PROCESS DESIGN

EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

(PROCESS DESIGN NO. D-28)

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EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

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I. PURPOSE OF DESIGN

Various waste water and vapor vent streams in the PVC process are contaminated with concentrations of vinyl chloride. Proposed EPA regulations will insist that these streams be treated to minimize their VCM content.

Currently most of the process waters which contain VCM are being collected and batch stripped in the existing blowdown tank. The existing large reactor recovery system is now employed for this purpose.

Most of the minor vapor vent streams are not now being collected. These include:

Vents from railcar vapor and liquid hoses
Vents from reactor sampling
Vents from monomer sampling
Vents from tandem seals on process pumps and tank farm pumps
Vents from Corken compressors
Vents from tank farm sphere and bullets
Vents from other process vessels

In addition to the above, vents originating from the Capacity Replacement Project will also have to be collected and treated.

The project will provide the treating of these streams. A collection header system will be provided as part of a soon to be issued design for collecting these emission sources and routing them to a common treating system. A two stage vacuum-compression system will be provided to compress the vapor streams so that as much VCM as possible can be condensed and thus contained. This system will also pressurize these contaminated streams thus facilitating the eventual final treatment via carbon adsorption or incineration.

The system described in this project will also free the existing large reactor recovery system from the task of blowdown tank stripping. This stripping will be handled by the Emission Recovery System described in this design.

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II. BASIS OF DESIGN

Flow Rate Basis

The various emission sources which will be contained with this system were estimated. Details are discussed below.

Blowdown Tank - This vessel will periodically be pressured to 10 psig as a result of the receiver draining process. The vessel will subsequently be evacuated with the Emission Recovery System. This procedure will result in total flow of 275 pounds of VCM. Estimated duration of this evacuation is 10 minutes.

Rail Area - The estimated, normal continuous load from the railcar area is 16 liters per minute at atmospheric pressure. This minimal vapor flow rate is about 1 CFM at vacuum pump suction conditions.

VCM Receiver - The evacuation of one of the receivers will require the recovery of 690 lbs. of VCM. This will take about 60 minutes with the proposed recovery system.

VCM Sampling - Sampling of VCM will require the collection of about 100 CF of vapor. This will take 30 seconds with the proposed system.

This system will be used to collect many other sources than those indicated above.

CONOCO ABERDEEN
TELEX NO. 910-420-1212

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EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

III. PROCESS DESCRIPTION

This process design consists of a Vacuum Recovery System and is composed of a Vacuum Pump-Compressor System. This system will provide a source of vacuum for the various emission sources. The vapors from these sources will be compressed to 80 psig and the vinyl chloride will subsequently be condensed and collected.

Vapors will enter the Vacuum Recovery System from several sources. Fugitive emissions, vessel vents and railcar area sources will flow directly into T-701, the Inlet Knockout Drum. Vapors resulting from large reactor recovery operation, reactor sampling, liquid VCM sampling, receiver draining and filter pack clearing will first flow to the existing Blowdown Tank.

They will exit the tank through CV-601 and then flow to T-701. The Blowdown Tank and T-701 will normally be equalized via CV-601. When the blowdown tank is being pumped out CV-601 will automatically close to isolate the tank. An open-close switch for CV-601 will be located in the control room. The board operator will use this switch in the procedure for draining the recovered VCM receivers.

The pressure in T-701 will be maintained at 20 in. Hg. Vac. via a bleed back vapor stream from the Recovered Monomer Receivers. This system will be controlled by PIC-701 located on a local explosion proof control panel which will be adjacent to the Emission Recovery System.

The system is designed to maintain a 20 in. Hg. Vac. pressure in T-701. If the pressure in T-701 exceeds 15 psig, PA-701 will indicate on the local panel and PS-701 will shutdown the vacuum pump and compressor. A shutdown alarm in the large reactor control room will alert operating personnel when this occurs.

The Inlet Knockout Drum is equipped with a level well which will sense the liquid level at three locations. LS-701B will sense a high liquid level and will open CV-701. This will drain liquid by gravity into the Blowdown Tank until LS-701A is activated and closes CV-701. In the event LS-701A/B malfunctions and T-701 fills with liquid LS-701C will be activated and will shutdown the vacuum pump and compressor and also activate the control room shutdown alarm. A level alarm located on the local control panel, LA-701, will also be energized.

T-701 is an existing vessel in an existing location (Conoco No. 45026). Nozzle modifications will be required for its new service.

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III. PROCESS DESCRIPTION - CONTINUED

Vapors will exit T-701 and flow to the suction of P-704, the Vacuum Pump. The Vacuum Pump is existing equipment (Conoco No. 72-716) which will be relocated from V-12. The pump is rated at 200 CFM at 20 in. Hg. Vac. The vacuum pump is equipped with a double mechanical seal per AFE No. 9525 and 9495 which were approved in December of 1975. The seals will require high pressure service water which will be supplied from the header via rotameters FIC-704A, 704B, 704C, 704D. The vacuum pump is the rotating liquid ring type. Water to the ring will be supplied by the seal water system via FIC-704.

The vapors will be pressurized to about 0 psig at the outlet of the vacuum pump and will flow to T-702, the Vacuum Compressor Seal Water Separator.

T-702 is an existing vessel (Conoco No. 45308) now located in V-12. this vessel will be relocated to the northwest area of the first floor of the V-11 building. The tank is to be mounted approximately five feet above grade and equipped with necessary access platforms and ladders.

The stream from the vacuum pump will be separated into liquid and vapor. The liquid, which is essentially water, will flow to P-707 or P-708 for circulation or will be drained to T-701 via CV-702. The drain mechanism and shutdown system for level control for T-702 is identical to the system for T-701. T-702 will be equipped with a temperature alarm, TA-702 and pressure alarm, PA-702 which will be on the local panel board. High temperature or pressure in T-702 will also activate the system shutdown previously described.

Water from T-702 will be circulated to the liquid rings of the vacuum pump and compressor via the Seal Water Pump, P-707 or P-708. This water will flow to FT-709 the Seal Water Filter and then to EA-709A, EA-709B, and EA-709C, the Seal Water Cooler. Cooling water flow to EA-709A, EA-709B, and EA-709C will be controlled by TIC-709 which will be mounted on the local control panel and will maintain a 90°F set point.

The seal water will exit the cooler and then flow to the liquid ring in the vacuum pump or compressor. Flow to the vacuum pump will be controlled by ~~FIC-705 or FIC-706.~~ FIC-704

The three Seal Water Coolers, EA-709A, EA-709B, and EA-709C are existing equipment (Conoco No. 55002, 55004, and 55311). Item No. 55002 will have to be relocated from the adjacent V-11 recovery system while item No. 55004 is now in place. Item No. 55311 will be relocated from V-12.

The vapors from T-702 will flow to the suction of the compressor, C-705 or C-706. Only one of these compressors will be operating. In the event of a vacuum pump failure, vapor flow will be direct from T-701 to the compressor.

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III. PROCESS DESCRIPTION - CONTINUED

Each of the compressors will be equipped with double mechanical seals. This mechanical modification is part of this project. The seals will use high pressure service water which will be controlled by FIC-705A, B, C, D or FIC-706 A, B, C, D.

The compressor is a rotating liquid ring type and seal water to the liquid ring is supplied via FIC-705 and FIC-706.

The compressor is rated at {175 CFM at 90 psig}. It will compress the vapors to 80 psig and the vapors will then flow to T-703, the Compressor Seal Water Separator.

T-703 is existing equipment (Conoco No. 45301). Nozzle modifications will be required. It will be relocated to be adjacent to the proposed location for T-702.

T-703 will be equipped with a pressure alarm-shutdown, temperature alarm-shutdown and level alarm shutdown identical to T-702. Liquid will drain from T-703 to T-702 via the same level switch system as will be employed on T-701 and T-702.

The vapors will exit T-703 and flow to an existing connection at the inlet to the existing large reactor recovery condensers. Here the monomer will be condensed. Subsequent processing of this stream will be coincident with the normal recovered monomer from the polymerization process.

For the prevention of polymerization in the seal water system hydroquinone will be injected into the seal water pump suction. This hydroquinone will be obtained from the existing metering pump system.

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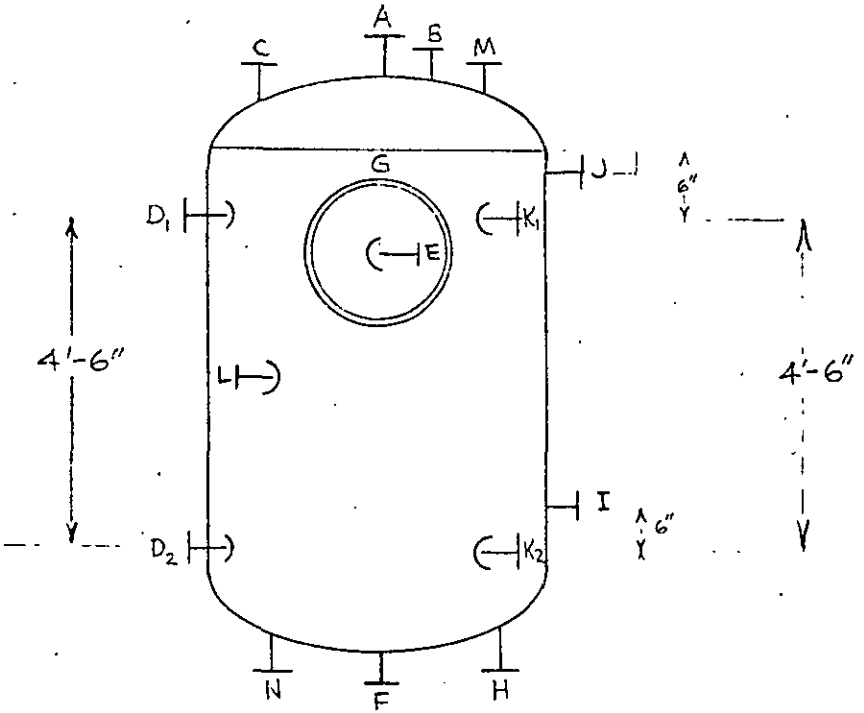
EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

IV. EQUIPMENT SPECIFICATIONS

EQUIPMENT LIST

Item	Description	Current Conoco No.
T-701	Inlet Knockout Drum	45026
-	Inlet Knockout Drum Level Well	Not Existing
T-702	Vacuum Compressor Seal Water Separator	45308
-	Vacuum Seal Separator Level Well	Not Existing
T-703	Compressor Seal Water Separator	45301
-	Compressor Seal Separator Level Well	Not Existing
P-704	Vacuum Pump	72716
P-705	Compressor No. 1	72752
P-706	Compressor No. 2	72714
EA-709A	Seal Water Cooler	55002
EA-709B	Seal Water Cooler	55004
EA-709C	Seal Water Cooler	55311
P-707	Seal Water Pump	New
P-708	Seal Water Pump	New
FT-709	Seal Water Filter	64-002



NOTE: DIMENSIONS TO BE VERIFIED BY FIELD INSPECTION

NOZZLE SCHEDULE

MARK NO.	NO. REQ.	SIZE	TYPE	SERVICE
A	1	3"	FLG	EXISTING - VAPOR OUTLET
B	1	1"	FLG	EXISTING - PRESS. SWITCH
C	1	1"	FLG	EXISTING - PIC
D_1	1	1"	FLG	EXISTING - LEVEL GUAGE
D_2	1	1"	FLG	EXISTING - LEVEL GUAGE
E	1	3"	FLG	EXISTING (BLIND)
F	1	3"	FLG	EXISTING - LIQUID OUTLET
G	1	18"	FLG	EXISTING MANWAY
H	1	2"	FLG	NEW -
I	1	1"	NPL	NEW - TEMP. GUAGE
J	1	1"	FLG	NEW - PRESS. GUAGE
K_1	1	2"	FLG	NEW - LEVEL WELL
K_2	1	2"	FLG	NEW - LEVEL WELL
L	1	3"	FLG	NEW - VALAN INLET
M	1	2"	FLG	NEW - RELIEF VALVE
N	1	2"	FLG	NEW - HPSW / STEAM INLET

APD0185000

DESIGN DATA

OPERATING TEMPERATURE, °F	100
DESIGN TEMPERATURE, °F	350
OPERATING PRESSURE, psig	20 in W/C
DESIGN PRESSURE, psig	150/FV
INSULATION:	
FIRE	( )
HEAT CONSERVATION	( )
NONE	(✓)
CORROSION ALLOWANCE	
MATERIAL OF CONSTRUCTION	CS

NOTES:

HEIGHT: 62" T-T
I.D.: 48"
MWP: 150
MWT: 350
SERIAL NO.: 5943
MFG.: TOWER IRON WORKS
TANK IS EXISTING

ISU	DATE	DESCRIPTION	BY	CKD	APD
	3/7	ORIGINAL	JRM		

CONOCO CHEMICALS
ABERDEEN, MS

T-101 KNOCK-OUT DRUM

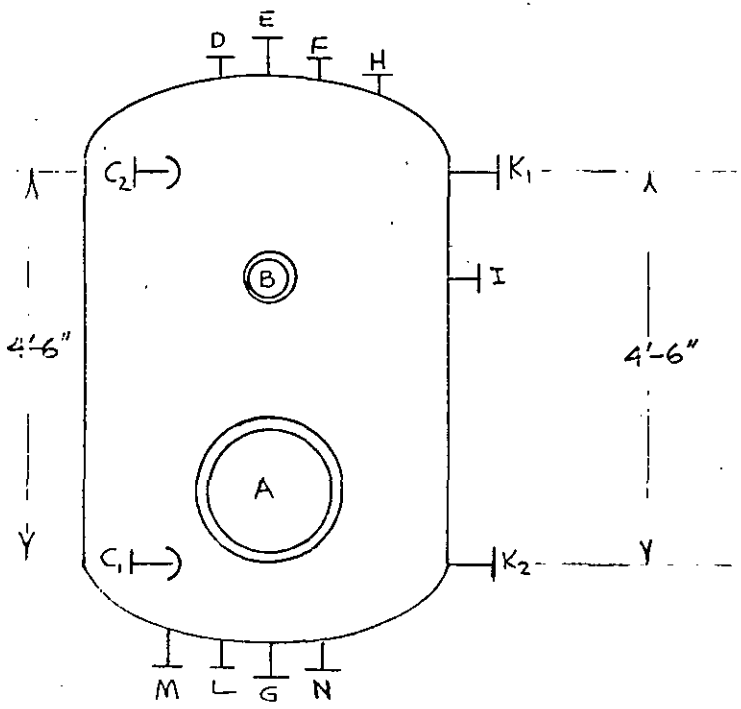
WELDING DWG. NO. [illegible]

USE BORDER SCALE:

APPD:
DATE: 3/7/16

No.

DWG. JRM



NOTE: DIMENSIONS TO BE VERIFIED BY FIELD INSPECTION

NOZZLE SCHEDULE

MARK NO.	NO. REQ.	SIZE	TYPE	SERVICE
A	1	18"	FLG	EXISTING MANWAY
B	1	3"	FLG	EXISTING-VAPOR INLET
C_1	1	1"	FLG	EXISTING-LEVEL GUAGE
C_2	1	1"	FLG	EXISTING-LEVEL GUAGE
D	1	1"	FLG	EXISTING-PRESS. SWITCH
E	1	3"	FLG	EXISTING-VAPOR OUTLET
F	1	1"	FLG	EXISTING-PRESS. GUAGE
G	1	2"	FLG	EXISTING-LIQUID OUTLET
H	1	2"	FLG	NEW-RELIEF VALVE
I	1	1"	FLG	NEW-TEMP. SWITCH
J	1	1"	FLG	NEW-TEMP. GUAGE
K_1	1	2"	FLG	NEW-LEVEL WELL
K_2	1	2"	FLG	NEW-LEVEL WELL
L	1	2"	FLG	NEW-PUMP SUCTION
M	1	2"	FLG	NEW-LIQUID DRAIN
N	1	2"	FLG	NEW-LIQUID INLET

DESIGN DATA

OPERATING TEMPERATURE, °F	100
DESIGN TEMPERATURE, °F	140
OPERATING PRESSURE, psig	0
DESIGN PRESSURE, psig	150/FV
INSULATION:	
FIRE	( )
HEAT CONSERVATION	( )
NONE	(/)
CORROSION ALLOWANCE	
MATERIAL OF CONSTRUCTION	C.S.

NOTES:

HEIGHT: 60" T-T
O.D.: 48"
MAWP: 150
MAWT: 140
SERIAL NO.: 016B
MFG.: HENDERS
TANK IS EXISTING

ISU	DATE	DESCRIPTION	BY	CKD	APD
	10/74	ORIGINAL	JPH		

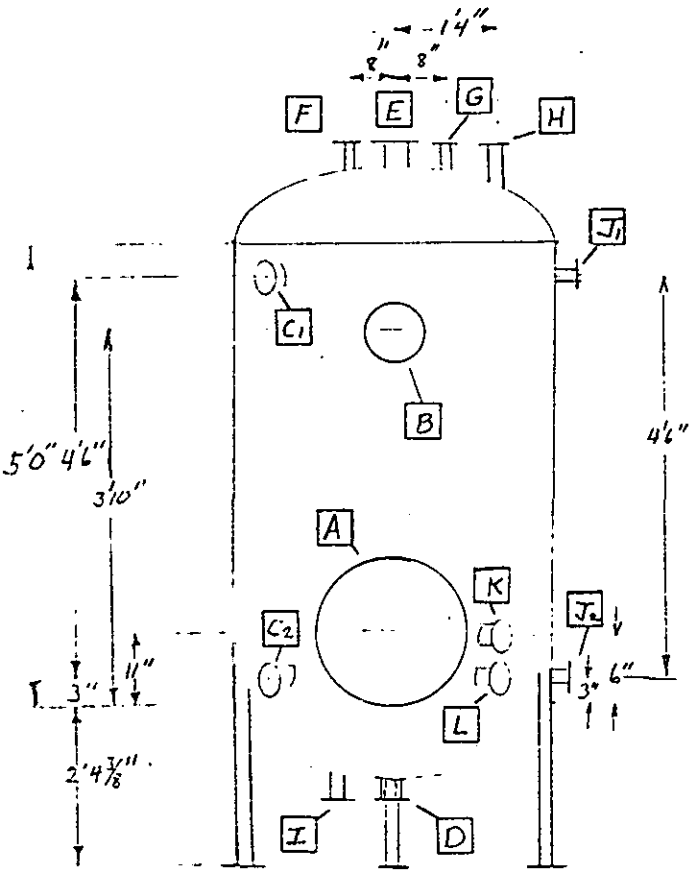
CONOCO CHEMICALS
ABERDEEN, MS

T-702 VAC. COMPRESSOR SEAL WATER SEPARATOR
EXISTING CO. NO. 45-309
USE BORDER SCALE:

APPD:
DATE:

No.

ABD00185010



NOTE: DIMENSIONS TO BE VERIFIED BY FIELD INSPECTION

NOZZLE SCHEDULE

MARK NO.	NO. REQ.	SIZE	TYPE	SERVICE
A	1*	18	FLG	MANWAY W/ FLANGE
B	1*	5	FLG	GAS INLET
C_1	1*	1"	FLG	level GUAGE
C_2	1*	1"	FLG	level GUAGE
D	1*	2"	FLG	DRAIN
E	1*	3"	FLG	GAS OUTLET
F	1*	1"	FLG	PRESS. SWITCH
G	1*	1"	FLG	PRESS GUAGE
H	1	2"	FLG	RELEIF VALVE*
I	1	2"	FLG	DRAIN
J_1	1	2"	FLG	Level TUBE
J_2	1	2"	FLG	Level TUBE
K	1	1"	NPL	TEMP. GUAGE
L	1	1"	NPL	Thermocouple

* EXIST ON TANK

DESIGN DATA

OPERATING TEMPERATURE, °F	100°
DESIGN TEMPERATURE, °F	140°
OPERATING PRESSURE, psig	60
DESIGN PRESSURE, psig	150 / FULL VAC
INSULATION:	
FIRE	( )
HEAT CONSERVATION	( )
NONE	(✓)
CORROSION ALLOWANCE	
MATERIAL OF CONSTRUCTION	C.S

NOTES:

(1) TANK IS EXISTING CONOCO NO. 45-301.

ISU	DATE	DESCRIPTION	BY	CKD	APD

CONOCO CHEMICALS
ABERDEEN, MS

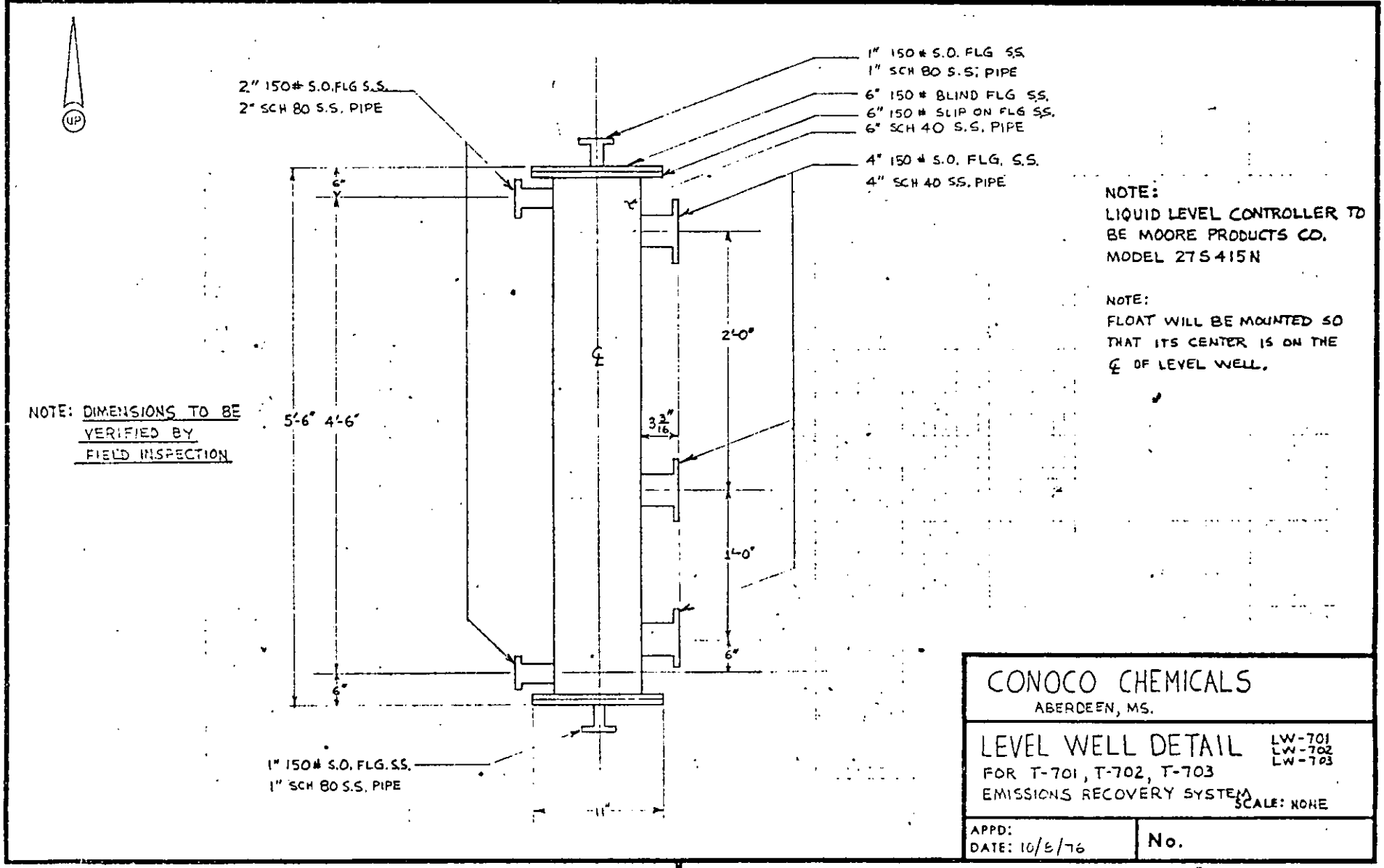
T-703
COMPRESSOR SEAL H2O SEPARATOR

USE BORDER SCALE:

APPD:
DATE:

No.

ABD00185011



NOTE: DIMENSIONS TO BE VERIFIED BY FIELD INSPECTION

NOTE:
LIQUID LEVEL CONTROLLER TO BE MOORE PRODUCTS CO. MODEL 27S415N

NOTE:
FLOAT WILL BE MOUNTED SO THAT ITS CENTER IS ON THE ℄ OF LEVEL WELL.

CONOCO CHEMICALS
ABERDEEN, MS.

LEVEL WELL DETAIL
FOR T-701, T-702, T-703
EMISSIONS RECOVERY SYSTEM

LW-701
LW-702
LW-703

SCALE: NONE

APPD:
DATE: 10/6/76

No.

4-290-S

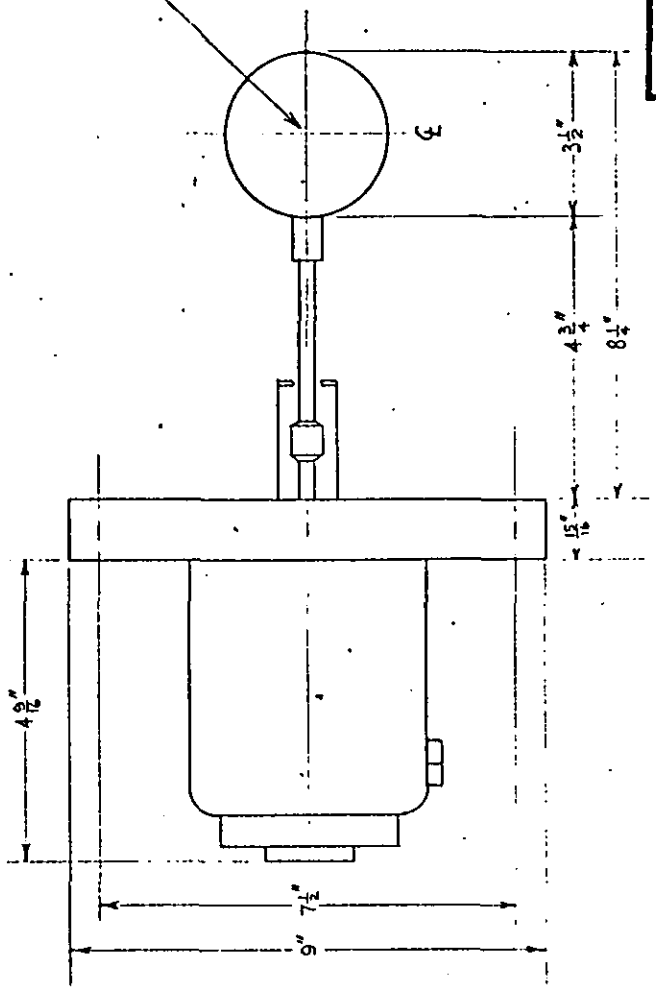
DWR. JRM

ABD00185012

A

MOORE PRODUCTS CO.
MODEL 27S415N
ELECTRIC (EXPLOSION PROOF)
STAINLESS STEEL FLANGE
4" 150 # FLANGE
TEMPERATURE TO 350°F
3½" SS BALL FLOAT

FLOAT WILL BE CENTERED ON ℄ OF LEVEL WELL.



CONOCO CHEMICALS
ABERDEEN, MS.

LIQUID LEVEL CONTROLLER DETAIL
EMISSIONS RECOVERY SYSTEM SCALE:

APPD:
DATE: 10/8/76

No.

DWR. JRM

4-290-3

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EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

Vacuum Pump Specification
(Existing - See Note 1)

Item No.		P-704 (Existing 72-751)
Service		Recovery Vacuum Pump
Type		Rotating Liquid Ring
Manufacturer		Nash Engineering Co.
Specification		H-5 Vacuum Pump
Conditions Of Flow		
Flow Rate	- Operating	200 CFM
	- Rated	130 CFM At 26 in Hg. Vac.
	- Rated	200 CFM At 20 in Hg. Vac.
Temperature	- Operating	120°F
	- Rated	
Pressure	- Operating	20 in Hg. Vac.
	- Minimum	26 in Hg. Vac.
	- Rated	26 in Hg. Vac.
Outlet		
Temperature	-	130°F
Pressure	-	0 psig
Seal Water To Rotating Liquid Ring		
Flow		6 GPM
Temperature		90°F
Motor (See Note 2)		
Horsepower		15
RPM		1150
Enclosure		Explosion Proof
Mechanical Shaft Seals (See Note 3)		
Type		Double, Unbalanced
Flush Water Pressure		200 psig
Flush Water Temperature		60°F
Materials		
Case		Cast Iron
Rotor & Cones		Stainless Steel

A

Vacuum Pump Specification
(Existing - See Note 1)

Notes:

1. Vacuum pump is to be existing Conoco equipment. Item is now located in V-12 and is to be relocated to the Emission Recovery System. Item is Conoco No. 72-751.

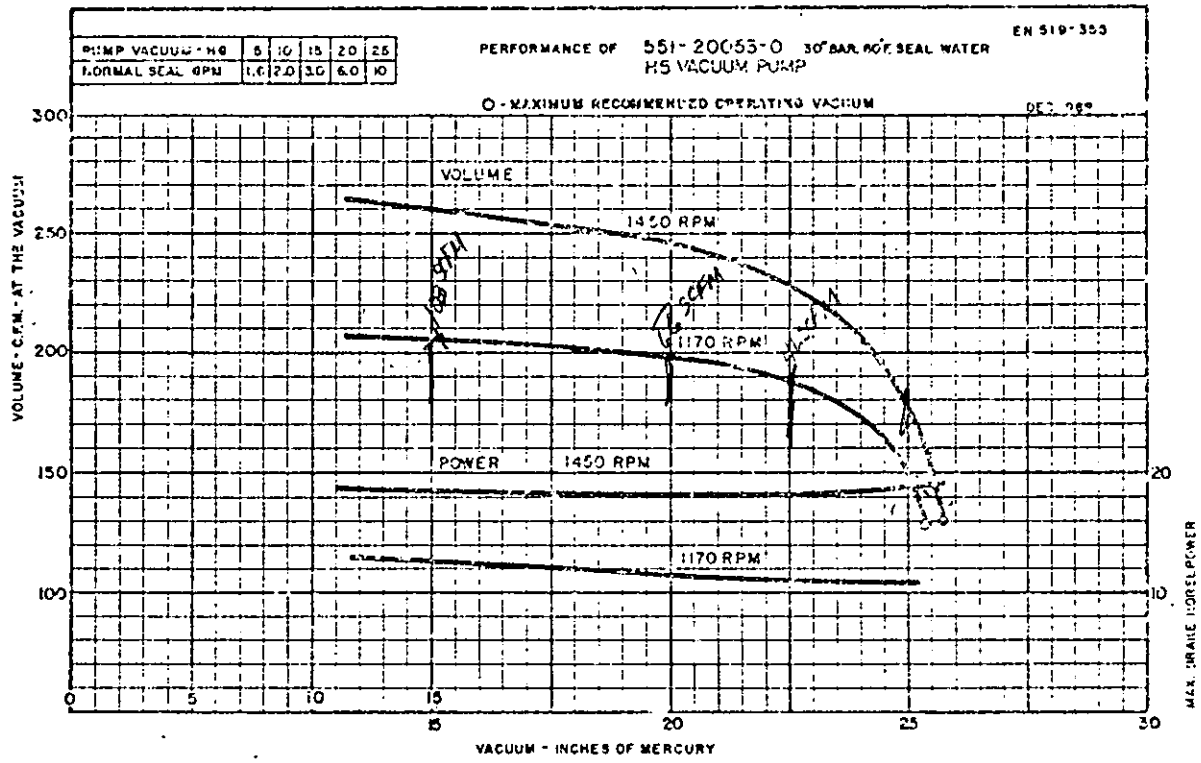
2. Motor is to be existing Conoco equipment. The current motor now located in V-12 is suitable. Item is Conoco No. 70-300.

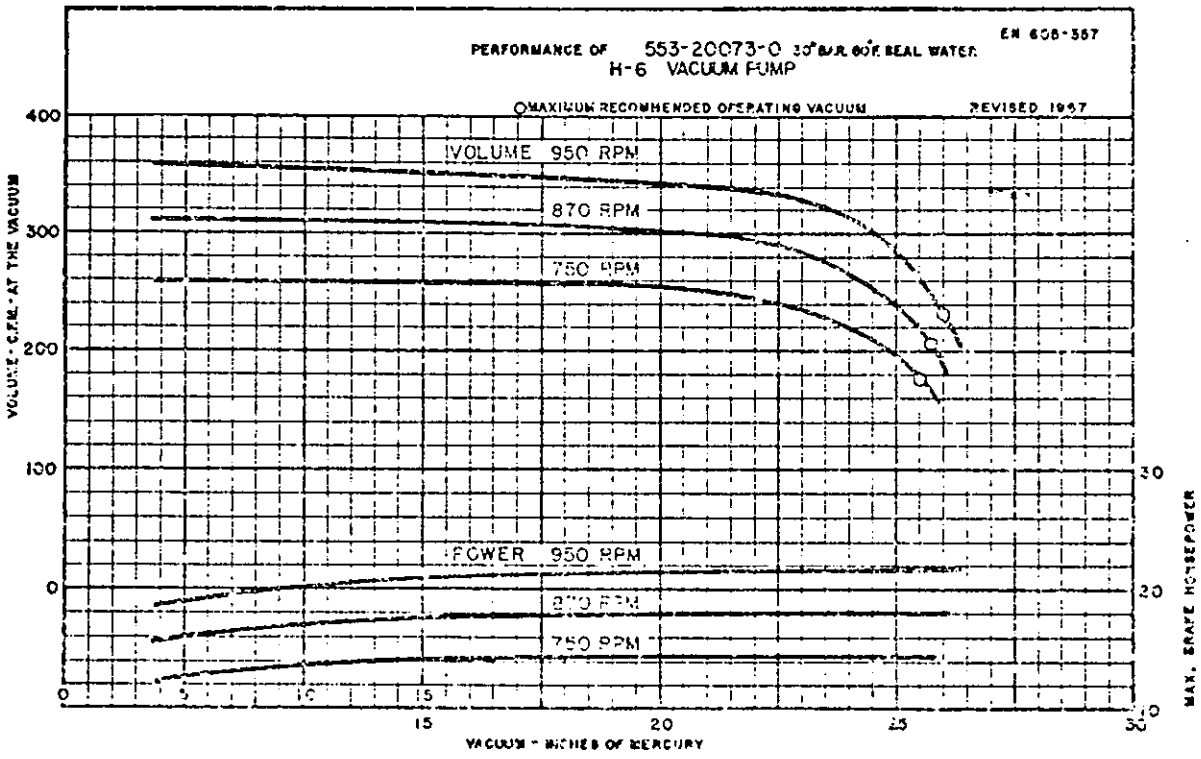
3. Double mechanical seals are to be installed on the selected vacuum pump. Funds have previously been provided for this project on AFE Nos. 9525 and 9495.

4. Required spare parts for this equipment should be obtained from other existing H-5 vacuum pumps now located at Aberdeen.

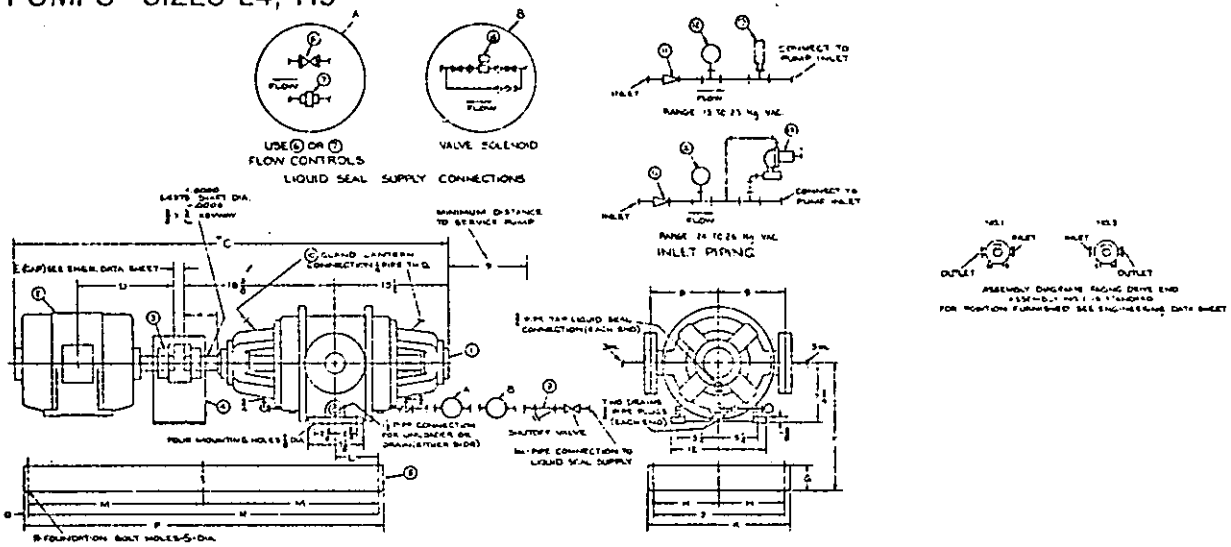
5. Vacuum pump and motor are to be completely overhauled prior to use in this service.

PUMPS—SIZES H5, H6





PUMPS—SIZES L4, H5



Drawing 14-1851

Motor	*C		D	E	F	G	H	J	K	L	M	N	P	Q	R	S
	ODP	TEFC														
256T	57 5/8	59 5/8	13 3/8	1 in.	10 7/8	3	7 1/4	14 1/2	16 1/4	4 3/16	-	46 1/4	48	7/8	4	3/4
284T	58 5/8	61 7/8	14 1/4													
284TS	57 1/8	60 3/8	12 7/8													
286T	60 1/8	64 1/8	15													
286TS	58 5/8	61 7/8	13 5/8													
284U	58 7/8	62 1/8	14 1/2													
286U	60 3/8	63 5/8	15 1/4													
324T	60 1/4	64	15 7/8	1/8	12 3/8	4 1/4	10 1/8	20 1/4	22 1/4	4 5/16	23	46	48	1 in.	6	
324TS	59 5/8	63 3/8	14 3/8	1 in.												
324S	59 1/8	62 7/8	13 7/8													
324U	61 5/8	65 1/8	16 1/4								29	58	60			
326U	63 1/8	66 5/8	17													
326S	60 5/8	64 3/8	14 5/8													
364U	63 1/2	67 3/4	18	1/8	13 3/8											
364US	61 5/8	66 1/8	15 3/8	1 in.												

*Length when coupling specified by Nash Engineering Company, with gap as shown.

NOTES:

1. Items listed below are furnished only if specifically ordered. See Engineering Data Sheet.

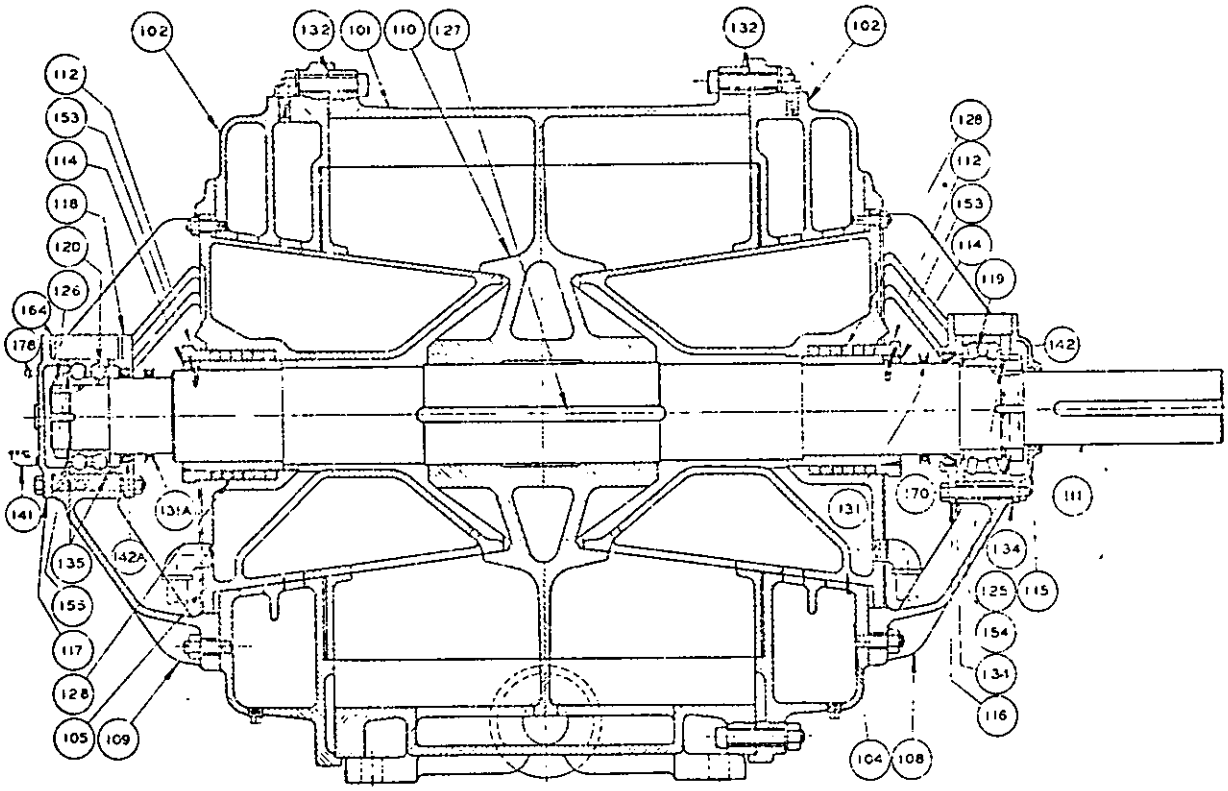
No.	Item
1	Pump Vacuum with Companion Flanges
2	Motor
3	Coupling
4	Guard
5	Base
6	Cock
7	Valve Control
8	Valve Solenoid
9	Strainer
10	Gland Lantern
11	Valve Check
12	Gage Vacuum
13	Valve Relief

2. Piping, valves, and fittings shown in single lines are furnished by Nash Eng. Co. only if ordered.
3. Foundation bolts are not furnished.
4. Do not use this drawing for installation unless certified correct for your order.
5. Dimensions are in inches.
6. Piping connection dimensions are approximate.
7. Pipe threads are American Standard.
8. For installation and operation see Instruction Bulletins.

JULY 1, 1970
subject to change without notice;
supersedes all previous cross sections.

Printed in U.S.A.

PUMPS—SIZES L3 THRU L8, H4 THRU H9



Cut B-27

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
101	Body	117	Bearing Cap-Outer-Idle End	135	Gasket-Bearing Cap-Idle End
102	Head	118	Bearing Cap-Inner-Idle End	141	Oiler For Bearing
104	Cone-Drive End	119	Bearing-Drive End	142	Shaft Seal-Drive End
105	Cone-Idle End	120	Bearing-Idle End	142A	Shaft Seal-Idle End
108	Bracket-Drive End	125**	Shaft Nut-Drive End	153*	Lock Screw-Shaft Sleeve
109	Bracket-Idle End	126	Shaft Nut-Idle End	154**	Lockwasher-Shaft Nut-Drive End
110	Rotor	127	Rotor Key	155	Lockwasher-Shaft Nut-Idle End
111	Shaft	128	Packing	164	Set Of Shims
112	Gland	131	Water Slinger-Drive End	170	Bearing Spacer (L8-H9 only)
114*	Shaft Sleeve	131A	Water Slinger-Idle End		
115	Bearing Cap-Outer-Drive End	132	Gasket Body		
116	Bearing Cap-Inner-Drive End	134	Gasket-Bearing Cap-Drive End	178	Vent Cap

* Not required for sizes L4, H5 and below. ** Not required for sizes L3 and H4.

A

EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

Compressor Specifications
(Existing - See Note 1)

Item Nos.	C-705 & C-706 (Two Required)
Service	Recovery Compressor
Type	Rotating Liquid Ring
Manuafacturer	Nash Engineering Company
Specification	Nash 1253 C
Conditions Of Flow	
Flow Rate - Operating	177 CFM
- Rated	170 CFM At 105 psig
- Rated	177 CFM At 60 psig
Temperature- Operating	130°F
- Rated	
Pressure - Operating	65 psig
- Rated	105 psig
Outlet	
Temperature	125°F
Pressure	65 psig
Seal Water To Rotating Liquid Ring	
Flow	16 GPM
Temperature	90°F
Motor (See Note 2)	
Horsepower	75
RPM	1770
Enclosure	Explosion Proof
Mechanical Shaft Seals	(See Note 3)
Type	Double, Unbalanced
Flush Water Pressure	200 psig
Flush Water Temperature	60°F
Materials	
Case	Cast Iron
Rotor & Cones	Stainless Steel

A

Compressor Specifications
(Existing - See Note 1)

Notes:

1. Compressors are to be existing Conoco equipment. One compressor is now located in V-12 and will be relocated to the Emission Recovery System. The remaining 1253C Compressor is now located in the V-10 Stores Area. Conoco equipment numbers are 72-714 and 72-752.

2. Motors are to be existing Conoco equipment. Both motors are now located in V-12, Conoco equipment No. 70-298 and 70-299.

3. Double mechanical seals are to be installed on each of the compressors. Funds should be included in this project.

4. Required spare parts may be available from other existing equipment or from the warehouse.

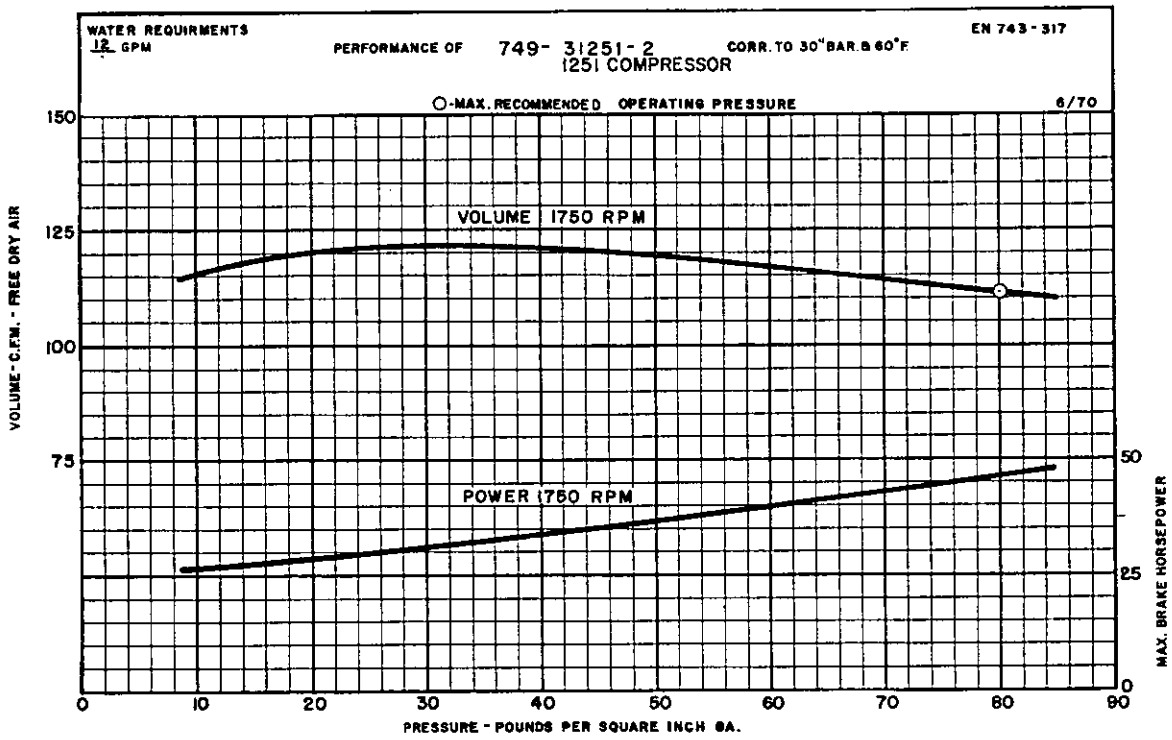
5. Both compressors and motors are to be completely overhauled prior to use in this service.

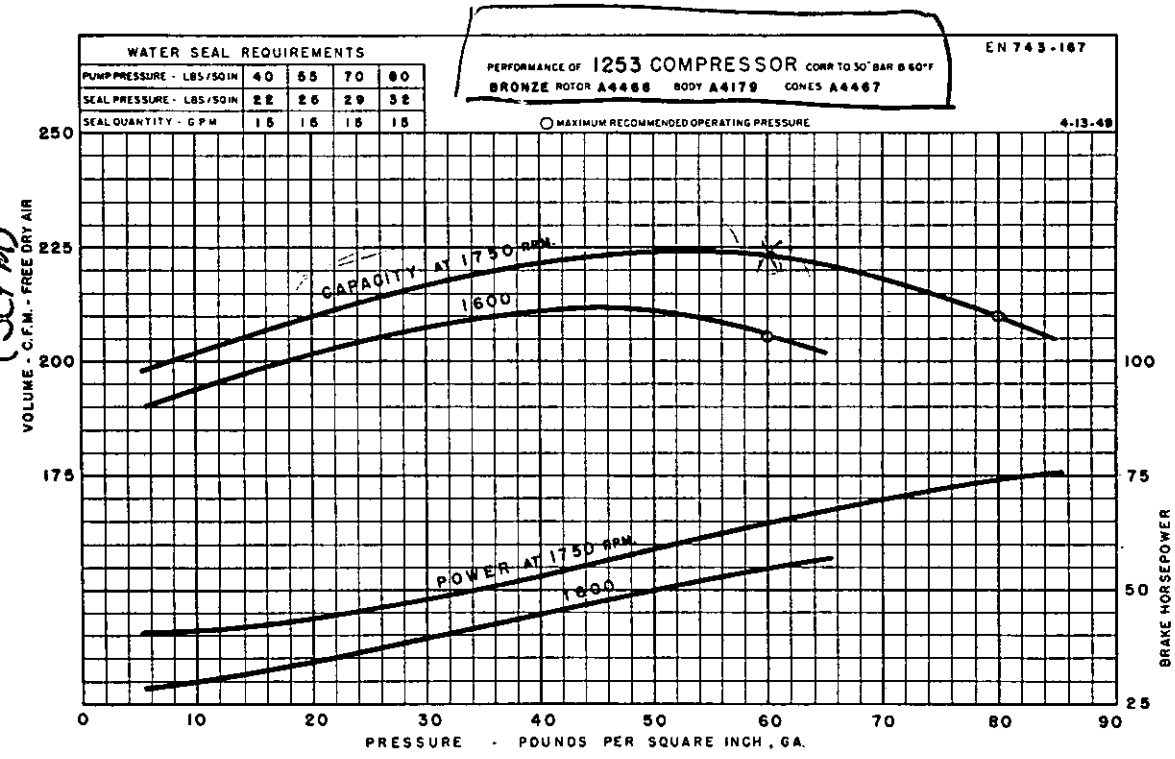
JULY 1, 1970

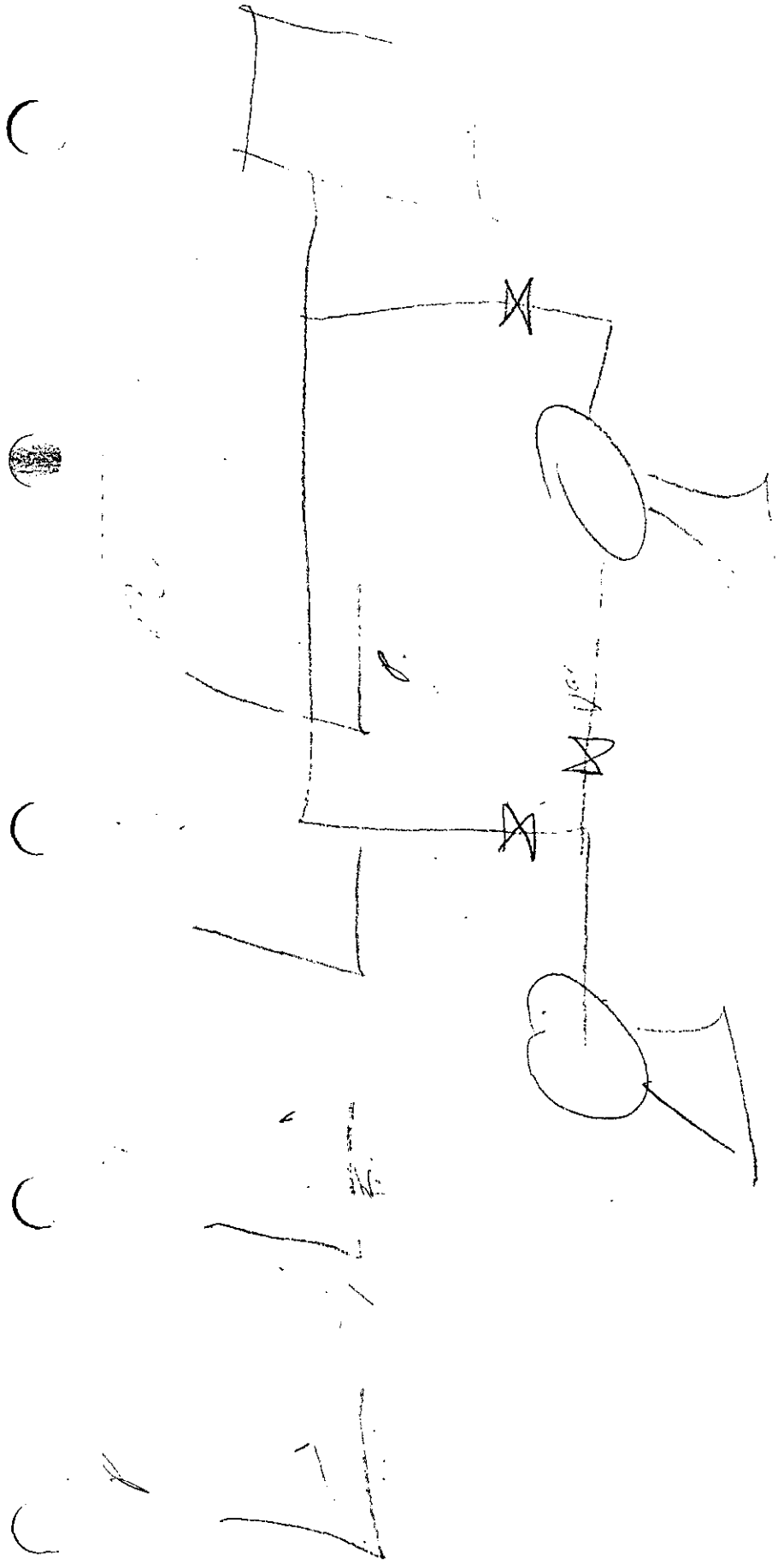
subject to change without notice;
supersedes all previous performance data.

Printed in U.S.A.

COMPRESSORS—SIZES 1251, 1253





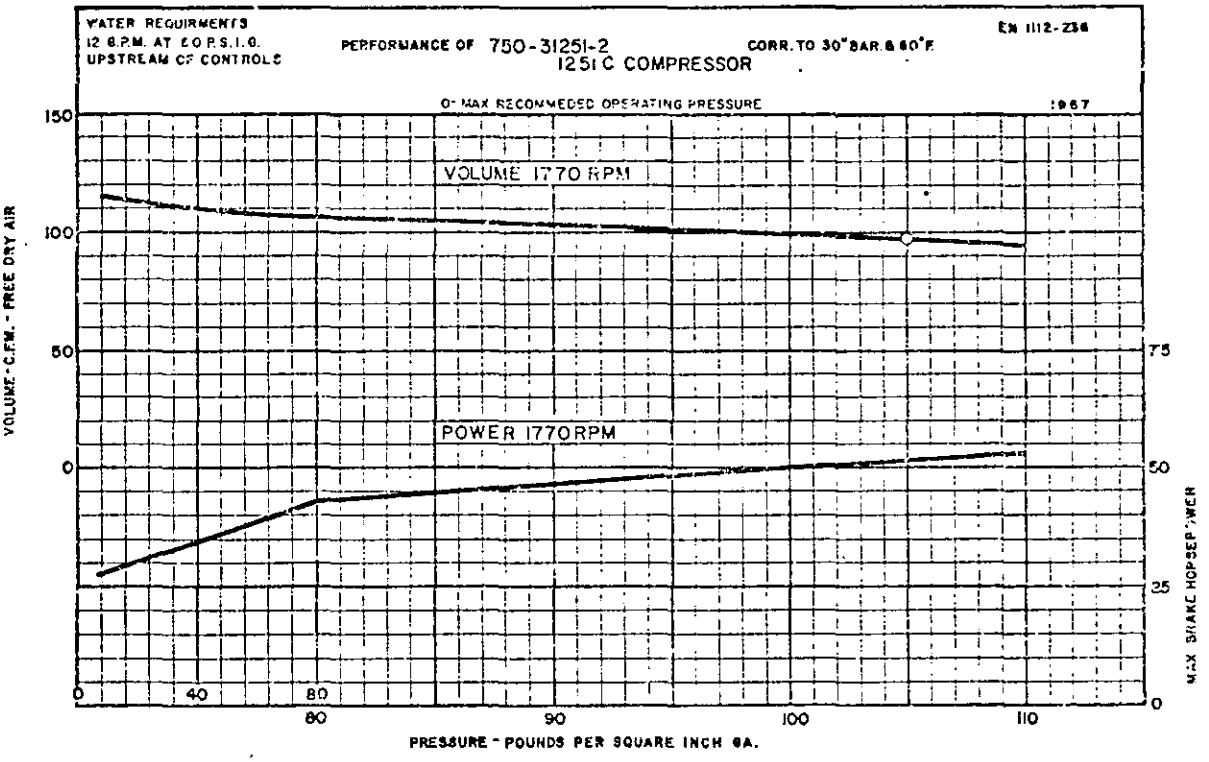


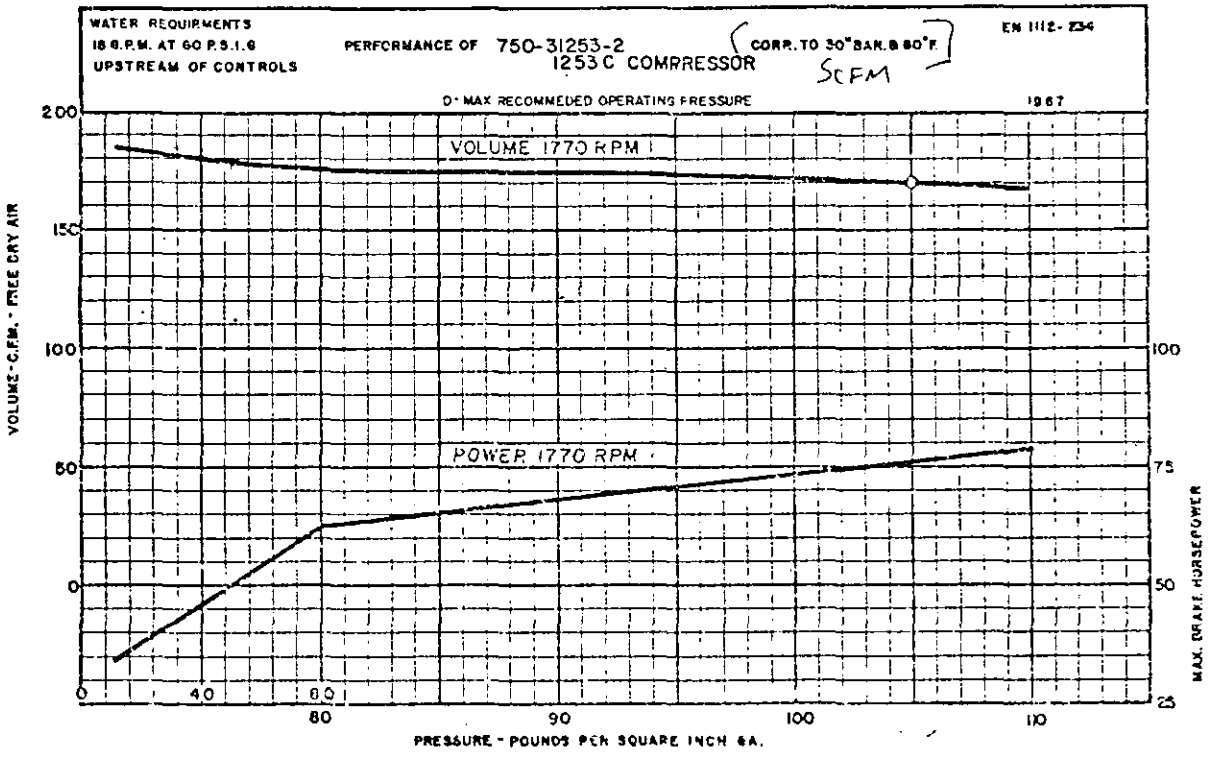
JULY 1, 1970

subject to change without notice;
supersedes all previous performance data.

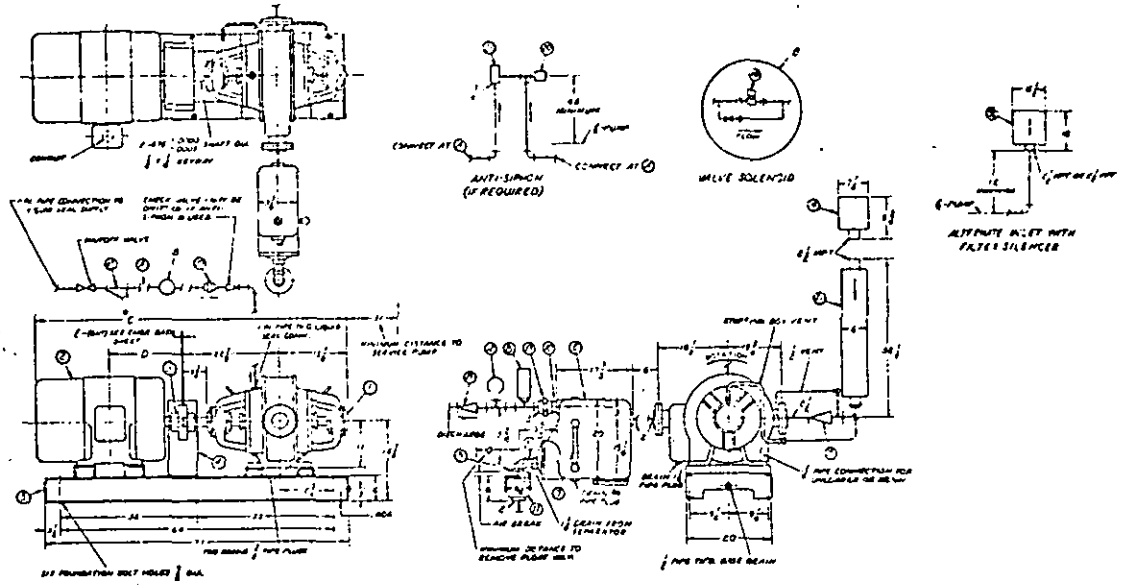
Printed in U.S.A.

COMPRESSORS—SIZES 1251C, 1253C





COMPRESSORS—SIZES 1251, 1253



Drawing 14-2614

Motor	*C		D	E
	ODP	TEFC		
324TS	63-1/2	64-3/4	14-3/8	1/8
324T	65	66	15-7/8	
326TS	65	66-1/4	15-1/8	
326T	66-1/2	67-1/2	16-5/8	
364TS	65-1/2	69-3/4	15-3/8	
364T	67-5/8	72	17-1/2	
365TS	66-1/2	70-3/4	15-7/8	
365T	68-5/8	73	18	
404TS	68-1/2	73	17-1/8	
404T	71-1/2	76	20-1/8	

Weights	
Pump	970 lbs.
Separator	460 lbs.
Base	280 lbs.

*Length when coupling specified by Nash Engineering Co., with gap as shown.

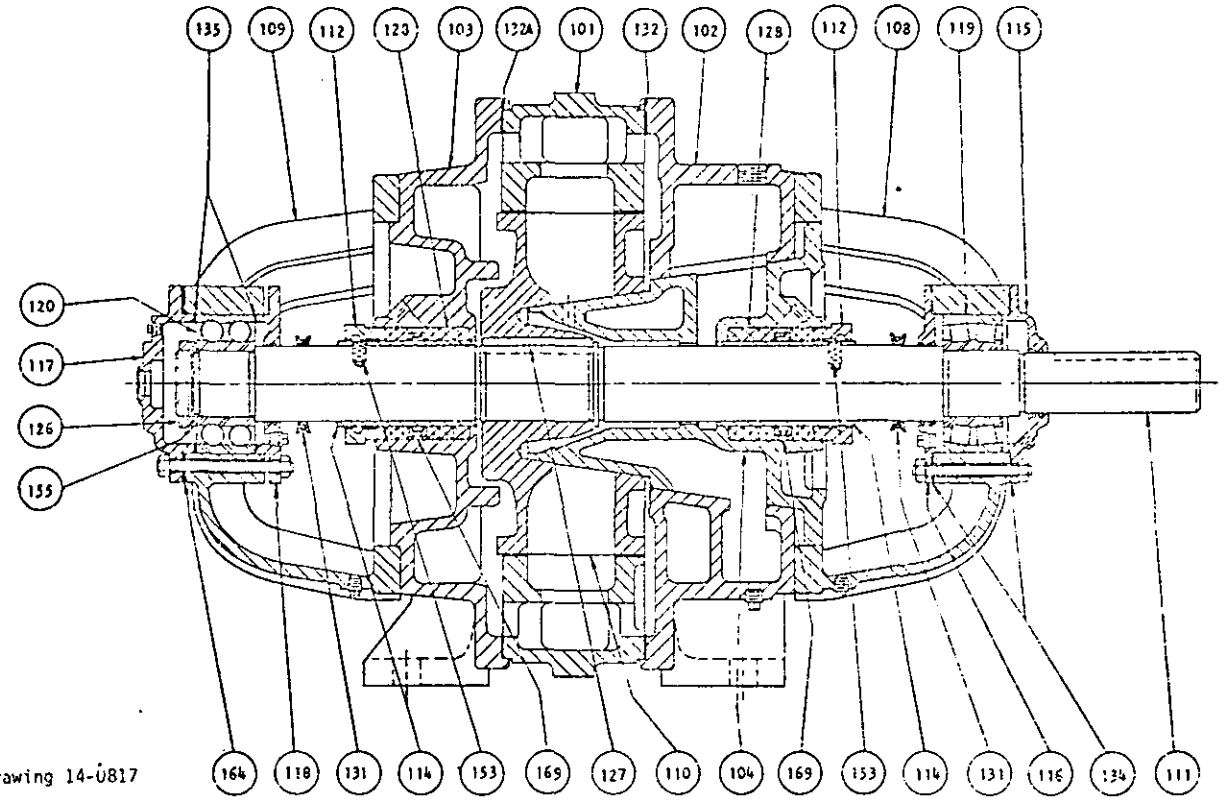
NOTES:

1. Items listed below are furnished only if specifically ordered. (see Engineering Data Sheet.)

No.	Item
1	Compressor with Companion Flanges
2	Motor
3	Coupling
4	Guard Coupling
5	Base
6	Separator with Float Valve
7	Glass Gage
8	Valve Relief
9	Elbow
10	Nipple
11	Funnel
12	Gage Pressure
13	Union Orifice
14	Valve Solenoid
15	Valve Check
16	Filter Inlet
17	Silencer
18	Strainer
19	Valve Control
20	Arrester Snock
21	Anti Siphon
22	Silencer Filter

2. Piping, valves and fittings shown in single lines are furnished by Nash Engineering Co., only if ordered.
3. Foundation bolts are not furnished.
4. For certification refer to Engineering Data Sheet.
5. Pump flanges are A.S.A. STD. 125 lbs. Pipe threads are American Standard.
6. Piping connection dimensions are approximate.
7. Dimension are in inches.
8. For installation and operation see Instruction Bulletins.

COMPRESSORS—SIZES 1251C, 1253C



Drawing 14-0817

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
101	Body	114	Shaft Sleeve-Drive And Idle End	128	Packing-Drive And Idle End
102	Head-Drive End	115	Bearing Cap-Outer Drive End	131	Slinger-Drive And Idle End
103	Head-Idle End	116	Bearing Cap-Inner Drive End	132	Gasket-Head-Drive End
104	Cone	117	Bearing Cap-Outer Idle End	132A	Gasket-Head-Idle End
108	Bracket-Drive End	118	Bearing Cap-Inner Idle End	134	Gasket-Bearing Cap-Drive End
109	Bracket-Idle End	119	Bearing-Drive End	135	Gasket-Bearing Cap-Idle End
110	Rotor	120	Bearing-Idle End	153	Lockscrew-Shaft Sleeve
111	Shaft	126	Shaft Nut	155	Lockwasher-Shaft Nut
112	Gland-Drive And Idle End	127	Rotor Key	164	Set of Shims
				169	Lantern Gland-Drive And Idle End

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

SHELL & TUBE EXCHANGERS

A.F.E. NO. _____ A

DATE 10-7-76 W. O. NO. _____

MADE BY DEM INQ. NO. _____

APP'D BY _____ REQ. NO. _____

B. M. NO. _____ P. O. NO. _____

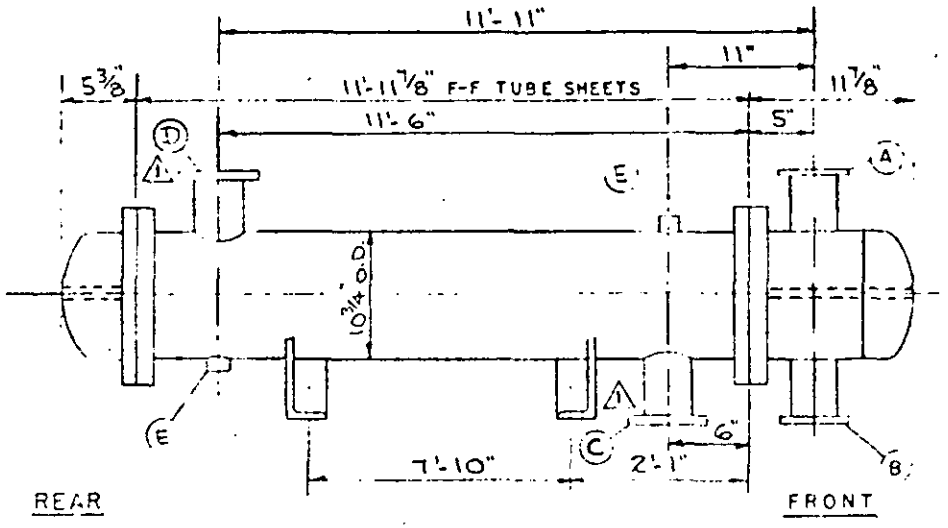
PLANT ABERDEEN PVC PLANT PROJECT EMISSION RECOVERY SYSTEM

1	ITEM NO. & TAG EA-709A (Conco No. 55002)							SERVICE OF UNIT	SEAL WATER COOLER	
2		SHELL SIDE			TUBE SIDE			MANUFACTURER	DOYLE AND ROM	
3	NOZZLES	NO	SIZE	RATING & FACING	NO.	SIZE	RATING & FACING	SIZE	TYPE	(HORIZ) ~~VERT~~
4	INLET	1	3	150 SORF	1	2	150 SORF	CONNECTED IN	( ) PARALLEL	( ) SERIES
5	OUTLET	1	3	150 SORF	1	2	150 SORF	EFF. SURF. PER UNIT, sq ft	170	
6	VENT	1	3/4	3000 CPLG				SHELLS PER UNIT	1 SHELL DIAM	10 3/4 IN.
7	DRAIN	1	3/4	3000 CPLG				EFF. SURF. PER SHELL, sq ft	170	
8	TEMP CONN							NO. TUBES PER SHELL	72 LENGTH	144 IN.
9	PRESS CONN							UNITS REQ'D.	1	
10	CHEM CLEAN							DELIVERY, WEEKS		
11								PRICE, PER UNIT		
12	SLIP-ON NOZZLE FLANGES ALLOWED (YES) (NO)							EST. FREIGHT COST		
13	SLIP-ON END FLANGES ALLOWED (YES) (NO)							TOTAL PRICE		
14	GASKETS: SHELL							DOLLARS PER SQUARE FOOT		
15	CHANNEL							MATERIALS: (MARK SR AND PERCENT XR)		TEMP
16	FLOATING-HEAD COVER							ITEM	MAT'L.	DEG. F SPECIFICATION
17								TUBES		A-214
18	TEST RING REQUIRED (YES) (NO)							SHELL		A-53B
19	SPARE GASKETS REQUIRED (YES) (NO)							SHELL COVER (REM) (INTEG)		A-285
20	STACKING HIGH							CHANNEL		
21	INSULATION THICKNESS IN.							CHANNEL COVER (REM) (INTEG)		
22	NO. TUBES 72 OD 3/4 IN.: MIN. THK. 16 BWG							FLOATING-HEAD COVER		
23	LENGTH 12'0" FT; PITCH 15/16 IN. (△ = ◇)							TUBE SHEETS	C.S.	A-285-C
24	SHELL DIAM 10 3/4 IN. OD MAX. BUNDLE DIAM ALLOW IN.							BAFFLES AND SUPPORT PLATES		
25	TRANSVERSE BAFFLE TYPE SPACING IN.							BOLTING: SHELL COVER		
26	PERCENT CUT (VERT.) (HORIZ.) (45 DEG)							CHANNEL		
27	LONG BAFFLE TYPE IMPINGEMENT BAFFLE (YES) (NO)							FLOATING HEAD		
28	TEMA CLASS R ASME CODE REQ'D YES							CHANNEL COVER		

PERFORMANCE OF ONE UNIT

		SHELL SIDE		TUBE SIDE	
30					
31	FLUID CIRCULATED	Cooling Water		Seal Water	
32	TOTAL FLUID ENTERING, lb/hr	30000		15000	
33		IN	OUT	IN	OUT
34	VAPOR, lb/hr	—	—	—	—
35	LIQUID, lb/hr	—	—	—	—
36	STEAM, lb/hr	—	—	—	—
37	WATER, lb/hr	30000	30000	15000	15000
38	NONCONDENSABLES, lb/hr	—	—	—	—
39	GRAVITY; ~~API DEG AT~~; SG @ 60 F	1.0	1.0	1.0	1.0
40	MOL. WT: VAPOR	—	—	—	—
41	MOL. WT: NONCONDENSABLES	—	—	—	—
42	VISCOSITY: LIQUID, CP	0.98 @ 70 F	0.98 @ 70 F	0.98 @ 70 F	0.98 @ 70 F
43	HEAT: ~~LATENT~~ SP.	1.0	1.0	1.0	1.0
44	THERM. COND: VAP. LIQ.	@ F	@ F	@ F	@ F
45	TEMPERATURE F	80	100	130	90
46	OPERATING PRESSURE psig	60	—	75	—
47	VELOCITY FPS				
48	NO. PASSES	1		4	
49	PRESSURE DROP psi	ALLOW	CALC	ALLOW	CALC
50	FOULING RESISTANCE (MIN.)	0.001		0.001	
51	PRESSURE, psig	DESIGN 150	TEST 225	DESIGN 150	TEST 225
52	DESIGN TEMPERATURE, DEG F	400		400	
53	CORROSION ALLOWANCE: IN.	1/16		1/16	
54	MTD ~~(CTD)~~ (CORR) F 28.8			HEAT EXCHANGED, BTU/HR	600,000
55	TRANSFER RATE, SERVICE 122			CLEAN 161	
56	WEIGHTS PER SHELL: SHIPPING 1300 lb;	FULL OF WATER	lb;	BUNDLE	lb;
57	NOTES: THE CALCULATED SERVICE HEAT TRANSFER RATE (OUTSIDE TUBE AREA) OR EXTENDED AREA) IS TO BE DECREASED BY				PERCENT FOR ALL
58	DESIGN CALCULATION THIS IS AN EXISTING RELOCATED EXCHANGER				
59	SUPPLIER TO COMPLE	M BY FURNISHING INFORMATION FOR BLANK SPACES		SHEET ___ OF ___ REV ___	

4-42-S



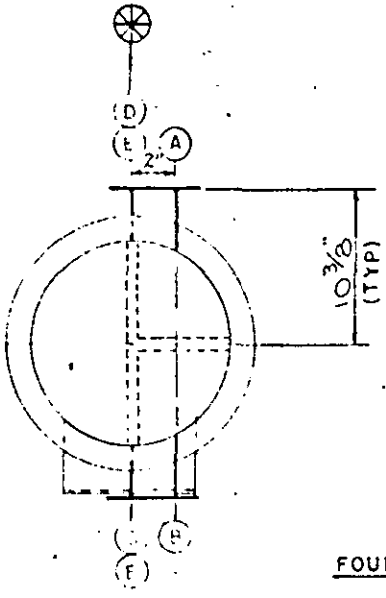
SEE FRONT END VIEW FOR TRUE ORIENTATION ALL CONNECTIONS

NOZZLES & FITTINGS

A	2"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 80 PIPE
B	2"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 80 PIPE
C	3"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 40 PIPE
D	3"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 40 PIPE
E	3/4	3000# F S HALF COUPLINGS A-105
F		

MATERIALS OF CONSTRUCTION

SHELL	10 3/4 OD SEAMLESS STEEL PIPE A-53B SCH 30
TUBE SHEETS	14 1/2" O D FLG QUALITY STEEL A285-C 1" TK
TUBES	72-3/4 OD X 16 BWG A-214 STEEL TUBES 12'-0" L G ON 15/16 PITCH
BONNET FLG.	14 1/2" O D STEEL A-201B 1 1/8" TK
BONNET CYL	10 3/4" O.D SEAMLESS STEEL A-53B SCH 30 PIPE
BONNET COV.	10 3/4" O D STEEL A-285-C SEMI-ELLIP-HDS 2" S F X 3/8" TK
BAFFLES	STEEL SEGMENTAL TYPE 6 1/8" NOM PITCH
GASKETS	COMPRESSED ASBESTOS 1/16" TK X 12" O D X 11 1/4" I D
BOLTING	ALLOY A-193 GR B7 & A 194 12-5/8" DIA BOLTS ON 13 1/8" B C
SUPPORTS	STEEL A-7 AS PER D&R DWG SK-41C



FRONT END VIEW

FOUR (4) PASS

D&R STD LL 1064-12H
170 FT² SURFACE

ALL STEEL CONSTRUCTION

REMARKS

WEIGHT: EMPTY 1300 LBS.
FULL OF WATER ____ LBS.

SPOT X-RAY REQUIRED
SHELL SIDE ☐ YES ☒ NO
TUBE SIDE ☐ YES ☒ NO

TUBES WELDED INTO TUBE SHEETS
☐ YES ☒ NO

PAINTING SHOP COAT ZINC CHROMATE PRIMER GREEN

BOLTING ALL BOLT HOLES TO STRADDLE ℄'S

CORROSION ALLOWANCE:
SHELL SIDE 1/16" TUBE SIDE 1/16"

NO	REVISION	DATE	DRAWN
1	REV PER CUST RED PRINT DATED APPROVED FOR CONSTR	3-20-69	RH

CUSTOMER CONOCO PLASTICS
PO NO W-50978
ITEM NO COMPRESSOR SUB-COOLERS

D&R JOB NO M-8096-1 & 2
TWO (2) REQUIRED

DOYLE & ROTH MANUFACTURING CO
10 HANOVER SQ NEW YORK, NY 10005

LL1064-12H

DRAWN BY RH	DATE 3-[illegible]-69	
CHECKED BY	DWG NO. B-[illegible]45-1	
APPROVED BY DATE	SHELL SIDE	TUBE SIDE
DESIGN TEMP	400°F	400°F
DESIGN PRESSURE	150 PSI	150 PSI
TEST PRESSURE	[illegible] PSI	[illegible] PSI

CODE - ASME STAMP ☒ YES ☐ NO TEMA

ABD00185027

Final - Approved Print

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

A

A.F.E. NO. _____

DATE 10-6-76 W. O. NO. _____

MADE BY DEM INQ. NO. _____

APP'D BY _____ REQ. NO. _____

B. M. NO. _____ P. O. NO. _____

SHELL & TUBE EXCHANGERS

PLANT ABERDEEN PVC PLANT PROJECT EMISSION RECOVERY SYSTEM

ITEM NO. & TAG EA-709 B (CONOCO No. 55004) SERVICE OF UNIT SEAL WATER COOLER

MANUFACTURER DOYLE & ROM

SIZE _____ TYPE _____ (HORIZ) (VERT)

CONNECTED IN ( ) PARALLEL ( ) SERIES

EFF. SURF. PER UNIT, sq ft 170

SHELLS PER UNIT 1 SHELL DIAM 10 3/4 IN.

EFF. SURF. PER SHELL, sq ft 170

NO. TUBES PER SHELL 72 LENGTH 174 IN.

UNITS REQ'D. 1

DELIVERY, WEEKS _____

PRICE, PER UNIT _____

EST. FREIGHT COST _____

TOTAL PRICE _____

DOLLARS PER SQUARE FOOT _____

NOZZLES	SHELL SIDE NO	SHELL SIDE SIZE	SHELL SIDE RATING & FACING	TUBE SIDE NO.	TUBE SIDE SIZE	TUBE SIDE RATING & FACING
INLET	1	3	RFSO	1	2	RFSO
OUTLET	1	3	RFSO	1	2	RFSO
VENT	1	3/4	3000 CPLG			
DRAIN	1	3/4	3000 CPLG			
TEMP CONN						
PRESS CONN						
CHEM CLEAN						

SLIP-ON NOZZLE FLANGES ALLOWED (YES) (NO)

SLIP-ON END FLANGES ALLOWED (YES) (NO)

GASKETS: SHELL _____

CHANNEL _____

FLOATING-HEAD COVER _____

TEST RING REQUIRED (YES) (NO)

SPARE GASKETS REQUIRED (YES) (NO)

STACKING _____ HIGH

INSULATION THICKNESS _____ IN.

NO. TUBES 72 OD 3/4 IN.: MIN. THK. 16 BWG

LENGTH 12'0" FT; PITCH 15/16 IN. (Δ) (□)

SHELL DIAM 10 3/4 IN. O.D. MAX BUNDLE DIAM ALLOW _____ IN.

TRANSVERSE BAFFLE TYPE _____ SPACING _____ IN.

PERCENT CUT _____ (VERT.) (HORIZ.) (45 DEG)

LONG BAFFLE TYPE _____ IMPINGEMENT BAFFLE (YES) (NO)

TEMA CLASS R ASME CODE REQ'D YES

MATERIALS: (MARK SR AND PERCENT XR)

ITEM	MAT'L.	TEMP DEG. F	SPECIFICATION
TUBES			A-214
SHELL			A-5313
SHELL COVER (REM) (INTEG)			A-285
CHANNEL			
CHANNEL COVER (REM) (INTEG)			
FLOATING-HEAD COVER			
TUBE SHEETS			A-285C
BAFFLES AND SUPPORT PLATES			
BOLTING: SHELL COVER			
CHANNEL			
FLOATING HEAD			
CHANNEL COVER			

PERFORMANCE OF ONE UNIT

	SHELL SIDE		TUBE SIDE	
FLUID CIRCULATED	COOLING WATER		SEAL WATER	
TOTAL FLUID ENTERING, lb/hr	300000		15200	
	IN	OUT	IN	OUT
VAPOR, lb/hr	—	—	—	—
LIQUID, lb/hr	—	—	—	—
STEAM, lb/hr	—	—	—	—
WATER, lb/hr	300000	300000	15200	15200
NONCONDENSABLES, lb/hr	—	—	—	—
GRAVITY; LIQ. DEG API; SG @ 60 F	1.0	1.0	1.0	1.0
MOL. WT: VAPOR	—	—	—	—
MOL. WT: NONCONDENSABLES	—	—	—	—
VISCOSITY: LIQUID, CP	0.98 @ 70 F	0.98 @ 70 F	0.98 @ 70 F	0.98 @ 70 F
HEAT; LATENT SP.	1.0	1.0	1.0	1.0
THERM. COND: VAP. LIQ.	@ F	@ F	@ F	@ F
TEMPERATURE F	80	100	130	90
OPERATING PRESSURE psig	60	—	75	
VELOCITY FPS				
NO. PASSES	1		4	
PRESSURE DROP psi	ALLOW	CALC	ALLOW	CALC
FOULING RESISTANCE (MIN.)	.001		.001	
PRESSURE, psig	DESIGN 150	TEST 225	DESIGN 150	TEST 225
DESIGN TEMPERATURE, DEG. F	400		400	
CORROSION ALLOWANCE: IN.	1/16		1/16	

MTD (CORR) F 29.9 HEAT EXCHANGED, BTU/HR 600,000

TRANSFER RATE: SERVICE 122 CLEAN 161

WEIGHTS PER SHELL: SHIPPING 1300 lb; FULL OF WATER _____ lb; BUNDLE _____ lb.

NOTES: THE CALCULATED SERVICE HEAT TRANSFER RATE (OUTSIDE TUBE AREA OR EXTENDED AREA) IS TO BE DECREASED BY _____ PERCENT FOR ALL

DESIGN CALCULATIONS THIS IS AN EXISTING RELOCATED EXCHANGER

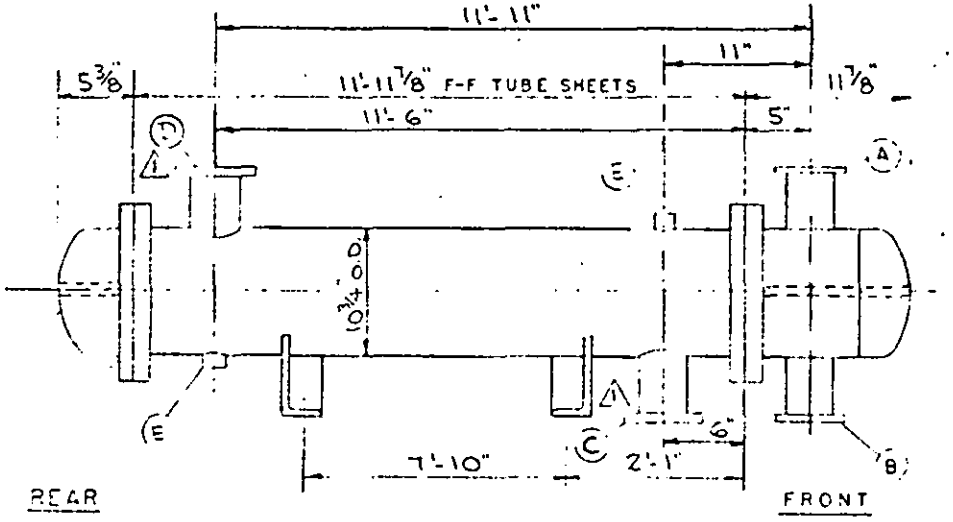
SUPPLIER TO COMPLETE FORM BY FURNISHING INFORMATION FOR BLANK SPACES

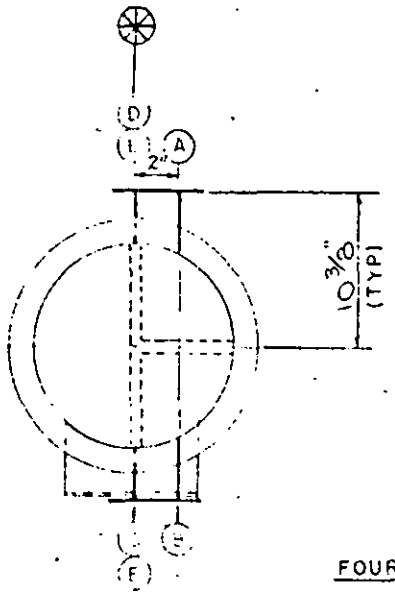
SHEET _____ OF _____ REV. _____

4-421-S

D&R ST'D LL 1064-12H
170 FT² SURFACE

ALL STEEL CONSTRUCTION





FOUR (4) PASS

FRONT END VIEW

SEE FRONT END VIEW FOR TRUE ORIENTATION ALL CONNECTIONS

NOZZLES & FITTINGS

A	2"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 80 PIPE
B	2"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 80 PIPE
C	3"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 40 PIPE
D	3"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 40 PIPE
E	3/4	3000# F.S. HALF COUPLINGS A-105
F		

MATERIALS OF CONSTRUCTION

SHELL	10 3/4 O.D. SEAMLESS STEEL PIPE A-53B SCH 30
TUBE SHEETS	14 1/2" O.D. FLG QUALITY STEEL A-285-C 1 1/8" TK
TUBES	72-3/4 O.D. X 16 BWG A-214 STEEL TUBES 12'-0" L.G. ON 15/16" PITCH
BONNET FLG.	14 1/2" O.D. STEEL A-201B 1 1/8" TK
BONNET CYL	10 3/4" O.D. SEAMLESS STEEL A-53B SCH 30 PIPE
BONNET COV.	10 3/4" O.D. STEEL A-285-C SEMI-ELLIP-HDS 2" S.F. X 3/8" TK
BAFFLES	STEEL SEGMENTAL TYPE 6 7/8" NOM PITCH
GASKETS	COMPRESSED ASBESTOS 1/16" TK X 12" O.D. X 11 1/4" I.D.
BOLTING	ALLOY A-193 B7 & A-194 12-5/8" DIA BOLTS ON 13 1/8" B.C.
SHELL SUPPORTS	STEEL A-7 AS PER D&R DWG SK-41C

REMARKS

WEIGHT: EMPTY 1300 LBS.
FULL OF WATER ____ LBS.

SPOT X-RAY REQUIRED
SHELL SIDE ☐ YES ☒ NO
TUBE SIDE ☐ YES ☒ NO

TUBES WELDED INTO TUBE SHEETS
☐ YES ☐ NO

PAINTING: SHOP COAT ZINC CHROMATE PRIMER GREEN

BOLTING: ALL BOLT HOLES TO STRADDLE ℄'S

CORROSION ALLOWANCE:
SHELL SIDE 1/16 TUBE SIDE 1/16

NO	REVISION	DATE	DRAWN
1	REV PER CUST MKD PRINT 3214 APPROVED FOR CONSTR	3-26-69	RH

CUSTOMER CONOCO PLASTICS
P.O. NO W-50978
ITEM NO COMPRESSOR SUB-COOLERS

D&R JOB NO M-8096-1 & 2
TWO 2 REQUIRED

DOYLE & ROTH MANUFACTURING CO
10 HANOVER SQ NEW YORK, NY 10005

LL1064-12H

DRAWN BY RHH	DATE 3-[illegible]	
CHECKED BY	DWG NO. B-[illegible]-1	
APPROVED BY DATE	SHELL SIDE	TUBE SIDE
DESIGN TEMP	400°F	400°F
DESIGN PRESSURE	150 PSI	150 PSI
TEST PRESSURE	[illegible] PSI	[illegible] PSI

CODE ASME STAMP ☒ YES ☐ NO TEMA

Final Approved Print

ABD00185029

A

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

A.F.E. NO. _____

DATE 10-10-76 W. O. NO. _____

MADE BY REM INQ. NO. _____

APP'D BY _____ REQ. NO. _____

B. M. NO. _____ P. O. NO. _____

SHELL & TUBE EXCHANGERS.

PLANT ABERDEEN PVC PLANT PROJECT EMISSION RECOVERY SYSTEM

1	ITEM NO. & TAG EA-709C (Conoco No. 55301							SERVICE OF UNIT	SEAL WATER COOLER
2		SHELL SIDE			TUBE SIDE			MANUFACTURER	DOYLE AND ROM
3	NOZZLES	NO	SIZE	RATING & FACING	NO.	SIZE	RATING & FACING	SIZE	TYPE (HORIZ) (VERT)
4	INLET	1	3	150 RFSO	1	2	150 RFSO	CONNECTED IN	( ) PARALLEL ( ) SERIES
5	OUTLET	1	3	150 RFSO	1	2	150 RFSO	EFF. SURF. PER UNIT, sq ft	170
6	VENT	1	3/4	3000 CPLG				SHELLS PER UNIT	1 SHELL DIAM 10 3/4 IN.
7	DRAIN	1	3/4	3000 CPLG				EFF. SURF. PER SHELL, sq ft	170
8	TEMP CONN							NO. TUBES PER SHELL	72 LENGTH 144 IN.
9	PRESS CONN							UNITS REQ'D.	1
10	CHEM CLEAN							DELIVERY, WEEKS	
11								PRICE, PER UNIT	
12	SLIP-ON NOZZLE FLANGES ALLOWED (YES) (NO)							EST. FREIGHT COST	
13	SLIP-ON END FLANGES ALLOWED (YES) (NO)							TOTAL PRICE	
14	GASKETS: SHELL							DOLLARS PER SQUARE FOOT	
15	CHANNEL							MATERIALS: (MARK SR AND PERCENT XR)	TEMP
16	FLOATING-HEAD COVER							ITEM	MAT'L. / DEG. F / SPECIFICATION
17								TUBES	A-214
18	TEST RING REQUIRED (YES) (NO)							SHELL	A-53B
19	SPARE GASKETS REQUIRED (YES) (NO)							SHELL COVER (REM) (INTEG)	A-285
20	STACKING HIGH							CHANNEL	
21	INSULATION THICKNESS IN.							CHANNEL COVER (REM) (INTEG)	
22	NO. TUBES 72 OD 3/4 IN.: MIN. THK. 16 BWG							FLOATING HEAD COVER	
23	LENGTH 12' 0" FT; PITCH 15/16 IN. (TR) (SQ)							TUBE SHEETS	A-285C
24	SHELL DIAM 10 3/4 IN. OD MAX BUNDLE DIAM ALLOW IN.							BAFFLES AND SUPPORT PLATES	
25	TRANSVERSE BAFFLE TYPE SPACING IN.							BOLTING: SHELL COVER	
26	PERCENT CUT (VERT.) (HORIZ.) (45 DEG)							CHANNEL	
27	LONG BAFFLE TYPE IMPINGEMENT BAFFLE (YES) (NO)							FLOATING HEAD	
28	TEMA CLASS R ASME CODE REQ'D YES							CHANNEL COVER	

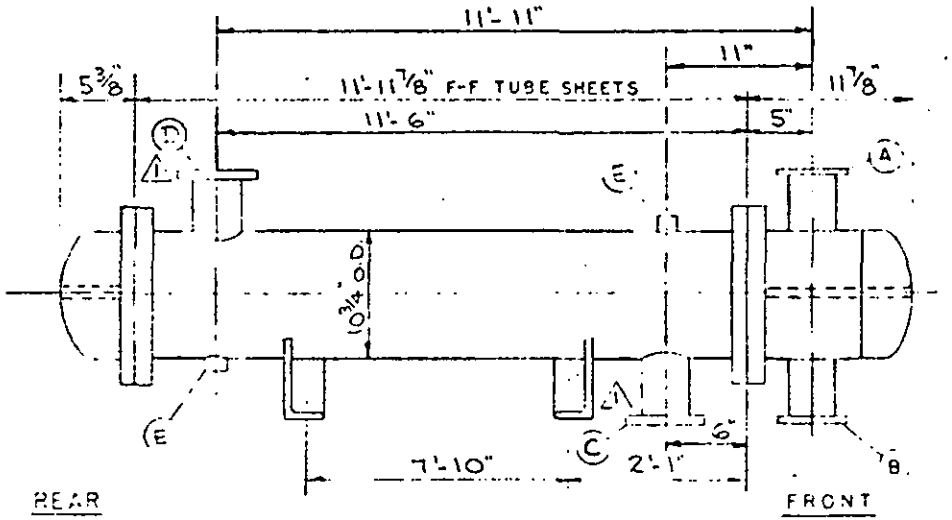
PERFORMANCE OF ONE UNIT

		SHELL SIDE		TUBE SIDE	
29					
30					
31	FLUID CIRCULATED	Cooling Water		Seal Water	
32	TOTAL FLUID ENTERING, lb/hr	30000		15000	
33		IN	OUT	IN	OUT
34	VAPOR, lb/hr	—		—	—
35	LIQUID, lb/hr	—		—	—
36	STEAM, lb/hr	—		—	—
37	WATER, lb/hr	30000	30000	15000	15000
38	NONCONDENSABLES, lb/hr	—	—	—	—
39	GRAVITY: LIQ. DEG API; SG @ 60 F	1.0	1.0	1.0	1.0
40	MOL. WT: VAPOR	—	—	—	—
41	MOL. WT: NONCONDENSABLES	—	—	—	—
42	VISCOSITY: LIQUID, CP	0.98 @ 70 F	0.98 @ 70 F	.98 @ 70 F	.98 @ 70 F
43	HEAT: ~~LATENT~~ SP.	1.0	1.0	1.0	1.0
44	THERM. COND: VAP. LIQ.	@ F	@ F	@ F	@ F
45	TEMPERATURE F	80	100	130	90
46	OPERATING PRESSURE psig	60	—	75	—
47	VELOCITY FPS				
48	NO PASSES	1		4	
49	PRESSURE DROP psi	ALLOW	CALC	ALLOW	CALC
50	FOULING RESISTANCE (MIN.)	.001		.001	
51	PRESSURE, psig	DESIGN 150 TEST 225		DESIGN 150 TEST 225	
52	DESIGN TEMPERATURE, DEG. F	400		400	
53	CORROSION ALLOWANCE: IN.	1/16		1/16	
54	MTD (~~UNCORR~~) (CORR) F 29.8		HEAT EXCHANGED, BTU/HR 600,000		
55	TRANSFER RATE: SERVICE 122		CLEAN 161		
56	WEIGHTS PER SHELL: SHIPPING 1300 lb;	FULL OF WATER lb;		BUNDLE lb;	
57	NOTES: THE CALCULATED SERVICE HEAT TRANSFER RATE (OUTSIDE TUBE AREA OR EXTENDED AREA) IS TO BE DECREASED BY PERCENT FOR ALL				
58	DESIGN CALCULATIONS This is an existing relocated exchanger.				
59	SUPPLIER TO COMPLETE FORM BY FURNISHING INFORMATION FOR BLANK SPACES			SHEET ___ OF ___ REV ___	

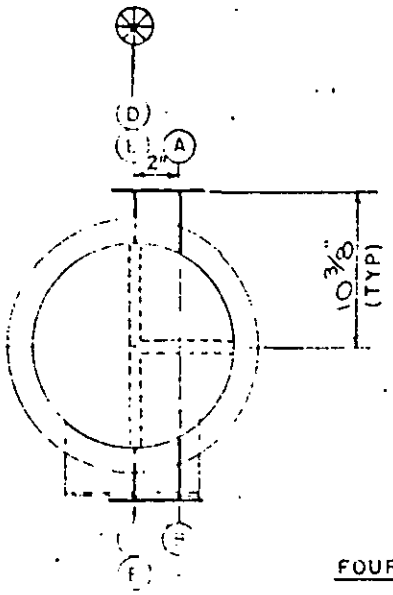
4-421-S

D&R ST'D LL 1064-12H
170 FT² SURFACE

ALL STEEL CONSTRUCTION



SEE FRONT END VIEW FOR TRUE ORIENTATION ALL CONNECTIONS



FRONT END VIEW

FOUR (4) PASS

Final - Approved Print

NOZZLES & FITTINGS

A	2"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 80 PIPE
B	2"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 80 PIPE
C	3"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 40 PIPE
D	3"	150# STD ASA S/O R/F FLG A-181 WITH A-53B SCH 40 PIPE
E	¾"	3000# F.S. HALF COUPLINGS A-105
F		

MATERIALS OF CONSTRUCTION

SHELL	10¾" O.D. SEAMLESS STEEL PIPE A-53B SCH 30
TUBE SHEETS	14½" O.D. FLG QUALITY STEEL A285-C 7/8" THK
TUBES	72-¾" O.D. X 16 BWG A-214 STEEL TUBES 12'-0" LG ON 15/16" PITCH
BONNET FLG.	14½" O.D. STEEL A-201B 1⅛" THK
BONNET CYL.	10¾" O.D. SEAMLESS STEEL A-53B SCH 30 PIPE
BONNET COV.	10¾" O.D. STEEL A-285-C SEMI-ELLIP-HDS 2" SF X ⅜" THK
BAFFLES	STEEL SEGMENTAL TYPE 6⅞" NOM PITCH
GASKETS	COMPRESSED ASBESTOS 1/16" THK X 12" O.D. X 11¼" I.D.
BOLTING	ALLOY A-193 B7/SA 194 12-5/8" DIA BOLTS ON 13⅛" B.C.
SUPPORTS	STEEL A-7 AS PER D&R DWG SK-410

REMARKS

WEIGHT: EMPTY 1300 LBS.
FULL OF WATER _____ LBS.

SPOT X-RAY REQUIRED
SHELL SIDE ☐ YES ☒ NO
TUBE SIDE ☐ YES ☒ NO

TUBES WELDED INTO TUBE SHEETS
☐ YES ☒ NO

PAINTING SHOP COAT ZINC CHROMATE PRIMER GREEN

BOLTING ALL BOLT HOLES TO STRADDLE ℄'S

CORROSION ALLOWANCE:
SHELL SIDE 1/16" TUBE SIDE 1/16"

NO.	REVISION	DATE	DRAWN
1	REV PER CUST HLD PRINT FOR APPROVED FOR CONSTR	3-28-79	RHT

CUSTOMER CONOCO PLASTICS
P.O. NO W-50978
ITEM NO COMPRESSOR SUB-COOLERS

D&R JOB NO M-8096-1 & 2
TWO (2) REQUIRED

DOYLE & ROTH MANUFACTURING CO.
10 HANOVER SQ. NEW YORK, NY 10005

LL1064-12H

DRAWN BY RHT	DATE 3-[illegible]	
CHECKED BY	DWG NO. B-[illegible]-1	
APPROVED BY DATE	SHELL SIDE	TUBE SIDE
DESIGN TEMP	400 °F	400 °F
DESIGN PRESSURE	150 PSI	150 PSI
TEST PRESSURE	[illegible] PSI	[illegible] PSI
CODE ASME STAMP	☒ YES ☐ NO	TEMA

ABD00185031

A

ENGINEERING CENTER

SPECIFICATION SHEET

CENTRIFUGAL PUMPS

A.F.E. NO. _____
DATE _____ W. O. NO. _____
MADE BY _____ INQ. NO. _____
APP'D BY _____ REQ. NO. _____
B.M. NO. _____ P. O. NO. _____

PLANT LOCATION ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

APPLICABLE TO: ESTIMATE ( ) PURCHASE ( )

TAG. NO. P-707 & P-708

SERVICE SEAL WATER PUMPS

MOTOR DRIVE (✓) TURBINE ( )

OPERATING CONDITIONS

LIQUID	WATER	U.S. gpm at PT. NOR.	DES 30
		DISCH PRESS., psig	114
PT F	130	SUCT PRESS., psig MAX	DES 0
SP GR at PT	.986	DIFF PRESS., psi	75
VAP PRESS. at PT, psia	2.2	DIFF HEAD, ft	175
VIS at PT, ~~Saa~~	.435 0.5	NPSH AVAIL., ft	/
CORR/EROS caused by			

CONSTRUCTION

CASING-MOUNTING (CENTERLINE) (FOOT) (BRACKET) (VERTICAL)

SPLIT (AXIAL) (RADIAL)

TYPE (SINGLE VOLUTE) (DOUBLE VOLUTE) (DIFFUSER)

TAPPED OPENINGS (VENT X) (DRAIN X) (GAGE CONNS.)

NOZZLES	SIZE	ASA RATING	FACING	POSITION
SUCTION				
DISCHARGE				

MATERIAL CODE—EXTERNAL CASING DI INTERNAL PARTS

I–CAST IRON	INTERNALS CODE	I	B	S	C	X
B–BRONZE	IMPELLER	I	B	(S)	C	
S–STEEL	INNER CASE PARTS	I	I	S	C	
C–11-13% Cr	SLEEVE (PACKED)	Cr	Cr	Af	Af	
A–ALLOY	SLEEVE (SEAL)	C	C	C	C	
h–HARDENED	WEAR PARTS	I	B	Cr	Cr	
f–FACED	SHAFT	S	S	S	S	
X–						

DI - DUCTILE IRON

MOTOR DRIVER BY			TURBINE DRIVER BY		
ITEM NO.		MTD BY	ITEM NO.		MTD BY
HP	RPM	FRAME	HP	RPM	MAT'L
MFR			MFR and TYPE		
OR COMPANY APPV'D. EQUAL			INLET STEAM, psig		TEMP F
TYPE		INSUL	EXHAUST		
ENC EXP PROOF		TEMP RISE C	STEAM RATE, FL		lb/BHP HR
VOLTS PHASE-CYCLES	460/3/60		BEARINGS		LUBE
BEARINGS		LUBE	NOZZLES	SIZE / ASA RATING / FACING / POSITION	
FULL LOAD AMPS			INLET		
			EXHAUST		

REMARKS:

SINGLE MECH SEAL WITH FLUSH

PUMP IS TO BE MANUFACTURED IN ACCORDANCE WITH THE FOLLOWING STANDARDS.

AVS

( ) INDICATES ITEM CHANGED ON LATEST REVISION.

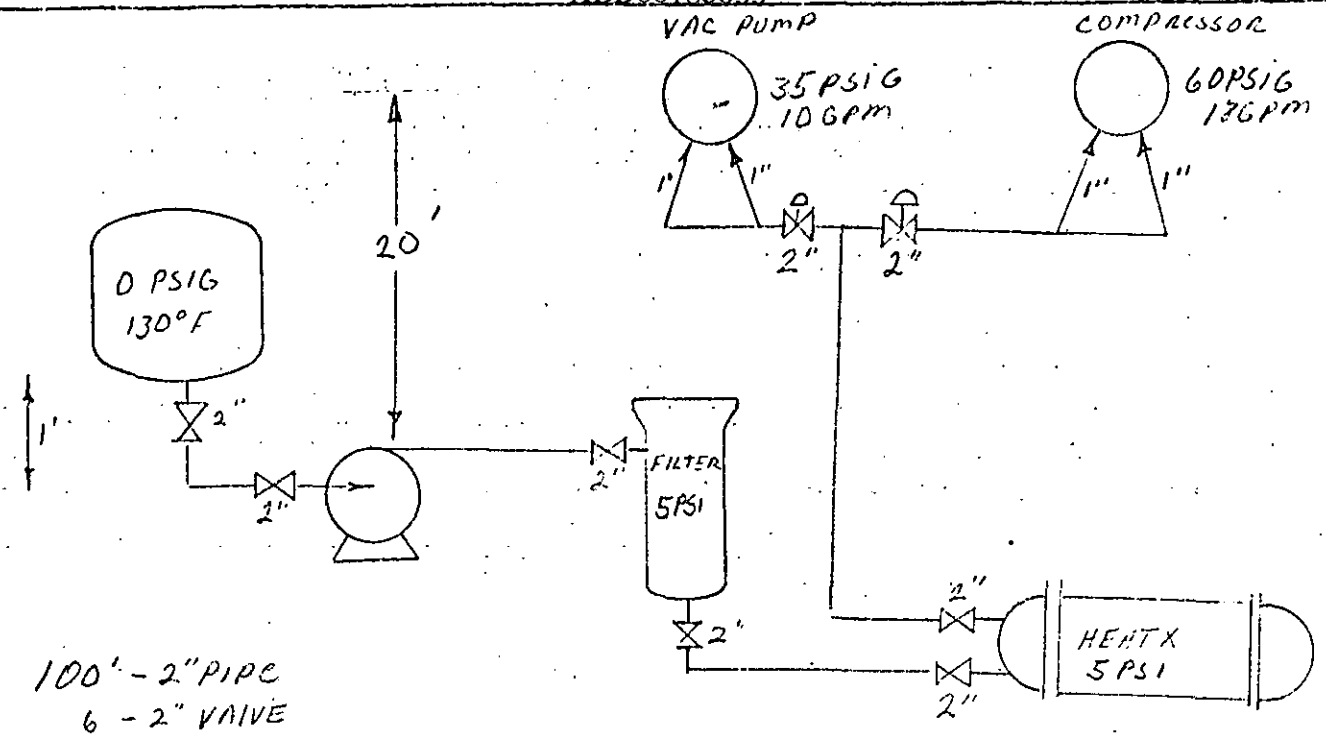
QUOTATION WILL NOT BE CONSIDERED IF SUPPLIER DOES NOT COMPLETE RIGHT HAND COLUMN.

SHEET _____ OF _____ REV. _____

VENDOR	
MANUFACTURER	
SIZE AND TYPE	
STAGES	
RPM	
ROTATION FACING CPLG	
DESIGN EFF.	
DESIGN B.H.P.	
MAX. B.H.P.	
HP DRIVER	
DESIGN DIA. IMP.	
MAX. DIA. IMPELLER	
N.P.S.H. REQD. IN FT. FLUID PUMPED	
MFRS. BEARING No.	
RADIAL	
THRUST	
PACKING OR SEAL	
FLUSHING, GPM	
MATERIAL EXCEPTIONS BY VENDOR	
WATER COOLING	
BEARINGS	
STUFF. BOX	
PEDESTAL	
GLAND	
TOTAL C.W. REQD.	
COUPLING MFR	
COUPLING, TYPE	
GUARD	
MECH. SEAL, MFR	
MECH. SEAL, TYPE	
PACKING	
DELIVERY, WEEKS	
PUMP PRICE	
DRIVER PRICE	
EST. FREIGHT	
TOTAL PRICE	

4-424-S

ABD00185033



SUCTION PRESSURE		
Origin Pressure	psia	14.7
Static Head	psi	.5
Line Loss Δ P	psi	1
PUMP SUCTION PRESSURE	psia	14.2

NET POSITIVE SUCTION HEAD		
Static Head	feet	1
-Line Loss	feet	.2
+Vapor Press. Correction*	feet	~~28.2~~
AVAILABLE NPSH	feet	13.0 → 29

DISCHARGE PRESSURE		
Delivery Pressure	psia	74.7
Static Head	psi	8.6
Δ P Control Valve(s)	psi	3.0
Δ P Exchanger(s)	psi	5
Δ P ~~Furnace(s)~~ FILTER	psi	5
Δ P Orifice(s)	psi	0
Line Loss Δ P	psi	1
Other 2 psi Min. Dynamic	psi	2
PUMP DISCHARGE PRESS.	psia	99.3

MAXIMUM SUCTION PRESSURE		
Vessel S. V. Setting	psia	164.7
Static Head	psi	.5
NET	psia	165.2

MAXIMUM DISCHARGE PRESSURE		
Max. Suction Press.	psia	165.2
Normal Pump Δ P	psi	75
T	psia	240.2

LIQUID		
PUMPING TEMP.	°F	= 130
VISCOSITY	@ 130°F cp	= .435
VAPOR PRESS.	@ 130°F psia	= 2.2
SPECIFIC GRAV.	@ 130°F	= .986
#/GALLON	@ 130°F	= 8.2
GPM	@ 60°F	= 30
GPM	@ 130°F	= 30

DIFFERENTIAL PRESSURE

Discharge Press. psia = 99.3

Suction Press. psia = 14.2

TOTAL PUMP Δ P { psi = 75 / feet = 175

GPM DESIGN = 30

BRAKE HORSEPOWER

$$BHP = \frac{30 \text{ gpm} \times 75 \text{ psi}}{1715 \times 0.6 \text{ Pump Eff.}}$$

PUMP CALCULATION SHEET

PLANT

Job No. Pump No. NP-708

By: Checked: NP-707

Date Rev.

Sketch No.

*Use for Liquids NOT at their bubble point.

V.P. Corr. = Orig. VP - Vapor Pr

12.2 = 14.7 − 2.2

EA 141 4-59

CONOCO

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

AFE NO _____ A

DATE _____ W O NO _____

MADE BY _____ INQ NO _____

APP'D BY _____ REQ NO _____

B M NO _____ P O NO _____

PLANT Aberdeen PVC PROJECT EMISSIONS RECOVERY SYSTEM

~~MEMO~~
~~SERVICE~~

ITEM NO	FT-709
SERVICE	SEALWATER FILTER
LOCATION	DISCHARGE of NP-707 & 708
TYPE	CARTRIDGE
STREAM HANDLED	
FLUID	SEAL WATER
TEMP °F, NORMAL (DESIGN)	100-150 (300)
PRESS. PSIG NORMAL (DESIGN)	70-100 (150)
FLOWRATE, gpM, NORMAL (DESIGN)	30 (60)
Specific Gravity at T AND P	0.99
Viscosity, Cp AT T AND P	0.62
Solids Removed	PVC RESIN
ALLOWABLE CLEAN ΔP, PSI	3
PARTICLE RETENTION, MICRONS	100
MATERIAL OF CONSTRUCTION	
FILTER	C.S.
Element	Polypropylene

NOTE: USE EXISTING V-12 CHARGE WATER FILTER CONOCO. NO. 64-002. NEED TO ORDER FILTER elements and overhaul

Filterite TYPE 36MS03-3FD-C150

SHEET _____ OF _____ REV

A

EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

V. INSTRUMENT SPECIFICATIONS

Instrument List

Item	Description		Location
FIC-701	Rotameter	1/2 GPM ↓	Ins. Flush T-701
FIC-704	Rotameter	FISCHER PORTER MODEL 1152	Line HM-739
FIC-705	Rotameter		Line HM-736
FIC-706	Rotameter		Line HM-733
FIC-704A	Rotameter	200 PSIG 1/2 GPM 1 GPM 70°F	Vac. Pump P-704
FIC-704B	Rotameter		Vac. Pump P-704
FIC-704C	Rotameter		Vac. Pump P-704
FIC-704D	Rotameter		Vac. Pump P-704
FIC-705A	Rotameter		Compres. C-705
FIC-705B	Rotameter		Compres. C-705
FIC-705C	Rotameter		Compres. C-705
FIC-705D	Rotameter		Compres. C-705
FIC-706A	Rotameter		Compres. C-706
FIC-706B	Rotameter		Compres. C-706
FIC-707C	Rotameter		Compres. C-706
FIC-706D	Rotameter		Compres. C-706
PG-701	Pressure Gauge		T-701
PG-702	Pressure Gauge		T-702
PG-703	Pressure Gauge		T-703
PG-704	Pressure Gauge		P-704
PG-709A	Pressure Gauge		P-709
PG-709B	Pressure Gauge		FT-709
PIC-701	Pressure Indicating Controller		Line HM-701 ←
PA-701	Pressure Alarm - High		T-701
PA-702	Pressure Alarm - High		T-702
PA-703	Pressure Alarm - High		T-703
PS-701	Pressure Switch		T-701
PS-702	Pressure Switch		T-702
PS-703	Pressure Switch		T-703
LG-701	Level Gauge	EXISTING	T-701
LG-702	Level Gauge		T-702
LG-703	Level Gauge		T-703
LA-701	Level Alarm		T-701
LA-702	Level Alarm		T-702
LA-703	Level Alarm		T-703

A

V. INSTRUMENT SPECIFICATIONS - CONTINUED

Item	Description	Location
LS-701A	Level Switch $300 ea	T-701
LS-701B	Level Switch	T-701
LS-701C	Level Switch	T-701
LS-702A	Level Switch	T-702
LS-702B	Level Switch	T-702
LS-702C	Level Switch	T-702
LS-703A	Level Switch	T-703
LS-703B	Level Switch	T-703
LS-703C	Level Switch	T-703
TG-701	Temperature Gauge	T-701
TG-702	Temperature Gauge	T-702
TG-703	Temperature Gauge	T-703
TG-709	Temperature Gauge	Line HM-726
TG-709A	Temperature Gauge	EA-709A
TG-709B	Temperature Gauge	EA-709B
TG-709C	Temperature Gauge	EA-709C
TA-702	Temperature Alarm	T-702
TA-703	Temperature Alarm	T-703
TS-702	Temperature Switch	T-702
TS-703	Temperature Switch	T-703
TIC-709	Temperature Indicating Controller	Line HM-726
CV-701	On-Off Valve	T-701
CV-702	On-Off Valve	T-702
CV-703	On-Off Valve	T-703
CV-601	On-Off Valve	Blowdown Tank
SV-701	Relief Valve	T-701
SV-702	Relief Valve	T-702
SV-703	Relief Valve	T-703
SV-704	Relief Valve	Line HM-707
SV-705	Relief Valve	Line HM-710
SV-706	Relief Valve	Line HM-712
RD-701	Rupture Disc	T-701
RD-702	Rupture Disc	T-702
RD-703	Rupture Disc	T-703
RD-704	Rupture Disc	Line HM-707
RD-705	Rupture Disc	Line HM-710
RD-706	Rupture Disc	Line HM-712
~~RO-704A~~	~~Restriction Orifice~~	
RO-704A	Restriction Orifice	Line HM-763
RO-704B	Restriction Orifice	Line HM-764
RO-705A	Restriction Orifice	Line HM-775
RO-705B	Restriction Orifice	Line HM-774
RO-706A	Restriction Orifice	Line HM-782
RO-706B	Restriction Orifice	Line HM-781

V. INSTRUMENT SPECIFICATIONS - CONTINUED

Item	Description	Location
-	Shutdown Description	
-	Local Panel Board Description	

A

ENGINEERING CENTER
PONCA CITY, OKLAHOMA
SPECIFICATION SHEET
FLOW INSTRUMENTS

A.F.E. NO. _____
DATE 10/11/76 W.O. NO _____
MADE BY JRM INQ. NO. _____
APP'D BY _____ REQ. NO. _____
P. M. NO. _____ P. O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	FIC-701
2	SERVICE	HPSW FLUSH TO
3		LW-701
4	INSTRUMENT, TYPE	ROTAMETER
5	LOCATION	LINE
6	ELEMENT TYPE	
7	LOCATION	
8	ORIFICE, IN. / CONDUCT	
9	D/D, IN.	
10	RANGE, IN. H_2O	
11	ELEM. LOCATION	
12	VALVE TYPE	
13		
14	LOCATION	
15	MATERIAL	
16	BODY SIZE / PORT SIZE	
17	PLUG SIZE	
18	ΔP / MIN / NOR / MAX	
19	CAGE CV / VALVE CV	
20	AIR TO OPEN OR CLOSE	
21	MAX. SHUTOFF ΔP	
22	FLUID	HPSW
23	TEMPERATURE °F	70
24	PRESSURE PSIG	200
25	SP. GR. (AIR = 1)	(1.0)
26	SP. GR. AT STD. COND.	1.0
27	SP. GR. AT FLT.	1.0
28	CRIT. AT T & P / COMPRESSIBILITY	
29	V. DENSITY AT FLT.	0.98
30	BASE FORMAL	GPM .5
31	RATE MAX / MIN	GPM 2 .2
32	NOTES	

SHEET _____ OF _____ REV _____

A

ENGINEERING CENTER
PONCA CITY, OKLAHOMA
SPECIFICATION SHEET
FLOW INSTRUMENTS

A.F.E. NO. _____
DATE 10/11/76 W.O. NO. _____
MADE BY JRM. ING. NO. _____
APP'D BY _____ REQ. NO. _____
B.M. NO. _____ P.O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	FIC-704	FIC-705	FIC-706
2	SERVICE	SEAL WATER	SEAL WATER	SEAL WATER
3				
4	INSTRUMENT, TYPE	FLOW IND Controller	Flow IND. Controller	Flow IND. Controller
5	LOCATION	2-HM-739	2-HM-736	2-HM-733
6	RECEIVING TYPE	ROTA METER	ROTA METER	ROTAMETER
7	LOCATION	2-HM-739	2-HM-736	2-HM-733
8	LINE SIZE, IN. / SCHEDULE	2 / 40	2 / 40	2 / 40
9	ORIF. IN.	—	—	—
10	RANGE, IN. H_2O	—	—	—
11	MATERIAL	—	—	—
12	VALVE TYPE			
13		SEE NOTE 1	SEE NOTE 1	SEE NOTE 1
14	LOCATION			
15	MATERIAL			
16	BODY SIZE / RATING			
17	PLUG FORM			
18	ΔP MIN / NOR / MAX			
19	ORIF. CV / VALVE CV			
20	AIR TO OPEN OR CLOSE			
21	MAX. SHUTOFF ΔP			
22	FLUID	WATER	WATER	WATER
23	TEMPERATURE °F	90	90	90
24	PRESSURE PSIG	70	70	70
25	SP. GR. (W)	—	—	—
26	ORIF. CF AT STD. COND.	1.0	1.0	1.0
27	SP. GR. AT FLT.	1.0	1.0	1.0
28	STEAM AT P.S.I. / SUPERHEAT °F			
29	VISCOSITY AT FLT.	.76	.76	.76
30	RATE NORMAL GPM	1.0	1.8	1.8
31	RATE MIN / MAX			
32	NOTES			

NOTE (1) USE FISCHER & PORTER MODEL 1152

SHEET ____ OF ____ REV ____

A

ENGINEERING CENTER
PONCA CITY, OKLAHOMA
SPECIFICATION SHEET
FLOW INSTRUMENTS

A.F.E. NO. _____
DATE 10/11/76 W.O. NO _____
MADE BY JRM IND. NO. _____
APP'D BY _____ REQ. NO _____
E.M. NO. _____ P.O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	FIC-704A	FIC-704B	FIC-704C	FIC-704D
2	SERVICE	HPSW FLUSH	HPSW FLUSH	HPSW FLUSH	HPSW FLUSH
3					
4	INSTRUMENT TYPE	ROTAMETER	ROTAMETER	ROTAMETER	ROTAMETER
5	LOCATION	P-704	P-704	P-704	P-704
6	ELEMENT TYPE				
7	LOCATION				
8	LINE SIZE, IN. / SCHEDULE				
9	PIPE ID				
10	RANGE, IN. H2O				
11	MATERIAL/ROTOR				
12	VALVE TYPE				
13					
14	LOCATION				
15	MATERIAL				
16	BODY SIZE / PORT SIZE				
17	PLUG FORM				
18	ΔP / MIN / NOR / MAX				
19	CALC Cv / VALVE Cv				
20	APP TO OPEN OR CLOSE				
21	MAX. PROTECTED ΔP				
22	FLUID	WATER	WATER	WATER	WATER
23	FLUID TEMP. °F	70	70	70	70
24	PIPE SUPPLIED	200	200	200	200
25	[illegible]	(18)	(18)	(18)	(18)
26	SP. G. AT STD. CONDS.	1.0	1.0	1.0	1.0
27	SP. GR. AT F.T.	1.0	1.0	1.0	1.0
28	COMPR. AT F.T. / COMPRESSIBILITY				
29	VISCOSITY AT F.T.	0.98	0.98	0.98	0.98
30	RATE, NORMAL GPM	1	1/2	1/2	1
31	RATE, MAX / MIN GPM	2 / .2	2 / .2	2 / .2	2 / .2
32	REMARKS				

SHEET _____ OF _____ REV _____

A

ENGINEERING CENTER
PONCA CITY, OKLAHOMA
SPECIFICATION SHEET
FLOW INSTRUMENTS

A.F.E. NO. _____
DATE 10/11/76 W. O. NO. _____
MADE BY JRM INO. NO. _____
APP'D BY _____ REQ. NO. _____
B. M. NO. _____ P. O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	FIC-705 A	FIC-705 B	FIC-705 C	FIC-705 D
2	SERVICE	HPSW FLUSH	HPSW FLUSH	HPSW FLUSH	HPSW FLUSH
3					
4	INSTRUMENT TYPE	ROTAMETER	ROTAMETER	ROTAMETER	ROTAMETER
5	LOCATION	C-705	C-705	C-705	C-705
6	ELEMENT TYPE				
7	LOCATION				
8	LINE SIZE, IN. / SCHEDULE				
9	FLOW, LB./HR.				
10	RANGE, IN. H2O				
11	ELEMENT SPECIAL				
12	VALVE TYPE				
13					
14	LOCATION				
15	MATERIAL				
16	BODY SIZE / PORT SIZE				
17	PLUG FORM				
18	ΔP / MIN. / NOR. / MAX.				
19	SHUT OFF / VENT OR				
20	AIR TO OPEN OR CLOSE				
21	MAX. PRESS. DROP ΔP				
22	FLUID	WATER	WATER	WATER	WATER
23	TEMPERATURE °F	70	70	70	70
24	PRESSURE PSIG	200	200	200	200
25	SPECIFIC GRAVITY	(18)	(18)	(18)	(18)
26	SP. GR. AT STD. COND.	1.0	1.0	1.0	1.0
27	SP. GR. AT N.T.	1.0	1.0	1.0	1.0
28	CRYO. ATT'D / CONDENSATE				
29	VISCOSITY AT N.T.	0.98	0.98	0.98	0.98
30	MAX. NORMAL GPM	1	1/2	1/2	1
31	RATE MAX. / MIN. GPM	2 .2	2 .2	2 .2	2 .2
32	NOTES				

SHEET ____ OF ____ REV ____

A

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PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

FLOW INSTRUMENTS

A.F.E. NO. _____

DATE 10/11/76 W. O. NO. _____

MADE BY JRM ING. NO. _____

APP'D BY _____ REQ. NO. _____

B. M. NO. _____ P. O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	FIC-706 A	FIC-706 B	FIC-706 C	FIC-706 D
2	SERVICE	HPSW FLUSH	HPSW-FLUSH	HPSW FLUSH	HPSW-FLUSH
3					
4	INSTRUMENT, TYPE	ROTAMETER	ROTAMETER	ROTAMETER	ROTAMETER
5	LOCATION	C-706	C-706	C-706	C-706
6	ELEMENT TYPE				
7	LOCATION				
8	LINE SIZE, IN. / SCHEDULE				
9	BORE, IN.				
10	RATING, PSI H_2O				
11	MATERIAL				
12	VALVE TYPE				
13					
14	LOCATION				
15	MATERIAL				
16	BODY SIZE / PORT SIZE				
17	PLUG PORT				
18	ΔP / MIN / NOR / MAX				
19	CAGE Cv / VALVE Cv				
20	AIR TO OPEN OR CLOSE				
21	MAX. SHUTOFF ΔP				
22	FLUID	WATER	WATER	WATER	WATER
23	TEMPERATURE °F	70	70	70	70
24	PRESSURE PSIG	200	200	200	200
25	ΔP	(18)	(18)	(18)	(18)
26	SPECIFIC GRAVITY	1.0	1.0	1.0	1.0
27	SPECIFIC HEAT	1.0	1.0	1.0	1.0
28	VISC. AT T & P / COMPRESSIBILITY				
29	VOLUMETRIC FLOW	0.98	0.98	0.98	0.98
30	RATE FORMAT	GPM	1	1/2	1/4	1
31	RATE MIN / NOR / MAX	GPM	2 / .2	2 / .2	2 / .2	2 / .2

NOTES

SHEET ____ OF ____ REV ____

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CONOCO

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

PRESSURE GAUGES

A F E NO _____

DATE 10/11/76 W O NO _____

MADE BY JRM INO NO _____

APP'D BY _____ REQ. NO _____

B M NO _____ P O NO _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

	TAG NO.	SERVICE	INSTRUMENT RANGE, PSIG	OPERATING PRESS PSIG	OPERATING TEMP, °F	LOCATION
3	PG-701	VCM VAPOR / WATER	30"Hg VAC-200	20"Hg VAC	150	T-701
4	PG-702	VCM VAPOR / WATER	30"Hg VAC-200	0 PSIG	130	T-702
5	PG-703	VCM VAPOR / WATER	30"Hg VAC-200	80 PSIG	130	T-703
6	PG-704	VCM VAPOR	30"Hg VAC-200	0 PSIG	130	P-704 DISCHARGE
7	PG-709A	WATER	0 - 200	100	130	P-707 DISCHARGE
8	PG-709B	WATER	0 - 200	100	130	FT-709 DISCHARGE

QUOTATION WILL NOT BE CONSIDERED IF SUPPLIER DOES NOT COMPLETE RIGHT HAND COLUMN

SHEET _____ OF _____ REV

CONOCO

ENGINEERING CENTER

PONCA CITY, OKLAHOMA
SPECIFICATION SHEET
PRESSURE INSTRUMENTS

A.F.E. NO. _____
DATE _____ W. O. NO. _____
MADE BY _____ INQ. NO. _____
APP'D BY _____ REQ. NO. _____
B. M. NO. _____ P. O. NO. _____

PLANT Aberdeen PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	PIC-701				
2	SERVICE	VCM Flow				
3		To T-701				
4	INSTRUMENT, TYPE	Press. IND. Contr.				
5	LOCATION	BOARD				
6	RANGE, PSIG	30"Hg -				
7	ELEMENT	Press. TRANS.				
8	TYPE / MATERIAL	Diaph Seal				
9	LOCATION	T-701				
10	TEMPERATURE °F	150				
11	PRESSURE PSIG	20" Hg Vac				
12	VALVE TYPE	BALL				
13	TAG. NO	PICV-701				
14	LOCATION	2-HM-701				
15	MATERIAL	C.S				
16	BODY SIZE / PORT SIZE	2				
17	PLUG FORM					
18	△P / MIN. / NOR. / MAX.	70				
19	CALC C_g / VALVE Cv	77(1)				
20	AIR TO OPEN OR CLOSE	ATO				
21	MAX SHUTOFF △P	100				
22	FLUID	VCM Vapor				
23	TEMPERATURE °F	70°				
24	PRESSURE PSIG	60				
25	°API (M. W.)					
26	SP. GR. AT STD COND. AIR	2.17				
27	SP. GR. AT P. & T.					
28	WEIGHT % VAPOR IN-OUT					
29	VISCOSITY AT P. & T.					
30	RATE, NORMAL lb/hr	626				
31	RATE / MAX. / MIN.	1200.				
32	NOTES					

(1) C_g = 77 at Normal flow 626 #/hr (3600 SCFM)
↳ SCFH
C_1 = 35
Valve to be sized to handle max flow

SHEET _____ OF _____ REV _____

A

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PONCA CITY, OKLAHOMA
SPECIFICATION SHEET
PRESSURE INSTRUMENTS

A.F.E. NO. _____
DATE _____ W. O. NO. _____
MADE BY _____ INQ. NO. _____
APP'D BY _____ REQ. NO. _____
B. M. NO. _____ P. O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSION RECOVERY SYSTEM

1	TAG NO	PA-701	PA-702	PA-703	
2	SERVICE	High Press T-701	High Press T-702	High Press T-703	
3					
4	INSTRUMENT, TYPE	ALARM	ALARM	ALARM	
5	LOCATION	BOARD	BOARD	BOARD	
6	RANGE, PSIG	0-100	0-100	0-200	
7	ELEMENT	Press. SWITCH	Press Switch	Press Switch	
8	TYPE / MATERIAL	Diaph Seal	Diaph Seal	Diaph Seal	
9	LOCATION	T-701	T-702	T-703	
10	TEMPERATURE °F	130	130	130	
11	PRESSURE PSIG	15	25	100	
12	~~VALVE~~ TYPE	SW.	Electric	Electric	Electric
13	TAG. NO.	PS-701	PS-702	PS-703	
14	~~CONNECTION~~				
15	MATERIAL				
16	BODY SIZE / PORT SIZE				
17	PLUG FORM				
18	△P / MIN. / NOR. / MAX.				
19	CALC. Cv / VALVE Cv				
20	AIR TO OPEN OR CLOSE				
21	MAX. SHUTOFF △P				
22	FLUID				
23	TEMPERATURE °F				
24	PRESSURE PSIG				
25	°API (M. W.)				
26	SP. GR. AT STD. COND.				
27	SP. GR. AT P. & T.				
28	WEIGHT % VAPOR IN-OUT				
29	VISCOSITY AT P. & T.				
30	RATE, NORMAL				
31	RATE / MAX / MIN				
32	NOTES:				

(1) PA-701, 702, 703 to be tied into multi-alarm panel on Local Panel

(2) PS-701, 702, 703 to be tied into auto-shutdown system.

SHEET _____ OF _____ REV. _____

A

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PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

LIQUID LEVEL INSTRUMENTS

A F E NO _____ _____

DATE _____ W O NO _____

MADE BY _____ INO NO. _____

APP'D BY _____ REQ NO _____ _____

B M. NO _____ P. O NO. _____

PLANT Aberdeen PVC PROJECT: EMISSIONS RECOVERY SYSTEM

1	TAG NO	LG-701	LG-702	LG-703	
2	SERVICE	Level IN T-701	level IN T-702	level IN T-703	
3					
4	INSTRUMENT, TYPE	level Guage	Level Guage	Level Guage	
5	LOCATION	Local	Local	Local	
6	ELEMENT, TYPE	TRANSPARENT	TRANSPARENT	TRANSPARENT	
7	LOCATION	T-701	T-703	T-703	
8	RANGE, INCHES	45	45	45	
9	INTERFACE	VCM / H_2O	VCM / H_2O	VCM / H_2O	
10	UPPER DENSITY, LB./CU. FT.	0.55 - 1.1	0.55 - 1.1	0.55 - 1.1	
11	LOWER DENSITY, LB./CU. FT.	61.2 - 62	61.2 - 62	61.2 - 62	
12	TEMPERATURE °F	100 - 150	100 - 150	100 - 150	
13	PRESSURE PSIG	20" Hg Vac	1 PSIG	40 - 80	
14	VALVE TYPE				
15					
16	LOCATION				
17	MATERIAL				
18	BODY SIZE / PORT SIZE				
19	PLUG FORM				
20	ΔP / MIN. / NOR. / MAX.				
21	CALC. Cv / VALVE Cv				
22	AIR TO OPEN OR CLOSE				
23	MAXIMUM SHUTOFF ΔP				
24	FLUID	VCM / H_2O	VCM / H_2O	VCM / H_2O	
25	TEMPERATURE °F MAX	300	300	300	
26	PRESSURE PSIG MAX	150	150	150	
27	°API (L.V.)				
28	SP. GR. AT STD. COND.				
29	SP. GR. AT P. & T.				
30	WEIGHT % VAPOR IN-OUT				
31	VISCOSITY AT P. & T.				
32	RATE, NORMAL				
33	RATE:				
34	MAX. / MIN				
35	NOTES:				

(1) USE EXISTING level Guages ON TANKS Clean and overhaul

SHEET _____ OF _____ REV. _____

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

LIQUID LEVEL INSTRUMENTS

A F E NO. _____ _____

DATE 12/11/76 W O NO. _____

MADE BY JRM INQ NO. _____

APP'D BY _____ REQ NO _____

B M. NO _____ P. O NO _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	LS-701A (1)	LS-701B (1)	LS-701C (1)	LA-701
2	SERVICE	T-701 LOW LEVEL	T-701	T-701	HIGH LEVEL T-701
3		(2)	(2)	(3)	(3)
4	INSTRUMENT, TYPE	LIQUID LEVEL CONTROLLER	LIQ. LEVEL CONTR.	LIQ. LEVEL CONTR.	HIGH LEVEL
5	LOCATION	LOCAL	LOCAL	LOCAL	PANEL
6	ELEMENT, TYPE	FLOAT	FLOAT	FLOAT	FLOAT
7	LOCATION	LW-701	LW-701	LW-701	LW-701
8	RANGE, INCHES				
9	INTERFACE	VCM VAPOR/WATER	VCM VAPOR/WATER	VCM VAPOR/WATER	VCM VAPOR/WATER
10	UPPER DENSITY, LB./CU. FT.				
11	LOWER DENSITY, LB./CU. FT.				
12	TEMPERATURE °F				
13	PRESSURE PSIG				
14	VALVE TYPE				
15					
16	LOCATION				
17	MATERIAL				
18	BODY SIZE / PORT SIZE				
19	PLUG FORM				
20	ΔP / MIN. / NOR. / MAX.				
21	CALC. Cv / VALVE Cv				
22	AIR TO OPEN OR CLOSE				
23	MAXIMUM SHUTOFF ΔP				
24	FLUID	WATER	WATER	WATER	WATER
25	TEMPERATURE °F				
26	PRESSURE PSIG				
27	~~VAC~~ (N.W.)	(18)	(18)	(18)	(18)
28	SP. GR. AT STD. COND.				
29	SP. GR. AT P. & T.				
30	WEIGHT % VAPOR IN-OUT				
31	VISCOSITY AT P. & T.				
32	RATE, NORMAL				
33	RATE:				
34	MAX. / MIN.				
35	NOTES:				

(1) INSTRUMENT TO BE MOORE ELECTRIC LIQUID LEVEL CONTROLLER MODEL 27-S-415-N WITH 3½" 316 SS BALL FLOAT AND EXPLOSION PROOF HEAVY DUTY MICRO SWITCH.

(2) LS-701A TO CLOSE CV-701 AND LS-701B OPENS CV-701.

(3) LS-701C TO SHUT DOWN SYSTEM UPON HIGH LEVEL IN T-701

SHEET _____ OF _____ REV. _____

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

LIQUID LEVEL INSTRUMENTS

A F E NO. _____

DATE 10/11/76 W. O NO. _____

MADE BY JRM INO NO. _____

APP'D BY _____ REQ NO _____

B M. NO _____ P. O NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	LS-702 A (1)	LS-702 B (1)	LS-702 C (1)	LA-702
2	SERVICE	T-702 LOW LEVEL	T-702	T-702	HIGH LEVEL T-702
3		(2)	(2)	(3)	(3)
4	INSTRUMENT, TYPE	LIQ. LEVEL CONTROLLER	LIQ. LEVEL CONTROLLER	LIQ. LEVEL CONTROLLER	HIGH LEVEL ALARM
5	LOCATION	LOCAL	LOCAL	LOCAL	PANEL
6	ELEMENT, TYPE	FLOAT	FLOAT	FLOAT	FLOAT
7	LOCATION	LW-702	LW-702	LW-702	LW-702
8	RANGE, INCHES				
9	INTERFACE	VCM VAPOR / WATER	VCM VAPOR / WATER	VCM VAPOR / WATER	VCM VAPOR / WATER
10	UPPER DENSITY, LB./CU. FT.				
11	LOWER DENSITY, LB./CU. FT.				
12	TEMPERATURE °F				
13	PRESSURE PSIG				
14	VALVE TYPE				
15					
16	LOCATION				
17	MATERIAL				
18	BODY SIZE / PORT SIZE				
19	PLUG FORM				
20	ΔP / MIN. / NOR. / MAX.				
21	CALC. Cv / VALVE Cv				
22	AIR TO OPEN OR CLOSE				
23	MAXIMUM SHUTOFF ΔP				
24	FLUID	WATER	WATER	WATER	WATER
25	TEMPERATURE °F				
26	PRESSURE PSIG				
27	~~MW~~ (M.W.)	(18)	(18)	(18)	(18)
28	SP. GR. AT STD. COND.				
29	SP. GR. AT P. & T.				
30	WEIGHT % VAPOR IN--OUT				
31	VISCOSITY AT P. & T.				
32	RATE, NORMAL				
33	RATE				
34	MAX. / MIN.				
35	NOTES:				

(1) INSTRUMENT TO BE MOORE ELECTRIC LIQUID LEVEL CONTROLLER MODEL 27-S-415-N WITH 3½" 316 SS BALL FLOAT AND EXPLOSION PROOF HEAVY DUTY MICRO SWITCH.

(2) LS-702A TO CLOSE CV-702 AND LS-702B TO OPEN CV-702.

(3) LS-701C TO SHUT DOWN SYSTEM UPON HIGH LEVEL IN T-702.

SHEET _____ OF _____ REV. _____

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PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

LIQUID LEVEL INSTRUMENTS

A F E NO. _____

DATE 10/11/76 W. O NO. _____

MADE BY JBM INO NO. _____

APP'D BY _____ REQ NO _____

B M. NO _____ P. O NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	LS-703A (1)	LS-703B (1)	LS-703C (1)	LA-703
2	SERVICE	T-703 LOW LEVEL	T-703	T-703	HIGH LEVEL T-703
3		(2)	(2)	(3)	(3)
4	INSTRUMENT, TYPE	LIQ. LEVEL CONTROL	LIQ. LEVEL CONTROL	LIQ. LEVEL CONTROL	HIGH LEVEL ALARM
5	LOCATION	LOCAL	LOCAL	LOCAL	PANEL
6	ELEMENT, TYPE	FLOAT	FLOAT	FLOAT	FLOAT
7	LOCATION	LW-703	LW-703	LW-703	LW-703
8	RANGE, INCHES				
9	INTERFACE	VCM VAPOR/WATER	VCM VAPOR/WATER	VCM VAPOR/WATER	VCM VAPOR/WATER
10	UPPER DENSITY, LB./CU. FT.				
11	LOWER DENSITY, LB./CU. FT.				
12	TEMPERATURE °F				
13	PRESSURE PSIG				
14	VALVE TYPE				
15					
16	LOCATION				
17	MATERIAL				
18	BODY SIZE / PORT SIZE				
19	PLUG FORM				
20	ΔP / MIN. / NOR. / MAX.				
21	CALC. Cv / VALVE Cv				
22	AIR TO OPEN OR CLOSE				
23	MAXIMUM SHUTOFF ΔP				
24	FLUID	WATER	WATER	WATER	WATER
25	TEMPERATURE °F				
26	PRESSURE PSIG				
27	~~M.W.~~	(18)	(18)	(18)	(18)
28	SP. GR. AT STD. COND.				
29	SP. GR. AT P. & T.				
30	WEIGHT % VAPOR IN-OUT				
31	VISCOSITY AT P. & T.				
32	RATE, NORMAL				
33	RATE:				
34	MAX. / MIN.				
35	NOTES:				

(1) INSTRUMENT TO BE MOORE ELECTRIC LIQUID LEVEL CONTROLLER MODEL 27-S-415-N WITH 3½" 316 SS BALL FLOAT AND EXPLOSION PROOF HEAVY DUTY MICRO SWITCH.

(2) LS-703A TO CLOSE CV-703 AND LS-703B TO OPEN CV-703.

(3) LS-703C TO SHUT DOWN SYSTEM UPON HIGH LEVEL IN T-703.

SHEET _____ OF _____ REV _____

CONOCO

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

TEMPERATURE GAUGES

A.F.E. NO. _____
DATE 10/11/76 W. O. NO. _____
MADE BY JRM INO. NO. _____
APP'D BY _____ REQ. NO. _____
B. M. NO _____ P. O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

	TAG NO.	SERVICE	INSTRUMENT RANGE °F (1)	OPERATING TEMP °F	LOCATION
3	TG-701	WATER/VCM	0-200	130	T-701
4	TG-702	WATER/VCM	0-200	130	T-702
5	TG-703	WATER/VCM	0-200	130	T-703
6	TG-709	WATER	0-200	130	LINE 3"
7	TG-709A	WATER	0-200	90	EA-709A
8	TG-709B	WATER	0-200	90	EA-709B
9	TG-709C	WATER	0-200	90	EA-709C
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40	(1) ALL GAUGE ELEMENTS TO BE BIMETALLIC UNLESS OTHERWISE NOTED.				
41					
42					
43					
44					
45					
46					
47					
48					
49					
50					
51					
52					
53					
54					
55					
56					

QUOTATION WILL NOT BE CONSIDERED IF SUPPLIER DOES NOT COMPLETE RIGHT HAND COLUMN

SHEET _____ OF _____ REV _____

A

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

TEMPERATURE INSTRUMENTS

A.F.E. NO. _____

DATE 10/11/76 W. O. NO. _____

MADE BY JRM INQ NO. _____

APP'D BY _____ REQ. NO. _____

B. M. NO. _____ P. O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	TA-702			TA-703		
2	SERVICE	T-702 TEMP			T-703 TEMP		
3							
4	INSTRUMENT TYPE	ALARM (1)			ALARM (1)		
5	LOCATION	BOARD (1)			BOARD (1)		
6	RANGE °F	0-200			0-200		
7	ELEMENT, TYPE	Temp Switch			Temp. Switch		
8	LOCATION	T-702			T-702		
9	TEMPERATURE °F	175			175		
10	PRESSURE PSIG	0			80		
11	~~VALVE~~ TYPE SW	Electric			Electric		
12	Element	BULB			BULB		
13	~~LOCATION~~ TAG. NO.	TS-702			TS-703		
14	MATERIAL						
15	BODY SIZE / PORT SIZE						
16	PLUG FORM						
17	ΔP / MIN. / NOR. / MAX						
18	CALC. Cv / VALVE Cv						
19	AIR TO OPEN OR CLOSE						
20	MAX SHUTOFF ΔP						
21	FLUID	VCM VAPOR/WATER			VCM VAPOR/WATER		
22	TEMPERATURE °F	130			130		
23	PRESSURE PSIG	0			80		
24	VAPOR WT						
25	SP GR AT STD COND						
26	SP GR AT P & T						
27	WEIGHT % VAPOR IN OUT						
28	VISCOSITY AT P & T						
29	RATE, NORMAL						
30	RATE						
31	MAX / MIN						
32	NOTES						

(1) TA-702, 703 TO be tied into multi-alarm panel with test and acknolege functions on local panel

(2) TS-702, 703 To be tied into auto-shutdown system

SHEET _____ OF _____ REV _____

CONOCO

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

TEMPERATURE INSTRUMENTS

A.F.E. NO. _____

DATE 10/11/76 W.O. NO. _____

MADE BY JRM INQ. NO. _____

APP'D BY _____ REQ. NO. _____

B.M. NO _____ P.O. NO. _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

1	TAG NO.	TIC-709			
2	SERVICE	STR TEMP			
3					
4	INSTRUMENT TYPE	TEMP. IND. CONTR.			
5	LOCATION	BOARD			
6	RANGE °F	0 - 200			
7	ELEMENT, TYPE				
8	LOCATION	2-HM-726-H-A2-3			
9	TEMPERATURE °F	130			
10	PRESSURE PSIG	80			
11	VALVE TYPE	BUTTERFLY			
12	TAG NO.	TICV-709			
13	LOCATION	LINE 4-WH-747			
14	MATERIAL	C.S.			
15	BODY SIZE / PORT SIZE	4"			
16	PLUG FORM				
17	ΔP: MIN. / NOR / MAX.	/ / 3			
18	CALC. Cv / VALVE Cv	35 (2)			
19	AIR TO OPEN OR CLOSE	ATC			
20	MAX. SHUTOFF ΔP	100 PSI			
21	FLUID	WATER			
22	TEMPERATURE °F	100			
23	PRESSURE PSIG	70			
24	[illegible]	18			
25	SP. GR. AT STD. COND	1.0			
26	SP. GR. AT P & T	1.0			
27	WEIGHT % VAPOR IN OUT				
28	VISCOSITY AT P & T	.68 CP			
29	RATE, NORMAL GPM	60			
30	RATE				
31	MAX / MIN	180.			
32	NOTES				

(1) VALVE to be SIZED for max flow of 180 GPM with control at 60 GPM

(2) Cv at normal flow 60 GPM

SHEET _____ OF _____ REV _____

ABD00185053

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PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

CONTROL VALVES

DATE 10/8/76 B. M. NO. A

A. F. E. NO.

W. O. NO. INQ. NO.

REQ. NO. P. O. NO

MADE BY JRM APP'D BY

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

	GENERAL				
1	ITEM NO. & TAG	CV-701	CV-702	CV-703	CV-601
2	SERVICE	T-701 LIQUID DRAIN	T-702 LIQUID DRAIN	T-703 LIQUID DRAIN	VCM VAPOR BLOWDOWN TANK
3	LINE SIZE	2"	2"	2"	3"
4	MANUFACTURER				
5	MODEL NO.				
6	TYPE	ON/OFF	ON/OFF	ON/OFF	ON/OFF
	SERVICE CONDITIONS				
7	FLUID	WATER/VCM	WATER/VCM	WATER/VCM	VCM VAPOR
8	TEMP F NORMAL / MAX.	130	130	130	150
9	PRESS, INLET, NORMAL / MAX	20"Hg Vac	1 PSIG	90PSIG	20" Hg
10	Δ P / MIN. / NORMAL / MAX.				
11	MOLECULAR WEIGHT / A.P.I.				
12	SP. GR @ 60 F. / @ F.T.				
13	WEIGHT : VAPOR IN / OUT				
14	VISCOSITY @ F.T. & P.				
15	RATE, NOR., LB HR (~~SCFH GPM~~)				626
16	RATE MAX. LB HR (SCFH) GPM				
17	NORMAL FLOW Cv				
18					
	BODY				
19	BODY SIZE / PORT SIZE	2" / STD	2" / STD	2" / STD	3" / STD.
20	TYPE (ANGLE OR GLOBE)	BALL	BALL	BALL	BALL
21	MATERIAL	C.S.	C.S.	C.S.	C.S.
22	END CONNECTIONS	150 lb. R.F.	150 lb R.F.	150 lb R.F.	150 lb. R.F.
23	BONNET				
24	Cv				
25	LUBRICATOR / ISO VAL.				
26	PACKING				
27	TRAVEL INDICATOR				
28					
	TRIM				
29	TYPE INNER VAL / NO OF PORTS				
30	PLUG & SEAT MATERIAL	316 S.S.	316 S.S.	316 S.S.	316 S.S.
31	SLEEVE OR SEAT	TFE	TFE	TFE	TFE
	ACTUATOR				
32	TYPE	Pneumatic	Pneumatic	Pneumatic	Pneumatic
33	FAILURE POSITION	closed	closed	closed	closed
34					
	POSITIONER				
35	INPUT SIGNAL / OUTPUT SIGNAL				
36	BYPASS / GAUGES				
37	MANUFACTURER				
38	MODEL NO.				
	ACCESSORIES				
39					Reed switch

NOTES: (1) CV-701, 702 and 703 to be opened and closed by L.S.-701A, B; LS-702 A, B; AND LS-703 A, B, respectively.

(2) CV-601 To have RX. control panel and local mounted open/close switch. CV-601 to auto-close when Blowdown TANK discharge pump is ON.

( ) INDICATES ITEM CHANGED ON LATEST REVISION.

(X) INDICATES MANUFACTURER TO GIVE REQUESTED INFORMATION IN HIS QUOTATION.

SHEET ____ OF ____ REV ____

4-435-S

REV. 1-21-69

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

RELIEF VALVES

A.F.E NO _____ A

DATE 10/8/76 W. O. NO _____

MADE BY JRM INQ. NO _____

APP'D BY _____ REQ. NO _____

B. M. NO. _____ P O NO _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

	GENERAL				
1	ITEM NO. & TAG	SV-701	SV-702	SV-703	
2	RELIEVES EQUIPMENT NO.	T-701	T-702	T-703	
3	MANUFACTURER				
4	MODEL NO.				
5					
	SERVICE CONDITIONS				
6	FLUID	VCM	VCM	VCM	
7	STATE				
8	REQUIRED CAPACITY				
9	MOL. WT. | SP. GR.				
10	VISCOSITY				
11	COMPRESSIBILITY FACTOR				
12	DESIGN PRESS. OF EQUIPMENT	150	150	150	
13	PRESS. OPERATING | RELIEVING	- | 150	- | 150	- | 150	
14	TEMP FLOWING | RELIEVING	| 150	| 150	| 150	
15	BACK PRESSURE	ATMOS	ATMOS	ATMOS	
16	DIFFERENTIAL SET PRESSURE	150	150	150	
17	ACCUMULATION %				
18	BLOW DOWN %				
19					
	BASIS OF SELECTION				
20	CODE REQUIREMENT				
21	FIRE EXPOSED AREA				
22	FIRE INSULATION THICKNESS				
23	OTHER BASIS				
24					
	DESIGN DETAILS				
25	DESIGN TYPE	CONVENTIONAL	CONVENTIONAL	CONVENTIONAL	
26	SEAT TYPE	DISC	DISC	DISC	
27	BONNET (OPEN OR CLOSED)	closed	closed	closed	
28	INLET SIZE, RATING, FACING	2" 150# R.F	2" 150# R.F	2" 150# R.F	
29	OUTLET SIZE, RATING, FACING	3" 150# R.F.	3" 150# R.F	3" 150# RF	
30	CALCULATED AREA	-	-	-	
31	ORIFICE LETTER | ACTUAL AREA	J | 1.287	J | 1.287	J | 1.287	
	MATERIALS				
32	BODY | BONNET	CS | CS	CS | CS	CS | CS	
33	SEAT & DISK	SS	SS	SS	
34	GUIDE & RING	SS	SS	SS	
35	SPRING	CS	CS	CS	
36	BELLOWS	NO	NO	NO	
	ACCESSORIES				
37	LIFTING LEVER (PLAIN OR PACKED)	NO	NO	NO	
38	GAG	NO	NO	NO	
39	CODE STAMP				
40	CAP (SCREWED OR BOLTED)	SCREWED	SCREWED	SCREWED	
41	OTHER				

NOTES:

MANUFACTURER SHALL VERIFY SELECTION OF ORIFICE SIZE AND MATERIALS

VALVES SHALL MEET DIMENSION REQUIREMENTS OF API RP-526.

VALVES SHALL MEET TEST REQUIREMENTS OF API RP-527

SUPPLIER TO COMPLETE FORM BY FURNISHING INFORMATION FOR BLANK SPACES

SHEET ____ OF ____ REV ____

4-436-S

REV. 12-9-66

ABD00185055

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

RELIEF VALVES

A.F.E NO _____ A

DATE 10/8/76 W. O. NO _____

MADE BY JRM INQ NO _____

APP'D BY _____ REQ NO. _____

B. M NO _____ P O NO _____

PLANT ABERDEEN PVC PROJECT EMISSIONS RECOVERY SYSTEM

	GENERAL											
1	ITEM NO. & TAG				SV-704		SV-705		SV-706			
2	RELIEVES EQUIPMENT NO.				3-HM-707-N-A2-1		3-HM-710-N-A2-1		3-HM-712-N-A2-1			
3	MANUFACTURER											
4	MODEL NO.											
5												
	SERVICE CONDITIONS											
6	FLUID				VCM		VCM		VCM			
7	STATE											
8	REQUIRED CAPACITY											
9	MOL. WT.	SP. GR.										
10	VISCOSITY											
11	COMPRESSIBILITY FACTOR											
12	DESIGN PRESS. OF EQUIPMENT				150		150		150			
13	PRESS OPERATING	RELIEVING				150		150		150		
14	TEMP FLOWING	RELIEVING				150		150		150		
15	BACK PRESSURE				ATMOS		ATMOS		ATMOS			
16	DIFFERENTIAL SET PRESSURE				150		150		150			
17	ACCUMULATION		%		—		—		—			
18	BLOW DOWN		%									
19												
	BASIS OF SELECTION											
20	CODE REQUIREMENT											
21	FIRE EXPOSED AREA											
22	FIRE INSULATION THICKNESS											
23	OTHER BASIS											
24												
	DESIGN DETAILS											
25	DESIGN TYPE				CONVENTIONAL		CONVENTIONAL		CONVENTIONAL			
26	SEAT TYPE				DISC		DISC		DISC			
27	BONNET (OPEN OR CLOSED)				closed		closed		closed			
28	INLET SIZE, RATING, FACING				1½"-150# R.F		1½"-150# R.F.		1½"-150# R.F			
29	OUTLET SIZE, RATING FACING				2"-150# R.F		2"-150# R.F		2"-150# R.F			
30	CALCULATED AREA											
31	ORIFICE LETTER	ACTUAL AREA			F	0.307	F	0.307	F	0.307		
	MATERIALS											
32	BODY	BONNET			CS	CS	CS	CS	CS	CS		
33	SEAT & DISK				SS		SS		SS			
34	GUIDE & RING				SS		SS		SS			
35	SPRING				CS		CS		CS			
36	BELLOWS				NO		NO		NO			
	ACCESSORIES											
37	LIFTING LEVER (PLAIN OR PACKED)				NO		NO		NO			
38	GAG				NO		NO		NO			
39	CODE STAMP											
40	CAP (SCREWED OR BOLTED)				SCREWED		SCREWED		SCREWED			
41	OTHER											

NOTES:

MANUFACTURER SHALL VERIFY SELECTION OF ORIFICE SIZE AND MATERIALS.

VALVES SHALL MEET DIMENSION REQUIREMENTS OF API RP-526.

VALVES SHALL MEET TEST REQUIREMENTS OF API RP-527.

SUPPLIER TO COMPLETE FORM BY FURNISHING INFORMATION FOR BLANK SPACES

SHEET ___ OF ___ REV ___

4-426-S

REV. 12-68

CONOCO

ENGINEERING CENTER
PONCA CITY, OKLAHOMA
SPECIFICATION SHEET

AFE NO _____
DATE _____ W O NO _____
MADE BY _____ INO NO _____
APP'D BY _____ REQ NO _____
B M NO _____ P O NO _____

PLANT Aberdeen PVC PROJECT EMISSIONS RECOVERY SYSEM

~~ITEM NO~~
~~SERVICE~~

RUPTURE DISC SPECIFICATION

ITEM NO.	RD-701	RD-702	RD-703
LOCATION	T-701	T-702	T-703
Line size IN.	2"	2	2
Rupture Disc. Size IN.	2	2	2
Set conditions			
PRESS. PSIG	150	150	150
TEMP. °F	150	150	150
OPERATING CONDITIONS			
PRESS. PSIG	20" Hg VAC	1	80
Temp. °F	130	130	130
DISC MATERIAL	SS	SS	SS
FLANGE MATERIAL			
inlet	C.S	C.S	C.S
outlet	C.S	C.S	C.S
Flange Rating	150# R.F	150# R.F	150# R.F

SHEET _____ OF _____ REV

ENGINEERING CENTER
PONCA CITY, OKLAHOMA
SPECIFICATION SHEET

AFE NO _____ A
DATE _____ W O NO _____
MADE BY _____ INO NO _____
APP'D BY _____ REQ NO _____
B M NO _____ P O NO _____

PLANT Aberdeen PVC PROJECT EMISSIONS RECOVERY SYSEM

REVISED REVISE

RUPTURE DISC SPECIFICATION

ITEM NO.	RD-704	RD-705	RD-706
LOCATION	Discharge R-704	Discharge C-705	Discharge C-706
Line size in.	1½	1½	1½
Rupture Disc. Size in.	1½	1½	1½
Set Conditions			
PRESS. PSIG	150	150	150
TEMP. °F	150	150	150
OPERATING CONDITIONS			
PRESS. PSIG	1	80	80
Temp. °F	130	130	130
DISC MATERIAL	SS	SS	SS
FLANGE MATERIAL			
Inlet	CS	CS	CS
outlet	CS	CS	CS
Flange Rating	150# R.F	150# R.F	150# R.F

SHEET ____ OF ____ REV

A

ENGINEERING CENTER

PONCA CITY, OKLAHOMA

SPECIFICATION SHEET

ORIFICE PLATES & FLANGES

INCLUDING DATA FOR BORE CALCULATION

A.F.E. NO. _____

DATE 10/15/74 W. O. NO _____

MADE BY _____ INQ. NO. _____

APP'D BY _____ REQ. NO _____

B. M. NO _____ P. O. NO. _____

PLANT Aberdeen PVC PROJECT: EMISSIONS RECOVERY SYSTEM

GENERAL SPECIFICATION

ORIFICE PLATES			ORIFICE FLANGES		
MAKE TO AGA/ASME STANDARD	OTHER		RATING & FACING		
PLATE MATERIAL ~~316 SS~~	OTHER 304 SS		TYPE: WELD NECK		OTHER
RTJ RING MAT'L & TYPE			MAT'L: STEEL		OTHER
BORE MAXIMUM RATE	NEAREST 1/8"		TAP SIZE 1/2" NPT		OTHER
STAMP TO ISA STANDARD	OTHER		FLANGES BY		

TAG NO		RO-704 A & B	RO-705 A & B	RO-706 A & B.		
LINE NO		3/4-HM-763 3/4-HM-764	3/4-HM-775 3/4-HM-774	3/4-HM-781 3/4-HM-782		
SERVICE CONDITIONS						
FLUID		WATER	WATER	WATER		
FLOW UNITS		GPM	GPM	GPM		
MAXIMUM FLOW		2.0	2.0	2.0		
NORMAL FLOW		1.0	1.0	1.0		
FLOW PRESSURE PSIG		180	180	180		
FLOW TEMPERATURE °F		100	100	100		
S G @ 60°F & 14.7 PSIA		1.0	1.0	1.0		
S G @ F. T. & 195 PSIA		0.99	0.99	0.99		
SUPERCOMP. FACTOR @ O. P.		—	—	—		
VAPOR GAS MOL WT		—	—	—		
VISCOSITY, CP @ F. T.		0.68	0.68	0.68		
STEAM QUALITY %		—	—	—		
STEAM SUPERHEAT °F		—	—	—		
MEASURING STATION DATA						
ACTUAL ORIFICE I. D., INS.		0.072	0.072	0.072		
LINE FLANGE I. D., INS.		0.742	0.742	0.742		
SEAL S. G. @ 60°F						
MANOMETER TYPE						
DIFF. RANGE INS H2O DRY						
STATIC RANGE, PSIA						
CHART OR SCALE RANGE						
CHART MULTIPLIER						

NOTES:

INSTRUMENT SOCIETY OF AMERICA

SHEET ____ OF ____ REV ____

4 444-S

A

EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

V. INSTRUMENT SPECIFICATIONS

Shutdown Description

The Emission Recovery System is to include a shutdown system to stop operation in the event of a malfunction.

The shutdown system will stop the motors on the following operating equipment:

P-704	Vacuum Pump
C-705	Compressor
C-706	Compressor
P-707	Seal Water Pump
P-708	Seal Water Pump

The shutdown system will activate a single shutdown light and alarm on the existing Large Reactor Ronan Alarm Panel.

The shutdown system will be activated by the following switches:

Item	Indication	Set Point
LS-701C	High Level In T-701	-
LS-702C	High Level In T-702	-
LS-703C	High Level in T-703	-
TS-702	High Vac. Pump Dis. Temp.	175°F
TS-703	High Comp. Dis. Temp.	175°F
PS-701	High System Inlet Press.	15 psig
PS-702	High Vac. Pump Dis. Press.	25 psig
PS-703	High Comp. Dis. Press.	100 psig

EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

V. INSTRUMENT SPECIFICATIONS

Local Panel Board Description

The local panel board is to be installed in a location adjacent to the Emission Recovery System. A location to the south of the compressors is suggested. The operator should read the panel while facing north.

An explosion proof enclosure for the panel is required.

The local panel board is to contain the following items:

1. One Ronan Alarm Consol. The following alarms (lights only) are to be designated on the consol.

   a. High Inlet Pressure
   b. High Intermediate Pressure
   c. High Discharge Pressure
   d. High Intermediate Temperature
   e. High Discharge Temperature
   f. High Inlet Drum Level
   g. High Seal Water Drum Level
   h. High Discharge Drum Level

2. One Temperature Indicating Control for TIC-709.

3. One Pressure Indicating Controller for PIC-701.

4. P-707 Start/Stop and Run Light

5. P-708 Start/Stop and Run Light

6. P-704 Start/Stop and Run Light

7. C-705 Start/Stop and Run Light

8. C-706 Start/Stop and Run Light

9. Provide approximately 40% spare room on panel for future instruments.

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 10/7/76 Made By MCJ/JRM
Project EMISSIONS RECOVERY SYSTEM
Plant ABERDEEN PVC

Line Designation	Service From	Service To	V/L	Flow Rate Lb/Hr (GPM)	Normal °F	Normal (VAC) PSIG (in. Hg)	At T and P Lb/CF (Sp Gr)	At T and P Visc Cp	Press Drop PSI/100'	Velocity Ft/Sec	Remarks
2-HM-701-N-A2-1	L.R. RVCM RECEIVERS	3-HM-702	V	626	70	60	0.868	0.0110	0.0833	3.6	MAX FLOW FOR VACUUM PUMP
3-HM-702-N-A2-1	2-HM-701	L.R. REC. SYSTEM CONDENSERS	V	626	70	(20)	0.058	0.0110	0.1695	58.4	MAX. FLOW FOR VACUUM PUMP
3-HM-703-N-A2-1	3-HM-702	T-701	V	626	120	(20)	0.053	0.0119	0.1872	63.9	
3-HM-704-N-A2-1	L.R. BLOW DOWN TANK	3-HM-703	V	626	170	(20)	0.049	0.0128	0.2042	69.1	MAX. FLOW FOR VACUUM PUMP
3-HM-705-N-A2-1	T-701	3-HM-702	V	626	130	(20)	0.052	0.0120	0.1910	65.1	
3-HM-706-N-A2-1	3-HM-702	P-704	V	626	130	(20)	0.052	0.0120	0.191	65.1	
3-HM-707-N-A2-1	P-704	T-102	V	626	130	0	0.153	0.0120	0.0649	22.1	
3-HM-708-N-A2-1	T-702	3-HM-702	V	626	130	0	0.153	0.0120	0.0649	22.1	
3-HM-709-N-A2-1	3-HM-702	C-705	V	626	130	0	0.153	0.0120	0.0649	22.1	
3-HM-710-N-A2-1	C-705	3-HM-713	V	626	120	80	0.989	0.0120	0.01	3.4	
3-HM-711-N-A2-1	3-HM-702	C-706	V	626	130	0	0.153	0.0120	0.0649	22.1	
3-HM-712-N-A2-1	C-706	3-HM-713	V	626	130	80	0.989	0.0120	0.01	3.4	
2-HM-713-N-A2-1	3-HM-710	T-703	V	626	130	80	0.989	0.0120	0.01	3.4	WITH ONLY ONE COMPRESSOR RUNNING
3-HM-714-N-A2-1	T-703	3-HM-702	V	626	130	80	0.989	0.0120	0.01	3.4	
3-HM-715-S-A2-3	T-701	EXISTING L.R. BLOWDOWN TANK	L	—	130	(20)	61.550	0.5			DRAIN INTERMITTENT
2-HM-716-S-A2-3	T-702	T-701	L	—	130	0	61.550	0.5			DRAIN INTERMITTENT
2-HM-717-S-A2-3	T-702	3-HM-715	L	—	130	0	61.550	0.5			DRAIN INTERMITTENT
2-HM-718-S-A2-3	T-702	AS HEADER	L	14,992	130	0.5	61.550	0.5	0.7132	2.9	P.D. DUE TO STATIC HEAD FOR P-70
3-HM-719-S-A2-3	T-703	T-702	L	—	130	80	61.550	0.5			DRAIN INTERMITTENT
3-HM-720-S-A2-3	T-703	3-HM-715	L	—	130	80	61.550	0.5			DRAIN INTERMITTENT
2-HM-721-S-A2-3	2-HM-718	P-707	L	14,992	130	0.5	61.550	0.5	0.7132	2.9	
2-HM-722-S-A2-3	2-HM-718	P-708	L	14,992	130	0.5	61.550	0.5	0.7132	2.9	

ABD00185061

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 10/14/76 Made By JRM
Project EMISSIONS RECOVERY SYSTEM
Plant ABERDEEN PVC

Line Designation	Service From	Service To	V L	Flow Rate Lb/Hr (GPM)	Normal °F	Normal PSIG	At T and P Lb/CF (Sp Gr)	At T and P Visc Cp	Press Drop PSI/100'	Velocity Ft/Sec	Remarks
2-HM-707-S-A2-3	P-707	2-HM-725	L	14,810.4	130	75	61.550	0.5	0.697	2.9	
2-HM-708-S-A2-3	P-708	2-HM-725	L	14,810.4	130	75	61.550	0.5	0.697	2.9	
2-HM-725-S-A2-3	AS HEADER	FT-709	L	14,810.4	130	75	61.550	0.5	0.697	2.9	
2-HM-726-S-A2-3	2-HM-725	AS HEADER EA-709	L	14,810.4	130	75	61.550	0.5	0.697	2.9	MAX FLOW
2-HM-727-S-A2-3	FT-709	2-HM-726	L	14,810.4	130	70	61.550	0.5	0.697	2.9	
2-HM-728-S-A2-3	2-HM-726	EA-709A	L	14,810.4	130	70	61.550	0.5	0.697	2.9	MAX FLOW
2-HM-729-S-A2-3	2-HM-726	EA-709B	L	14,810.4	90	65	62.116	0.76	0.736	2.8	
2-HM-730-S-A2-3	EA-709B	2-HM-732	L	14,810.4	90	65	62.116	0.76	0.736	2.8	
2-HM-731-S-A2-3	EA-709A	2-HM-732	L	14,810.4	90	65	62.116	0.76	0.736	2.8	
2-HM-732-S-A2-3	EA-709A	AS HEADER	L	14,810.4	90	65	62.116	0.76	0.736	2.8	
2-HM-733-S-A2-3	2-HM-732	1-HM-734	L	4,936.8	90	60	62.116	0.76	0.077	0.9	
1-HM-734-S-A2-3	2-HM-733	C-706	L	2,468.4	90	50	62.116	0.76	0.765	1.8	
1-HM-735-S-A2-3	2-HM-733	C-706	L	2,468.4	90	50	62.116	0.76	0.765	1.9	
2-HM-736-S-A2-3	2-HM-732	1-HM-738	L	4,936.8	90	50	62.116	0.76	0.697	0.7	
1-HM-737-S-A2-3	2-HM-736	C-705	L	2,468.4	90	50	62.116	0.76	0.763	1.8	
1-HM-738-S-A2-3	2-HM-737	C-705	L	2,468.4	90	50	62.116	0.76	0.763	1.8	
2-HM-739-S-A2-3	2-HM-732	1-HM-741	L	4,936.8	90	50	62.116	0.76	0.097	0.9	
1-HM-740-S-A2-3	2-HM-739	P-704	L	2,468.4	90	50	62.116	0.76	0.763	1.8	
1-HM-741-S-A2-3	2-HM-739	P-704	L	2,468.4	90	50	62.116	0.76	0.763	1.8	
1-HQ-742-H-A2-1	EXISTING HYDRO-DYNAMIC SYSTEM	2-HM-722	L	0.35	70						INJECTION INTERMITTENT

ABD00185062

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 10/14/76 Made By JRM
Project EMISSIONS RECOVERY SYSTEM
Plant ABERDEEN PVC

Line Designation	Service		V	Flow Rate Lb/Hr (GPM)	Normal		At T and P		Press Drop PSI/ 100'	Velocity Ft/Sec	Remarks
	From	To	L		°F	PSIG	Lb/CF (Sp Gr)	Visc Cp			
4-WC-743-N-M2-4	L.R. CTS SYSTEM	EA-709 AS HEADER	L	89,829	80	60	62.220	0.86	0.780	4.5	COOLING WATER SUPPLY (MAX FLOW)
3-WC-744-N-M2-4	4-WC-743	EA-709A	L	29,943	80	60	62.220	0.86	0.385	2.6	
3-WC-745-N-M2-4	4-WC-743	EA-709B	L	29,943	80	60	62.220	0.86	0.385	2.6	
3-WC-746-N-M2-4	4-WC-743	EA-709C	L	29,943	80	60	62.220	0.86	0.385	2.6	
4-WH-747-N-M2-4	EA-709 AS HEADER	L.R. CTR SYSTEM	L	89,829	100	50	61.996	0.68	0.764	4.6	COOLING WATER RETURN (MAX FLO
3-WH-748-N-M2-4	EA-709A	4-WH-747	L	29,943	100	50	61.996	0.68	0.374	2.6	
3-WH-749-N-M2-4	EA-709B	4-WH-747	L	29,943	100	50	61.996	0.68	0.374	2.6	
3-WH-750-N-M2-4	EA-709C	4-WH-747	L	29,943	100	50	61.996	0.68	0.374	2.6	
1-SL-751-H-A2-3		T-101	V	—	350	135					FOR PURGING & CLEANING
1-WP-764-S-A2-3	HYDRAULIC SEALING WATER SYS.	1-WH-769	L	(8.0)	70	200	62.305	0.98	1.732	3.0	
1-WP-753-S-A2-3	1-WP-752	1-SL-751	L	—	70	200	62.305	0.98			INTERMITTENT FOR CLEANING LG-7
1-WP-754-S-A2-3	1-WP-753	LG-101	L	(1.0)	70	200	62.305	0.98	0.043	0.4	
1-WP-755-S-A2-3	1-WP-754	LW-101	L	(0.5)	70	200	62.305	0.98	0.011	0.2	FOR CLEANING LW-70
1-HM-756-S-A2-3	LG-101	1-HM-757	L	(1.0)	70	200	62.305	0.98	0.043	0.4	DRAIN
1-HM-757-M-A2-3	LW-101	S-HM-715	L	(1.5)	70	200	62.305	0.98	0.091	0.6	DRAIN
1-WP-758-S-A2-3	1-WP-752	FIC-701 & HEADER	L	(3.0)	70	200	62.305	0.98	0.[illegible]	1.1	SEAL WATER FLUSH
3/4-WP-759-S-A2-3	FIC-701A	P-101	L	(1.0)	70	200	62.305	0.98	0.142	0.6	
3/4-WP-760-S-A2-3	FIC-701B	P-101	L	(0.5)	70	200	62.305	0.98	0.037	0.3	
3/4-WP-761-S-A2-3	FIC-701C	P-101	L	(0.5)	70	200	62.305	0.98	0.037	0.3	
3/4-WP-762-S-A2-3	FIC-701D	P-101	L	(1.0)	70	200	62.305	0.98	0.14[illegible]	0.6	
3/4-HM-763-S-A2-3	P-701	1-HM-791	L								DRAIN
3/4-HM-764-S-A2-3	P-701	1-HM-791	L								DRAIN

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PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 10/14/76 Made By JRM
Project EJECTION RECOVERY SYSTEM
Plant ABERDEEN PVC

Line Designation	Service		V	Flow Rate Lb/Hr (GPM)	Normal		At T and P		Press Drop PSI/ 100'	Velocity Ft/Sec	Remarks
	From	To	L		°F	PSIG	Lb/CF (Sp Gr)	Visc Cp			
1-WP-765-S-A2-3	1-WP-752	LW-702	L	(1.0)	70	200	62.305	0.98	0.043	0.4	FOR CLEANING LW-70
1-WP-766-S-A2-3	1-WP-765	LG-702	L	—	70	200	62.305	0.98			FOR CLEANING LG-70
1-HM-767-S-A2-3	LW-702	2-HM-717	L	—	70	200	62.305	0.98			DRAIN
1-HM-768-S-A2-3	LG-702	1-HM-767	L	—	70	200	62.305	0.98			DRAIN
1-WP-769-S-A2-3	1-WP-752	FIC-705 AS HEADER	L	(3.0)	70	200	62.305	0.98	0.325	1.1	SEAL WATER FLUSH
¾-WP-770-S-A2-3	FIC-705A	C-705	L	(1.0)	70	200	62.305	0.98	0.142	0.6	
¾-WP-771-S-A2-3	FIC-705B	C-705	L	(0.5)	70	200	62.305	0.98	0.029	0.3	
¾-WP-772-S-A2-3	FIC-705C	C-705	L	(0.5)	70	200	62.305	0.98	0.029	0.3	
¾-WP-773-S-A2-3	FIC-705D	C-705	L	(1.0)	70	200	62.305	0.98	0.142	1.1	
¾-HM-774-S-A2-3	C-705	1-HM-790	L								DRAIN
¾-HM-775-S-A2-3	C-705	1-HM-790	L								DRAIN
1-WP-776-S-A2-3	1-WP-752	FIC-706 AS HEADER	L	(3.0)	70	200	62.305	0.98	0.325	1.1	SEAL WATER FLUSH
¾-WP-777-S-A2-3	FIC-706A	C-706	L	(1.0)	70	200	62.305	0.98	0.143	0.6	
¾-WP-778-S-A2-3	FIC-706B	C-706	L	(0.5)	70	200	62.305	0.98	0.029	0.3	
¾-WP-779-S-A2-3	FIC-706C	C-706	L	(0.5)	70	200	62.305	0.98	0.029	0.3	
¾-WP-780-S-A2-3	FIC-706D	C-706	L	(1.0)	70	200	62.305	0.98	0.142	0.6	
¾-HM-781-S-A2-3	C-706	1-HM-789	L								DRAIN
¾-HM-782-S-A2-3	C-706	1-HM-789	L								DRAIN
1-WP-783-S-A2-3	1-WP-752	1-WP-784	L	(1.0)	70	200	62.305	0.98	0.043	0.4	
1-WP-784-S-A2-3	1-WP-783	LG-703	L		70	200	62.305	0.98			FOR CLEANING LG-70
1-WP-785-S-A2-3	1-WP-783	LW-703	L		70	200	62.305	0.98			FOR CLEANING LW-70

PROCESS PIPING SCHEDULE
PROCESS ENGINEERING DEPARTMENT

Date 10/14/76 Made By JRM
Project EMISSIONS RECOVERY SYS
Plant ABERDEEN PVC

Line Designation	Service From	Service To	V L	Flow Rate Lb/Hr (GPM)	Normal °F	Normal PSIG	At T and P Lb/CF (Sp Gr)	At T and P Visc Cp	Press Drop PSI/ 100'	Velocity Ft/Sec	Remarks
1-HM-786-S-A2-3	LW-703	2-HM-720	L		70	200	62.305	0.98			DRAIN
1-HM-787-S-A2-3	LG-703	1-HM-786	L		70	200	62.305	0.98			DRAIN
2-HM-722-S-A2-3	—	—	L	—	—	—	—	—			DELETE
1-HM-789-S-A2-3	3/4-HM-781	2-HM-716	L								DRAIN
1-HM-790-S-A2-3	3/4-HM-774	1-HM-789	L								DRAIN
1-HM-791-S-A2-3	3/4-HM-764	2-HM-716	L								DRAIN
2-HM-792-S-A2-3	2-HM-726	EA-709C	L	14,810.4	130	70	61.550	0.5	0.697	2.9	MAX FLOW
2-HM-793-S-A2-3	EA-709C	2-HM-732	L	14,810.4	90	65	62.116	0.76	0.726	2.8	

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EMISSION RECOVERY SYSTEM

ABERDEEN PVC PLANT

VII. WORK LIST

1. Tie in 2-HM-701-N-A2-1 to the north and south R-VCM Receiver.
2. Tie in 3-HM-704-N-A2-1 to the Large Reactor Blowdown Tank.
3. Tie in 3-HM-715-S-A2-1 to the Large Reactor Blowdown Tank.
4. Tie in 1-SL-751-H-A2-3 into the Process Steam System.
5. Tie in 1-WP-752-S-A2-3 into the High Pressure Service Water System.
6. Overhaul existing hydroquinone injection pump and tie in line 1-HQ-742-H-A2-1 to the hydroquinone injection system.
7. Tie in line 3-HM-702-N-A2-3 into the Large Reactor Recovery System at the VCM condenser inlet header.
8. Tie in electrical switch for CV-601 into the control system for the Blowdown Tank Discharge Pump.
9. Tie in lines 4-WH-747-N-M2-4 and 4-WC-743-N-M2-4 into the Large Reactor CTS and CTR System.