

Specification and Data Sheets

from

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James R. Couper, W. Roy Penney, James R. Fair, and Stanley M. Walas
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Additional Data and Spec Sheets can be found in the book.

CATALYTIC CONSTRUCTION CO.
ENGINEERING DIVISION

AGITATOR DATA SHEET

JOB NO.	SPEC NO.	PAGE	OF
CLIENT	ITEM NO.	REQ. NO.	
LOCATION	BY	DATE	
NUMBER REQ'D.	REVISION	DATE	BY

PERFORMANCE DATA

AGITATOR APPLICATION
TYPE OF AGITATION
FOAMING TENDENCY
WORKING CAPACITY-(BATCH OR CONTINUOUS, MIN. & MAX.)
MIXING CYCLE

MATERIALS TO BE MIXED					MIXING TEMP.	°F
COMPONENT	VOLUME %	WEIGHT %	SPECIFIC GRAVITY	VISCOSITY CENTIPOISE	TEMP. °F	
FINISHED MIX						
SOLIDS IN FINISHED MIX				SETTLING VELOCITY		FT/MIN

PARTICLE SIZE	
AGITATOR IN OPERATION DURING FILLING	, DURING DRAW-OFF
VERTICAL DISTANCE: VESSEL BOTTOM TO DRAW-OFF	
ADDITIONAL NOTES & DATA	

VESSEL DATA		
VESSEL	ITEM NO.	SKETCH OR DWG. NO.
CAPACITY GAL., DESIGN PRESSURE PSIG	TEMP. °F,	MATERIAL
CLEARANCE AVAILABLE FROM MOUNTING FLANGE FOR INSTALLING OR REMOVING AGITATOR		
DIMENSIONS OF LARGEST OPENING TO PASS IMPELLER		
NO. & DIMENSIONS OF BAFFLES REQ'D		

VENDOR'S UNIT CHARACTERISTICS		
MANUFACTURER	OUTLINE DWG. NO.	
TYPE OR MODEL	B.H.P.	SECTIONAL DWG. NO.
DRIVE TYPE (DIRECT OR GEARED)	RATIO	MATERIALS
IMPELLER: TYPE	QUANTITY	IMPELLER
R.P.M.	DIA.	SCRAPER BLADE
SHAFT LENGTH BELOW MOUNTING FLANGE		STABILIZER RING
IMPELLER SHAFT SEAL TYPE		IMPELLER SHAFT
BEARINGS TYPE		MIXER DRIVE HOUSING
COUPLING TYPE		MOUNTING FLANGE
LUBRICATION TYPE		PACKING
MOUNTING TYPE & OPER. ANGLE		GLAND
NO. & TYPE STEADY BEARINGS		LANTERN RING
ELEC. MOTOR: MANUFACTURER		COUPLING
TYPE	FRAME NO.	GASKET
VOLTS,	PHASE,	MECH SEAL
STARTING CURRENT	FULL LOAD CURRENT	STEADY BEARING
POWER FACTOR		WEIGHT: AGITATOR LBS.
WEIGHT: MOTOR LBS.		
REMARKS:		

**AGITATOR
SPECIFICATION SHEET**

Page 1 of 2

**AGITATOR
SPECIFICATION SHEET**

Page 2 of 2

REMARKS

34

DRIVE DATA

- 35 Driver Type: _____ rpm: _____ hp: _____ Manufacturer: _____
 36 Current Characteristics: _____ v _____ ph _____ cycles; Type Encl. _____
 37 Starting Torque: _____ Full Load Amps: _____ NEMA Code Letter: _____ Frame: _____
 38 Speed Reducer Type: _____
 39 Expected Noise Level (Measured 3 ft. from Source) _____ dB
 40 _____

41

MATERIALS OF CONSTRUCTION

- 42 Impeller _____ Lantern Ring _____
 43 Impeller Shaft _____ Packing Gland _____
 44 Impeller Shaft Coupling(s) _____ Packing _____
 45 Mounting Flange _____ Seal _____
 46 Mounting Flange Facing _____
 47 Seal Faces: Rotating _____ Stationary _____
 48 Stuffing Box _____

49

REMARKS

- 50 _____
 51 _____
 52 _____
 53 _____
 54 _____
 55 _____

DES.SUPRV.

CHECKED BY

INITIATOR

REMARKS

APP'V

DATE

CHAD SUPRV.

BY

REV

TITLE



SCALE
BLDG. NO.

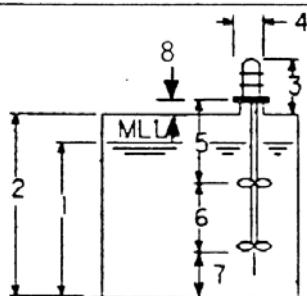
DRAWING NO.

TANK MIXER TOP ENTERING (TYPICAL)

1 SERVICE: INDOOR/OUTDOOR: ENGLISH/METRIC UNITS
 2 FEED TO TANK: COMPOSITION/CONCENTRATION.
 3 SOLIDS: TYPE/CONCENTRATION.
 4 OPERATING PARAMETERS: PRESS. TEMP.
 5 SP.GR. @ OP. TEMP. MAX. VISCOSITY @ OP. TEMP. MAX.
 6 DESIGN PARAMETERS: PRESS. TEMP. DESIGN LEVEL
 7 TANK-ITEM NO. CAPACITY SIZE
 8 DESIGN BAFFLES
 9 TANK MIXER-ITEM NO. QTY.
 10 MANUF. MODEL NO.
 11 REDUCT. GEAR EFFIC. SERVICE FACTOR CAL. PRI. PUMPING CAP.
 12 DESIGN LOADS: TORQUE STATIC MOMENT
 13 DYNAMIC MOMENT DOWNWARD WEIGHT
 14 FIRST CRITICAL SHAFT SPEED OP. SPEED STEADY BEARING: YES/NO
 15 IMPELLER: SIZE NO. TYPE MAT'L. OF CONST.
 16 ACTUAL H.P. ABSORBED @ IMPELLER PITCH REMOVE IMP. THRU.
 17 SHAFT: DIAMETER LENGTH MAT'L. OF CONST.
 18 OUTPUT SHAFT BEARING: TYPE AFBMA L-10 LIFE LUB. TYPE
 19 OTHER BEARINGS: TYPE AFBMA L-10 LIFE LUB. TYPE
 20 MOUNTING FLANGE: TYPE SIZE MAT'L. OF CONST.
 21 SEAL TYPE: MANUF. MODEL NO.
 22 MAT'L. OF CONST: ROTATING FACES: INTL'S, METALLIC FLEX.
 23 BALANCED. YES/NO: TANK SHUTOFF. YES/NO: FLUSH FLUID
 24 SEAL DESIGN: PRESS. TEMP.
 25 GEAR HOUSING: V-BELT/GEAR. MAT'L. OF CONST. AGMA GEAR CLASS
 26 TYPE OF SUPPORT GEAR BOX LUB. TYPE
 27 Motor: Item No. Mfr. Model No. Qty.
 28 Area Class Gr. Div. /Non-Hazardous: Volts Phase Hertz
 29 Enclosure Insulation ; Temp. Rise °C above °C By @ S.F.
 30 Space Heater: Volts Phase Hertz

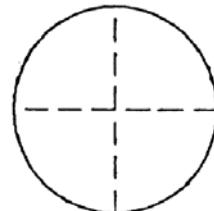
Item No.	HP KW	Current Full Load	Eff. Locked Rotor	P.F. 4/3/4/4	Full Load RPM	Frame No.	Brg. Lub. (1)	Weight LB/KG	Allow-Thrust Up/Down LB/KG	Space Heater	S.F.
Mixer											

31 WEIGHT: SHIPPING INSTALLED
 32 PAINT SPECIFICATION
 33 NOTES:
 34
 35
 36
 37
 38
 39
 40



VENDOR TO SHOW LOC. AND ANGLE. DIMENSIONS:

TOP VIEW: SHOW LOC. OF MTG.FLG: DIR. OF ROTATION



REVISIONS	6	7	8	9	10	11	MANAGING OFFICE	ENGINEERING OFFICE
	5							
	4							
	3							
	2							
	1							
	0							
	NO.	DATE	ENGINEER	CHK/REVIEW	APPROVE			

DATA SHEET/SKETCH
 CLIENT _____
 LOCATION _____ JOB NO. _____
 ITEM _____
 ITEM NO. _____ SPEC. NO. _____
 REO'N. NO. _____ PAGE ____ OF _____

TANK MIXER SIDE ENTERING (TYPICAL)

1	SERVICE:	INDOOR/OUTDOOR, ENGLISH/METRIC UNITS													
2	FEED TO TANK: COMPOSITION/CONCENTRATION.														
3	SOLIDS: TYPE/CONCENTRATION.														
4	OPERATING PARAMETERS: PRESS.	TEMP.													
5	SP.GR. @ OP. TEMP.	MAX.	VISCOSITY @ OP. TEMP.	MAX.											
6	DESIGN PARAMETERS: PRESS.	TEMP.	DESIGN LEVEL												
7	TANK- ITEM NO.	CAPACITY		SIZE											
8	DESIGN			BAFFLES											
9	TANK MIXER-ITEM NO.	QTY.													
10	MANUF.	MODEL NO.													
11	REDUCT. GEAR EFFIC.	SERVICE FACTOR		CAL. PRI. PUMPING CAP.											
12	DESIGN LOADS: TORQUE	STATIC MOMENT													
13	DYNAMIC MOMENT	DOWNWARD WEIGHT													
14	FIRST CRITICAL SHAFT SPEED	OPER. SPEED													
15	PROPELLER: SIZE	TYPE		MAT'L. OF CONST.											
16	ACTUAL H.P. ABSORBED @ PROPELLER	PITCH		REMOVE PROP. THRU											
17	SHAFT: DIAMETER	LENGTH		MAT'L. OF CONST.											
18	OUTPUT SHAFT BEARING: TYPE	AFBMA L-10 LIFE		LUB. TYPE											
19	OTHER BEARINGS: TYPE	AFBMA L-10 LIFE		LUB. TYPE											
20	MOUNTING FLANGE: TYPE	SIZE		MAT'L. OF CONST.											
21	ANGLE θ	RIGHT/LEFT HAND MOUNT: DIR. OF ROTAT.		FROM MOTOR END											
22	SEAL TYPE:	MANUF.		MODEL NO.											
23	MAT'L. OF CONST: ROTATING FACES:	INTL'S, METALIC		FLEX.											
24	BALANCED: YES/NO, TANK SHUTOFF: YES/NO, FLUSH FLUID														
25	SEAL DESIGN: PRESS.	TEMP.													
26	GEAR HOUSING: V-BELT/GEAR-MAT'L. OF CONST.	AGMA GEAR CLASS													
27	TYPE OF SUPPORT	GEAR BOX LUB. TYPE													
28	Motor: Item No.	Mfr.		Model No.		Qty.									
29	Area Class	Gr.	Div.	/Non-Hazardous: Volts		Phase	Hertz								
30	Enclosure	Insulation		; Temp. Rise		°C above	°C	By	@	S.F.					
31	Space Heater: Volts	Phase		Hertz											
32	Item No.	Current		Eff.	P.F.	Full Load	Frame No.	Brg.	Lub.	Weight	Allow-Thrust Up/Down	Space Heater	S.F.		
33		HP	Full Load	Locked Rotor	4	3	4	(1)	LB/KG	LB/KG	Up/Down	Watts			
34	KW			4	4	4									
35	Mixer														
36	WEIGHT: SHIPPING	INSTALLED													
37	PAINT SPECIFICATION														
38	NOTES:														
39															
40															
41	VENDOR TO SHOW LOCATIONS AND ANGLE.														
42	DIMENSION:														
43															
44	1.														
45	2.														
46	3.														
47	4.														
48	5.														
49	6.														
50	7.														

REVISIONS	6					 DATA SHEET/SKETCH	MANAGING OFFICE		ENGINEERING OFFICE	
	5									
	4									
	3									
	2									
	1									
	0									
	NO.	DATE	ENGINEER	CHK/REVIEW	APPROVE					

		PROCESS DESIGN SECTION CORPORATE ENGINEERING		SYPHON PUMP (MIXING TEE) DATA SHEET	
REMARKS	EQUIP. POSITION NO.				
	SYPHON PUMP NO.				
FLOWSHEET NO.					
<u>PROCESS DATA</u>					
<u>INLET FLUID #1</u>					
DESCRIPTION _____					
SPECIFIC GRAVITY _____					
VISCOSITY; CP _____					
PRESSURE; PSIG _____					
TEMPERATURE; °F _____					
FLOW _____					
<u>INLET FLUID #2</u>					
DESCRIPTION _____					
SPECIFIC GRAVITY _____					
VISCOSITY; CP _____					
PRESSURE; PSIG _____					
TEMPERATURE; °F _____					
FLOW _____					
<u>OUTLET</u>					
TEMPERATURE; °F _____					
<u>MATERIALS of CONST'N.</u>					
<u>MANUFACTURER</u>					
SIZE NO. _____					
<u>PIPE CONN'S. - INCHES</u>					
PRESS. INLET _____					
SUCT. & DELIVERY _____					
NOTES:					
INITIATOR	DRAWN BY	CHECKED BY	DES SURV.	PROJ. ENG.	DATE
DATE					
JOB NO. _____				PLANT LOCATION _____	
PROJECT NO. _____				REF. DWG. NO. _____ SEE ABOVE LIST _____	
TITLE _____					
POSITION NO. - SEE ABOVE LIST _____				SERIES _____ STEP NO. _____	
				DRAWING NO. _____	
ISSUE DATE _____					
SCALE _____					
BLDG. NO. _____					

**CENTRIFUGAL COMPRESSOR
SPECIFICATION**

THE FLUOR CORPORATION LTD.

VENDOR MUST FURNISH ALL PERTINENT DATA FOR THIS
SPECIFICATION SHEET BEFORE RETURNING

SHEET NO. REV.

DATE

BY CHK'D.

JOB NO.

ITEM NO.	SERVICE			MANUFACTURER:	STAGES				
NO. REQ'D.	DRIVE			DESCRIPTION					
GAS HANDLED				SIZE & TYPE					
CORROSION FACTORS				COMPRESSOR MATERIALS					
OPERATING CONDITION	1:	2:	3:						
CAPACITY				CASE					
CFM @ INLET CONDS				DIAPHRAGMS					
WT. FLOW. LBS/HR.				GUIDE VANES					
(M ³ SCFD) (SCFM)*				INTER STAGE LABYRINTHS					
TEMP., INLET, °F				IMPELLER HUBS & COVERS					
DISCH, °F				IMPELLER VANES					
PRESS., INLET, PSIA				SHAFT					
DISCH. PSIA				SHAFT SLEEVES					
DIFFER. PSI				BALANCE DRUM OR DISC					
COMP. RATIO				CONSTRUCTION DETAILS					
MOLECULAR WT.				CASE: SWP	PSIG, MAX. HYDTEST	PSIG			
SP. GR. (AIR=1)				SPLIT: (HORIZONTAL: VERTICAL: BARREL)					
REL. HUMIDITY, %				SUPPORT: (FOOT: PEDESTAL: BRACKET)					
"K" VALUE, CP/CV				IMPELLER: TYPE: (OPEN: SEMI-ENCLOSED: ENCLOSED)					
COMPRESSIBILITY, "Z"				CONSTR: (CAST: FORGED: RIVETED: WELDED)					
ELEV. ABOVE SEA LEVEL				DIAMETER	"	, VANE THICKNESS "			
BHP (INCL. GEAR LOSS)				SHAFT: DIAM. AT IMP	"	, AT BRGS "			
RPM				SPAN: C-C BRGS	"	, IMP OVERHANG "			
IMP. TIP VEL.. FPS				CRITICAL SPEED			RPM		
WATER RATE, #/HP/HR				BRGS: LOCATION (INTERNAL: EXTERNAL)					
MAX. CAP., CFM @ INL.	: MAX. BHP			RADIAL: TYPE	:	PROJ. AREA	SQ "		
MIN. CFM. (SURGE POINT)				THRUST: TYPE	:	EFF. AREA	SQ "		
CONTROL: (SPEED: SUCTION VALVE: INLET VANES)				SEALS:					
SOURCE: (MANUAL: FC: PC: TC)				COUPLING CPLG GRD: YES, NO					
STEAM: PRESS.	PSIG:	TEMP.	"F: EXH.	BASE PLATE:					
POWER:	VOLTS:	PH.	CYC., COOLING WATER °F						
MFGR SHALL SUPPLY THE FOLLOWING				DRAWING NO.	NOZZLES	SIZE	RATING	FACING	LOCATION
PERFORMANCE CURVE				INLET					
SECTIONAL DRAWING				DISCHARGE					
OUTLINE DRAWING				DRAINS					
ROTATION FACING CPLG: CW: CCW				TURB. INLET					
LUBRICATION SYSTEM				TURB. EXHAUST					
COMBINED WITH DRIVER: YES, NO				WT., TOP HALF	LBS				
TWIN OIL COOLERS				WT., ROTOR	LBS	TESTS: MECHANICAL RUN IN: YES, NO			
TWIN OIL FILTERS				WT., COMPR. BARE	LBS	WITNESSED PERFORMANCE: YES, NO			
MAIN OIL PUMP				WT., BASEPLATE	LBS	OVERSPEED IMPELLERS TO RPM			
AUX. OIL PUMP				WT., ACCESSORIES	LBS	OVERSPEED ROTOR TO RPM			
OIL PRESS. SHUT DOWN				SHIPPING WT. LESS DRIVE	LBS	HYDROSTATIC TEST PRESS. PSIG			
OIL TEMP. ALARM				FLOOR SPACE	SHOP INSPECTION: YES, NO				
				REDUCTION GEAR					
DRIVER: MAKE				MFGR:					
TYPE				TYPE:					
RATED HP				ARRANGEMENT: (COUPLED) (INTEGRAL)					
RPM				LOW SPEED SHAFT.					RPM
SHIPPING WEIGHT				RATING					HP
SHIPPING POINT				SERVICE FACTOR					
SHIPMENT. MONTHS				LUBRICATION:					
REMARKS:									

THE C.W. NOFSINGER COMPANY
KANSAS CITY, MISSOURI

RECIPROCATING COMPRESSOR
SPECIFICATION SHEET

SHEET NO. _____
ITEM NO. _____
CWN JOB NO. _____
CUST. JOB NO. _____
DATE _____
BY _____
REVISED _____

CUSTOMER _____
LOCATION _____
SERVICE _____
MFR. _____ MODEL NO. _____ NO. REQUIRED _____
SERIAL NO. _____

OPERATING CONDITIONS			CONSTRUCTION DETAILS		
1 VAPOR - GAS	MOL. WT. (INCL H ₂ O)		FRAME RATING: HP	RPM	
2 ELEVATION, FT.	BAROMETER, PSIA		LUBE: TYPE	RESERVOIR CAP. MIN	
3 INDOOR - OUTDOOR	HEATED: YES - NO		FLOW, GPM	TEMP. IN/OUT, °F	
4 CORR/EROS PROPERTIES			WATER: GPM	TEMP. IN/OUT, °F	
5	NORM	RATED	WEIGHTS: COMPR	DRIVER	
6 MMSCFD/SCFM (14.7 PSIA-60 °F)			FLYWHEEL	SHIPPING	
7 WT.FLOW, LB/HR			TESTS: SHOP INSPECT	PERFORMANCE	
8 SUCTION, PSIA AT °F			HYDROSTATIC, PSIG	WITNESS	
9 DISCHARGE PRESS, PSIA			ACCESS: SUCT.VA.UNLOADING, MANUAL-AUTO		
10 CP/CV, K (SUCT)			CLEARANCE POCKETS, FIXED-VARIABLE		
11 COMPRESSIBILITY, Z (SUCT)			OUTLINE DWG.NO.	API 618: YES-NO	

PERFORMANCE (EACH STAGE)

12 STAGE - CYLINDERS/STAGE	1ST	2ND	3RD	4TH	5TH
13 DISCHARGE PSIA/°F					
14 RPM					
15 BORE & STROKE					
16 CYL. DISPLACEMENT, ACFM					
17 CLEARANCE, %					
18 COMPRESSION RATIO					
19 VOLUMETRIC EFF.					
20 CAPACITY, MMCFD					
21 BHP/STAGE					
22 VALVE: TYPE					
23 LIFT (IN/OUT), MILS					
24 GAS VELOCITY, FPM					
25 TEST PRESS (WORKING P x 1.5), PSIG					
26 ROD LOAD: TENSION, PSI					
27 COMPRESSION, PSI					
28 INTAKE NOZZLE: SIZE-RATING-FACING					
29 DISCH. NOZZLE: SIZE-RATING-FACING					

MATERIALS

30 CYLINDER/LINER					
31 PISTON/RINGS					
32 RODS					
33 VALVES/SPRINGS					
34 ROD PACKING					

MOTOR DRIVER

TURBINE DRIVER

35 SUPPLIED BY	OUNTED BY	SUPPLIED BY	OUNTED BY
36 MFR.	TYPE	MFR.	TYPE
37 ENCLOSURE	RPM	HP	RPM
38 HP	SF	INLET STM.PRESS, PSIG:	NORM MAX
39 FRAME	INSULATION	INLET STM.TEMP, °F:	NORM MAX
40 VOLTS/PH/HZ	TEMP.RISE, °F	EXHAUST STM.PRESS,PSIG:	NORM MAX
41 BEARINGS	LUBE	BEARINGS	LUBE
42 DRIVE TRAIN:BY	MFR.	NOZZLES	SIZE
43 MODEL	RATIO	INLET	RATING
44 TORSIONAL STUDY: YES-NO	BY	EXHAUST	FACING
45 SEPARATE SPEC IF: DIESEL, GAS		API-611: YES - NO	LOCATION

		PROCESS DESIGN SECTION CORPORATE ENGINEERING		FAN OR BLOWER DATA SHEET																	
REMARKS	OPERATING CONDITIONS																				
	GAS: _____ SP. GR. (AIR = 1.0) _____ POUNDS/HR: _____ STD. CFM: _____ FLOW TEMP: _____ °F	CFM AT FLOW TEMP: _____ REL. HUMIDITY AT FLOW TEMP: _____ % SUCTION PRESS: _____ PSIA DISCH. PRESS: _____ PSIA DIFFERENTIAL PRESS: _____ PSIA																			
> APPR'D DATE	MECHANICAL DATA																				
	MFG: _____ SIZE & TYPE: _____ <table border="1"> <thead> <tr> <th>NOZZLES</th> <th>SIZE</th> <th>ASA RATING</th> <th>FACING</th> <th>POSITION</th> </tr> </thead> <tbody> <tr> <td>SUCTION</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DISCH.</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DRAIN</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> IMPELLER DIAM: RATED: _____ MAX: _____ TYPE: _____	NOZZLES	SIZE	ASA RATING	FACING	POSITION	SUCTION					DISCH.					DRAIN				
NOZZLES	SIZE	ASA RATING	FACING	POSITION																	
SUCTION																					
DISCH.																					
DRAIN																					
BY CHKD SUPRV	MATERIALS OF CONSTRUCTION																				
	CASE: _____ IMPELLER: _____ SHAFT: _____ SHAFT SLEEVE: _____	WEAR RINGS: _____ COUPLING: _____ GASKETS: _____																			
REV	PERFORMANCE																				
	PROPOSAL CURVE NO: _____ NO. OF STAGES: _____ RPM _____ RATED EFF: _____ RATED BHP: _____ MAX. BHP-RATED IMP. _____	TIP SPEED: _____ OUTLET VELOCITY: _____ ROTATION FACING COUPLING END: X CW <input type="checkbox"/> CCW <input type="checkbox"/>																			
DRAWN BY INITIATOR	MOTOR DRIVE DATA																				
	ITEM NO. _____ MTD. BY. _____ HP _____ RPM _____ FRAME _____ MFG. _____ TYPE: _____ INSUL. _____ ENCLOSURE: CLASS I GROUP D	VOLTS PHASE/CYCLE _____ / _____ / BEARINGS: _____ LUBE: _____ FULL LOAD AMPS: _____ S.F. _____ L.R. AMPS: _____																			
MISCELLANEOUS																					
	OUTLINE DWG. NO. _____ SECTION DWG. NO. _____ FAN OR BLOWER SERIAL NO. _____	ACTUAL IMPELLER DIA. _____ TEST CURVE NO. _____ WEIGHT POUNDS NET. _____																			
REMARKS																					
	JOB NO. PROJECT NO. TITLE POSITION NO.	PLANT LOCATION REF. DWG. NO. SERIES	SCALE ISSUE DATE DRAWING NO.																		
E223B39			BLDG. NO.																		

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGVACUUM PUMP
DATA SHEET

OPERATING CONDITIONS

REMARKS

GAS HANDLED: _____ SEAL FLUID: _____
 MOLECULAR WGT: _____ COMPOSITION: _____
 SUCTION PRESS: _____ "Hg VACUUM TEMPERATURE: _____ °F
 DISCHARGE PRESS: _____ PSIA DENSITY: _____ LB./CU. FT.
 SUCTION TEMP: _____ °F VISCOSITY: _____ CPS
 DISCHARGE TEMP: _____ °F VAPOR PRESS: _____ PSIA
 CAPACITY: _____ LB./HR. HEAT EXCHANGER COOLING WATER:
 CAPACITY: _____ SCFM INLET TEMP: _____ °F
 CAPACITY INTAKE: _____ ACFM OUTLET TEMP: _____ °F
 "K" VALUE: _____ INLET PRESS: _____ PSIG
 RELATIVE HUMIDITY: _____ % ALLOWABLE PRESS. DROP: _____ PSI
 ALTITUDE: _____ FT.

REV APP'R'V

DATE

CHKD BY

SUPRV

MECHANICAL DATA

MFG. _____
 SIZE & TYPE _____

NOZZLES	SIZE	ASA RATING	FACING	POSITION
SUCTION				
DISCH.				
HEAT EXCH. COOLING				
DRAIN				
SEAL LIQUID				

CPLG. MFG. _____
 TYPE: _____

RECEIVER
 CAPACITY: _____ GALS.
 SIZE: _____
 DESIGN PRESS: _____ PSIG-TEMP. _____ °F
 CODED: NON CODED:
 HEAT EXCHANGER:
 SURFACE AREA _____ SQ. FT.
 DUTY: _____ BTU./HR.
 SHELL DESIGN: _____ PSIG-TEMP. _____ °F
 TUBE DESIGN: _____ PSIG-TEMP. _____ °F
 MAX. CASING PRESS: _____ PSIG.

MATERIALS OF CONSTRUCTION

PUMP:
 CASING: _____ IMPELLER: _____
 SHAFT: _____
 SHAFT SEAL: _____
 RECEIVER: _____

HEAT EXCHANGER:
 SHELL: _____
 TUBES: _____
 CHANNEL: _____
 BAFFLES: _____

PERFORMANCE
 RATED CAPACITY: _____ CFM @ _____ "Hg. VAC. SEAL FLUID FLOW RATE: _____ GPM
 PUMP SPEED: _____ RPM COOLING WATER FLOW RATE: _____ GPM
 NO. OF STAGES: _____ ROTATION FACING PUMP END:
 RATED BHP _____ CLOCKWISE COUNTERCLOCKWISE

MOTOR DRIVE DATA

ITEM NO. _____ MTD. BY _____
 VOLTS/PHASE/CYCLE/ _____ / /
 HP _____ RPM _____ FRAME _____ BEARINGS: _____ LUBE _____
 MFG. _____ FULL LOAD AMPS: _____ SF _____
 TYPE: _____ INSUL: _____ LR AMPS: _____
 ENCLOSURE: CLASS I GROUP D

ACCESSORIES

SILENCER: _____
 CONTROL VALVE: _____
 SOLENOID VALVE: _____
 SEPARATOR: _____

JOB NO. PLANT LOCATION
 PROJECT NO. REF. DWG. NO.

SCALE

TITLE

ISSUE DATE

BLDG. NO.

POSITION NO.

SERIES

STEP NO.

DRAWING NO.

E217B33

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGSTEAM EJECTOR
DATA SHEET

SHEET 1 of 2

REMARKS	Service _____		Manufacturer _____			
	No. of Units _____	Type _____	Model No. _____			
PROCESS CONDITIONS						
Non-Condensables	lb./hr.	M.W.				
Condensables Vapors (Air etc.)	lb./hr.	M.W.				
Steam	lb./hr.					
Suction Conditions at Ejector: Abs. Press. _____		mmHg.	Temp. _____	°F.		
Discharge Conditions at Ejector: _____		psig	Temp. _____	°F.		
Volume of Evacuated System _____		cu.ft.	Max. Evacuating Time: _____ Minutes			
Expected Air Leakage _____		lb./hr.				
Duty	hrs./day	days/week				
Steam Conditions Normal: Press.	psig	Temp. _____	°F.	Min: Press. _____ psig Temp. _____ °F.		
Consumption at Rated Load	lb./hr. at Press. _____	psig	Temp. _____	°F.		
Water Pressure Normal:	psig	Min:	psig	Temp. _____ °F		
Consumption at Rated Load:	gpm					
MECHANICAL DESIGN DATA						
EJECTOR	1 st Stage	2 nd Stage	3 rd Stage	4 th Stage	5 th Stage	6 th Stage
Size						
Suction Conn. Size						
Discharge Conn. Size						
Steam Conn. Size						
Design Pressure, psig						
Test Pressure, psig						
<u>MATERIALS:</u>						
Suction Chamber						
Steam Chest						
Steam Nozzle						
Diffuser						
BAROMETRIC CONDENSER						
Location: (Precondenser, Intercondenser etc.)						
Size						
Condenser Water Rate gpm						
Outlet Water Temp. °F.						
Inlet Water Pressure Req'd; psig						
Vapor Inlet Nozzle Size						
Vapor Outlet Nozzle Size						
Water Inlet Nozzle Size						
Water Outlet Nozzle Size						
Design Pressure, psig						
Test Pressure, psig						
<u>MATERIALS:</u>						
Shell						
Baffles						
Spray Nozzle						
DATE	INITIATOR	JOB NO. _____	PLANT LOCATION _____		SCALE	
	CHECKED BY	PROJECT NO. _____	REF. DWG. NO. _____		ISSUE DATE	BLDG. NO.
	DRAWN BY	TITLE				
		POSITION NO. _____		SERIES _____	STEP NO. _____	DRAWING NO. _____

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGSTEAM EJECTOR
DATA SHEET

SHEET 2 of 2

MECHANICAL DESIGN CONT'D.

SURFACE CONDENSER

REMARKS	Location	Precondenser, Intercondenser, etc.			
	Size				
	Surface Area; sq.ft.				
	Tubes; No. x O.D. x BWG x Length		x x x	x x x	x x x
	Water Flow Rate; gpm				
	Water Temp; In/Out °F		/	/	/
	Water Side ΔP; psig				
	Tubeside Nozzle Sizes; In./Out		/	/	/
	Shellside Nozzle Sizes; In./Out		/	/	/
	Design Press; psig Shell/Tubes		/	/	/
	Test Press; psig Shell/Tubes		/	/	/
	MATERIALS				
	Tubes				
	Tube Sheet				
	Channel				
	Shell				
	Shell Baffles				
	Impingement Plate				

REMARKS

1 Unit to have complete stability at zero load and to be designed for 25 % overcapacity.

2 Tail pipes furnished by _____

3 Interconnecting piping by _____

INITIATOR DRAWN BY CHECKED BY DES SURV.

JOB NO. _____ PLANT LOCATION _____

PROJECT NO. _____ REF. DWG. NO. _____

TITLE _____

POSITION NO. _____ SERIES _____ STEP NO. _____

SCALE
BLDG. NO.

DRAWING NO.



B11

FORM NO. 2829
IM 4-56 MP&S

SOUTHWESTERN ENGINEERING COMPANY

4800 SANTA FE AVENUE

LOS ANGELES 58, CALIFORNIA

SHEET ____ OF ____

ELECTRIC MOTOR DATA SHEET

REV

1	CUSTOMER	EQUIP. NO.
2	PLANT LOCATION	FILE NO.
3	SERVICE	
4	MANUFACTURER	TYPE
5	INDUCTION MOTOR	SYNCHRONOUS MOTOR
6	HORSEPOWER	HORSEPOWER
7	RPM	RPM
8	VOLTS	VOLTS
9	PHASES	PHASES
10	CYCLES	CYCLES
11	FULL LOAD AMPERES	REQUIRED TORQUE
12	LOCKED ROTOR AMPERES	LOAD WR ²
13	STARTING TORQUE - PERCENT	FULL LOAD AMPERES
14	BREAKDOWN TORQUE - PERCENT	LOCKED ROTOR AMPERES
15	FULL LOAD RPM	STARTING TORQUE - PERCENT
16	EFFICIENCY - PERCENT	PULL-IN TORQUE - PERCENT
17	FULL LOAD	PULL-OUT TORQUE - PERCENT
18	1/4 LOAD	POWER FACTOR RATING
19	1/2 LOAD	FIELD AMPS @ FULL LOAD
20	POWER FACTOR	EFFICIENCY - PERCENT
21	FULL LOAD	FULL LOAD
22	1/4 LOAD	1/4 LOAD
23	1/2 LOAD	1/2 LOAD
24	ELEV. ABOVE SEA LEVEL - FT.	POWER FACTOR
25	SERVICE FACTOR	FULL LOAD
26	TEMPERATURE RISE	1/4 LOAD
27	ROTATION FACING END OPP. COUP.	1/2 LOAD
28	CLASSIFICATION	ELEV. ABOVE SEA LEVEL - FT.
29	GENERAL PURPOSE	SERVICE FACTOR
30	SPLASH PROOF	ROTATION FACING END OPP. COUP.
31	TEFC	ENCLOSURE
32	TEFC EXPLOSION PROOF	RADIAL BEARINGS
33	MOUNTING	LUBRICATION
34	HORIZONTAL	DRIVE CONNECTION
35	VERTICAL	BASE
36	SHAFT - SOLID, HOLLOW	WEIGHT
37	SHAFT DIAMETER	OUTLINE DRAWING
38	LOAD THRUST - LBS.	SERIAL NUMBER
39	MAX. ALLOWABLE THRUST	EXCITER - TYPE
40	TYPE INSULATION	DRIVE
41	RADIAL BEARINGS - BALL OR SLEEVE	(IF MOTOR, DESCRIBE AT LEFT)
42	THRUST BEARINGS - BALL OR SLEEVE	RPM
43	LUBRICATION - OIL OR GREASE	VOLTS, D.C.
44	DRIVE CONNECTION	AMPS @ FULL LOAD
45	BASE	SHUNT OR COMPOUND WOUND
46	WEIGHT	SERVICE FACTOR
47	OUTLINE DRAWING NUMBER	TEMPERATURE RISE
48	SERIAL NUMBER	ENCLOSURES
49	NEMA CODE LETTER	TYPE INSULATION
50	MISCELLANEOUS	TYPE BEARINGS
51	OIL COOLER - TYPE	LUBRICATION
52	COOLING WATER @ °F & GPM	BASE
53	FORCED FEED LUBRICATION	WEIGHT
54	PUMP BUILT-IN OR MOTOR DRIVEN	OUTLINE DRAWING
55	MOTOR HP - VOLTS - PHASE - CYCLES	SERIAL NUMBER
56	REMARKS:	
57		

HIGH VOLTAGE INDUCTION MOTORS (LESS THAN 1500 HP/1119 KW)

<input type="radio"/> Motor Design Data <input type="radio"/> English <input type="radio"/> Metric Units		<input type="radio"/> Shop Inspection and Test <input type="checkbox"/> Required <input type="checkbox"/> Witness	
1 Mfr.	Model No.		
2 Serial No.	Qty	Shop Inspection <input type="radio"/>	
3 Driven Equip.		Testing Per NEMA(MG-1) <input type="radio"/>	
4 Site Data:		Mfr. Std. Shop Test <input type="radio"/>	
5 Altitude	Amb.Temp.Max. <input type="radio"/> °C Min. <input type="radio"/> °C	Special Tests Listed Below:	
6 Dust/Fumes/Other		<input type="radio"/>	<input type="radio"/>
7 Area Class	Gr. <input type="radio"/> Div. <input type="radio"/> /Non-hazardous	<input type="radio"/>	<input type="radio"/>
8 Basic Data:		<input type="radio"/>	<input type="radio"/>
9 Volts	Phase <input type="radio"/> Hertz	Couplings Supplied By:	
10 Nameplate H.P./KW	S.F.	Mfr.	Model No.
11 RPM		<input type="radio"/> Motor Mfr.	<input type="radio"/> Driven Equip.Mfr.
12 Insulation: Class	Type	<input type="radio"/> Purch. to Mount Motor Half.	
13 Temp. Rise	°C above <input type="radio"/> °C By	Painting: Mfr. Std. <input type="radio"/> Spec. No.	
14 NEMA Design	Type: <input type="radio"/> Hor. <input type="radio"/> Vert.	Shipment: <input type="radio"/> Domestic <input type="radio"/> Export	
15 Starting:		<input type="radio"/> Export Boxing Required	
16 <input type="radio"/> Full Voltage	<input type="radio"/> Reduced Voltage	<input type="radio"/> Outdoor Storage for Over Three (3) Months	
17 <input type="radio"/> Loaded	<input type="radio"/> Unloaded	<input type="checkbox"/> Manufacturer's Data	
18 <input type="radio"/> Voltage Dip	%	Frame No.:	Full Load RPM
19 Drive Systems:		Efficiency: F.L.	3/4L <input type="radio"/> 1/2L
20 <input type="radio"/> Direct Connected	<input type="radio"/> Gear	Power Factor: F.L.	3/4L <input type="radio"/> 1/2L
21 <input type="radio"/> Other		Current (Rated Volt).	F.L. <input type="radio"/> L.R.
22 Enclosure:		Locked Rotor Power Factor	
23 <input type="radio"/> Open Drip Proof	<input type="radio"/> Weather Protected	Lock.Rtr. W/Stnd. Time (Cold Start)	Sec.
24 <input type="radio"/> Totally Enclosed Fan Cooled		Lock.Rtr. W/Stnd. Time (Hot Start)	Sec.
25 <input type="radio"/> Other		Torques: Full Load	
26 Driven Equipment Inertia		Locked Rotor	
27 Bearing Type	Lub.	Pull-Up	
28 No. Starts: <input type="radio"/> /hr, Motor @ Amb.Temp.	°C	Breakdown	
29 No. Starts: <input type="radio"/> /hr, Motor @ Rated Temp.	°C	Acceleration Time (Motor & Load @ 100%/80% Rated Voltage)	Sec./ Sec.
30 Rotation Facing Coupling End:		Rotor WK ²	
31 Vibration: <input type="radio"/> NEMA Std.	<input type="radio"/>	Allow. WK ² @ Motor Shaft	
32 Noise: <input type="radio"/> NEMA Std.	<input type="radio"/>	Min. Allowable Acceleration Volt.	
33 Space Heaters: <input type="radio"/> Yes	<input type="radio"/> No	Total Shaft End Float	
34 Volts	Phase <input type="radio"/> Hertz	Limit End Float To	
35 Maximum Sheath Temp.	°C	Space Heater KW	
36 Accessories:		Max. Stator Winding Temp.: <input type="radio"/> °C Alarm °C for Shutdown.	
37 <input type="radio"/> Baseplates	<input type="radio"/> Soleplates	Thrust Brg.Cap.(Vert.): Up <input type="radio"/> Down <input type="radio"/>	
38 <input type="radio"/> Mfr. Std. Fans	<input type="radio"/> Non-Sparking Fans	Dimensions:	
39 Winding Temp. Detector: No./Phase		Length <input type="radio"/> Width <input type="radio"/> Height	
40 Type		Weight:	
41 Selector Switch & Ind. By: <input type="radio"/> Purch. <input type="radio"/> Mfr.		Net <input type="radio"/> Rotor <input type="radio"/> Shipping	
42 Winding Temp. Detector & Space Htr. Leads:		Note: _____	
43 <input type="radio"/> Separate Conduit Box	<input type="radio"/> Same Conduit Box		
44 Specifications:			
45			
46			
47			
48			
49			
50 Note: <input type="radio"/> Indicates information to be completed by Purchaser; <input type="checkbox"/> By Manufacturer			

REVISIONS	6					 <p align="center">EQUIPMENT DATA SHEET</p> <p>CLIENT _____</p> <p>LOCATION _____ JOB NO. _____</p> <p>ITEM _____</p> <p>ITEM NO. _____ SPEC. NO. _____</p> <p>REQ'N. NO. _____</p>	MANAGING OFFICE	ENGINEERING OFFICE	
	5								
	4								
	3								
	2								
	1								
	0								
	NO	DATE	ENGINEER	CHK/REVIEW	APPROVE				
								PAGE	OF



GENERAL PURPOSE STEAM TURBINE SPECIFICATION

CONSTRUCTION FEATURES					no	
1						
2	<input type="checkbox"/> Potential Max. Horsepower at Normal Steam Conditions					
3	<input type="checkbox"/> Outline Dwg. No. <input type="checkbox"/> Sectional Dwg. No.					
4	Turbine Mounting	<input type="radio"/> Vertical	<input type="radio"/> Horizontal			
5	Support	<input type="radio"/> Centerline	<input type="radio"/> Foot			
6	Case Split	<input type="radio"/> Radial	<input type="radio"/> Axial			
7	<input type="checkbox"/> No. of Stages	<input type="checkbox"/> Wheel Diam.				
8	<input type="checkbox"/> Single Stage	<input type="checkbox"/> 2 Row	<input type="checkbox"/> 3 Row	<input type="checkbox"/> Reentry		
9	Interstage Gland Seal	<input type="radio"/> Carbon	<input type="radio"/> Labyrinth			
10	End Gland Seal	<input type="radio"/> Carbon	<input type="radio"/> Labyrinth			
11	<input type="checkbox"/> No. of Rings/Box					
12	Bearing Type	<input type="checkbox"/> Radial	<input type="checkbox"/> Thrust			
13	<input type="checkbox"/> rpm Max. Cont.	Trip				
14	<input type="checkbox"/> rpm Max. Allowable	1st Critical				
15	<input type="checkbox"/> Case Max. Allow. Working Press.	Inlet	<input type="checkbox"/> psig	Exhaust	<input type="checkbox"/> psig	
16	Max. Inlet Temp.	°F	Max. Exhaust Temp.	°F		
17	Min. Allowable Exhaust Pressure	<input type="checkbox"/> psig				
18	<input type="checkbox"/> R.V. Set Press. Exh.	<input type="checkbox"/> psig Capacity <input type="checkbox"/> lb/hr				
19	<input type="checkbox"/> Hydrotest Press.	Inlet	<input type="checkbox"/> psig	Exhaust	<input type="checkbox"/> psig	
20	Lube System	<input type="radio"/> Ring Oil	<input type="radio"/> Purchasers	<input type="radio"/> Other		
21	<input type="radio"/> Corrosion Resistant Drain Lines					
22	<input type="checkbox"/> Oil Required	<input type="checkbox"/> gpm <input type="checkbox"/> psig				
23	MATERIALS					
24	<input type="checkbox"/> High Press. Casing	<input type="checkbox"/> Exhaust Casing				
25	<input type="checkbox"/> Nozzles	<input type="checkbox"/> Blades				
26	<input type="checkbox"/> Shaft	<input type="checkbox"/> Wheels				
27	<input type="checkbox"/> Under Packing					
28	<input type="checkbox"/> Trip Valve Body	<input type="checkbox"/> Gov. Valve Trim				
29	CONNECTIONS					
30	SIZE	ANSI RATING	FACING	POSITION		
31	Inlet					
32	Exhaust					
33	Drain					
34	Cooling Water					
35	<input type="checkbox"/> Manufacturer to give allowable piping forces & moments on nozzles on separate sheet.					
36	TESTS					
37	REQ'D. WITN.				REQ'D. WITN.	
38	Hydrostatic	<input checked="" type="radio"/>	<input type="radio"/>	Aux. Equipment	<input type="radio"/>	<input type="radio"/>
39	No Load Run	<input checked="" type="radio"/>	<input type="radio"/>	Disassembly After Test	<input type="radio"/>	<input type="radio"/>
40	Performance	<input type="radio"/>	<input type="radio"/>	Test Data Sheets	<input type="radio"/>	
41	Gov. Response to Contr. Signal	<input type="radio"/>	<input type="radio"/>	Inspection	<input type="radio"/> Surface	<input type="radio"/> Parts
42						
43	WEIGHTS					
44	<input type="checkbox"/> Turbine	lb	<input type="checkbox"/> Cooler	lb	<input type="checkbox"/> Mounted	lb.
45	APPLICABLE SPECIFICATIONS					
46	<input type="radio"/> API 611 Gen. Purpose Steam Turbines		<input type="radio"/> - R-1 Painting			
47	<input type="radio"/> - GN-1 Noise		<input type="radio"/>			
48						
49	REMARKS:					
50						
51						
52						
53						
54						
55						
56						
BADGER ENGINEERS, INC. <small>A Neumann Company</small>		ISSUE	DATE	SHEET	OF	



SOUTHWESTERN ENGINEERING COMPANY

4800 SANTA FE AVENUE

LOS ANGELES 58, CALIFORNIA

SHEET ____ OF ____

GEAR DRIVE DATA SHEET

REV

1	CUSTOMER	EQUIP. NO.		
2	PLANT LOCATION	FILE NO.		
3	SERVICE			
4	MANUFACTURER	TYPE	SIZE	
5	OPERATION		BEARINGS	
6	CONTINUOUS OR INTERMITTENT		H.S. SHAFT - OUTBOARD	
7	GEAR RATING - BHP		H.S. SHAFT - INBOARD	
8	THERMAL RATING - HP		INTERMEDIATE SHAFT - OUTBOARD	
9	SERVICE RATING - HP		INTERMEDIATE SHAFT - INBOARD	
10	MECHANICAL HP RATING		L.S. SHAFT - OUTBOARD	
11	AGMA SERVICE FACTOR		L.S. SHAFT - INBOARD	
12	AGMA CLASS GEARS			
13	GEAR RATIO		COUPLINGS	
14	EFFICIENCY @ BHP RATING		H.S. SHAFT COUPLING - TYPE	
15	NO. OF REDUCTIONS OR INCREASES		SIZE	
16	HIGH SPEED SHAFT RPM		MFG.	
17	LOW SPEED SHAFT RPM		L.S. SHAFT COUPLING - TYPE	
18	ACTUAL DRIVEN MACHINE RPM		SIZE	
19	ROTATION H.S. SHAFT FACING DRIVER		MFG.	
20	ROTATION L.S. SHAFT FACING DRIVER		COUPLING GUARDS	
21				
22	CONSTRUCTION & MATERIAL		TESTING	
23	CASE TYPE		WITNESS PERFORMANCE TEST	
24	CASE MATERIAL		INSPECTION	
25	H. S. PINION OR WORM			
26	H.S. GEAR		MISCELLANEOUS	
27	H.S. SHAFT		WEIGHT	
28	INTERMEDIATE PINION OR WORM		OUTLINE DWG. NO.	
29	INTERMEDIATE GEAR		CROSS SECTION DWG. NO.	
30	INTERMEDIATE SHAFT		SERIAL NO.	
31	L.S. PINION OR WORM			
32	L. S. GEAR		PRIME MOVER	
33	L.S. SHAFT		TYPE - MOTOR, TURBINE, OTHER	
34	H.S. SHAFT - SINGLE OR DB'L. EXT.		RATED HP	
35	L.S. SHAFT - SINGLE OR DB'L. EXT.		DRIVER RPM /FULL LOAD RPM	/
36	H.S. SHAFT O.D. AT CLPG.		ROTATION FACING END OPP. CLPG.	
37	L.S. SHAFT O.D. AT CLPG.		MANUFACTURER	
38	CASE GASKETS		TYPE /SIZE	/
39	CASE BOLTS		WEIGHT	
40	BEDPLATE		NOM. SHAFT O.D. AT CLPG.	
41			DRAWING NO.	
42				
43	LUBRICATION		DRIVEN MACHINERY	
44	TYPE LUBRICATION - GEARS		MACHINE DRIVEN	
45	TYPE LUBRICATION - BEARINGS		BHP REQUIRED	
46	OIL PUMP TYPE		REQUIRED DRIVEN RPM	
47	OIL PUMP DRIVE		ROTATION FACING SHAFT END	
48	VISIBLE LUBRICATOR SIGHT GLASS		MANUFACTURER	
49	OIL FILTER OR STRAINER		TYPE /SIZE	/
50	OIL COOLER REQUIRED		WEIGHT	
51	TYE OIL COOLER		NOM. SHAFT O.D. AT CLPG.	
52	COOLING WATER @ °F & GPM		DRAWING NO.	
53	SIZE COOLING WATER CONN.			
54				
55	REMARKS:			
56				
57				

STANDARDS OF TUBULAR EXCHANGER MANUFACTURERS ASSOCIATION

EXCHANGER SPECIFICATION SHEET

1	CUSTOMER	JOB NO.	
2		REFERENCE NO.	
3	ADDRESS	INQUIRY NO.	
4	PLANT LOCATION	DATE	
5	SERVICE OF UNIT	ITEM NO.	
6	SIZE	CONNECTED IN	
7	GROSS SURFACE PER UNIT	SURFACE PER SHELL	
8	PERFORMANCE OF ONE UNIT		
9		SHELL SIDE	
10	FLUID CIRCULATED	TUBE SIDE	
11	TOTAL FLUID ENTERING		
12	VAPOR		
13	LIQUID		
14	STEAM		
15	NON-CONDENSABLES		
16	FLUID VAPORIZED OR CONDENSED		
17	STEAM CONDENSED		
18	GRAVITY—LIQUID		
19	VISCOSITY—LIQUID		
20	MOLECULAR WEIGHT—VAPORS		
21	SPECIFIC HEAT—LIQUIDS	BTU/LB/°F	BTU/LB/°F
22	LATENT HEAT—VAPORS	BTU/LB/°F	BTU/LB/°F
23	TEMPERATURE IN	° F	° F
24	TEMPERATURE OUT	° F	° F
25	OPERATING PRESSURE	PSI	PSI
26	NUMBER OF PASSES PER SHELL		
27	VELOCITY	FT./SEC.	FT./SEC.
28	PRESSURE DROP	PSI	PSI
29	FOULING RESISTANCE		
30			
31	HEAT EXCHANGED—BTU/HR.	M.T.D. (Corrected)	
32	TRANSFER RATE—SERVICE	EFF. SURFACE PER UNIT	

CONSTRUCTION

THE GRISCOM-RUSSELL CO.
G-FIN TANK HEATER SPECIFICATIONS

1 Customer				Item No.	
2 Address				Inq. No.	
3 Plant				Date	
4 Unit Required					
5					
6 Service				Type Internal External	
7	SHELLS			TUBES	
8 Class of Fluid					
9 Specific Gravity @ 60°F.					
10 Specific Heat @ Ave. Temp.					
11 Latent Heat @ Ave. Temp.	B.T.U./#			B.T.U./#	
12 Viscosity	S.S.U. at	°F.			
13 Viscosity	Centipoises at	°F.		Centipoises at °F.	
14 Viscosity	Centipoises at	°F.		Centipoises at °F.	
15 Quantity	GPM	#/Hr.		#/Hr.	
16 Operating Temperature	In	°F. : Out	°F.	In °F. : Out °F.	
17 Operating Pressure	#/□"			#/□"	
18 No. Passes per Shell	1			2	
19 Design Pressure	#/□"			#/□"	
20 Test Pressure	#/□"			#/□"	
21 Design Temperature (Max. Metal Temp.)	°F.			°F.	
22 Heat Exchanged	BTU/Hr.		Surface Per Unit		Sq. Ft.
23 Corrected M.T.D.	Design Rate		Surface Per Shell		Sq. Ft.
MATERIALS AND CONSTRUCTION					
25 SHELL:	Steel	CHANNEL:	Steel	Baffles:	Steel Standard Spacing
26 INLET CONN. SIZE	INLET CONN. SIZE:			Tie Rods and Spacers: Steel	
27 Drilling: 150#	Drilling: 150#	P.T.	Gaskets: Durabla		
28 OUTLET CONN. SIZE	OUTLET CONN. SIZE			Saddles: Steel	(Type HSU-CSU only)
29 Drilling: 150#	Drilling: 150#	P.T.	Structural Codes		
30 Tank Manhole Flange Size : O.D.	Tubes— $\frac{3}{4}$ " IPS Seamless Steel			Inspection by:	
31 Bolt Circle No. Dia.	Fins—Steel. Nom. Length:			OVERALL LENGTH	
32 Tube Sheet—Steel with Cone Seat Tube Joints and Lock Nuts				OUTSIDE SHELL DIAMETER	
33 Support Plate on Open Shell Unit Steel 1" Thick				Reference Print	
34 GUARANTEE: This unit will give full capacity with tank liquid level 2 Ft. or more above unit.					

SUGGESTIONS:

1. Steam trace all oil lines.
2. Use steam trap large enough to handle indicated steam condensate.
3. Vent steam side of unit.
4. Provide drains for steam side to take care of shut down during cold weather.
5. This is an instantaneous heater; steam required only when pumping oil.



SOUTHWESTERN ENGINEERING COMPANY

4800 SANTA FE AVENUE

LOS ANGELES 58, CALIFORNIA

SHEET ____ OF ____

FIRED HEATER SPECIFICATION SHEET

REV

1	CUSTOMER	EQUIP. NO.			
2	PLANT LOCATION	FILE NO.			
3	SERVICE				
4	MANUFACTURER	TYPE			
5		SIZE			
THERMAL DESIGN					
7	FLUID CIRCULATED				
8	TOTAL FLUID ENTERING	#/HR			
9		INLET			
10	TOTAL VAPOR	#/HR			
11	TOTAL LIQUID				
12	GRAVITY LIQUID	°API			
13	DENSITY VAPOR	#/CU. FT.			
14	VISCOSITY LIQUID	CP			
15	VISCOSITY VAPOR	CP			
16	SPECIFIC HEAT	BTU/#			
17	LATENT HEAT	BTU/#			
18	TEMPERATURE	°F			
19	OPERATING PRESSURE	PSIG			
20	MOLECULAR WEIGHT OF VAPOR				
21					
22					
23	ALLOWABLE PRESSURE DROP	PSI	CALCULATED PRESSURE DROP	PSI	
24	TYPE OF FLOW		SERIES	PARALLEL	
25	EFFECTIVE SURFACE	SQ. FT.	RADIANT	CONVECTION	
26	HEAT ABSORPTION	BTU/HR.	RADIANT	CONVECTION	
27	HEAT ABSORPTION	BTU/HR.	TOTAL		
28	LIQUID TEMPERATURE	°F			
29					
30	RADIANT TRANS. RATE	BTU/SQ. FT./HR.	AVERAGE	MAXIMUM	
31	CONVECTION TRANS. RATE	BTU/SQ. FT./HR.	AVERAGE	MAXIMUM	
32	EFFICIENCY	% - LHV/HHV			
33	FLUE GAS TEMP. (APPROX.)	°F			
34	TYPE OF FUEL				
35	LHV OF FUEL	BTU/			
36					
37	PRESSURE AVAILABLE AT BURNER - PSIG	FOR GAS	NORMAL	MAXIMUM	
38		FOR FUEL OIL	NORMAL	MAXIMUM	
39		FOR STEAM	NORMAL	MAXIMUM	
40					
41	MECHANICAL DESIGN				
43	NO. OF TUBES	RADIANT	CONVECTION		
44	EFFECTIVE TUBE LENGTH	RADIANT	CONVECTION		
45	RADIANT TUBES	INCHES O.D.	TUBEWALL	INCHES MATERIAL	
46	CONVECTION TUBES	INCHES O.D.	TUBEWALL	INCHES MATERIAL	
47	RETURN BENDS	TYPE	MATERIAL		
48	NOZZLES	INLET	OUTLET		
49	DESIGN	RADIANT	PRESSURE	PSIG	TEMPERATURE °F
50		CONVECTION	PRESSURE	PSIG	TEMPERATURE °F
51	CODE	CUSTOMERS SPECIFICATION			
52	BURNERS - NO	TYPE	MFG.	PILOTS REQ'D.	
53	HEATER TYPE		HEATER WEIGHT		
54	TYPE SHELL CONSTRUCTION		TYPE ASSEMBLY		
55	REMARKS:				
57					

BOILER DATA SHEET

BOILER SHALL BE FURNISHED IN ACCORDANCE WITH THE M. W. KELLOGG COMPANY SPEC.

1. OPERATING CONDITIONS					11. EXPECTED PERFORMANCE				
RATED CAPACITY: _____ PPH CONTINUOUS PER UNIT					STEAM ACTUAL M. LB/HR				
STEAM PRESSURE: _____ PSIG AT S.H. OUTLET					BLOWDOWN %				
STEAM TEMP.: _____ F AT S.H. OUTLET ON _____ FIRED OPERATION					FUEL				
FEED WATER TEMP. _____ F. BLOWDOWN _____ %					LOAD DURATION				
FUEL					FURNACE LIBERATION				
					M.B.T.U./CU. FT./HR.				
					FURNACE HEAT RATE				
					M.B.T.U./SQ. FT./HR.				
					EXCESS AIR LEAVING BLR. %				
					QUANT. M. LB/HR				
					FUEL (GAS CFM)				
					FLUE GAS ENT. A.H.				
					FLUE GAS LEAVING A.H.				
					AIR LEAVING A.H.				
					STEAM AT S.H. OUTLET - PSIG				
					SUPER HEATED STEAM				
					FLUE GAS LEAVING BLR				
					FLUE GAS LEAVING				
					WATER ENT. ECON.				
					WATER ENT. BLR.				
					AIR ENT. A.H.				
					AIR LEAVING A.H.				
					FURNACE				
					BOILER AND S.H.				
					ECONOMIZER				
					AIR HEATER				
					FLUES				
					NET DRAFT LOSS				
					ACROSS INST. CONNECT				
					BURNERS WINDBOX				
					DUCTS				
					AIR HEATER				
					NET RESISTANCE				
					AIR RESISTANCE IN. OF WATER				
					EFFICIENCY %				
					F.D. FAN		LB/HR	IN. H ₂ O	F
					NET RATING				
					TEST RATING				
					NET RATING				
					TEST RATING				
TYPE OF INSTALLATION: _____									
CASING: _____									
AMBIENT TEMP: _____ F									
ALTITUDE: _____ FT. ABOVE SEA LEVEL									
DESIGN WIND LOADING: _____ LB/SQ. FT.									
EARTH QUAKE LOADING: _____ ZONE.									
INSTRUMENT AIR: _____ PSIG									
START UP									
REVISIONS	6						MANAGING OFFICE		ENGINEERING OFFICE
	5								
	4								
	3								
	2								
	1								
	0								
	NO.	DATE	ENGINEER	CHK/REVIEW	APPROVE				
EQUIPMENT DATA SHEET									
CLIENT _____									
LOCATION _____ JOB NO. _____									
ITEM _____									
ITEM NO. _____ SPEC. NO. _____									
REQN. NO. _____									
PAGE _____ OF _____									

PACKAGE BOILER DATA SHEET

REVISIONS	6				 KELLOGG W	MANAGING OFFICE	ENGINEERING OFFICE	
	5							
	4					EQUIPMENT DATA SHEET		
	3					CLIENT		
	2					LOCATION	JOB NO.	
	1					ITEM		
	0					ITEM NO.	SPEC. NO.	
NO	DATE	ENGINEER	CHK/REVIEW	APPROVE	REQ'N. NO.	PAGE	OF	

Job No. _____

B/M No. _____

COOLING TOWER SPECIFICATIONS

SPEC. DWG. NO.		
A.		
Page	of	Pages
Unit Price		
No. Units		
Item No.		

PERFORMANCE

Water Circulating Rese: _____ Spm. Temp. Fn: _____ °F Temp. Out: _____ °F

Cooling Duly _____ Stu/Hrs Perform, Test Cose _____

*As Option of Owner _____

SELECTION

Manufacturer: _____ Models _____

Type: _____ No. of Calls: _____

DESIGN

Wet Bulb Temp: _____ *Fx Static Pumping Ht. _____ Ft. Elf. Cool. Vol. _____ Cu. Ft.

Fill Wetted Surf. _____ Sq.Fts. Total Wetted Surf. _____ Sq. Fts. EN. Splash Surf. _____ Cu. Ft.

No. of Fens Req'd. _____ Clm/Fen _____ ; SteNc Press _____ In. H2O;Normal BHP/Fen _____

Evaporation Less. Max. % _____ Saray Less. Max. % _____

MATERIALS OF CONSTRUCTION

Frame work _____ Casing _____ Fill _____

Fan Cylinder _____ Steirway _____

Salts Nutes, Mise, Hardware _____ Nails _____

Water Inlet Hdrs. _____ Mexxles _____ Basin _____

Fan Blade _____ Fen Hub _____ Fan Sheft. _____

Code for Lumber Grades _____ Code for Lumbar Strech Design _____

**Exceptions B1 and Lending, See Inquiry or P.O. _____

AUXILIARY EQUIPMENT

Fan	Manufacturer _____	Type _____	
	Diameter _____	Fts. Speed _____	RPM: Tip Speed _____ Spm. _____
Geer	Manufacturer _____	Type _____	Size _____
	ReducNon Restle _____	Reted Cop. _____	BHP: Mechanical EN. _____ %
Driver	Manufactuerer _____	Type _____	Speed _____ RPM _____
	Electric Power _____	BHP _____	Service Factor _____ Frame _____

REMARKS

By	Chk.d.	App.	Rev.	Rev.	Rev.
Date					

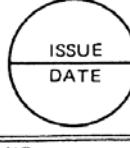
P.O.Tet _____

PROCESS DESIGN SECTION CORPORATE ENGINEERING				WIPIED FILM EVAPORATOR DATA SHEET			SHEET 1 OF 4		
REMARKS	SCOPE: _____ _____ _____ _____ _____								
	INITIATOR	DRAWN BY	CHECKED BY	DES SUPRV.	REV	BY	CHKD	SUPRV	DATE
PERFORMANCE REQUIREMENTS									
IDENTIFICATION <u>QUANTITY:</u> LBS/HR. NORMAL OPERATING DESIGN <u>COMPOSITION:</u> _____ _____ _____ _____ _____ _____ <u>PHYSICAL PROPERTIES</u> MOLECULAR WEIGHT SPECIFIC GRAVITY _____ VISCOSITY; CP _____ _____ _____ _____ _____ SPECIFIC HEAT: BTU/#°F LATENT HEAT: BTU/# THERMAL CONDUCTIVITY - BTU/#°F FT. VAPOR PRESS: MMHG _____ _____ _____ MELTING POINT - °C				FEED	DISTILLATE	CONCENTRATE			
JOB NO. PROJECT NO. TITLE _____ POSITION NO.				PLANT LOCATION REF. DWG. NO. _____ SERIES			DRAWING NO. <div style="border: 1px solid black; border-radius: 50%; padding: 5px; text-align: center;">ISSUE DATE</div>		
							SCALE BLDG. NO. 		

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGWIPIED FILM EVAPORATOR
DATA SHEET

SHEET 2 OF 4

OPERATING CONDITIONS

REMARKS  REV. <input type="checkbox"/> BY <input type="checkbox"/> CHKD <input type="checkbox"/> SUPRV. DATE APP'R'D	FLUID DESCRIPTION TEMPERATURE FEED _____ °C DISTILLATE _____ °C CONCENT. _____ °C VAPORIZATION TEMP. DESIGN TEMP. _____ °C MAX. ALLOW. TEMP. _____ °C OPERATING PRESS. DESIGN PRESS. _____ PSIG NORMAL FLOW RATE _____ MAX. FLOW RATE _____ PRESSURE DROP _____ MAX. ALLOW. PRESS DROP _____ MAX. AIR LEAKAGE RATE _____ HEAT DUTIES: PRE-HEAT _____ VAPORIZATION _____ CONDENSING _____ SURFACE REQUIRED VAPORIZATION _____ CONDENSATION _____	PROCESS	JACKET	CONDENSER
		_____	INLET _____ °C	_____ °C
		_____	OUTLET _____ °C	_____ °C
		_____	_____ °C	_____ °C
		_____	_____ °C	_____ °C
		_____	PSIG	PSIG
		_____	PSIG	PSIG
		_____	_____	_____
		_____	_____	_____
		_____	_____	_____
MATERIALS				
INITIATOR DRAWN BY <input type="checkbox"/> CHECKED BY <input type="checkbox"/> DES SUPRV. 	MAIN VESSEL _____	MECH. SEAL _____		
	JACKET _____	ROTATING FACE _____		
	SHAFT _____	STATIONARY FACE _____		
	WIPER BLADES _____	SEAL RING _____		
	BEARINGS _____	"O" RINGS _____		
	INTERNAL COND. TUBES _____	MAIN GASKETS _____		
MOTOR DRIVE DATA				
E230B46 SHEET 2	ITEM NO. _____ MTD BY. _____	VOLTS/PHASE/HZ: _____ / /		
	HP _____ RPM _____ FRAME _____	BEARINGS _____ LUBE _____		
	MFR. _____	FULL LOAD AMPS: _____ S.F. _____		
	TYPE _____ INSUL. _____	L.R. AMPS _____		
	ENCLOSURE: CLASS 1 GROUP D-DIV.			
	JOB NO. _____ PLANT LOCATION _____ PROJECT NO. _____ REF. DWG. NO. _____ TITLE _____			ISSUE DATE 
POSITION NO. _____ SERIES _____ STEP NO. _____			DRAWING NO. _____ 	

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGWIPIED FILM EVAPORATOR
DATA SHEET

SHEET 3 OF 4

VENDOR DATA (RETURNED BY VENDOR)

REMARKS

UNIT SIZE & TYPE:

NOZZLES	SIZE	RATING	FACING	POSITION
FEED				
VAPOR(VAC)				
RESIDUE				
DISTILLATE				
JACKET-IN				
JACKET-OUT				

HEATING SURFACE _____ SQ. FT.
 CONDENSING SURFACE: _____ SQ. FT.
 PACKING: TYPE _____
 SIZE _____ NO. RINGS _____
 PRESS. ON PACKING BOX. _____ PSIG
 MECH. SEAL: TYPE _____
 MFR. _____
 SEAL FLUID _____

MOTOR: SIZE & TYPE _____ MFG: _____
 RPM _____ PERIPHERAL SPEED _____ FT./SEC.

DRIVE TYPE _____

VENDOR TO SUPPLY DIMENSIONAL PRINTS OF ALL UNITS.

WEIGHT OF UNIT: EMPTY _____ FULL OF WATER _____

UTILITIES AVAILABLE

STEAM _____ #/HR @ _____ PSIG @ _____ °F
 COOLING WATER _____ GPM @ _____ PSIG @ _____ °F
 HOT OIL _____ GPM @ _____ PSIG @ _____ °F
 ELECTRICITY _____ VOLTS _____ PHASE _____ CYCLES

MISCELLANEOUS REQUIREMENTS

QUOTATIONS:

VENDOR QUOTATION SHOULD INCLUDE THE FOLLOWING:

1. EQUIPMENT DESCRIPTION WITH DEFINITIVE SPECIFICATIONS INCLUDING SIZE, OPERATING AND DESIGN PRESSURES, AND MATERIALS OF CONSTRUCTION ON ALL PARTS.
2. VENDOR SHALL STATE THE REQUIRED FLOWS, PRESSURE DROPS AND DESIGN DUTIES FOR EACH JACKET, STILL CONDENSER, AND FREEZEOUT TRAP.
3. SUMMARY OF UTILITY REQUIREMENTS.
4. RECOMMENDED INSTRUMENTATION.
5. RECOMMENDED LAYOUTS AND REQUIRED STRUCTURES.
6. RECOMMENDED SPARE PARTS LIST AND COST OF EACH ITEM

TESTS

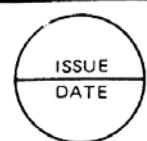
ALL EQUIPMENT AND MANIFOLDS DESCRIBED IN THIS SPECIFICATION SHALL BE ASSEMBLED AND TESTED UNDER DESIGN VACUUMS AT THE VENDORS SHOPS TO ASSURE PROPER FIT, VACUUM TIGHTNESS AND THE GENERAL OPERABILITY OF THE DESIGN. ROCHE INSPECTION AND APPROVAL OF THE RUN-IN TESTS IS REQUIRED PRIOR TO SHIPMENT.

GUARANTEES:

THE VENDOR SHALL GUARANTEE THE MECHANICAL OPERATION OF THE EQUIPMENT AND SYSTEM PROVIDED FOR A MINIMUM OF ONE YEAR AFTER START-UP. HLR EXPECTS PROCESS GUARANTEES ON THE SPECIFIED DISTILLATION RATES, CONDENSER PERFORMANCE, AND MAXIMUM PRESSURE DROPS. ENTRAINMENT, AIR LEAKAGE RATES AND UTILITY CONSUMPTIONS SHALL BE SPECIFIED. ALL PRODUCT AND PROCESS SPECIFICATIONS WHICH THE VENDOR CANNOT GUARANTEE SHALL BE ENUMERATED.

JOB NO.	PLANT LOCATION	SCALE
PROJECT NO.	REF. DWG. NO.	
TITLE		

POSITION NO.	SERIES	STEP NO.
--------------	--------	----------



BLDG. NO.

DRAWING NO.

PROCESS DESIGN SECTION
CORPORATE ENGINEERING

WIPED FILM EVAPORATOR DATA SHEET

SHEET 4 OF 4

GENERAL NOTES

1 - VESSEL FABRICATION TO BE IN ACCORDANCE WITH THE FOLLOWING:

ASME CODE, SECTION VIII. STAMP REQ'D. NOT REQ'D.
 SPEC. UNFIRED PRESSURE VESSELS.

2 - SPECIFICATIONS TO BE COMPLETED BY VENDOR AND RETURNED WITH PROPOSAL.

PROCESS DESIGN SECTION
CORPORATE ENGINEERING

WIPIED FILM EVAPORATOR
DATA SHEET

SHEET 4 OF 4

GENERAL NOTES

1 - VESSEL FABRICATION TO BE IN ACCORDANCE WITH THE FOLLOWING:

ASME CODE, SECTION VIII. STAMP REQ'D. NOT REQ'D.
 SPEC. UNFIRED PRESSURE VESSELS.

2 - SPECIFICATIONS TO BE COMPLETED BY VENDOR AND RETURNED WITH PROPOSAL.

E230B46
SHEET 4

STONE & WEBSTER ENGINEERING CORPORATION

INSTRUMENT SPECIFICATION

Item
Page
Preliminary
Final

1 Client	J. O. No.		
2 Apparatus	Project No.		
3 Service	Date By		
4 Based on	Process Page Dated		
INSTRUMENT CASE			
BULBS OR THERMOCOUPLES			
5 Location	Location		
6 Type	Bulb Type		
7 Case Finish	Thermocouple Matl		
8 Connections	Socket Material		
9 Mounting	Socket Length		
10 Chart or Dial	Ext Neck Length		
11 Range	Standard Pipe Thread		
12 Control Point	Bulb Distance From Instr	Above Below	
13 Chart Volume	Tubing or Lead	Above Below	
14 Clock	RESPONSES		
15 Current	Throttling Band		
16 Accessories	Reset	Automatic Manual	
17	Rate Response	Yes -- No	
18	Pneumatic Set		
INSTRUMENT			
CONTROLLED VALVE — Item No.			
21 Location	Service		
22 Type			
23 Float Body	Valve	Size in. Drilling	
24 Float Flange Conn.	Plug Type Valve	Balanced Parabolic V-Port or Equal	
25 Float	Type	Spring Diaphragm Weight Loaded	
26 Stuffing Box	Body	Matl Trim	
27 Orifice Flanges	Stem	Sliding — Rotary	
28 Orifice Plate	Stuffing Box	With Grease Seal	
29 Instr Body Diff Range	Operating Medium	Gas Comp Air @ lb ga Corrosive Yes	
30 Instr Body Located	Valve Action	Open Close with Fall of	
31 Instr Body Distance		Open Close with Failure of	
32 Mercury Included	Valve Positioner	Yes - No with Bypass	
33 Sealing Medium	Radiating Fins	Yes - No	
CONDITIONS AND REQUIREMENTS			
36 In	Control Valve	In	Control Valve
37 Fluid		Nor Quantity @	*F P
38 Sp Gr @ 60° F Water = 1		Max Quantity @	*F P
39 Sp Gr @ Nor T & P Water = 1		Min Quantity @	*F P
40 Viscosity	cp @ *F	Nor Pressure (Up Stream)	lb ga
41 Corrosion Present	Yes — No	Max Pressure (Up Stream)	lb ga
42 Line Size	in.	Down Stream Pressure	lb ga
43 Normal Temperature	*F	Pressure Drop	lb
44 Max Temperature	*F	Amount of Superheat	*F
Supply Metal Tag, securely wired, marked with Item Number			
REMARKS			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57	For Typical Installation Details See		
58 General Specifications for Instrument, Page	; for Valve, Page		
59 Copy to	Date	Checked	Date Approved Date
60 Revised:			

DIFFERENTIAL PRESSURE TYPE FLOW INSTRUMENT

		SERVICE DATA	PRESENT	NEW
By	App'd.	ITEM NO. _____		
		LOCATION _____		
		SERVICE _____		
Date _____		LINE SIZE _____		
		ORIFICE SIZE (Bevel) _____		
		MANOMETER (Range & Mfg.) _____		
		MANOMETER TYPE (Mercury, Aneroid) _____		
		CONNECTIONS (Flange & Series) _____		
		FLOWING FLUID _____		
		SP. GR. AT 60F _____		
		FLOWING TEMP. _____		
		FLOWING PRESSURE _____		
		SEAL MATERIAL _____		
		SEAL TEMP. _____		
		SEAL GRAVITY AT 60F _____		
MAX. FLOW _____				
CHART NO. _____				
INSTRUMENT				
PRIMARY METER			REMARKS	
TYPE - Recording, Indicating, Blind, Transmitting				
MFR. MODEL _____				
MANOMETER - 1500 psi - Carbon Steel				
RECEIVER				
TYPE - Conventional, Miniature, None				
MFR. MODEL _____				
MOUNTING - Control Board, Local				
CHART TYPE - Circular 24 Hour, Strip				
CHART DRIVE - Spring, Pneumatic				
CONTROLLER				
TYPE - Conventional, Force Balance, Pneumatic				
MFR. MODEL _____				
MOUNTING - Control Board, Field				
MANUAL CONTROL BYPASS - Yes, No				
PNEUMATIC SET - Adjustable, Fixed, None				
CONTROL FEATURES - Prop. Band, Reset, Rate				
INCREASE IN FLOW, OUTPUT TO - Increase, Decrease				
REQUISITION OR REQUEST - _____				
REF. SPEC. SHEET - _____				
REF. DRAWING - _____				
INST. TAG DATA				
By _____ App'd. _____ Date _____		HUMBLE OIL & REFINING CO. BAYTOWN ENGINEERING DIVISION INSTRUMENT SPECIFICATION		App'r'n. _____ Sub _____ Zone _____ NO. _____

N. Y. PURCHASING DEPT. **MATERIAL REQUISITION**
FOSTER WHEELER CORPORATION
 165 BROADWAY
 NEW YORK, U. S. A.

**TEMP.-PRESS.
INSTRUMENTS**

CUSTOMER'S NAME _____
 CONTRACT No. _____
 ITEM _____
 SERVICE _____

REQUISITION NO.

DATE _____
 PAGE NO. _____
 CHANGE NO. _____

INSTRUMENT

No. Req'd. Type _____
 Location Case _____
 Mounting _____
 Range Scale _____
 Chart _____
 Thermal System _____
 Press. Element _____
 Control Point No. Pens _____
 Control _____
 Clock _____
 Current Volts Cycle Phase _____
 Connections _____
 Accessories: type air reducing valve,
 air filter charts, ink set and air gauges
 Special _____

— TEMPERATURE BULBS —

Location _____
 Type _____
 No. Req'd. Bulb Mat'l _____
 Bulb. Elev. _____ Instrument _____
 Type Socket Mat'l _____
 Length Below Threads _____
 Ext. Above Threads _____
 S. P. T. Size _____
 Tubing Mat'l _____
 Tubing Length _____
 Special _____

CONTROLLED VALVE

Type _____
 Location _____
 No. Req'd. Size Diaphragm Control Valve _____
 Body Material Ends _____
 Faced and Drilled _____
 Trim _____
 Valve Plug _____
 Stuffing Box Sealed, Isolating Valve _____

Operating Medium _____ @ _____ Lbs. Ga.
 Valve to With Increase in _____
 Valve to With Failure of Air _____
 Air-Cooled Bonnet Required _____
 Valve Positioner Required _____
 Extra Reducing Valve and Filter Required _____
 Special _____

SERVICE CONDITIONS AND REQUIREMENTS

Fluid		VALVE		VALVE
Sp.Gr. @ 60° F. Air = 1 Water = 1			Nor. Quan. @ _____ ° F.	
Sp.Gr. @ Nor. Con. (T&P)			Max. Quan. @ _____ ° F.	
Viscosity @ _____ ° F.			Nor. Press. (Upstream) Lb. Ga.	
Line Size _____			Max. Press. (Upstream) Lb. Ga.	
Normal Temp., ° F. _____			Downstream Press. _____	
Max. Temp., ° F. _____			Pressure Drop _____	

REMARKS: _____



**LEVEL
INSTRUMENTS
SPECIFICATION
SHEET**

LOCATION _____	FILE NO. _____
ITEM NO. _____	JOB NO. _____
W.O. NO. _____	PREPARED BY _____
DATE _____	CHECKED BY _____
DATE _____	APPROVED BY _____
DATE _____	

△ INDICATES REVISION

GENERAL							
1	TYPE						
2							
3	TAG NO.						
4	VESSEL OR EQUIPMENT NO.						
	BODY						
5	MATERIAL						
6	TOP CONN LOCATION						
7	BTM CONN LOCATION						
8	CONN-SIZE						
9	CONN SCREWED OR FLANGED						
10	CASE MOUNTING						
11	FLANGE ORIENTATION						
12	ROTATABLE HEAD						
13							
	FLOAT OR DISPLACER						
14	DIAMETER OR LENGTH						
15	EXTENSION						
16	MATERIAL						
17	TORQUE TUBE MATERIAL						
18	AIR FIN						
19							
	TRANSMITTER						
20	TYPE						
21	OUTPUT						
22	RECEIVERS ON SHEET NO.						
	CONTROL						
23	TYPE						
24	PROPORTIONAL - %	RESET					
25	OUTPUT						
26	ON LEVEL INCREASE; OUTPUT						
27							
	ACCESSORIES						
28	FILTER AND REGULATOR						
29	GAGE GLASS CONNECTIONS						
30	GAGE GLASS						
31	PURGE CONNECTION						
32	ELECTRIC SWITCH						
33							
34							
	SERVICE CONDITIONS						
35	UPPER LIQUID						
36	LOWER LIQUID						
37	SP GR. UPPER	LOWER					
38	PRESS. MAX.	NORM					
39	TEMP. MAX.	NORM					
40							
41							
REMARKS:							
<hr/> <hr/> <hr/> <hr/>							



**GAUGE GLASSES
AND COCKS
SPECIFICATION
SHEET**

LOCATION _____ FILE NO. _____
ITEM NO. _____ JOB NO. _____ W.O. NO. _____
PREPARED BY _____ DATE _____
CHECKED BY _____ DATE _____
APPROVED BY _____ DATE _____

 INDICATES REVISION

GAUGE GLASSES		GAUGE COCKS	
1 SUPPLY	<input type="checkbox"/> GAUGES ONLY <input type="checkbox"/> GAUGES & COCKS	15 SUPPLY	<input type="checkbox"/> COCKS ONLY
NO NIPPLES REQUIRED		16 TYPE	<input type="checkbox"/> OFFSET <input type="checkbox"/> ANGLE
2 TYPE	<input type="checkbox"/> TRANSPARENT <input type="checkbox"/> TUBULAR <input type="checkbox"/> REFLEX	17 CONNECTIONS-NPT	VESSEL GAUGE DRAIN
3 CONNECTIONS	<input type="checkbox"/> 1/2" <input type="checkbox"/> 3/4" <input type="checkbox"/> "	MALE FEMALE FEMALE	
	<input type="checkbox"/> TOP & BOTTOM <input type="checkbox"/> SIDE <input type="checkbox"/> BACK	<input type="checkbox"/> 1/2" <input type="checkbox"/> 1/2" <input type="checkbox"/> 1/2"	
4 MATERIAL	<input type="checkbox"/> WELDING PAD OTHER _____	<input type="checkbox"/> 3/4" <input type="checkbox"/> 3/4" <input type="checkbox"/> 3/4"	
5 MINIMUM RATING	PSIG @ _____ °F	<input type="checkbox"/> OTHER <input type="checkbox"/>	<input type="checkbox"/>
		BODY TRIM	
18 MAT'L			
		19 MINIMUM RATING	PSIG @ _____ °F
ACCESSORIES			
6 ILLUMINATORS:			
7 SHIELDS:			
8 HEATING-COOLING } INTERNAL			
9 CHAMBERS } EXTERNAL			
10 NON-FROSTING TYPE:			
11 CALIBRATED SCALE			
12 SUPPORT PLATES:			
13 GUARD RODS:			
14 OTHER			
NOTES:			
20 CONST. <input type="checkbox"/> PLAIN CLOSING <input type="checkbox"/> QUICK CLOSING			
<input type="checkbox"/> HANDWHEEL <input type="checkbox"/> LEVER HANDLE			
21 VESSEL <input type="checkbox"/> PLAIN UNION <input type="checkbox"/> SOLID SHANK			
CONN. <input type="checkbox"/> SPHERICAL UNION <input type="checkbox"/> OTHER			
22 GAUGE <input type="checkbox"/> PLAIN UNION <input type="checkbox"/> PLAIN			
CONN. <input type="checkbox"/> SPHERICAL UNION <input type="checkbox"/> OTHER			
23 BONNET <input type="checkbox"/> SCREWED <input type="checkbox"/> UNION <input type="checkbox"/> BOLTED			
24 SCREW <input type="checkbox"/> INSIDE <input type="checkbox"/> OUTSIDE			
25 RENEWABLE SEAT <input type="checkbox"/> YES <input type="checkbox"/> NO			
26 BALL CHECKS <input type="checkbox"/> YES <input type="checkbox"/> NO			
27 PACKING <input type="checkbox"/> MFR STD <input type="checkbox"/> OTHER			
28 MFR MODEL NO. _____			
NOTES:			

CONTROL VALVE SPECIFICATION SHEET

SPECIFICATION No. _____

B/M NUMBER											
ITEM NUMBER											
TAG NUMBER											
INSTRUMENT OR CONTROL SERVICE											
PROCESS CONDITIONS	FLUID THROUGH VALVE										
	CORROSIVE DUE TO										
	INLET OP. TEMP., °F		NORMAL								
			MAXIMUM								
	INLET OP. PRESS., PSIG,		NORMAL								
			MAXIMUM								
	PRESSURE DROP, PSI,		NORMAL								
			MAXIMUM								
	NORM. FLOW AT NORM. OP. TEMP., VAPOR										
			LIQUID								
			TOTAL								
	MAX. FLOW AT NORM. OP. TEMP., VAPOR										
			LIQUID								
			TOTAL								
	M.W. OF VAPOR										
SP. GR. OF LIQ. REL. TO WATER AT 60°F											
		AT NORM. OP. TEMP.									
VIS. OF LIQUID,		CPS @ °F									
		CPS @ °F									
CONSTRUCTION	CATALOG OR TYPE NO.										
	NOMINAL SIZE, INCHES										
	REDUCED AREA PORTS										
	BODY CONNECTIONS & RATING										
	FLANGE FACING										
	LUBRICATOR REQUIRED										
	MATERIALS: BODY										
	PLUG										
	SEAT										
	TYPE OF PLUG										
	TYPE OF STUFFING BOX										
	ACCESSORIES: VALVE POSITIONER										
	PILOT RANGE										
	FINS REQUIRED										
	ACTUATING FLUID										
VALVE TO: OPEN WITH INCREASE OF											
CLOSE WITH INCREASE OF											
ON ACTUATING FLUID FAILURE, VALVE TO:											
REMARKS:											
REVISION	1	2	3	4	5	6	7	8	9	10	11
BY											
DATE											
MADE BY:			CHECKED BY:			W.N. NO.			PAGE		
DATE:			DATE:			CONT. NO.			OF		



**VALVE
OPERATOR
SPECIFICATION
SHEET**

LOCATION _____	FILE NO. _____
ITEM NO. _____	JOB NO. _____
PREPARED BY _____	W. O. NO. _____
CHECKED BY _____	DATE _____
APPROVED BY _____	DATE _____
△ INDICATES REVISION _____	

GENERAL INFORMATION

1 NUMBER OF UNITS REQUIRED _____	OPERATOR	VALVE
2 <input type="checkbox"/> ELECTRIC <input type="checkbox"/> PNEUMATIC <input type="checkbox"/> HYDRAULIC		6 MANUFACTURE: _____
<input type="checkbox"/> PNEUMATIC <input type="checkbox"/> HYDRAULIC		7 FIGURE NO. _____ SIZE _____ LOT _____
3 MODEL NO. _____		8 DESIGN PRESSURE _____ PSI
4 TIME: FULL OPEN MIN. _____ MAX. _____		9 MAX DIFFERENTIAL _____ PSI
FULL CLOSE MIN. _____ MAX. _____		10 VALVE STEM POSITION: <input type="checkbox"/> HORIZONTAL <input type="checkbox"/> VERTICAL
5 MINIMUM TORQUE OUTPUT W/FULL POWER GAS PRESSURE _____		11 GEAR RATIO _____
		12 TORQUE REQUIREMENT _____

OPERATOR

ELECTRIC		PNEUMATIC OR HYDRAULIC
13 POWER SUPPLY: VOLTAGE _____ PHASE _____ FREQ. _____		17 POWER GAS: <input type="checkbox"/> AIR <input type="checkbox"/> GAS
14 MOTOR ENCLOSURE: <input type="checkbox"/> CLASS I GP.D <input type="checkbox"/> GENERAL PURPOSE		18 PRESSURE _____ PSI
<input type="checkbox"/> OTHER _____		19 DRIVER MOTOR: <input type="checkbox"/> TURBINE <input type="checkbox"/> VANE <input type="checkbox"/> PISTON
<input type="checkbox"/> BREATHER AND DRAIN		<input type="checkbox"/> VANE MOTOR W/GEARING
15 DUTY RATING: <input type="checkbox"/> 5 MIN. <input type="checkbox"/> 15 MIN. <input type="checkbox"/> CONTINUOUS		
16 BEARINGS TYPE _____		

CONTROL

PILOT VALVE		25 <input type="checkbox"/> EMERGENCY SHUT DOWN SYSTEM
20 ELECTRIC: <input type="checkbox"/> CLASS I GP.D <input type="checkbox"/> GENERAL PURPOSE		26 ESD OPERATION WHEN PILOT: <input type="checkbox"/> PRESSURIZED <input type="checkbox"/> DE-PRESSURIZED
<input type="checkbox"/> OTHER _____		27 SYSTEM PRESSURE _____
21 VALVE ACTUATION: PILOT VALVE		28 VALVE ON SHUTDOWN: <input type="checkbox"/> TO OPEN <input type="checkbox"/> TO CLOSE
<input type="checkbox"/> ACTUATES <input type="checkbox"/> DEACTUATES		29 ESD TO OVER-RIDE: <input type="checkbox"/> REMOTE OPERATION <input type="checkbox"/> LOCAL
22 VOLTAGE _____		30 MANUAL OPERATION
23 PNEUMATIC: PILOT PRESSURE FOR VALVE ACTUATION		31 OVER-RIDE: <input type="checkbox"/> MANUAL <input type="checkbox"/> AUTOMATIC
<input type="checkbox"/> INCREASES <input type="checkbox"/> DECREASES		32 PUSHBUTTON
24 CONTROL SYSTEM: <input type="checkbox"/> ONE VALVE <input type="checkbox"/> TWO VALVES		33 CONTACT: <input type="checkbox"/> MOMENTARY <input type="checkbox"/> MAINTAINED MOUNTED: <input type="checkbox"/> REMOTE <input type="checkbox"/> INTEGRALLY

ELECTRIC CONTACTER

33 MOUNTING: <input type="checkbox"/> INTEGRAL	35 HEATERS: <input type="checkbox"/> OVERLOAD HEATERS
34 ENCLOSURE: <input type="checkbox"/> CLASS 1 GROUP D	<input type="checkbox"/> SPACE HEATERS
<input type="checkbox"/> GENERAL PURPOSE	<input type="checkbox"/> WITH THERMOSTAT
OTHER _____	

ACCESSORIES

36 LIMIT LIGHTS: <input type="checkbox"/> LOCAL <input type="checkbox"/> INTG. MTD.	TYPE OF ELECT. SWITCH
<input type="checkbox"/> REMOTE SLIDE WIRE TRANSMITTER	NORMALLY OPEN IN EA. DIR. OF TRAVEL
<input type="checkbox"/> REMOTE POSITIVE INDICATOR W/PWR. SUP.	NORMALLY CLOSED IN EA. DIR. OF TRAVEL
<input type="checkbox"/> INTEGRALLY MOUNTED REVERSING STARTER	43 ADJ. TORQUE SW: <input type="checkbox"/> OPENED END <input type="checkbox"/> CLOSED END
<input type="checkbox"/> MANUAL HAND VALVE:	44 ENCLOSURE: <input type="checkbox"/> EXPLOSION PROOF <input type="checkbox"/> GENERAL PURPOSE
41 NO. OF RELAYS <input type="checkbox"/> TIME DELAY <input type="checkbox"/> AUXILIARY	45 <input type="checkbox"/> MANUAL HAND PUMP
42 LIMIT SWITCHES: <input type="checkbox"/> ELECTRIC <input type="checkbox"/> PNEUMATIC	46 <input type="checkbox"/> GAS HYDRAULIC TANKS
<input type="checkbox"/> ADJUSTABLE POSITION	47 <input type="checkbox"/> ALL NECESSARY ADAPTERS TO FIT UNIT TO VALVE
<input type="checkbox"/> GEAR DRIVE	48 <input type="checkbox"/> POWER STORAGE TANKS

MISCELLANEOUS

49 <input type="checkbox"/> ALL WIRING BROUGHT TO EXPLOSION PROOF JUNCTION BOX	50 <input type="checkbox"/> ALL TUBING BROUGHT TO BULKHEAD FITTINGS
--------------------------------------------------------------------------------	---------------------------------------------------------------------

**ARTHUR G. MCKEE & COMPANY
RELIEF VALVES**

ARTHUR G. MCKEE & COMPANY
RELIEF VALVES

REVISION DATE							
ITEM No.							
TAG No.							
VALVE SERVICE							
MANUFACTURER & TYPE No.							
NUMBER VALVES REQ'D.							
NORMAL SYSTEM PRESS., PSIG.							
NORMAL SYSTEM TEMP., °F.							
GOVERNING UPSET CONDITION							
ACCUMULATION, PERCENT							
MADE BY _____ DATE _____ APP. BY _____ DATE _____	VALVE SIZING CONDITIONS						
	FLOWING FLUID FLOW QUANTITY, GPM, SCFM, #/HR. FLOW SP. GR. OR MW. FLOW TEMP. °F. FLOW VISCOSITY SET PRESSURE, PSIG. ACCUM. INLET PRESSURE, PSI. ABS. BACK PRESS., PSIG. (STATIC-VALVE CL.) REQ'D. ORIFICE AREA, SQ. IN.						
MADE BY _____ DATE _____ APP. BY _____ DATE _____	CONSTRUCTION						
	NOMINAL SIZE, INS. ORIFICE AREA, SQ. IN./VALVE TOTAL ACTUAL AREA, SQ. IN. BODY CONN. & RATING — INLET — OUTLET						
MADE BY _____ DATE _____ APP. BY _____ DATE _____	ACCESSORIES						
	MAT'L SIZE/RATING BODY & BONNET TRIM SPRING RADIATING BONNET STYLE TOP LIFTING GEAR — REG./PACKED TEST ROD						
REMARKS:							
WN No.		PAGE		OF		CONT. No.	
						B/M No.	

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CENTRIFUGAL PUMP DATA SHEET

FOR						JOB NO.		
PLANT						PUMP NO.		
LOCATION						NO. UNITS		
SERVICE						MOTOR DRIVE		
VENDOR - SIZE & MODEL						TURBINE DRIVE		
TYPE						SERIAL NO.		
OPERATING CONDITIONS								
FLUID	NORMAL GPM @ PT			NPSH AVAIL	FT. FLUID			
PUMP TEMP. °F	DESIGN GPM @ PT			NPSH REQ'D.	FT. WATER			
SP. GR. @ PT.	DISCHARGE PRESS. - PSIG			NPSH REQ'D.	FT. FLUID			
VAP. PR @ PT - PSIA	SUCTION PRESS - PSIG							
VISC @ PT - SSU	Δ P	PSI	FT.					
DESIGN								
CASE SPLIT	RADIAL BRG TYPE			SHAFT - MAX. DIAM.	"AT CPLG"			
SUPPORT	THRUST BRG TYPE			WEAR RING CLEARANCE				
IMPELLER TYPE	BRG LUBE			STUFFING BOX ID	"DEPTH"			
CORROSION ALLOW.	VISIBLE LUBRICATOR			BASE PLATE				
CW PIPING FURNISH BY				CPLG GUARD				
COOLING WATER °F @ PSIG	NOZZLES	POSITION	SIZE	RATING				
C.W. JACKETS	REQ'D.	GPM	SUCT		TESTS	REQ'D.		
RAD BRG			DISCH.		SHOP INSPECTION			
THRUST BRG			VENT		HYDROSTATIC			
PACKING			DRAIN		PERFORMANCE			
PEDESTAL			SEAL		NPSH			
MATERIALS								
CASE	PACKING			THROAT BUSHING				
IMPELLER	N# & SIZE RING			CASING GASKET				
CASE WRG RING	MECH. SEAL			GLAND				
IMP WRG RING	ROTATING FACE			BASE PLATE				
SHAFT	STATIONARY FACE			COUPLING				
SHAFT SLEEVE	SEAL RING							
LANTERN RING	AUX. GLAND							
PERFORMANCE								
NO. STAGES	ROTATION FACING PUMP CPLG			WEIGHTS :				
MAX. IMPELLER - INCHES	SHUTOFF HD W/DESIGN IMP PSI			PUMP & CPLG.	#			
BID IMPELLER - INCHES	MAX. W.P. PSIG @ °F			BASE	#			
MIN. IMPELLER - INCHES	HYDRO TEST PRESSURE PSIG			TOTAL	#			
EYE AREA - SQ. INCHES	FURNISHED BY	VENDOR	R.M.PARSONS	SPACE REQUIREMENTS : WITH DRIVER				
SPEED RPM	PUMP			OVERALL LENGTH	INCHES			
DESIGN EFF %	BASE			OVERALL WIDTH	INCHES			
DESIGN BHP	COUPLING			OUTLINE DRG #				
MAX. BHP, BID IMP.	CPLG GUARD			CROSS-SECTION #				
MAX. BHP, MAX IMP.	MOTOR			PERFORMANCE CURVE #				
	TURBINE			GFP #				
DRIVER								
MOTOR	HP	RPM	TURBINE	HP	RPM			
VOLTS	PHASE	CYCLE	STEAM	PSIG	°F. SUPER HT.			
ENCL.			EXHAUST	PSIG	WRH/HP-HR			
FRAME N#	WT.	#	TOTAL STEAM #/HR.	WT.	#			
SPEC. N#			SPEC. N#					
THE RALPH M. PARSONS COMPANY LOS ANGELES								
			No.	DATE	REVISIONS	BY	CH'K	APP'D.

CENTRIFUGAL PUMP					
SERVICE		DRIVE	QTY	SERIAL	ITEM
		OPER			
		SPARE			
GENERAL SPEC		MFR			
PUMP CLASS		SIZE AND TYPE			
PROCESS-DATA					
LIQUID		GPM HOT		SUBMERGENCE AVAIL FT	
PUMP-TEMP F		DISCH PRESS PSIG		SUBMERGENCE REQD FT	
SP GR @ PT		SUCTION PRESS PSIG		TOTAL SUCTION LIFT FT	
VAP PR @ PT PSIA		DIFF HEAD PSI		NPSH AVAIL FT	
VIS @ PT SSU		DIFF HEAD FT		NPSH REQD FT WATER	
CORR DUE TO		MAX SUCTION-PRESS PSIG		NPSH REQD FT OIL	
SOLIDS		IF CRITICAL, MIN GPM			
REQUIREMENTS					
AXIS		MIN CASE CORR-ALLOW		CPLG GUARD	
SPLIT		SUPPORT		BASEPLATE	
IMPELLER		BRG LUBE		DRIVERS BY	
COOLING WATER	F@	PSIG	F-LUSH	REQD	FLUID GPM
C-W JACKETS	REQD	GPM	CAGE RING		TESTS
RADIAL BEARING			WEAR RING		SHOP INSPECTION
THRUST BEARING			GLAND		HYDROSTATIC
PACKING BOX			THROAT BUSH		RUNNING
PEDESTAL			SEAL		NPSH
MATERIALS					
CASE	PACKING BOX			DIFFUSERS	
INNER CASE	THROAT-BUSH OR -RING			BAL DRUM	
IMPELLER	PACKING			BAL SLEEVE	
CASE WRG-RING	CAGE RING			BASEPLATE	
IMP WRG-RING	GLAND AND BUSH			CASE STUDS	
SHAFT	MECHANICAL SEAL			GLAND STUDS	
SHAFT SLEEVE	ROTATING FACE			CASE GASKET	
SPACER SLEEVE	STATIONARY FACE			DISCH COLUMN	
CASE BUSH	O-RING			SURFACE HEAD	
DIAPHRAGMS	AUX GLAND			SUCTION BELL	
DESIGN					
NO STAGES	ROTATION FACING CPLG			CPLG	
MAX IMPELLER	SEAL			CPLG SIZE	
BID IMPELLER	PACKING SIZE			RADIAL BRG	
MIN IMPELLER	NO OF PACKING RINGS			THRUST BRG	
EYE-AREA SQ IN	SHUTOFF HD. IMP. PSI			COLUMN BRG	
SPEED RPM	MAX WP	PSIG @ F		DESIGN THRUST, LB	
DESIGN EFF	HYDRO TEST-PRESS PSIG			MAX THRUST, LB	
DESIGN BHP	NOZZLE	ORIENT	SIZE	THRUST DIRECTION	
MAX BHP, BID IMPELLER	SUCTION			WT W/O DRIVER, LB	
MAX BHP, MAX IMPELLER	DISCH			OUTLINE	
MOTOR HP	VENT			CROSS SECTION	
TURBINE BHP	DRAIN			PERFORMANCE	
REMARKS SUPPLIER FILLS IN ALL DATA MARKED X					

THE C.W. NOFSINGER COMPANY
KANSAS CITY, MISSOURI

RECIPROCATING PUMP
SPECIFICATION SHEET

CUSTOMER _____
LOCATION _____
SERVICE _____ NO. REQUIRED _____ REVISED _____
MFR. _____ MODEL NO. _____ SERIAL NO. _____

OPERATING CONDITIONS					PERFORMANCE			
1	LIQUID	GPM AT PT: NORM			41	CURVE NO.		
2	PT. °F	RATED			42	OUTLINE DWG. NO.		
3	SP GR AT PT.	DISCH PRESS, PSIG			43	PUMP SPEED, RPM		
4	VAP PRESS AT PT	SUCT PRESS, PSIG			44	PISTON: STROKES/MIN FPS		
5	VIS AT PT: SSU - CP	DIFF PRESS, PSI			45	EFF AT DESIGN		
6	CORR/EROS PROPERTIES	DIFF HEAD, FT			46	BHP: DES MAX		
7		NPSHA, FT			47	SHUT-OFF HEAD, FT		
CONSTRUCTION								
8	ARRANGEMENT: HORIZ - VERT							
9	DIRECT - SINGLE - DOUBLE ACTING							
10	SIMPLEX - DUPLEX - TRIPLEX	POW. FRAME:	PISTON - PLUNGER					
11	CASE DES PRESS, PSIG		SWP, PSIG					
12	TAPPED CONNECTIONS: VENT - DRAIN - GAUGE							
13	NOZZLES	SIZE	RATING	FACE	LOCATION			
14	SUCTION							
15	DISCHARGE							
16							SHOP TESTS	
17	PUMP SIZE, IN: BORE		STROKE					
18	CYLINDER LINER						58	SHOP INSPECTION
19	VALVES(LIQ)	TYPE	NUMBER	AREA, SQ. IN.			59	PERFORMANCE
20	SUCTION						60	HYDROSTATIC, PSIG/°F
21	DISCHARGE						61	WITNESS
22	BEARINGS: RADIAL		THRUST				62	
23	LUBE: OIL - GREASE		OILER: YES - NO				63	WEIGHTS:
24	CPLG: MFR	MODEL	GUARD: YES - NO			64	PUMP DRIVER	
25	PACKING		BASE: MFR. STD. - OTHER			65	REDUCER SHPG	
LIQUID CYLINDER MATERIALS					DRIVER CYLINDER MATERIALS			
26	CYLINDER	VALVES		CYLINDER		VALVES		
27	CYL LINER	PISTON ROD		PISTON		GASKETS		
28	LANTERN RINGS	GASKETS		PISTON RINGS				
29	PISTON - PLUNGER			PISTON ROD				
MOTOR DRIVER					TURBINE/PISTON DRIVER			
30	SUPPLIED BY	MOUNTED BY		SUPPLIED BY		MOUNTED BY		
31	MFR	TYPE		MFR		TYPE		
32	ENCLOSURE	RPM		HP RPM		WATER RATE, LB/HP-HR		
33	HP	SF		INLET STM PRESS, PSIG: NORM		MAX		
34	FRAME	INSULATION		INLET STM TEMP, °F: NORM		MAX		
35	VOLTS/PH/HZ	TEMP RISE, °F		EXHAUST STM PRESS, PSIG: NORM		OTHER		
36	BEARINGS	LUBE		BEARINGS LUBE				
37				NOZZLES	SIZE	RATING	FACE	
38	SPEED REDUCER: INTEGRAL - SEPARATE			INLET				
39	MFR	MODEL		EXHAUST				
40	RATIO	CLASS		API 611: YES - NO	SEPARATE DRIVER SPEC: YES - NO			
VENDOR TO SUPPLY INFORMATION MARKED _____								



ROTARY PUMP DATA SHEET

FOR _____
LOCATION _____
ITEM NO. _____
SERVICE _____
NO. REQUIRED _____ MOTOR DRIVE _____ TURBINE DF

JOB NO. _____
SHEET NO. _____
PAGE _____ OF _____

OPERATING CONDITIONS

PRODUCT HANDLED	DISCHARGE PRESSURE	PSIG	
CORROSIVE DUE TO	SUCTION PRESSURE	PSIG	
PUMPING TEMPERATURE DEG F	DETERMINED BY	PSI	
VAPOR PRESS. PSIA			
GRAVITY AT 60 DEG F SP GR	DESIGN HEAD		
API GR.	NPSH* AVAIL	FT. NPSH REQUIRED	FT.
SP GR AT SUC COND	SP GR. AT DIS. COND		
VISCOSITY	AT	DEG. F.	
CAPACITY - G P D AT 60 DEG F NORMAL	NPSH INCLUDES	FT. FT. STATIC HEAD - LIFT	
DESIGN	STEAM PRESSURE	PSIG	
G P M. AT PUMP TEMP NORMAL	% SATUR. OR TOTAL TEMP.		
DESIGN	EXHAUST STEAM PRESSURE		
MOTOR CHARACTERISTICS VOLTS PHASE CYCLE			

SPECIFICATIONS

PUMP SHALL BE FURNISHED IN ACCORDANCE WITH

MANUFACTURER	HYD. H.P. — NORMAL	DESIGN
TYPE	PUMP. EFF. %—NORMAL	DESIGN
SIZE	BRAKE H.P. — NORMAL	DESIGN
RATED CAPACITY	B.H.P. AT RATED CAPACITY	
GPM AT RPM		
ROTATION—COUNTER—CLOCKWISE FACING COUPLING END		
SUC. FLANGE SIZE	MOTOR H.P.	TURBINE H.P.
DIS. FLANGE SIZE	DRIVER (S) TO BE FURNISHED BY	
CASE DESIGN PRESS.	PUMP BASE	
RELIEF VALVE TO BE FURN. BY	DRIVER BASE	
MAX. REL. VALVE SET TO PREVENT MOTOR OVERLOAD	COUPLING WITH GUARD	
PSIG		

MATERIALS AND DETAILS

CASE	MIN THICK	+	LUBRICATION		
END COVERS			PACKING BOX-TYPE	NO.	
FLANGES			SIZE-I.D.	O.D.	LENGTH
SHAFT			PACKING ARRANGEMENT		
SHAFT SLEEVES					
ROTORS			SPARE PACKING		
DRIVE GEARS			PACKING GLAND-TYPE		
RADIAL BEARING			GLAND STUDS		
THRUST BEARING			LANTERN RING		

GENERAL INFORMATION

COOLING WATER	DEG F	GPM	INSULATION BY
PACKING BOXES		GPM	INSPECTION—HYDRO TEST
COOLING OIL LANTERN RINGS	DEG F	GPM	PERFORM. TEST
FLUSHING OIL TO THROAT BUSHING		GPM	SPECIAL TESTS
COOLING WATER PIPING	SYSTEM BY		DIMEN PRINT NO. _____ SERIAL NO. _____
GLAND OIL PIPING BY			NET WEIGHT—PUMP AND BASE _____ LB.
FLUSHING OIL PIPING BY			FOUNDATION BOLTS—TO BE FURNISHED BY KELLOGG.
BYPASS CONTROL—TO BE FURNISHED BY KELLOGG			FLANGE STUDS—TO BE FURNISHED BY PUMP MFR.

* NPSH AVAILABLE MEASURED TO TOP OF PUMP FOUNDATION

REMARKS:

CHEMICAL PROCESS PLANTS DEPARTMENT
CORPORATE ENGINEERINGROTARY PUMP
DATA SHEET Sheet 1 of 2

REMARKS	OPERATING CONDITIONS										
	FLUID PUMPED	CAPACITY NORMAL			GPM						
FLUID CHARACTERISTICS	CAPACITY DESIGN			GPM							
TEMP. MAX _____°F MIN. _____°F NORMAL _____°F	TDH DESIGN			FT. FLUID							
VISCOSITY AT MIN. P.T.	SUCTION PRESS.			DISCH. PRESS.							
SPECIFIC GRAVITY AT MIN. P.T.	NPSH AVAILABLE			FT. FLUID							
VAPOR PRESS. AT MAX. P.T.	HYDRAULIC HP										
TYPE OF OPERATION: <input type="checkbox"/> CONTINUOUS <input type="checkbox"/> INTERMITTENT HRS./DAY _____											
LOCATION: <input type="checkbox"/> INDOORS <input type="checkbox"/> OUTDOORS											
MATERIALS											
APP'R'V	DATE	BODY	MECH. SEAL:								
		HEADS	ROTATING FACE								
		ROTORS	STATIONARY FACE								
		SHAFT	METAL PARTS								
		PACKING GLAND	RELIEF VALVE								
		LANTERN RING	CASING GASKET								
CONSTRUCTION DATA											
REV.	CHKD/SUPRV.	PUMP TYPE:									
BY	BY	PACKING: TYPE	MFR.								
		MECH. SEAL: TYPE	MFR.			CODE					
		NOTES:									
	REV.	SEAL FLUID:									
		RELIEF VALVE: BUILT-IN	SEPARATE								
MOTOR DRIVE DATA						TESTS					
PROJ. ENG.	DES SUPRV.	ITEM NO.	MTD. BY	SHOP TESTS	NOT WITNESSED	WITNESSED	CERT. DATA				
		H.P.	RPM	FRAME							
		MFR.		CPLG. GUARD							
		TYPE	INSUL.	NPSH							
		ENC'L: CLASS I-GROUP	DIVISION 1	HYDROSTATIC							
		OTHER		PSIG							
		VOLOTS/PHASE/Hz:									
		BEARINGS	LUBE								
		FULL LOAD AMPS	SF								
		LR AMPS									
MANUFACTURER'S DATA											
INITIATOR	DRAWN BY	CHECKED BY	MFR.	PUMP BEARINGS							
			MODEL NO.	RPM	PUMP LUBRICATION						
			NOZZLES	SIZE	ASA RATING	FACING	POSITION	PRESS. IN SEALING CHAMBER	PSIG	PSIG	
			SUCTION					SHAFT DIA. IN SEALING CHAMBER		INCHES	
			DISCH					WATER COOLING AVAIL. AT	PSIG	°F	
			MAX. ALLOW. W.P.	PSIG	TEMP.	°F	BEARINGS		GPM		
			NPSH REQ'D. (WATER) FT.				STUFF. BOX		GPM		
			DESIGN EFF.	DESIGN BHP			PEDESTAL		GPM		
			SHUT-OFF HEAD FT.				TOTAL WATER REQ'D.		GPM		
			ROTATION FACING CP'LG. END				PACKING LUBRICATION				
			CP'LG. MFR.				SEAL LUBRICATION				
DATE	JOB NO. _____ PLANT LOCATION _____									SCALE	
	PROJECT NO. _____ REF. DWG. NO. _____										
	TITLE									ISSUE DATE	
	POSITION NO. _____ SERIES _____ STEP NO. _____									DRAWING NO.	

		CHEMICAL PROCESS PLANTS DEPARTMENT CORPORATE ENGINEERING				ROTARY PUMP DATA SHEET Sheet 2 of 2	
		MANUFACTURER'S DATA CONT'D.					
REMARKS		WEIGHTS: PUMP _____ BASE _____ DRIVE _____					
		SEAL FLUSH _____					
		SEAL QUENCH & DRAIN _____					
		SPEED REDUCER: MFR. _____ TYPE _____					
		BASEPLATE _____					
APPRV		SPECIAL REQUIREMENTS & NOTES					
		<p>1. VENDOR IS TO QUOTE MOST ENERGY-EFFICIENT PUMP-DRIVE COMBINATION AS ALTERNATE IF DIFFERENT THAN UNIT(S) OFFERED.</p> <p>2. GROUNDING LUG TO BE PROVIDED IN MOTOR CONDUIT BOX.</p> <p>3. MOTOR SHALL BE IN CONFORMANCE WITH FOLLOWING STANDARD PROCUREMENT SPECIFICATION:</p> <p><input type="checkbox"/> E16 - 150P, PROCESS ELECTRICAL EQUIPMENT - LOW VOLTAGE MOTORS, ALTERNATING CURRENT.</p> <p><input type="checkbox"/> E16 - 151P, PROCESS ELECTRICAL EQUIPMENT - MEDIUM VOLTAGE MOTORS, ALTERNATING CURRENT.</p> <p><input type="checkbox"/> E16 - 160P, PROCESS ELECTRICAL EQUIPMENT - VARIABLE FREQUENCY AC MOTORS</p> <p>4. MOTOR SHALL BE PROVIDED IN ACCORDANCE WITH DATA GIVEN ON STANDARD DATA SHEET FORM E242P1 ELECTRICAL ALTERNATING CURRENT MOTORS.</p>					
REV.							
PROJ. ENG.							
DATE							
BY CHK'D SUPRV.							
BY DES SUPRV.							
INITIATOR		DRAWN BY		CHECKED BY		DATE	
DATE							
JOB NO. _____		PLANT LOCATION _____		REF. DWG. NO. _____		SCALE _____	
PROJECT NO. _____							
TITLE _____						ISSUE DATE	
POSITION NO. _____		SERIES _____		STEP NO. _____		DRAWING NO. _____	

E 142B10* (REV. 4/83)

Rotary Pump—(continued)



MOTOR DRIVEN PROPORTIONING & RECIPROCATING PUMP DATA SHEET

FOR: _____
LOCATION: _____
SERVICE: _____
NO. REQUIRED: _____

JOB NO. _____
ITEM NO. _____
PAGE: _____ OF _____

SERVICE CONDITIONS		
FLUID PUMPED	DISCHARGE PRESSURE	PSIG
CORROSIVE DUE TO	INLET PRESSURE	PSIG
INLET TEMPERATURE	DIFFERENTIAL PRESSURE	PSI
SPECIFIC GRAVITY AT INLET TEMP.	VAPOR PRESSURE AT INLET TEMP.	PSIA
CAPACITY AT INLET TEMP. NORMAL	NPSH* AVAILABLE AT TOP OF PUMP FOUNDATION	FT
CAPACITY AT INLET TEMP. DESIGN	NPSH REQUIRED AT TOP OF PUMP FOUNDATION	FT

MECHANICAL DATA (PUMPS TO BE FURNISHED IN ACCORDANCE WITH KELLOGG SPEC.) DATED:

DATED:

MANUFACTURER	BRAKE KW NORMAL	DESIGN
SIZE AND TYPE	INLET SIZE AND RATING	
NO. CYLINDERS	DISCH-SIZE AND RATING	
LIQUID END DESIGN PRESSURE	PSIG	STEAM IN SIZE
STALLING PRESSURE	PSIG	EXHAUST SIZE

PROPORTIONING PUMP DATA

RECIPROCATING PUMP DATA

CAPACITY CYL. A MAX	MIN.	STEAM PRESSURE	
CAPACITY CYL. B MAX	MIN.	% SATURATION OR TOTAL TEMP	
TYPE CAPACITY ADJ.		EXHAUST STEAM PRESSURE	
RANGE OF ADJ.		TOTAL STEAM LB/HR NORMAL	DESIGN
BORE CYL. A	CYL. B	VALVE TYPE	
STROKE CYL. A	CYL. B	STEAM END PACKING	

MATERIALS

CYLINDER _____
PLUNGER _____
VALVE _____
VALVE SEAT _____
VALVE SPRINGS _____
CASE _____
LINER _____
PISTON _____
PISTON ROD _____
PISTON RING _____

MECHANICAL DETAILS

COMMON BASE FOR PUMP AND MOTOR BY _____	PACKING BOX TYPE _____	NO. OF BOXES _____
COUPLING WITH GUARD BY _____	PACKING BOX SIZE _____	O.D. _____ LENGTH _____
LUBRICATOR _____	PACKING TYPE _____	
REVOLUTION COUNTER _____	<input type="checkbox"/> 100% <input type="checkbox"/> 200% SPARE PACKING (BY MFGR.)	
INSULATION: STM END BY _____ LIQ END BY _____	<input type="checkbox"/> LANTERN RING IN CENTER WITH CONN PLUGGED	
<input type="checkbox"/> HYDROSTATIC TEST WITNESSED _____	<input type="checkbox"/> GLAND OIL _____ GPM _____	
<input type="checkbox"/> PERFORMANCE TEST WITNESSED _____	<input type="checkbox"/> FLUSHING OIL _____ GPM _____	
<input type="checkbox"/>	<input type="checkbox"/> COOLING WATER _____ GPM _____	

MOTOR DATA (MOTOR TO BE FURNISHED IN ACCORDANCE WITH KELLOGG SPEC.)

DATED

1

MANUFACTURER	FRAME
KILOWATTS	RATED LOAD CURRENT
VOLTS	LOCKED ROTOR CURRENT
ENCLOSURE	EFFICIENCY 4/4
SERVICE FACTOR	POWER FACTOR 4/4
TEMPERATURE RISE	SPEED REDUCER TYPE
C	RATIO

GENERAL

APPROX. BASE SIZE _____ TOTAL WEIGHT _____ KG _____

EQUIPMENT TO BE SUITABLE FOR OUTDOOR INSTALLATION

SERIAL NO

NPSH — NET POSITIVE SUCTION HEAD TO TOP OF PUMP FOUNDATION

MANUFACTURER SHALL SUBMIT THIS SHEET FULLY COMPLETED WITH HIS QUOTATION

REMARKS

PROCESS DESIGN SECTION CORPORATE ENGINEERING		VIBRATING FEEDER DATA SHEET	
FEED MATERIAL CHARACTERISTICS			
REMARKS	FEED MATERIAL:	WEIGHT % MOISTURE:	
	BULK DENSITY: _____ LBS./CU. FT.	TEMPERATURE _____ OF	
DATE APP'R'D	PARTICLE SIZE: AVERAGE: _____ MAXIMUM: _____	ABRASIVENESS: _____	
	PRODUCT DESCRIPTION: _____	TENDENCY TO PACK: _____	DESCRIPTION: _____
OPERATING CONDITIONS			
REV	FEED RATE - LBS/HR. NORMAL _____ MAX. _____	LOCATION: INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/>	
	REQ'D. WIDTH OF FEED _____	MAX. ROOM TEMP: _____ OF	
BY CHKD	REQ'D. DEPTH OF FEED _____	INLET TO OUTLET LENGTH: _____	
	MODE OF OPERATION _____	ATMOSPHERIC CONDITIONS: DUSTY <input type="checkbox"/> CORROSIVE <input type="checkbox"/> EXPLOSIVE <input type="checkbox"/>	OTHER _____
DESIGN DATA			
SUPRV.	TROUGH TYPE: _____	COVER CLAMPS: _____	
	LENGTH/WIDTH/DEPTH _____	FREQUENCY - CPM: _____	
TYPE	THICKNESS: _____	SPEED OF MAT'L. CONVEYED - FPM: _____	
	COVER: REQ'D. _____	NATURAL FREQUENCY: REQ'D: _____	
MOUNTING:	FLOOR _____ SUSPENSION _____	SPRINGS: _____	
	INCLINE _____ DECLINE _____	AMPLIFICATION: _____	
CONTROL	ISOLATION: _____	HANGERS- TYPE: _____	
	BASE: _____	NO. _____	
MATERIALS OF CONSTRUCTION			
DES SUPRV.	TROUGH: _____	SPRINGS - AMPLIFICATION: _____	
	COVER: _____	ISOLATION: _____	
GASKETS	BASE: _____	DRIVE COVER: _____	
	_____	_____	
MOTOR DRIVE DATA			
CHECKED BY	ITEM NO. _____ MTD. BY: _____	BEARINGS: _____ LUBE: _____	
	MFG. _____	FULL LOAD AMPS: _____ SF: _____	
DRAWN BY	TYPE: _____ FRAME: _____	L.R. AMPS: _____	
	HP: _____ RPM: _____		
INITIATOR	VOLTS/PHASE/CYCLE: _____ / _____ / _____	MOUNTING: BOTTOM <input type="checkbox"/> OVERHEAD <input type="checkbox"/>	
MISCELLANEOUS			
E227B43	TOTAL WEIGHT: _____	VENDOR DWG. NO. _____	
	PAINTING: _____	FEEDER SERIAL NO. _____	
TITLE	GALVANIZING: _____		
	FINISH REQ'D.: _____		
JOB NO.	PLANT LOCATION	SCALE	
PROJECT NO.	REF. DWG. NO.		
POSITION NO. _____ SERIES: _____ STEP NO. _____		ISSUE DATE	BLDG. NO.
		DRAWING NO. _____	

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGSCREW CONVEYOR
DATA SHEET

SHEET 1 OF 2

FEED MATERIAL CHARACTERISTICS

REMARKS	FEED MATERIAL _____	ABRASIVENESS _____
	BULK DENSITY: _____ LBS./CU. FT.	STICKINESS _____
	PARTICLE SIZE _____	DUSTINESS _____
	MAXIMUM SIZE _____	CHEMICAL ACTION _____
	ANGLE OF REPOSE _____	TEMPERATURE _____ °F
	PRODUCT DESCRIPTION _____ _____	

OPERATING CONDITIONS

CAPACITY: LBS./HR.	NORMAL _____	LOADING CLASSIFICATION _____
	MAX. _____	LOCATION: INDOOR <input type="checkbox"/> OUTDOOR <input checked="" type="checkbox"/>
RPM OF SCREW _____		

CONSTRUCTION AND MATERIALS

TROUGH:	TYPE _____	SHAFT DIAM.. _____
	MAT'L. _____	TROUGH END _____
	THICKNESS _____	TYPE HANGERS _____
COVER:	TYPE _____	SADDLES _____
	MAT'L. _____	DUST SEALS _____
	THICKNESS _____	BEARINGS: TYPE - HARD IRON _____
FLIGHT:	PITCH _____	BABBITED _____
	MAT'L. _____	BRONZE _____
	THICKNESS _____	ANTI-FRICTION _____
FLAT VALVE PLATE GATE _____		JACKETED TROUGH _____
RACK & PINION GATE - FLAT VALVE PLATE _____		
		CURVED VALVE PLATE _____

DRIVE DATA

MOTOR DATA

CHAIN-ASA NO. _____	ITEM NO. _____	MTD. BY _____
SPROKETS - DRIVER NO. TEETH _____	MFG. _____	
DRIVEN NO. TEETH _____	TYPE _____	FRAME _____
V-BELT NO. & SIZE _____	HP _____	RPM _____
SHEAVES - DRIVER-PITCH DIA. _____	VOLTS PHASE/CYCLE _____ / _____ / _____	
DRIVEN-PITCH DIA. _____	BEARINGS _____	LUBE _____
REDUCER - MFGR. _____	FULL LOAD AMPS _____	SF _____
MODEL NO. _____	LR AMPS _____	
SERVICE FACTOR _____	RANGE	
INPUT RPM _____		
OUTPUT RPM _____		
COUPLING - MFG'R. _____		
TYPE _____		

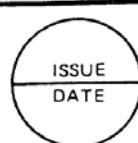
JOB NO. _____
PROJECT NO. _____
TITLE _____

PLANT LOCATION
REF. DWG. NO. _____

POSITION NO. _____

SERIES

STEP NO.



SCALE
BLDG. NO. _____

DRAWING NO. _____

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGSCREW CONVEYOR
DATA SHEET

SHEET 2 OF 2

MISCELLANEOUS

REMARKS

PAINTING: _____
GALVANIZING _____
TOTAL WEIGHT _____
MFG. _____
TYPE & MODEL NO. _____
VENDOR DWG. NO. _____
CONVEYOR SERIAL NO. _____
FINISH OF INTERNAL PARTS: _____

REMARKS

INITIATOR DRAWN BY CHECKED BY DES SUPRV.

E228B44
SHEET 2

JOB NO. PROJECT NO. TITLE	PLANT LOCATION REF. DWG. NO.	SCALE
POSITION NO.	SERIES	STEP NO.
		DRAWING NO.
		ISSUE DATE
		BLDG. NO.

		PROCESS DESIGN SECTION CORPORATE ENGINEERING		BUCKET ELEVATOR DATA SHEET	
REMARKS	OPERATING CONDITIONS				
	MATERIAL CONVEYED: _____	MOISTURE CONTENT: _____	WGT. %	PRODUCT DESCRIPTION: _____	CAPACITY: TONS/HR. NORMAL _____ MAX. _____
	BULK DENSITY: _____ LBS./CU. FT.	MODE OF OPERATION: _____	BUCKET SPEED: _____ FPM	SCREEN ANALYSIS: _____ %	ANGLE OF INCLINE: _____
	PRODUCT TEMP: _____ °F	INSTALLATION: INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/>			
MECHANICAL DATA					
REV BY CHKD SUPRV DATE APPRV	TYPE: CENTRIFUGAL <input type="checkbox"/> CONTINUOUS <input type="checkbox"/>	BELT CARRIER FOR BUCKETS:			
	DISTANCE BETWEEN HEAD & TAIL SHAFTS: _____	WIDTH: _____	NO. OF PLIES: _____		
	CASING - CROSS SECTION DIMENSION: _____	WT. OF DUCK: _____	COVER THICKNESS: _____		
	CASING GAUGE _____	TYPE OF BELT SPLICE: _____			
	CASING HD. SECT. - GAUGE DISCH. OPENING: _____	HEAD PULLEY DIA: _____	FACE WIDTH: _____		
	BOOT - TYPE: _____	TAIL PULLEY DIA: _____	FACE WIDTH: _____		
	GAUGE: _____	HEAD SHAFT DIA: _____	TAIL SHAFT DIA: _____		
	LOADING OPENINGS _____	TYPE OF BEARINGS: _____			
	CHAIN CARRIER FOR BUCKETS	HEAD SHAFT SPEED: _____ RPM			
	TYPE: _____	TYPE OF TAKE-UP: _____			
	HEAD SHAFT SPROCKET P.D.: _____	LOCATIONS: _____			
	TAIL SHAFT P.D.: _____	INLET CHUTE ANGLE: _____			
	SIZE OF BUCKETS: _____ INCHES	DISCH. CHUTE ANGLE: _____			
	BUCKET SPACING: _____ INCHES	INLET OPENING W/LOADING LEG: _____			
	BUCKET BOLTS-TYPE: _____	FEED HOPPER _____			
	NO. PER BUCKET: _____				
MATERIALS OF CONSTRUCTION					
DESSUPRV CHECKED BY DRAWN BY	CASING: _____	CHAIN: _____			
	HEAD SECTION: _____	HEAD & TAIL SPROCKETS: _____			
	BOOT: _____	TAKE-UP DEVICE: _____			
	BUCKETS: _____	BUCKET BOLTS: _____			
	HEAD & TAIL SHAFTS: _____	BUCKET FILLER PIECES: _____			
	HEAD & TAIL SHAFT BEARINGS: _____	GASKETS: _____			
	BELT & COVERS: _____	JOINTS: _____			
	HEAD & TAIL PULLEYS: _____	DOORS & MANWAYS: _____			
MOTOR DRIVE DATA					
INITIATOR DRAWN BY	ITEM NO. _____ MTD. BY. _____	LR AMPS _____			
	HP _____ RPM _____ FRAME _____	MFG. _____			
	TYPE _____ INSUL. _____	REDUCTION UNIT: _____			
	ENCLOSURE: CLASS I GROUP D	MFG. _____			
	VOLTS/PHASE/CYCLE _____ / _____ / _____	TYPE DRIVE: CHAIN <input type="checkbox"/> BELT <input type="checkbox"/>			
	BEARINGS _____ LUBE _____	MOTOR COUPLING: TYPE _____			
	FULL LOAD AMPS. _____ S.F. _____	MFG. _____			
JOB NO. _____ PROJECT NO. _____ TITLE _____ POSITION NO. _____				PLANT LOCATION REF. DWG. NO. SERIES STEP NO.	SCALE BLDG. NO. ISSUE DATE DRAWING NO.
E225B41					

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGVIBRATING SCREEN
DATA SHEET

SHEET 1 OF 2

FEED MATERIAL CHARACTERISTICS

REMARKS	FEED MATERIAL: _____	ABRASIVENESS _____
	BULK DENSITY _____ LBS./CU. FT.	STICKINESS _____
	ANGLE OF REPOSE _____	CHEMICAL ACTION _____
	WEIGHT % MOISTURE _____	DUSTINESS _____
	PRODUCT DESCRIPTION _____	TEMPERATURE _____ °F

MATERIAL TO BE SCREENED OUT _____
PART. SIZE ON 1ST SCREEN/% RETAINED _____
PART. SIZE ON 2ND SCREEN/% RETAINED _____
PART. SIZE ON 3RD SCREEN/% RETAINED _____

OPERATING CONDITIONS

REV BY	APP'R'V	DATE	FEED RATE - TONS/HR: _____ NORMAL/MAX. _____ SUCTION IN DISCH. LINE _____
			% OF SOLIDS _____ PRESS. IN DISCH. LINE _____
			FEED LINE SIZE _____ LOCATION: INDOOR <input type="checkbox"/> OUTDOOR <input checked="" type="checkbox"/>
			METHOD OF FEED _____ MODE OF OPERATION: _____

DESIGN DATA

REV BY	CHKD BY	DES SUPRV.	NO. OF SCREENS REQ'D. _____ DISCH. SIZE TABLE _____
			SCREEN TYPE/SIZE _____ FEED DISTRIBUTOR REQ'D. _____
			1ST SCREEN MESH _____ SCREEN ANGLE: DESIGN _____
			2ND SCREEN MESH _____ MAX. _____
			3RD SCREEN MESH _____ COVER REQ'D. _____
			1ST SCREEN DISCH. SIZE _____ MOUNTING: FLOOR <input type="checkbox"/> SUSPENSION <input checked="" type="checkbox"/>
			2ND SCREEN DISCH. SIZE _____ TYPE OF SCREEN CLEANER _____
			3RD SCREEN DISCH. SIZE _____ INLET DIAM. _____
			SCREEN AREA FREE/GROSS 1ST SCREEN SQ. FT. _____
			SCREEN AREA FREE/GROSS 2ND SCREEN SQ. FT. _____
			SCREEN AREA FREE/GROSS 3RD SCREEN SQ. FT. _____
			SCREEN BACKING REQ'D./TYPE 1ST SCREEN _____
			SCREEN BACKING REQ'D./TYPE 2ND SCREEN _____
			SCREEN BACKING REQ'D./TYPE 3RD SCREEN _____

MATERIALS OF CONSTRUCTION

INITIATOR	DRAWN BY	CHECKED BY	DES SUPRV.	SCREEN DECKS _____ HOUSING _____
				SCREENS _____ FEED DISTRIBUTOR _____
				SCREEN SUPPORT RINGS _____ SPRINGS _____
				BASE _____ COLLECTING PANS _____
				TABLE ASSY. (IN CONTACT WITH PRODUCT) _____
				TABLE ASSY. (NOT IN CONTACT WITH PRODUCT) _____
				MISC: _____

JOB NO.	PLANT LOCATION	SCALE
PROJECT NO.	REF. DWG. NO.	
TITLE		ISSUE DATE
POSITION NO.	SERIES	BLDG. NO.
STEP NO.		DRAWING NO.
		REV BY

E226B42

PROCESS DESIGN SECTION
CORPORATE ENGINEERINGVIBRATING SCREEN
DATA SHEET

SHEET 2 OF 2

MOTOR DRIVE DATA

ITEM NO.	MTD. BY	BEARINGS	LUBE
MFG.		FULL LOAD AMPS	SF.
TYPE	FRAME	LR. AMPS	
HP	RPM		
VOLTS PHASE/CYCLES	/ /	V BELT DRIVE	
		GEAR REDUCER	

MISCELLANEOUS

PAINTING	
GALVANIZING	
TOTAL WEIGHT	
VENDORS DWG. NO.	
SIFTER SERIAL NO.	
INLET & OUTLET FLEX. CONNECTIONS	
VENDORS MODEL NO.	

REMARKS



REV

BY

CHKD

SUPRV.

DATE

APP'R V

PROJ. ENG.

DES SUPRV.

CHECKED BY

DATE

E226B42
SHEET 2

PLANT LOCATION

REF. DWG. NO.

ISSUE
DATE

SCALE

BLDG. NO.

JOB NO.

PROJECT NO.

TITLE

POSITION NO.

SERIES

STEP NO.

DRAWING NO.





COLUMN SPECIFICATIONS

ITEM NO.	NO. REQ'D	DESCRIPTION			
PERFORMANCE DATA		SHELL DATA			
FLUIDS PROCESSED:		<input type="checkbox"/> CONICAL HEAD			
<hr/> <hr/>		<input type="checkbox"/> DISCHED HEAD			
PRESSURE:		TYPE _____			
OPERATING: _____		<input type="checkbox"/> BLIND FLANGE COVER			
DESIGN: _____		<input type="checkbox"/> FLANGED TOP CLOSURE			
TEST: _____		<input type="checkbox"/> STRAIGHT SHELL			
TEMPERATURE:		DIAMETER _____ I. D. _____ O. D.			
OPERATING: _____		LENGTH _____			
DESIGN: _____		TO TANG. LINE OR FACE OF FLANGE OR FLANGES.			
CONSTRUCTION DATA		NOTE: WHERE INTERMEDIATE FLANGES OR OTHER SHELL DETAILS ARE RE- QUIRED, INDICATE BY SKETCH ON ADJACENT DRAWING AND LOCATE BY DIMENSIONS.			
<input type="checkbox"/> CODE: _____		<input type="checkbox"/>			
<input type="checkbox"/> MANHOLES: SIZE _____ SHAPE _____ NO. _____ LOCATION: _____		<input type="checkbox"/>			
<input type="checkbox"/> HANHOLES: SIZE _____ SHAPE _____ NO. _____ LOCATION: _____		<input type="checkbox"/>			
INSULATION:		<input type="checkbox"/>			
REMARKS: FOR INTERIOR CONSTRUCTION AND SUPPORT DATA SEE ATTACHED SHEETS.		<input type="checkbox"/>			
DESCRIPTION OF FUNCTION OF VESSEL AND REMARKS		<input type="checkbox"/>			
<hr/> <hr/> <hr/>		<input type="checkbox"/>			
NOTE: DATA FOR ITEMS MARKED THUS <input type="checkbox"/> ARE NORMALLY SUPPLIED BY ENG'R'G DEPT. DATA ENTRIES FOR THESE ITEMS MADE BY OTHER THAN ENG'R'G DEPT. INDICATE MANDATORY REQUIREMENTS DICTATED BY PROCESS, PROPOSAL, CONTRACT, OR CUSTOMER.		<input type="checkbox"/>			
APPR.		<input type="checkbox"/> MATERIAL OF CONSTRUCTION: _____			
APPR.		REMARKS: _____			
APPR.		<hr/> <hr/>			
APPR.	REFERENCES	CHKD.	MADE	DATE	NO.
CHKD.	CHEMICAL PLANTS DIVISION BLAW-KNOX CONSTRUCTION COMPANY PITTSBURGH, PENNA.	REVISONS			
MADE					

STONE & WEBSTER ENGINEERING CORPORATION
BUBBLE TOWER SPECIFICATION

Item _____

Page _____

Rev. 1 _____

Rev. 2 _____

1 Client	Location	J. O. No.
2 Apparatus		Project No.
3		Date By
4 Based on		Rating Page Dated

DESIGN CONDITIONS

Oper Pr	lb/sq in ga	Oper Temp	*F	Hammer Test	Yes	No
Des Pr	lb/sq in ga	Des Temp	*F	Field Hyd Test	Yes	No
Wind - Proj Area	lb/sq ft	Self Supporting	Yes	No	Other Tests	
Max. Horizontal Deflection at Top Tray in						
Earthquake 0.2 Operating Weight applied at c.g. Yes No						

MECHANICAL DATA

Code	Stress Relieve	Yes	No	Shell & Heads	ASTM Spec
	Radiograph	Yes	No	Type of Heads	

THICKNESS:	Calculated	Corrosion	Total Thick	Liner Mat	Liner Thick
Shell	in	in	in		in
	in	in	in		in
	in	in	in		in
Top Head	in	in	in		in
Intermediate Head	in	in	in		in
	in	in	in		in
Bottom Head	in	in	in		in
Cone Section	in	in	in		in
Skirt	in	in	in		in
Insulation			in		

Stiffener Rings	Number Req'd	Size	in ×	in
-----------------	--------------	------	------	----

NOZZLES:	Number	Type	Series	Size	Mark No.
Feed				in	
O H Vapor				in	
Reflux In				in	
Reflux Out				in	
Bottoms				in	
Drains				in	
Reboiler Vapor				in	
Reboiler Liquid				in	
				in	
				in	
Safety Valve				in	
Manholes				in	
Thermocouples				in	
				in	
				in	
Gage Glass				in	
Pr Gage				in	
Level Control				in	
				in	
Vent				in	
Steam out				in	

TRAYS:	CAPS:						
Tray No.	Diameter	Spacing	Type	Materials	Size	Type	Materials
	" "	"					
	" "	"					
	" "	"					

Baffles, etc.

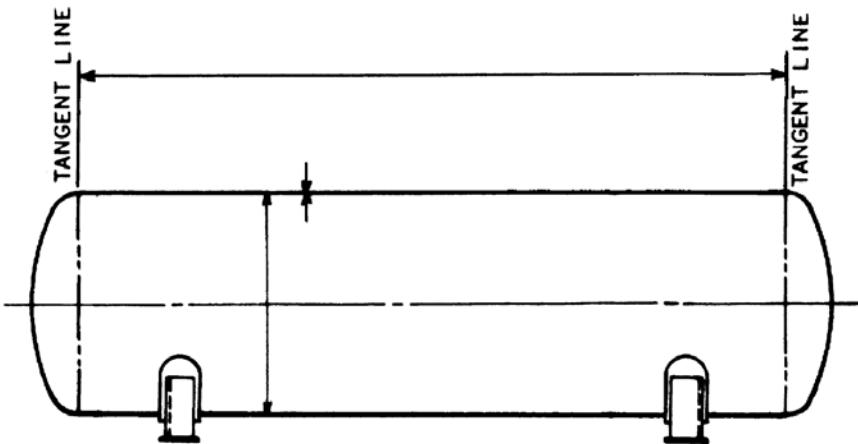
Insulation Supports:	Yes	No: Number Req'd	Size	in ×	in: Shop	Field
Platform Clips:	Yes	No: Number Req'd	Shop	Field	Ladder Clips:	Yes
Manhole Davits Required For All Covers Weighing Over 75 Lb					No: Number Req'd	Shop

For Further Details Refer To:

Remarks:

Copy To	Date	Checked	Date	Approved	Date
---------	------	---------	------	----------	------

		DESIGN DATA							
		CODE STAMP OTHER SPECS.: ST-L4-496 DESIGN PRESS. @ TEMP. PSI @ °F OPER. PRESS. @ TEMP. PSI @ °F STRESS RELIEVING WELD EXAMINATION JOINT EFFICIENCY SHELL % HEADS % CORR. ALLOWANCE SHELL HEADS LINING MAX. ALL. PRESS. (NEW & COLD) PSI HYDROSTATIC TEST PSI HAMMER TEST PSI MATERIALS SHELL HEADS SUPPORT INTERNALS TRAYS FIREPROOFING INSULATION INS. SUPP. RINGS PAINT NET FAB. WEIGHT (LESS CAPS) LBS. FAB. WEIGHT WITH CAPS LBS. FOUNDATION DATA EMPTY WEIGHT LBS. OPERATING WEIGHT LBS. TEST WEIGHT LBS. WIND M _B = FT. LBS. EARTHQUAKE M _B = FT. LBS. MANHOLE ("HINGED OR DAVITED") NOTES & REF. DRGS. ST-L4-496							
		MK.	RTG.	FCG.	SIZE	MK.	RTG.	FCG.	SIZE
NOZZLE SCHEDULE									
VESSEL FABRICATOR TO SUPPLY CLIPS ONLY FOR									
BY		PLAT. FORMS	NO.				NO. PIPE SUPPORT CLIPS	TYPE I	
DATE		SIZE					TYPE II		
CHK'D		WIDTH					TYPE III		
APP'D		PLATFORM WEIGHT					VESSEL DAVIT		
		LADDER	CAGE		WT.				
		PIPE GUIDES 1/2 CPLGS. 3000#							
		CONTRACT NO.				DRG. NO.			



DESIGN DATA			NOTES & REF. DRGS. ST-L4-496						
CODE STAMP									
OTHER SPECS.: ST-L4-496									
DESIGN PRESS. @ TEMP. PSI @ °F									
OPER. PRESS. @ TEMP. PSI @ °F									
STRESS RELIEVING									
WELD EXAMINATION									
JOINT EFFICIENCY	SHELL	% HEADS	%						
CORR. ALLOWANCE	SHELL	HEADS							
LINING									
MAX. ALL. PRESS. (NEW & COLD)			PSI						
HYDROSTATIC TEST			PSI						
HAMMER TEST			PSI						
MATERIALS	SHELL								
	HEADS								
	SUPPORT	MK.	RTG.	FCG.	SIZE	MK.	RTG.	FCG.	
	INTERNAL	NOZZLE SCHEDULE							
		VESSEL FABRICATOR TO SUPPLY CLIPS ONLY FOR							
FIREPROOFING			PLATFORM WT.						
INSULATION			LADDER	CAGE	WT.				
PAINT									
NET FAB WEIGHT			LBS.						
EMPTY WEIGHT			LBS.						
OPERATING WEIGHT			LBS.						
TEST WEIGHT			LBS.						
MANHOLE (^{HINGED ON})				CONTRACT NO.		DRG. NO.			
BY _____ DATE _____			CHK'D _____	APP'D _____					
THE FLUOR CORPORATION LTD.									

PROCESS DESIGN SECTION CORPORATE ENGINEERING								GLASS LINED VESSEL		
								DATA SHEET Sheet 1 of 2		
DATE	INITIATOR	DRAWN BY	CHECKED BY	PROJ. ENG.	DES SUPRV.	REV BY	CHKD BY	APPRV	REMARKS	GENERAL VESSEL DATA
										Reactor <input type="checkbox"/> ; Tank <input type="checkbox"/> ; Other _____ Vertical <input type="checkbox"/> ; Horizontal <input type="checkbox"/> ; Jacketed <input type="checkbox"/> ; Unjacketed <input type="checkbox"/> Rated capacity, gals. _____; Flanged head <input type="checkbox"/> ; One piece construction <input type="checkbox"/> Standard Head Openings <input type="checkbox"/> ; Non standard head required: <input type="checkbox"/> Specification Based on Pfaudler Series _____ or equal.
									VESSEL OPENINGS	
									TOP HEAD	
									BOTTOM HEAD	
									JACKET	
									ORIENTATION	
									JACKET	
									VESSEL SUPPORT	
									GLASS-LINED ACCESSORIES	
JOB NO. _____ PROJECT NO. _____				PLANT LOCATION _____ REF. DWG. NO. _____				SCALE		
TITLE _____				POSITION NO. _____ SERIES _____ STEP NO. _____				ISSUE DATE		
								BLDG. NO.		
								DRAWING NO.		

PROCESS DESIGN SECTION
CORPORATE ENGINEERING

GLASS LINED VESSEL

DATA SHEET Sheet 2 of 2

REMARKS	GENERAL NOTES									
	<p>Insulation Thickness _____ " . By Hoffmann-La Roche.</p> <p>Matching flanges to be supplied by HLR <input type="checkbox"/> ; Piping contractor <input type="checkbox"/> .</p> <p>Material:-s/s <input type="checkbox"/> ; Other _____</p> <p>Vendor to supply: -Approval drawing <input type="checkbox"/> ; Certified drawing <input type="checkbox"/> .</p> <p>Vendor to fill in all missing information on: -Approval drawing <input type="checkbox"/> ; Certified drawing <input type="checkbox"/> .</p>									
PROJ. ENG.	DES. SUPRV.	REV BY	CHKD SUPER.	DATE	APPRV	DUTY	<p>For: -Simple mixing <input type="checkbox"/> ; Extraction <input type="checkbox"/> ; Reaction <input type="checkbox"/> ; Heat transfer <input type="checkbox"/> .</p> <p>Gas incorporation <input type="checkbox"/> ; Solids incorporation <input type="checkbox"/> .</p> <p>1 Phase liquid <input type="checkbox"/> ; d_4 _____ ; Viscosity Cp/$^{\circ}$C _____</p> <p>Bottom layer, d_4 _____ ; Viscosity Cp/$^{\circ}$C _____</p> <p>Liquid-gas <input type="checkbox"/> ; Liquid d_4 _____ ; Viscosity Cp/$^{\circ}$C _____ ; Gas _____</p> <p>Liquid-solid <input type="checkbox"/> ; Liquid d_4 _____ ; Viscosity Cp/$^{\circ}$C _____ ; Solid _____.</p> <p>Change during process: _____</p>			
						AGITATION	<p>TYPE</p> <p>Anchor <input type="checkbox"/> ; Impeller <input type="checkbox"/> ; Other _____ ; rpm _____.</p> <p>Agitation quality: -Mild <input type="checkbox"/> ; Good <input type="checkbox"/> ; Vigorous <input type="checkbox"/> ; Violent <input type="checkbox"/> .</p>			
INITIATOR	DRAWN BY	CHECKED BY	DATE	APPRV	Baffles	<p>None <input type="checkbox"/> ; Thermowell <input type="checkbox"/> ; Flat <input type="checkbox"/> ; Std. up <input type="checkbox"/> .</p> <p>Std. down <input type="checkbox"/> ; Long <input type="checkbox"/> ; To be used for thermowell <input type="checkbox"/> .</p> <p>G.L. restricted tip <input type="checkbox"/> ; Tantalum tip <input type="checkbox"/> ; Hastelloy tip <input type="checkbox"/> .</p> <p>Dimensions by instrument eng. I.D. _____ " ; Length _____ ".</p>				
					MOTOR	<p>HP _____ ; 3 phase, 60 cycle, 220/440 volts, rpm _____.</p> <p>Enclosure: Class 1 Group D <input type="checkbox"/> Other _____.</p>				
WORKING CONDITIONS		PROCESS DESCRIPTION		<p>Level at start: -gals, _____ ; Straight shell _____ ".</p> <p>Level at end: -gals, _____ ; Straight shell _____ ".</p> <p>Pressure: -Atmospheric <input type="checkbox"/> ; _____ psig; Vacuum <input type="checkbox"/> .</p> <p>Temperature range _____ $^{\circ}$F to _____ $^{\circ}$F</p> <p>Chemicals: _____</p> <p>Plugs permitted: - Tantalum <input type="checkbox"/> ; Hastelloy <input type="checkbox"/> ; Other _____.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>						
JOB NO. _____ PROJECT NO. _____ TITLE _____		PLANT LOCATION _____ REF. DWG. NO. _____		ISSUE DATE		SCALE				
POSITION NO. _____		SERIES _____ STEP NO. _____		DRAWING NO. _____		BLDG. NO. _____				

		PROCESS DESIGN SECTION CORPORATE ENGINEERING				FRACTIONATOR TRAY DESIGN DATA SHEET			
		REBOILER TYPE (KETTLE OR THERMOSYPHON) _____				SERVICE _____			
REMARKS		TRAYS NUMBERED FROM TOP OR BOTTOM							
		TRAY NUMBER _____							
		TOWER INSIDE DIAM. (SEE NOTE 1)							
		TOTAL TRAYS IN SECTION							
		TRAY SPACING (INCHES) (SEE NOTE 1)							
		NO. OF LIQUID PASSES (SEE NOTE 1)							
		MAX. ΔP () /TRAY							
		TRAY EFFICIENCY (SEE NOTE 1)							
		ENTRAINMENT (SEE NOTE 1)							
		INTERNAL CONDITIONS							
		VAPOR TO TRAY		MAX.					
		RATE (#/HR.)		MIN.					
		DENSITY (# FT. ³)							
		PRESSURE (PSIA)							
		TEMPERATURE (⁰ F)							
		LIQUID FROM TRAY		MAX.					
		RATE (#/HR.)		MIN.					
		DENSITY (# FT. ³)							
		TEMPERATURE (⁰ F)							
		VISCOSITY, CP							
		SURFACE TENSION (DYNES/CM)							
		FOAMING TENDENCY							
MECHANICAL DATA									
		TOWER MANHOLE _____ I.D. (INCHES) (NOTE 2)				TYPE OF TRAY INSTALLATION:			
PROJ. ENG.		MATERIAL				REMOVABLE <input type="checkbox"/> WELDED <input type="checkbox"/>			
		DECK _____				BOLTED <input type="checkbox"/>			
		CAP _____				HATCHWAY _____			
		HOLDOWN _____							
		NUTS & BOLTS _____							
		SUPPORT RING _____							
		DECK THICKNESS (GAGE). (NOTE 1) _____							
		SUPPORT RING WIDTH & THK. (INCHES) (NOTE 1) _____							
		DOWNCOMER BOLT BAR THK. (INCHES) (NOTE 1) _____							
		CORROSION ALLOWANCE _____							
		TRAYS (INCHES) _____							
		TOWER ATTACHMENTS (INCHES) _____							
		TRAYS INSTALLED FROM TOP OR BOTTOM _____							
		NOTES: 1. VENDOR SHALL FILL IN ALL BLANKS AND RETURN WITH QUOTATION. 2. SMALLEST I.D. THROUGH WHICH TRAY PARTS MUST PASS. 3. WEIR ADJUSTABILITY OF ± 1/2" REQUIRED. 4. VENDORS GUARANTEE: THE VENDOR SHALL BE EXPECTED TO GUARANTEE HIS DESIGN: IF HE CANNOT DO THIS WITHIN THE LIMITS SPECIFIED FOR DIAMETER, TRAY SPACING OR DOWNCOMER AREA, HE SHOULD SUBMIT A DESIGN WHICH HE CAN GUARANTEE FOR THE SPECIFIED SERVICE.							
DATE	INITIATOR	JOB NO. _____ PLANT LOCATION _____ PROJECT NO. _____ REF. DWG. NO. _____				TITLE		SCALE	
	CHECKED BY					ISSUE DATE		BLDG. NO.	
	DRAWN BY	POSITION NO. _____ SERIES _____ STEP NO. _____				DRAWING NO.			
E 144812-									

CATALYTIC CONSTRUCTION COMPANY
PHILADELPHIA 2, PA.

TRAY SPECIFICATION

1	I.D. VESSEL		
2	ITEM NO.		
3	DESIGN TEMP. °F *		
4	I.D. VESSEL MANHOLE		
5	NO. & TYPE TRAYS		
6	TRAY MATERIAL		
7	TRAY CORROSION ALLOW.(Total)		
8	D'CH'R AREA-TOP * Tower Area Sq. Inches		
9	D'CH'R AREA-BOT. * Tower Area Sq. Inches		
10	OUTLET WEIR PERIPHERY		
11	OUTLET WEIR HEIGHT		
12	OUTLET WEIR ADJUSTMENT		
13	OUTLET WEIR NOTCH		
14	INLET WEIR HEIGHT		
15	TRAY MANWAY **		
16	TRAY SPACING		
17	D'CH'R CLEARANCE		
18	SUMP & DRAWDOWN REQUIREMENTS		
19	NO. CAPS PER TRAY		
20	CAP & RISER MATERIAL		
21	CAP & RISER ASSY. TYPE		
22	SIZE OF CAPS		
23	CAP SPACING		
24	CAP SKIRT CLEARANCE		
25	CAP SLOT SPEC.		
26	TOP OF SLOT ABOVE TRAY		
27	TYPE OF SLOT IN CAP		
28	I.D. & HEIGHT OF RISERS		
29	SIZE OF TRAY SUPPORT BAR		
30	TRAY SUPPORT - MATERIAL		
REMARKS:			
0	2	-	
REVISIONS			
* - Trays to be designed for 1/8" Max. Deflection at Design Temp. ** - Tray Manways to be removable from top and bottom			FORM CC-220
APPROVAL:		DATE:	DWG. NO.
			REV.

PROCESS DESIGN SECTION CORPORATE ENGINEERING						TOWER INTERNALS DATA SHEET	
REMARKS	DISTRIBUTOR			SUPPORT PLATE			
	TOWER INSIDE DIA.	MATERIAL	CORROSION ALLOWANCE	TOWER INSIDE DIA.	MATERIAL	CORROSION ALLOWANCE	DESIGN LOAD (LIQUID) LB/SQ. FT/HR
						DESIGN LOAD (VAPOR) LB/SQ. FT/HR	
						DESIGN TEMP. °F or °C	
						MIN. DIA. OF ACCESS	
						PACKING SIZE & TYPE	
						PACKING DEPTH	
						SPECIAL REQUESTS	
APPRV.	DATE	CHKD	Supy.				
REV.							
PROJ. ENG.	DES. SUPRV.						
INITIATOR	DRAWN BY	CHECKED BY					
HOLD-DOWN PLATE				BED LIMITER			
TOWER INSIDE DIA.				TOWER INSIDE DIA.			
MATERIAL				MATERIAL			
CORROSION ALLOWANCE				CORROSION ALLOWANCE			
DESIGN TEMP. °F or °C				DESIGN TEMP. °F or °C			
MIN. DIA. OF ACCESS				MIN. DIA. OF ACCESS			
PACKING SIZE & TYPE				PACKING SIZE & TYPE			
SPECIAL REQUESTS				SPECIAL REQUESTS			
COLLECTOR PLATE				REDISTRIBUTOR			
TOWER INSIDE DIA.				TOWER INSIDE DIA.			
MATERIAL				MATERIAL			
CORROSION ALLOWANCE				CORROSION ALLOWANCE			
DESIGN TEMP. °F or °C				LIQUID FLOW-NORMAL			
LIQUID FLOW-NORMAL				MAX. MIN.			
MAX. MIN.				LIQUID DENSITY			
MIN. DIA. OF ACCESS				SUPPORT LEDGE WIDE x THK.			
SUPPORT LEDGE WIDE x THK.				DESIGN TEMP. °F or °C			
MAX. % LEAKAGE				GAS FLOW			
NO. OF SUMPS				MIN. DIA. OF ACCESS			
GAS FLOW				SPECIAL REQUESTS			
SPECIAL REQUESTS							
JOB NO. PLANT LOCATION				SCALE			
PROJECT NO. REF. DWG. NO.							
TITLE				ISSUE DATE			
POSITION NO. SERIES STEP NO.				BLDG. NO.			
				DRAWING NO.			