAC CS-8470-12-TT MARPAC CS-400-12-TT SMITH 415-TRV00 SMITH 415-TR000 WKM B100-CS-02-S1 WKM B102-CS-02-S1
V-40	1/2 THRU 1 1/2	150-LB SCREWED, INSIDE SCREW, RISING STEM GATE VALVE, ALL BRONZE, UNION BONNET, SPLIT WEDGE DISC. CRANE 435UR FAIRBANKS U-022P HAMMOND 18631 JENKINS 64-U LUNK 3150 NISCO T-135 POWELL 2714 STOCKHAM B-121 WALWORTH 11 WALWORTH 12

ST0409462

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ITEM	SIZE	DESCRIPTION
V-1	2 THRU 4	125-LB FLANGED OS/Y GATE VALVE, IRRM. CRANE 465-1/2 FAIRBANKS 0405 HAMMOND IR-1140 JENKINS 651-A KENNEDY 6020 LUNK 1430 POWELL 1793 NISCO F-617-0 STOCKHAM G-623 WALWORTH 726F TEST: IN SERVICE

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PIPING SPEC. H

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PIPING SPEC J
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PROCESS-DRY
25 PSIG 200F

ITEM	SIZE	DESCRIPTION
N-1		ALL 1/2 NPT NIPPLES USED FOR INSTRUMENT, AND TEST CONNECTIONS SHALL BE HEAVY HEX BAR STOCK WITH A MINIMUM WALL THICKNESS OF 0.151 INCH, (0.400 I.D.).
N-8		NO THREADED FITTINGS PERMITTED UNLESS ISOLATED FROM PROCESS BY WELDED OR FLANGED VALVE
N-213		PIPING SHALL BE INSTALLED IN ACCORDANCE WITH ENGR SPEC 47-110.
PIPE		
P-28	1/2 THRU 2	ASTM A-106 GR A OR B, EX STRONG SEAMLESS STEEL PIPE.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTXR-16	1/2 THRU 2	EX STRONG SEAMLESS STEEL WELDING FITTINGS, ASTM A-234 GR WPA OR WPF, ANSI B16.9.
FLANGES		
F-1-RF	1/2 THRU 2	150-LB RAISED FACE SLIP-ON FLANGE, ASTM A-105, ANSI B16.5.
F-24-RF	1/2 THRU 2	150-LB RAISED FACE WELDING NECK FLANGE, ASTM A-105, ANSI B16.5, BORE TO MATCH WELDING FITTINGS.
F-3-RF	1/2 THRU 2	150-LB FLAT FACE BLIND FLANGE, ASTM A-105, ANSI B16.5.
BRANCH CONNECTIONS		
BC-154	1/2 THRU 2	FOR WELDED PIPING, BRANCH LINES SHALL BE WELDED IN WITHOUT REINFORCEMENT REGARDLESS OF SIZE COMBINATION.

HVA

PIPING SPEC. J

730132

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ST0409464

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ITEM	SIZE	DESCRIPTION
GASKETS		
G-4		STD FLAT RING GASKET. 1/16 INCH THICK ASBESTOS, GARLOCK 900.
FLANGE BOLTS		
B-A307B6		ASTM A-307 GR B HEAVY HEX OR SQUARE HEAD GALV MACHINE BOLTS WITH HEAVY HEX GALV NUTS.
BOLT LUBRICANT		
BL-1A		ARMITE LEO-PLATE 250.
VALVES		
V-667	1/2 THRU 2	150-LB FLANGED DUCTILE IRON BALL VALVE. TEFLON SEATS AND SEALS. 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE. 1 1/4" AND OVER LEVER OPERATOR. CONTRO C-1166-EE HILLS MC C S151-DI-T JAMESBURY 5150-11-2100-TT LUNK 715 T MARPAQ DI-400-TT SMITH 415-T0V00 SMITH 415-T0000 WKM R100-DC-02 WKM B102-DC-02
N-BOLTS		ALL VALVES SHALL HAVE A-193 GR B7 STEEL BODY-BONNET BOLTING-NO STAINLESS IS ALLOWED
N-		WELDING: WELDING TO BE PER DOW SPEC. T96-901. WELDING PROCESS TO BE TUNGSTEN INERT GAS. FILLER METAL 1/2 PER CENT MOLY.
N-		TEST: BY OWNER
N-100		INSTRUMENTATION
N-101		THE FOLLOWING SPECIFICATIONS ARE TO BE USED FOR INSTRUMENTATION. FOR ITEMS NOT LISTED. THE PRECEDING PIPING SPECIFICATION IS TO BE USED WHERE APPLICABLE.
INSTRUMENT ITEM		
ITF-200		ALL TUBE FITTINGS SHALL BE STEEL FITTINGS

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ITEM	SIZE	DESCRIPTION
		AS MANUFACTURED BY SWAGELOK.
IVGV-213		GAUGE VALVE AND VENT - CARBON STEEL BODY, STAINLESS STEEL STEM, DELRIN SEAT, TEFLON SEAL, 3000 PSI AT 200F, 1/2" NPTM INLET PORT AND 1/2" NPTF OUTLET PORT WITH BLEED VALVE. ANDERSON-GREENWOOD M9310
NOTE		ALL PROCESS TUBING TO BE CARBON STEEL
IBST-501		RUG SCREEN - 316 STAINLESS STEEL 1/4 OD TUBE CONNECTOR WITH 40 MESH SCREEN WIRE AND RETAINING RING. SWAGELOK SS-400-C(ND)
VALVES		
V-700A		3000-LB 316 STAINLESS NEEDLE VALVE, TEFLON PACKING, 1/4 INCH SWAGELOK ENDS. WHITEY SS1VS4-316

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PIPING SPEC. J

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PROCESS-WET
100 PSIG, 120F

ITEM	SIZE	DESCRIPTION
PIPE		
P-206	1/2 THRU 2	SCH 80 SOLID KYNAR PIPE. RESISTOFLEX.(NOTE-2" MAX SIZE SOLID KYNAR AVAIL.)
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTR-212	1/2 THRU 2	THREADED SOLID KYNAR FITTINGS. RESISTOFLEX.(NOTE-2" MAX SIZE SOLID KYNAR AVAIL.)
PC-32	1/2 THRU 2	THREADED SOLID KYNAR CAP. RESISTOFLEX.(NOTE-2" MAX SIZE SOLID KYNAR AVAIL.)
FLANGES		
F-103	1/2 THRU 2	150-LB SOLID KYNAR THREADED FLANGE, DRILLING TO MATCH ANSI B16.5, RESISTOFLEX.(NOTE-2" MAX SIZE SOLID KYNAR AVAIL.)
N-		TEST: IN SERVICE

ST0409467

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PIPING SPEC. L

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ST0409467

SEA WATER-DRAIN
5 PSIG 75C

ITEM	SIZE	DESCRIPTION
N-		1. ALL PIPE AND FITTINGS SHALL BE HAND LAID-UP FRP (NO PROPRIETARY PIPE OR FITTINGS ALLOWED.) 2. LINER CONSTRUCTION SHALL BE: TWO LAYERS CHOPPED STRAND MAT ONE LAYER 10-20 MIL NEXUS 1012. 3. PIPE AND FITTING WALL THICKNESS SHALL BE 3/8 INCH MIN. 4. DOW TEXAS DIVISION ENGINEERING STDS. 54-100 AND 54-104 SHALL APPLY EXCEPT AS NOTED ABOVE.
PIPE		
F-214N	8 THRU 12	DEPAKANE (R) 411-45 FIBERGLASS REINFORCED VINYL ESTER RESIN PIPE WITH NEXUS 1012 LINER. PIPE SHALL BE NOMINAL 10 SIZE.
FITTINGS		
F=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTR-233	8 THRU 12	DERAKANE (R) 411-45 FIBERGLASS REINFORCED VINYL ESTER RESIN BUTT JOINT FITTINGS WITH LINER SAME AS PIPE. WALL THICKNESS TO MATCH PIPE. FITTINGS SHALL BE SPECIALLY FABRICATED TO THE SAME SPECIFICATIONS AS PIPE.
FLANGES		
F-115	8 THRU 12	DERAKANE (R) 411-45 FIBERGLASS REINFORCED VINYL ESTER RESIN BUTT JOINT FLANGE WITH LINER SAME AS PIPE. FLANGE OD AND DRILLING TO MATCH 125-LP ANSI F16.1.
F-115R	8 THRU 12	150-LP FRP VIN EST RESIN REDUCING WN FLANGE.
GASKETS		
G-7AF	8 THRU 12	FULL FACE RED RUBBER GASKET, 1/16 INCH THICK, JN-107, GARLOCK 22, OR GOODRICH SPR-75.

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PIPING SPEC. N

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ITEM	SIZE	DESCRIPTION
FLANGE BOLTS		
B-A307BG	1/2" THRU 12"	ASTM A-307 GR. B HEAVY HEX OR SQUARE HEAD GALV MACHINE BOLTS WITH HEAVY HEX GALV NUTS.
BOLT LUBRICANT		
BL-2		FEL PRO CS-A.
N-231		APPLY BOLT LUBRICANT TO THE FULL LENGTH OF THREADS.
N-		TEST: IN SERVICE

ST0409469

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10- 2-80

PIPING SPEC. N

T30132

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ST0409469

MAG. HYDRATE
70 PSIG AMBIENT

ITEM	SIZE	DESCRIPTION
PIPE		
P-288	1/4 THRU 1 1/2	ASTM A-106 GR B, EX STRONG SEAMLESS STEEL PIPE.
P-38W	2 THRU 4	ASTM A-53 OR API-5L GR B, STD WEIGHT SEAMLESS OR ELEC WELD STEEL PIPE.
FITTINGS		
E=90 DEG ELL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTXR-66G	1/4 THRU 1 1/2	2000-LB THREADED GALV FORGED STEEL FITTINGS, ASTM A-105, ANSI B16.11.
ELTR-15B	2 THRU 4	STD WEIGHT SEAMLESS STEEL WELDING FITTINGS, ASTM A-234 GR WPB, ANSI B16.9.
C-3G		3000-LB THREADED GALV FORGED STEEL COUPLING, ANSI B16.11, OR 3000-LB GALV THREDOLET, ASTM A-105, FOR WELDING IN.
N-1		ALL 1/2 NPT NIPPLES USED FOR INSTRUMENT AND TEST CONNECTIONS SHALL BE HEAVY WY BAR STOCK WITH A MINIMUM WALL THICKNESS OF 0.151 INCH, (0.400 I.D.).
FLANGES		
F-24-RF	2 THRU 4	150-LB RAISED FACE WELDING NECK FLANGE, ASTM A-105, ANSI B16.5, BORE TO MATCH WELDING FITTINGS.
F-3-RF	2 THRU 4	150-LB RAISED FACE BLIND FLANGE, ASTM A-105, ANSI B16.5.
GASKETS		
G-9A		STD FLAT RING GASKET, 1/8 INCH THICK ASBESTOS WITH SILICON RELEASING AGENT, JM-60, GARLOCK 7021 OR NICOLET 225 OR 245.

ST0409470

H.A

PIPING SPEC. P

T30132

10-2-80

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ITEM	SIZE	DESCRIPTION
FLANGE BOLTS		
B-A307BG		ASTM A-307 GR B HEAVY HEX OR SQUARE HEAD GALV MACHINE BOLTS WITH HEAVY HEX GALV NUTS.
N-231		APPLY BOLT LUBRICANT TO THE FULL LENGTH OF THREADS.
VALVES		
V-667	1/2 THRU 3	150-LB FLANGED DUCTILE IRON BALL VALVE, TEFLON SEATS AND SEALS. 1" AND UNDER SHALL HAVE ROUND OR OVAL HANDLE. 1 1/4" AND OVER LEVER OPERATOR. CONTRC C-1166-FE HILLS MC C S151-DI-T JAMESBURY 5150-11-2100-TT LUNK 715 T MARPAQ DI-400-TT SMITH 415-TOV00 SMITH 415-T0000 WKM E100-DC-02 WKM E102-DC-02
*V-671	3 THRU 4	150-LB FLANGED PLUG VALVE, DUCTILE IRON BODY AND PLUG, TEFLON SLEEVE. WRENCH OPERATED. TUFLINE 067-DI
V-216		VALVES NORMALLY FURNISHED WITH STAINLESS STEEL BODY-BONNET BOLTS SHALL BE FURNISHED WITH ASTM A-193 GR P7 STUD BOLTS. LIQUID QUENCHED AND TEMPERED. AND ASTM A-194 GR 2H HEAVY HEX NUTS.
N-		TEST: IN SERVICE
*		ASTERISK BEFORE VALVE NUMBER INDICATES RESTRICTED VENDOR LIST.

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SEA WATER
80 PSIG AMBIENT

ITEM	SIZE	DESCRIPTION
N-		1. PIPING SHALL BE FABRICATED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. A TWO-COAT SYSTEM INCLUDING A PRIMER AND ADHESIVE AS RECOMMENDED BY MANUFACTURER SHALL BE USE FOR CEMENTED JOINTS.
PIPE		
F-SP10	2 THRU 6	SCHEDULE 80 NORMAL IMPACT CPVC PIPE, ASTM F-441.
FITTINGS		
E=90 DEG FLL, L=45 DEG ELL, T=TEE, X=CROSS, R=REDUCER C=COUPLING, S=STUB END, U=UNION, PC=PIPE CAP		
ELTR-SP10	2 THRU 6	SCHEDULE 80 SOCKET TYPE CPVC FITTINGS, ASTM F-439. FITTINGS TO INCLUDE BUSHINGS (B) AND COUPLINGS (C) AS NOTED ON DWGS.
FLANGES		
F-SP13	2 THRU 6	150 POUND CPVC SOCKET TYPE FLANGE, NORMAL IMPACT, DRILLING TO MATCH ANSI 316.5.
BRANCH CONNECTIONS		
BC-230		FOR SOCKET TYPE PLASTIC PIPING. USE STRAIGHT SIZE TEE ONLY. FOR REDUCING BRANCH, USE A SOCKET TYPE BUSHING.
GASKETS		
G-7AF		FULL FACE RED RUBBER GASKET, 1/16 INCH THICK, JM-107, GARLOCK 22, OR GOODRICH SRR-75.
FLANGE BOLTS		
B-A307B5		ASTM A-307 GR B HEAVY HEX OR SQUARE HEAD GALV MACHINE BOLTS WITH HEAVY HEX GALV NUTS.

HWA PIPING SPEC. P

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ITEM	SIZE	DESCRIPTION
N-231		APPLY BOLT LUBRICANT TO THE FULL LENGTH OF THREADS.
N-6		FLANGE BOLTS TO HAVE TWO GALV STEEL WASHERS, ONE UNDER HEAD AND ONE UNDER NUT.
BOLT LUBRICANT		
BL-2		FEL PRO C5-A.
N-		TEST: IN SERVICE

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PIPING SPEC. 9

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