

APPENDIX A: Specifications for Vessels and Tanks

<u>Tag</u>	<u>Equipment</u>
D-5	Benzol Seperator
D-6	Recycle Gas Separator
D-7	Primary Separator
D-8	Flash Tank
D-9	Methanator Effluent Separator
D-14	CRG Effluent Separator
FIL-1 A/B	Secondary Separator
R-1	Hydrogenator
R-2	Zinc Oxide Drum
R-3	CRG Reactor
R-4	Methanator #1
R-5	Methanator #2
T-1	Benzol Absorber
T-2	Benzol Stripper
TK-2	Benzol Storage Tank
TK-3	Lean Oil Storage Tank
TK-4	Pump Tank
TK-5	Oxidizer
TK-6	Slurry Tank
TK-7	Sump Tank

108
PRESSURE VESSEL DATA

JOB NO. 4394
TECH. CNTR.
PROJECT ENGR.
REQ. NO.
PAGE OF DATE:

CUSTOMER SASSI CORPORATION				TAG: 0-5			
LOCATION Indianapolis, Indiana				NO. REQ'D. 1			
SERVICE BENZOL SEPARATOR							
SIZE 3'0" I-D X 12'0" T-T							

6" THK. T-304
S. STL. MIST
ELIMINATOR
W/ TOP & BOT.
GRIDS / SUPP. RG.

INLET IMPINGE-
MENT BAFFLE

S.G. = 0.85

S.G. = 1.0

BASE RING:

DESIGN DATA

VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS. J. P. PRITCHARD & CO. SPECIFICATION 2B-3 DATED

ASME CODE STAMPED: YES ☐ NO ☐

STR. RELIEVED: RADIOGRAPHED:

WELDING EFFICIENCY, SHELL: HEADS:

DESIGN PRESS. 50 PSIG WORKING 0.4 PSIG

DESIGN TEMP. 150 °F. WORKING 100 °F.

CORR. ALLOW. 1/8" STRUCT. ALLOW. FOR

HEAD THICKNESS: TYPE

SHELL THICKNESS:

HEAD STEEL ASTM

SHELL STEEL ASTM

PRESS. PIPE ASTM FLO. STEEL

SKIRT STEEL ASTM BASE STEEL

STRUCTURAL STEEL ASTM

NOZZLE RATING ASA STD.

PROJ. NOZZLES IN. MANWAYS

MANWAYS TO BE I.D. M.W. HINGED

MAX. PRESS. AT TEST TEMP. (NO CORR.) PSIG

HYDROSTATIC TEST PSIG

TRAYS: TYPE NO. MAT'L.

TRAYS: TYPE NO. MAT'L.

SEAL PAN NO. MAT'L.

TRAY SUPPORTS

TRAY DOWNCOMER BOLTING BARS FURNISHED BY FAB. AND INSTALLED BY VESSEL FABRICATOR.

CLEANING PAINTING

INSULATION SUPPORT RINGS REQUIRED TO BE 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.

INSPECTION BY

EMPTY VESSEL WEIGHT LB.

REMARKS:

Apprd. for Bldg		Apprd. for Purchase		Rev. 0	Date 11/15/78	JLA												
Date 11/16/78	By CWR	Date	By															

JOB NO. 2392
TECH. CNTR. _____
PROJECT ENGR. _____
REQ. NO. _____
PAGE 1 OF 1 DATE: _____

CUSTOMER		SASSI CORPORATION		TAG: D-6	
LOCATION		Indranapolis, Indiana			
SERVICE		RECYCLE GAS SEPARATOR		NO. REQ'D. 1	
SIZE		18" x 4'-6" T.T.			
				DESIGN DATA VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS. J. P. PRITCHARD & CO. SPECIFICATION 13-3 DATED	
				ASME CODE STAMPED: YES ☐ NO ☐ STR. RELIEVED: RADIOGRAPHED: WELDING EFFICIENCY, SHELL: HEADS: DESIGN PRESS. PSIG WORKING 231 PSIG DESIGN TEMP. °F. WORKING 100 °F. CORN. ALLOW. 1/16 STRUCT. ALLOW. FOR HEAD THICKNESS: TYPE SHELL THICKNESS: HEAD STEEL ASTM SHELL STEEL ASTM	
				PRESS. PIPE ASTM FLG. STEEL SKIRT STEEL ASTM BASE STEEL STRUCTURAL STEEL ASTM NOZZLE RATING ASA STD. PROJ. NOZZLES IN. MANWAYS MANWAYS TO BE I.D. O.W. HINGED MAX. PRESS. AT TEST TEMP. (NO CORR.) PSIG HYDROSTATIC TEST PSIG	
				TRAYS: TYPE NO. MAT'L. TRAYS: TYPE NO. MAT'L. SEAL PAN NO. MAT'L. TRAY SUPPORTS TRAY DOWNCOMER BOLTING BARS FURNISHED BY FAB. AND INSTALLED BY VESSEL FABRICATOR. CLEANING PAINTING INSULATION SUPPORT RINGS REQUIRED TO BE 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS. INSPECTION BY	
BASE RING:				EMPTY VESSEL WEIGHT LB. REMARKS: GAS FLOW 10.07 ft ³ /s, LIQUID - MIST REMOVAL ONLY	
Approved for Build Date By		Approved for Purchase Date By		Rev. O CWR Date 12/8/8	
12/2/78 CWR					

JOB NO. 2302
TECH. CNTR. _____
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE: _____

[illegible]

JOB NO. 2392
TECH. CNTR. _____
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE: _____

CUSTOMER		SASSI CORPORATION		TAG:		D-9	
LOCATION		Indianapolis, Indiana		NO. REQ'D.		1	
SERVICE		METHANATOR EFFLUENT SEPARATOR					
SIZE		5'6" I.D. X 6'0" T-T					
				DESIGN DATA			
				VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS.			
				J. F. PRITCHARD & CO. SPECIFICATION 28-2 DATED			
				ASME CODE STAMPED: YES ☐ NO ☐			
				STR. RELIEVED: RADIOGRAPHED:			
				WELDING EFFICIENCY, SHELL: HEADS:			
				DESIGN PRESS. 210 PSIG WORKING 154 PSIG			
				DESIGN TEMP. 250 °F. WORKING 100 °F.			
				CORR. ALLOW. 1/16" STRUCT. ALLOW. FOR			
				HEAD THICKNESS: TYPE			
SHELL THICKNESS:							
HEAD STEEL ASTM							
SHELL STEEL ASTM							
PRESS. PIPE ASTM				FLG. STEEL			
SKIRT STEEL ASTM				BASE STEEL			
STRUCTURAL STEEL ASTM							
NOZZLE RATING ASA STD.							
PROJ. NOZZLES				IN. MANWAYS			
MANWAYS TO BE				I.D. M.W. HINGED			
MAX. PRESS. AT TEST TEMP. (NO. CORR.)				PSIG			
HYDROSTATIC TEST				PSIG			
TRAYS: TYPE				NO. MAT'L.			
TRAYS: TYPE				NO. MAT'L.			
SEAL PAN				NO. MAT'L.			
TRAY SUPPORTS							
TRAY DOWNCOMER BOLTING BARS FURNISHED BY _____ FAB. AND INSTALLED BY VESSEL FABRICATOR.							
CLEANING				PAINTING			
_____ INSULATION SUPPORT RINGS REQUIRED TO BE _____" x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.							
INSPECTION BY _____							
EMPTY VESSEL WEIGHT				L.B.			
REMARKS:							

TAG: D-14

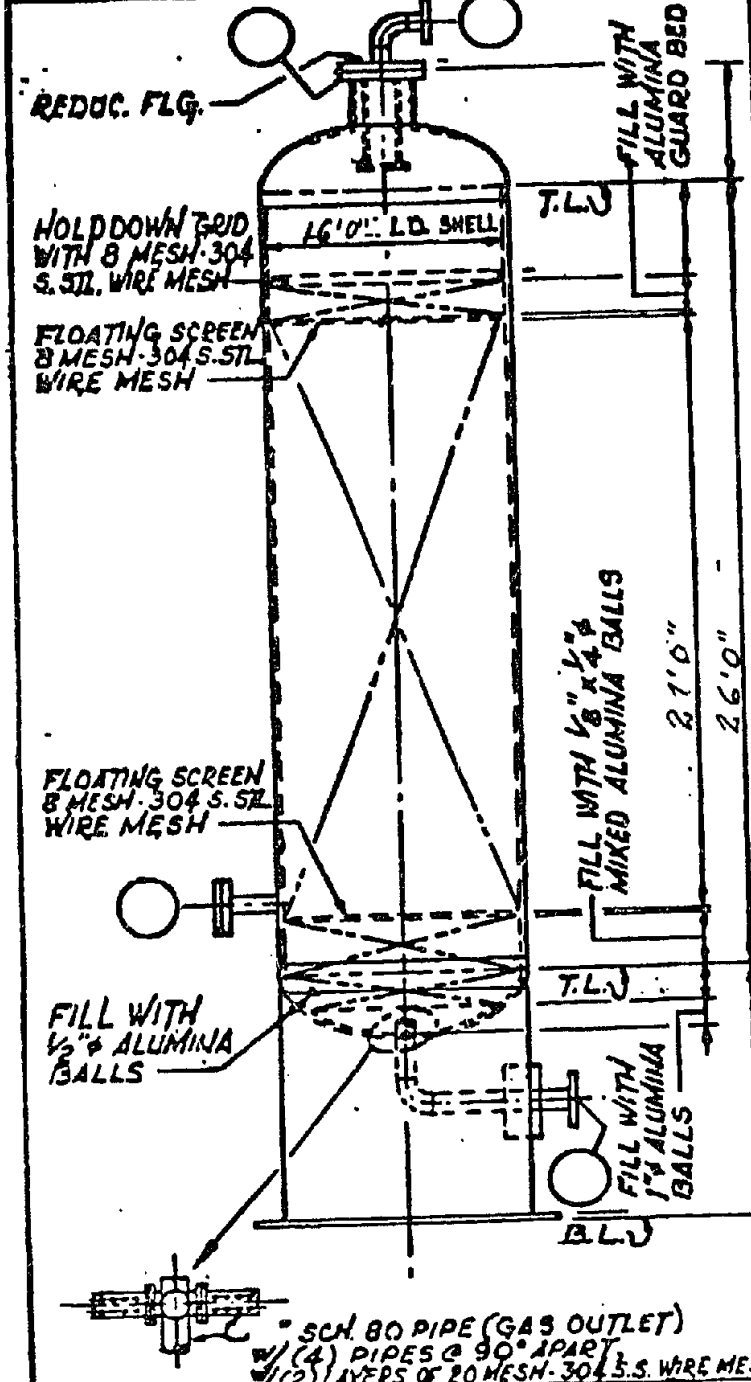
CUSTOMER		SASSI CORPORATION		TAG: D-14	
LOCATION		Indranapolis, Indiana		NO. REQ'D. 1	
SERVICE		C.R.G. EFFLUENT SEPARATOR			
SIZE		6'0" I-D x 8'0" T-T			
				DESIGN DATA	
				VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS. J. P. PRITCHARD & CO. SPECIFICATION 33-3 DATED	
				ASME CODE STAMPED: YES ☐ NO ☐	
				STR. RELIEVED: RADIOGRAPHED:	
				WELDING EFFICIENCY, SHELL: HEADS:	
				DESIGN PRESS. 225 PSIG WORKING 169 PSIG	
				DESIGN TEMP. 275 °F. WORKING 212 °F.	
				CORR. ALLOW. STRUCT. ALLOW. FOR	
				HEAD THICKNESS: TYPE	
				SHELL THICKNESS:	
HEAD STEEL ASTM					
SHELL STEEL ASTM					
PRESS. PIPE ASTM		FLG. STEEL			
SKIRT STEEL ASTM		BASE STEEL			
STRUCTURAL STEEL ASTM					
NOZZLE RATING ASA STD.					
PROJ. NOZZLES		IN. MANWAYS			
MANWAYS TO BE		I.D. M.W. HINGED			
MAX. PRESS. AT TEST TEMP. (NO. CORR.)		PSIG			
HYDROSTATIC TEST		PSIG			
TRAYS: TYPE		NO. MAT'L.			
TRAYS: TYPE		NO. MAT'L.			
SEAL PAN		NO. MAT'L.			
TRAY SUPPORTS					
TRAY DOWNCOMER BOLTING BARS FURNISHED BY _____ FAB. AND INSTALLED BY VESSEL FABRICATOR.					
CLEANING		PAINTING			
_____ INSULATION SUPPORT RINGS REQUIRED TO BE _____" x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.					
INSPECTION BY _____					
EMPTY VESSEL WEIGHT		LB.			
REMARKS:					
Approved for Sales		Approved for Purchase		Rev.	
Date	By	Date	By	Date	

PRESSURE VESSEL DATA

JOB NO. 2392
 TECH. CNTR. _____
 PROJECT ENGR. _____
 REQ. NO. _____
 PAGE ____ OF ____ DATE: ____

TAG: R-1

CUSTOMER	SASSI CORPORATION
LOCATION	Indianapolis, Indiana
SERVICE	HYDROGENATOR
SIZE	16'0" I.D. X 26'0" T-T
	NO. REQ'D. 1



DESIGN DATA

VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS
 J. P. PRITCHARD & CO. SPECIFICATION 22-3 DATED

ASME CODE STAMPED: YES ☐ NO ☐
 STR. RELIEVED: RADIOGRAPHED:
 WELDING EFFICIENCY, SHELL: HEADS:
 DESIGN PRESS. 285 PSIG WORKING 237 PSIG
 DESIGN TEMP. 430 °F. WORKING 800 °F.
 CORR. ALLOW. STRUCT. ALLOW. FOR
 HEAD THICKNESS: TYPE
 SHELL THICKNESS:
 HEAD STEEL ASTM
 SHELL STEEL ASTM

PRESS. PIPE ASTM FLO. STEEL
 SKIRT STEEL ASTM BASE STEEL
 STRUCTURAL STEEL ASTM
 NOZZLE RATING ASA STD.
 PROJ. NOZZLES IN. MANWAYS
 MANWAYS TO BE I.D. M.W. HINGED
 MAX. PRESS. AT TEST TEMP. (NO CORR.) PSIG
 HYDROSTATIC TEST PSIG
 TRAYS: TYPE NO. MATL.
 TRAYS: TYPE NO. MATL.
 SEAL PAN NO. MATL.

TRAY SUPPORTS
 TRAY DOWNCOMER BOLTING BARS FURNISHED BY _____ FAB. AND INSTALLED BY VESSEL FABRICATOR.

CLEANING PAINTING
 INSULATION SUPPORT RINGS REQUIRED TO BE _____" x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.
 INSPECTION BY _____

EMPTY VESSEL WEIGHT LB.

REMARKS:
 CATALYST VOLUME: 4200 CU. FT.

Approved for Design		Approved for Purchase		Para.	0
Date	By	Date	By		
12/7/72	CWR			Date	17 OCT 78

PRESSURE VESSEL DATA

JOB NO. _____
 TECH. CNTR. _____
 PROJECT ENGR. _____
 REQ. NO. _____
 PAGE ____ OF ____ DATE: ____

TAG: R-2A/B

CUSTOMER SASSI CORPORATION
 LOCATION Indianapolis, Indiana
 SERVICE ZINC OXIDE DRUMS
 SIZE 15' 0" I-D X 16' 0" T-T

NO. REQ'D. 2

DESIGN DATA

VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSEL
 J. F. PRITCHARD & CO. SPECIFICATION 25-3 DATED

ASME CODE STAMPED: YES ☐ NO ☐

STR. RELIEVED: RADIOGRAPHED:

WELDING EFFICIENCY, SHELL: HEADS:

DESIGN PRESS. 250 PSIG WORKING 207 PSIG

DESIGN TEMP. 250 °F. WORKING 250 °F.

CORR. ALLOW. STRUCT. ALLOW. FOR

HEAD THICKNESS: TYPE

SHELL THICKNESS:

HEAD STEEL ASTM

SHELL STEEL ASTM

PRESS. PIPE ASTM PLG. STEEL

SKIRT STEEL ASTM BASE STEEL

STRUCTURAL STEEL ASTM

NOZZLE RATING ASA STD.

PROJ. NOZZLES IN. MANWAYS

MANWAYS TO BE I.D. M.W. HINGED

MAX. PRESS. AT TEST TEMP. (NO. CORR.) PSIG

HYDROSTATIC TEST PSIG

TRAYS: TYPE NO. MAT'L.

TRAYS: TYPE NO. MAT'L.

SEAL PAN NO. MAT'L.

TRAY SUPPORTS

TRAY DOWNCOMER BOLTING BARS FURNISHED BY FAB. AND INSTALLED BY VESSEL FABRICATOR.

CLEANING PAINTING

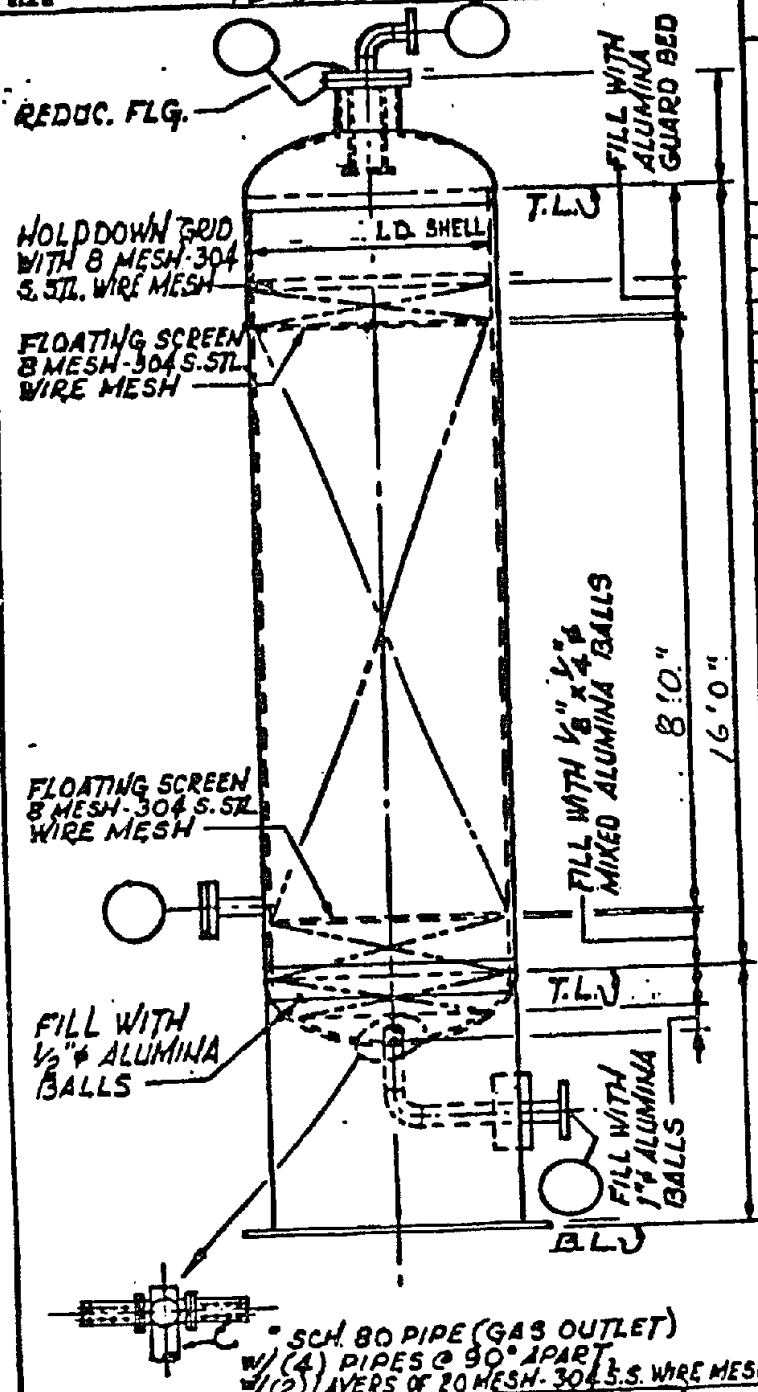
INSULATION SUPPORT RINGS REQUIRED TO BE 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.

INSPECTION BY

INSPECTION BY

EMPTY VESSEL WEIGHT LB.

REMARKS: CATALYST VOLUME: 2650 CU. FT.



Approved for Bids

Approved for Purchase

Rev. 0

Date

By

Date

By

Date

19 OCT 78

12/7/78

CUL

117
PRESSURE VESSEL DATA

JOB NO. 4554
TECH. CNTR. _____
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE: _____

CUSTOMER				SASSI CORPORATION				TAG: R-3			
LOCATION				Indianapolis, Indiana				NO. REQ'D. 1			
SERVICE				CRG REACTOR							
SIZE				13'0" I.D. x 11'0" T-T							

REDUC. FLG.

HOLD-DOWN GRID WITH 8 MESH-304 S.S. WIRE MESH

FLOATING SCREEN 8 MESH-304 S.S. WIRE MESH

FILL WITH 1/2" ALUMINA BALLS

13'0" I.D. SHELL

11'0"

6'0"

T.L.V.

FILL WITH 1" ALUMINA BALLS

SCH. 80 PIPE (GAS OUTLET)

W/ (4) PIPES @ 90° APART

(2) LAYERS OF 20 MESH-304 S.S. WIRE MESH

DESIGN DATA

VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS
J. F. PRITCHARD & CO. SPECIFICATION 28-3 DATED _____

ASME CODE STAMPED: YES ☐ NO ☐

STR. RELIEVED: _____ RADIOGRAPHED: _____

WELDING EFFICIENCY, SHELL: _____ HEADS: _____

DESIGN PRESS. 250 PSIG WORKING 185 PSIG

DESIGN TEMP. 1000°F. WORKING 927°F.

CORR. ALLOW. _____ STRUCT. ALLOW. _____ FOR _____

HEAD THICKNESS: _____ TYPE _____

SHELL THICKNESS: _____

HEAD STEEL ASTM _____

SHELL STEEL ASTM _____

PRESS. PIPE ASTM _____ FLO. STEEL _____

SKIRT STEEL ASTM _____ BASE STEEL _____

STRUCTURAL STEEL ASTM _____

NOZZLE RATING ASA STD. _____

PROJ. NOZZLES _____ IN. MANWAYS _____

MANWAYS TO BE _____ I.D. _____ L.W. HINGED _____

MAX. PRESS. AT TEST TEMP. (NO CORR.) _____ PSIG

HYDROSTATIC TEST _____ PSIG

TRAYS: TYPE _____ NO. _____ MAT'L _____

TRAYS: TYPE _____ NO. _____ MAT'L _____

SEAL PAN _____ NO. _____ MAT'L _____

TRAY SUPPORTS _____

TRAY DOWNCOMER BOLTING BARS FURNISHED BY _____ FAB. AND INSTALLED BY _____ VESSEL FABRICATOR.

CLEANING _____ PAINTING _____

INSULATION SUPPORT RINGS REQUIRED TO BE _____" x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.

INSPECTION BY _____

EMPTY VESSEL WEIGHT _____ LB.

REMARKS:
CATALYST VOLUME: 680 CU. FT.

Apprd. for Bldg		Apprd. for Purchase		Rev.	0								
Date	By	Date	By	Date	19 OCT 78								
12/7/78	cwr												

B/M 503 Rev. 1

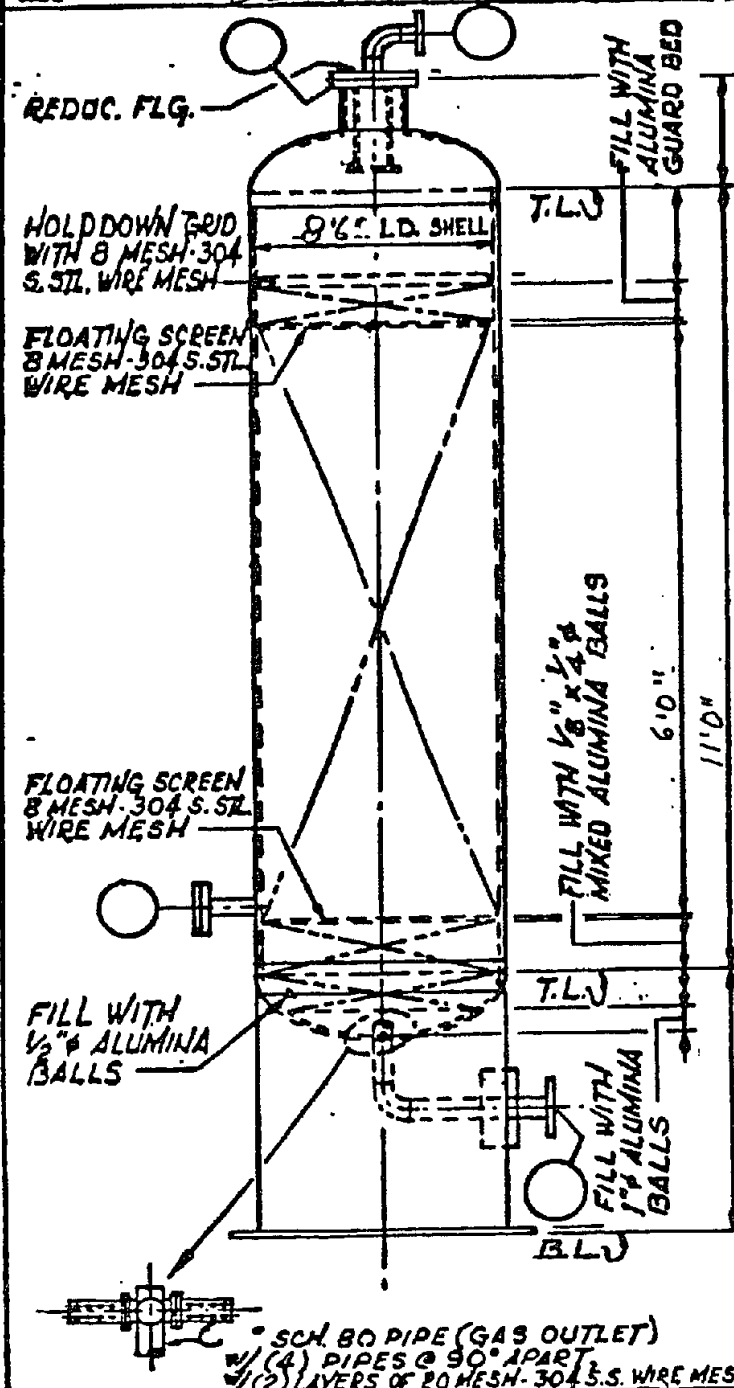
118

PRESSURE VESSEL DATA

JOB NO. 2392
TECH. CNTR.
PROJECT ENGR.
REQ. NO.
PAGE OF DATE:

TAG: R-4

CUSTOMER	SASSI CORPORATION
LOCATION	Indianapolis, Indiana
SERVICE	METHANATOR #1
SIZE	3'6" I.D. x 11'0" T-T
	NO. REQ'D. 1



DESIGN DATA

VESSLS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS J. F. PRITCHARD & CO. SPECIFICATION 18-3 DATED

ASME CODE STAMPED: YES ☐ NO ☐

STR. RELIEVED: RADIOGRAPHED:

WELDING EFFICIENCY, SHELL: HEADS:

DESIGN PRESS. 220 PSIG WORKING 175 PSIG

DESIGN TEMP. 925 °F. WORKING 800 °F.

CORR. ALLOW. STRUCT. ALLOW. FOR

HEAD THICKNESS: TYPE

SHELL THICKNESS:

HEAD STEEL ASTM

SHELL STEEL ASTM

PRESS. PIPE ASTM FLG. STEEL

SKIRT STEEL ASTM BASE STEEL

STRUCTURAL STEEL ASTM

NOZZLE RATING ASA STD.

PROJ. NOZZLES IN. MANWAYS

MANWAYS TO BE I.D. M.W. HINGED

MAX. PRESS. AT TEST TEMP. (NO CORR.) PSIG

HYDROSTATIC TEST PSIG

TRAYS: TYPE NO. MAT'L.

TRAYS: TYPE NO. MAT'L.

SEAL PAN NO. MAT'L.

TRAY SUPPORTS

TRAY DOWNCOMER BOLTING BARS FURNISHED BY FAB. AND INSTALLED BY VESSEL FABRICATOR.

CLEANING PAINTING

INSULATION SUPPORT RINGS REQUIRED TO BE 1/4" x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.

INSPECTION BY

EMPTY VESSEL WEIGHT LB.

REMARKS:

CATALYST VOLUME 8380 CU. FT.

App'd. for Bldg.	App'd. for Purchase	Rev.	0
Date	By	Date	By
12/7/78	CWR	19 OCT 78	

PRESSURE VESSEL DATA

JOB NO. 2392
 TECH. CNTR. _____
 PROJECT ENGR. _____
 REQ. NO. _____
 PAGE OF DATE: _____

TAG: R-5

CUSTOMER		SASSI CORPORATION	
LOCATION		Indianapolis, Indiana	
SERVICE		METHANATOR # 2	
SIZE		8' 6" x 11' 0"	

DESIGN DATA

VESSLS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS.
 J. F. PRITCHARD & CO. SPECIFICATION 12-3 DATED _____

ASME CODE STAMPED: YES ☐ NO ☐

STR. RELIEVED: _____ RADIOGRAPHED: _____

WELDING EFFICIENCY, SHELL: _____ HEADS: _____

DESIGN PRESS. 200 PSIG WORKING 150 PSIG

DESIGN TEMP. 725 °F. WORKING 800 °F.

CORR. ALLOW. _____ STRUCT. ALLOW. _____ FOR _____

HEAD THICKNESS: _____ TYPE _____

SHELL THICKNESS: _____

HEAD STEEL ASTM _____

SHELL STEEL ASTM _____

PRESS. PIPE ASTM _____ FLO. STEEL _____

SKIRT STEEL ASTM _____ BASE STEEL _____

STRUCTURAL STEEL ASTM _____

NOZZLE RATING ASA STD. _____

PROJ. NOZZLES _____ NO. MANWAYS _____

MANWAYS TO BE _____ I.D. _____ M.W. HINGED _____

MAX. PRESS. AT TEST TEMP. (NO CORR.) _____ PSIG

HYDROSTATIC TEST _____ PSIG

TRAYS: TYPE _____ NO. _____ MAT'L. _____

TRAYS: TYPE _____ NO. _____ MAT'L. _____

SEAL PAN _____ NO. _____ MAT'L. _____

TRAY SUPPORTS _____

TRAY DOWNCOMER BOLTING BARS FURNISHED BY _____ FAB. AND INSTALLED BY _____ VESSEL FABRICATOR.

CLEANING _____ PAINTING _____

INSULATION SUPPORT RINGS REQUIRED TO BE _____ ° x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.

INSPECTION BY _____

EMPTY VESSEL WEIGHT _____ LB.

REMARKS:
 CATALYST VOLUME: 350 cu. ft.

Approved for Bids		Approved for Purchase		Rev.	0
Date	By	Date	By		
12/7/78	CWR			Date	19 JAN 78

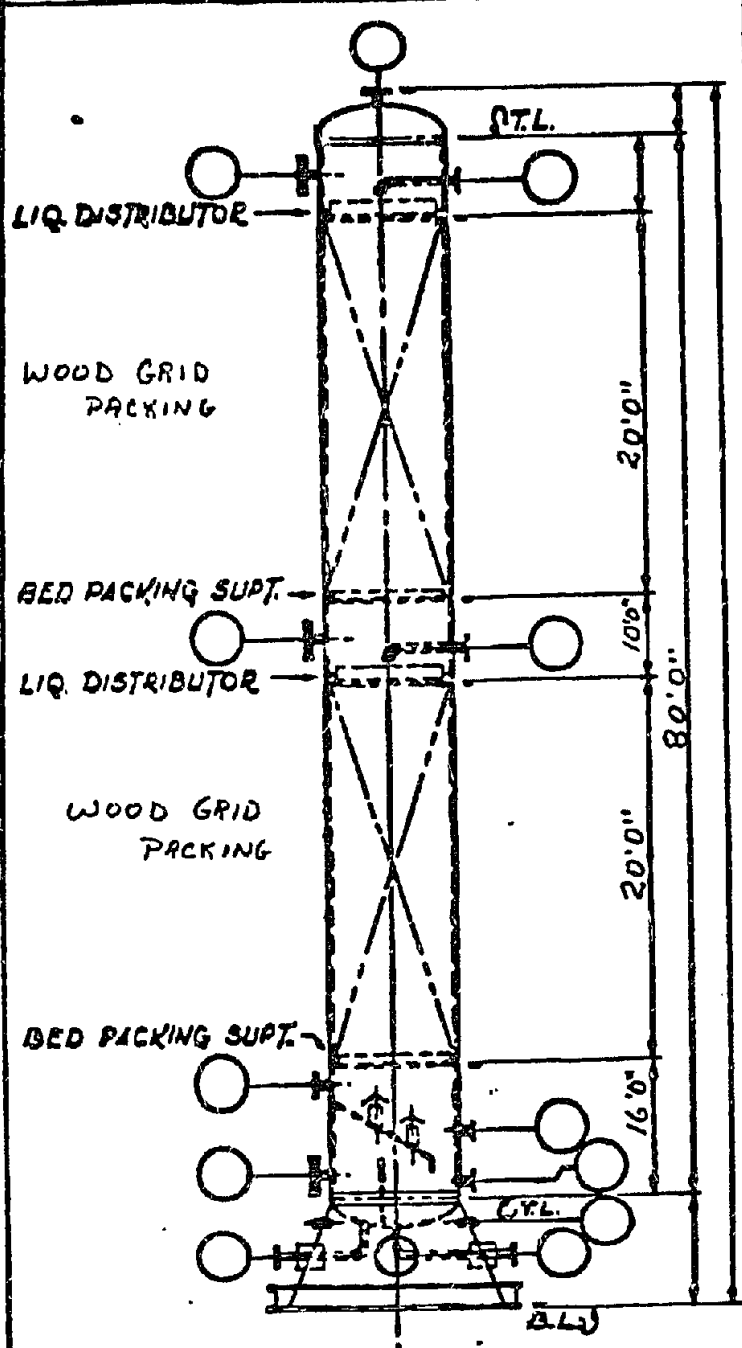
120
PRESSURE VESSEL DATA

JOB NO. 2392
TECH. CNTR.
PROJECT ENGR.
REQ. NO.
PAGE OF DATE:

CUSTOMER SASSI CORPORATION
LOCATION Indianapolis, Indiana
SERVICE BENZOL ABSORBER
SIZE 22'0" I-D x 80'0" T-T

T-1

NO. REQ'D. 1



DESIGN DATA

VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS
J. F. PRITCHARD & CO. SPECIFICATION 2B-3 DATED

ASME CODE STAMPED: YES ☐ NO ☐
STR. RELIEVED: RADIOGRAPHED:
WELDING EFFICIENCY, SHELL: HEADS:
DESIGN PRESS. 5 PSIG WORKING 1.1 PSIG
DESIGN TEMP. 150 °F. WORKING 108 °F.
CORR. ALLOW. 1/8" STRUCT. ALLOW. FOR
HEAD THICKNESS: TYPE
SHELL THICKNESS:
HEAD STEEL ASTM
SHELL STEEL ASTM

PRESS. PIPE ASTM PLG. STEEL
SHEET STEEL ASTM BASE STEEL
STRUCTURAL STEEL ASTM
NOZZLE RATING ASA STD.
PROJ. NOZZLES IN. MANWAYS
MANWAYS TO BE LD. M.W. WINGED
MAX. PRESS. AT TEST TEMP. (NO CORR.) PSIG
HYDROSTATIC TEST PSIG
TRAYS: TYPE NO. MATL.
TRAYS: TYPE NO. MATL.
SEAL PAN NO. MATL.

TRAY SUPPORTS
TRAY DOWNCOMER BOLTING BARS FURNISHED BY FAB. AND INSTALLED BY VESSEL FABRICATOR.

CLEANING PAINTING
INSULATION SUPPORT RINGS REQUIRED TO BE 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.
INSPECTION BY

EMPTY VESSEL WEIGHT LB.

REMARKS:

Approved for Bids		Approved for Purchase		Rev.					
Date	By	Date	By						
11/16/78	CWR			0	11/15/78				
				Date	J-A				

$$\frac{\pi D^2}{4} = \frac{\pi (22')^2}{4} = 380.13 \text{ sq. ft.}$$

12.7' dia. area in 2 vessels

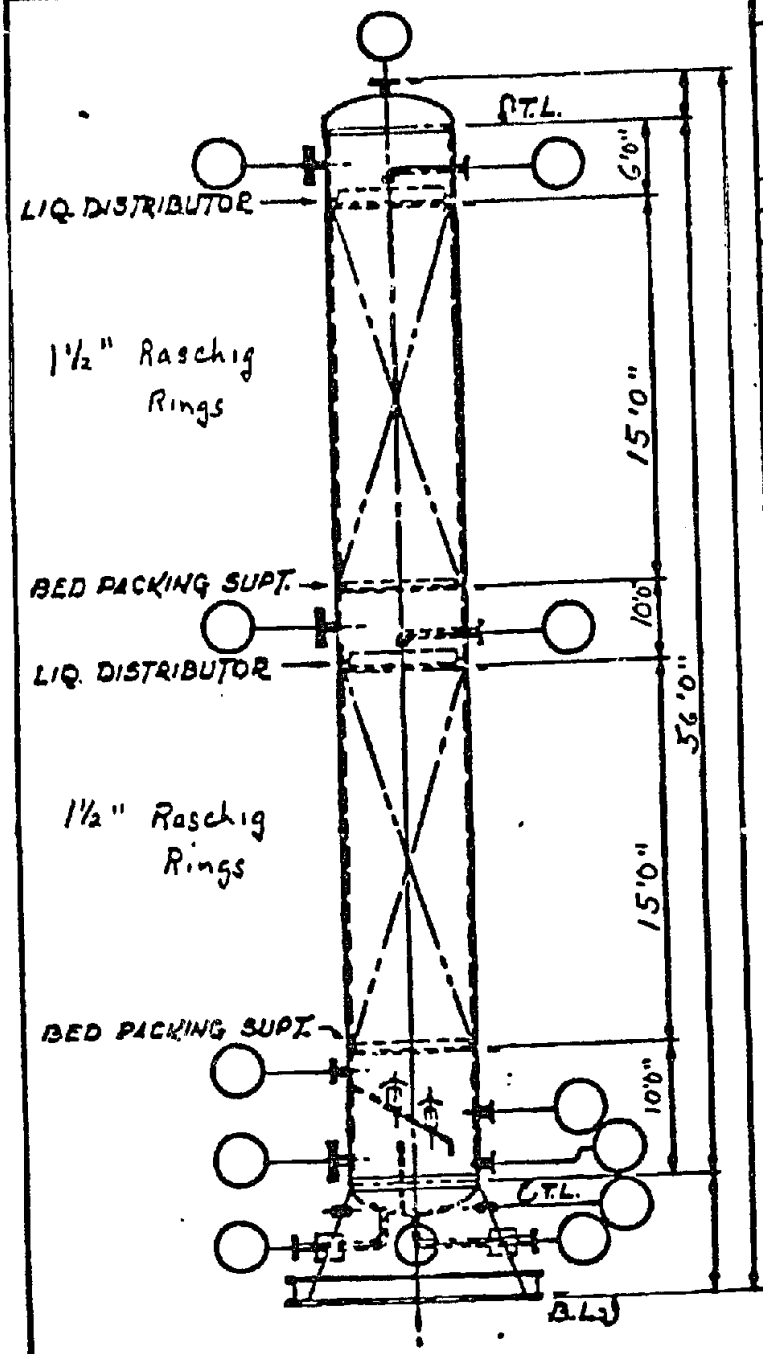
JOB NO. 2392
TECH. CNTR.
PROJECT ENGR.

8-14-500 Rev. 1

TECH. C. I. R. _____
 PROJECT MGR. _____
 REQ. NO. _____
 PAGE _____ OF _____ DATE: _____

121
 PRESSURE VESSEL DATA

CUSTOMER	SASSI CORPORATION	
LOCATION	Indianapolis, Indiana	
SERVICE	BENZOL STRIPPER	
SIZE	20'0" I-D x 56'0" T-T	
		NO. REQ'D. 1



DESIGN DATA	
VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS J. P. PRITCHARD & CO. SPECIFICATION 84-3 DATED	
ASME CODE STAMPED:	YES ☐ NO ☐
STR. RELIEVED:	RADIOGRAPHED:
WELDING EFFICIENCY, SHELL:	HEADS:
DESIGN PRESS. 5.0 PSIG	WORKING 1.0 PSIG
DESIGN TEMP. 250 °F.	WORKING 215 °F.
CORR. ALLOW.	STRUCT. ALLOW. FOR
HEAD THICKNESS:	TYPE
SHELL THICKNESS:	
HEAD STEEL ASTM	
SHELL STEEL ASTM	
PRESS. PIPE ASTM	FLG. STEEL
SKIRT STEEL ASTM	BASE STEEL
STRUCTURAL STEEL ASTM	
NOZZLE RATING ASA STD.	
PROJ. NOZZLES	IN. MANWAYS
MANWAYS TO BE	I.D. M.W. HINGED
MAX. PRESS. AT TEST TEMP. (NO CORR.)	PSIG
HYDROSTATIC TEST	PSIG
TRAYS: TYPE	NO. MAT'L.
TRAYS: TYPE	NO. MAT'L.
SEAL PAN	NO. MAT'L.
TRAY SUPPORTS	
TRAY DOWNCOMER BOLTING BARS FURNISHED BY _____ FAB. AND INSTALLED BY VESSEL FABRICATOR.	
CLEANING	PAINTING
INSULATION SUPPORT RINGS REQUIRED TO BE _____" x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.	
INSPECTION BY _____	
EMPTY VESSEL WEIGHT	LB.
REMARKS:	

Approved for Build		Approved for Purchase		Rev.	0								
Date	By	Date	By										
11/16/77	CWR				11/15/77	JLA							

$$D_1 = 2 \sqrt{\frac{P}{S}} = 11.55'0" \text{ (EQUIVALENT AREA IN 3 VESSELS)}$$

B/M 001 Rev. 3

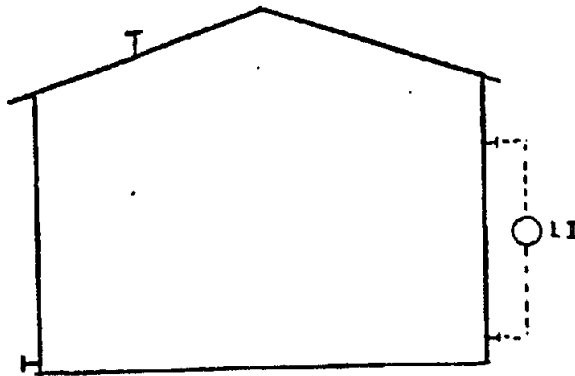
122

JOB NO. 2392
TECH. CNTR. JLA
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE

BENZOL STORAGE TANK
FOR SASSI CORPORATION
Indianapolis, Indiana

ITEM NO.: TK-2

CAPACITY: 1000 gallons
DESIGN PRESSURE, PSIG 0.5
DESIGN TEMPERATURE, °F 120



Apprd. for Bids		Apprd. for Purchase		REV.									
DATE	BY	DATE	BY										
11/15/72	EWR			DATE	JLA								

B/M 001 Rev. 3

123

JOB NO. 2392
TECH. CNTR. JLA
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE _____

LEAN OIL STORAGE TANK

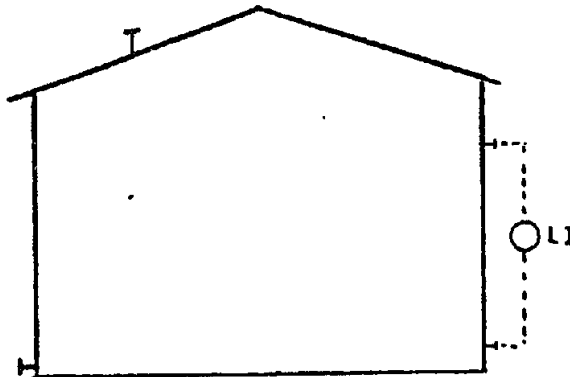
ITEM NO.: TK-3

FOR SASSI CORPORATION
Indianapolis, Indiana

CAPACITY: 25000 gallons

DESIGN PRESSURE, PSIG Atmos.

DESIGN TEMPERATURE, °F 120



Appvd. for Bids		Appvd. for Purchase		REV.									
DATE	BY	DATE	BY										
11/15/78		CWn.		DATE	11/16/78								
					JLA								

VESSEL DATA

JOB NO. 2392
 TECH. CNTR. _____
 PROJECT ENGR. _____
 REQ. NO. _____
 PAGE OF DATE: _____

CUSTOMER <u>SASSI CORPORATION</u>		TAG <u>TK-9</u>	
LOCATION <u>Indianapolis, Indiana</u>		NO. REQ'D. <u>One</u>	
SERVICE <u>Pump Tank</u>			
SIZE <u>26'-0" x 16'-6" DIA.</u>			

NOZZLE SCHEDULE

1. Level Conn
2. Solution inlet
- 3A. Pump conn
- 5 DRAIN

DESIGN DATA

VESSELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS. J. F. PRITCHARD & CO. SPECIFICATION 85-3 DATED _____

ASME CODE STAMPED: YES ☐ NO ☐

STR. RELIEVED: _____ RADIOGRAPHED: _____

WELDING EFFICIENCY, SHELL: _____ HEADS: _____

DESIGN PRESS. _____ PSIG WORKING ATM PSIG _____

DESIGN TEMP. _____ °F. WORKING 110 °F.

CORR. ALLOW. _____ STRUCT. ALLOW. _____ FOR _____

HEAD THICKNESS: _____ TYPE _____

SHELL THICKNESS: _____

HEAD STEEL ASTM _____

SHELL STEEL ASTM _____

PRESS. PIPE ASTM _____ FLG. STEEL _____

SKIRT STEEL ASTM _____ BASE STEEL _____

STRUCTURAL STEEL ASTM _____

NOZZLE RATING ASA STD. _____

PROJ. NOZZLES _____ IN. MANWAYS _____

MANWAYS TO BE _____ I.D. _____ M.W. HINGED _____

MAX. PRESS. AT TEST TEMP. (NO CORR.) _____ PSIG

HYDROSTATIC TEST _____ PSIG

TRAYS: TYPE _____ NO. _____ MAT'L. _____

TRAYS: TYPE _____ NO. _____ MAT'L. _____

SEAL PAN _____ NO. _____ MAT'L. _____

TRAY SUPPORTS _____

TRAY DOWNCOMER BOLTING BARS FURNISHED BY _____ FAB. AND INSTALLED BY _____ VESSEL FABRICATOR.

CLEANING _____ PAINTING _____

INSULATION SUPPORT RINGS REQUIRED TO BE _____" x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS.

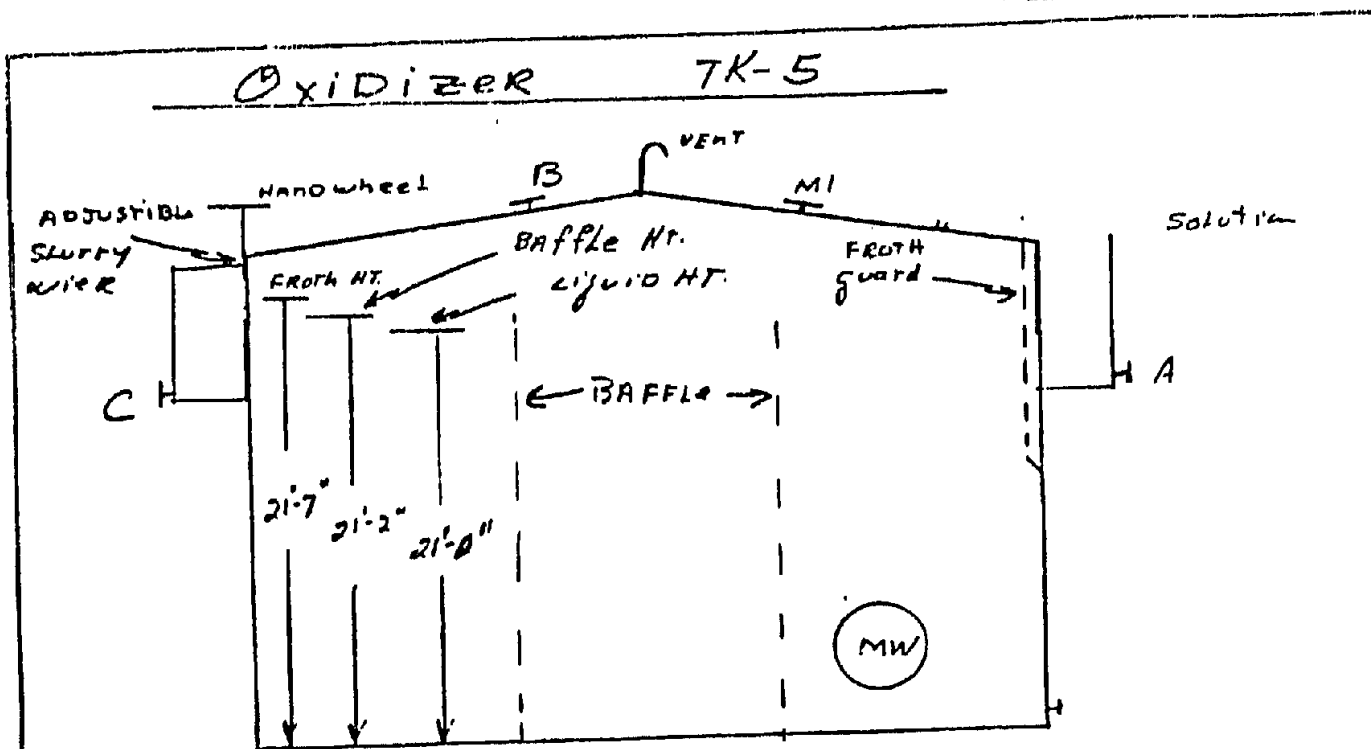
INSPECTION BY _____

EMPTY VESSEL WEIGHT _____ LB.

REMARKS: ① inside lined with coal tar epoxy
 ② Sp. gr. Des. 1.3

Apprd. for Bids		Apprd. for Purchase		Rev.									
Date	By	Date	By										
				Date									

8/1001 Rev. 3



26' x 37' DIAMETER

Notes

1. Line inside of tank and internals with coal tar epoxy
2. Solution inlet Extends into tank to the bottom
3. Baffles are placed in order to divide the tank into three equal compartments
4. AIR manifold on roof.
134 AIR SPARGERS - 304 L.S.S.
EACH SPARGER 18" DIA X 18" hgt
AIR PIPES 2" Ø

Nozzle Schedule

A Solution outlet
B Solution inlet
C Slurry outlet

[illegible]

CUSTOMER		SASSI Corporation		Tag TK-6	
LOCATION		Indianapolis, Indiana			
SERVICE		SLURRY TANK		NO. REQ'D. ONE	
SIZE		26'-0" x 16'-0" DIA			
Note: Baffle Design by mixer mfg.					
			DESIGN DATA VESELS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS. J. F. PRITCHARD & CO. SPECIFICATION 25-3 DATED ASME CODE STAMPED: YES ☐ NO ☐ STR. RELIEVED: RADIOGRAPHED: WELDING EFFICIENCY, SHELL: HEADS: DESIGN PRESS. PSIG WORKING AT PSIG DESIGN TEMP. °F. WORKING 110 °F. CORR. ALLOW. STRUCT. ALLOW. FOR HEAD THICKNESS: TYPE SHELL THICKNESS: HEAD STEEL ASTM SHELL STEEL ASTM PRESS. PIPE ASTM FLG. STEEL SKIRT STEEL ASTM BASE STEEL STRUCTURAL STEEL ASTM NOZZLE RATING ASA STD. PROJ. NOZZLES IN. MANWAYS MANWAYS TO BE I.D. M.W. HINGED MAX. PRESS. AT TEST TEMP. (NO. CORR.) PSIG HYDROSTATIC TEST PSIG TRAYS: TYPE NO. MAT'L. TRAYS: TYPE NO. MAT'L. SEAL PAN NO. MAT'L. TRAY SUPPORTS TRAY DOWNCOMER BOLTING BARS FURNISHED BY FAB. AND INSTALLED BY VESSEL FABRICATOR. CLEANING PAINTING INSULATION SUPPORT RINGS REQUIRED TO BE ° x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS. INSPECTION BY EMPTY VESSEL WEIGHT LB. REMARKS: ① Inside Liner with coal tar epoxy ② Sp. gr. Des. 1.3		
NOZZLE SCHEDULE - Level Conn - Mixer Conn. - Solution Inlet - Pump Conn - DRAIN					
Apprd. for Bids		Apprd. for Purchase		Rev.	
Date	By	Date	By	Date	

JOB NO. 2392
TECH. CNTR. _____
PROJECT ENGR. _____
REQ NO. _____
PAGE OF DATE:

CUSTOMER				TAG			
LOCATION				NO. REQ'D.			
SERVICE				ONE			
SIZE				DESIGN DATA			
				VESSLS SHALL BE CONSTRUCTED ACCORDING TO THE LATEST REVISION OF THE ASME CODE FOR UNFIRED PRESSURE VESSELS. J. F. PRITCHARD & CO. SPECIFICATION 85-3 DATED ASME CODE STAMPED: YES ☐ NO ☐ STR. RELIEVED: RADIOGRAPHED: WELDING EFFICIENCY, SHELL: HEADS: DESIGN PRESS. PSIG WORKING Δ7M PSIG DESIGN TEMP. °F. WORKING 110 °F. CORR. ALLOW. STRUCT. ALLOW. FOR HEAD THICKNESS. TYPE SHELL THICKNESS: HEAD STEEL ASTM SHELL STEEL ASTM			
<u>NOZZLE Schedule</u> - CHEMICAL ADDITION hatch - Pump Conn - Level Conn - Temperature Conn - CHEMICAL DRAIN inlet				PRESS. PIPE ASTM FLG. STEEL SKIRT STEEL ASTM BASE STEEL STRUCTURAL STEEL ASTM NOZZLE RATING ASA STD. PROJ. NOZZLES IN. MANWAYS MANWAYS TO BE I.D. M.V. HINGED MAX. PRESS. AT TEST TEMP. (NO. CORR.) PSIG HYDROSTATIC TEST PSIG TRAYS: TYPE NO. MAT'L. TRAYS: TYPE NO. MAT'L. SEAL PAN NO. MAT'L. TRAY SUPPORTS TRAY DOWNCOMER BOLTING BARS FURNISHED BY FAB. AND INSTALLED BY VESSEL FABRICATOR. CLEANING PAINTING INSULATION SUPPORT RINGS REQUIRED TO BE " x 1/4" BAR WELDED. RINGS TO HAVE 3/16" DIA. HOLES AT 12" CENTERS. INSPECTION BY			
<u>Notes</u> TANK TO BE EITHER FRP OR CARBON STEEL WITH COAL TAR EPOXY LINING AND SUITABLE CORROSION PROTECTION FOR BELOW GROUND INSTALLATION				EMPTY VESSEL WEIGHT LB. REMARKS:			
APPROVED FOR BID DATE BY				APPROVED FOR PURCHASE DATE BY			
REV. DATE							

APPENDIX B: Specifications for Direct-Fired Equipment

<u>Tag</u>	<u>Equipment</u>
F-1	Start-up Feed Gas Furnace

ITEM NO.: F-1

A furnace for heating of process gas is required for startup purposes. The furnace will consist of two separated radiant sections, each having separate controls for setting the rate of fuel gas to that section of the furnace. The process specifications for each section of the furnace are attached.

Appvd. for Bids		Appvd. for Purchase		REV.									
DATE	BY	DATE	BY	DATE									

HEAT EXCHANGER DATA
131
SHELL AND TUBE

JOB NO. 4374
TECH. CNTR. _____
PROJECT ENGR. _____
REQ. NO. _____
PAGE 2 OF 3 DATE _____

1 CUSTOMER		SASSI CORPORATION			
2 ADDRESS		Indianapolis, Indiana			
3 PLANT LOCATION		HYDROGENATOR FEED SECTION		TAG NO. F-1	
4 SERVICE OF UNIT		STARTUP FEED GAS FURNACE		NO. OF UNITS	
5 SIZE		TYPE		CONNECTED IN	
6 SURFACE PER UNIT		SHELLS PER UNIT		SURFACE PER SHELL	
7 PERFORMANCE OF ONE UNIT					
		SHELL SIDE		TUBE SIDE	
		NORMAL DESIGN*		NORMAL DESIGN*	
10 FLUID CIRCULATED				H/L GAS	
11 TOTAL FLUID ENTERING		LBS/MR.		132905 145300	
12 VAPOR		LBS/MR.		132905 145300	
13 LIQUID		LBS/MR.		-	
14 STEAM		LBS/MR.		-	
15 NON-CONDENSABLES		LBS/MR.		-	
16 FLUID VAPORIZED OR COND.		LBS/MR.		-	
17 STEAM CONDENSED		LBS/MR.		-	
18 DENSITY - LIQUID		LB/FT ³		-	
19 VISCOSITY - LIQUID		CP		-	
20 MOLE WT. - VAPOR IN/OUT				26.24 26.24	
21 SPECIFIC HEAT - LIQUIDS		BTU/LB/°F		-	
22 LATENT HEAT - VAPORS		BTU/LB		-	
23 TEMPERATURE IN		°F		428	
24 TEMPERATURE OUT		°F		550	
25 OPERATING PRESSURE		PSIG		240	
26 NUMBER OF PASSES PER SHELL				*	
27 VELOCITY		FT/SEC		3	
28 PRESSURE DROP		PSI		0.001	
29 FOULING FACTOR				0.001	
30 HEAT EXCHANGED		① BTU/MR. 6805700 7440400		M.T.D. (CORRECTED)	
31 TRANSFER RATE - SERVICE		CLEAN			
32 CONSTRUCTION					
33 DESIGN PRESSURE		PSIG		27.5	
34 TEST PRESSURE		PSIG		600	
35 DESIGN TEMPERATURE		°F		600	
36 TUBES		NO.	O.D.	BWG.	LENGTH
37 SHELL		I.D.		O.D.	PITCH
38 SHELL COVER		FLOATING HEAD COVER			
39 CHANNEL		CHANNEL COVER			
40 TUBE SHEETS - STATIONARY		FLOATING			
41 BAFFLES - CROSS		TYPE			
42 BAFFLE - LONG		TYPE			
43 TUBE SUPPORTS					
44 GASKETS					
45 CONNECTIONS - SHELL - IN		OUT		ASA RATING	
46 CHANNEL - IN		OUT		ASA RATING	
47 CORROSION ALLOWANCE - SHELL SIDE		TUBE SIDE			
48 CODE REQUIREMENTS		TEMA CLASS			
49 WEIGHTS - EACH SHELL		BUNDLE		FULL OF WATER	
50 NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)					
REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS					
* DESIGN SAME AS NORMAL UNLESS SPECIFIED					
Apprd. for Bids		Apprd. for Purchase		REV.	0 JLA
DATE	BY	DATE	BY	DATE	12/7/78 1/9/79
11/7/78	CWR				

132
HEAT EXCHANGER DATA
SHELL AND TUBE

JOB NO. 2392
TECH. CNTR.
PROJECT ENGR.
REQ. NO.
PAGE 3 OF 3

1	CUSTOMER	SASSI CORPORATION																							
2	ADDRESS	Indianapolis, Indiana																							
3	PLANT LOCATION	CRG REFINERY, HEAVY SECTOR																							
4	SERVICE OF UNIT	STARTING AND GAS EXCHANGER																							
5	SIZE	TYPE																							
6	SURFACE PER UNIT	SHELLS PER UNIT																							
7	PERFORMANCE OF ONE UNIT																								
8	SHELL SIDE																								
9	NORMAL DESIGN																								
10	FLUID CIRCULATED	26.48																							
11	TOTAL FLUID ENTERING	26.48																							
12	VAPOR	26.48																							
13	LIQUID	26.48																							
14	STEAM	26.48																							
15	NON-CONDENSABLES	26.48																							
16	FLUID VAPORIZED OR COND.	26.48																							
17	STEAM CONDENSED	26.48																							
18	DENSITY - LIQUID	26.48																							
19	VISCOSITY - LIQUID	26.48																							
20	MOLE WT. - VAPOR IN/OUT	26.48																							
21	SPECIFIC HEAT - LIQUIDS	26.48																							
22	LATENT HEAT - VAPORS	26.48																							
23	TEMPERATURE IN	26.48																							
24	TEMPERATURE OUT	26.48																							
25	OPERATING PRESSURE	26.48																							
26	NUMBER OF PASSES PER SHELL	26.48																							
27	VELOCITY	26.48																							
28	PRESSURE DROP	26.48																							
29	FOULING FACTOR	26.48																							
30	HEAT EXCHANGED	26.48																							
31	TRANSFER RATE - SERVICE	26.48																							
32	CONSTRUCTION																								
33	DESIGN PRESSURE	26.48																							
34	TEST PRESSURE	26.48																							
35	DESIGN TEMPERATURE	26.48																							
36	TUBES	26.48																							
37	SHELL	26.48																							
38	SHELL COVER	26.48																							
39	CHANNEL	26.48																							
40	TUBE SHEETS - STATIONARY	26.48																							
41	BAFFLES - CROSS	26.48																							
42	BAFFLE - LONG	26.48																							
43	TUBE SUPPORTS	26.48																							
44	GASKETS	26.48																							
45	CONNECTIONS - SHELL - IN	26.48																							
46	CHANNEL - IN	26.48																							
47	CORROSION ALLOWANCE - SHELL SIDE	26.48																							
48	CODE REQUIREMENTS	26.48																							
49	WEIGHTS - EACH SHELL	26.48																							
50	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)																								
REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS																									
* DESIGN SAME AS NORMAL UNLESS SPECIFIED																									
<table border="1"> <tr> <td>Apprd. for Bids</td> <td>Apprd. for Purchase</td> <td>REV.</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DATE</td> <td>BY</td> <td>DATE</td> <td>BY</td> <td>DATE</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>						Apprd. for Bids	Apprd. for Purchase	REV.								DATE	BY	DATE	BY	DATE					
Apprd. for Bids	Apprd. for Purchase	REV.																							
DATE	BY	DATE	BY	DATE																					

APPENDIX C. HEAT EXCHANGERS

<u>Tag</u>	<u>Equipment</u>
E-5	Lean Oil Cooler
E-6	Rich Oil Heater
E-7	Lean/Rich Exchanger
E-8	Benzol Condenser
E-9	Gas/Gas Exchanger
E-10	Gas Cooler
E-11	CRG Feed Cooler
E-12	CRG Effluent Cooler
E-13	Methanator Effluent Cooler #1
E-14	Methanator Exchanger
E-15	Methanator Effluent Cooler #2
E-16	Methanator Effluent Cooler #3
E-24	Feed Gas Heater
E-25	Gas/Gas Exchanger
E-26	CRG Effluent Steam Condenser
E-27	Cold Recycle Cooler #1
E-28	Cold Recycle Cooler #2

134
HEAT EXCHANGER DATA
SHELL AND TUBE

JOB NO. 2392
TECH. CNTR.
PROJECT ENGR.
REQ. NO.
PAGE OF DATE

GENERAL INFORMATION		DESIGN		PERFORMANCE OF ONE UNIT	
SHELL AND TUBE		SHELL SIDE		TUBE SIDE	
1. TYPE	2. SIZE	3. DESIGN	4. DESIGN	5. DESIGN	6. DESIGN
7. STEADY	8. NON-CONDENSABLES	9. FLUID VAPORIZED OR COND.	10. STEAM CONDENSED	11. DENSITY - LIQUID	12. VISCOSITY - LIQUID
13. MOLE WT. - VAPOR IN/OUT	14. SPECIFIC HEAT - LIQUIDS	15. LATENT HEAT - VAPORS	16. TEMPERATURE IN	17. TEMPERATURE OUT	18. OPERATING PRESSURE
19. NUMBER OF PASSES PER SHELL	20. VELOCITY	21. PRESSURE DROP	22. FOULING FACTOR	23. HEAT EXCHANGED	24. TRANSFER RATE - SERVICE
CONSTRUCTION					
25. DESIGN PRESSURE	26. TEST PRESSURE	27. DESIGN TEMPERATURE	28. TUBES	29. SHELL	30. SHELL COVER
31. CHANNEL	32. TUBE SHEETS - STATIONARY	33. BAFFLES - CROSS	34. BAFFLE - LONG	35. TUBE SUPPORTS	36. GASKETS
37. CONNECTIONS - SHELL - IN	38. CONNECTIONS - SHELL - OUT	39. CONNECTIONS - CHANNEL - IN	40. CONNECTIONS - CHANNEL - OUT	41. CORROSION ALLOWANCE - SHELL SIDE	42. CODE REQUIREMENTS
43. WEIGHTS - EACH SHELL	44. NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)	REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS			
* DESIGN SAME AS NORMAL UNLESS SPECIFIED					
Apprd. for Bids		Apprd. for Purchase		REV.	0
DATE	BY	DATE	BY	DATE	11/15/78
11/16/78	CWR			DATE	JLA

1	CUSTOMER	SASSI CORPORATION					TAG NO.		E-6																																		
2	ADDRESS	Indianapolis, Indiana					NO. OF UNITS																																				
3	PLANT LOCATION						CONNECTED IN																																				
4	SERVICE OF UNIT	RICH OIL HEATER					SURFACE PER SHELL																																				
5	SIZE	TYPE																																									
6	SURFACE PER UNIT	SHELLS PER UNIT																																									
7	PERFORMANCE OF ONE UNIT																																										
8						SHELL SIDE		TUBE SIDE																																			
9						NORMAL		DESIGN*		NORMAL	DESIGN*																																
10	FLUID CIRCULATED	RICH OIL					50 PSIG		STEAM																																		
11	TOTAL FLUID ENTERING	LBS/MR.	287725	316500	2800	3080																																					
12	VAPOR	LBS/MR.	-	-	-	-																																					
13	LIQUID	LBS/MR.	287725	316500	-	-																																					
14	STEAM	LBS/MR.	-	-	2800	3080																																					
15	NON-CONDENSABLES	LBS/MR.	-	-	-	-																																					
16	FLUID VAPORIZED OR COND.	LBS/MR.	-	-	-	-																																					
17	STEAM CONDENSED	LBS/MR.	-	-	2800	3080																																					
18	DENSITY - LIQUID	LB/FT ³	53	53	-	-																																					
19	VISCOSITY - LIQUID	CP	-	-	-	-																																					
20	MOLE WT. - VAPOR IN/OUT		-	-	18	18																																					
21	SPECIFIC HEAT - LIQUIDS	BTU/LB/°F	0.344	-	-	-																																					
22	LATENT HEAT - VAPORS	BTU/LB	-	-	911	-																																					
23	TEMPERATURE IN	°F	250	250	298	298																																					
24	TEMPERATURE OUT	°F	275	275	298	298																																					
25	OPERATING PRESSURE	PSIG	48	-	50	50																																					
26	NUMBER OF PASSES PER SHELL		2	-	2	-																																					
27	VELOCITY	FT/SEC	2	2	2	2																																					
28	PRESSURE DROP	PSI	4	-	-	-																																					
29	FOULING FACTOR		0.002	-	0.0005	-																																					
30	HEAT EXCHANGED	BTU/MR.	2474400	2721830	M.T.D. (CORRECTED)																																						
31	TRANSFER RATE - SERVICE	CLEAN																																									
32	CONSTRUCTION																																										
33	DESIGN PRESSURE	75				PSIG	75 PSIG																																				
34	TEST PRESSURE					PSIG	PSIG																																				
35	DESIGN TEMPERATURE	350				°F	350 °F																																				
36	TUBES CS	NO.	O.D.	BWG.	LENGTH		PITCH																																				
37	SHELL CS	I.D. O.D.																																									
38	SHELL COVER						FLOATING HEAD COVER																																				
39	CHANNEL						CHANNEL COVER																																				
40	TUBE SHEETS - STATIONARY						FLOATING																																				
41	BAFFLES - CROSS	TYPE																																									
42	BAFFLE - LONG	TYPE																																									
43	TUBE SUPPORTS																																										
44	GASKETS																																										
45	CONNECTIONS - SHELL - IN	OUT					ASA RATING																																				
46	CHANNEL - IN	OUT					ASA RATING																																				
47	CORROSION ALLOWANCE - SHELL SIDE						TUBE SIDE																																				
48	CODE REQUIREMENTS						TEMA CLASS																																				
49	WEIGHTS - EACH SHELL	BUNDLE					FULL OF WATER																																				
50	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)																																										
REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS																																											
* DESIGN SAME AS NORMAL UNLESS SPECIFIED																																											
<table border="1"> <tr> <td colspan="2">Appvd. for Bids</td> <td colspan="2">Appvd. for Purchase</td> <td>REV.</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DATE</td> <td>BY</td> <td>DATE</td> <td>BY</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>11/16/78</td> <td>CWR</td> <td></td> <td></td> <td>DATE</td> <td>11/16/78</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>											Appvd. for Bids		Appvd. for Purchase		REV.	0						DATE	BY	DATE	BY								11/16/78	CWR			DATE	11/16/78					
Appvd. for Bids		Appvd. for Purchase		REV.	0																																						
DATE	BY	DATE	BY																																								
11/16/78	CWR			DATE	11/16/78																																						

THE PRITCHARD CORPORATION
HEAT EXCHANGER DATA
SHELL AND TUBE

JOB NO. 2392
TECH. CNTR. JNM
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE 7-14-80

B. M. 700 Rev. 1

1	CUSTOMER	<u>SASSI CORP</u>				TAG NO.	<u>E-7</u>	
2	ADDRESS	<u>INDIANAPOLIS, INDIANA</u>				NO. OF UNITS	<u>1</u>	
3	PLANT LOCATION					CONN. IN		
4	SERVICE OF UNIT	<u>LEAN / RICH EXCHANGER</u>				STACKED		
5	SIZE	TYPE				* DESIGN SAME AS NORMAL UNLESS SPECIFIED		
6	SURFACE PER UNIT	SHELLS PER UNIT				SURFACE PER SHELL		
7	PERFORMANCE OF ONE UNIT							
8		SHELL SIDE				TUBE SIDE		
9		NORMAL		DESIGN *		NORMAL		DESIGN *
10	FLUID CIRCULATED	<u>LEAN OIL</u>		<u>RICH OIL</u>				
11	TOTAL FLUID ENTERING	LBS/HR.	<u>280500</u>	<u>308550</u>	<u>287725</u>	<u>316500</u>		
12	VAPOR	LBS/HR.						
13	LIQUID	LBS/HR.	<u>280500</u>	<u>308550</u>	<u>287725</u>	<u>316500</u>		
14	STEAM	LBS/HR.						
15	NON-CONDENSABLES	LBS/HR.						
16	FLUID VAPORIZED OR COND.	LBS/HR.						
17	STEAM CONDENSED	LBS/HR.						
18	DENSITY - LIQUID	LB/FT ³	<u>53</u>	<u>53</u>	<u>53</u>	<u>53</u>		
19	VISCOSITY - LIQUID	CP						
20	MOLE WT. VAPOR IN/OUT							
21	SPECIFIC HEAT - LIQUIDS	BTU/LB*F	<u>0.513</u>	<u>0.513</u>	<u>0.513</u>	<u>0.513</u>		
22	LATENT HEAT - VAPORS	BTU/LB						
23	TEMPERATURE IN /OUT	*F	<u>280/134</u>	<u>280/134</u>	<u>100/250</u>	<u>100/250</u>		
24	CONDUCTIVITY	Vap/Liq						
25	OPERATING PRESSURE	PSIG	<u>66</u>	<u>66</u>	<u>52</u>	<u>52</u>		
26	NUMBER OF PASSES PER SHELL							
27	VELOCITY	FT/SEC						
28	PRESSURE DROP Allow/Calc	PSI	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>		
29	FOULING FACTOR		<u>0.002</u>					
30	HEAT EXCHANGED	BTU/HR.	<u>1308000</u>	<u>1433000</u>	M.T.D. (CORRECTED) / (WTD)			<u>1</u>
31	TRANSFER RATE - SERVICE	CLEAN						
32	CONSTRUCTION							
33	DESIGN PRESSURE		<u>75</u>	PSIG	<u>90</u>	PSIG		
34	TEST PRESSURE			PSIG		PSIG		
35	DESIGN TEMPERATURE		<u>300</u>	*F	<u>300</u>	*F		
36	TUBES <u>CS</u>	NO.	<u>300</u>	O.D.	<u>300</u>	BWG.	LENGTH	PITCH
37	SHELL <u>CS</u>	I.D.		O.D.	SKETCH (BUNDLE/NOZZLE ORIENTATION)			
38	SHELL COVER							
39	CHANNEL	CHAN COVER						
40	TUBE SHEETS - STATIONARY	FLOATING						
41	BAFFLES - CROSS	TYPE						
42	BAFFLE - LONG	TYPE						
43	TUBE SUPPORTS							
44	GASKETS							
45	CONNECTIONS - SHELL - IN	OUT		ASA RATING				
46	CHANNEL - IN	OUT		ASA RATING				
47	CORROSION ALLOWANCE - SHELL SIDE	TUBE SIDE		TEST RINGS				
48	CODE REQUIREMENTS			TEMA CLASS				
49	WEIGHTS - EACH SHELL	BUNDLE		FULL OF WATER				
50	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)							
REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS								
SHOP ASSEMBLED AND HYDRO TESTED IN A STACKED SETTING.								

REV. <u>0</u>	DATE <u>11/5/78</u>	BY <u>JNM</u>
11/16/78 <u>GR</u>		

1	CUSTOMER	SASSI CORPORATION									
2	ADDRESS	Indianapolis, Indiana									
3	PLANT LOCATION	TAC NO. E-8									
4	SERVICE OF UNIT	BENZOL CONDENSER									
5	SIZE	NO. OF UNITS									
6	SURFACE PER UNIT	CONNECTED IN									
7		SURFACE PER SHELL									
8	PERFORMANCE OF ONE UNIT										
9		SHELL SIDE				TUBE SIDE					
10		NORMAL		DESIGN		NORMAL		DESIGN			
11	FLUID CIRCULATED	STRIPPING STEAM		COLD LIQ. WATER							
12	TOTAL FLUID ENTERING	LBS/MR.	12000	13200	582000	640200					
13	VAPOR	LBS/MR.	12000	13200	-	-					
14	LIQUID	LBS/MR.	-	-	582000	640200					
15	STEAM	LBS/MR.	-	-	-	-					
16	NON-CONDENSABLES	LBS/MR.	-	-	-	-					
17	FLUID ENTERING COND.	LBS/MR.	12000	13200	-	-					
18	STEAM CONDENSED	LBS/MR.	-	-	-	-					
19	DENSITY - LIQUID	LB/FT ³	62.0	100	-	-					
20	VISCOSITY - LIQUID	CP	-	-	-	-					
21	MOLE WT. - VAPOR IN/OUT		-	-	-	-					
22	SPECIFIC HEAT - LIQUIDS	BTU/LB/°F	-	-	1.0	100					
23	LATENT HEAT - VAPORS	BTU/LB	970	-	-	-					
24	TEMPERATURE IN	°F	225	225	95	95					
25	TEMPERATURE OUT	°F	100	100	115	119					
26	OPERATING PRESSURE	PSIG	0.6	0.6	50	50					
27	NUMBER OF PASSES PER SHELL		4	-	4	-					
28	VELOCITY	FT/SEC	4	4	4	4					
29	PRESSURE DROP	PSI	0.4	0.4	8	8					
30	FOULING FACTOR		0.002	-	0.001	-					
31	HEAT EXCHANGED	BTU/MR.	11640000	12804000	M.T.D. (CORRECTED)						
32	TRANSFER RATE - SERVICE	CLEAN									
33	CONSTRUCTION										
34	DESIGN PRESSURE	15				PSIG	7.5				PSIG
35	TEST PRESSURE					PSIG					PSIG
36	DESIGN TEMPERATURE	300				°F	320				°F
37	TUBES	NO.	O.D.	SWG.	LENGTH	PITCH					
38	SHELL	I.D.				O.D.					
39	SHELL COVER					FLOATING HEAD COVER					
40	CHANNEL					CHANNEL COVER					
41	TUBE SHEETS - STATIONARY					FLOATING					
42	BAFFLES - CROSS	TYPE									
43	BAFFLE - LONG	TYPE									
44	TUBE SUPPORTS										
45	GASKETS										
46	CONNECTIONS - SHELL - IN	OUT				ASA RATING					
47	CHANNEL - IN	OUT				ASA RATING					
48	CORROSION ALLOWANCE - SHELL SIDE					TUBE SIDE					
49	CODE REQUIREMENTS					TEMA CLASS					
50	WEIGHTS - EACH SHELL	BUNDLE				FULL OF WATER					
51	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)										
52	REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS										
53	* DESIGN SAME AS NORMAL UNLESS SPECIFIED										
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THE PRITCHARD CORPORATION
HEAT EXCHANGER DATA
SHELL AND TUBE

JOB NO. 2392
TECH. CNTR. JNIA
PROJECT ENGR. _____
REQ. NO. _____
PAGE 1 OF 1 DATE 7/14/80

1	CUSTOMER	<u>SASSI CORP</u>				TAG NO.	<u>E-9</u>	
2	ADDRESS	<u>INDIANAPOLIS, INDIANA</u>				NO. OF UNITS	<u>1</u>	
3	PLANT LOCATION					CONN. IN		
4	SERVICE OF UNIT	<u>GAS / GAS EXCHANGER</u>				STACKED		
5	SIZE	TYPE				* DESIGN SAME AS NORMAL UNLESS SPECIFIED		
6	SURFACE PER UNIT	SHELLS PER UNIT				SURFACE PER SHELL		
7	PERFORMANCE OF ONE UNIT							
8		SHELL SIDE				TUBE SIDE		
9		NORMAL		DESIGN *		NORMAL		DESIGN *
10	FLUID CIRCULATED	<u>HYDROCARBON GAS</u>		<u>HYDROCARBON GAS</u>		<u>HYDROCARBON GAS</u>		<u>HYDROCARBON GAS</u>
11	TOTAL FLUID ENTERING	LBS/HR.	<u>125838</u>	<u>138.422</u>		<u>125764</u>	<u>138340</u>	
12	VAPOR	LBS/HR.	<u>125838</u>	<u>138.422</u>		<u>125764</u>	<u>138340</u>	
13	LIQUID	LBS/HR.						
14	STEAM	LBS/HR.						
15	NON-CONDENSABLES	LBS/HR.						
16	FLUID VAPORIZED OR COND.	LBS/HR.						
17	STEAM CONDENSED	LBS/HR.						
18	DENSITY - LIQUID	LB/FT ³						
19	VISCOSITY - LIQUID	CP						
20	MOLE WT. - VAPOR IN/OUT		<u>26.5</u>	<u>26.5</u>		<u>26.5</u>	<u>26.5</u>	
21	SPECIFIC HEAT - LIQUIDS	BTU/LB *F						
22	LATENT HEAT - VAPORS	BTU/LB						
23	TEMPERATURE IN /OUT	*F	<u>10/550</u>	<u>110/450</u>		<u>700/297</u>	<u>800/324</u>	
24	CONDUCTIVITY	Vap/Liq						
25	OPERATING PRESSURE	PSIG	<u>210</u>	<u>210</u>		<u>231</u>	<u>231</u>	
26	NUMBER OF PASSES PER SHELL							
27	VELOCITY	FT/SEC				<u>3</u>	<u>3</u>	
28	PRESSURE DROP Allow/Calc	PSI						
29	FOULING FACTOR		<u>.001</u>	<u>.001</u>		<u>.001</u>	<u>.001</u>	
30	HEAT EXCHANGED	BTU/HR.	<u>20,550,000</u>	<u>26,720,000</u>		M.T.D. (CORRECTED) / (WTD) <u>1</u>		
31	TRANSFER RATE - SERVICE		CLEAN					
32	CONSTRUCTION							
33	DESIGN PRESSURE		<u>260</u>	PSIG		<u>285</u>	PSIG	
34	TEST PRESSURE			PSIG			PSIG	
35	DESIGN TEMPERATURE		<u>700</u>	*F		<u>950</u>	*F	
36	TUBES <u>CS</u>	NO.	O.D.	BWG.	LENGTH	PITCH	SKETCH (BUNDLE/NOZZLE ORIENTATION)	
37	SHELL <u>CS</u>		I.D.	O.D.				
38	SHELL COVER							
39	CHANNEL	CHAN COVER						
40	TUBE SHEETS - STATIONARY	FLOATING						
41	BAFFLES - CROSS	TYPE						
42	BAFFLE - LONG	TYPE						
43	TUBE SUPPORTS							
44	GASKETS							
45	CONNECTIONS - SHELL - IN	OUT	ASA RATING					
46	CHANNEL - IN	OUT	ASA RATING					
47	CORROSION ALLOWANCE - SHELL SIDE	<u>1/16"</u>	TUBE SIDE	<u>1/8"</u>	TEST RINGS			
48	CODE REQUIREMENTS	BUNDLE		TEMA CLASS				
49	WEIGHTS - EACH SHELL	FULL OF WATER						
50	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)							
	REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS							
	SHOP ASSEMBLED AND HYDRO TESTED IN A STACKED SETTING.							

Agreed for Bldg.	Agreed for Purchase	REV.	<u>0</u>
DATE <u>12/19/78</u>	DATE <u>7/14/80</u>	BY	<u>JNIA</u>

139
HEAT EXCHANGER DATA
SHELL AND TUBE

JOB NO. 2392
TECH. CNTR. _____
PROJECT ENGR. _____
REQ. NO. _____
PAGE ____ OF ____ DATE ____

1	CUSTOMER		SASSI CORPORATION	
2	ADDRESS		Indianapolis, Indiana	
3	PLANT LOCATION		TAG NO. E-10	
4	SERVICE OF UNIT		NO. OF UNITS	
5	SIZE		CONNECTED IN	
6	SURFACE PER UNIT		SURFACE PER SHELL	
7	PERFORMANCE OF ONE UNIT			
8			SHELL SIDE	
9			TUBE SIDE	
10			NORMAL DESIGN	
11	FLUID CIRCULATED		HYDROCARBON GAS	
12	TOTAL FLUID ENTERING		COOLING WATER	
13	VAPOR			
14	LIQUID			
15	STEAM			
16	NON-CONDENSABLES			
17	FLUID VAPORIZED OR COND.			
18	STEAM CONDENSED			
19	DENSITY - LIQUID			
20	VISCOSITY - LIQUID			
21	MOLE WT. - VAPOR IN/OUT			
22	SPECIFIC HEAT - LIQUIDS			
23	LATENT HEAT - VAPORS			
24	TEMPERATURE IN			
25	TEMPERATURE OUT			
26	OPERATING PRESSURE			
27	NUMBER OF PASSES PER SHELL			
28	VELOCITY			
29	PRESSURE DROP			
30	FOULING FACTOR			
31	HEAT EXCHANGED			
32	TRANSFER RATE - SERVICE			
33	CONSTRUCTION			
34	DESIGN PRESSURE			
35	TEST PRESSURE			
36	DESIGN TEMPERATURE			
37	TUBES			
38	SHELL			
39	SHELL COVER			
40	CHANNEL			
41	TUBE SHEETS - STATIONARY			
42	BAFFLES - CROSS			
43	BAFFLE - LONG			
44	TUBE SUPPORTS			
45	GASKETS			
46	CONNECTIONS - SHELL - IN			
47	CHANNEL - IN			
48	CORROSION ALLOWANCE - SHELL SIDE			
49	CODE REQUIREMENTS			
50	WEIGHTS - EACH SHELL			
51	BUNDLE			
52	FULL OF WATER			
53	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)			
54	REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS			
55	* DESIGN SAME AS NORMAL UNLESS SPECIFIED			
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140
PROCESS BOILER
DATA SHEET

JOB NO. 2392
DATE 7-15-80
PAGE

B/M 503

1.	CUSTOMER	SASSI CORP		ITEM:	E-11	
2.	ADDRESS	INDIANAPOLIS, INDIANA		NO. OF UNIT	1	
3.	PLANT LOCATION					
4.	SERVICE OF UNIT	CRG FEED COOLER				
5.	PERFORMANCE					
6.	GAS SIDE			STEAM SIDE		
7.	Gas flow	lb/hr	125961	Steam generated	lb/hr	4249
8.	Design pressure	psig	250	Design pressure	psig	500
9.	Operating pr. at blr. inlet	psig	190	Operating pressure	psig	450
10.	Operating pr. at blr. outlet	psig	185	Blow-down water	%	2
11.	Pressure drop	psi	5	Circulation ratio		*
12.	Temp. at boiler inlet	F	750	Saturation temp.	F	459
13.	Temp. at boiler outlet	F	662	Feedwater temp.	F	100
14.	Temperature drop	F	88	Heat abs./lb of steam	Btu/lb	—
15.	Specific heat (ave.)	Btu/lb/F	.4387	Steam quality	% or PPM	.150-125
16.	Heat given up	MBtu/hr	4862	Heat absorbed	MBtu/hr	4862
17.	Efficiency	%	100	LMTD	F	*
18.	Fouling factor	hr sq ft. F/Btu	.001	Fouling factor	hr sq ft. F/Btu	0.0
19.				Heat tr. coeff.	Btu/hr. sq ft. F	*
20.						
21.						
22.						
23.	MECHANICAL DATA *					
24.	INLET CHANNEL	Tubesheet thickness	in		Hearing surface	sq ft
25.		material			Tube number	
26.		refractory			diameter	in
27.		ferrules			min thickness	in
28.		Channel thickness	in		spacing	in
29.		material			length	
30.		refractory			material	CS
31.		anchors			internal bypass diameter	in
32.		Gas inlet diameter	in		Shell diameter	in
33.		material			thickness	in
34.	Manhole diameter	in		material	CS	
35.	material			handholes		
36.				Steam drum diameter	in	
37.				thickness	in	
38.				length		
39.	OUTLET CHANNEL	Tubesheet thickness	in		material	
40.		material			manholes	
41.		Channel thickness	in		feed inlet	in
42.		material			steam outlet dia	in
43.		refractory			demister th.	in
44.		anchors			demister area	sq ft
45.		flange				
46.		Gas outlet diameter	in		Risers number	
47.		material			diameter	in
48.		Manhole diameter	in		Downcomers number	
49.	material			diameter	in	
50.						
51.						

NOTES: Designed according to ASME Boiler and Pressure Vessel Code Section
Corrosion allowance:

* Vendor to specify

Appvd. for Bids		Appvd. for Purchase		REV.	0	1						
DATE	BY	DATE	BY	DATE		7-15-80						
						JNM						

PROCESS BOILER
DATA SHEET
 JOB NO. 2392
 DATE 7-15-80
 PAGE 1

B/M 603

1.	CUSTOMER <u>SASSI CORPORATION</u>	ITEM: <u>E-12</u>		
2.	ADDRESS <u>INDIANAPOLIS, INDIANA</u>	NO. OF UNIT <u>1</u>		
3.	PLANT LOCATION			
4.	SERVICE OF UNIT <u>CRG EFFLUENT COOLER</u>			
5.	PERFORMANCE			
6.	GAS SIDE STEAM SIDE			
7.	Gas flow lb/hr <u>188497</u>	Steam generated lb/hr <u>37833</u>		
8.	Design pressure psig <u>250</u>	Design pressure psig <u>500</u>		
9.	Operating pr. at blr. inlet psig <u>181</u>	Operating pressure psig <u>450</u>		
10.	Operating pr. at blr. outlet psig <u>176</u>	Blow-down water % <u>2</u>		
11.	Pressure drop psi <u>5</u>	Circulation ratio <u>*</u>		
12.	Temp. at boiler inlet F <u>1006</u>	Saturation temp. F <u>459</u>		
13.	Temp. at boiler outlet F <u>512</u>	Feedwater temp. F <u>100</u>		
14.	Temperature drop F <u>494</u>	Heat abs./lb of steam Btu/lb <u>—</u>		
15.	Specific heat (ave.) Btu/lb °F <u>.4643</u>	Steam quality % or PPM <u>150000</u>		
16.	Heat given up MBtu/hr <u>43296</u>	Heat absorbed MBtu/hr <u>43296</u>		
17.	Efficiency % <u>100</u>	LMTD F <u>*</u>		
18.	Fouling factor hr, sq ft, F/Btu <u>.001</u>	Fouling factor hr, sq ft, F/Btu <u>0.0</u>		
19.		Heat tr. coeff. Btu/hr, sq ft, F <u>*</u>		
20.				
21.				
22.				
23.	MECHANICAL DATA *			
24.	INLET CHANNEL	Tubesheet thickness in	Heating surface sq ft	
25.		material	Tube number	
26.		refractory	diameter in	
27.		ferrules	min thickness in	
28.		Channel thickness in	spacing in	
29.		material	length	
30.		refractory	material	<u>CS</u>
31.		anchors	Internal bypass diameter in	
32.		Gas inlet diameter in	Shell diameter in	
33.		material	thickness in	
34.	Manhole diameter in	material	<u>CS</u>	
35.	material	handholes		
36.		Steam drum diameter in		
37.		thickness in		
38.		length		
39.	OUTLET CHANNEL	Tubesheet thickness in	material	
40.		material	manholes	
41.		Channel thickness in	feed inlet in	
42.		material	steam outlet dia in	
43.		refractory	demister th. in	
44.		anchors	demister area sq ft	
45.		flange		
46.		Gas outlet diameter in	Risers number	
47.		material	diameter in	
48.		Manhole diameter in	Downcomers number	
49.	material	diameter in		
50.				
51.				

NOTES: Designed according to ASME Boiler and Pressure Vessel Code Section
 Corrosion allowance:
 * : Vendor to specify

Appvd. for Bids		Appvd. for Purchase		REV.	0	1						
DATE	BY	DATE	BY									
				DATE		7/15/80						
						JNM						

142
PROCESS BOILER
DATA SHEET

JOB NO. 2292
DATE 7-15-80
PAGE

B/M 603

1.	CUSTOMER <u>SASSI CORPORATION</u>	ITEM: <u>E-13</u>
2.	ADDRESS <u>INDIANAPOLIS, INDIANA</u>	NO. OF UNIT <u>1</u>
3.	PLANT LOCATION	
4.	SERVICE OF UNIT <u>METHANATOR EFFLUENT COOLER # 1</u>	

PERFORMANCE			
		GAS SIDE	STEAM SIDE
7.	Gas flow	lb/hr	127723
8.	Design pressure	psig	250
9.	Operating pr. at blr. inlet	psig	162
10.	Operating pr. at blr. outlet	psig	158
11.	Pressure drop	psi	4
12.	Temp. at boiler inlet	F	795
13.	Temp. at boiler outlet	F	512
14.	Temperature drop	F	283
15.	Specific heat (ave.)	Btu/lb/F	.4251
16.	Heat given up	MBtu/hr	17778
17.	Efficiency	%	100
18.	Fouling factor	hr sq ft F/Btu	.001
19.			
20.			
21.			
22.			

23.		MECHANICAL DATA					
24.	INLET CHANNEL	Tubesheet thickness	in		Hearing surface	sq ft	
25.		material			Tube number		
26.		refractory			diameter	in	
27.		ferrules			min thickness	in	
28.		Channel thickness	in		spacing	in	
29.		material			length		
30.		refractory			material		CS
31.		anchors			Internal bypass diameter	in	
32.		Gas inlet diameter	in		Shell diameter	in	
33.		material			thickness	in	
34.		Manhole diameter	in		material		CS
35.		material			handholes		
36.					Steam drum diameter	in	
37.					thickness	in	
38.					length		
39.		OUTLET CHANNEL	Tubesheet thickness	in		material	
40.	material				manholes		
41.	Channel thickness		in		feed inlet	in	
42.	material				steam outlet dia	in	
43.	refractory				demister th.	in	
44.	anchors				demister area	sq ft	
45.	flange						
46.	Gas outlet diameter		in		Risers number		
47.	material				diameter	in	
48.	Manhole diameter		in		Downcomers number		
49.	material				diameter	in	
50.							
51.							

NOTES: Designed according to ASME Boiler and Pressure Vessel Code Section

Corrosion allowance:

* Vendor to specify

Appvd. for Bids		Appvd. for Purchase		REV.	0	1							
DATE	BY	DATE	BY	DATE		7-15-80	JNM						

143

THE PRITCHARD CORPORATION
HEAT EXCHANGER DATA

SHELL AND TUBE

JOB NO. 2392
TECH. CNTR. JNAL
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE 7-15-87

B.M 700 Rev. 1

1	CUSTOMER <u>SASSI CORP</u>				TAG NO. <u>E-14</u>	
2	ADDRESS <u>INDIANAPOLIS, INDIANA</u>				NO. OF UNITS <u>1</u>	
3	PLANT LOCATION _____				CONN. IN _____	
4	SERVICE OF UNIT <u>METHANATOR EXCHANGER</u>				STACKED _____	
5	SIZE _____	TYPE _____		* DESIGN SAME AS NORMAL UNLESS SPECIFIED		
6	SURFACE PER UNIT _____		SHELLS PER UNIT _____		SURFACE PER SHELL _____	
7	PERFORMANCE OF ONE UNIT					
8				SHELL SIDE		TUBE SIDE
9		NORMAL		DESIGN*	NORMAL	DESIGN*
10	FLUID CIRCULATED	<u>HYDROCARBON GAS</u>		<u>HYDROCARBON GAS</u>	<u>HYDROCARBON GAS</u>	
11	TOTAL FLUID ENTERING	LBS/HR.	<u>139460</u>	<u>153406</u>	<u>153038</u>	<u>168342</u>
12	VAPOR	LBS/HR.	<u>139460</u>	<u>153406</u>	<u>153038</u>	<u>168342</u>
13	LIQUID	LBS/HR.	—	—	—	—
14	STEAM	LBS/HR.	—	—	—	—
15	NON-CONDENSABLES	LBS/HR.	—	—	—	—
16	FLUID VAPORIZED OR COND.	LBS/HR.	—	—	<u>396</u>	<u>396</u>
17	STEAM CONDENSED	LBS/HR.	—	—	<u>59.2</u>	<u>234</u>
18	DENSITY - LIQUID	LB/FT ³	—	—	—	—
19	VISCOSITY - LIQUID	CP	—	—	—	—
20	MOLE WT. - VAPOR IN/OUT		<u>27.7</u>	<u>27.7</u>	<u>26.4</u>	<u>26.4</u>
21	SPECIFIC HEAT - LIQUIDS	BTU/LB*F	—	—	—	—
22	LATENT HEAT - VAPORS	BTU/LB	—	—	—	—
23	TEMPERATURE IN /OUT	*F	<u>100 / 482</u>	<u>100 / 482</u>	<u>512 / 234</u>	<u>512 / 234</u>
24	CONDUCTIVITY	Vap/Liq	—	—	—	—
25	OPERATING PRESSURE	PSIG	<u>152</u>	<u>152</u>	<u>159</u>	<u>159</u>
26	NUMBER OF PASSES PER SHELL					
27	VELOCITY	FT/SEC				
28	PRESSURE DROP Allow/Calc	PSI	<u>2</u>	<u>2</u>	<u>3</u>	<u>3</u>
29	FOULING FACTOR		<u>.001</u>	<u>.001</u>	<u>.001</u>	<u>.001</u>
30	HEAT EXCHANGED	BTU/HR.	<u>18,606,000</u>	<u>20,466,000</u>	M.T.D. (CORRECTED) / (WTD) <u>/</u>	
31	TRANSFER RATE - SERVICE <u>CLEAN</u>					
32	CONSTRUCTION					
33	DESIGN PRESSURE		<u>250</u>	PSIG	<u>250</u>	PSIG
34	TEST PRESSURE			PSIG		PSIG
35	DESIGN TEMPERATURE		<u>550</u>	*F	<u>600</u>	*F
36	TUBES <u>25</u>	NO.	D.D.	BWG.	LENGTH	PITCH
37	SHELL <u>25</u>	I.D. O.D.			SKETCH (BUNDLE/NOZZLE ORIENTATION)	
38	SHELL COVER					
39	CHANNEL					
40	TUBE SHEETS - STATIONARY					
41	BAFFLES - CROSS					
42	BAFFLE - LONG					
43	TUBE SUPPORTS					
44	GASKETS					
45	CONNECTIONS - SHELL - IN	OUT	ASA RATING			
46	CHANNEL - IN	OUT	ASA RATING			
47	CORROSION ALLOWANCE - SHELL SIDE	TUBE SIDE	TEST RINGS			
48	CODE REQUIREMENTS	TEMA CLASS				
49	WEIGHTS - EACH SHELL	BUNDLE	FULL OF WATER			
50	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)					
REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS						
SHOP ASSEMBLED AND HYDRO TESTED IN A STACKED SETTING.						
Appvd. for Bids		Appvd. for Purchase		REV.	<u>0</u>	<u>1</u>
DATE	BY	DATE	BY	DATE	<u>12/17/78</u>	<u>7-15-80</u>
					<u>JNAL</u>	<u>JNAL</u>

JOB NO. 2392
TECH. CNTR. JNAL

144
THE PRITCHARD CORPORATION
HEAT EXCHANGER DATA
SHELL AND TUBE

JOB NO. 2392
TECH. CNTR. JLA
PROJECT ENGR.
REQ. NO.
PAGE OF DATE 7-11-60

B. M. T. Co. Inc.

1	CUSTOMER	SASSI CORP				TAG NO.	E-15	
2	ADDRESS	INDIANAPOLIS, INDIANA				NO. OF UNITS	1	
3	PLANT LOCATION					CONN. IN		
4	SERVICE OF UNIT	METHANATOR EFFLUENT COOLER # 2				STACKED		
5	SIZE	TYPE				* DESIGN SAME AS NORMAL UNLESS SPECIFIED		
6	SURFACE PER UNIT	SHELLS PER UNIT				SURFACE PER SHELL		
7	PERFORMANCE OF ONE UNIT							
8		SHELL SIDE				TUBE SIDE		
9		NORMAL		DESIGN *		NORMAL		DESIGN *
10	FLUID CIRCULATED	HYDROCARBON GAS		COOLING WATER				
11	TOTAL FLUID ENTERING	LBS/HR.	153038	165342	925,600	1,018,200		
12	VAPOR	LBS/HR.	152642	167900				
13	LIQUID	LBS/HR.	296	436	925,600	1,018,200		
14	STEAM	LBS/HR.						
15	NON-CONDENSABLES	LBS/HR.						
16	FLUID VAPORIZED OR COND.	LBS/HR.						
17	STEAM CONDENSED	LBS/HR.	15174	15491				
18	DENSITY - LIQUID	LB/FT ³						
19	VISCOSITY - LIQUID	CP						
20	MOLE WT. VAPOR IN/DUT		20.4	20.4				
21	SPECIFIC HEAT - LIQUIDS	BTU/LB *F						
22	LATENT HEAT - VAPORS	BTU/LB						
23	TEMPERATURE IN / OUT	*F	234 / 100	134 / 100	92 / 100	92 / 100		
24	CONDUCTIVITY	Vap/Liq						
25	OPERATING PRESSURE	PSIG	150	100	75			
26	NUMBER OF PASSES PER SHELL							
27	VELOCITY	FT/SEC			(1)			
28	PRESSURE DROP Allow/Calc	PSI	3	2				
29	FOULING FACTOR		.001					
30	HEAT EXCHANGED	BTU/HR.	18,512,000	20,868,200	M.T.D. (CORRECTED) / (WTD) /			
31	TRANSFER RATE - SERVICE	CLEAN						
32	CONSTRUCTION (*)							
33	DESIGN PRESSURE		210	PSIG	75	PSIG		
34	TEST PRESSURE			PSIG		PSIG		
35	DESIGN TEMPERATURE		320	*F	320	*F		
36	TUBES	CS	NO.	O.D.	BWG.	LENGTH	PITCH	
37	SHELL	CS	I.D.	O.D.	SKETCH (BUNDLE/NOZZLE ORIENTATION)			
38	SHELL COVER							
39	CHANNEL	CHAN COVER						
40	TUBE SHEETS - STATIONARY	FLOATING						
41	BAFFLES - CROSS	TYPE						
42	BAFFLE - LONG	TYPE						
43	TUBE SUPPORTS							
44	GASKETS							
45	CONNECTIONS - SHELL - IN	OUT				ASA RATING		
46	CHANNEL - IN	OUT				ASA RATING		
47	CORROSION ALLOWANCE - SHELL SIDE	TUBE SIDE				TEST RINGS		
48	CODE REQUIREMENTS					TEMA CLASS		
49	WEIGHTS - EACH SHELL	BUNDLE				FULL OF WATER		
50	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X.R.)							
	REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS							
	SHOP ASSEMBLED AND HYDRO TESTED IN A STACKED SETTING.							
	(1) Vendor to specify							
	Approved for Sales	Approved for Purchase	REV.					
	DATE	BY	DATE	BY	DATE	12/7/75	12/7/80	JLA

PROCESS BOILER
DATA SHEETJOB NO. 2392
DATE 7-15-80
PAGE

B/M 603

1.	CUSTOMER <u>SASSI CORP</u>	ITEM: <u>E-16</u>											
2.	ADDRESS <u>INDIANAPOLIS, INDIANA</u>	NO. OF UNIT <u>1</u>											
3.	PLANT LOCATION												
4.	SERVICE OF UNIT <u>METHANATOR EFFLUENT COOLER # 3</u>												
5.	PERFORMANCE												
6.	GAS SIDE												
7.	Gas flow lb/hr	<u>139166</u>											
8.	Design pressure psig	<u>250</u>											
9.	Operating pr. at blr. inlet psig	<u>146</u>											
10.	Operating pr. at blr. outlet psig	<u>140</u>											
11.	Pressure drop psi	<u>6</u>											
12.	Temp. at boiler inlet F	<u>547</u>											
13.	Temp. at boiler outlet F	<u>482</u>											
14.	Temperature drop F	<u>65</u>											
15.	Specific heat (ave.) Btu/lb/F	<u>0.3926</u>											
16.	Heat given up MBtu/hr	<u>3547</u>											
17.	Efficiency %	<u>100</u>											
18.	Fouling factor hr, sq ft, F/Btu	<u>0.001</u>											
19.													
20.													
21.													
22.													
23.	MECHANICAL DATA *												
24.	INLET CHANNEL	Tubesheet thickness in											
25.		material											
26.		refractory											
27.		ferrules											
28.		Channel thickness in											
29.		material											
30.		refractory											
31.		anchors											
32.		Gas inlet diameter in											
33.		material											
34.		Manhole diameter in											
35.		material											
36.													
37.													
38.													
39.	OUTLET CHANNEL	Tubesheet thickness in											
40.		material											
41.		Channel thickness in											
42.		material											
43.		refractory											
44.		anchors											
45.		flange											
46.		Gas outlet diameter in											
47.		material											
48.		Manhole diameter in											
49.		material											
50.													
51.													
NOTES: Designed according to ASME Boiler and Pressure Vessel Code Section Corrosion allowance: <u>* Vendor to specify</u>													
Appvd. for Bids		Appvd. for Purchase		REV.	0	1							
DATE	BY	DATE	BY	DATE		7/15/80							
						JNM							

146

THE PRITCHARD CORPORATION
HEAT EXCHANGER DATA

SHELL AND TUBE

JOB NO. 2392
TECH. CNTR. JNM
PROJECT ENGR. _____
REQ. NO. _____
PAGE 1 OF 1 DATE 7-16-80

B.M. 700 Rev. 3

1	CUSTOMER	SASSI CORP				TAG NO.	E-24	
2	ADDRESS	INDIANAPOLIS, INDIANA				NO. OF UNITS		
3	PLANT LOCATION					CONN. IN		
4	SERVICE OF UNIT	FEED GAS HEATER				STACKED		
5	SIZE	TYPE				* DESIGN SAME AS NORMAL UNLESS SPECIFIED		
6	SURFACE PER UNIT	SHELLS PER UNIT				SURFACE PER SHELL		
7	PERFORMANCE OF ONE UNIT							
8		SHELL SIDE				TUBE SIDE		
9		NORMAL				DESIGN *		
10	FLUID CIRCULATED	HYDROCARBON GAS				450 PSIG STEAM		
11	TOTAL FLUID ENTERING	LBS/HR.	25764	138340	20720	22792		
12	VAPOR	LBS/HR.	25764	138340				
13	LIQUID	LBS/HR.						
14	STEAM	LBS/HR.						
15	NON-CONDENSABLES	LBS/HR.						
16	FLUID VAPORIZED OR COND.	LBS/HR.						
17	STEAM CONDENSED	LBS/HR.			20720	22792		
18	DENSITY - LIQUID	LB/FT ³						
19	VISCOSITY - LIQUID	CP						
20	MOLE WT. - VAPOR IN. OUT		25.7	138.3	12			
21	SPECIFIC HEAT - LIQUIDS	BTU/LB *F						
22	LATENT HEAT - VAPORS	BTU/LB			754			
23	TEMPERATURE IN / OUT	*F	100 / 120	100 / 120	450 / 450	450 / 450		
24	CONDUCTIVITY	Vap/Liq						
25	OPERATING PRESSURE	PSIG	240	240	450	450		
26	NUMBER OF PASSES PER SHELL				1	1		
27	VELOCITY	FT/SEC						
28	PRESSURE DROP Allow/Calc	PSI	3	3	0	0		
29	FOULING FACTOR		.001	.001	.001	.001		
30	HEAT EXCHANGED	BTU/HR.	15,832,000	17,432,000	M.T.D. (CORRECTED) / (WTD)			
31	TRANSFER RATE - SERVICE	CLEAN						
32	CONSTRUCTION (1)							
33	DESIGN PRESSURE		275	PSIG	500	PSIG		
34	TEST PRESSURE			PSIG		PSIG		
35	DESIGN TEMPERATURE		470	*F	470	*F		
36	TUBES CS	NO.	O.D.	BWG.	LENGTH	PITCH		
37	SHELL CS		I.D.	O.D.	SKETCH (BUNDLE/NOZZLE ORIENTATION)			
38	SHELL COVER							
39	CHANNEL	CHAN COVER						
40	TUBE SHEETS - STATIONARY	FLOATING						
41	BAFFLES - CROSS	TYPE						
42	BAFFLE - LONG	TYPE						
43	TUBE SUPPORTS							
44	GASKETS							
45	CONNECTIONS - SHELL - IN	OUT				ASA RATING		
46	CHANNEL - IN	OUT				ASA RATING		
47	CORROSION ALLOWANCE - SHELL SIDE	1/16"	TUBE SIDE	8	TEST RINGS			
48	CODE REQUIREMENTS	TEMA CLASS						
49	WEIGHTS - EACH SHELL	BUNDLE				FULL OF WATER		
50	NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)							
	REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS							
	SHOP ASSEMBLED AND HYDRO TESTED IN A STACKED SETTING.							
	Vendor to specify							
	Appvd. for Bids	Appvd. for Purchase	REV.	0	1			
	DATE	DATE	DATE	12/7/78	7/16/80	JNM		

JOB NO. 2392
TECH. CNTR. _____

147
THE PRITCHARD CORPORATION
HEAT EXCHANGER DATA
SHELL AND TUBE

JOB NO. 2392
TECH. CNTR. JNM
PROJECT ENGR. _____
REQ. NO. _____
PAGE 1 OF 1 DATE 7/17/80

B.M. 700 Rev. 1

1 CUSTOMER <u>SASSI CORP</u>		TAG NO. <u>E-25</u>	
2 ADDRESS <u>INDIANAPOLIS, INDIANA</u>		NO. OF UNITS	
3 PLANT LOCATION		CONN. IN	
4 SERVICE OF UNIT <u>GAS/GAS EXCHANGER</u>		STACKED	
5 SIZE		* DESIGN SAME AS NORMAL UNLESS SPECIFIED	
6 SURFACE PER UNIT		SHELLS PER UNIT	
		SURFACE PER SHELL	
7 PERFORMANCE OF ONE UNIT			
		SHELL SIDE	
		TUBE SIDE	
		NORMAL - DESIGN*	
		NORMAL DESIGN*	
10 FLUID CIRCULATED			
11 TOTAL FLUID ENTERING	LBS/MR. <u>153,008</u>	<u>168,304</u>	<u>188,497</u>
12 VAPOR	LBS/MR. <u>153,008</u>	<u>168,304</u>	<u>188,497</u>
13 LIQUID	LBS/MR.		
14 STEAM	LBS/MR.		
15 NON-CONDENSABLES	LBS/MR.		
16 FLUID VAPORIZED OR COND.	LBS/MR.		
17 STEAM CONDENSED	LBS/MR.		
18 DENSITY - LIQUID	LB/FT ³		
19 VISCOSITY - LIQUID	CP		
20 MOLE WT. - VAPOR IN/OUT		<u>24.5</u>	<u>24.5</u>
21 SPECIFIC HEAT - LIQUIDS	BTU/LB/°F		
22 LATENT HEAT - VAPORS	BTU/LB		
23 TEMPERATURE IN /OUT	°F	<u>212/148.2</u>	<u>212/148.2</u>
24 CONDUCTIVITY	Vap/Liq		
25 OPERATING PRESSURE	PSIG	<u>171</u>	<u>171</u>
26 NUMBER OF PASSES PER SHELL			
27 VELOCITY	FT/SEC		
28 PRESSURE DROP Allow/Calc	PSI	<u>2</u>	<u>2</u>
29 FOULING FACTOR		<u>.001</u>	
30 HEAT EXCHANGED	BTU/MR.	<u>16,072,000</u>	<u>17,679,000</u>
31 TRANSFER RATE - SERVICE			CLEAN
32 CONSTRUCTION (1)			
33 DESIGN PRESSURE		<u>225</u>	PSIG
34 TEST PRESSURE			PSIG
35 DESIGN TEMPERATURE		<u>550</u>	°F
36 TUBES <u>CS</u>	NO.	O.D.	BWG.
37 SHELL <u>CS</u>		I.D.	O.D.
38 SHELL COVER			
39 CHANNEL	CHAN COVER		
40 TUBE SHEETS - STATIONARY	FLOATING		
41 BAFFLES - CROSS	TYPE		
42 BAFFLE - LONG	TYPE		
43 TUBE SUPPORTS			
44 GASKETS			
45 CONNECTIONS - SHELL - IN	OUT		ASA RATING
46 CHANNEL - IN	OUT		ASA RATING
47 CORROSION ALLOWANCE - SHELL SIDE	TUBE SIDE		TEST RINGS
48 CODE REQUIREMENTS			TEMA CLASS
49 WEIGHTS - EACH SHELL	BUNDLE		FULL OF WATER
50 NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)			
REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS			
SHOP ASSEMBLED AND HYDRO TESTED IN A STACKED SETTING.			
(1) Vendor to advise			
Approved for Sale		Approved for Purchase	
DATE	BY	DATE	BY
REV.	0	1	
DATE	12/1/78	7/17/80	JNM

JOB NO. 2392
TECH. CNTR. _____
PROJECT ENGR. _____

148
AIR-COOLED HEAT EXCHANGER DATA SHEET

JOB NO. 2392
TECH. CNTR. ENR
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE 7/2/83

B/M 702 Rev. 2

Manufacturer																																					
1	Customer <u>SASSI CORP</u>					Tag No. <u>E-26</u>																															
2	Plant Location <u>INDIANAPOLIS, INDIANA</u>					No. Reqd. <u>1</u>																															
3	Service <u>CRG EFFLUENT STEAM CONDENSER</u>					Purch. Ord. No. _____																															
4	Size & Type _____					Induced/Forced Draft No. of Bays _____																															
5	Surface per Unit - Finned Tube _____					Sq Ft; Bare Tube _____		Sq Ft _____																													
6	Heat Exchanged <u>40,660,000</u>					Btu/Hr _____		MTD (Eff.) _____ °F																													
7	Transfer Rate - Finned Tube _____					; Bare Tube, Service _____		Clean _____ Btu/Hr Sq Ft °F																													
PERFORMANCE DATA																																					
TUBE SIDE																																					
10	Fluid Circulated <u>HYDROCARBON STREAM</u>					Gravity, Liq. _____ °API/SG @ 60°F																															
11	Total Fluid Entering <u>188,497</u>					Lb/Hr _____																															
12						Pour Point _____ °F																															
13	Temperature _____ °F					Bubble Point _____ °F																															
14	Liquid _____ Lb/Hr					Specific Heat _____ Btu/Lb °F																															
15	Vapor _____ Lb/Hr, MW <u>188,497</u>					Latent Heat _____ Btu/Lb °F																															
16	Noncond _____ Lb/Hr, MW _____					Cond. (Liq/Vap) _____ Btu Ft/Hr Sq Ft °F																															
17	Steam _____ Lb/Hr					Outlet Pressure <u>18.5</u> _____ PSIG/PSIA																															
18	Water _____ Lb/Hr					Allowable Pressure Drop <u>3</u> _____ PSI																															
19	Viscosity (Liq/Vap) _____ Cp					Calc. Pressure Drop _____ PSI																															
AIR SIDE *																																					
21	Air Quantity <u>*</u>					Altitude <u>1200</u> _____ Ft																															
22	Air Quantity/Fan _____					Temperature In _____ °F																															
23	Static Pressure _____					Temperature Out <u>X</u> _____ °F																															
24	Face Velocity _____ FPM (Std)					Minimum Ambient _____ °F																															
DESIGN-MATERIALS-CONSTRUCTION *																																					
26	Design Pressure _____ PSI					Design Temperature _____ °F																															
27	TUBE BUNDLE					HEADER																															
28	Size _____ No. Tube Rows _____					Material _____																															
29	No./Bay _____					ASTM _____ seamless/welded																															
30	Arrangement _____					Passes-No. _____ Arrangement* _____																															
31	Bundles In Parallel _____ In Series _____					No./Bundle* _____ Length _____ Ft																															
32	Boys In Parallel _____ In Series _____					Pitch _____ In. Δ _____																															
33	Bundle Frame _____					FIN _____																															
34	MISCELLANEOUS					Corrosion Allowance _____ In. Type _____																															
35	Structure Mounting-Piperack/Grade _____					Size Inlet Nozzle _____ In. Material _____																															
36	Surface Preparation _____					Size Outlet Nozzle _____ In. OD _____ In. Stock Thickness _____ In.																															
37	Louvers Auto/Manual _____					Rating & Facing _____ No./In. _____																															
38	Code - ASME VIII Stamp - Yes/No _____					Specs API 661 OSHA _____																															
MECHANICAL EQUIPMENT *																																					
40	FAN					DRIVER																															
41	Mfr. & Model _____					Type _____																															
42	No./Bay _____ BHP/Fan _____					No./Bay _____ HP/Driver _____																															
43	Diameter, _____ Ft RPM _____					RPM _____																															
44	No. Blades _____ Pitch _____ Adj. _____ Auto. _____					Enclosure _____																															
45	Blade Material _____ Angle _____					Volt/Phase/Cycle _____																															
46	Hub Material _____ Tip Vel. _____					Mfr. _____																															
47	Control Action on Air Failure-Fan Pitch _____					Min./Max.; Louvers _____ Open/Closed _____																															
48	NOTES: * Give tube count of each pass when irregular.																																				
49	Drive Arrangement _____																																				
50	Plenum Arrangement & Material _____																																				
51	Fip/Bare Surface Area Ratio _____																																				
52	_____																																				
53	_____																																				
54	_____																																				
55	X Vendor to Furnish _____																																				
56	Plot Area _____ Weight - Bundle _____ Weight - Shipping _____																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2">Appvd. for Bid</td> <td colspan="2">Appvd. for Purchase</td> <td rowspan="2">Rev.</td> <td rowspan="2"></td> <td rowspan="2"></td> <td rowspan="2"></td> <td rowspan="2"></td> <td rowspan="2"></td> <td rowspan="2"></td> <td rowspan="2"></td> </tr> <tr> <td>Date</td> <td>By</td> <td>Date</td> <td>By</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>Date</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>										Appvd. for Bid		Appvd. for Purchase		Rev.								Date	By	Date	By					Date							
Appvd. for Bid		Appvd. for Purchase		Rev.																																	
Date	By	Date	By																																		
				Date																																	

PROCESS BOILER
DATA SHEET
 JOB NO. 2392
 DATE 7-16-80
 PAGE

B/M 503

1.	CUSTOMER SASSI CORP				ITEM: E-27			
2.	ADDRESS INDIANAPOLIS, INDIANA				NO. OF UNIT 1			
3.	PLANT LOCATION							
4.	SERVICE OF UNIT COLD RECYCLE COOLER # 1							
5.	PERFORMANCE							
6.	GAS SIDE				STEAM SIDE			
7.	Gas flow	lb/hr	33192		Steam generated	lb/hr	4145	
8.	Design pressure	psig	300		Design pressure	psig	75	
9.	Operating pr. at blr. inlet	psig	231		Operating pressure	psig	50	
10.	Operating pr. at blr. outlet	psig	228		Blow-down water	%	2	
11.	Pressure drop	psi	3		Circulation ratio		*	
12.	Temp. at boiler inlet	F	700		Saturation temp.	F	298	
13.	Temp. at boiler outlet	F	360		Feedwater temp.	F	107	
14.	Temperature drop	F	340		Heat abs./lb of stream	Btu/lb	-	
15.	Specific heat (avg.)	Btu/lb F	-		Steam quality	% or PPM	150-105	
16.	Heat given up	MBtu/hr	4626		Heat absorbed	MBtu/hr	4626	
17.	Efficiency	%	100		LMTD	F	*	
18.	Fouling factor	hr, sq ft, F/Btu	0.001		Fouling factor	hr, sq ft, F/Btu	0.0	
19.					Heat tr. coeff.	Btu/hr, sq ft, F	*	
20.								
21.								
22.								
23.	MECHANICAL DATA *							
24.	INLET CHANNEL	Tubesheet thickness	in		Heating surface	sq ft		
25.		material			Tube number			
26.		refractory			diameter	in		
27.		ferrules			min thickness	in		
28.		Channel thickness	in		spacing	in		
29.		material			length			
30.		refractory			material		CS	
31.		anchors			Internal bypass diameter	in		
32.		Gas inlet diameter	in		Shell diameter	in		
33.		material			thickness	in		
34.	Manhole diameter	in		material		CS		
35.	material			handholes				
36.				Steam drum diameter	in			
37.				thickness	in			
38.				length				
39.	OUTLET CHANNEL	Tubesheet thickness	in		material			
40.		material			manholes			
41.		Channel thickness	in		feed inlet	in		
42.		material			steam outlet dia	in		
43.		refractory			demister th.	in		
44.		anchors			demister area	sq ft		
45.		flange						
46.		Gas outlet diameter	in		Risers number			
47.		material			diameter	in		
48.		Manhole diameter	in		Downcomers number			
49.	material			diameter	in			
50.								
51.								

 NOTES: Designed according to ASME Boiler and Pressure Vessel Code Section
 Corrosion allowance:

* Vendor to specify

Appvd. for Bids		Appvd. for Purchase		REV.	0								
DATE	BY	DATE	BY	DATE	7/15/80								
					ENM								

150
THE PRITCHARD CORPORATION
HEAT EXCHANGER DATA
SHELL AND TUBE

JOB NO. 2392
TECH. CNTR. JNM
PROJECT ENGR. _____
REQ. NO. _____
PAGE OF DATE 7-16-80

B/M 700 Rev. 1

1 CUSTOMER <u>4 SASSI CORP</u>		TAG NO. <u>E-28</u>	
2 ADDRESS <u>INDIANAPOLIS, INDIANA</u>		NO. OF UNITS <u>1</u>	
3 PLANT LOCATION _____		CONN. IN _____	
4 SERVICE OF UNIT <u>COLD RECYCLE COOLER # 2</u>		STACKED _____	
5 SIZE _____		* DESIGN SAME AS NORMAL UNLESS SPECIFIED	
6 SURFACE PER UNIT _____		SHELLS PER UNIT _____	
7 _____		SURFACE PER SHELL _____	
PERFORMANCE OF ONE UNIT			
		AIR SHELL SIDE	
		TUBE SIDE	
		NORMAL - DESIGN*	
		NORMAL DESIGN*	
10 FLUID CIRCULATED _____		AERIAL COOLER	
11 TOTAL FLUID ENTERING LBS/HR. _____		HYDROCARBON GAS	
12 VAPOR LBS/HR. _____		33192 36511	
13 LIQUID LBS/HR. _____		33192 36511	
14 STEAM LBS/HR. _____		— —	
15 NON-CONDENSABLES LBS/HR. _____		— —	
16 FLUID VAPORIZED OR COND. LBS/HR. _____		— —	
17 STEAM CONDENSED LBS/HR. _____		— —	
18 DENSITY - LIQUID LB/FT ³ _____		— — °F	
19 VISCOSITY - LIQUID CP _____		— — °F	
20 MOLE WT. - VAPOR IN/OUT _____		26.5 / 26.5	
21 SPECIFIC HEAT - LIQUIDS BTU/LB/°F _____		— — °F	
22 LATENT HEAT - VAPORS BTU/LB _____		— — °F	
23 TEMPERATURE IN /OUT °F <u>80 / (1)</u>		360 / 100 360 / 100	
24 CONDUCTIVITY Vap/Liq _____		228 228	
25 OPERATING PRESSURE PSIG _____		228 228	
26 NUMBER OF PASSES PER SHELL _____		2 2	
27 VELOCITY FT/SEC _____		.001	
28 PRESSURE DROP Allow/Calc PSI _____		— —	
29 FOULING FACTOR _____		— —	
30 HEAT EXCHANGED BTU/HR. <u>3,124,000</u> <u>3,436,000</u>		M.T.D. (CORRECTED) / (WTD) /	
31 TRANSFER RATE - SERVICE _____		CLEAN	
CONSTRUCTION (1)			
33 DESIGN PRESSURE _____		PSIG	
34 TEST PRESSURE _____		PSIG	
35 DESIGN TEMPERATURE _____		°F	
36 TUBES <u>C S</u> NO. _____		J.D. B.W.G. LENGTH PITCH	
37 SHELL <u>C S</u> I.D. _____		O.D. SKETCH (BUNDLE/NOZZLE ORIENTATION)	
38 SHELL COVER _____		SKETCH (BUNDLE/NOZZLE ORIENTATION)	
39 CHANNEL CHAN COVER _____			
40 TUBE SHEETS - STATIONARY FLOATING _____			
41 BAFFLES - CROSS TYPE _____			
42 BAFFLE - LONG TYPE _____			
43 TUBE SUPPORTS _____			
44 GASKETS _____		ASA RATING	
45 CONNECTIONS - SHELL - IN _____		OUT ASA RATING	
46 CHANNEL - IN _____		OUT TEST RINGS	
47 CORROSION ALLOWANCE - SHELL SIDE _____		TUBE SIDE TEMA CLASS	
48 CODE REQUIREMENTS _____		FULL OF WATER	
49 WEIGHTS - EACH SHELL _____		BUNDLE	
50 NOTE: INDICATE AFTER EACH PART WHETHER STRESS RELIEVED (S.R.) AND WHETHER RADIOGRAPHED (X-R)			
REMARKS - STACKED EXCHANGERS TO BE FURNISHED COMPLETE WITH BOLTS AND GASKETS			
SHOP ASSEMBLED AND HYDRO TESTED IN A STACKED SETTING.			
(1) Vendor to specify			
H2 PARTIAL PR = 30 PSIA & CO PARTIAL PR = 63 PSIA			
Appvd. for Bids		Appvd. for Purchase	
DATE	BY	DATE	BY
REV.	0	1	
DATE	12/7/78	7/16/80	JNM

APPENDIX D. Mechanical and Packaged Equipment

<u>Tag</u>	<u>Equipment</u>
B-2 A/B	Air Blower
C-2 A/B	Recycle Compressor
C-3 A/B	Exhauster
M-1	Contactator
M-2	Slurry Tank Mixer
P-4 A/B	Rich Oil Pump
P-5 A/B	Lean Oil Pump
P-6 A/B	Lean Oil Makeup Pump
P-7	Benzol Condensate Pump
P-9 A/B	Lean Solution Circulation Pump
P-10 A/B	Slurry Pump
P-11	Sump Pump
PG-1 A/B	Feed Gas Compressor Package
PG-2	Carbon Disulfide Injection Unit
PG-3	Package Hydrogen Plant
PG-4	Glycol Dehydration Package
PG-5	CO ₂ Removal Package (Proprietary unit-spec. not included)

B/M 906B, Rev. 3

CENTRIFUGAL COMPRESSOR DATA SHEET

153

 JOB NO. 2392 ITEM NO. B-2 A/B
 PAGE 2 OF 4 BY AZ
 DATE 11-27-78 REVISION _____

GAS ANALYSIS		NORMAL	RATED	OTHER CONDITIONS				REMARKS
☐ MOL %	☐ _____			A	B	C	D	
AIR	M.W. 28.986	100	100					
OXYGEN	32.000							
NITROGEN	28.016							
WATER VAPOR	18.016							
CARBON MONOXIDE	28.010							
CARBON DIOXIDE	44.010							
HYDROGEN SULFIDE	34.076							
HYDROGEN	2.016							
METHANE	16.042							
ETHYLENE	28.052							
ETHANE	30.068							
PROPYLENE	42.078							
PROPANE	44.094							
I-BUTANE	58.120							
N-BUTANE	58.120							
I-PENTANE	72.146							
N-PENTANE	72.146							
HEXANE PLUS								
TOTAL								
AVG. MOL. WT.								

LOCATION:

☐ INDOOR ☐ HEATED ☐ UNDER ROOF

☒ OUTDOOR ☐ UNHEATED ☐ PARTIAL SIDES

☒ GRADE ☐ MEZZANINE ☐ _____

☐ ELECTRICAL AREA CLASS _____ GR. _____ DIV. _____

☐ WINTERIZATION REQD. ☐ TROPICALIZATION REQD.

SITE DATA:

☐ ELEVATION _____ FT. BAROMETER 14.4 PSIA

☐ RANGE OF AMBIENT TEMPS.:

	DRY BULB	WET BULB
SITE RATED °F	<u>92</u>	<u>77</u>
NORMAL °F	<u>92</u>	<u>77</u>
MAXIMUM °F	<u>94</u>	<u>78</u>
MINIMUM °F	<u>6</u>	<u>6</u>

UNUSUAL CONDITIONS: ☐ DUST ☐ FUMES

☐ OTHER _____

NOISE SPECIFICATIONS

☐ APPLICABLE TO MACHINE:
SEE SPECIFICATION _____

☐ APPLICABLE TO NEIGHBORHOOD
SEE SPECIFICATION _____

ACOUSTIC HOUSING: ☐ YES ☐ NO

APPLICABLE SPECIFICATIONS:

API 617 CENTRIFUGAL COMPR. FOR GEN. REFINERY SERVICES

PAINTING:

☐ MANUFACTURER'S STD.

☐ OTHERS _____

SHIPMENT:

☐ DOMESTIC ☐ EXPORT ☐ EXPORT BOXING REQD.

☐ OUTDOOR STORAGE OVER 3 MONTHS

REMARKS: _____

Appvd. for Bids		Appvd. for Purchase		REV.										
DATE	BY	DATE	BY	DATE										

B/M 906B, Rev. 3

CENTRIFUGAL COMPRESSOR DATA SHEET

154

JOB NO. 2392 ITEM NO. 44, D.S.W.
PAGE 2 OF 3 BY RUSSELL
DATE 12/8/78 REVISION

GAS ANALYSIS		NORMAL	WATED	OTHER CONDITIONS				REMARKS
✓ MOL %	M.W.			A	B	C	D	
AIR	28.966	-						
OXYGEN	32.000	-						
NITROGEN	28.016	8.92						
WATER VAPOR	18.016	0.08						
CARBON MONOXIDE	28.010	32.54						
CARBON DIOXIDE	44.010	2.65						
HYDROGEN SULFIDE	34.076	0.01						
HYDROGEN	2.016	15.98						
METHANE	16.042	28.49						
ETHYLENE	28.052	-						
ETHANE	30.068	6.17						
PROPYLENE	42.078	-						
PROPANE	44.094	1.60						
I - BUTANE	58.120	-						
n - BUTANE	58.120	1.66						
I - PENTANE	72.146	-						
n - PENTANE	72.146	1.23						
HEXANE PLUS		-						
ARGON		0.66						
TOTAL		100.00						
AVG. MOL. WT.		22.34						

LOCATION		NOISE SPECIFICATIONS	
☐ INDOOR	☐ HEATED	☐ APPLICABLE TO MACHINE:	
☒ OUTDOOR	☒ UNHEATED	SEE SPECIFICATION	
☒ GRADE	☐ MEZZANINE	☐ APPLICABLE TO NEIGHBORHOOD	
☐ ELECTRICAL AREA CLASS	GR. DIV.	SEE SPECIFICATION	
☐ WINTERIZATION REQD.	☐ TROPICALIZATION REQD.	ACOUSTIC HOUSING: ☐ YES ☐ NO	

SITE DATA:		APPLICABLE SPECIFICATIONS:	
☐ ELEVATION 1000 FT.	BAROMETER PSIA	API 617 CENTRIFUGAL COMPR. FOR GEN. REFINERY SERVICES	
☐ RANGE OF AMBIENT TEMPS:			
	DRY BULB	WET BULB	
SITE RATED °F			
NORMAL °F			
MAXIMUM °F	95	76	
MINIMUM °F			

UNUSUAL CONDITIONS		PAINTING:	
☐ DUST	☐ FUMES	☐ MANUFACTURER'S STD.	
☐ OTHER		☐ OTHERS	

SHIPMENT:	
☐ DOMESTIC	☐ EXPORT
☐ OUTDOOR STORAGE OVER 3 MONTHS	

REMARKS:	

Appvd. for Bids		Appvd. for Purchase		REV.	DATE
DATE	BY	DATE	BY		
12/8/78	CWR				

DATE	BY	DATE	BY	DATE	BY	DATE	BY	DATE	BY
12/8/78	CWR			12/8/78					

155

JOB NO. 2392 ITEM NO. C2 A4B
PURCH. ORDER NO. _____ DATE 12/7/78
REQUISITION NO. _____
INQUIRY NO. _____
PAGE 1 OF A BY RUSSELL

CENTRIFUGAL COMPRESSOR DATA SHEET

[illegible]

DATE _____

PAGE

COMPRESSORS

MANUFACTURED

TYPE & SIZE

SERIAL NO.

NORMAL	RATED	OTHER CONDITIONS		
		A	B	C
PURON	OFFGAS			
14.7	14.7			
—	—			
1186	1422			

GAS HANDLED

BAROMETER, pole

STD CU FT PER MIN (14.7 psia - 60 F - Dry)

OR
WEIGHT FLOW, lb per min

INLET CONDITIONS

Pionero, polo

Temperature, deg F.

Relative Humidity, per cent

Molecular Weight (kDa)

 $C_p/C_v (M_1)$

Compressibility (Z_1)

Lal or Y siuna, cu li par mola

DISCHARGE CONDITIONS

Pressure, psi

Temperature, deg F

 $C_p/C_v (X_2)$

Comprehensibility (2)

HORSEPOWER REQUIRED BY DRIVER

SPEED, rpm

ESTIMATED SURGE, ICFM
(At Speed Above)

ADIABATIC HEAD (Hg)

PERFORMANCE CURVE NO.CORROSIVENESS AND REMARKS REGARDING GAS BY VENDOR TO SPECIFY

NO COPPER OR COPPER ALLOYS

Appd. for Find		Appd. for Purchase		Rev.						
Date	By	Date	By							
11/16/78	CWR			Date	7 NOV '78					

8/14/2018

ITEM NO. : M-1

Item: Kenics Static Mixer

Quantity: Three (3) modules, each module containing six (6) elements.

Duty: Mix gas and Stretford solution.

Gas	124,000 lb/hr
Solution	4,550 gpm
Gas Temperature	110°F
Gas Pressure	239 psia

MOC: Carbon Steel

Maximum Allowable Gas Side
Pressure Drop: 10 psi

[illegible]

9/14 001 Rev. 3

ITEM NO.: M-2

Quantity: One

Restrictions:

1. All wetted parts, shaft and turbine shall be stainless steel.
2. No copper, aluminum or alloys of same allowed.
3. No steady bearing mount allowed.

- 26' high x 16' diameter
- cone roof
- mixer conn. center
- maximum liquid level 21'
- minimum liquid level 2'

Supply baffle design for tank.

Appvd. for Bids		Appvd. for Purchase		REV.									
DATE	BY	DATE	BY										
				DATE									

CENTRIFUGAL PUMP DATA SHEET¹⁵⁹

JOB NO. 2392
 TECH. CNTR. _____
 PROJECT ENGR. _____
 REQ. NO. _____
 PAGE OF DATE

NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER;
☐ BY MANUFACTURER

CUSTOMER SASSI CORPORATION SITE P-4 A/B
Indianapolis, Indiana SERVICE RICH OIL PUMP
 UNIT _____
 NO. PUMPS REQ'D 2 NO. MOTORS REQ'D 1 TAG NO. _____ PROVIDED BY _____ MTD BY _____
 NO. TURBINES REQ'D 1 TAG NO. _____ PROVIDED BY _____ MTD BY _____
 PUMP MFR _____ SIZE AND TYPE _____ SERIAL NO. _____

OPERATING CONDITIONS, EACH PUMP

LIQUID	U.S. GPM at FT. HOR.	RATED
<u>PETROLEUM</u>	<u>677</u>	<u>750</u>
<u>OIL</u>	<u>52</u>	<u>1.5</u>
FT. HOR. <u>100</u> MAX. <u>120</u>	SUCT. PRESS. PSIG MAX. <u>8.3</u>	RATED <u>1.5</u>
SP. GR. at FT. <u>0.849</u>	DIFF. PRESS. PSI <u>50</u>	
VAP. PRESS. at FT. PSIA <u>3.2</u>	DIFF. HEAD, FT. <u>135</u>	
VIS. at FT. <u>35</u>	NPSHA, FT. <u>9</u>	
CORR./EROS. CAUSED BY _____	HYD. HP <u>21.4</u>	

CONSTRUCTION

NOZZLES	SIZE	RATING	FACING	LOCATION
SUCTION				
DISCHARGE				

CASE MOUNT: ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
 -SPLIT: ☐ AXIAL ☐ RAD; TYPE VOLUTE ☐ BGL ☐ DBL ☐ DIFFUSER
 -PRESS: ☐ MAX. ALLOW. _____ PSIG _____ "F; ☐ HYDRO TEST _____ PSIG
 -CONNECT: ☐ VENT ☐ DRAIN ☐ GAGE
 IMPELLER DIA.: ☐ RATED _____ ☐ MAX. _____ ☐ TYPE: _____
 MOUNT: ☐ BETWEEN BRGS ☐ OVERHUNG
 BEARINGS-TYPE: ☐ RADIAL _____ ☐ THRUST _____
 LUBE: ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
 COUPLING: ☐ MFR _____ ☐ MODEL _____
 DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR ☐ PURCHASER
 PACKING: ☐ MFR & TYPE _____ ☐ SIZE/NO. OF RINGS _____
 MECH. SEAL: ☐ MFR & MODEL _____ API CLASS. CODE _____
☐ MFR CODE _____

AUXILIARY PIPING

☐ C.W. PIPE PLAN _____ ☐ CU; ☐ S.S.; ☐ TUBING; ☐ PIPE _____
☐ TOTAL COOLING WATER REQ'D, GPM _____ ☐ SIGHT F.I. REQ'D _____
☐ PACKING COOLING INJECTION REQ'D: ☐ TOTAL GPM _____ ☐ PSIG _____
☐ SEAL FLUSH PIPE PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE _____
☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG _____
☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE _____
☐ AUX SEAL QUENCH FLUID _____

MOTOR DRIVER

HP _____ RPM _____ FRAME _____ VOLTS/PHASE/CYCLES _____
 MFR _____ BEARINGS _____ LUBE _____
 TYPE _____ INSUL _____ PULL LOAD AMPS _____
 ENC _____ TEMP RISE, C _____ LOCKED MOTOR AMPS _____
☐ VHS ☐ VBS VERT. THRUST CAP., LB. _____

PERFORMANCE

PROPOSAL CURVE NO. _____
 RPM _____ NPSHE (WATER) _____
 EFF. _____ BHP RATED _____
 MAX. BHP RATED IMP _____
 MAX. HEAD RATED IMP _____
 MIN. CONTINUOUS GPM _____
 ROTATION (VIEWED FROM C/PLO END) _____

SHOP TESTS

☐ NON-WIT. PERF. ☐ WIT. PERF.
☐ NON-WIT. HYDRO ☐ WIT. HYDRO
☐ NPSH REQ'D. ☐ WIT. NPSH
☐ SHOP INSPECTION
☐ DISMANT. & INSP. AFTER TEST
☐ OTHER _____

MATERIALS

PUMP, CASE/TRIM CLASS ☐ _____
 BASEPLATE: ☐ _____

VERTICAL PUMPS

PIT OR SUMP DEPTH ☐ _____
 MIN. SUBMERGENCE REQ'D. ☐ _____
 COLUMN PIPE: ☐ FLANGED ☐ THREADED
 LINE SHAFT: ☐ OPEN ☐ ENCLOSED
 BRGS: ☐ ROWL ☐ LINE SHAFT
 BRG. LUBE ☐ WATER ☐ OIL ☐ GREASE
 FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ ☐ NONE
 FLOAT SWITCH ☐ _____
 PUMP THRUST, LB ☐ UP ☐ DOWN

APPROX. WT, PUMP & BASE _____
 MOTOR _____ TURBINE _____

Remarks

Apprd. for Bid		Apprd. for Purchase		Rev.					
Date	By	Date	By						
11/16/78	CWR			0	11/15/78	JLA			

CENTRIFUGAL PUMP DATA SHEET

160

JOB NO. 2392
TECH. CNTR. _____
PROJECT ENGR. _____
REQ. NO. _____
PAGE ____ OF ____ DATE ____

NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER,
☐ BY MANUFACTURER

CUSTOMER SASSY CORPORATION SITE P-5 A/B
UNIT Indianapolis, Indiana SERVICE LEAN OIL PUMP
NO. PUMPS REQ'D 2 NO. MOTORS REQ'D 1 Tag No. _____ PROVIDED BY _____ MTD BY _____
NO. TURBINES REQ'D 1 Tag No. _____ PROVIDED BY _____ MTD BY _____
PUMP AFR _____ SIZE AND TYPE _____ SERIAL NO. _____

OPERATING CONDITIONS, EACH PUMP
LIQUID BENZENE U.S. GPM or FT. NO. 660 RATED 750
DISCH. PRESS. PSIG 70
PT. F. NO. 280 MAX 300 SUCT. PRESS. PSIG MAX 4 RATED 3
SP. GR. or FT. 0.85 DIFF. PRESS. PSI 66
VAP. PRESS. or FT. PSIA 62 DIFF. HEAD. FT. 180
VIS. or FT. Sec 0.4 NPSHA FT. 4 HYD. HP 29
CORR./EROS. CAUSED BY _____

CONSTRUCTION
NOZZLES _____ SIZE _____ RATING _____ FACING _____ LOCATION _____
SUCTION _____
DISCHARGE _____

CASE MOUNT: ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____
SPLIT: ☐ AXIAL ☐ RAD. TYPE VOLUTE ☐ SGL ☐ DGL ☐ DIFFUSER
PRESS: ☐ MAX. ALLOW. _____ PSIG _____ "F; ☐ HYDRO TEST _____ PSIG
CONNECT: ☐ VENT ☐ DRAIN ☐ GAGE
IMPELLER DIA: ☐ RATED _____ ☐ MAX. _____ TYPE: _____
MOUNT: ☐ BETWEEN BRGS ☐ OVERHUNG
BEARINGS-TYPE: ☐ RADIAL _____ ☐ THRUST _____
LUBE: ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE
COUPLING: ☐ MFR _____ ☐ MODEL _____
DRIVER HALF MTD BY: ☐ PUMP AFR ☐ DRIVER AFR ☐ PURCHASER
PACKING: ☐ MFR & TYPE _____ ☐ SIZE/NO. OF RINGS _____
MECH. SEAL: ☐ MFR & MODEL _____ API CLASS. CODE _____
☐ MFR CODE _____

AUXILIARY PIPING
☐ C.W. PIPE PLAN _____ ☐ CU; ☐ S.S.; ☐ TUBING; ☐ PIPE
☐ TOTAL COOLING WATER REQ'D, GPM _____ ☐ SHORT P.I. REQ'D
☐ PACKING COOLING INJECTION REQ'D: ☐ TOTAL GPM ☐ PSIG
☐ SEAL FLUSH PIPE PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG
☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE
☐ AUX. SEAL QUENCH FLUID _____

MOTOR DRIVER
HP _____ RPM _____ FRAME _____ VOLTS/PHASE/CYCLES _____
MFR _____ BEARINGS _____ LUBE _____
TYPE _____ INSUL _____ FULL LOAD AMPS _____
ENC _____ TEMP RISE, C _____ LOCKED MOTOR AMPS _____
☐ VHS ☐ VES VERT. THRUST CAP., LB. _____

PERFORMANCE
PROPOSAL CURVE NO. _____
RPM _____ NPSHR (WATER) _____
EFF. _____ BHP RATED _____
MAX. BHP RATED IMP _____
MAX. HEAD RATED IMP _____
MIN. CONTINUOUS GPM _____
ROTATION (VIEWED FROM CPLG END) _____

SHOP TESTS
☐ NON-WIT. PERF. ☐ WIT. PERF.
☐ NON-WIT. HYDRO ☐ WIT. HYDRO
☐ NPSH REQ'D. ☐ WIT. NPSH
☐ SHOP INSPECTION
☐ DISMANT. & INSP. AFTER TEST
☐ OTHER _____

MATERIALS
PUMP CASE/TRIM CLASS ☐ _____
BASEPLATE: ☐ _____

VERTICAL PUMPS
PIT OR SUMP DEPTH ☐ _____
MIN. SUBMERGENCE REQ'D. ☐ _____
COLUMN PIPE: ☐ FLANGED ☐ THREADED
LINE SHAFT: ☐ OPEN ☐ ENCLOSED
BRGS: ☐ BOWL ☐ LINE SHAFT
BRO. LUBE ☐ WATER ☐ OIL ☐ GREASE
FLOAT & BOD ☐ C.S. ☐ S.S. ☐ BRZ ☐ NONE
FLOAT SWITCH ☐ _____
PUMP THRUST, LB ☐ UP ☐ DOWN

APPROX. WT, PUMP & BASE
MOTOR _____ TURBINE _____

Remarks _____

Apprd. for Bldg		Apprd. for Purchase		Rev.	0							
Date	By	Date	By									
11/16/72	CW			Date	11/15/72	JLA						

CENTRIFUGAL PUMP DATA SHEET

161

JOB NO. 2392
 TECH. CNTR. _____
 PROJECT ENGR. _____
 REQ. NO. _____
 PAGE _____ OF _____ DATE _____

NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER,
☐ BY MANUFACTURER

CUSTOMER SASSI CORPORATION SITE P-6 A/B
Indianapolis, Indiana SERVICE LEAN OIL MAKEUP PUMP
 UNIT _____ PROVIDED BY _____ MTD BY _____
 NO. PUMPS REQ'D 2 NO. MOTORS REQ'D 2 Tag No. _____
 NO. TURBINES REQ'D _____ Tag No. _____ PROVIDED BY _____ MTD BY _____
 PUMP MFR _____ SIZE AND TYPE _____ SERIAL NO. _____

OPERATING CONDITIONS, EACH PUMP					PERFORMANCE	
LIQUID <u>PETROLEUM</u>	U.S. GPM at FT. NOR. <u>50</u>	RATED <u>50</u>	PROPOSAL CURVE NO. _____		EPM _____ NPSH (WATER) _____	
<u>OIL</u>	DISCH. PRESS., PSIG <u>15</u>	RATED <u>1.5</u>	EFF. _____ BHP RATED _____		MAX. BHP RATED IAP _____	
FT. F. NOR. <u>100</u> MAX <u>120</u>	SUCT. PRESS., PSIG MAX <u>2</u>	RATED <u>1.5</u>	MAX. HEAD RATED IAP _____		MIN. CONTINUOUS GPM _____	
SP. GR. at FT. <u>0.86</u>	DIFF. PRESS., PSI <u>13.5</u>		ROTATION (VIEWED FROM CPLG. END): _____			
VAP. PRESS. at FT. PSIA <u>3</u>	DIFF. HEAD, FT. <u>37</u>					
VIS. at FT. S.W. <u>35</u>	NPSHA, FT. <u>2</u>					
CORR./EROS. CAUSED BY _____			HYD. HP <u>0.4</u>			
CONSTRUCTION					SHOP TESTS	
NOZZLES	SIZE	RATING	FACING	LOCATION	☐ NON-WIT. PERF.	☐ WIT. PERF.
SUCTION					☐ NON-WIT. HYDRO	☐ WIT. HYDRO
DISCHARGE					☐ NPSH REQ'D.	☐ WIT. NPSH
CASE MOUNT: ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____					☐ SHOP INSPECTION	
SPLIT: ☐ AXIAL ☐ RAD; TYPE VOLUTE ☐ SOL ☐ DBL ☐ DIFFUSER					☐ DISMANT. & INSP. AFTER TEST	
PRESS: ☐ MAX. ALLOW. _____ PSIG _____ "F; ☐ HYDRO TEST _____ PSIG					☐ OTHER _____	
CONNECT: ☐ VENT ☐ DRAIN ☐ GAGE						
IMPELLER DIA.: ☐ RATED _____ ☐ MAX. _____ TYPE: _____						
MOUNT: ☐ BETWEEN BRGS ☐ OVERHUNG						
BEARINGS-TYPE: ☐ RADIAL _____ ☐ THRUST _____						
LUBE: ☐ BING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE						
COUPLING: ☐ MFR _____ ☐ MODEL _____						
DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR ☐ PURCHASER						
PACKING: ☐ MFR & TYPE _____ ☐ SIZE/NO. OF RINGS _____						
MECH. SEAL: ☐ MFR & MODEL _____ API CLASS. CODE _____						
☐ MFR CODE _____						
AUXILIARY PIPING					VERTICAL PUMPS	
☐ C.W. PIPE PLAN _____ ☐ CU; ☐ S.S.; ☐ TUBING; ☐ PIPE _____					PIT OR SUMP DEPTH ☐ _____	
☐ TOTAL COOLING WATER REQ'D, GPM _____ ☐ SIGHT F.I. REQ'D _____					MIN. SUBMERGENCE REQ'D. ☐ _____	
☐ PACKING COOLING INJECTION REQ'D: ☐ TOTAL GPM ☐ PSIG					COLUMN PIPE: ☐ FLANGED ☐ THREADED	
☐ SEAL FLUSH PIPE PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE _____					LINE SHAFT: ☐ OPEN ☐ ENCLOSED	
☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG _____					BRGS: ☐ BOWL _____ ☐ LINE SHAFT _____	
☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE _____					BRG. LUBE ☐ WATER ☐ OIL ☐ GREASE	
☐ AUX SEAL QUENCH FLUID _____					FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ ☐ NONE	
MOTOR DRIVER					FLOAT SWITCH ☐ _____	
HP _____	BPM _____	FRAME _____	VOLTS/PHASE/CYCLES _____		PUMP THRUST, LB ☐ UP _____ ☐ DOWN _____	
MFR _____	BEARINGS _____	LUBE _____				
TYPE _____	INSUL _____	FULL LOAD AMPS _____				
ENC _____	TEMP RISE, C _____	LOCKED MOTOR AMPS _____				
☐ YES ☐ YES	VERT. THRUST CAP., LB. _____				APPROX. WT, PUMP & BASE _____	
					MOTOR _____ TURBINE _____	

Remarks _____

Appvd. for Bids		Appvd. for Purchase		Rev.								
Date	By	Date	By									
11/16/78	CWR			0	11/15/78	JLA						

JOB NO. 2392
 TECH. CNTR. JLA
 PROJECT ENGR. _____

CENTRIFUGAL PUMP DATA SHEET 162

JOB NO. 2392
 TECH. CNTR. _____
 PROJECT ENGR. _____
 REQ. NO. _____
 PAGE _____ OF _____ DATE _____

NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER;
☐ BY MANUFACTURER

Customer SASSI CORPORATION SITE P-7
 UNIT Indianapolis, Indiana SERVICE GENERAL CONDENSATE PUMP
 NO. PUMPS REQ'D 1 NO. MOTORS REQ'D 1 Tag No. _____ PROVIDED BY _____ MTD BY _____
 NO. TURBINES REQ'D _____ Tag No. _____ PROVIDED BY _____ MTD BY _____
 PUMP MFR _____ SIZE AND TYPE _____ SERIAL NO. _____

OPERATING CONDITIONS, EACH PUMP				PERFORMANCE	
LIQUID <u>BENZOL</u>	U.S. GPM at FT. HOR. <u>15</u>	RATED <u>20</u>		PROPOSAL CURVE NO. _____	
	DISCH. PRESS., PSIG <u>20</u>			RPM _____ NPSH (WATER) _____	
PT. F. HOR. <u>100</u> MAX. <u>120</u>	SUCT. PRESS., PSIG MAX. <u>3</u>	RATED <u>2.5</u>		EFF. _____ BHP RATED _____	
SP. GR. at FT. <u>0.85</u>	DIFF. PRESS., PSI <u>16.5</u>			MAX. BHP RATED IMP _____	
VAP. PRESS. at FT. PSIA <u>3</u>	DIFF. HEAD, FT. <u>45</u>			MAX. HEAD RATED IMP _____	
VIS. at FT. Sec <u>45</u>	NPSHA, FT. <u>3</u>			MIN. CONTINUOUS GPM _____	
CORR/EROS. CAUSED BY _____	HYD. HP <u>0.2</u>			ROTATION (VIEWED FROM CPLG END) _____	

CONSTRUCTION					SHOP TESTS	
NOZZLES	SIZE	RATING	FACING	LOCATION	☐ NON-WIT. PERF.	☐ WIT. PERF.
SUCTION					☐ NON-WIT. HYDRO	☐ WIT. HYDRO
DISCHARGE					☐ NPSH REQ'D.	☐ WIT. NPSH
CASE-MOUNT: ☐ CENTERLINE ☐ FOOT ☐ BRACKET ☐ VERT. (TYPE) _____					☐ SHOP INSPECTION	
SPLIT: ☐ AXIAL ☐ RAD; TYPE VOLUTE ☐ SGL ☐ DBL ☐ DIFFUSER					☐ DISMANT. & INSP. AFTER TEST	
PRESS: ☐ MAX. ALLOW. _____ PSIG _____ "F; ☐ HYDRO TEST _____ PSIG					☐ OTHER _____	
CONNECT: ☐ VENT ☐ DRAIN ☐ GAGE						
IMPELLER DIA: ☐ RATED _____ ☐ MAX. _____ ☐ TYPE: _____						
MOUNT: ☐ BETWEEN BRGS ☐ OVERHUNG						
BEARINGS-TYPE: ☐ RADIAL						
LUBE: ☐ RING OIL ☐ FLOOD ☐ OIL MIST ☐ FLINGER ☐ PRESSURE						
COUPLING: ☐ MFR _____ ☐ MODEL _____						
DRIVER HALF MTD BY: ☐ PUMP MFR ☐ DRIVER MFR ☐ PURCHASER						
PACKING: ☐ MFR & TYPE _____ ☐ SIZE/NO. OF RINGS _____						
MECH. SEAL: ☐ MFR & MODEL _____ ☐ API CLASS CODE _____						
☐ MFR CODE _____						

AUXILIARY PIPING				VERTICAL PUMPS	
☐ C.W. PIPE PLAN _____	☐ CU; ☐ S.S.; ☐ TUBING; ☐ PIPE			PIT OR SLUMP DEPTH ☐ _____	
☐ TOTAL COOLING WATER REQ'D, GPM _____	☐ SIGHT P.I. REQ'D _____			MIN. SUBMERGENCE REQ'D. ☐ _____	
☐ PACKING COOLING INJECTION REQ'D: ☐ TOTAL GPM _____ ☐ PSIG _____				COLUMN PIPE: ☐ FLANGED ☐ THREADED	
☐ SEAL FLUSH PIPE PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE				LINE SHAFT: ☐ OPEN ☐ ENCLOSED	
☐ EXTERNAL SEAL FLUSH FLUID _____ ☐ GPM _____ ☐ PSIG _____				BRGS: ☐ BOWL _____ ☐ LINE SHAFT _____	
☐ AUXILIARY SEAL PLAN _____ ☐ C.S. ☐ S.S. ☐ TUBING ☐ PIPE				BRG. LUBE ☐ WATER ☐ OIL ☐ GREASE	
☐ AUX. SEAL QUENCH FLUID _____				FLOAT & ROD ☐ C.S. ☐ S.S. ☐ BRZ ☐ NONE	

MOTOR DRIVER				APPROX. WT, PUMP & BASE	
HP _____	RPM _____	FRAME _____	VOLTS/PHASE/CYCLES _____	MOTOR _____	TURBINE _____
MFR _____	BEARINGS _____	LUBE _____			
TYPE _____	INSUL _____	FULL LOAD AMPS _____			
ENC _____	TEMP RISE, C _____	LOCKED MOTOR AMPS _____			
☐ VHS ☐ VSS	VERT. THRUST CAP., LB. _____				

Remarks _____

Appvd. for Bids		Appvd. for Purchase		Rev.						
Date	By	Date	By							
11/16/78	car			0	11/15/78	JLA				

(P)

PRITCHARD

163

PROCESS PUMP DATA SHEET

JOB *SASSI CORP.*Job No. *2392*

Sheet

of

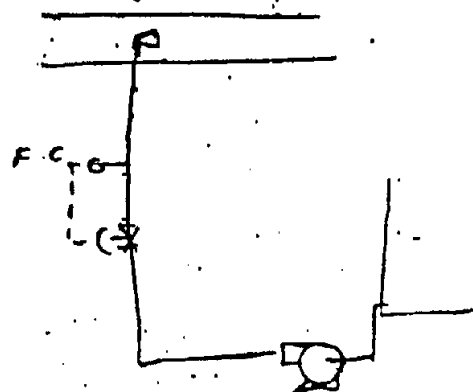
PUMP SERVICE

*Circulation Pump*Pump No. *P9-A9B*

Mater. No.

Drawing

UNITS/CASE		AMERICAN	METRIC	DESIGN		
Liquid Handled				SEER		
Pumping Temp T		°F	°C	110		
SG @ T				1.3		
Vacuum @ T		in	mm	2		
Vel Press @ T		psi	kg/cm ²	1.27		
Mass Flow		lb/hr	kg/hr	2960		
Quantity		US GPM	M ³ /hr	4550		
Percentage of Normal				90		
DISCHARGE CONDITIONS						
Vessel Pressure		psi	kg/cm ²	+246	*	*
Static head		psi	kg/cm ²	+28	*	*
Exchanger ΔP		psi	kg/cm ²	—	*	*
Header ΔP		psi	kg/cm ²	—	*	*
Orifice ΔP		psi	kg/cm ²	5	*	*
Control Valve ΔP		psi	kg/cm ²	5	*	*
Line ΔP		psi	kg/cm ²	5	*	*
Total Discharge Press.		psi	kg/cm ²	+289	*	*
SUCTION CONDITIONS						
Vessel Pressure		psi	kg/cm ²	+144	*	*
Static Head		psi	kg/cm ²	+1	*	*
Line ΔP		psi	kg/cm ²	-1	*	*
Total Suction Press.		psi	kg/cm ²	+12.4	*	*
DIFFERENTIAL Press.		psi	kg/cm ²	776.6		
Head		ft	m	497		
NPSH						
Total Suction Press.		psi	kg/cm ²	+12.4	*	*
Vapour Press.		psi	kg/cm ²	-1.3	*	*
Actual NPSH		psi	kg/cm ²	+11.1	*	*
		ft	m	+19.7	*	*
Safety Factor		ft	m	-5-	*	*
Summed NPSH		ft	m	+14.7	*	*
POWER						
Hydraulic Power		HP	KW	734		
Est. Pump Efficiency				70		
Est. Aft. Power		HP	KW	1048		
Est. Shut off Press.		psi	kg/cm ²			
(US) GPM = (m ³ /hr) ÷ (600 × SG)				Material Casing C.S.		
psi = ft × SG ÷ 2.31				Fluid Data PH 10-7		
HP = GPM × ΔP (psi) ÷ 1715				7 0 5		
m ³ /hr = kg/hr ÷ (1000 × SG)						
kg/cm ² = m × SG ÷ 30						
KW = m ³ /hr × ΔP (kg/cm ²) ÷ 36.7						



PIPING & EQUIPMENT DIAGRAM

NOTES:

(P)

PRITCHARD

164

PROCESS PUMP DATA SHEET

JOB SASSI Corp
PUMP SERVICE Slurry PumpJob No. 2392

Sheet

of

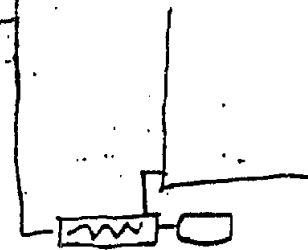
Pump No. P-10A4B

No. of

Pumps

UNITS/CASE	PHILIP AMIN	METRIC	DES		
Liquid Material			DES		
Pumping Temp °F	°F	°C	110		
SG @ T			1.3		
Vacuum @ T	in	mm	2		
Vac Press @ T	psia	kg/cm ²	1.27		
Mass Flow	lb/hr	kg/hr	32500		
Capacity	US GPM	M ³ /hr	50		
Percent of Normal			100		
DISCHARGE CONDITIONS					
Vessel Pressure	psia	kg/cm ²	14.4		
Static head	psi	kg/cm ²	17		
Exchanger ΔP	psi	kg/cm ²	—		
Heat ex ΔP	psi	kg/cm ²	—		
Orifice ΔP	psi	kg/cm ²	—		
Control Valve ΔP	psi	kg/cm ²	—		
HAND VALVE	psi		5		
Line ΔP	psi	kg/cm ²	5		
Total Discharge Press.	psia	kg/cm ²	41.4		
SUCTION CONDITIONS					
Vessel Pressure	psia	kg/cm ²	14.4		
Static Head	psi	kg/cm ²	1.1		
Line ΔP	psi	kg/cm ²	1.0		
Total Suction Press.	psia	kg/cm ²	14.4		
DIFFERENTIAL Press.	psi	kg/cm ²	27		
Head	ft	M	48		
NPSH					
Total Suction Press.	psia	kg/cm ²	14.4		
Vapor Press.	psia	kg/cm ²	1.3		
Actual NPSH	psia	kg/cm ²	13.1		
	ft	M	23		
Safety Factor	ft	M	5		
Specified NPSH	ft	M	18		
POWER					
Hydraulic Power	HP	KW	0.8		
Est. Pump Efficiency			70		
Est. Aft. Power	HP	KW	1.1		
Est. Shut off Press.	psia	kg/cm ²			
Pump Type <u>Rotary</u> Driver Type <u>electric</u> Motor <u>rubber coat</u> Shot Mod. Excluded <u>Co, AI</u> Mail Casing <u>304</u> Fluid Data <u>pH 10, 7% Sulfur Slurry</u>					
(US) GPM = lb/hr ÷ (8.33 × SG) psi = ft × SG ÷ 2.31 HP = GPM × ΔP psi ÷ 1715 M ³ /hr = kg/hr ÷ (1000 × SG) kg/cm ² = M × SG ÷ 90 KW = M ³ /hr × ΔP kg/cm ² ÷ 36.7					

TO TK-5
↓
DUMPSITE



PIPING & EQUIPMENT DIAGRAM

NOTES:

MaynoVariable speed drive

(P)

PRITCHARD

165

PROCESS PUMP DATA SHEET

JOB *SASSI CORP*Job No. *2392*

Sheet

of

PUMP SERVICE

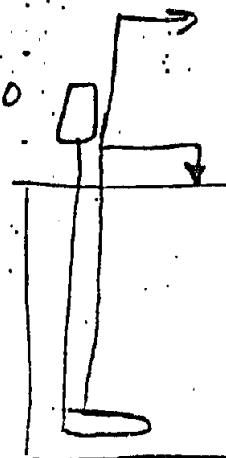
*Sump Pump*Pump No. *P11*

No. of

Wiring

UNITS/CASE	AMERICAN	BRITISH	SI						
Liquid Handling			55.5						
Pumping Temp T	°F	°C	110						
SG @ T			1.3						
Viscosity @ T	cp	cp	2						
Vap Press @ T	psia	kg/cm ² A	1.27						
Mass Flow	lb/hr	kg/hr	32.520						
Capacity	USGPM	M ³ /hr	55						
Percentage of Normal			100						
DISCHARGE CONDITIONS									
Vessel Pressure	psia	kg/cm ² A	14.4						
Static head	psi	kg/cm ²	16.9						
Exchanger ΔP	psi	kg/cm ²	—						
Heat exchanger ΔP	psi	kg/cm ²	—						
Orifice ΔP	psi	kg/cm ²	—						
Control Valve ΔP	psi	kg/cm ²	—						
Line ΔP	psi	kg/cm ²	5						
Total Discharge Press.	psia	kg/cm ² A	36.3						
SUCTION CONDITIONS									
Vessel Pressure	psia	kg/cm ² A	14.4						
Static Head	psi	kg/cm ²	0						
Line ΔP	psi	kg/cm ²	0						
Total Suction Press.	psia	kg/cm ² A	14.4						
DIFFERENTIAL Press.	psi	kg/cm ²	21.9						
Head	ft	M	38.9						
NPSH									
Total Suction Press.	psia	kg/cm ² A	14.4						
Vapour Press.	psia	kg/cm ² A	1.3						
Actual NPSH	psia	kg/cm ² A	13.1						
	ft	M	23.2						
Safety Factor	ft	M	5						
Required NPSH	ft	M	18.2						
POWER									
Hydraulic Power	HP	KW	0.7						
Est. Pump Efficiency			70						
Est. Aft. Power	HP	KW	1.0						
Est. Shut Off Press.	psia	kg/cm ² A							
(US) GPM = $\frac{141.8 \times \text{SG}}{\Delta P \text{ (psi)}}$ M ³ /hr = $\frac{141.8 \times \text{SG}}{\Delta P \text{ (kg/cm}^2\text{)}}$ KW = $\frac{141.8 \times \text{SG} \times \Delta P \text{ (kg/cm}^2\text{)}}{3600}$									
Pump Type <i>Cent. vert.</i> Drive Type <i>electric</i> Motor Casing <i>CS</i> Impeller <i>CS</i> Shaft <i>Stainless Steel</i> Material <i>Al, Cu</i> Fluid Data <i>PH-10. Sulfur particles present.</i>									
	7	6	5	4	3	2	1	0	Line No.
									Flow By
									Control By
									Use

P-10



TO TK-5

TK-7

PIPING & EQUIPMENT DIAGRAM

NOTES:

B/M 501 Rev. 3

PG - 1 A&BFEED GAS COMPRESSION PACKAGEI. DESCRIPTION OF PACKAGE

Two identical feed gas compression package will be designed to compress atmospheric (14.7 psia) treated PUROX off-gas to 250 PSIG. A three stage screw type compressor will be used with water (coolant) injected into the suction of each stage. This coolant will absorb the heat of compression and maintain a maximum discharge temperature of about 200°F.

Attached are the following items:

- process flowsheet, Al-10B, showing process scheme and process equipment requirements for each compressor package.
- process specification for the compressor.
- process design basis.

Each compressor package will normally compress 50 percent of the plants capacity, but will be rated to compress 60% of the plant's capacity at the design conditions. Each compressor package will be supplied with 100% recycle capability which will independently allow it to be operated at rates from 0 to 100% of each package's total throughput.

II. EQUIPMENT ITEMS

The following items of process equipment are to be included and specified for each package. Also, any auxilliary and utility equipment, instrumentation, etc. required for proper operation of each package are to be supplied. Instrumentation to be supplied for each package is for local operation of unit plus remote actuation of alarms, shutdowns, etc.

The packages are to be skid mounted with piping, instrumentation, etc. installed and assembled.

Process equipment items as shown on attached flowsheet, Al-10B, for each compressor package, PG-1 A and B are:

Appvd. for Bids		Appvd. for Purchase		REV.	0								
DATE	BY	DATE	BY										
11/16/72	CWR			DATE	9 Nov 1978								

JOB NO. 2392
 TECH. CNTR. JLA
 PROJECT ENGR. _____
 REQ. NO. _____
 PAGE 2 OF _____ DATE _____

	<u>EQUIPMENT ITEM NUMBERS</u>	
	<u>PG - 1A</u>	<u>PG - 1B</u>
1. One Three Stage Screw Type Compressor Driven by One Steam Turbine	(C-1A) (ST-1A)	(C-1B) (ST-1B)
2. One Interstage Separator	(D-1A)	(D-1B)
3. One Interstage Separator	(D-2A)	(D-2B)
4. One Discharge Separator	(D-3A)	(D-3B)
5. One Discharge Separator	(D-4A)	(D-4B)
6. One Interstage Cooler	(E-1A)	(E-1B)
7. One Interstage Cooler	(E-2A)	(E-2B)
8. One Discharge Cooler	(E-3A)	(E-3B)
9. One Compressor Coolant Cooler	(E-4A)	(E-4B)
10. Two Coolant Pumps (100% Spare)	(P-1A/B)	(P-1C/D)
11. Two Coolant Booster Pumps (100% Spare)	(P-2A/B)	(P-2C/D)
12. One Oil Skimmer Pump	(P-3A)	(P-3B)
13. One Coolant Surge Tank	(TK-1A)	(TK-1B)

III. DESIGN CONDITIONS

1. Normal Gas Analysis, mole percent

N ₂	17.22		
CO	23.92		
CO ₂	19.49		
CH ₄	20.94		
C ₂	4.54		
	(SPLIT:	Acetylene	12.4%
		Ethylene	39.1%
		Ethane	48.5%)
C ₃	1.18		
	(SPLIT:	Propylene	22.9%
		Propane	77.1%)

<u>Appvd. for Bids</u>		<u>Appvd. for Purchase</u>		<u>REV.</u>								
<u>DATE</u>	<u>BY</u>	<u>DATE</u>	<u>BY</u>									
				<u>DATE</u>								

FD-302 (Rev. 7-7-73)

C ₄	1.22 (SPLIT:	Diacetylene Vinyl Acetylene Butadiene Butylene Butane	3.9% 4.1% 18.0% 30.6% 43.4%
C ₅ ⁺	1.76 (SPLIT:	C ₅ H ₁₂ C ₅ H ₁₀ C ₅ H ₈ C ₅ H ₆ C ₆ H ₁₄ C ₆ H ₁₂ C ₆ H ₁₀ C ₆ H ₈	17.5% 14.7% 12.3% 6.5% 10.5% 6.9% 17.2% 2.3%
Aromatics	1.20 (SPLIT:	C ₆ H ₆ C ₇ H ₈ C ₈ H ₁₀ C ₉ H ₈	80.3% 12.4% 2.4% 4.8%
Sulfur	0.61 (SPLIT:	H ₂ S COS SO ₂	98.5% 0.2% 1.0%
Oxygen	0.03		
Nitrogen & Argon	7.04		
Oxygenated Organics	0.85		

2. Ambinet

Process Design
Maximum - 94°F
Minimum - -20°F

Mechanical Design
Maximum 110°F
Minimum -20°F

3. Electrical

Electrical to be supplied to the battery limits at the following conditions:

480 Volts
60 Hertz
3 Phase

App. 4 for Disc.	App. 4 for Purchase	REV.								
DATE	BY	DATE								

4. Cooling Water

Available at 95°F, 50 psig
Maximum $\Delta T = 20^\circ\text{F}$
Return at 35 psig

5. Steam

High Pressure Steam System = 450 psig (saturated)
Low Pressure Steam System - 50 psig

6. Safety Factor

- Exchangers and pumps to be designed for 10% excess capacity.
- Pump NPSH

$$\text{NPSH (design)} = \text{NPSH (calculated)} \times 1.5$$

IV. UTILITIES REQUIREMENTS

Anticipated quantities of utility steam, nitrogen, water, oil, electricity, etc. are to be specified. Coolant circulation rate to be specified.

All effluents, e.g. water, blowdown, etc. are to be specified.

Appvd. for Bids		Appvd. for Purchase		REV.									
DATE	BY	DATE	BY										
				DATE									

PURCHASER SASSI CORPORATION
LOCATION Indianapolis, Indiana
UNIT C-1 A/B NO. REQUIRED 2
ITEM NO. Feed Gas Compressor
SERVICE Feed Gas Compressor

MANUFACTURER Screw
TYPE & SIZE Screw
SERIAL NO.

FIRST STAGE

ALL HANDLED

BAROMETER, psi

STD CU FT PER MIN (14.7 psia - 60 F - Dry)
OR
WEIGHT FLOW, lb per min

FILE CONDITIONS

Pravno, polit

7 days or more, day 7.

Relative Humidity, per cent

Molecular Weight (Mn)

 $C_p/C_v = (\gamma, \gamma)$

Corrosibility (Z₁)

[illegible]14.7

100

— 100 —

25.84

1.26

1.0.

18766

Pressure, pale

Temperatur, deg F

 $C_p/C_v (K_2)$

Composability (Z₂)

50

* 200 Max

1.26

10

SPEED, mph

ESTIMATED SURGE, ICFM
(At Speed Above)

ADJABATIC HEAD (H_B)

PERFORMANCE CURVE NO.

X

X

11

—

	X
--	---

CORROSIVENESS AND REMARKS REGARDING GAS * VENDOR TO SPECIFY NO COPPER OR COPPER ALLOYS. (1) VENDOR TO SPECIFY COOLANT FLOWRATE.

Apptd. for Hnds		Apptd. for Purchase		Rev.							
Date	By	Date	By								
				Date							

JOB 2392

DATE

PAGE

DATA SHEET FOR SCREW COMPRESSORS

PURCHASER SASSI CORPORATION MANUFACTURER SCREW
 LOCATION Indianapolis, Indiana TYPE & SIZE SCREW
 UNIT C-1 A/B NO. REQUIRED 2 SERIAL NO. _____
 ITEM NO. FEED GAS COMPRESSOR
 SERVICE _____

PROCESS REQUIREMENTS

SECOND STAGE

GAS HANDLED

BAROMETER, psia

STD CU FT PER MIN (14.7 psia - 60 F - Dry)

OR
WEIGHT FLOW, lb per min

NORMAL	RATED	OTHER CONDITIONS		
		A	B	C
PUROX	OFFGAS			
14.7	14.7			
---	---			
1147(1)	1377(1)			

INLET CONDITIONS

Pressure, psia

Temperature, deg F.

Relative Humidity, per cent

Molecular Weight (M)

Cp/Cv (K₁)Compressibility (Z₁)

Inlet Volume, cu ft per min

45	45			
100	100			
---	---			
26.22	26.22			
1.27	1.27			
0.995	0.995			
5772	6927			

DISCHARGE CONDITIONS

Pressure, psia

Temperature, deg F

Cp/Cv (K₂)Compressibility (Z₂)

120	120			
* 200 Max	* 200 Max			
1.27	1.27			
0.997	0.997			

HORSEPOWER REQUIRED BY DRIVER

SPEED, rpm

ESTIMATED SURGE, ICFM
(At Speed Above)ADIABATIC HEAD (H_g)

PERFORMANCE CURVE NO.

X	X			
X	X			
X	X			
X	X			
X	X			

CORROSIVENESS AND REMARKS REGARDING GAS * VENDOR TO SPECIFY NO COPPER OR
 COPPER ALLOYS. (1) VENDOR TO SPECIFY COOLANT FLOWRATE.

App'd. for Mfg.		App'd. for Purchase		Rev.							
Date	By	Date	By								
				Date							

JOB 2392
 DATE _____
 PAGE _____

DATA SHEET FOR SCREW COMPRESSORS

PURCHASER SASSI CORPORATION MANUFACTURER _____
 LOCATION Indianapolis, Indiana TYPE & SIZE Screw
 UNIT C-1 A/B NO. REQUIRED 2 SERIAL NO. _____
 ITEM NO. _____
 SERVICE FEED GAS COMPRESSOR

PROCESS REQUIREMENTS THIRD STAGE

GAS HANDLED
 BAROMETER, psia
 STD CU FT PER MIN (14.7 psia - 60 F - Dry)
 OR
 WEIGHT FLOW, lb per min

NORMAL	RATED	OTHER CONDITIONS		
		A	B	C
PUROX	OFFGAS			
14.7	14.7			
---	---			
1139 (1)	1366 (1)			

INLET CONDITIONS
 Pressure, psia
 Temperature, deg F
 Relative Humidity, per cent
 Molecular Weight (M)
 Cp/Cv (K₁)
 Compressibility (Z₁)
 Inlet Volume, cu ft per min

115	115			
100	100			
---	---			
26.31	26.31			
1.27	1.27			
0.988	0.988			
2225	2671			

DISCHARGE CONDITIONS
 Pressure, psia
 Temperature, deg F
 Cp/Cv (K₂)
 Compressibility (Z₂)

265	265			
* 200 Max	* 200 Max			
1.27	1.27			
0.992	0.992			

HORSEPOWER REQUIRED BY DRIVER
 SPEED, rpm
 ESTIMATED SURGE, ICFM
 (At Speed Above)
 ADIABATIC HEAD (H_g)
 PERFORMANCE CURVE NO.

X	X			
X	X			
X	X			
X	X			
X	X			

CORROSIVENESS AND REMARKS REGARDING GAS * VENDOR TO SPECIFY NO COPPER OR
COPPER ALLOYS. (1) VENDOR TO SPECIFY COOLANT FLOWRATE.

Appd. for bids		Appd. for Purchase		Rev.							
Date	By	Date	By								
				Date							

FD-302a (Rev. 2-7-72)

CUSTOMER <u>SASSI CORPORATION</u> SITE <u>Indianapolis, Indiana</u> SERVICE <u>FUEL GAS COMPRESSOR TURBINE</u> MANUFACTURER _____		TAG NO. <u>ST-1 A/B (for C-1A/B)</u> UNIT _____ SERIAL NO _____ DRIVEN EQUIPMENT <u>C-1 A/B</u> MODEL _____																																																	
NOTE: ☐ INDICATES INFORMATION TO BE COMPLETED BY PURCHASER; ☐ BY MANUFACTURER PARAGRAPH NUMBERS WITHIN () REFER TO APPLICABLE PARTS OF THIS STANDARD																																																			
OPERATING CONDITIONS <table border="1" style="width: 100%;"> <thead> <tr> <th></th> <th>HORSEPOWER</th> <th>SPEED, RPM</th> </tr> </thead> <tbody> <tr> <td>RATED</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>NORMAL</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table> <table border="1" style="width: 100%;"> <thead> <tr> <th>STEAM CONDITIONS</th> <th>MAX.</th> <th>NORMAL</th> <th>MIN.</th> </tr> </thead> <tbody> <tr> <td>INLET PSIG</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>TEMP °F</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>EXHAUST PSIG IN HG ABS</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table> MAX EXHAUST CASING PRESSURE _____ PSIG COOLING WATER IN _____ PSIG _____ °F OUT _____ PSIG (5d) ☐ WINTERIZATION ☐ DRIVEN EQUIP. THRUST LB/IN' UP _____ DOWN _____ ☐ SERVICE ☐ CONTINUOUS ☐ INTERMITTENT ☐ STANDBY			HORSEPOWER	SPEED, RPM	RATED	_____	_____	NORMAL	_____	_____	STEAM CONDITIONS	MAX.	NORMAL	MIN.	INLET PSIG	_____	_____	_____	TEMP °F	_____	_____	_____	EXHAUST PSIG IN HG ABS	_____	_____	_____	PERFORMANCE AT NORMAL STEAM CONDITIONS <table border="1" style="width: 100%;"> <thead> <tr> <th rowspan="2">CONDITION</th> <th>STEAM RATES</th> <th colspan="2">HAND VALVE POSITION</th> </tr> <tr> <th>LB/HP/HR</th> <th>NO. OPEN</th> <th>NO. CLOSED</th> </tr> </thead> <tbody> <tr> <td>RATED</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>NORMAL</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>A</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>B</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table> ☐ NORMAL EXHAUST TEMPERATURE _____ °F ☐ COOLING WATER REQ'D _____ GPM ☐ POTENTIAL MAX HP _____		CONDITION	STEAM RATES	HAND VALVE POSITION		LB/HP/HR	NO. OPEN	NO. CLOSED	RATED	_____	_____	_____	NORMAL	_____	_____	_____	A	_____	_____	_____	B	_____	_____	_____
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	HORSEPOWER	RPM	P ₁	T ₁	P ₂																																														
A	_____	_____	_____	_____	_____																																														
B	_____	_____	_____	_____	_____																																														
ACCESSORIES NEMA GOVERNOR TYPE CLASS _____ ☐ MECH ☐ HYDR ☐ OIL RELAY (30n-1) ADJUSTABLE SPEED RANGE PLUS _____ % MINUS _____ % ☐ HAND SPEED CHANGER (30a) ☐ ELECTRICAL HAZARD CLASS _____ GR _____ DIV (5f) ☐ REMOTE TRIP SIGNAL _____ (30m) ☐ BASEPLATE ☐ SOLEPLATE BY _____ (19a) ☐ EXTENDED FOR GEAR ☐ FOR DRIVEN MACHINE ☐ GLAND CONDENSER MOUNTED _____ (15d) ☐ MOUNT COUPLING HALF ☐ TAPER SHAFT ☐ STRAIGHT (16a-d) ☐ INSULATION ☐ JACKET ☐ SENTINEL WARNING VALVE		BEARINGS TYPE ☐ RADIAL _____ THRUST _____ ☐ LUBE SYSTEM ☐ RING OILED ☐ PURCHASERS SYSTEM OTHER _____ ☐ CORROSION-RESISTANT OIL DRAIN LINES (12d)																																																	
TESTS AND INSPECTION R = REQUIRED W = WITNESSED INSPECTION ☐ SURFACE PARTS _____ (31c) ☐ NO-LOAD RUN ☐ DISASSEMBLY AFTER TEST HYDRO INLET ☐ _____ PSIG EXCH CASE ☐ _____ PSIG ☐ PERFORMANCE ☐ AUX EQUIP. ☐ GOV RESPONSE TO CONTROL SIGNAL ☐ TEST DATA SHEETS REQUIRED OUTLINE DRG NO _____ SECTION DRG NO _____		MATERIALS (25a) ☐ HIGH-PRESS. CASING _____ EXCH CASING _____ ☐ NOZZLES _____ WHEELS _____ ☐ SHAFT _____ UNDER PACKING _____ ☐ GOV VALVE TRIM _____																																																	
REMARKS. * VENDOR TO SPECIFY BASED ON C-1A/B REQUIREMENTS PLUS 10%		<table border="1" style="width: 100%;"> <thead> <tr> <th>CONNECTIONS</th> <th>SIZE</th> <th>UEASI RATING</th> <th>FACING</th> <th>POSITION</th> </tr> </thead> <tbody> <tr> <td>INLET</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>EXHAUST</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>DRAINS</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>COOLING WATER</td> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table> ☐ RPM MAX CONT _____ TRIP _____ 1ST CRITICAL _____ (17a) ☐ CASING DESIGN INLET _____ PSIG _____ °F EXCH _____ PSIG ☐ MAX ALLOWABLE RPM _____ WEIGHT _____ LB GEAR FURNISHED BY _____ (23a-f) TYPE _____ RATIO _____ NOTE: FOR ADDITIONAL GEAR INFORMATION USE DATA SHEET FROM API STD 613		CONNECTIONS	SIZE	UEASI RATING	FACING	POSITION	INLET	_____	_____	_____	_____	EXHAUST	_____	_____	_____	_____	DRAINS	_____	_____	_____	_____	COOLING WATER	_____	_____	_____	_____																							
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COOLING WATER	_____	_____	_____	_____																																															

CARBON DISULFIDE INJECTION UNIT

ITEM NO.: PG-2

FOR SASSI CORPORATION

Indianapolis, Indiana

DESCRIPTION OF PERFORMANCE

One carbon disulfide (CS_2) injection unit (skid mounted) to provide CS_2 to a gas stream which must maintain a sulfur concentration of 200 ppm after CS_2 injection point. The gas stream H_2S /organic sulfur concentration before injection may vary from 0 to 200+ ppm sulfur.

DUTY

Unit will provide from 0 through 75 lbs/hr. CS₂ at a pressure of 275 psig. Unit will contain gas stream analyzer and controls to set CS₂ injection rate to concentration to maintain the 200 ppm level in the gas.

[illegible]

Exhibit 1001 Nov. 3

ITEM NO.: PG-3

FOR SASSI CORPORATION
Indianapolis, Indiana

A package hydrogen plant is required for generation of hydrogen for startup, catalyst reduction, and hydrogen addition during normal operation. The feedstock to the unit will be natural gas at 40 psig. The package plant is to be skid-mounted and meet the following process requirements:

1. The design capacity of the unit is 500,000 SCFD of product gas having a 99% hydrogen purity. The product hydrogen pressure is 275 psig.
2. Catalyst reformer for converting natural gas or methane to hydrogen.
3. A high temperature shift reactor containing chromium-promoted iron oxide catalyst for conversion of carbon monoxide and steam to hydrogen, and carbon dioxide.
4. Hydrogen purification to use an adsorption process to produce high purity hydrogen. The adsorption process operates on a repeated pressure swing cycle having two basic steps: adsorption at high pressure and desorption at low pressure.

[illegible]

GLYCOL DEHYDRATION PACKAGE UNIT

ITEM NO.: PG-4

FOR SASSI CORPORATION
Indianapolis, Indiana

1. SCOPE

This specification covers one triethylene-glycol natural-gas dehydration unit, PG-4, designed and fabricated in accordance with this requisition and all references, codes and standards.

2. EQUIPMENT

The unit is Item PG-4 with component item numbers as follows:

- T-5 Glycol to Gas Contactor Tower with integral 2-phase inlet scrubber section
- T-6 Glycol Regenerator
Glycol/Gas Heat Exchanger (separate, externally mounted)
- P-16A/B Glycol Circulation Pumps, Gas Operated
Inlet Scrubber Bottoms Heater (Internal to T-1)

These units shall be support-mounted.

3. PROCESS DESIGN CONDITIONS

3.1 Gas Side

<u>Process Design Conditions</u>	<u>Inlet Gas</u>	<u>Outlet Gas</u>
Operating Gas Flow Rate, MMSCFD	31.02	31.02
Specific Gravity Gas (Air = 1)	0.59	0.59
Temperature, °F	100	*
Operating Pressure, psia	140	*
Gas Dew Point, °F	Saturated	0°F

3.2 T.E.G. Side

Glycol Conditions (Vendor to specify all but glycol loss)

Lean Glycol Purity (%)	*
Reconcentration Temperature (°F)	*
Circulation Rate (GPM)	*
Gallons Glycol/# Water Removed	*
SCF Strip Gas/Gallon Glycol	*
Guaranteed Glycol Loss	1/10 gallon/MMSCFD

* Vendor to specify.

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DATE	BY	DATE	BY										
				DATE									

B/M 001 Rev. 3

JOB NO. 2392
 TECH. CNTR. JLA
 PROJECT ENGR.
 REQ. NO.
 PAGE 2 OF 4 DATE

3. PROCESS DESIGN CONDITIONS (Continued)

3.2 T.E.G. Side

Flash Gas from Pumps (SCFM)
 Glycol from Pumps (GPM)
 Pressure Drop through Contactor + E-1
 Pressure Drop through Glycol/Gas Exch.
 Gas Temperature Out Glycol/Gas Exch.
 Gas Temperature Entering Glycol/Gas Exch.

_____*_____
 _____*_____
 _____*_____
 _____*_____
 _____*_____
 _____*_____

4. EQUIPMENT DETAILS

4.1 Contactor, T-5

The following components shall be included on the contactor:

- Stainless steel wire mesh extractor in scrubber and in the top of the contactor.
- Scrubber level controller and normally closed control valve with block and bypass valves.
- Relief valve with packed lift lever and drain valve.
- Level controller filter-regulator set.
- Hydrocarbon high and low level alarms in scrubber.
- Thermometers, with thermowell; one in scrubber bottoms, one in scrubber vapor space, one in overhead gas line, one in glycol leaving E-1 glycol/gas exchanger.
- Pressure gauge with valve in scrubber section.
- Inter-tray manways on trays and from scrubber to contacting section.
- Provide outside manway on vessel.
- Hydrocarbon level gauge, reflex type, on scrubber.
- Internal cold weather heating coil in liquid space of scrubber section (inlet scrubber bottoms heater).
- Outside safety-caged ladder per OSHA and OMV specifications
- Bubble cap trays 24" spacing.

Vendor to advise:

- Size, type and function of vessel openings.
- Required glycol charge for contactor - (glycol supplied by others).
- Contactor weight.
- Contactor diameter.
- Contactor height, seam to seam 25'-6".
- Temperature of glycol entering glycol/gas exchanger from regenerator.

4.2 Glycol Cooler

- Separately mounted on contactor, external.

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				DATE								

3/14/33.

Design duty (by vendor).

- Integral inlet glycol-cooled reflux-coil in still column.
-
- Removable glycol-glycol heat exchanger coil (non-code) in accumulator.
- Gas preheat coil for fuel gas.
- Glycol filter with built-in relief valve, bypass valves, drain valve and two extra sets of replaceable cartridges.
- Removable free standing stack with arrestor good for 100 mph wind.
- Burner and pilot light and their controls.
- Temperature controller.
- Reflex type gauge glasses on reboiler and storage tank.
- High and low glycol temperature alarm (TSHL).
- Flame failure shutdown and pilot light relighter (Vigilant) with standard battery.
- Fuel gas control valves.
- Stripping gas controls for operation with stripping gas.
- Fuel gas safety drip with drain and relief valve, 2-float type with level control.
- Fuel gas pressure gauge (to adjust F.G. regulator set pressure).
- Fuel gas strainer.
- Removable burner flame arrestor with damper.
- Low level alarm switch for glycol regenerator, including exterior float chamber, isolating and drain valves.
- Automatic starting of spare pump in case of glycol circulation failure.
- Stripping gas rotameter with pressure gauge.

Two pumps, one operating, one spare. Pumps to be of the "KIMRAY" type.

Vendor to furnish the flow rates for this system.

Pump valving, instrumentation and piping shall be furnished as required for isolation and control. Vendor to furnish all components. Furnish flapper type automatic pump transfer switch.

[illegible]

5. INSULATION

INSULATION

Provide insulation for reboiler shell, still column and feed gas drip pot with suitable aluminum cover. Provide expanded metal personnel guard on accumulator.

NOTE: Vendor to winterize equipment on glycol regenerator skid as required. Heating glycol solution is available. One heating glycol supply connection and one return connection shall be provided on the skid.

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