

**LUWA CORPORATION**  
**CHARLOTTE, N. C.**

**BILL OF MATERIAL**  
Customer:  
**BALTIMORE, MARYLAND**

Page 1 of 6  
S.O. # T-2230  
Customer P.O. # CR-7116-21.04

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B/M #	Qty.	P.O. # Date Issued	Ship- ment	Description	Vendor Remarks
1	1	1851	7/15/71	Luwa Thin Film Evaporator	Luwa AG
				Type NL3-300/2200/10	Zurich, Switzerland
				Heat Exchange Surface: 21.6 sq.ft.	211'626
				Pressure rating	
				With vacuum inside:	
				- Separator: Not Jacketed	
				- Heating jacket: 150 psig @ sat. steam	
				- Conical Bottom: 100 psig @ sat. steam	
				Outline Dimensions per Dwa. #S.O.2230-1CB	
				Serial #13190	
				Material of Construction:	
				- All product wetted parts: T-316L SS	
				- Heating jackets: Stainless steel	
				- Heating nozzles and flanges: carbon steel	
				- Mechanical seal rings: Stainless steel (stellited) and carbon	
				- Lower Bearing Bushing: Graphite	
				- Lower Bearing Pin: T-316L SS (stellited)	
				- Body Gaskets: Asbestos flat joints and lipwelded	
				- Mech. seal gaskets: Viton A O-rings	
				- Heating nozzle gaskets: Asbestos	
				Major Components:	
				- Thermal Section: (2) st'd. heating bodies w/ tangential heating nozzles.	
				- Separator: St'd w/ baffle basket	
				- Conical Bottom: Jacketed 60° cone	
				- Rotor: st'd rotor machined for 15 mm RT ring and dynamically balanced	

Item No. ~~M1201~~

M-5641

~~\$97495~~

**FOR RECORD**

DATE 5-25-71 BY: HLL

DWG. NO

Revision 

**[Redacted]** Products Group

Rev	Date	Reviewed by:	Approved by: Engineering Manager
0	6/20/02		

**EQUIPMENT - DATA SHEET**

Equipment : M-5641 (Wiped Film Still) (Cone Section) *only!*  
 Manufacturer : Ward Tank & Heat Exchanger Corp. / Newton Machine Co.  
 Year Fabricated : 1999  
 Natl. Board No. : 2391  
 Serial No. : WC-4184 - A  
 Classification : Class 2  
 PSM Covered : Yes  
 P&ID's : 5-F-65  
 TML Dwg. No. : PSM-M5641  
 Contents :

*Cone*      *# 93495*

Item	Vessel	
	Shell	Jacket
<b>Design Conditions</b>		
Internal Pressure (psig)	15	150
External Pressure (psig)	FV	FV
Design Temperature (°F)	365	365
MDMT (°F)	-20	-20
Hydrotesting (psig)	22.5	259
Head Type (top/bottom)	Cone	Cone
Material of construction	SA-240-TP316L	SA-312-TP304 L
Diameter	12.75" (OD)	14" (OD)
Length	1'-4.8125" (OA)	0.3.15625"
Corrosion Allowance	0.00"	0.00"
Heat treatment	None	None
Min. Wall Thickness (shell / cone / pipe)	??? 0.0961"/0.1328"	0.0749
Nom. Wall Thickness (shell / cone / pipe)	0.687" / 0.25" / 0.216"	0.25"
<b>Operating Conditions</b>		
Operating Pressure (psig)	1-5mm Hg	??
Operating Temperature (°F)	170-230	???

**FORM U-1 MANUFACTURER'S DATA REPORT FOR PRESSURE VESSELS**  
As Required by the Provisions of the ASME Code Rules, Section VIII, Division 1

WC-4184-1

1. Manufactured and certified by Ward Tank & Heat Exchanger Corp., 6670 East Harris Blvd., Charlotte, NC 28215  
(Name and address of Manufacturer)

2. Manufactured for Newton MachineCo., 1120 N. Hoskins Rd., Charlotte, NC 28216  
(Name and address of Purchaser) # 93495

3. Location of Installation Unknown  
(Name and address)

4. Type: Vertical Spool Section Jacket WC-4184-1 N/A 99-WC-4184 2389 1999  
(Horiz., vert., or sphere) (Tank separator, J.L. vessel, heat exch., etc.) (Mfg's serial No.) (CRN) (Drawing No.) (Nat'l. Bd. No.) (Year built)

5. ASME Code, Section VIII, Div. 1 Edition 1998, Addenda None N/A N/A  
Edition and Addenda (date) Code Case No. Special Service per UG-120(d)

Items 6 - 11 Incl. to be completed for single wall vessels, jackets of jacketed vessels, shell of heat exchangers, or chamber of multi-chamber vessels.

6. Shell (a) No. of course(s): 1 (b) Overall length (ft & in.): 3-7 5/8"

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter, in.	Length (ft & in.)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	14" O.D.	3'-4 3/8"	SA-312 TP304		.25"	0	N/A	None	85%	N/A	None	85%	N/A	N/A

7. Heads: (a) None (b) None  
(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp

Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A			
	Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.	
(a) None														
(b) None														

If removable, bolts used (describe other fastening) None  
(Mat'l Spec. No., Grade, Size, No.)

8. Type of jacket Type 1 CONE Jacket closure Bar  
(Describe as cage & weld, bar, etc.)  
If bar, give dimensions 1 5/8" x 1 5/8" if bolted, describe or sketch.

9. MAWP 150 15 psi at max. temp. 365 -- °F Min. design metal temp. -20 °F at 150 psi.  
(internal) (external) (internal) (external)

10. Impact test No  
(Indicate yes or no and the component(s) impact tested)

11. Hydro., ~~XXXX~~, or ~~XXXX~~ test press 259 Proof test N/A

Items 12 and 13 to be completed for tube sections.

12. Tubesheet: None  
Stationary (Mat'l Spec. No.) Dia., in (subject to press.) Nom. thk., in. Corr. Allow., in. Attachment (welded or bolted)  
None Floating (Mat'l Spec. No.) Dia., in. Nom. thk., in. Corr. Allow., in. Attachment

13. Tubes: None  
Mat'l Spec. No., Grade or Type O. D., in. Nom. thk., in. or gauge Number Type (Straight or U)

Items 14 - 18 Incl. to be completed for inner chambers of jacketed vessels or channels of heat exchangers.

14. Shell (a) No. of course(s): 1 (b) Overall length (ft & in.): 3-7 7/8"

Course(s)			Material		Thickness		Long. Joint (Cat. A)			Circum. Joint (Cat. A, B & C)			Heat Treatment	
No.	Diameter, in.	Length (ft. & in.)	Spec./Grade or Type		Nom.	Corr.	Type	Full, Spot, None	Eff.	Type	Full, Spot, None	Eff.	Temp.	Time
1	12 3/4"	3'-7.71875"	SA-312 TP316L		.687"	0	N/A	Spot	85%	N/A	None	85%	N/A	N/A

15. Heads: (a) None (b) None  
(Mat'l Spec. No., Grade or Type) H.T. - Time & Temp

Location (Top, Bottom, Ends)	Thickness		Radius		Elliptical Ratio	Conical Apex Angle	Hemispherical Radius	Flat Diameter	Side to Pressure		Category A			
	Min.	Corr.	Crown	Knuckle					Convex	Concave	Type	Full, Spot, None	Eff.	
(a) None														
(b) None														

If removable, bolts used (describe other fastening) None  
(Mat'l Spec. No., Grade, Size, No.)

16. MAWP 15 165 psi at max. temp. 365 365 ° F Min. design metal temp. -20 ° F at 15 psi  
(internal) (external) (internal) (external)

17. Impact test No  
(Indicate yes or no and the component(s) impact tested)

18. Hydro., ~~burst~~, or ~~burst~~ test pressure N/A Proof test N/A

19. Nozzles, inspection, and safety valve openings:

Purpose (Inlet, Outlet, Drain, etc.)	No.	Diameter or Size	Flange Type	Material		Nozzle Thickness		Reinforcement Material	How Attached		Location (Insp. Open.)
				Nozzle	Flange	Nom.	Corr.		Nozzle	Flange	
In / Out	2	2"	Cl300 WN	SA-312 Ty TP304L	SA-182 Ty F304L	S80s	0	None	Welded	Welded	Jacket

20. Supports: Skirt No Lugs -- Legs -- Others -- Attached   None    
(Yes or No.) (No.) (No.) (Describe) (Where and How)

21. Manufacturer's Partial Data Reports properly identified and signed by Commissioned Inspectors have been furnished for the following items of the report:  
(List the name of part, item number, mfg's. name and identifying number)  
None

22. Remarks: The customer is responsible for the pressure relief device per UG 125 (a)  
Customer P.O. No. 18440.

*Handwritten:* 183495

**CERTIFICATE OF SHOP COMPLIANCE**

We certify that the statements made in this report are correct and that all details of design, material, construction, and workmanship of this vessel conform to the ASME Code for Pressure Vessels, Section VIII, Division 1.

U Certificate of Authorization No. 18,365 Expires 2-17 2002

Date 9-1-99 Name Ward Tank & Heat Exchanger Corp. Signed Michael C. Maloney  
(Manufacturer) (Representative)

**CERTIFICATE OF SHOP INSPECTION**

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of NC and employed by NC Department of Labor of Raleigh, NC have inspected

the pressure vessel described in this Manufacturer's Data Report on 7-26-99, and state that, to the best of my knowledge and belief, the Manufacturer has constructed this pressure vessel in accordance with ASME Code, Section VIII, Division 1. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

Date 9-1-99 Signed Ron Pame Commissions NB 11458 (A) (B), NC 1359  
(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

**CERTIFICATE OF FIELD ASSEMBLY COMPLIANCE**

We certify that the statements on this report are correct and that the field assembly construction of all parts of this vessel conforms with the requirements of ASME Code, Section VIII, Division 1.

U Certificate of Authorization No.   Expires  

Date   Name   Signed    
(Assembler) (Representative)

**CERTIFICATE OF FIELD ASSEMBLY INSPECTION**

I, the undersigned, holding a valid commission issued by The National Board of Boiler and Pressure Vessel Inspectors and the State or Province of   and employed by   of   have compared the statements in this Manufacturer's Data Report with the described pressure vessel and state that parts referred to as data items

 , not included in the certificate of shop inspection, have been inspected by me and to the best of my knowledge and belief, the Manufacturer has constructed and assembled this pressure vessel in accordance with ASME Code, Section VIII, Division 1. The described vessel was inspected and subjected to a hydrostatic test of   psi. By signing this certificate neither the Inspector nor his employer makes any warranty, expressed or implied, concerning the pressure vessel described in this Manufacturer's Data Report. Furthermore, neither the Inspector nor his employer shall be liable in any manner for any personal injury or property damage or a loss of any kind arising from or connected with this inspection.

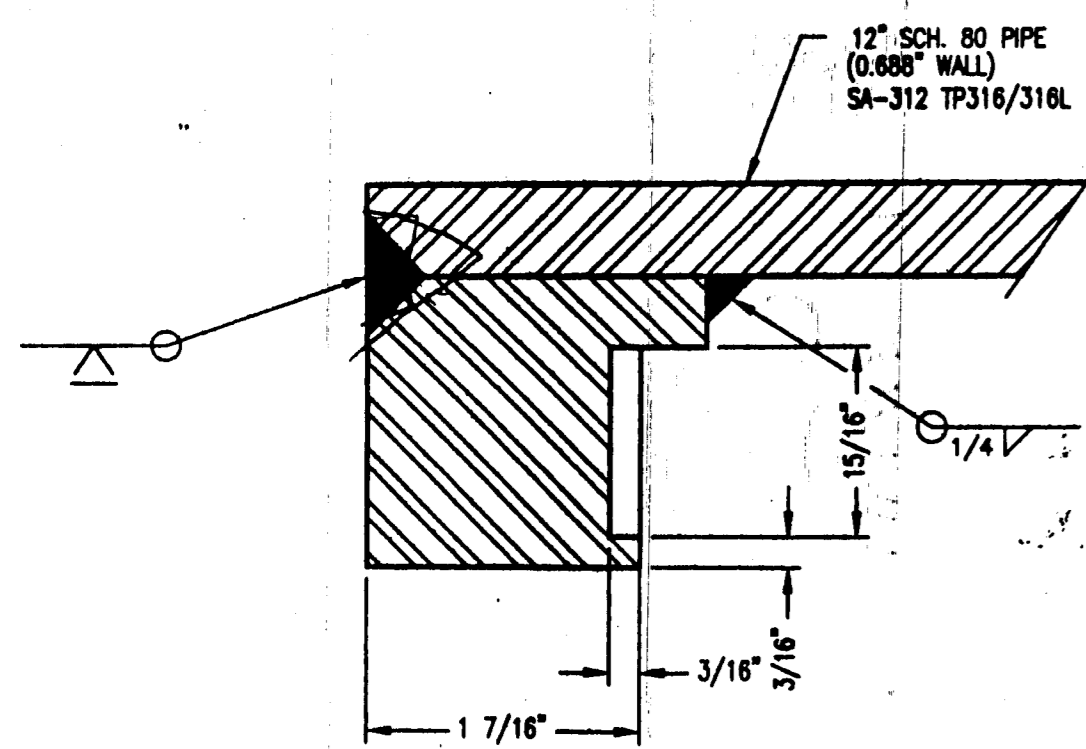
Date   Signed   Commissions    
(Authorized Inspector) (Nat'l Board incl. endorsement, State, Province and No.)

NATIONAL BOARD SERIAL NO. **LATER**  
 FABRICATED & CERTIFIED BY  
**WARD TANK AND HEAT EXCHANGER CORP**  
 CHARLOTTE, N.C.

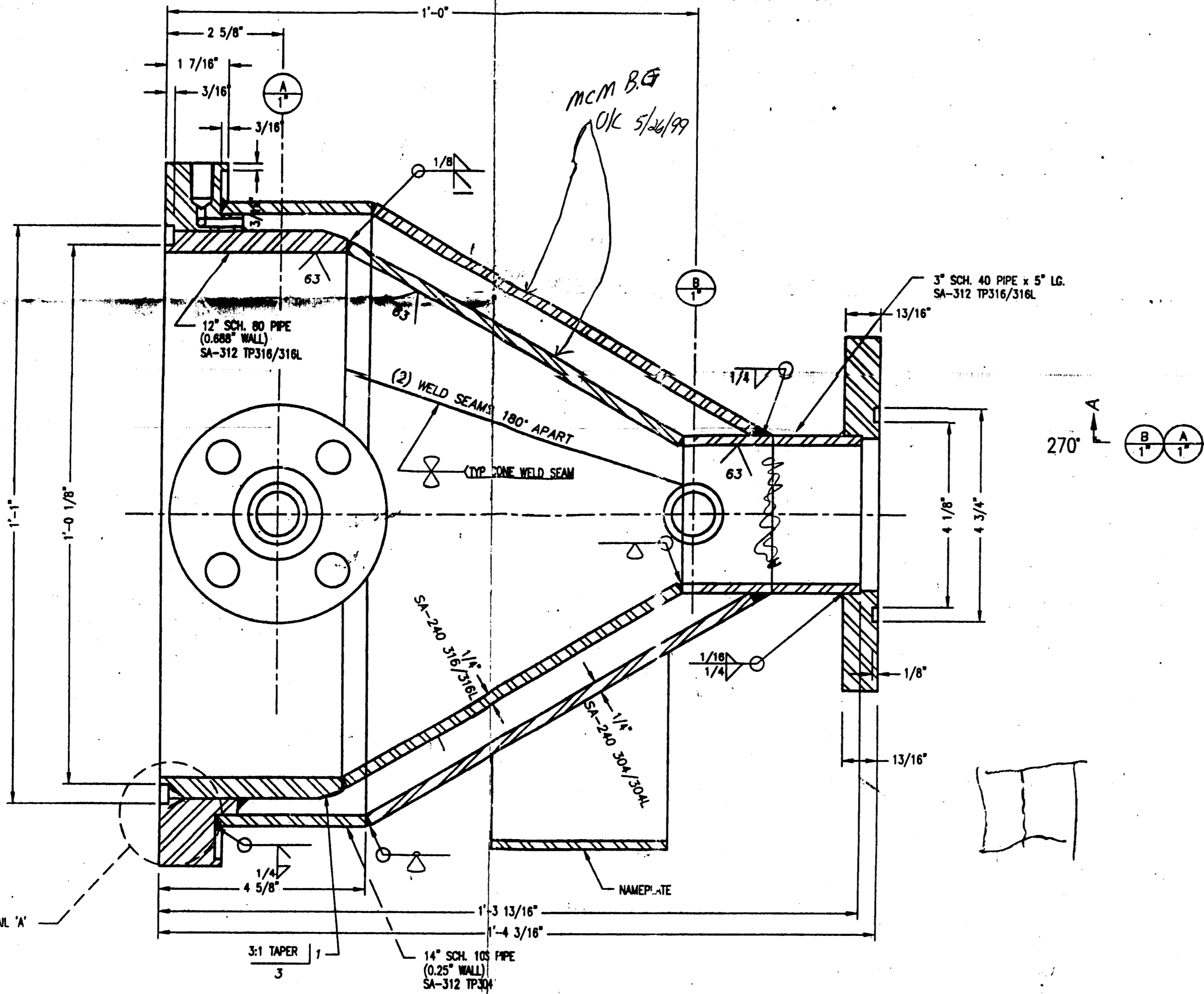
SHELL	MAWP: FV/15	PSI @ 365 F
JKT./TUBE SIDE	MAWP: FV/150	PSI @ 365 F
SHELL	MDMT: -20 F @	15 PSI
JKT./TUBE SIDE	MDMT: -20 F @	150 PSI
TEST PRESS.	SHELL: -	PSI JKT./TUBE SIDE: 259 PSI
MFGR. S. N.	WC-4184A	YR. BUILT: 1999
CUSTOMER	NEWTON MACHINE CO.	
P.O. NO.	18440	DATE: 4.30.99
NOMENCLATURE	118220B0	
EQUIP. NO.		

JACKET ALSO RATED FOR 125 PSI @ 650 F

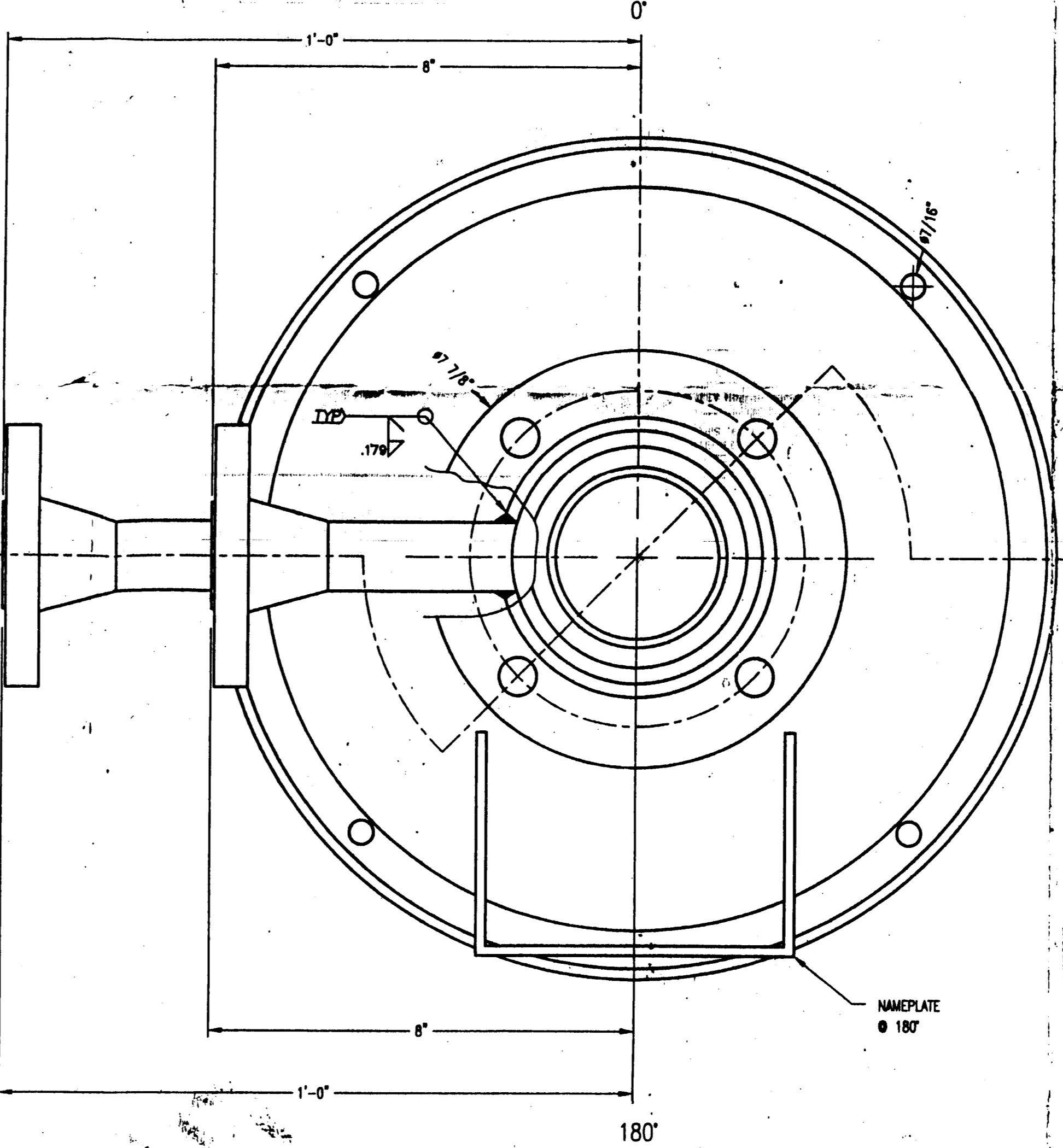
MARK	QTY	SIZE	SERIES	TYPE	MATL	FLG BORE	SERVICE	ITEM NO.	WALL THK	SCH	MATL	INT. RAD.	THK	O.D.	PROJ- ECTION	ORIEN- TATION	NECK O S PAD	ATTACH- MENT NO.	REMARKS
A	1	1"	CL 300	RFWN	304L	BOS			.170"	BOS	304/304L	1/8"							
B	1	1"	CL 300	RFWN	304L	BOS			.170"	BOS	304/304L	1/8"							



DETAIL 'A'  
SCALE: 12" = 1'-0"



SECTION A-A  
SCALE: 6" = 1'-0"  
(SEE RIGHT END VIEW FOR CORRECT ORIENTATION)



RIGHT END VIEW  
SCALE: 6" = 1'-0"

**DESIGN DATA**

DESIGN CONDITIONS:  
 SHELL: INT. 15 Paig @ 365 F  
 COIL: - Paig @ - F  
 JACKET: FULL VACUUM & 150 Paig @ 365 F

HYDROSTATIC TEST:  
 SHELL: - Paig  
 COIL: - Paig  
 JACKET: 259 Paig

SPECIFIED CORROSION ALLOWANCE: NONE  
 RADIOGRAPHY: NONE STRESS RELIEF: NONE  
 SHELL MAWP: 150 Paig LIMITED BY: SHELL  
 CODE: ASME SECT. VIII, DIV. 1, 1998 ED., NO ADDENDA STAMP: YES  
 TYPE HEADS:  
 SHELL SIDE: NONE  
 JACKET: -  
 JOINT EFFICIENCY: NONE  
 SHIPPING WEIGHT: ~175 # TEST WEIGHT:  
 SPECIFIC GRAVITY: 1.0

**MATERIALS**

SHELL: VESSEL: SA-240 316/316L DUAL GRADE SA-312 TP316/316L DUAL GRADE  
 JACKET: SA-240 316/316L DUAL GRADE SA-312 TP316/316L DUAL GRADE  
 HEAD: VESSEL: -  
 JACKET: -  
 COUPLINGS: -  
 FITTINGS: -  
 INTERNAL BAFFLES: -  
 FLANGES: SA-182 F304/304L; SA-240 316L  
 RATING: CL 300 ANSI B16.5  
 FACING: RAISED FACED - STANDARD FINISH  
 EXTERNAL PIPE SPEC.: SA-312 TP304/304L (WELDED) 839.19 DUAL GRADE  
 INTERNAL PIPE SPEC.: SA-312 TP316/316L (WELDED) 839.19 DUAL GRADE  
 NECK PLATE: -  
 CLADDING SPEC.: -  
 REINFORCING PADS: -  
 GASKETS: -  
 SUPPORTS: -  
 INSULATION: -  
 PAINTING: -  
 INTERIOR FINISH: MILL

- NOTES**
- ORIENTATION MEASURED CLOCKWISE FROM 0°.
  - NOZZLE BOLT HOLES TO STRADDLE 0°-180° CENTERLINE OR ITS PARALLEL UNLESS NOTED OTHERWISE.
  - COVER ALL FLANGES, OPENINGS AND MACHINED SURFACES PRIOR TO SHIPMENT UNLESS NOTED OTHERWISE.
  - WELDING PROCEDURES:  
 # 5 GTAW S.S. TO S.S.  
 # 8 SMAW S.S. TO S.S.  
 # 36 FCAW S.S. TO S.S.
  - TOLERANCES PER WTC SPEC. UG-1-3.
  - INSPECTION BY WTC Q.C., A.I., & CUSTOMER.
  - NAMEPLATE BRACKET IS SA-240 304 CHANNEL SHAPE, 4 1/4" HIGH x 6 1/2" LG. ON 1 1/2" STAND-OFFS (WELDED TO VESSEL)
  - PROJECTION MEASURED FROM OUTSIDE OF VESSEL TO EXTREME FACE OF FLANGE.

SHOP PRINT  
 By: *[Signature]*  
 Date: MAY 14 1999

**WTC** WARD TANK AND HEAT EXCHANGER CORP  
 8870 EAST HARRIS BOULEVARD  
 CHARLOTTE, NORTH CAROLINA 28215

CUSTOMER: NEWTON MACHINE CO. CHARLOTTE, NC  
 PURCHASE ORDER NUMBER: 18440

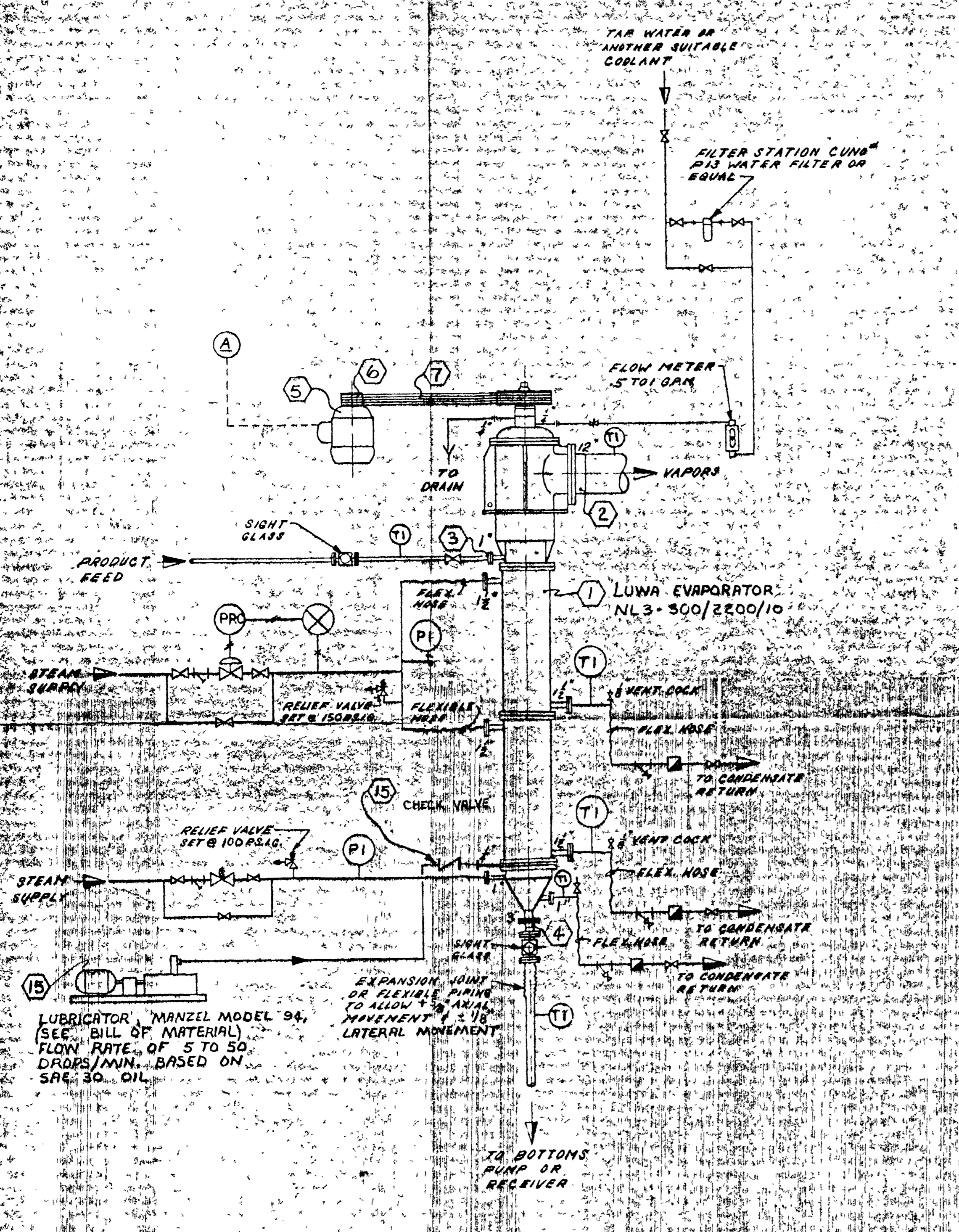
TITLE: 118220B0

0	5.10.99	RELEASED FOR FABRICATION	LDW				
REV. NO.	DATE	DESCRIPTION	BY	EQUIPMENT NO.	NO. RECD	1	

CHECKED BY: *[Signature]* DATE: 5.10.99 DRAWING NUMBER: 99-WC-4184A REV. NO.: 0  
 DRAWN BY: LDW SCALE: As Noted SHEET 2 OF 2

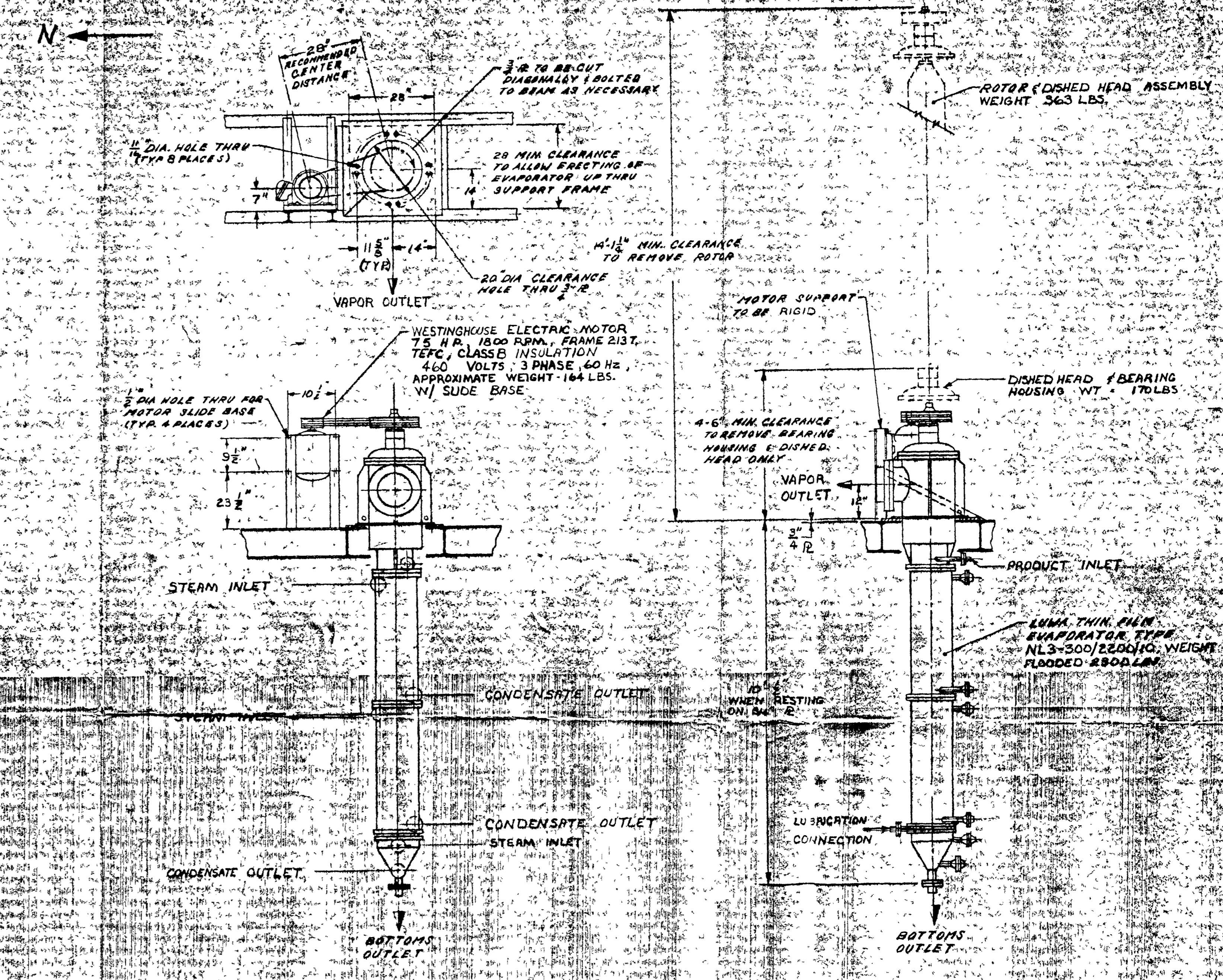
REPLACED BY CONE # 93495





**SUGGESTED  
PIPING SCHEMATIC  
AND FLOW SHEET  
FOR NL3-300-2200-10**

LUBRICATOR, MANZEL MODEL 94.  
(SEE BILL OF MATERIAL)  
FLOW RATE OF 5 TO 50  
DROPS/MIN. BASED ON  
SAE 30 OIL



**SUGGESTED  
STRUCTURAL ARRANGEMENT  
FOR LUMA EVAPORATOR & MOTOR**

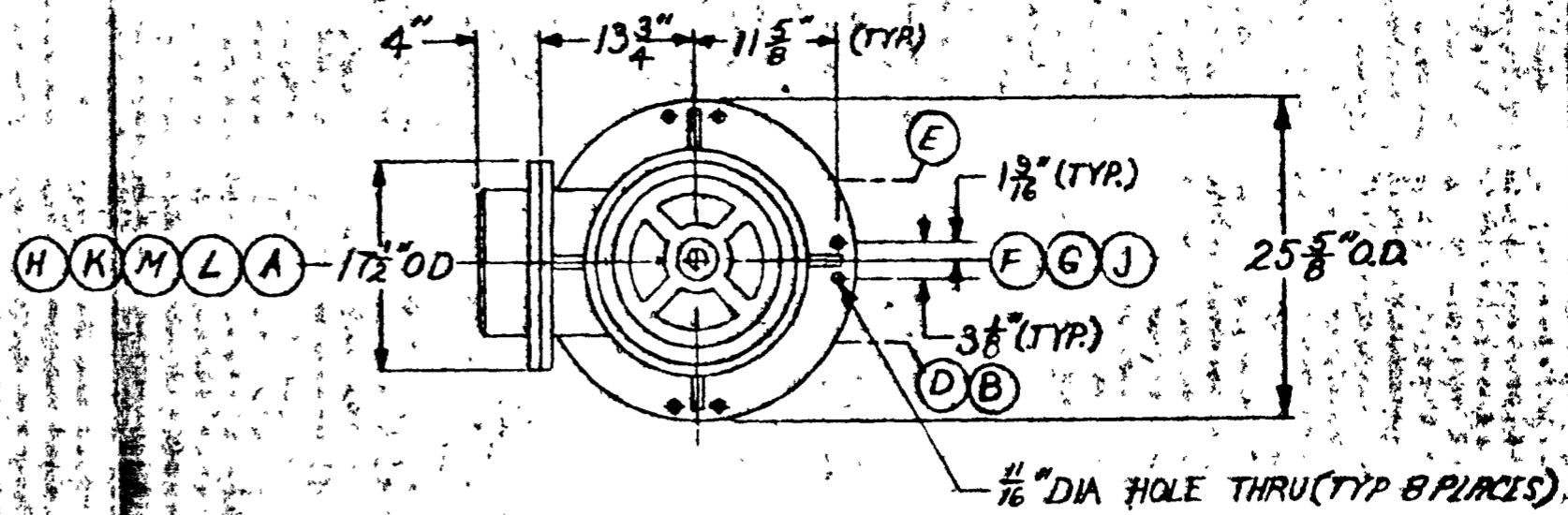
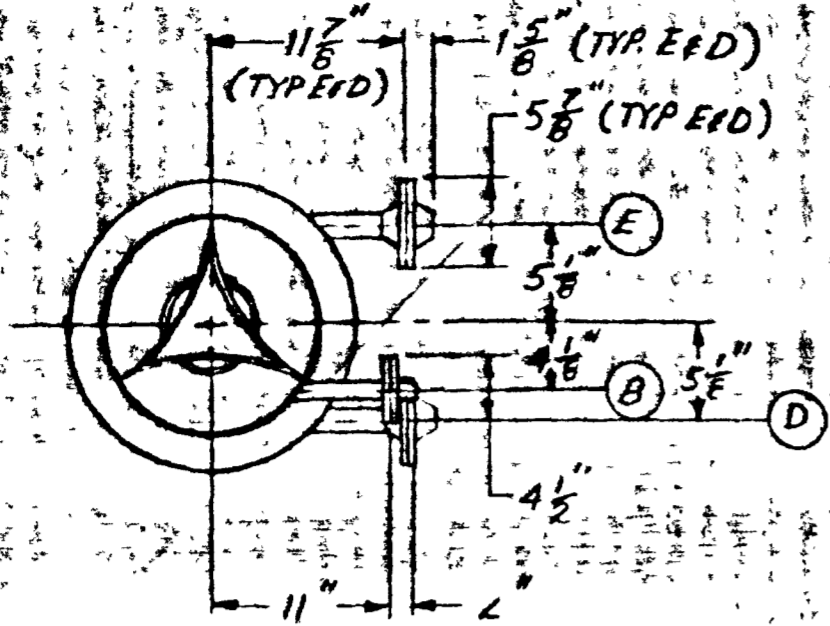
**NOTE:**  
1. SEE DWG. NO. 2230-1CB FOR  
SIZE, NOZZLE ORIENTATION  
AND OUTLINE DIMENSIONS  
OF LUMA EVAPORATOR  
2. NUMBERS IN HEXAGONS REFER  
TO BILL OF MATERIAL ITEM NOS.

CRAWFORD & RUSSELL, RO. NO. CR-716-21-04  
EQUIPMENT ITEM NO. M-1201

# 97495  
JUL 2 1971  
7116-2104  
M-1201  
**FOR RECORD**

DATE	BY	REVISION	DESCRIPTION
APR 71	APR	A	ISSUED
MAY 71	APR	B	REVISED
JUN 71	APR	C	REVISED

7116-2104  
M-1201



14'-1 1/2" MIN. CLEARANCE TO REMOVE ROTOR

SECTION: A-A  
(SCALE: 1"=1'-0")

CERTIFIED PRINT FOR  
CRAWFORD & RUSSELL / FMC

APPROVED FOR C&R P.O. NO. CR-7116-21.04

LUMA CORPORATION

BY *[Signature]* DATE 6-28-71

DO NOT SCALE DRAWING

**GENERAL NOTES:**

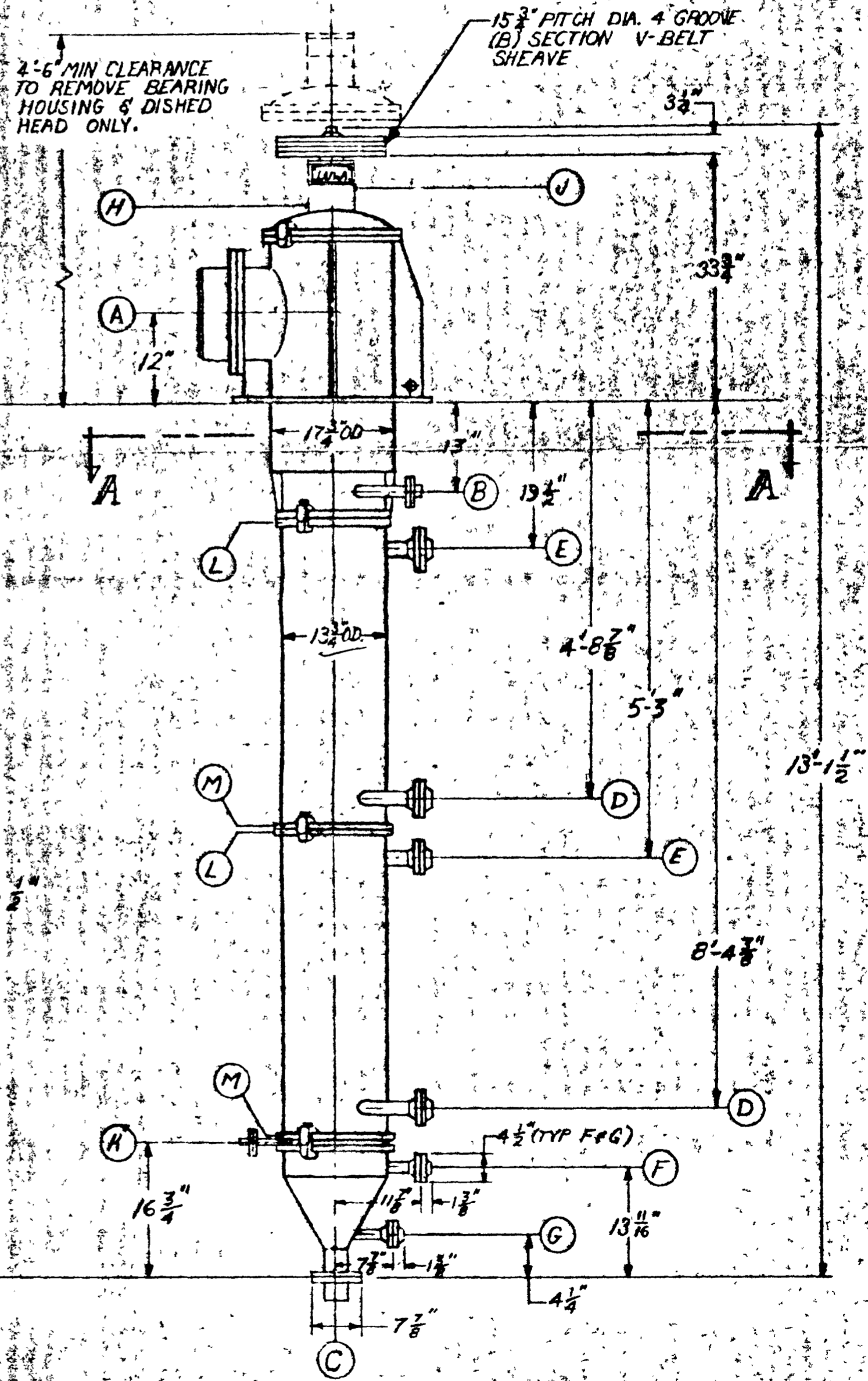
- 1) HEATING SURFACE \_\_\_\_\_ 21.6 SQ. FT.
- PRESSURE RATING WITH INSIDE UNDER VACUUM.
- HEATING JACKET \_\_\_\_\_ 150 PSIG @ SAT. STEAM
- SEPARATOR \_\_\_\_\_ NOT VACKETED
- CONICAL BOTTOM JACKET \_\_\_\_\_ 100 PSIG @ SAT. STEAM
- WEIGHTS:
- UNIT EMPTY \_\_\_\_\_ 1650 LBS.
- UNIT FLOODED \_\_\_\_\_ 2300 LBS.
- ROTOR & DISHED HEAD ASSEMBLY \_\_\_\_\_ 363 LBS.
- DISHED HEAD & BEARING HOUSING \_\_\_\_\_ 170 LBS.

CRAWFORD & RUSSELL P.O. NO. CR 7116-21.04  
EQUIPMENT ITEM NO. M-1701

**FOR RECORD**

NOZZLE	QTY	SERVICE	DESCRIPTION	REMARKS
M	2	JACKET DRAIN	1/2" FNPT	PLUGGED
L	2	JACKET VENT	1/2" FNPT	PLUGGED
K	1	LUBRICANT CONN.	1" @ 150" DIN FEMALE TEG FLG	MATING FLANGE 1/2" @ 150" DIN MALE TEG FLG
J	1	SEAL COOLANT OUTLET	1/2" FNPT	PLUGGED (TO BE REMOVED)
H	1	SEAL COOLANT INLET	1/2" FNPT	PLUGGED (TO BE REMOVED)
G	1	COND. OUTLET	1" @ 300" DIN FEMALE TEG FLG	MATING FLANGE 1" @ 300" DIN MALE TEG FLG
F	1	STEAM INLET	1" @ 300" DIN FEMALE TEG FLG	MATING FLANGE 1" @ 300" DIN MALE TEG FLG
E	2	STEAM INLET	1/2" @ 300" DIN FEMALE TEG FLG	MATING FLANGE 1/2" @ 300" DIN MALE TEG FLG
D	2	COND. OUTLET	1/2" @ 300" DIN FEMALE TEG FLG	MATING FLANGE 1/2" @ 300" DIN MALE TEG FLG
C	1	PRODUCT OUTLET	3" @ 150" DIN FEMALE TEG FLG	MATING FLANGE SEE LUMA DWG # 1563 BA
B	1	PRODUCT INLET	1" @ 150" DIN FEMALE TEG FLG	MATING FLANGE SEE LUMA DWG # 1676 BA
A	1	VAPOR OUTLET	1/2" @ 150" DIN FEMALE TEG FLG	MATING FLANGE SEE LUMA DWG # 1559 BA

NOZZLE SCHEDULE



JUL 2 1971