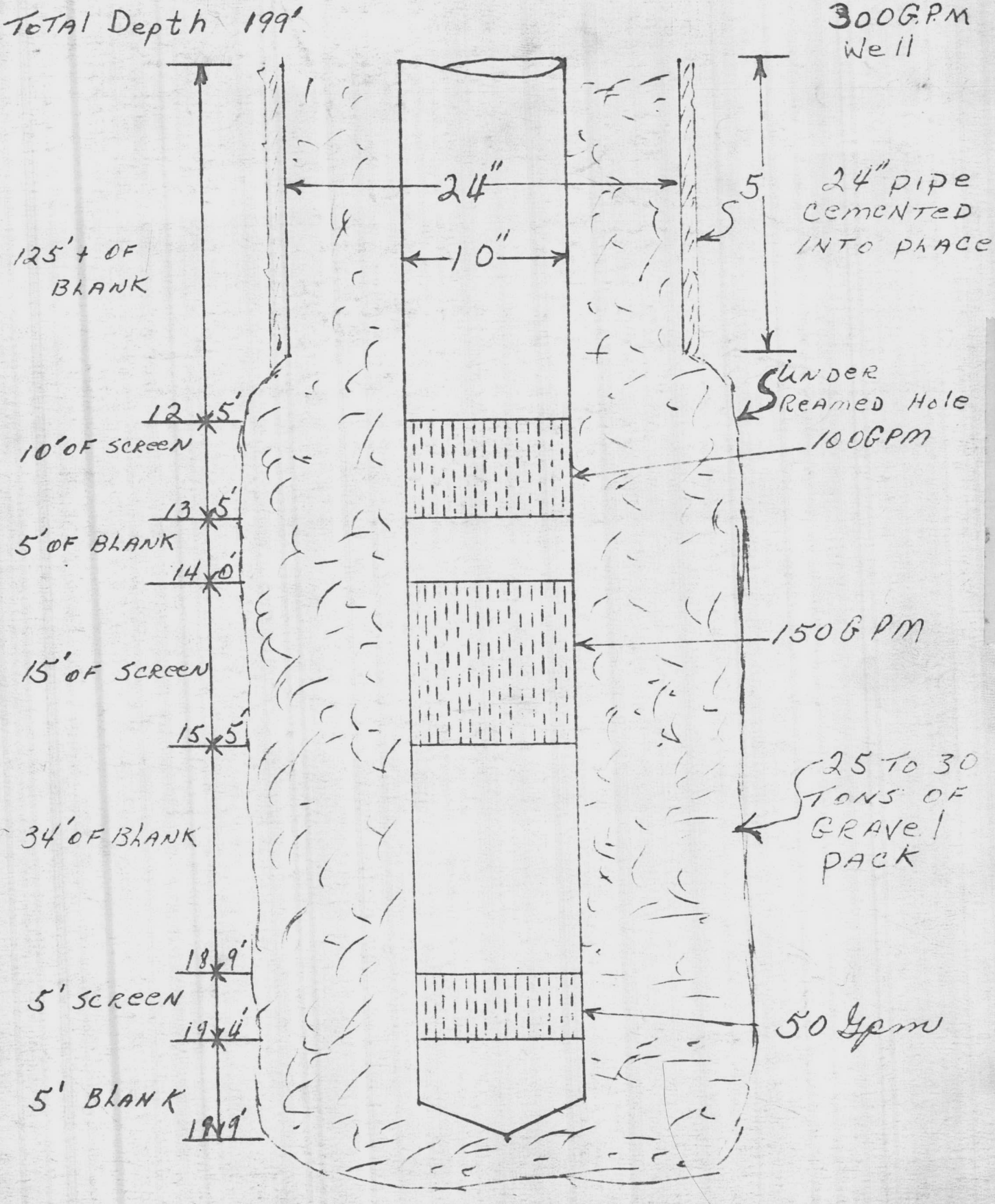
CHKD. BY _____ New Construction @ Camp Lejeune, NC JOB NO. 40126

Proposed sketch of Well #9



North [redacted]olina Department of Environment, Health, and [redacted]
Division of Environmental Health, Public Water Supply Section

SOURCE INFORMATION
GROUND WATER

Date Form Completed: M M D D Y Y = 0 1 2 5 9 5

PWSID: 0 4 6 1 7 0 4

Owner Assigned Source Code: 6 5 1

Well Name (If purchase, name of system): H A D N O T P O I N T 6 5 1

Code: G

G=Ground
W=Purchase/G
Y=G w/direct influence
Z=W w/direct influence

If Purchase, seller ID#:

Source Begin Date (M M Y Y):

Source exempt—SWTR? Y N

Direct Influence Date (M M D D Y Y):

Availability: O

P=Permanent
E=Emergency
I=Interim
S=Seasonal
O=Other

T/B ABANDONED

Location of well within the system (If purchase, location of master meter): O L D P I N E Y G R E E N R O A D

Latitude (N) Deg. Min. Sec.: 3 4 4 1 4 1.

Longitude (W) Deg. Min. Sec.: 0 7 7 1 9 2 7.

How Determined: G
G=GPS
M=Map
S=Surveyed

GPS Data: Q # or DOP #

No. of Sats. Locked on:

(If purchase, use seller's primary source lat/long)

Vulnerable (VOCs)? Y N

Assessment Date (M M D D Y Y):

ENTRY POINT INFORMATION

Use Code: C
C=Ground/Permanent
D=Ground/non-permanent

Availability: P
P=Year-round
E=Emergency
S=Seasonal
I=Interim
O=Other

Owner Assigned Entry Point Code: 1 0 0

Entry Point Name: H P 6 5 1

Location:

Well Site: Owned or controlled? ____ (Y,N) Control Area (100' radius)? ____ (Y,N) If no, explain:

Sources of pollution/distance:

Surface water within 200'? Y N If yes, actual distance ___ feet If yes, bact. samples collected? ____ (Y,N)

Adequate slope? ____ (Y,N) Flooding? ____ (Y,N) Maintenance:

Well House: Free of stored materials? ____ (Y,N) Properly drained? ____ (Y,N) Locked? ____ (Y,N)

Condition of house: Type of freeze protection:

Well: Diameter: 8" Type: SCREENED Yield (gpm): 242 Properly sealed? ____ (Y,N

Properly vented? ____ (Y,N) Casing depth 5 0 ft. (If unknown, put 'UNK') Well depth: 199' Meter available? N (Y,N

Concrete slab adequate? ____ (Y,N) If no, explain: Size:

Size of blow-off: 4" (V) Sample tap: Before treatment? ____ (Y,N) After treatment? ____ (Y,N

Pumps: Capacity: GPM: 200 HP: 20 Pump intake depth: 126 Auxiliary Power? Y (Y,N

Type pump: VERTICAL TURBINE Height above floor (pump/casing): 10" /

Storage at well site: Elev: Hydro: Ground:

If hydroautomatic, air volume control? ____ (Y,N) Safety valves? ____ (Y,N) Coded? ____ (Y,N)

High service pumps: 1. ____ gpm ____ hp 2. ____ gpm ____ hp 3. ____ gpm ____ hp Auxiliary Power? ____ (Y,N

Is the water treated at this well? N Y N If yes, complete back of form.

If other wells are treated here, which ones? If treated elsewhere, where? HP-20 PLANT

If purchase, retreat? Y N If yes, complete back of form.

DEHNR 3803 (Revised 12/93)
Public Water Supply Section (Revised 12/95)

CONTAMINATED

*

WELL NUMBER 651 BY Thomas J Brown DATE 10-29-84

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
125	40	60	20	90	104	0800
		65	25	86	115	0810
		68	28	83	122	0820
		71	31	80	130	0830
		75	35	77	143	0840
		78	38	74	151	0850
		84	44	71	159	0900
		85	45	68	175	0910
		89	49	65	185	0920
		98	58	62	214	0930
		100	60	58	221	0940
REMARKS		102	62	55	236	0950
left set at →		109	69	52	242	1000
						1011

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER	651	BY THOMAS / RAYNOR			DATE 9-14-83	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1030
125	48	90	42	75	164	1042
		99	51	70	190	1044
		104	56	65	203	1105
		111	63	61	221	1116
		117	69	56	239	1133

REMARKS

used direct reading gage

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

~~602~~

DATE	LENGTH OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF DRAW DOWN (GPM)	TOTAL CAP.
~~Nov. 30, 81~~	~~60'~~	~~30'~~	~~58'~~	~~28~~	~~28 LD~~		~~90 GPM~~
651						start	1030
July 26	125'	48'	83'	35	80	130	1040
			89	41	77	151	1050
			92	44	74	162	1100
			99	51	71	183	1110
			107	59	63	207	1120
			115	67	56	232	1142

REMARKS:

used direct reading gage

left set at 56 lbs. P/L 115 D/D 67 GPM 232

WELL # 651

DATE	LENGTH OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF DRAW DOWN	TOTAL CAP.
3/31/77	125	21	92	71	70		159
			92	71	68		175
			93	72	66		175
			94	73	(64)		190
			97	76	62		205
			105	84	55		228
			108	87	50		254
			115	94	40		
1-10-79		99	20'	79'	60		215
REMARKS:			12'	87'	50		269
			25'	74'	65		167
			31'	68'	70		151
2-13-80			109'		65		224
			116'		60		239
			108'		70		178

EPTH OF ELL: 199'
AIRLINE LEVATION: + -
ATE NSTALLED:

CORBIN CONSTRUCTION COMPANY
Camp LeJeune, North Carolina
Pumping Test, Well No. 9
December 30, 1971

Static Level 21' 0"

TIME	GPM	PUMPING LEVEL
9:45	150	21'
10:00	150	50'
10:15	150	51'
10:30	150	53'
10:45	150	54'
11:00	150	54'
11:15	150	58'
11:30	150	59'
11:45	150	59'
12:00	150	59'
12:15	150	59'
12:30	150	59'
12:45	200	68'
1:00	200	68'
1:15	200	65'
1:30	200	65'
1:45	200	66'
2:00	200	66'
2:15	200	66'
2:30	200	66'
2:45	200	66' DD 45'
3:00	250	78'
3:15	250	78'
3:30	250	80'
3:45	250	80'
4:00	250	80'
4:15	250	80'
4:30	250	80'
4:45	300	93'
5:00	300	93'
5:15	300	93'
5:30	300	93'
5:45	300	93'
6:00	300	93'
6:15	300	93'
6:30	300	93'
6:45	300	93'
7:00	300	93'
7:15	300	93'
7:30	300	93'
8:00	300	93'
8:30	300	93'
9:00	300	93'
10:00	300	93'
11:00	300	93'
12:00	300	93'
1:00	300	93'
2:00	300	93'
3:00	300	93'
4:00	300	93'
5:00	300	93'
6:00	300	93'
7:00	300	93'
8:00	300	93'
9:00	300	93'
10:00	300	93'

99
66
33

January 6, 1972

TIME	GPM	PUMPING LEVEL
4:00	335	114' 5"
5:00	335	115'
6:00	335	115'
7:00	335	115'
8:00	335	115'
9:00	335	115'
10:00	335	115'
11:00	335	115'
12:00	335	115'
1:00	335	115'
2:00	335	115'
3:00	335	115'
4:00	335	115'
5:00	335	115'
6:00	335	115'
7:00	335	115'
8:00	335	115'
9:00	340	115'
10:00	325	115'
11:00	340	115'
12:00	335	115'
1:00	349	115'
2:00	345	115'
3:00	340	115'
4:00	340	115'

DEPTH OF WELL 199'
PUMP SETTING 110'
G.P.M. 200
T.D.H. 226'
PUMPING LEVEL 66'
DRAW DOWN 45'
DISCHARGE PRESS

Top of Screen Line 125 feet

Layne-ATLANTIC COMPANY
ASSOCIATED WITH LAYNE & BOWLER, INC.
P. O. BOX 7095 • NORFOLK, VIRGINIA 23509

FACTORY AND GENERAL OFFICE
MEMPHIS, TENN.
SALES OFFICES
ALBANY, GA.
GLEN BURNIE, MD.
NORFOLK, VA.
ORLANDO, FLA.
SAVANNAH, GA.

WELL WATER SYSTEMS
PUMPING EQUIPMENT
WATER CONDITIONING EQUIPMENT

JOB #40936

FORMATION SAMPLES LOG

CORBIN CONSTRUCTION CO.
Camp Lejeune, N.C.
Well #9
November 10, 1971

0 - 10'	Sand and clay
10 - 20'	Sand and clay
20 - 30'	Sand and clay
30 - 40'	Sand
40 - 50'	Sand
50 - 60'	Sand and limestone
60 - 70'	Sand and limestone
70 - 80'	Sand and limestone
80 - 90'	Limestone
90 - 100'	Limestone
100 - 110'	Sand and limestone
110 - 120'	Sand and limestone
120 - 130'	Sand and limestone
130 - 140'	Sand and limestone
140 - 150'	Sand and limestone
150 - 160'	Sand and limestone
160 - 170'	Sand and limestone
170 - 180'	Sand and limestone
180 - 190'	Sand and limestone
190 - 200'	Sand and limestone
200 - 210'	Sand and limestone
210 - 220'	Sand
220 - 230'	Sand and clay
230 - 240'	Clay
240 - 250'	Sand and clay
250 - 260'	Sand and limestone
260 - 270'	Sand
270 - 280'	Sand
280 - 290'	Sand
290 - 300'	Sand
300 - 310'	Sand

"Hello Analysis, Goodbye Worry"

WATER ANALYSIS LABORATORY
802 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512

(803) 479-4639

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
DEVELOPERS
IRRIGATION
OTHERS

DATE: December 4, 1971

Report To: Layne-Atlantic Co.
Norfolk, Va.

Date Analyzed: 12/4/71 651

Sample Number: Camp Lejuene, #9
170'-190', Sample #2

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.2	Carbon Dioxide (CO_2)	25
Iron (Fe)	0.15	Total Acidity ($CaCO_3$)	43
Nitrate (NO_3)	Trace	Calcium Hardness ($CaCO_3$)	181
Fluoride (F)	0.3	Magnesium Hardness ($CaCO_3$))	23
Manganese (Mn)	0	Carbonate Hardness ($CaCO_3$)	204
Total Hardness ($CaCO_3$)	204	Noncarbonate Hardness ($CaCO_3$)	0
Chlorides (Cl)	8	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	5.6	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0.7	Bicarbonate Alkalinity ($CaCO_3$)	208
Magnesium (Mg)	5.5	Total Alkalinity ($CaCO_3$)	208
Calcium (Ca)	72	Total Dissolved Solids	234
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°c)	360
Bicarbonate (HCO_3)	254	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionable

Water Analysis Laboratory
802 Hamlet Highway
Bennettsville, South Carolina 29512

SIGNED: _____
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

FORM A-4
(MAY '70)

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
OFFICE OF WATER DATA COORDINATION

INVENTORY OF HYDROLOGIC DATA STATIONS
QUALITY OF WATER

APPROVED.
Budget Bureau No. 42-R1485
Approval Expires June 30, 1976

1. AGENCY CODE	2. TYPE	3. LATITUDE	4. LONGITUDE	
MC	Q	34° 41' 41" N	77° 19' 26" W	

6. AGENCY STATION NO.	7. STATION NAME
HP-651	HP-20-651

8. DRAINAGE BASIN CODE No.	Letter	9. STATE CODE	10. COUNTY CODE	11. COUNTY NAME
06	N	32	133	Onslow

12. PERIOD OF RECORD Began	Discontinued	Y ☐ Continuous Interruption Exceeds 1 Year	13.	14.
1972				

15. SITE

- ☐ 101 Stream
- ☐ 102 Canal
- ☐ 103 Lake
- ☐ 104 Reservoir
- ☐ 105 Estuarine zone
- ☐ 106 Spring
- ☒ 107 Well
- ☐ 108 Drain
- ☐ 109 Other

16. TYPES OF DATA AVAILABLE AND FREQUENCY OF MEASUREMENT (Enter appropriate number (1-8) beside each parameter to indicate frequency of measurement. For parameters telemetered, enter "T".)

1 Continuous
2 Seasonal
3 Daily
4 Weekly
5 Monthly
6 Quarterly
7 Annual
8 Other Periodic

Physical

311 ___ Temperature
312 ___ Specific conductance
313 ___ Turbidity
314 ___ Color
315 ___ Odor
316 ___ pH (field)
317 8 pH (lab)
318 ___ Eh
319 ___ Suspended solids
320 ___ Other

Chemical

331 ___ Dissolved solids
332 8 Chloride
333 ___ Nutrients (nitrogen)
334 ___ Nutrients (phosphorus)
335 ___ Common ions
336 8 Hardness
337 ___ Radiochemical
338 ___ Dissolved oxygen
339 ___ Other gases
340 ___ Minor elements
341 ___ Pesticides (insecticides, herbicides, etc.)
342 ___ Detergents - MBS
343 ___ Biochemical oxygen demand
344 ___ Carbon (total, dissolved, etc.)

Biologic

361 ___ Coliforms
362 ___ Other micro-organisms (Benthic organism, phytoplankton, etc.)
363 ___ Other

Sediment

371 ___ Concentration (suspended)
372 ___ Particle size (suspended)
373 ___ Particle size (bed load material)
374 ___ Other

17. SUPPLEMENTARY DATA AVAILABLE FOR STATION

- ☐ 421 Surface water station
- ☐ 422 Ground water station
- ☐ 423 Water stage or level
- ☒ 424 Water discharge
- ☐ 425 Time of travel
- ☐ 426 Drainage area

18. STORAGE OF DATA

- ☐ 501 Published
- ☒ 502 Not published
- ☐ 503 Data on punchcard
- ☐ 504 Data on magnetic tape, disc, data cell, etc.
- ☐ 505 Other

19. INQUIRIES ABOUT DATA SHOULD BE SENT TO:

Office: Base Maintenance Department, Utilities Division
Street No.: Marine Corps Base
City, State, Zip: Camp Lejeune, North Carolina 28542
City Code: 0735

20. DATA ARE AVAILABLE TO PUBLIC ON REQUEST ☒ Yes ☐ No

21. OFFICE COMPLETING FORM
BASE MAINTENANCE DEPARTMENT

22. COMPILER'S NAME
BOB WILSON

23. DATE Month: 12 Year: 1976

WATER ANALYSIS LABORATORY
802 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512

(803) 479-4639

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
DEVELOPERS
IRRIGATION
OTHERS

DATE: December 4, 1971

Report To: Layne-Atlantic Co.
Norfolk, Va.

Date Analyzed: 12/4/71

Sample Number: Camp Lejuene, #9
125'-160', Sample #1

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.1	Carbon Dioxide (CO_2)	25
Iron (Fe)	0.1	Total Acidity ($CaCO_3$)	36
Nitrate (NO_3)	0	Calcium Hardness ($CaCO_3$)	152
Fluoride (F)	0.2	Magnesium Hardness ($CaCO_3$))	20
Manganese (Mn)	0	Carbonate Hardness ($CaCO_3$)	172
Total Hardness ($CaCO_3$)	172	Noncarbonate Hardness ($CaCO_3$)	0
Chlorides (Cl)	7	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	4.3	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0.5	Bicarbonate Alkalinity ($CaCO_3$)	176
Magnesium (Mg)	4.8	Total Alkalinity ($CaCO_3$)	176
Calcium (Ca)	61	Total Dissolved Solids	208
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°c)	320
Bicarbonate (HCO_3)	215	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionable

Water Analysis Laboratory
802 Hamlet Highway
Bennettsville, South Carolina 29512

SIGNED: _____
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

0
20
40
60
80
100
120
5'
--125--
140
15'
155
160
170
5
175
18'
--189--
5
--194--
200
220
240
260
280
301

R-10

P-10

Corbin Const. Co.
Camp LeJeune, N.C.
Well #9 Job #40986
11-10-71

"Hello Analysis, Goodbye Worry"

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802 HAMLET HIGHWAY
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Manganese (Mn)	0	Carbonate Hardness ($CaCO_3$)	172
Total Hardness ($CaCO_3$)	172	Noncarbonate Hardness ($CaCO_3$)	0
Chlorides (Cl)	7	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	4.3	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0.5	Bicarbonate Alkalinity ($CaCO_3$)	176
Magnesium (Mg)	4.8	Total Alkalinity ($CaCO_3$)	176
Calcium (Ca)	61	Total Dissolved Solids	208
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°c)	320
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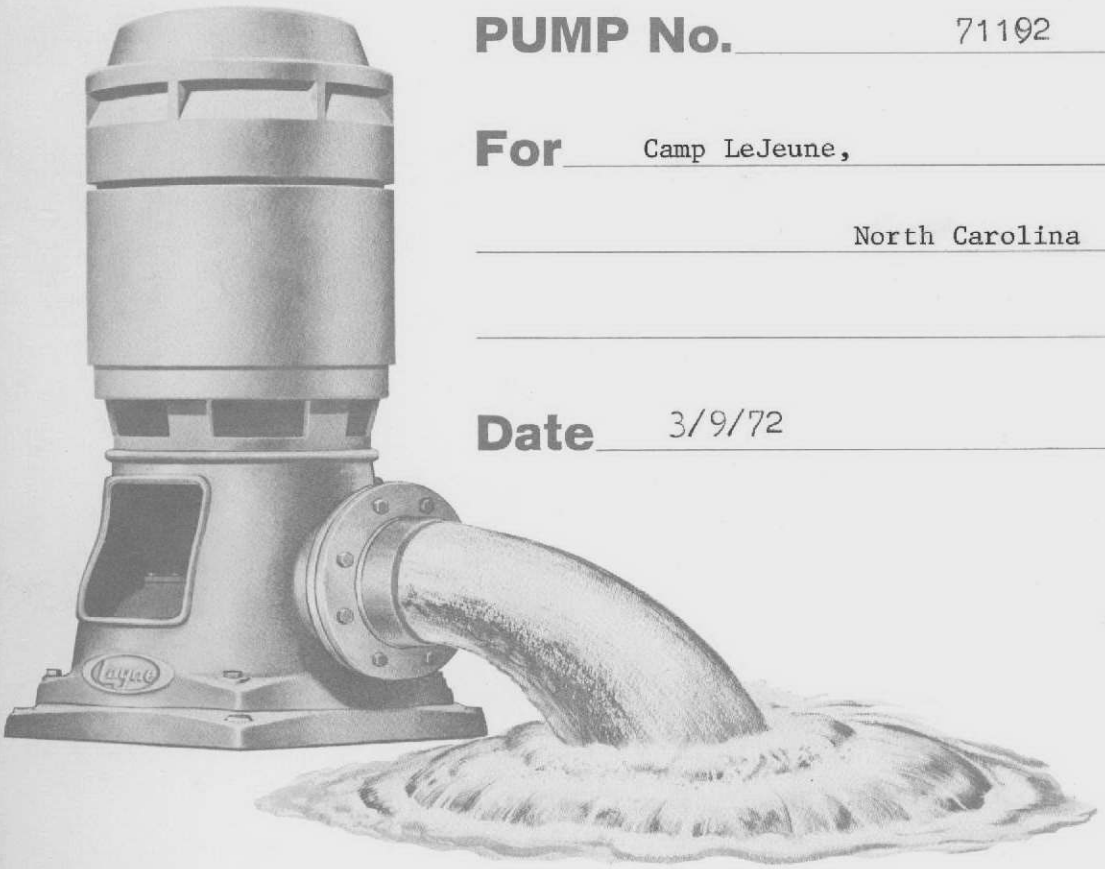
651

WELL #9 HP 651

RECEIVED
MAR 20 1972
RECEIVED

PUMP RECORD



PUMP No. 71192

For Camp LeJeune,

North Carolina

Date 3/9/72

Layne Atlantic Co.

Norfolk,

Virginia

Manufactured By:

SINGER

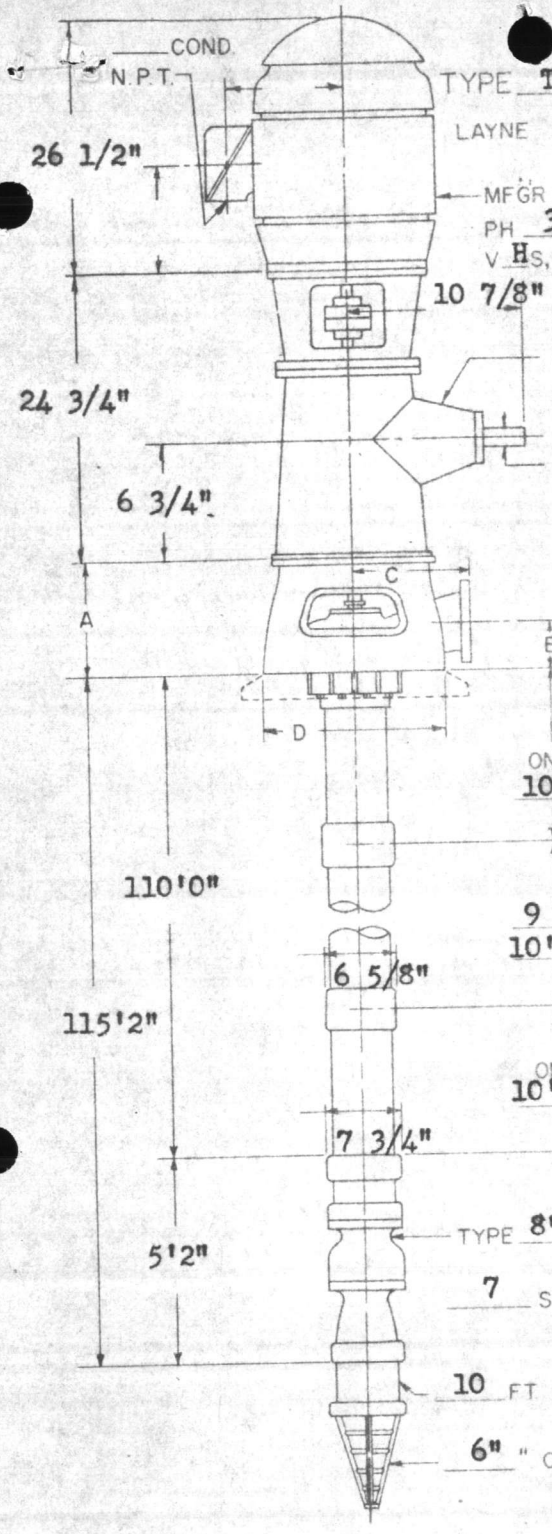
LAYNE & BOWLER DIVISION

MEMPHIS, TENNESSEE U.S.A.

INSTALLATION PLAN

TYPE TF413 DISCHARGE HEAD

LAYNE & BOWLER INC. MEMPHIS, TENN.



MFG'R G. E.x, HP 20, R.P.M. 1750, PH 3, CY 60, VOLTS 230/450, V. Hs, FRAME 256TP10.

MFG'R Amarillo, MODEL C20 RATIO 1:1.

COLUMN 5" Zinc Coated
TUBING 2"
SHAFT 1 3/16"

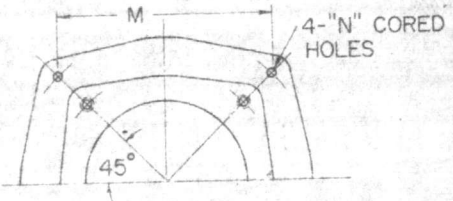
TYPE 8" RKHC BOWL

7 STAGE

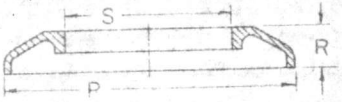
10 FT. OF 6" SUCTION Zinc Coated

6" " CONE STRAINER

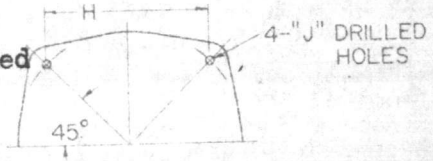
USE THESE DIMENSIONS ONLY WHEN CERTIFIED BY FACTORY



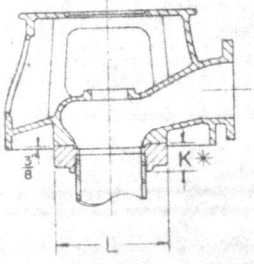
HOLES IN BASE PLATE



BASE PLATE



HOLES IN BASE OF HEAD



SECTION THRU HEAD

* FOR COLUMN SETTINGS OF 200' OR GREATER, "K"=11"

CUSTOMER: Camp LeJeune, N. C.
LOCATION:
FOR APPROVAL:
CERTIFIED: John Zenkell

YOUR NO. N-14-72
OUR NO. 72D-367
PUMP NO. 71192
DATE: Feb. 22, 1972

G.P.M. 200
T.D.H. 226
R.P.M. 1750
B.H.P.

HEAD	A	B	C	D	E	F	G	H	J	K*	L	M	N	P	R	S
→ TF413	13	6	11	18	9	8-3/4	7 1/2	14 1/8	11/16	2 13/16	10	16 15/16	7/8	21	2	17
TF613	14	6	11	18	11	8-7/8	9 1/2	14 1/8	11/16	2 7/8	11	16 15/16	7/8	21	2	17
TF418	13	6	14 1/4	23	9	8-3/4	7 1/2	17 5/16	13/16	2 13/16	10	20 1/16	7/8	26 1/2	2 3/4	21 3/4
TF618	15	6	14 1/4	23	11	8-7/8	9 1/2	17 5/16	13/16	2 7/8	12 1/2	20 1/16	7/8	26 1/2	2 3/4	21 3/4
TF818	18	7 3/32	14 1/4	23	13 1/2	8-7/8	11 3/4	17 5/16	13/16	3 1/16	13 1/2	20 1/16	7/8	26 1/2	2 3/4	21 3/4
TF1018	18	8 1/8	14 1/4	23	16	12-1	14 1/4	17 5/16	13/16	3 11/16	16	20 1/16	7/8	26 1/2	2 3/4	21 3/4
TF1218	20	9 5/8	16 1/4	26	19	12-1	17	19 5/8	13/16	3 11/16	19	23 11/16	7/8	32	3 1/4	24

HEAD	A	B	C	D	E	F	G	H	J	K*	L	M	N	P	R	S
TF625	15	8 1/8	18 1/4	31	11	8-7/8	9 1/2	23 11/16	13/16	2 7/8	12 1/2	29	1	38	3 3/4	29
TF825	20	8 1/8	18 1/4	31	13 1/2	8-7/8	11 3/4	23 11/16	13/16	3 1/16	13 1/2	29	1	38	3 3/4	29
TF1025	20	8 1/8	18 1/4	31	16	12-1	14 1/4	23 11/16	13/16	3 11/16	16	29	1	38	3 3/4	29
TF1225	21	9 5/8	18 1/4	31	19	12-1	17	23 11/16	13/16	3 11/16	19	29	1	38	3 3/4	29
TF1225I	21	9 5/8	18 1/4	31	19	12-1	17	23 11/16	13/16	4 7/16	21	29	1	38	3 3/4	29
TF1425	21	10 5/8	18 1/4	31	21	12-1 1/8	18 3/4	23 11/16	13/16	4 7/16	21	29	1	38	3 3/4	29
TF1227	24 1/2	9 3/4	21	36	19	12-1	17	27 5/8	13/16	3 11/16	19	33 3/8	1	43	4 1/4	33 7/8

PBO 179

VERTICAL CENTRIFUGAL PUMP-INSTALLATION OF PUMP HEADS WITH STYLE 60 STUFFING BOX
HOLLOW SHAFT-MOTOR DRIVEN BUTT-JOINT TOP COLUMN FLANGE

DISASSEMBLE AND CLEAN Before installation, the pump head should be disassembled and all parts thoroughly cleaned with kerosene. Remove the stuffing box from the discharge ell.

MOUNT DISCHARGE ELL With the style 60 packing box a butt-joint, top-column flange is used. Therefore, no adjustment is necessary. Clean the face of the top flange and the bottom flange of the discharge ell and coat with Layncote. Note condition of top of the projecting tubing and remove with a file any burrs or sharp edges that might cut the O ring when it is installed. Bolt discharge ell and column together.

PACKING BOX Clean the tension bearing and stuffing box thoroughly before continuing with installation. Insert the stuffing box first, having the "O" ring in place (a light coat of oil should be given the "O" ring). The tension bearing can now be installed, the threaded portion being coated with Layncote. Slip bearing over shaft and screw into tubing until the bearing flange butts the stuffing box. (This should be a hand tight snug fit). The bearing is now ready to take the tension.

TENSION The amount of tension should be based on 1/8" tube travel per 100 ft. of setting, this is put in terms of No. of turns of the tension bearing in the table below:

SIZE TUBING	NUMBER THREADS	NUMBER OF TURNS PER 100 FEET OF SETTING
1 1/4"	16	2
1 1/2"	12	1 1/2
2"	10	1 1/4
2 1/2", 3" & 3 1/2"	8 OLD STD.	1
2 1/2", 3" & 3 1/2"	10 NEW STD.	1 1/4
4" & UP	10	1 1/4

ALIGNMENT The pump shaft MUST now be in the exact center of the pump head and exactly perpendicular to the machined surface of the discharge ell. This can be checked with a stright edge, square, and pair of calipers. The discharge ell can be shaifted slightly on the concrete foundation or tilted with shims until the shaft is properly aligned.

MOTOR MOUNT Lower the hollow shaft motor over the drive shaft, taking care not to disturb the alignment. To insure proper operation of the pump it is necessary that the motor be centered exactly, so great care should be taken in this operation. Bolt motor to discharge ell or motor stand with cap screws.

When a hollow shaft motor is used the drive shaft is keyed to a removable motor coupling. Screw on and tighten the drive shaft nut, lifting the shaft until the impellers are drawn against the top of the pump bowl. In this position the shaft cannot be rotated. The nut should then be loosened 1/4 to 1/2 turn or until the shaft turns freely. A gib key is then inserted to prevent the drive shaft nut from working loose.

GROUT BASE AND CONNECT DISCHARGE Grout the discharge ell in position, being careful not to disturb the alignment of the pump head. In case the discharge nipple is to be connected to a water main, a Dresser Coupling should be used. The main should be placed as nearly as possible in line with the discharge nipple. The Dresser Coupling prevents throwing any strain on the pump head if the discharge nipple and main are not exactly in line.

LUBRICATING SYSTEM Connect the hand oil pump, drip feed lubricator or automatic solenoid lubricator to the oil connection in the tension bushing. When first connected allow about one cup full oil to enter the tubing. Then adjust the drip cup or automatic lubricator to allow the following quantity of oil to enter the tubing:

For setting up to 50 feet - 5 drops per minute
For setting up to 100 feet - 10 drops per minute
For setting up to 150 feet - 15 drops per minute
For setting up to 200 feet - 20 drops per minute
For setting up to 250 feet - 25 drops per minute
For setting up to 300 feet - 30 drops per minute

When using a force feed oil pump inject about one cup full of oil for each 24 hours of operation.

The oil should be of a good grade of mineral oil free from grit or foreign matter, with a viscosity rating of approximately S.A.E. 10 and having a relatively low cold pour point.

STARTING PUMP CHECK DIRECTION OF MOTOR ROTATION very carefully before applying power. The pump must operate in a left hand or counter clock-wise direction.

Open pet cock located adjacent to packing box to release air from discharge column, and close as soon as water discharges from pet cock.

After the pump has been in operation a few hours, shut down and check the adjustment of the pump runners. The pump shaft may have been screwed up tighter by the power applied and thereby shortened.

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TYPE TF DISCHARGE HEAD

ENCLOSED LINE SHAFT

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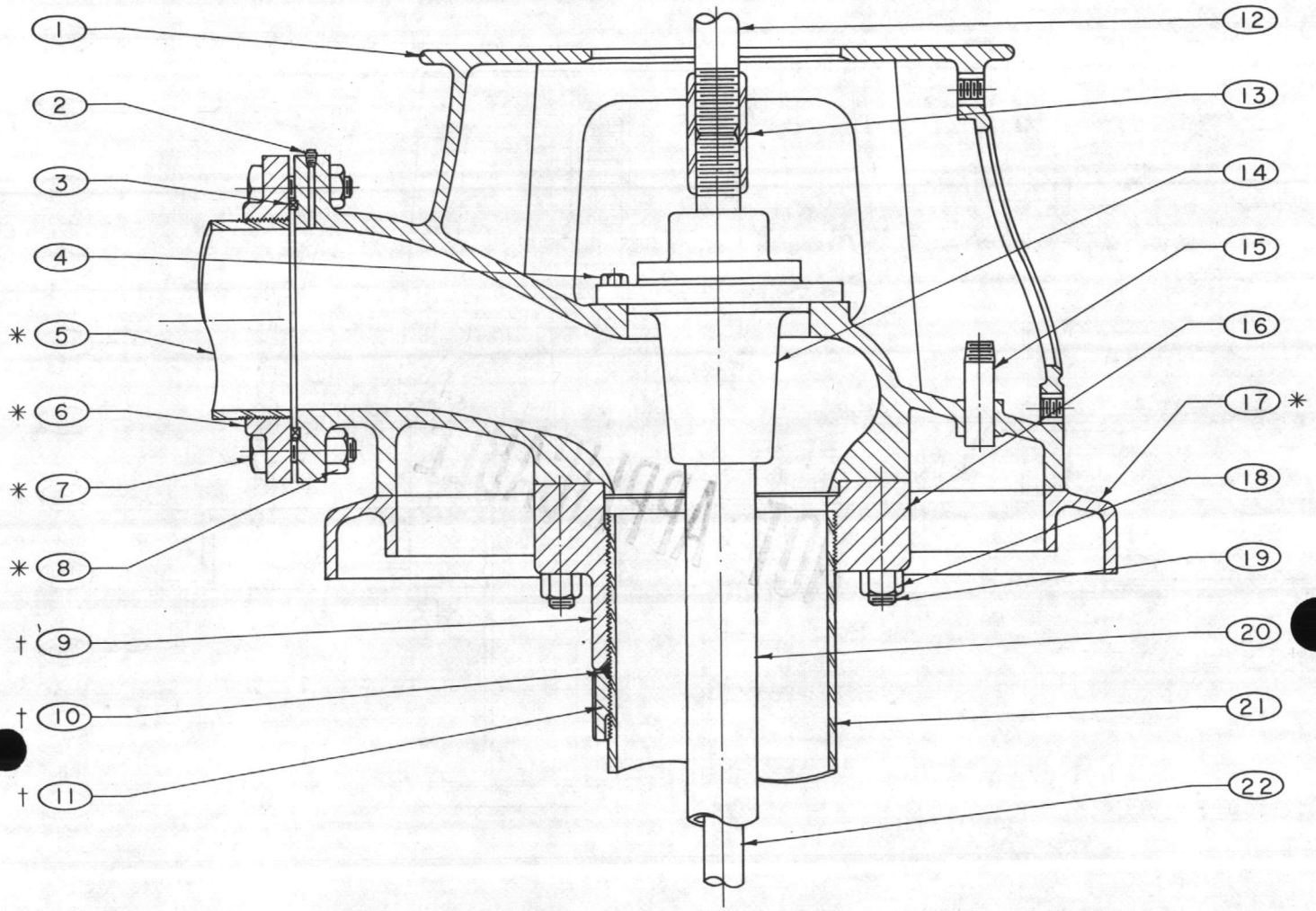
MEMPHIS, TENNESSEE U.S.A.
Layne



*NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER

ITEM NO.		DESCRIPTION
1		DISCHARGE HEAD
2		PIPE PLUG, PRESSURE GAUGE
3		PACKING, COMPANION FLANGE
4		CAPSCREW (STUFFING BOX)
5		DISCHARGE PIPE
6		COMPANION FLANGE
7		MACHINE BOLT, COMPANION FLG.
8		HEX NUT, COMPANION FLANGE
9		ADJ. TOP COLUMN FLANGE
10		PACKING
11		PACKING RING

†USED FOR SETTINGS GREATER THAN 200 FT.

ITEM NO.		DESCRIPTION
12		MOTOR DRIVE SHAFT
13		HEAD COUPLING
14		STUFFING BOX (ASSEMBLY)
15		PIPE NIPPLE (AUXILIARY OPN'G)
16		TOP COLUMN FLANGE
17		BASE PLATE
18		HEX NUT
19		STUD
20		TUBING
21		TOP COLUMN PIPE
22		LINE SHAFT, TOP PIECE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

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PBS 193

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TYPE TF DISCHARGE HEAD

OPEN LINE SHAFT

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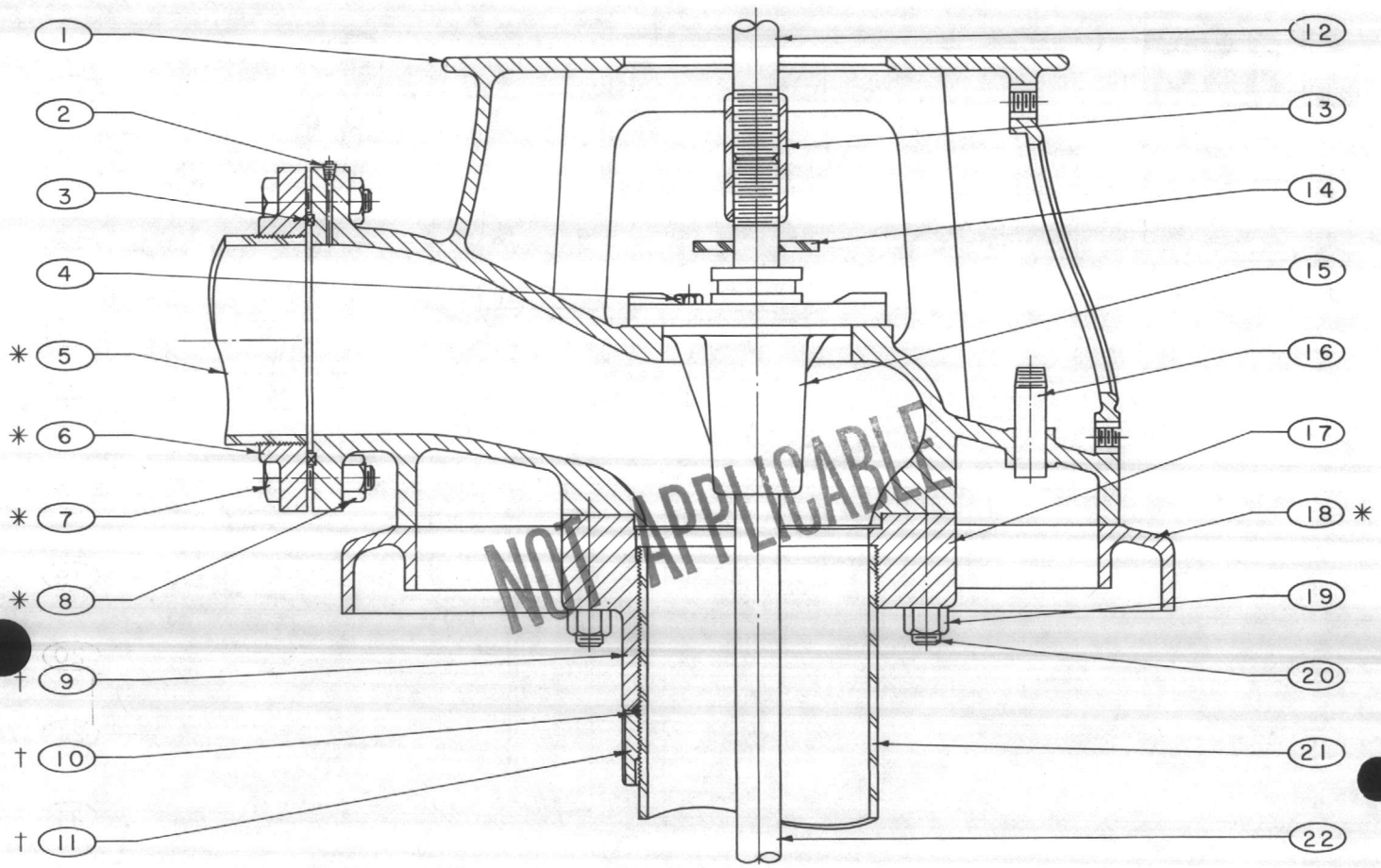
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.
Layne



*NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER

†USED FOR SETTINGS GREATER THAN 200 FT.

ITEM NO.		DESCRIPTION
1		DISCHARGE HEAD
2		PIPE PLUG, PRESSURE GAUGE
3		PACKING, COMPANION FLANGE
4		CAPSCREW (STUFFING BOX)
5		DISCHARGE PIPE
6		COMPANION FLANGE
7		MACHINE BOLT, COMPANION FLG.
8		HEX NUT, COMPANION FLANGE
9		ADJ. TOP COLUMN FLANGE
10		PACKING
11		PACKING RING

ITEM NO.		DESCRIPTION
12		MOTOR DRIVE SHAFT
13		HEAD COUPLING
14		WATER SLINGER
15		STUFFING BOX (ASSEMBLY)
16		PIPE NIPPLE (AUXILIARY OPN'G)
17		TOP COLUMN FLANGE
18		BASE PLATE
19		HEX NUT
20		STUD
21		TOP COLUMN PIPE
22		LINE SHAFT, TOP PIECE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

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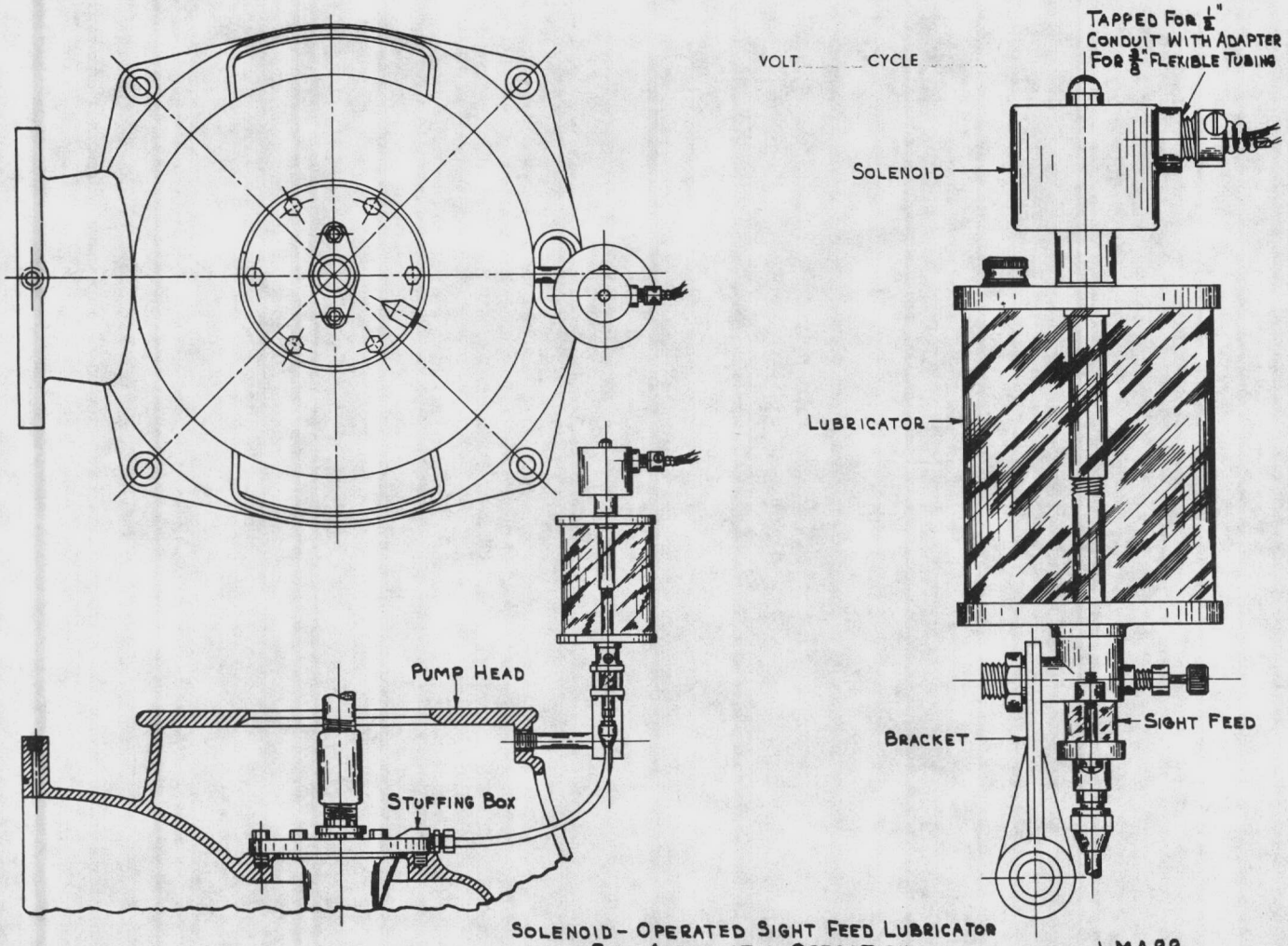

SOLENOID - OPERATED SIGHT FEED LUBRICATOR FOR AUTOMATIC OPERATION

LMA99

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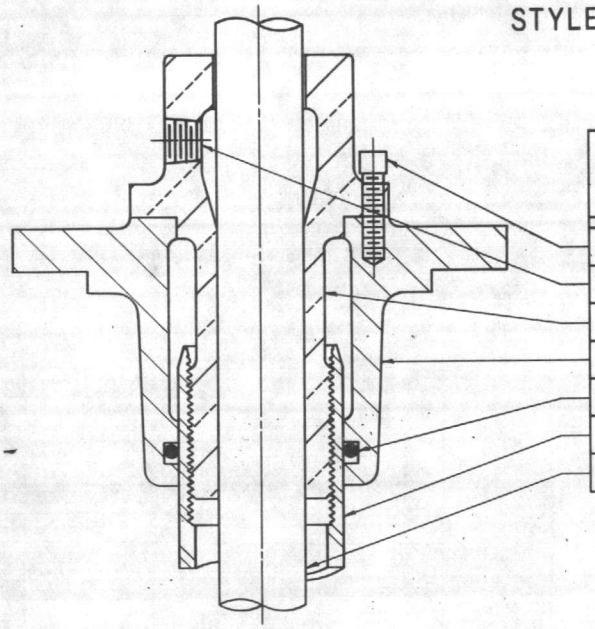
MEMPHIS, TENNESSEE U.S.A.

STUFFING BOX ASSEMBLY
OIL LUBRICATION
STYLE 60



PART NAME	MATERIAL	
	STANDARD	SPECIAL
LOCK SCREW	STEEL	
OIL INLET		
TENSION BEARING	BRONZE	
TENSION BOX	CAST IRON	
O-RING	BUNA-N	
TUBING	C.S.-SCH. 80 PIPE	
LINE SHAFT	C-1045 CAR. STL.	

IN ORDERING REPLACEMENT PARTS, SPECIFY PARTS DESCRIPTION AND PUMP SERIAL NO.

INSTALLATION AND OPERATING INSTRUCTIONS

1. REMOVE THE LOCK SCREW AND THE O-RING AND THOROUGHLY CLEAN THE TENSION BOX INCLUDING THE O-RING GROOVE. REMOVE ANY NICKS OR BURRS FROM THE UPPER AND LOWER MOUNTING FACES AND MALE REGISTER WITH A FINE FLAT FILE. RE-INSTALL AND LIGHTLY OIL THE EXPOSED SURFACE OF THE O-RING.

2. CLEAN THE SURFACE OF THE HEAD THAT RECEIVES THE TENSION BOX AND REMOVE ANY NICKS OR BURRS WITH A FINE FLAT FILE.

3. CAREFULLY INSTALL THE TENSION BOX, ALIGN THE MOUNTING HOLES WITH THE TAPS IN THE HEAD AND SEAT THE BOX TO THE HEAD. INSTALL AND EVENLY TIGHTEN THE MOUNTING CAPSCREWS.

4. CLEAN THE TENSION BEARING THOROUGHLY AND REMOVE ANY NICKS OR BURRS FROM THE MOUNTING FACE AND REGISTER WITH A FINE FLAT FILE. REMOVE ANY NICKS OR BURRS FROM THE THREADS WITH A THREE CORNERED FILE.

5. OIL THE THREADS AND THE BORE AND CAREFULLY PLACE THE TENSION BEARING OVER THE SHAFT AND THREAD (RIGHT HAND) INTO THE TUBING. CONTINUE THREADING UNTIL THE LOWER FLANGE FACE FIRMLY CONTACTS THE TENSION BOX FACE.

6. FOR THE PROPER AMOUNT OF TUBE TENSION, REFER TO INSTRUCTIONS PBI 100 PAGE 1 OR 2. FOR SETTINGS LESS THAN 100 FEET, TIGHTEN TO THE NEAREST LOCKING POSITION.

   CHART 1 BELOW GIVES THE AMOUNT OF PULL-UP FOR EACH COMPLETE TURN. OF THE TENSION BEARING.

CHART 1

SIZE TUBING	1 1/4"	1 1/2"	2"	2 1/2"	3"	3 1/2"	4" & UP
NO. THD'S/IN	16	12	10	10		8	10
"A"	.063"	.083"	.100"	.100"		.125"	.100"

"A" = AMOUNT OF PULL-UP FOR EACH COMPLETE TURN OF THE TENSION BEARING.

THE TOTAL NUMBER OF TURNS REQUIRED CAN BE CALCULATED BY DIVIDING THE FIGURE ABOVE INTO THE TENSION FIGURE FROM PBI 100.

EXAMPLE: 500 FEET OF 10" (.279" WALL) x 1 11/16" x 2 1/2": FROM PBI 100, THE PROPER TENSION OR PULL-UP IS FOUND TO BE 0.529" AND FROM CHART 1, THE PULL-UP PER COMPLETE TURN IS 0.100" FOR 2 1/2" 10 THD. TUBING.

TOTAL NO. OF TURNS = $\frac{0.529}{0.100}$ = 5.29 OR APPROXIMATELY 5 1/4.

IF AFTER ADJUSTING THE TENSION BEARING THE PROPER NUMBER OF TURNS, NO SLOT ALIGNS WITH THE LOCK SCREW TAP IN THE BOX, IT IS RECOMMENDED THAT THE BEARING BE BACKED OFF TO THE NEAREST ALIGNMENT POSITION IF IT TAKES MORE THAN AN EIGHTH TURN FORWARD TO ACHIEVE ALIGNMENT.

7. INSTALL AND TIGHTEN THE LOCK SCREW.

8. CONNECT THE LUBRICATOR TO THE OIL CONNECTION IN THE TENSION BEARING.

   FILL THE LUBRICATOR WITH A GOOD GRADE MINERAL OIL HAVING A VISCOSITY RATING OF APPROXIMATELY S.A.E. 10 AND HAVING A RELATIVELY LOW COLD POUR POINT.

CONTINUED ON PAGE 2

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MEMPHIS, TENNESSEE U.S.A.

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STYLE 60 INSTALLATION AND OPERATING INSTRUCTIONS

(CONTINUED)

IMPORTANT:

PRIOR TO INITIAL START-UP AND AFTER A SHUT DOWN OF 150 HOURS OR LONGER, THE LUBRICATOR SHOULD BE ADJUSTED FOR THE RECOMMENDED NUMBER OF DROPS PER MINUTE AS OUTLINED IN CHART 2 AND ALLOWED TO OPERATE AT THIS RATE FOR 20 MINUTES FOR EACH 100 FEET OF SETTING.

FOR NORMAL OPERATION, THE LUBRICATOR SHOULD BE ADJUSTED IN ACCORDANCE WITH CHART 2.

CHART 2

SHAFT SIZE	"A" LUBRICATOR SETTING IN DROPS PER MIN.	"B" DROPS PER MIN. PER EACH 100 FT. SETTING
7/8 - 1 3/16	5	2
1 1/2 - 1 11/16	7	3
1 15/16 - 2 7/16	10	4
2 11/16	12	5

TOTAL DROPS/MIN. = "A" + $\left(\frac{\text{SETTING}}{100} \times \text{"B"}\right)$

EXAMPLE: 500 FEET OF 1 11/16" x 2 1/2"

TOTAL DROPS/MIN. = $7 \times \left(\frac{500}{100} \times 3\right) = 7 + (5 \times 3) = 7 + 15 = 22$

9. THE LUBRICATOR SHOULD BE CHECKED PERIODICALLY AND RESET IF REQUIRED TO MAINTAIN THE PROPER FLOW.

THE APPROXIMATE NUMBER OF HOURS OF CONTINUOUS OPERATION AT VARIOUS FLOW RATES CAN BE FOUND IN CHART 3. IT IS GENERALLY RECOMMENDED THAT THE LUBRICATION BE RE-FILLED WHEN IT IS NO LESS THAN ONE QUARTER FULL.

CHART 3

NUMBER OF HOURS OF CONTINUOUS OPERATION			
FLOW RATE DROPS/MIN.	LUBRICATOR CAPACITY		
	1 QUART	2 QUART	3 QUART
5	110	220	440
10	55	110	220
15	38	75	150
20	28	55	110
25	22	45	90
30	19	38	75
40	14	28	55
50	11	22	45

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

TUBE TENSION ADJUSTMENT CHART

COLUMN SIZE	SHAFT AND TUBING SIZE	TUBE TENSION IN INCHES SETTING IN FEET									
		100	200	300	400	500	600	700	800	900	1000
3" MC*	1 1/4 x 7/8	0.025	0.103	0.233	0.415	0.649					
(.187)	1 1/2 x 1	0.028	0.115	0.261	0.465	0.726					
4" *	1 1/4 x 7/8	0.020	0.083	0.186	0.333	0.520	0.750	1.021	1.334	1.688	2.084
(.237)	1 1/2 x 1	0.022	0.090	0.202	0.361	0.564	0.813	1.107	1.447	1.831	2.260
SCH. 40S	2 x 1 3/16	0.025	0.103	0.233	0.416	0.650	0.936	1.275	1.666	2.108	2.603
5" *	1 1/4 x 7/8	0.018	0.075	0.171	0.305	0.476	0.686	0.934	1.220	1.544	1.906
(.258)	1 1/2 x 1	0.020	0.081	0.182	0.325	0.508	0.733	0.998	1.303	1.650	2.036
SCH. 40S	2 x 1 3/16	0.022	0.091	0.205	0.366	0.571	0.824	1.121	1.465	1.854	2.289
	1 1/4 x 7/8	0.017	0.071	0.160	0.286	0.447	0.644	0.878	1.146	1.451	1.791
6" *	1 1/2 x 1	0.018	0.075	0.169	0.302	0.472	0.681	0.927	1.211	1.532	1.892
(.280)	2 x 1 3/16	0.020	0.083	0.187	0.333	0.521	0.751	1.022	1.335	1.690	2.086
SCH 40S	2 1/2 x 1 1/2	0.024	0.098	0.220	0.393	0.613	0.884	1.204	1.572	1.990	2.457
	2 1/2 x 1 11/16	0.025	0.102	0.231	0.412	0.643	0.927	1.263	1.649	2.088	2.577
	3 x 1 15/16	0.029	0.119	0.269	0.480	0.750	1.080	1.471	1.922	2.432	3.003
	1 1/2 x 1	0.017	0.071	0.161	0.287	0.449	0.647	0.881	1.151	1.457	1.798
	2 x 1 3/16	0.019	0.077	0.175	0.313	0.488	0.704	0.958	1.252	1.584	1.956
7" *	2 1/2 x 1 1/2	0.022	0.089	0.202	0.360	0.563	0.811	1.105	1.443	1.827	2.255
(.300)	2 1/2 x 1 11/16	0.023	0.093	0.211	0.376	0.587	0.846	1.153	1.506	1.906	2.353
	3 x 1 15/16	0.026	0.107	0.242	0.431	0.673	0.970	1.321	1.726	2.184	2.696
	3 1/2 x 2 3/16	0.030	0.121	0.272	0.485	0.757	1.092	1.486	1.941	2.457	3.034
	3 1/2 x 2 7/16	0.031	0.127	0.287	0.512	0.800	1.153	1.570	2.050	2.595	3.204
	2 x 1 3/16	0.019	0.076	0.173	0.308	0.481	0.694	0.945	1.234	1.562	1.928
8" *	2 1/2 x 1 1/2	0.022	0.088	0.198	0.354	0.552	0.796	1.084	1.416	1.793	2.213
(.277)	2 1/2 x 1 11/16	0.022	0.091	0.206	0.368	0.575	0.829	1.129	1.475	1.867	2.306
SCH 30	3 x 1 15/16	0.026	0.105	0.236	0.421	0.657	0.947	1.290	1.684	2.132	2.632
	3 1/2 x 2 3/16	0.029	0.117	0.265	0.472	0.737	1.062	1.447	1.890	2.392	2.953
	3 1/2 x 2 7/16	0.031	0.124	0.279	0.498	0.778	1.121	1.526	1.993	2.522	3.114
	2 x 1 3/16	0.018	0.074	0.166	0.297	0.464	0.668	0.910	1.189	1.505	1.858
8"	2 1/2 x 1 1/2	0.020	0.083	0.188	0.336	0.525	0.757	1.031	1.347	1.704	2.104
(.322)	2 1/2 x 1 11/16	0.021	0.087	0.196	0.349	0.545	0.786	1.070	1.398	1.769	2.184
SCH. 40S	3 x 1 15/16	0.024	0.098	0.221	0.394	0.616	0.887	1.208	1.579	1.998	2.467
	3 1/2 x 2 3/16	0.027	0.109	0.246	0.439	0.685	0.987	1.344	1.756	2.223	2.744
	3 1/2 x 2 7/16	0.028	0.115	0.259	0.461	0.720	1.038	1.413	1.846	2.336	2.884
	2 x 1 3/16	0.018	0.072	0.163	0.291	0.455	0.655	0.892	1.166	1.476	1.822
	2 1/2 x 1 1/2	0.020	0.081	0.183	0.327	0.511	0.737	1.003	1.311	1.659	2.048
9" *	2 1/2 x 1 11/16	0.021	0.084	0.190	0.339	0.530	0.763	1.040	1.358	1.719	2.122
(.312)	3 x 1 15/16	0.023	0.095	0.213	0.381	0.595	0.857	1.167	1.524	1.929	2.382
	3 1/2 x 2 3/16	0.026	0.105	0.236	0.422	0.658	0.949	1.292	1.688	2.136	2.637
	3 1/2 x 2 7/16	0.027	0.110	0.248	0.442	0.690	0.995	1.355	1.770	2.240	2.766
	2 x 1 3/16	0.018	0.072	0.163	0.291	0.454	0.655	0.891	1.164	1.474	1.819
	2 1/2 x 1 1/2	0.020	0.081	0.183	0.327	0.510	0.736	1.002	1.309	1.656	2.045
10" *	2 1/2 x 1 11/16	0.021	0.084	0.190	0.338	0.529	0.762	1.038	1.355	1.716	2.118
(.279)	3 x 1 15/16	0.023	0.094	0.213	0.380	0.593	0.855	1.164	1.521	1.925	2.377
	3 1/2 x 2 3/16	0.026	0.104	0.236	0.420	0.657	0.946	1.289	1.683	2.131	2.630
	3 1/2 x 2 7/16	0.027	0.110	0.247	0.441	0.689	0.992	1.351	1.765	2.234	2.758
	4 x 2 11/16	0.030	0.122	0.276	0.492	0.769	1.108	1.509	1.971	2.494	3.079
	2 x 1 3/16	0.017	0.071	0.159	0.285	0.445	0.641	0.873	1.141	1.444	1.783
	2 1/2 x 1 1/2	0.019	0.079	0.178	0.318	0.496	0.715	0.974	1.272	1.610	1.988
10"	2 1/2 x 1 11/16	0.020	0.081	0.184	0.328	0.513	0.739	1.007	1.315	1.664	2.055
(.307)	3 x 1 15/16	0.022	0.091	0.205	0.366	0.572	0.824	1.122	1.466	1.855	2.290
SCH. 30	3 1/2 x 2 3/16	0.025	0.100	0.226	0.403	0.629	0.907	1.235	1.614	2.042	2.521
	3 1/2 x 2 7/16	0.026	0.105	0.236	0.422	0.659	0.949	1.292	1.688	2.137	2.638
	4 x 2 11/16	0.029	0.116	0.263	0.469	0.732	1.055	1.436	1.876	2.374	2.931

NOTE: ALL PIPE MARKED * IS SINGER-LAYNE & BOWLER DIV. STANDARD

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LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

Layne

TUBE TENSION ADJUSTMENT CHART

COLUMN SIZE	SHAFT AND TUBING SIZE	TUBE TENSION IN INCHES									
		SETTING IN FEET									
		100	200	300	400	500	600	700	800	900	1000
10" (.365) 40S	2 x 1 3/16	0.017	0.068	0.154	0.276	0.430	0.620	0.845	1.104	1.397	1.725
	2 1/2 x 1 1/2	0.018	0.075	0.170	0.303	0.474	0.683	0.930	1.215	1.538	1.899
	2 1/2 x 1 11/16	0.019	0.077	0.175	0.312	0.488	0.703	0.958	1.251	1.583	1.955
	3 x 1 15/16	0.021	0.085	0.193	0.344	0.538	0.775	1.055	1.378	1.745	2.154
	3 1/2 x 2 3/16	0.023	0.093	0.210	0.376	0.586	0.845	1.151	1.504	1.903	2.349
	3 1/2 x 2 7/16	0.024	0.097	0.219	0.391	0.611	0.881	1.199	1.567	1.983	2.448
	4 x 2 11/16	0.026	0.107	0.242	0.431	0.673	0.970	1.321	1.725	2.183	2.695
12" * (.330) SCH. 30	2 1/2 x 1 1/2	0.018	0.074	0.166	0.297	0.464	0.670	0.912	1.191	1.508	1.861
	2 1/2 x 1 11/16	0.019	0.076	0.171	0.306	0.477	0.688	0.937	1.225	1.550	1.913
	3 x 1 15/16	0.020	0.083	0.188	0.335	0.524	0.755	1.028	1.342	1.699	2.098
	3 1/2 x 2 3/16	0.022	0.090	0.204	0.364	0.569	0.820	1.116	1.458	1.846	2.278
	3 1/2 x 2 7/16	0.023	0.094	0.212	0.379	0.592	0.853	1.161	1.517	1.919	2.370
	4 x 2 11/16	0.025	0.103	0.233	0.415	0.649	0.935	1.273	1.663	2.105	2.599
12" (.375) "S"	2 1/2 x 1 1/2	0.018	0.072	0.162	0.289	0.451	0.650	0.886	1.157	1.464	1.808
	2 1/2 x 1 11/16	0.018	0.073	0.166	0.296	0.463	0.667	0.908	1.187	1.502	1.854
	3 x 1 15/16	0.020	0.080	0.181	0.322	0.503	0.726	0.988	1.291	1.634	2.017
	3 1/2 x 2 3/16	0.021	0.086	0.195	0.348	0.543	0.783	1.066	1.393	1.763	2.177
	3 1/2 x 2 7/16	0.022	0.090	0.202	0.361	0.563	0.812	1.106	1.444	1.828	2.257
	4 x 2 11/16	0.024	0.098	0.220	0.393	0.614	0.885	1.205	1.574	1.992	2.459
14" * (.375) SCH. 30S	2 1/2 x 1 1/2	0.017	0.070	0.158	0.283	0.442	0.637	0.868	1.133	1.435	1.771
	2 1/2 x 1 11/16	0.018	0.072	0.162	0.290	0.452	0.652	0.888	1.160	1.468	1.813
	3 x 1 15/16	0.019	0.078	0.175	0.313	0.489	0.705	0.961	1.255	1.588	1.961
	3 1/2 x 2 3/16	0.021	0.084	0.189	0.337	0.526	0.758	1.032	1.348	1.706	2.106
	3 1/2 x 2 7/16	0.021	0.086	0.195	0.348	0.544	0.784	1.067	1.394	1.765	2.179
	4 x 2 11/16	0.023	0.094	0.212	0.378	0.590	0.850	1.157	1.512	1.914	2.362
16" * (.375) SCH. 30S	3 x 1 15/16	0.018	0.075	0.169	0.302	0.472					
	3 1/2 x 2 3/16	0.020	0.080	0.180	0.322	0.503					
	3 1/2 x 2 7/16	0.020	0.082	0.186	0.332	0.519					
	4 x 2 11/16	0.022	0.089	0.201	0.358	0.559					

NOTE: ALL PIPE MARKED * IS SINGER-LAYNE & BOWLER DIV. STANDARD.

VERTICAL CENTRIFUGAL PUMP

Installation of Pump Bowls and Column

Butt Joint Column

Enclosed Line Shaft

Derrick Installation of a Layne Pump requires a derrick 30 to 40 feet in height and a hand winch or power hoist of sufficient size to handle the total weight.

Foundation The concrete foundation for the pump base should be built in accordance with foundation plans furnished by the factory. Where a separate pump base plate is used it should be set in position in the concrete foundation before the pump bowls and column are installed but not grouted into position until the installation is completed.

Dimensions of Well Check the inside diameter of the well and the outside diameter of the pump bowls and column flanges or couplings to be sure that the pump and column will go in the well with ample clearance. The well casing must be straight and without obstructions that might bend the line shaft. Measure the static level of the water in the well to determine if the pump has been furnished with the proper depth of setting. The pump bowls should be submerged when the pump is operating and we do not recommend or guarantee satisfactory operation with a suction lift.

Check Material Check all parts of the pump against the packing list to find out whether all parts have been received. If any parts are missing claim should be made at once to the railroad company.

Clean All Joints All threads and flanged couplings of the discharge pipe and protective tubing should be carefully cleaned and at the time of installation coated with L A Y N C O T E. Care should be taken that there be absolutely no sand or grit between flanges or couplings when making up the joints.

Suction If a basket suction is used it should be lowered into the well first and held by pipe clamps. The suction pipe is picked up and screwed into the coupling at top of basket suction. The basket suction and suction pipe are then lowered into the well until about 18 inches of suction pipe extend above the well casing. The suction pipe is clamped in this position with pipe clamps. When the suction pipe has only threads at the top end care should be taken to place the clamps under the small lug welded on the pipe.

Pump Bowls The pump bowls should be carefully inspected before placing in the well. Rotate impeller shaft several times by hand to be sure that it does not bind at any point. The impeller shaft should have about ¼-inch or more end play. DO NOT STRAIN SHAFT IN ANY WAY THAT MIGHT BEND IT AND DO NOT LIFT PUMP BOWLS BY THE SHAFT. The pump bowls can best be handled by a pair of pipe clamps. The bowls should be lifted into position and screwed or bolted to the suction pipe. The clamps on the suction pipe are then removed and the bowls and suction pipe lowered into the well until the top of the discharge nozzle is about 18 inches above the well casing or top of foundation. The bowls are then supported at this point by pipe clamps.

Discharge Column Pipe Check the enclosed chart to determine the correct spacing of the spiders in the discharge column. If the discharge pipe screws into the pump bowl be sure to have the coupling at the top end of the first section either with the spider or without the spider as shown on the chart. If the lower section of discharge pipe has a special flange to connect to the pump bowls be sure to arrange the pipe with this flange at the lower end.

Protective Tubing and Shaft The shaft and protective tubing are shipped assembled in 20-ft. or 10-ft. lengths and packed with sufficient lubricant to prevent rusting. A 20-ft. length or 10-ft. length of shaft and tubing is required for each 20-ft. or 10-ft. length of pipe. Remove the protecting cap only from the top end of the tubing, which is the end fitted with the bronze shaft bearing and tubing coupling. Slide the assembled tubing and shafting into the discharge column pipe, making sure that the bronze bearing end of the assembly will be on top.

Installing Discharge Column Pull the tubing about six inches below the lower end of the discharge pipe and tie them together in this position with a piece of rope by taking several half hitches around the pipe and then the tubing.

Raise the assembled section of pipe, tubing and shafting until it is hanging vertically in the derrick with the lower end of the tubing about one inch above a board placed on the foundation. Remove the lower plug from the tubing to release the shaft. Raise the discharge pipe about six inches and take several half hitches around the shaft. This method avoids straining the shaft as the column is swung under the derrick. Swing the discharge pipe into position over the pump bowls and screw the shaft into the shaft coupling until it butts aginst the impeller shaft.

THE THREADS AND THE ENDS OF THE SHAFTING AND THE SHAFT COUPLINGS MUST BE PERFECTLY CLEAN.

Lower the discharge pipe and tubing and screw the tubing onto the main bearing box about 3 or 4 threads Then coat the threads on the bronze box with L A Y N C O T E and screw the tubing on the box until it butts. The discharge pipe is then bolted or screwed to the pump bowls.

Remove the clamps from the pump bowls and lower the pump bowls with the section of discharge column until the column extends about 18 inches above the well casing or foundation. Clamp the discharge column in this position.

Remove the bronze shaft bearing and tubing coupling and pour about one pint of oil into the tubing. The oil used should be a good grade of mineral oil free from grit and foreign matter, with a viscosity rating approximately SAE 10 and having a relatively low cold pour point.

When the next section of discharge column is in position in the derrick replace the bronze bearing, screwing it into the tubing about 3 or 4 threads. After the spider and spider bushing or aligning ring have been installed (as described below) and the shaft connection is made, lower the discharge pipe and tubing and screw the tubing onto the bronze bearing about 3 or 4 threads. Then coat the threads of the bearing with L A Y N C O T E and screw the tubing on the bearing until the ends butt tightly together. IT IS VERY IMPORTANT THAT EVERY TUBING JOINT BE TIGHT AND to form a seal the ends of the tubing must be smooth and square. While handling and installing the tubing use care to keep from scoring or damaging the ends in any way.

When flanged column is used, slip a bronze spider or aligning ring over the top of the tubing and fit it into the recess in the flange. (Refer to spider spacing chart to determine whether a flange or aligning ring should be used at the joint in question). When screw coupled column is used the spider is cast integral with the coupling. The rubber spider bushings are installed in the spiders before shipment from the factory.

Each section of discharge column is installed as described above. When screw couplings are used care should be taken in starting the pipe in the coupling. The pipe should start by hand and screw by hand to within 5 or 6 threads of butting. If the thread appears tighter than this check carefully for a damaged thread as the pipe should not be forced into the coupling. The last 5 or 6 threads should be made up with a chain tong, making sure that the joint is tight with the pipe butting against the shoulder in the coupling or against the end of the pipe in the coupling as the case might be.

When the line shaft connects to the motor drive shaft below the tension assembly, the motor drive shaft should be attached to the line shaft in the top section of tubing before the top length of discharge column is installed.

The top length of discharge pipe will usually have a special flange or special threads to connect to the bottom of the discharge ell and the top length of shaft will be of special length.

In case the discharge column does not check out within reasonable limits notify the factory to furnish the correct lengths.

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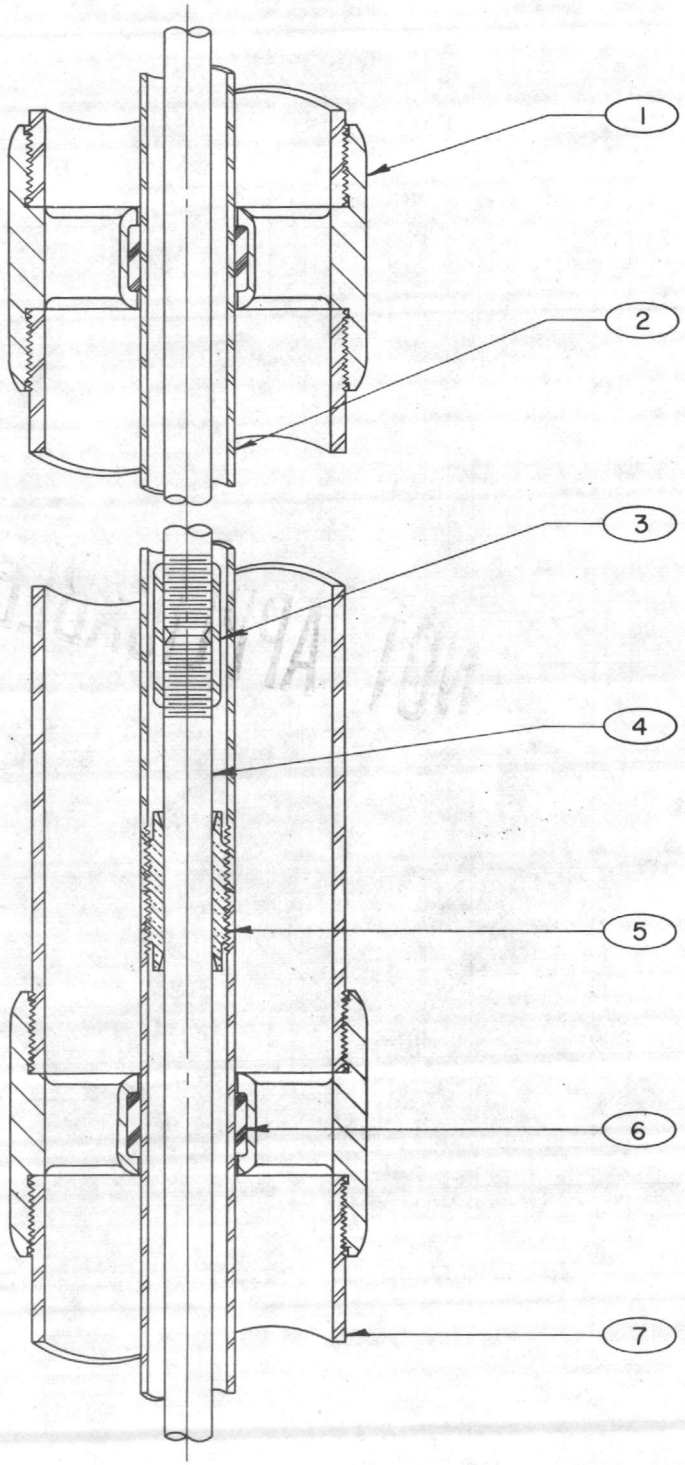
SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

DISCHARGE COLUMN ASSEMBLY

SCREWED TYPE - ENCLOSED LINE SHAFT



ITEM NO.		DESCRIPTION
1		COMBINATION COUPLING
2		SHAFT TUBING
3		SHAFT COUPLING
4		LINE SHAFT

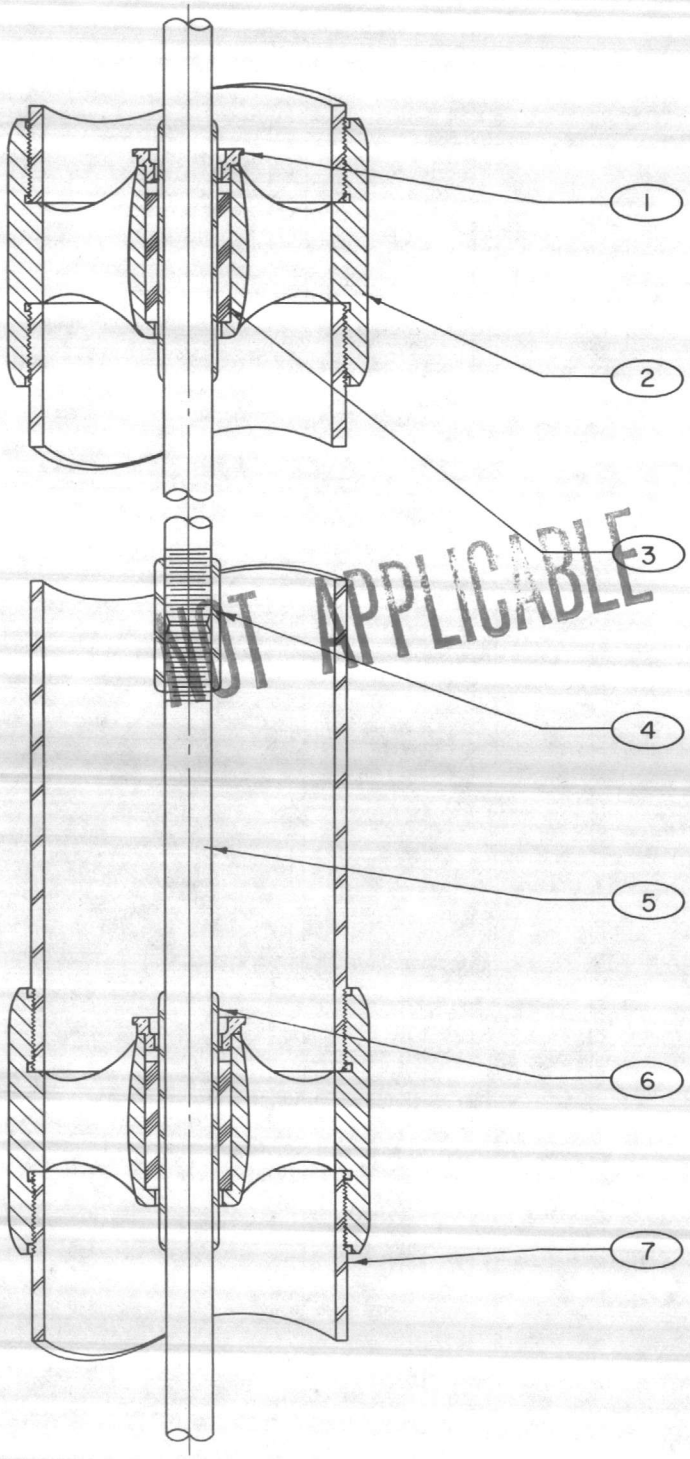
ITEM NO.		DESCRIPTION
5		SHAFT BOX
6		RUBBER BEARING
7		COLUMN PIPE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

DISCHARGE COLUMN ASSEMBLY

SCREWED COUPLED - OPEN LINE SHAFT



NOT APPLICABLE

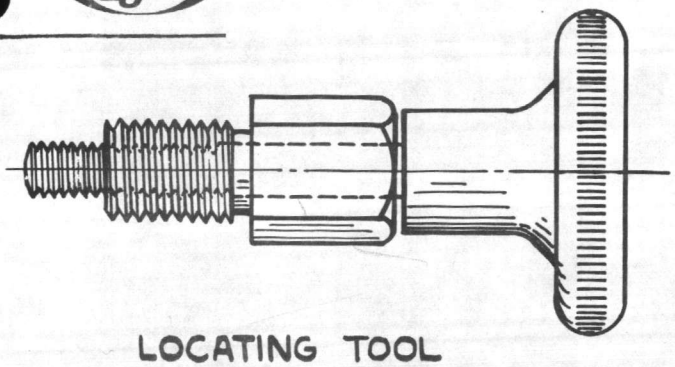
ITEM NO.		DESCRIPTION
1		LOCK RING
2		COMBINATION COUPLING
3		RUBBER BEARING
4		SHAFT COUPLING

ITEM NO.		DESCRIPTION
5		LINE SHAFT
6		MONEL SLEEVE
7		COLUMN PIPE

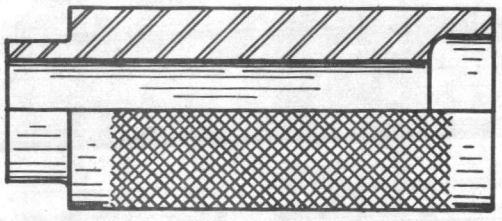
IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

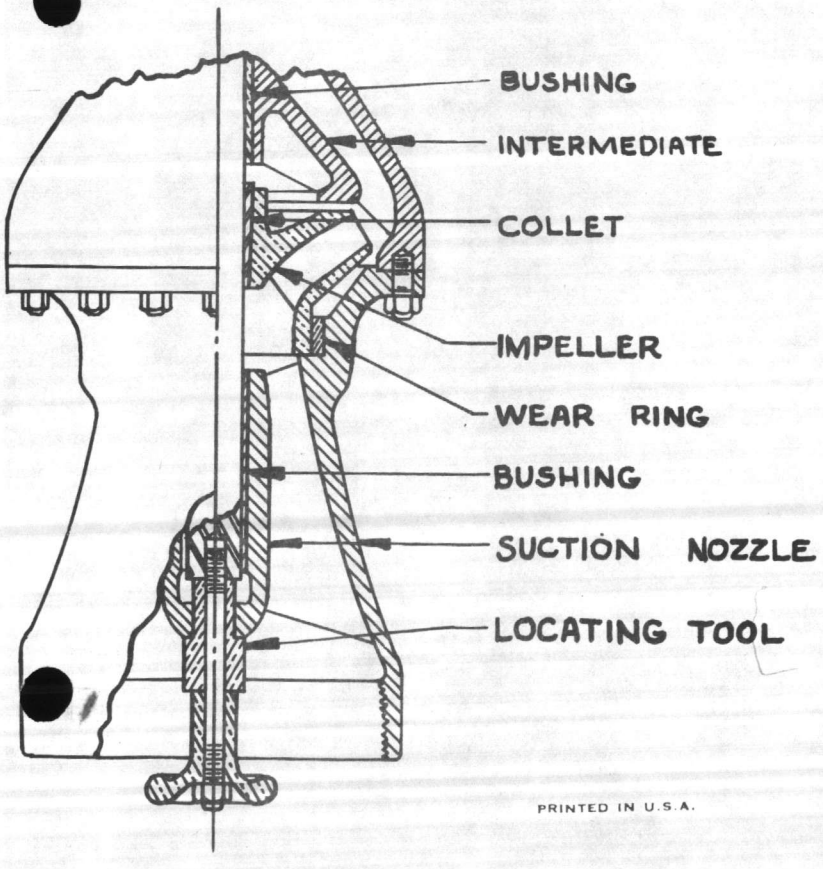
INSTRUCTIONS FOR ASSEMBLYING AND DISMANTLING PUMP BOWLS WITH COLLETS



LOCATING TOOL



COLLET DRIVER



TO ASSEMBLE BOWL

1. Remove cap screw from the bottom of the suction nozzle.
2. Screw locating tool into bottom end of suction nozzle hub.
3. Insert impeller shaft into suction nozzle bearing and turn handwheel of locating tool until impeller shaft is pulled down tight against the shoulder of the tool.
4. Place the impeller over the shaft. Slip the collet over the shaft with the small end first. (A screw driver can be used to spread collet for ease in slipping over shaft). Hold the impeller firmly into the wear ring recess and drive the collet into place with the male end of the collet driver.
5. Remove collet driver and assemble first intermediate stage. Place the next impeller over the shaft and continue to assemble as explained above.
6. When the bowl is completely assembled remove locating tool and replace cap screw in suction nozzle.

TO DISMANTLE BOWL

1. Remove discharge nozzle. Place collet driver over shaft with the female end first and while holding the impeller out of the wear ring recess, drive the impeller off of the collet. Remove the collet and impeller.
2. Remove the intermediate shell and drive the impeller off of the next collet. Continue to dismantle in like manner.

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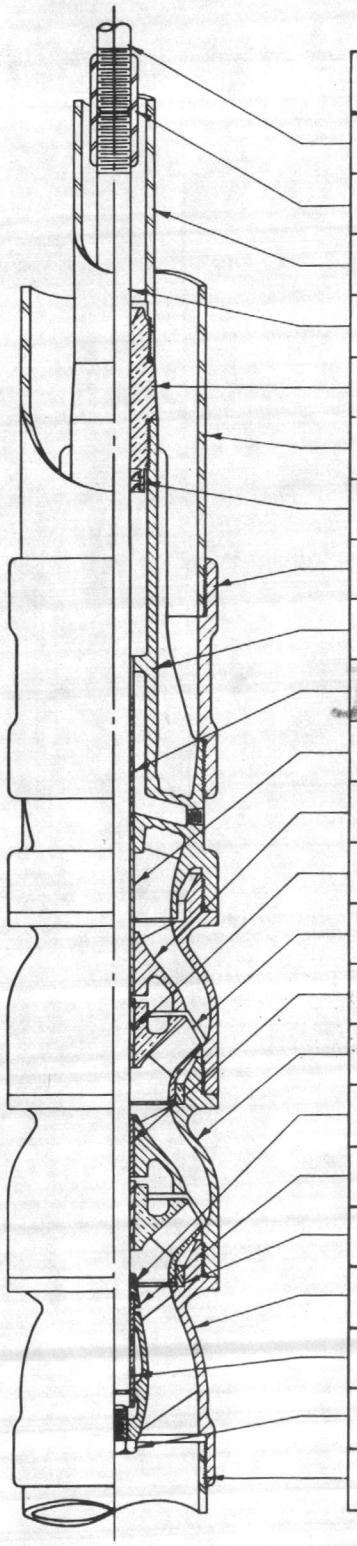
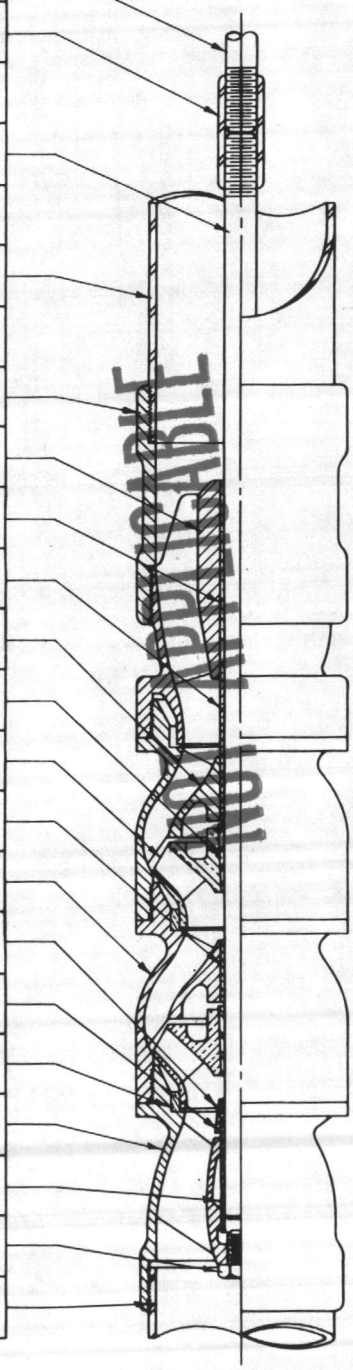
SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

VERTICAL TURBINE PUMP
DEEP WELL

8" B, DR, PR, RK, T, UR - 10" RK, T, U - 12" T, UR



PART NAME	MATERIAL	
	STANDARD	SPECIAL
LINE SHAFT	CARBON STEEL C-1045	
SHAFT COUPLING	CARBON STEEL	
SHAFT TUBING	EXTRA HEAVY PIPE	
BOWL SHAFT	STAINLESS STEEL 416	
MAIN BEARING	BRONZE	
DISCHARGE COLUMN	ASTM-A 53-58 GRADE A OR B	
SEALS	BRONZE CASE SYN. RUBBER	
DISCHARGE ADAPTOR	CAST IRON CLASS 30	
DISCHARGE NOZZLE	CAST IRON CLASS 30	
DISCHARGE BEARING	BRONZE	
TOP INTERMEDIATE BRG.	BRONZE	
TOP INTERMEDIATE	CAST IRON CLASS 30	
COLLET	BRONZE	
IMPELLER	BRONZE	
INTERMEDIATE BRG.	BRONZE	
INTERMEDIATE	CAST IRON CLASS 30	
SET SCREW	STAINLESS STEEL	
‡ SAND COLLAR	BRONZE	
WEAR RING	BRONZE	
SUCTION NOZZLE	CAST IRON CLASS 30	
SUCTION NOZZLE BRG.	BRONZE	
SUCTION CAPSCREW	CARBON STEEL	
* SUCTION PIPE	ASTM-A 53-58 GRADE A OR B	



* NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER
‡ HARD RUBBER USED ON 8" BOWLS

ENCLOSED LINE SHAFT ☐ ☐ OPEN LINE SHAFT

REVISED 3-26-68
SUPERSEDES ORIGINAL PRICE BOOK ISSUE

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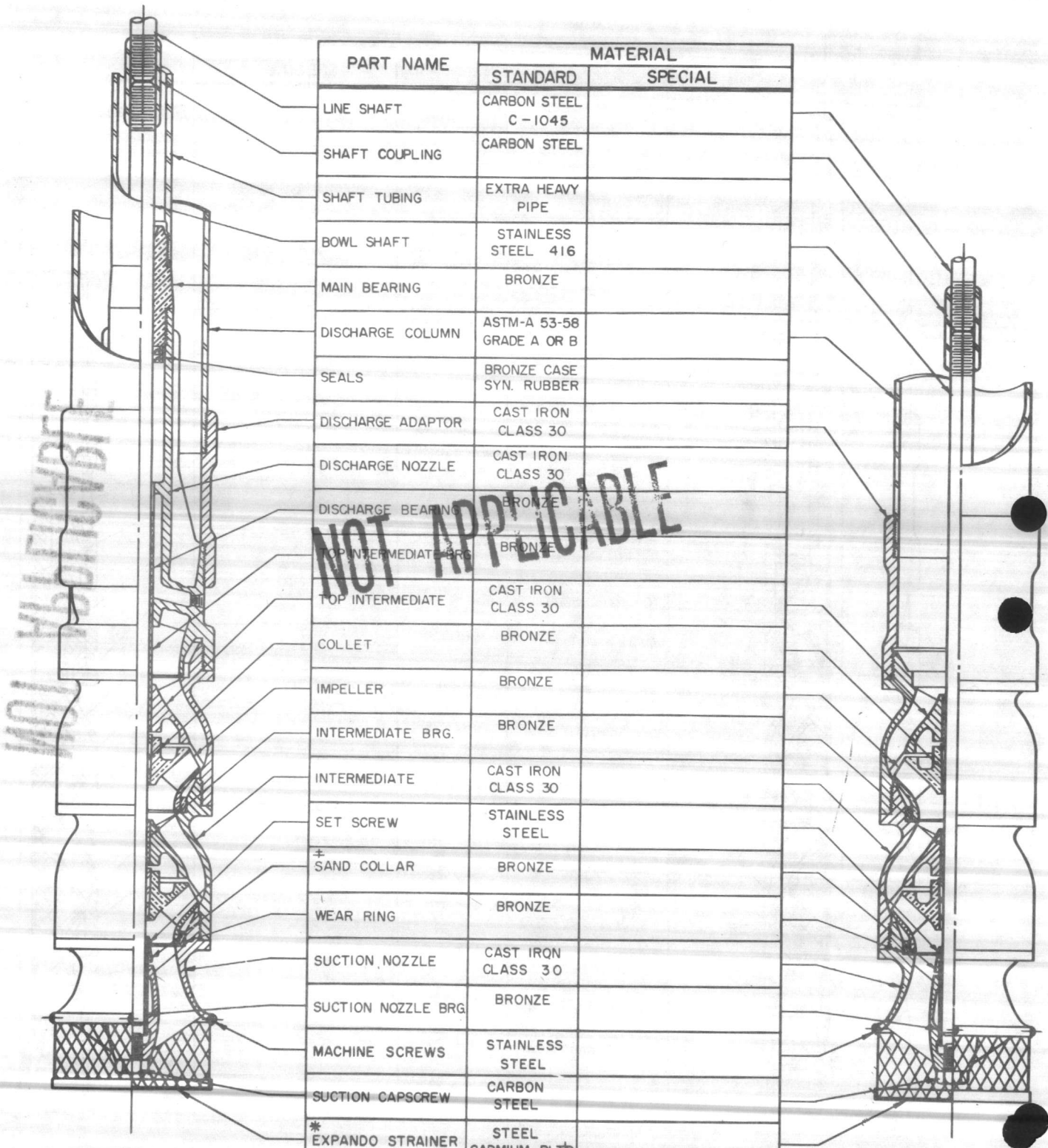
VERTICAL TURBINE PUMP
SHORT COUPLED

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.
Layne

8" B, DR, PR, RK, T, UR – 10" RK, T, U – 12" T, UR



PART NAME	MATERIAL	
	STANDARD	SPECIAL
LINE SHAFT	CARBON STEEL C – 1045	
SHAFT COUPLING	CARBON STEEL	
SHAFT TUBING	EXTRA HEAVY PIPE	
BOWL SHAFT	STAINLESS STEEL 416	
MAIN BEARING	BRONZE	
DISCHARGE COLUMN	ASTM-A 53-58 GRADE A OR B	
SEALS	BRONZE CASE SYN. RUBBER	
DISCHARGE ADAPTOR	CAST IRON CLASS 30	
DISCHARGE NOZZLE	CAST IRON CLASS 30	
DISCHARGE BEARING	BRONZE	
TOP INTERMEDIATE BRG.	BRONZE	
TOP INTERMEDIATE	CAST IRON CLASS 30	
COLLET	BRONZE	
IMPELLER	BRONZE	
INTERMEDIATE BRG.	BRONZE	
INTERMEDIATE	CAST IRON CLASS 30	
SET SCREW	STAINLESS STEEL	
‡ SAND COLLAR	BRONZE	
WEAR RING	BRONZE	
SUCTION NOZZLE	CAST IRON CLASS 30	
SUCTION NOZZLE BRG.	BRONZE	
MACHINE SCREWS	STAINLESS STEEL	
SUCTION CAPSCREW	CARBON STEEL	
* EXPANDO STRAINER	STEEL CADMIUM PLTD	

NOT APPLICABLE

ENCLOSED LINE SHAFT ☐

* NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER
‡ HARD RUBBER USED ON 8" BOWLS

☐ OPEN LINE SHAFT

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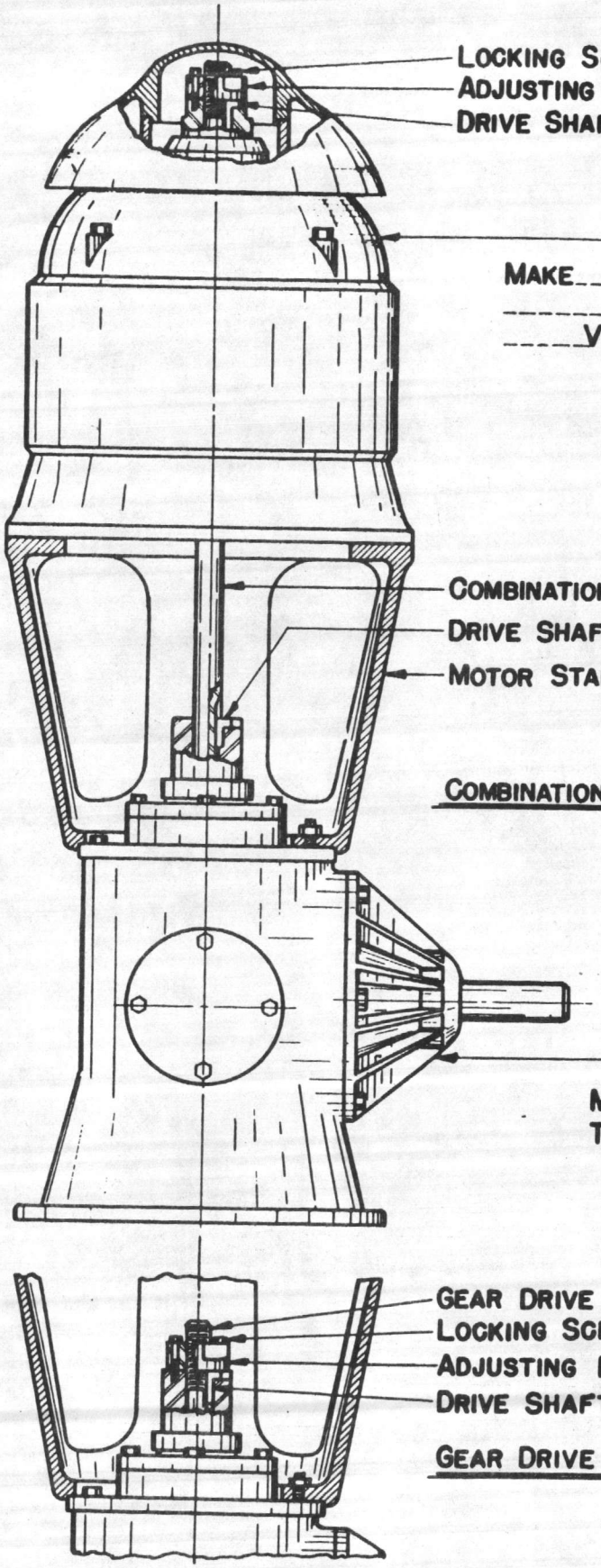
REVISED 3-26-68
SUPERSEDES ORIGINAL PRICE BOOK ISSUE

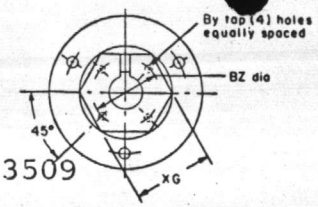


COMBINATION GEAR DRIVE AND HOLLOW SHAFT MOTOR

USING SOLID COMBINATION SHAFT & SEPARATE GEAR SHAFT

COUPLING DIMENSIONS

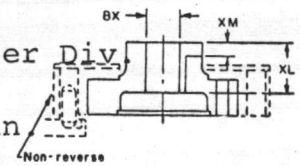
5 - Singer
Layne Atlantic
Box 7095
Norfolk, Va. 23509



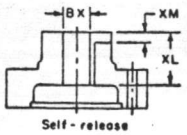
Coupling 1" Non Reverse

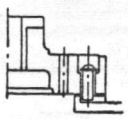
FRAMES 254TP - 286TP
UPPER BRG - MRC 210SFF or Equiv.
LOWER BRG - MRC 7310P or Equiv.

5 - Singer
Layne & Bowler Div.
Box-8097
Memphis, Tenn.
38108



B324TP-B445TP





213TP-B286TP

DIMENSIONS OF COUPLINGS IN INCHES

Frame No.	Cat. No. Self-release or Bolted	Cat. No. Nonreverse	BX Bore Nominal	BX Bore Actual □	BY	BZ	XG	XL	XM	KEYWAY Width	KEYWAY Depth
213TP	148X420G7	148X421G2	¾	0.751	10–32	1 ⅜	2 ¼	1 3/16	11/32	3/16	3/32
215TP	148X420G8	148X421G3	⅞	.876	10–32	1 ⅜	2 ¼	1 3/16	7/16	¼	⅛
B254TP	148X420G6	148X421G1	1	1.001	10–32	1 ⅜	2 ¼	1 3/16	7/16	¼	⅛
254TP	148X250G15	148X251G3	¾	.751	10–32	1 ⅜	2 ¼	1 ½	11/32	3/16	3/32
256TP	148X250G17	148X251G5	⅞	.876	10–32	1 ⅜	2 ¼	1 ½	7/16	¼	⅛
B284TP	148X250G13	148X251G1	1	1.001	10–32	1 ⅜	2 ¼	1 ½	7/16	¼	⅛
B286TP	148X250G14	148X251G2	1 1/16	1.188	¼–20	1 ¾	2 ¼	1 ½	7/16	¼	⅛
	148X250G16	148X251G4	1 ¼	1.251	¼–20	1 ¾	2 ¼	1 ½	7/16	¼	⅛
	148X250G21	148X251G7	1 ¼	1.251	¼–20	1 ¾	2 ¼	1 ½	9/16	⅜	3/16
	148X399G3	148X400G1	1	1.001	10–32	1 ⅜	2 ⅝	1 13/16	7/16	¼	⅛
	148X399G2	Use	1 3/16	1.188	¼–20	1 ¾	2 ⅝	1 13/16	7/16	¼	⅛
B324TP	148X399G6	with	1 ¼	1.251	¼–20	1 ¾	2 ⅝	1 13/16	7/16	¼	⅛
B326TP	148X399G5	Self-	1 ¼	1.251	¼–20	1 ¾	2 ⅝	1 13/16	9/16	⅜	3/16
	148X399G7	release	1 7/16	1.438	¼–20	2 ⅛	2 ⅝	1 13/16	9/16	⅜	3/16
	148X399G1	Coupling	1 ½	1.501	¼–20	2 ⅛	2 ⅝	1 13/16	9/16	⅜	3/16
	148X403G5		1	1.001	10–32	1 ⅜	3 ¼	2	7/16	¼	⅛
	148X403G6	148X404G1	1 3/16	1.188	¼–20	1 ¾	3 ¼	2	7/16	¼	⅛
	148X403G9	Use	1 ¼	1.251	¼–20	1 ¾	2 ¼	2	9/16	⅜	3/16
B364TP	148X403G2	with	1 ⅜	1.376	¼–20	2 ⅛	3 ¼	2	9/16	⅜	3/16
B365TP	148X403G10	Self-	1 7/16	1.438	¼–20	2 ⅛	3 ¼	2	9/16	⅜	3/16
	148X403G4	release	1 ½	1.501	¼–20	2 ⅛	3 ¼	2	9/16	⅜	3/16
	148X403G8	Coupling	1 11/16	1.688	¼–20	2 ½	3 ¼	2	9/16	⅜	3/16
	148X403G1		1 ¾	1.751	¼–20	2 ½	3 ¼	2	9/16	⅜	3/16
	148X455G6	174L509G5	1 3/16	1.188	¼–20	1 ¾	3 ¼	2 ¼	7/16	¼	⅛
	148X455G5	Use	1 ¼	1.251	¼–20	1 ¾	3 ¼	2 ¼	9/16	⅜	3/16
B404TP	148X455G2	with	1 7/16	1.438	¼–20	2 ⅛	3 ¼	2 ¼	9/16	⅜	3/16
B405TP	148X455G3	Self-	1 ½	1.501	¼–20	2 ⅛	3 ¼	2 ¼	9/16	⅜	3/16
	148X455G4	release	1 11/16	1.688	¼–20	2 ½	3 ¼	2 ¼	9/16	⅜	3/16
	148X455G7	Coupling	1 ¾	1.751	¼–20	2 ½	3 ¼	2 ¼	9/16	⅜	3/16
	148X455G1		1 13/16	1.938	¼–20	2 ½	3 ¼	2 ¼	11/16	½	¼
	148X499G2	174L511G1									
B444TP	148X499G1	Use with	1 3/16	1.188	¼–20	1 ¾	2 ¾	2 ¼	7/16	¼	⅛
(2-pole	148X499G3	Self-release	1 ¼	1.251	¼–20	1 ¾	2 ¾	2 ¼	9/16	⅜	3/16
only)		Coupling	1 ½	1.501	¼–20	2 ⅛	2 ¾	2 ¼	9/16	⅜	3/16
	148X460G7	148X461G1	1 3/16	1.188	¼–20	1 ¾	3 ¾	2 ¾	7/16	¼	⅛
	148X460G5	Use	1 7/16	1.438	¼–20	2 ⅛	3 ¾	2 ¾	9/16	⅜	3/16
B444TP	148X460G4	with	1 ½	1.501	¼–20	2 ⅛	3 ¾	2 ¾	9/16	⅜	3/16
B445TP	148X460G3	Self-	1 11/16	1.688	¼–20	2 ½	3 ¾	2 ¾	9/16	⅜	3/16
	148X460G6	release	1 13/16	1.813	¼–20	2 ½	3 ¾	2 ¾	11/16	½	¼
	148X460G2	Coupling	1 15/16	1.938	¼–20	2 ½	3 ¾	2 ¾	11/16	½	¼
	148X460G1		2 3/16	2.188	⅜–16	3 ¼	3 ¾	2 ¾	11/16	½	¼

□Tolerances for the "BX" dimensions are +0.001 inch, −0.000 inch, up to and including 1½ inch diameter, and +0.0015 inch, −0.000 inch for larger diameters.

Nonreverse coupling assemblies, frames 213TP—B286TP are complete, nonreverse assemblies, frames B324TP—B445TP, must be used together with appropriate self-release coupling.

GEM-2296E L. Atl. #N-17-72
L & B #M1009 72D-367

20 HP 1800 RPM 230/450 Volt 3 ph 60 hz

Prints are: For Approval ☐

Prints are: Approved for Construction ☒

Customer Singer

Customer's Order No. M1009 Item

Our Req. No. 405-32285 Item Approved by K.T.

INDUCTION MOTORS—INTEGRAL-HP, 3- AND 2-PHASE SQUIRREL-CAGE
VERTICAL

TRI-CLAD • Hollow-shaft • Shielded (Dripproof)*

High-thrust • Normal-starting-torque • NEMA Type P Base

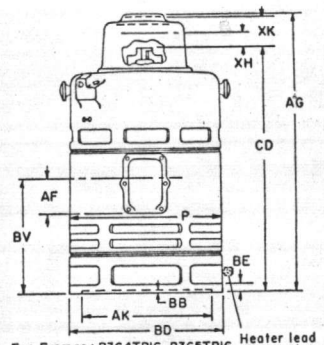
Type K
Frames 213TP10 to B405TP20, 3600 Rpm and Below
Frames B444TP16 to B445TP20, 1800 Rpm and Below θ

Self-release, Bolted or Nonreverse Coupling

GEM-2296E

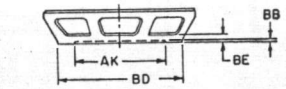
Sept. 8, 1970

DIMENSIONS

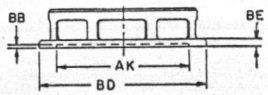


For Frames B364TP16, B365TP16, B444TP20, and B445TP20

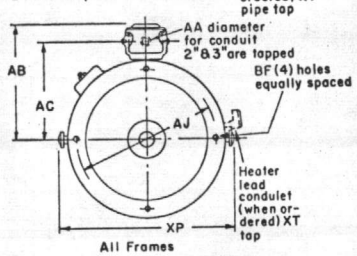
Heater lead conduit (when ordered) XT pipe tap



For Frames: 213TP10, 215TP10, B254TP10, 254TP10, 254TP12, 256TP10, 256TP12, B284TP10, B284TP12, B286TP10, B286TP12, B324TP12, B326TP12, B364TP12, B365TP12, B404TP16, B405TP16, B444TP16, B445TP16



254TP16, 256TP16, B284TP16, B286TP16, B324TP16, B326TP16, B404TP20, B405TP20



All Frames

FOR 3600-RPM MOTORS ONLY

For a given pump-shaft diameter, the following table gives the maximum distance between the motor's top coupling and the pump's first line-shaft bearing. This table is based on keeping the headshaft critical at least 25% above operating speed. The selection of a small headshaft diameter may make it necessary to support the headshaft in a close-fitting bushing in the lower end of the motor shaft.

Pump-shaft Diameter in Inches	Maximum Distance Between Top Coupling and Lower Support in Inches
0.750	33
1.000	38
1.187	42
1.437	45
1.500	47
1.688	50
1.750	51

Frame No.	Approx Net Wt in Lb	Dimensions in Inches																
		P	AA	AB	AC	AF	AG	AJ	AK †	BB Min	BD	BE	BF	BV	CD	XH ‡	XK	XP	XT
213TP10	165	10 7/8	1 1/4	9 3/8	7 5/16	3 1/2	23 13/16	9 1/8	8 1/4	3/16	10	3/4	7/16	10 15/16	20 15/16	1 3/4	2 3/4	....	1/2
215TP10	180	10 7/8	1 1/4	9 3/8	7 5/16	3 1/2	23 13/16	9 1/8	8 1/4	3/16	10	3/4	7/16	10 15/16	20 15/16	1 3/4	2 3/4	....	1/2
B254TP10	205	10 7/8	1 1/2	9 3/8	7 5/16	3 1/2	23 13/16	9 1/8	8 1/4	3/16	10	3/4	7/16	10 15/16	20 15/16	1 3/4	2 3/4	....	1/2
254TP10	270	12 15/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	9 1/8	8 1/4	3/16	10	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
254TP12	270	12 15/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	9 1/8	8 1/4	3/16	12	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
254TP16	270	12 15/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	14 3/4	13 1/2	1/4	16 1/2	3/4	11/16	13	23 9/16	1 3/4	2 3/4	....	1/2
256TP10	310	12 15/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	9 1/8	8 1/4	3/16	10	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
256TP12	310	12 15/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	9 1/8	8 1/4	3/16	12	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
256TP16	310	12 15/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	14 3/4	13 1/2	1/4	16 1/2	3/4	11/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B284TP10	330	12 15/16	2	11 3/8	8 7/8	4 3/8	26 1/2	9 1/8	8 1/4	3/16	10	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B284TP12	330	12 15/16	2	11 3/8	8 7/8	4 3/8	26 1/2	9 1/8	8 1/4	3/16	12	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B284TP16	330	12 15/16	2	11 3/8	8 7/8	4 3/8	26 1/2	14 3/4	13 1/2	1/4	16 1/2	3/4	11/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B286TP10	355	12 15/16	2	11 3/8	8 7/8	4 3/8	26 1/2	9 1/8	8 1/4	3/16	10	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B286TP12	355	12 15/16	2	11 3/8	8 7/8	4 3/8	26 1/2	9 1/8	8 1/4	3/16	12	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B286TP16	355	12 15/16	2	11 3/8	8 7/8	4 3/8	26 1/2	14 3/4	13 1/2	1/4	16 1/2	3/4	11/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B324TP12	460	14 1/4	2§	12 3/16	9 11/16	4 3/8	32 7/16	9 1/8	8 1/4	3/16	12	7/8	7/16	15 7/16	28 3/16	3 1/8	4	15 3/4	1/2
B324TP16	460	14 1/4	2§	12 3/16	9 11/16	4 3/8	32 7/16	14 3/4	13 1/2	1/4	16 1/2	7/8	11/16	15 7/16	28 3/16	3 1/8	4	15 3/4	1/2
B326TP12	510	14 1/4	3	13 15/16	10 5/16	6 1/2	32 7/16	9 1/8	8 1/4	3/16	12	7/8	7/16	15 7/16	28 3/16	3 1/8	4	15 3/4	1/2
B326TP16	510	14 1/4	3	13 15/16	10 5/16	6 1/2	32 7/16	14 3/4	13 1/2	1/4	16 1/2	7/8	11/16	15 7/16	28 3/16	3 1/8	4	15 3/4	1/2
B364TP12	600	16 1/4	3	14 13/16	11 3/16	6 1/2	35 7/16	9 1/8	8 1/4		12	1 1/8	7/16	16 1/8	31 3/16	3 1/8	4	17 7/8	3/4
B364TP16	600	16 1/4	3	14 13/16	11 3/16	6 1/2	35 7/16	14 3/4	13 1/2	1/4	16 1/2	1	11/16	16 1/8	31 3/16	3 1/8	4	17 7/8	3/4
B365TP12	660	16 1/4	3	14 13/16	11 3/16	6 1/2	35 7/16	9 1/8	8 1/4	3/16	12	1 1/8	7/16	16 1/8	31 3/16	3 1/8	4	17 7/8	3/4
B365TP16	660	16 1/4	3	14 13/16	11 3/16	6 1/2	35 7/16	14 3/4	13 1/2	1/4	16 1/2	1	11/16	16 1/8	31 3/16	3 1/8	4	17 7/8	3/4
B404TP16	890	18 7/16	3	15 3/4	12 1/8	6 1/2	41 1/4	14 3/4	13 1/2	1/4	16 1/2	7/8	11/16	19 1/2	36 7/16	3 1/4	4 1/2	20 1/8	3/4
B404TP20	890	18 7/16	3	15 3/4	12 1/8	6 1/2	41 1/4	14 3/4	13 1/2	1/4	20	7/8	11/16	19 1/2	36 7/16	3 1/4	4 1/2	20 1/8	3/4
B405TP16	990	18 7/16	3	15 3/4	12 1/8	6 1/2	41 1/4	14 3/4	13 1/2	1/4	16 1/2	7/8	11/16	19 1/2	36 7/16	3 1/4	4 1/2	20 1/8	3/4
B405TP20	990	18 7/16	3	15 3/4	12 1/8	6 1/2	41 1/4	14 3/4	13 1/2	1/4	20	7/8	11/16	19 1/2	36 7/16	3 1/4	4 1/2	20 1/8	3/4
B444TP16	1180	20 3/8	3	16 15/16	13 5/16	6 1/2	47 1/8	14 3/4	13 1/2	1/4	16 1/2	1 1/8	11/16	23 1/4	41 7/8	3 3/8	5	22	3/4
B444TP20	1180	20 3/8	3	16 15/16	13 5/16	6 1/2	47 1/8	14 3/4	13 1/2	1/4	20	1 1/8	11/16	23 1/4	41 7/8	3 3/8	5	22	3/4
B445TP16	1330	20 3/8	3	16 15/16	13 5/16	6 1/2	47 1/8	14 3/4	13 1/2	1/4	16 1/2	1 1/8	11/16	23 1/4	41 7/8	3 3/8	5	22	3/4
B445TP20	1330	20 3/8	3	16 15/16	13 5/16	6 1/2	47 1/8	14 3/4	13 1/2	1/4	20	1 1/8	11/16	23 1/4	41 7/8	3 3/8	5	22	3/4

Coupling dimensions on reverse side.

* These motors meet NEMA specifications for weather-protected Type 1 motors.

† 'AK' diameters of 8 1/4 inches will come within the limits of +0.003 inch, −0.000 inch; diameters of 13 1/2 inches will come within the limits of +0.005 inch, −0.000 inch.

‡ The total height of pump shaft and locking nut above top of coupling must not exceed dimension XH.

§ For 3600 rpm, Frames B324TP12 and B324TP16, conduit box dimensions are same as for Frames B326TP12 and B326TP16.

θ For 3600 rpm in this frame size, refer to the Company.

Frames 213TP10 through B286TP16 have grease-lubricated upper guide and lower thrust bearings. All other frames have oil-lubricated upper thrust bearing and grease-lubricated lower guide bearing.

For 3600 rpm, Frames B404TP16 through B405TP20 inclusive maximum shaft permissible 1.751 inches.

Nonreverse coupling assemblies, Frames 213TP to B286TP are complete, nonreverse assemblies, Frame B324TP to B445TP, must be used together with appropriate self-release coupling.

Provided mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward, or from either side.

For shipping weight add 5 per cent to the above net weights.

For ESTIMATING ONLY unless endorsed for construction.

WELL # 651

651
18,900

WELL # 651

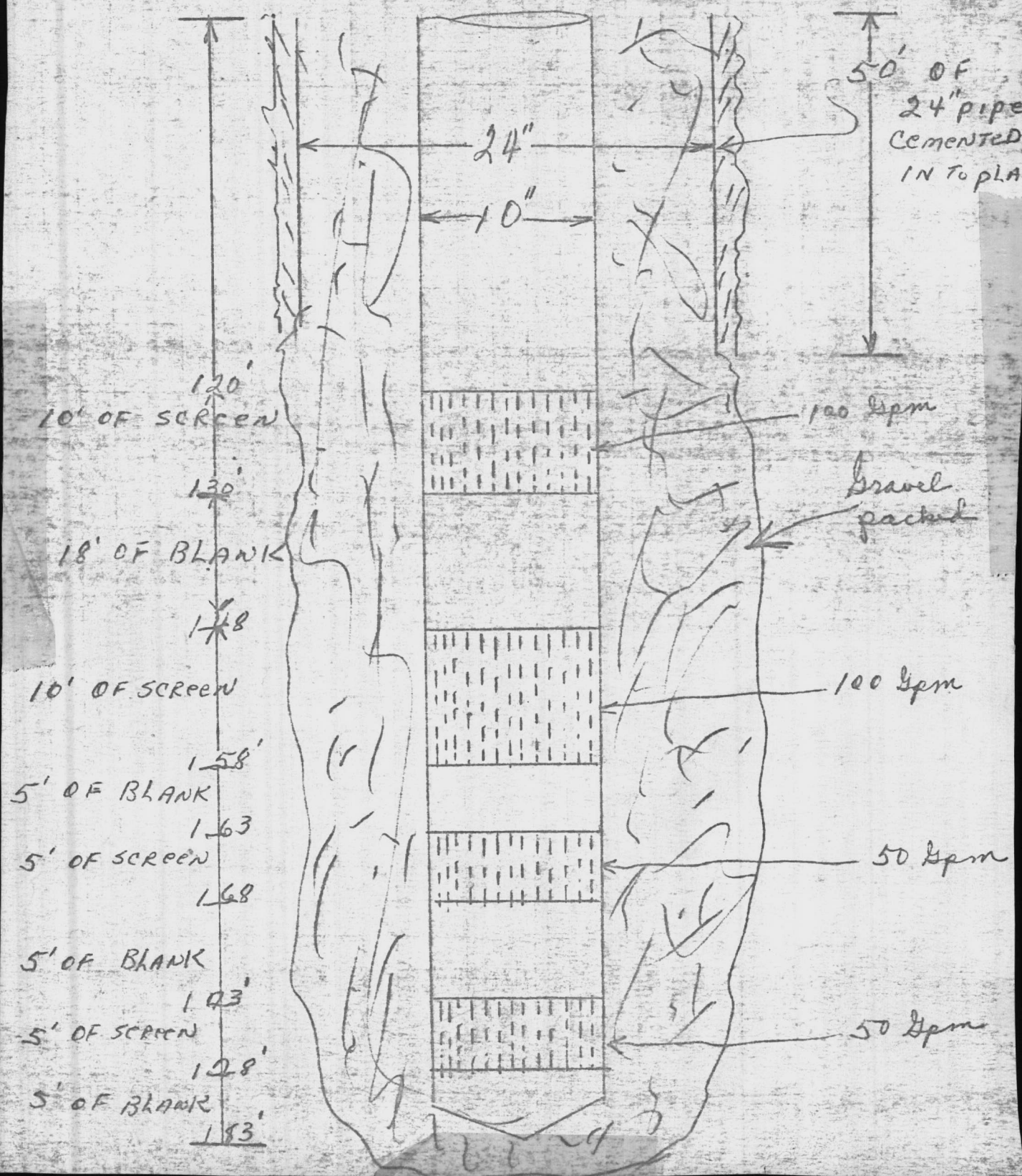
BY _____ DATE 11-26-71 SUBJECT Well # 10 SHEET NO _____ OF _____

CHKD. BY _____ DATE _____ Carbon Construction Co JOB NO. 40936

Camp Lejeune N.C.

Proposed Well # 10

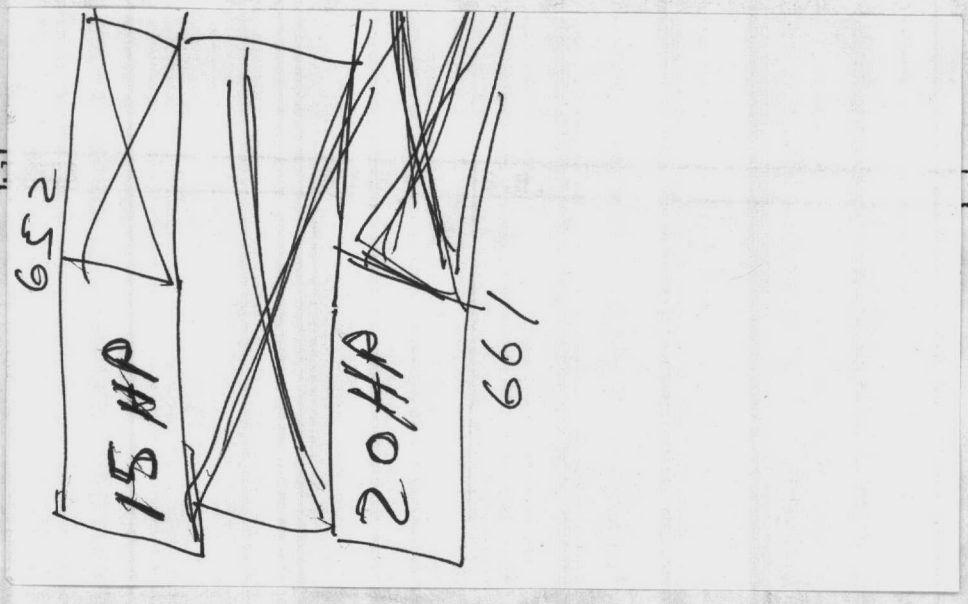
300 Gpm Well



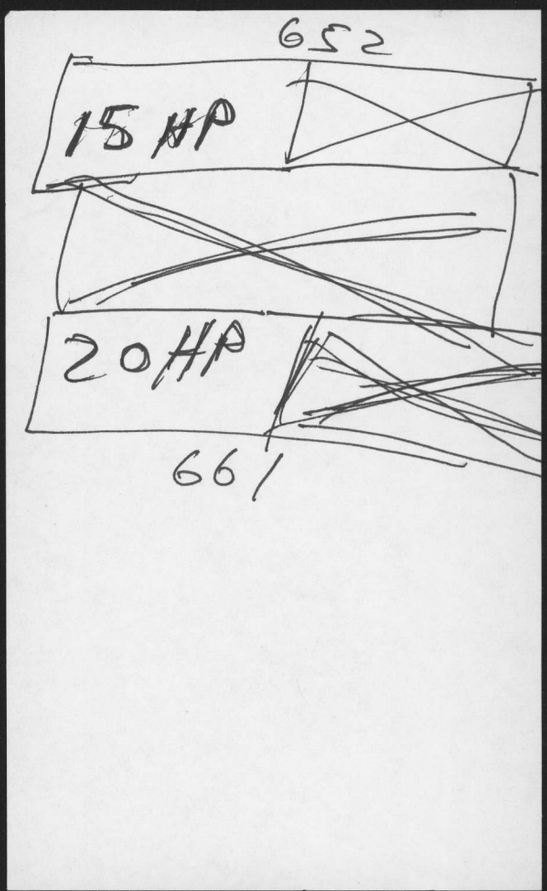
WELL NUMBER	652	BY Stevenson & Sons			DATE 3-28-01	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
110	15	42	27	98	100	
		54	43	85	146	
		67	52	75	164	
		78	63	65	192	
		87	72	55	214	
		90	75	50	221	
		95	80	48	230	
		100	95	40	240	
	Left set	104	99	35	250	

D/H-100+

REMARKS



MANUFACT					TOTAL HEAD	SIZE


652
15 HP
20 HP
661

WELL NUMBER	652	BY	Stevenson & Sayre	DATE	3-28-01

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
110	15	42	27	98	100	
		54	43	85	146	
		67	52	75	164	
		78	63	65	192	
		87	72	55	214	
		90	75	50	221	
		95	80	45	230	
		100	95	40	240	
	Left set	104	99	35	250	

P/H-100+

REMARKS

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

DATE 2-25-09

PWSID 04-67-041

WELL # HP 652

WELL NAME HAD NOT POINT HP20

BLDG. HP 652

CODE G.

AVAILABILITY A

LOCATION LYMAN ROAD

LATITUDE 34.67207

LONGITUDE 77.31342

WELL DIAMETER 8"

WELL DEPTH 183

SCREEN INTERVAL ____

YIELD 119

STATIC LEVEL 11

PUMPING LEVEL 43

PUMP TYPE VERTICAL TURBINE

MOTOR HP 15

INTAKE DEPTH 126'

DESIGN CAPACITY 200

ACTUAL GPM 200

SIZE OF CONCRETE SLAB ____

HEIGHT OF CASING 11"

North [redacted]olina Department of Environment, Health, and [redacted]
Division of Environmental Health, Public Water Supply Se[redacted]

SOURCE INFORMATION
GROUND WATER

Date Form Completed (M M D D Y Y): 01/25/95

PWSID: 04-97-041

Owner Assigned Source Code: 002

Well Name (If purchase, name of system): HADNOT POINT 652

Code: S (G=Ground, W=Purchase/G, Y=G w/direct influence, Z=W w/direct influence)

If Purchase, seller ID#:

Source Begin Date (M M Y Y):

Source exempt—SWTR? ☐ Y ☐ N

Direct Influence Date (M M D D Y Y):

Availability: P (P=Permanent, E=Emergency, S=Seasonal, I=Interim, O=Other)

Location of well within the system (If purchase, location of master meter): LYMAN ROAD

Latitude (N) (Deg. Min. Sec.): 34 40 19.

Longitude (W) (Deg. Min. Sec.): 077 18 47.

How Determined: O (G=GPS, M=Map, S=Surveyed)

GPS Data: Q # or DOP #

No. of Sats. Locked on:

(If purchase, use seller's primary source lat/long)

Vulnerable (VOCs)? ☐ Y ☐ N

Assessment Date (M M D D Y Y):

ENTRY POINT INFORMATION

Use Code: C (C=Ground/Permanent, D=Ground/non-permanent)

Availability: P (P=Year-round, S=Seasonal, E=Emergency, I=Interim, O=Other)

Owner Assigned Entry Point Code: 100

Entry Point Name: ~~HP 652~~ MCB HADNOT PT WTP

Location:

Well Site: Owned or controlled? Y (Y,N) Control Area (100' radius)? Y (Y,N) If no, explain:

Sources of pollution/distance: woods - Road @ 100'

Surface water within 200'? ☐ Y ☒ N If yes, actual distance ☐☐☐ feet If yes, bact. samples collected? ___ (Y,N)

Adequate slope? Y (Y,N) Flooding? N (Y,N) Maintenance: OK

Well House: Free of stored materials? Y (Y,N) Properly drained? Y (Y,N) Locked? Y (Y,N)

Condition of house: OK Type of freeze protection: Elec Heater

Well: Diameter: 8" Type: SCREENED Yield (gpm): ~~140~~ 200 Properly sealed? Y (Y,N)

Properly vented? N (Y,N) Casing depth 50 ft. (If unknown, put 'UNK') Well depth: 183' Meter available? N (Y,N)

Concrete slab adequate? Y (Y,N) If no, explain: Size: 10x12

Size of blow-off: 4" (V) Sample tap: Before treatment? Y (Y,N) After treatment? ___ (Y,N)

Pumps: Capacity: GPM: ~~200~~ 146 HP: 15 Pump intake depth: 126 Auxiliary Power? N (Y,N)

Type pump: VERTICAL TURBINE Height above floor (pump/casing): 11" / ___

Storage at well site: Elev: ☐☐☐☐☐☐☐ Hydro: ☐☐☐☐☐ Ground: ☐☐☐☐☐☐☐

If hydroautomatic, air volume control? ___ (Y,N) Safety valves? ___ (Y,N) Coded? ___ (Y,N)

High service pumps: 1. ___ gpm ___ hp 2. ___ gpm ___ hp 3. ___ gpm ___ hp Auxiliary Power? ___ (Y,N)

Is the water treated at this well? ☒ Y ☐ N If yes, complete back of form.

If other wells are treated here, which ones? If treated elsewhere, where? HP-20 PLANT

If purchase, retreat? ☐ Y ☐ N If yes, complete back of form. ~~O~~ OK vent ② oil cube bearings

DEHNR 3803 (Revised 12/93)

WELL NUMBER 652 | BY THOMAS/STEVENSON | DATE 2-15-94

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
110	8	36	26	37	104	04
		38	28	32	108	
		39	29	25	119	
		45	35	20	125	
		50	40	15	133	
LEAVE SET →		53	43	10	146	

REMARKS Dead @ 90 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER 652		BY Stevenson & Peterson			DATE 4-4-97	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
100	11	33	22	20	100	10
				15	D.I not change	
		43	32	10	119	

REMARKS D/H 42 PSI

652 D.R.I

WELL PUMP # 10

STATIC 8.0

PUMPING LEVEL 90 ft.

LENGTH OF AIRLINE 110

DISCHARGE PRESSURE

GPM 200

DEPTH 183'

MANUFACTURER	STAGE	S.I

652 D.R.1

WELL PUMP # 10

STATIC	8.0
PUMPING LEVEL	90 ft.
LENGTH OF AIRLINE	110
DISCHARGE PRESSURE	
GPM	200
DEPTH	183'

WELL NUMBER 652 BY Stevenson & Peterson DATE 4-4-97

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
100	11	33	22	20	100	10
				15	D.I not change	
		43	32	10	119	

REMARKS D/H 42 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER 652 | BY THOMAS & BROWN | DATE 10-26-84

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1340
110	6	40	34	90	111	1350
		50	44	84	130	1400
		57	51	78	146	1410
		64	58	72	159	1420
		68	62	68	167	1430
		72	66	64	180	1440
		77	71	59	187	1450
		80	74	54	199	1500
		85	79	50	205	1510
		88	82	45	216	1520

REMARKS list set at 45 PSI 216 GPM

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER	652	BY THOMAS / RAYNOR			DATE 9-30-83	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1425
110	15	53	38	81	122	1435
		59	44	77	130	1446
		64	49	73	140	1500
		70	55	68	154	1510
		72	57	64	170	1521
		82	67	59	183	1530
		85	70	55	190	1540
		90	75	50	205	1550

REMARKS Last set at 50 PSI 205 GPM

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL # 652

DATE	LENGTH OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF DRAW DOWN GPM	TOTAL CAP.
9-18-81	110'	30	79'	49'	67 LBS	167	
			84'	54'	64 LBS	178	
			87'	57'	61 LBS	185	
			90'	60'	58 LB	192	

REMARKS: Left at 60 lbs as was set.

DEPTH OF WELL:

WATERLINE ELEVATION: +

DATE INSTALLED:

WELL # 652

DATE	LENGTH OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF DRAW DOWN	TOTAL CAP.
~~4~~/3/77	110	8'	63		78		133
			67		76		151
			70		74		167
			72		(72)		178
			74		70		183
			78		65		210
			82		60		221
			87		55		235
REMARKS:							
2-13-80	110'		92'		60		201
			93'		65		187
			97'		55		221
EPTH OF ELL:							
IRLINE VATION:	+	-					
E ALVED:							

FORM A-4
(MAY '70)

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
OFFICE OF WATER DATA COORDINATION

APPROVED.
Budget Bureau No. 42-R1485
Approval Expires June 30, 1976

INVENTORY OF HYDROLOGIC DATA STATIONS
QUALITY OF WATER

1. AGENCY CODE	2. TYPE	3. LATITUDE	4. LONGITUDE	5.
MC	Q	34° 40' 19" N	77° 18' 48" W	

6. AGENCY STATION NO.	7. STATION NAME
HP-652	HP-20-652

8. DRAINAGE BASIN CODE (No. / Letter)	9. STATE CODE	10. COUNTY CODE	11. COUNTY NAME
06 / N	32	133	Onslow

12. PERIOD OF RECORD (Began / Discontinued)	Y ☐ Continuous Interruption Exceeds 1 Year	13	14
1972			

15. SITE

- ☐ 101 Stream
- ☐ 102 Canal
- ☐ 103 Lake
- ☐ 104 Reservoir
- ☐ 105 Estuarine zone
- ☐ 106 Spring
- ☒ 107 Well
- ☐ 108 Drain
- ☐ 109 Other

16. TYPES OF DATA AVAILABLE AND FREQUENCY OF MEASUREMENT (Enter appropriate number (1-8) beside each parameter to indicate frequency of measurement. For parameters telemetered, enter "T".)

1 Continuous
2 Seasonal
3 Daily
4 Weekly
5 Monthly
6 Quarterly
7 Annual
8 Other Periodic

Physical

311 ___ Temperature
312 ___ Specific conductance
313 ___ Turbidity
314 ___ Color
315 ___ Odor
316 ___ pH (field)
317 8 pH (lab)
318 ___ Eh
319 ___ Suspended solids
320 ___ Other

Chemical

331 ___ Dissolved solids
332 8 Chloride
333 ___ Nutrients (nitrogen)
334 ___ Nutrients (phosphorus)
335 ___ Common ions
336 8 Hardness
337 ___ Radiochemical
338 ___ Dissolved oxygen
339 ___ Other gases
340 ___ Minor elements
341 ___ Pesticides (insecticides, herbicides, etc.)
342 ___ Detergents - MBS
343 ___ Biochemical oxygen demand
344 ___ Carbon (total, dissolved, etc.)

Biologic

361 ___ Coliforms
362 ___ Other micro-organisms (Benthic organism, phytoplankton, etc.)
363 ___ Other

Sediment

371 ___ Concentration (suspended)
372 ___ Particle size (suspended)
373 ___ Particle size (bed load material)
374 ___ Other

17. SUPPLEMENTARY DATA AVAILABLE FOR STATION

- ☐ 421 Surface water station
- ☐ 422 Ground water station
- ☐ 423 Water stage or level
- ☒ 424 Water discharge
- ☐ 425 Time of travel
- ☐ 426 Drainage area

18. STORAGE OF DATA

- ☐ 501 Published
- ☒ 502 Not published
- ☐ 503 Data on punchcard
- ☐ 504 Data on magnetic tape, disc, data cell, etc.
- ☐ 505 Other

19. INQUIRIES ABOUT DATA SHOULD BE SENT TO:

Office Base Maintenance Department, Utilities Division
Street No. Marine Corps Base
City, State, Zip Camp Lejeune, North Carolina 28542
City Code 0735

20. DATA ARE AVAILABLE TO PUBLIC ON REQUEST ☒ Yes ☐ No

21. OFFICE COMPLETING FORM
BASE MAINTENANCE DEPARTMENT

22. COMPILER'S NAME
BOB WILSON

23. DATE Month 12 Year 19 76

CORBIN CONSTRUCTION COMPANY
Camp Lejeune, North Carolina
Pumping Test Well No. 10
January 18, 1972

Static Level 8' 0"

TIME	GPM	PUMPING LEVEL
9:30	150	65' 8"
9:45	150	67' 4"
10:00	150	67' 10"
10:30	150	68' 2"
11:00	150	68' 6"
11:30	150	68' 10"
12:00	200	88'
12:15	200	89'
12:30	200	90'
1:00	200	90'
1:30	200	90'
2:00	200	90'
2:30	200	90'
3:00	200	90'
3:15	250	No reading
3:30	230	109'
3:45	230	109'
4:00	230	109'
4:30	230/225	No reading /105'
5:00	230	109'
5:15	230	No reading
5:30	225	105'
5:45	225	105'
6:00	225	107'
6:15	225	107'
6:30	225	107'

TIME	GPM	PUMPING LEVEL
7:00	225	107'
7:30	225	107'
8:00	225	107'
9:00	225	107'
10:00	225	107'
11:00	225	107'
12:00	225	107'
1:00	225	107'
2:00	225	107'
3:00	225	107'
4:00	225	107'
5:00	225	107'
6:00	225	107'
7:00	225	107'
8:00	225	107'
9:00	225	107'
10:00	225	107'
11:00	225	107'
12:00	225	107'
1:00	225	107'
2:00	225	107'
3:00	225	107'
4:00	225	107'
5:00	225	107'
6:00	225	107'
7:00	225	107'

Airline 110'

"Hello Analysis, Goodbye Worry"

WATER ANALYSIS LABORATORY
802 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512

(803) 479-4639

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
DEVELOPERS
IRRIGATION
OTHERS

DATE: November 20, 1971

Report To: Layne-Atlantic Co.
Norfolk, Va.

Date Analyzed: 11/20/71 652

Sample Number: Test Well #10
140'-160'
Camp Lejeune

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.3	Carbon Dioxide (CO_2)	24
Iron (Fe)	0.15	Total Acidity ($CaCO_3$)	38
Nitrate (NO_3)	Trace	Calcium Hardness ($CaCO_3$)	201
Fluoride (F)	0.3	Magnesium Hardness ($CaCO_3$))	20
Manganese (Mn)	0	Carbonate Hardness ($CaCO_3$)	221
Total Hardness ($CaCO_3$)	221	Noncarbonate Hardness ($CaCO_3$)	20
Chlorides (Cl)	10	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	7.2 (?)	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0.9	Bicarbonate Alkalinity ($CaCO_3$)	245
Magnesium (Mg)	4.8	Total Alkalinity ($CaCO_3$)	245
Calcium (Ca)	80.0	Total Dissolved Solids	239
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°c)	370 (?)
Bicarbonate (HCO_3)	298 (CALC)	Appearance When Analyzed (TURBIDITY)	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionable

SIGNED: Water Analysis Laboratory
LABORATORY DIRECTOR
802 Hamlet Highway
Bennettsville, South Carolina 29512

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

CORBIN CONSTRUCTION COMPANY
Camp LeJeune, North Carolina
Pumping Test Well No. 10
January 18, 1972

Static Level 8' 0"

TIME	GPM	PUMPING LEVEL
9:30	150	65' 8"
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11:30	150	68'10"
12:00	200	88'
12:15	200	89'
12:30	200	90'
1:00	200	90'
1:30	200	90'
2:00	200	90'
2:30	200	90'
3:00	200	90'
3:15	250	no reading
3:30	230	109'
3:45	230	109'
4:00	230	109'
4:30	230/225	no reading/105
5:00	230	109'
5:15	230	no reading
5:30	225	105'
5:45	225	105'
6:00	225	107'
6:15	225	107'
6:30	225	107'
7:00	225	107'
7:30	225	107'
8:00	225	107'
9:00	225	107'
10:00	225	107'
11:00	225	107'
12:00	225	107'
1:00	225	107'
2:00	225	107'
3:00	225	107'
4:00	225	107'
5:00	225	107'
6:00	225	107'
7:00	225	107'
8:00	225	107'
9:00	225	107'
10:00	225	107'
11:00	225	107'
12:00	225	107'
1:00	225	107'
2:00	225	107'
3:00	225	107'
4:00	225	107'
5:00	225	107'
6:00	225	107'
7:00	225	107'

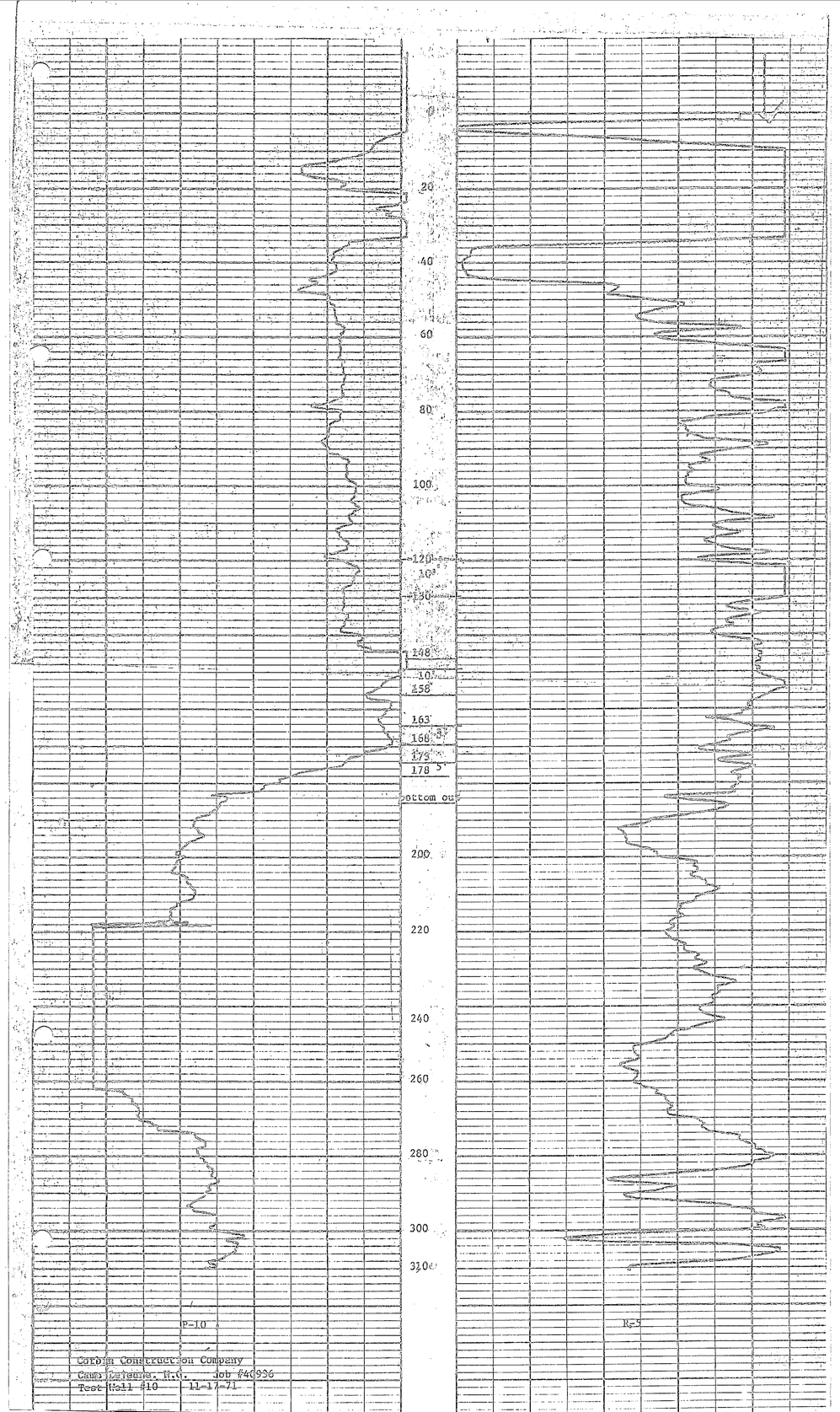
Layne -ATLANTIC COMPANY
ASSOCIATED WITH LAYNE & BOWLER, INC.
P. O. BOX 7095 • NORFOLK, VIRGINIA 23509

FACTORY AND GENERAL OFFICE
MEMPHIS, TENN.
SALES OFFICES
ALBANY, GA.
GLEN BURNIE, MD.
NORFOLK, VA.
ORLANDO, FLA.
SAVANNAH, GA.

WELL WATER SYSTEMS
PUMPING EQUIPMENT
WATER CONDITIONING EQUIPMENT

CORBIN CONSTRUCTION CO.
Camp Lejeune, N.C.
Well #10
November 17, 1971

0 - 10'	Top soil sandy clay
10 - 20'	Medium to fine white sand
20 - 30'	Medium to fine white sand
30 - 40'	Soft blue clay
40 - 50'	Soft blue clay
50 - 60'	Blue clay with streaks of lime & shell rock
60 - 70'	Lime stone with streak of fine sand
70 - 80'	Lime stone with streaks of sand
80 - 90'	Soft lime stone with traces of clay
90 - 100'	Shell fragments with traces of clay (soft)
100 - 110'	" " " " " " "
110 - 120'	" " " " " " "
120 - 130'	" " " " " " "
130 - 140'	" " " " " " "
140 - 150'	Fine sand and shell fragments
150 - 160'	Fine sand and shell fragments
160 - 170'	Fine sand with traces of shell and clay
170 - 180'	Shell fragments fine sandy clay
180 - 190'	Shell fragments fine sandy clay
190 - 200'	Shell fragments fine sandy clay
200 - 210'	Fine sand and shell fragments (soft)
210 - 220'	Fine to medium sandy clay
220 - 230'	Fine to medium sandy clay
230 - 240'	Very fine sand
240 - 250'	Fine sandy clay
250 - 260'	Fine silty sand - shell (soft)
260 - 270'	Fine silty sand (soft)
270 - 280'	Fine silty sand and shell (soft)
280 - 290'	" " " " " "
290 - 300'	" " " " " "
300 - 310'	" " " " " "


0
20
40
60
80
100
120
10'
130
248'
10'
258'
163'
160'
3'
173'
178'
Bottom of
200
220
240
260
280
300
310
P-10
R-5
Catlin Construction Company
Camp Lejeune, N.C. Job #40936
Test Hole #10 11-17-71

Well # 10

Discharge head per section 11A, par. 11A.3.1	----	130
Pumping level @ 200 gpm	----	90
Total head	----	220

Pump

8" PRHC 7 stage 15 hp

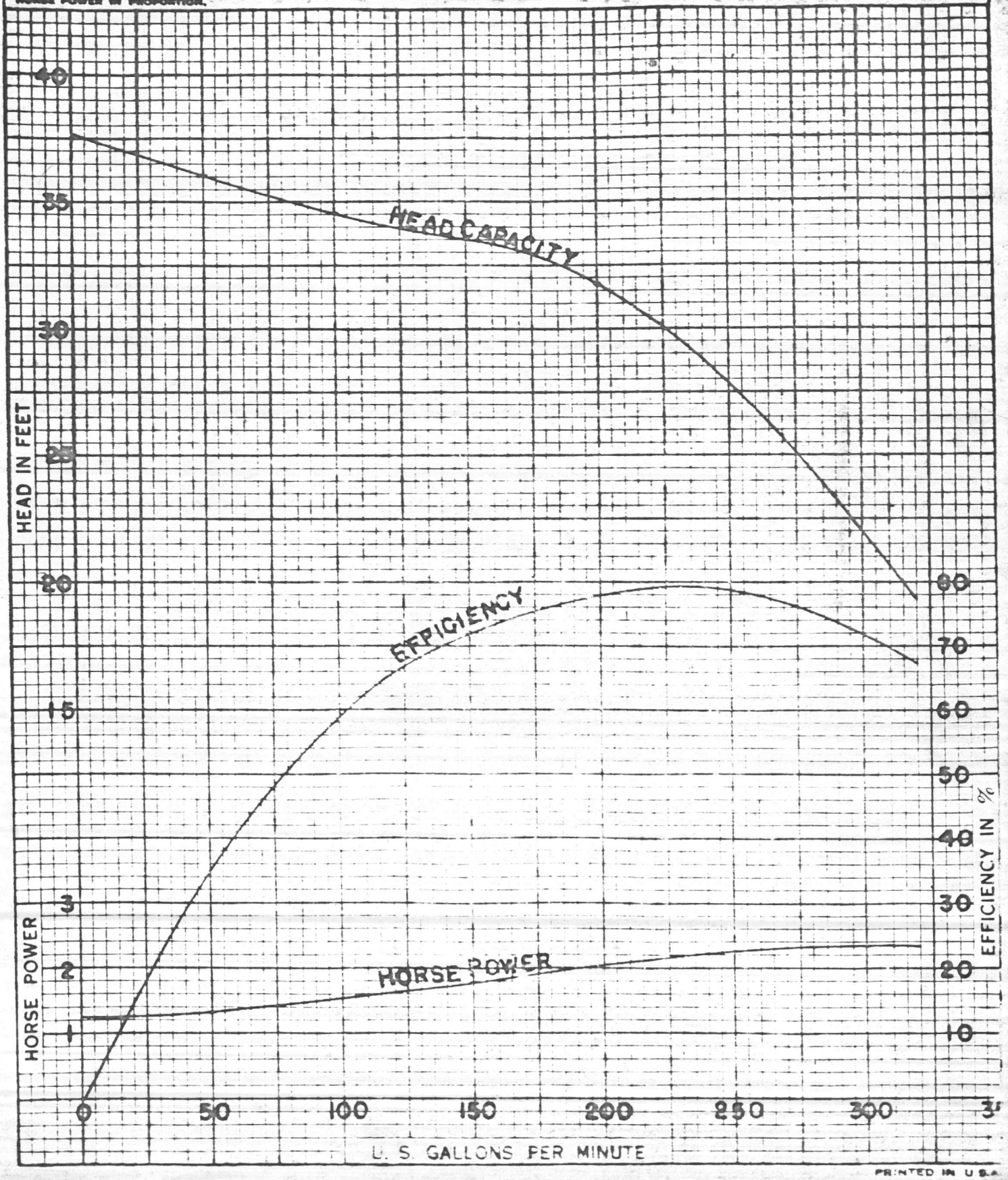
CURVE NO. PB 1810

CHANGE EFFICIENCY AS FOLLOWS	NUMBER OF POINTS	FOR NUMBER OF STAGES
LOWER	5.5	1
LOWER	4.0	2
LOWER	2.5	3
LOWER	1.0	4

NOTE: ANY CHANGE IN EFFICIENCY CHANGES EITHER THE HEAD OR HORSE POWER IN PROPORTION.

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.
Layne

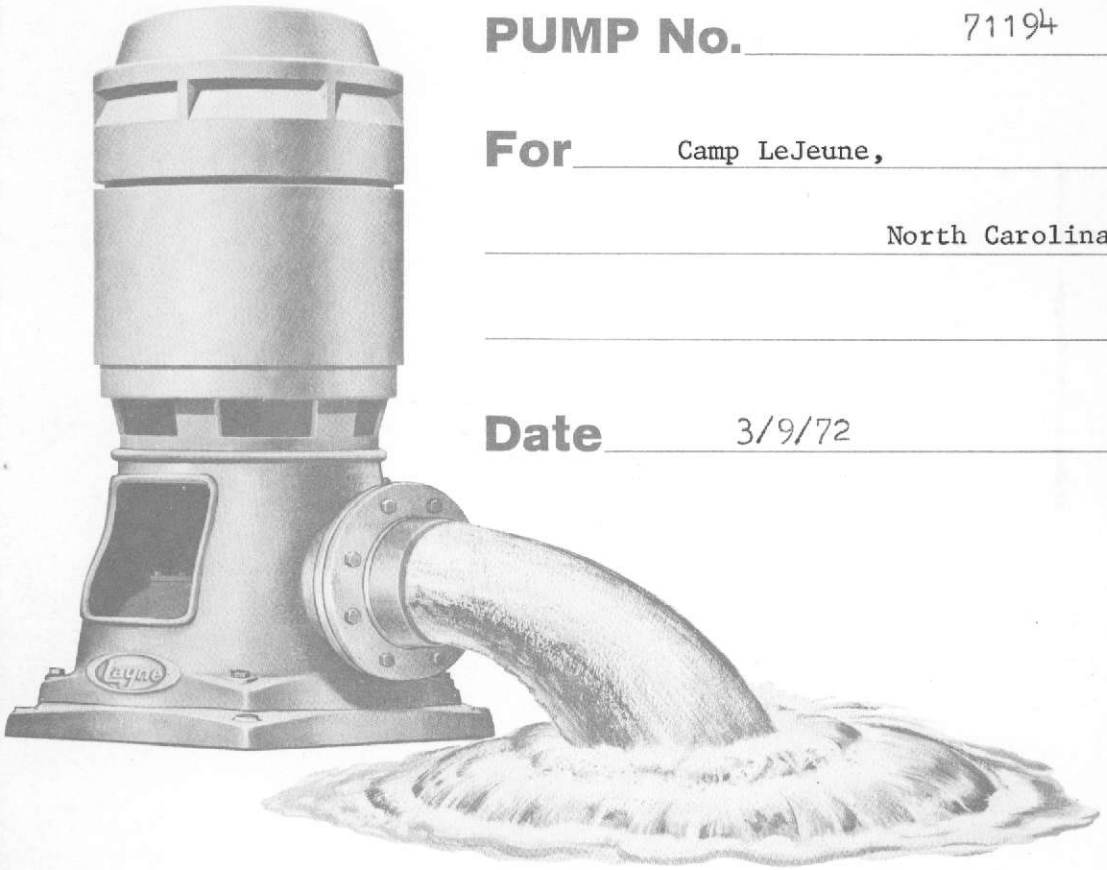
8" PRHC
1750 RPM
SINGLE STAGE LABORATORY
HEAD & HORSE POWER
THRUST "K" = 4



PRINTED IN U.S.A.

WELL #10 HP 652

PUMP RECORD



PUMP No. 71194

For Camp LeJeune,

North Carolina

Date 3/9/72

SINGER- Layne Atlantic Co.

Norfolk,

Va.

Manufactured By:

SINGER

LAYNE & BOWLER DIVISION

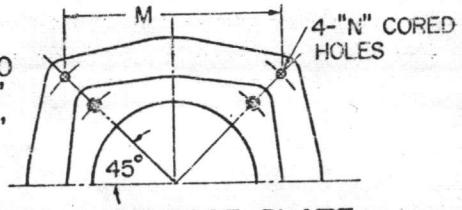
MEMPHIS, TENNESSEE U.S.A.

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.
Layne

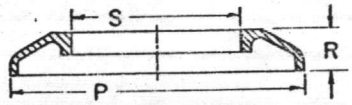
INSTALLATION PLAN

TYPE TF413 DISCHARGE HEAD

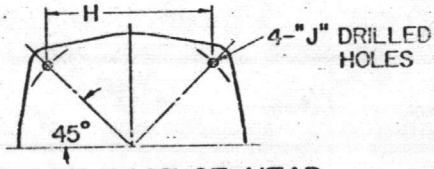
USE THESE DIMENSIONS ONLY
WHEN CERTIFIED BY FACTORY



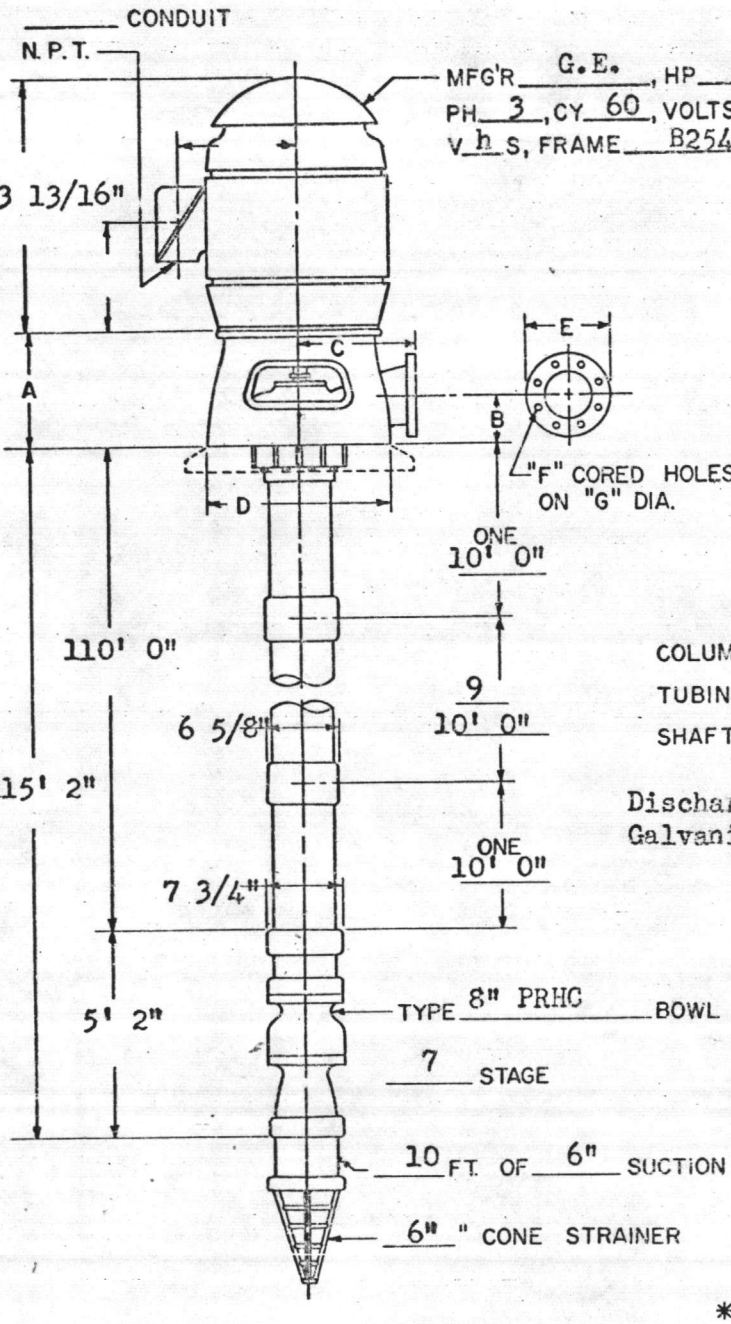
HOLES IN BASE PLATE



BASE PLATE



HOLES IN BASE OF HEAD

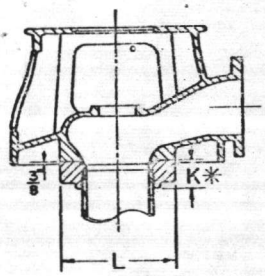


MFG'R G.E., HP 15, R.P.M. 1800,
PH 3, CY 60, VOLTS 240,
V h S, FRAME B254TP10,

COLUMN 5"
TUBING 2"
SHAFT 1 3/16"

Discharge Pipe & Suction Pipe to be Hot Dipped Galvanized Seamless Steel

TYPE 8" PRHC BOWL
7 STAGE
10 FT. OF 6" SUCTION
6" " CONE STRAINER



SECTION THRU HEAD

* FOR COLUMN SETTINGS OF 200' OR GREATER, "K"=11"

CUSTOMER:	YOUR NO: N-16-72	G.P.M. 200
LOCATION:	OUR NO: 72D-369	T.D.H. 220
FOR APPROVAL:	PUMP NO: 71194	R.P.M. 1750
CERTIFIED: Tom Morrow	DATE: 2/2/72	B.H.P.

HEAD	A	B	C	D	E	F	G	H	J	K*	L	M	N	P	R	S
TF413	13	6	11	18	9	8-3/4	7 1/2	14 1/8	11/16	2 13/16	10	16 15/16	7/8	21	2	17
TF613	14	6	11	18	11	8-7/8	9 1/2	14 1/8	11/16	2 7/8	11	16 15/16	7/8	21	2	17
TF418	13	6	14 1/4	23	9	8-3/4	7 1/2	17 5/16	13/16	2 13/16	10	20 1/16	7/8	26 1/2	2 3/4	21 3/4
TF618	15	6	14 1/4	23	11	8-7/8	9 1/2	17 5/16	13/16	2 7/8	12 1/2	20 1/16	7/8	26 1/2	2 3/4	21 3/4
TF818	18	7 3/32	14 1/4	23	13 1/2	8-7/8	11 3/4	17 5/16	13/16	3 1/16	13 1/2	20 1/16	7/8	26 1/2	2 3/4	21 3/4
TF1018	18	8 1/8	14 1/4	23	16	12-1	14 1/4	17 5/16	13/16	3 11/16	16	20 1/16	7/8	26 1/2	2 3/4	21 3/4
TF1218	20	9 5/8	16 1/4	26	19	12-1	17	19 5/8	13/16	3 11/16	19	23 11/16	7/8	32	3 1/4	24

HEAD	A	B	C	D	E	F	G	H	J	K*	L	M	N	P	R	S
TF625	15	8 1/8	13 1/4	31	11	8-7/8	9 1/2	23 11/16	13/16	2 7/8	12-1/8	29	1	38	3 1/4	29
TF825	20	8 1/8	18 1/4	31	13 1/2	8-7/8	11 3/4	23 11/16	13/16	3 1/16	13 1/2	29	1	38	3 1/4	29
TF1025	20	8 1/8	18 1/4	31	16	12-1	14 1/2	23 11/16	13/16	3 11/16	16	29	1	38	3 1/4	29
TF1225	21	9 3/8	18 1/4	31	19	12-1	17	23 11/16	13/16	3 11/16	19	29	1	38	3 1/4	29
TF1225i	21	9 5/8	18 1/4	31	19	12-1	17	23 11/16	13/16	4 7/16	21	29	1	38	3 1/4	29
TF1425	21	10 5/8	18 1/4	31	21	12-1 1/8	18 3/4	23 11/16	13/16	4 7/16	21	29	1	38	3 1/4	29
TF1227	24 1/2	9 3/4	21	36	19	12-1	17	27 5/8	13/16	3 11/16	19	33 5/8	1	43	4 1/4	33 1/4

PBO 152

VERTICAL CENTRIFUGAL PUMP-INSTALLATION OF PUMP HEADS WITH STYLE 60 STUFFING BOX
HOLLOW SHAFT-MOTOR DRIVEN BUTT-JOINT TOP COLUMN FLANGE

DISASSEMBLE AND CLEAN Before installation, the pump head should be disassembled and all parts thoroughly cleaned with kerosene. Remove the stuffing box from the discharge ell.

MOUNT DISCHARGE ELL With the style 60 packing box a butt-joint, top-column flange is used. Therefore, no adjustment is necessary. Clean the face of the top flange and the bottom flange of the discharge ell and coat with Layncote. Note condition of top of the projecting tubing and remove with a file any burrs or sharp edges that might cut the O ring when it is installed. Bolt discharge ell and column together.

PACKING BOX Clean the tension bearing and stuffing box thoroughly before continuing with installation. Insert the stuffing box first, having the "O" ring in place (a light coat of oil should be given the "O" ring). The tension bearing can now be installed, the threaded portion being coated with Layncote. Slip bearing over shaft and screw into tubing until the bearing flange butts the stuffing box. (This should be a hand tight snug fit). The bearing is now ready to take the tension.

TENSION The amount of tension should be based on 1/8" tube travel per 100 ft. of setting, this is put in terms of No. of turns of the tension bearing in the table below:

SIZE TUBING	NUMBER THREADS	NUMBER OF TURNS PER 100 FEET OF SETTING
1 1/4"	16	2
1 1/2"	12	1 1/2
2"	10	1 1/4
2 1/2", 3" & 3 1/2"	8 OLD STD.	1
2 1/2", 3" & 3 1/2"	10 NEW STD.	1 1/4
4" & UP	10	1 1/4

ALIGNMENT The pump shaft MUST now be in the exact center of the pump head and exactly perpendicular to the machined surface of the discharge ell. This can be checked with a stright edge, square, and pair of calipers. The discharge ell can be shaifted slightly on the concrete foundation or tilted with shims until the shaft is properly aligned.

MOTOR MOUNT Lower the hollow shaft motor over the drive shaft, taking care not to disturb the alignment. To insure proper operation of the pump it is necessary that the motor be centered exactly, so great care should be taken in this operation. Bolt motor to discharge ell or motor stand with cap screws.

When a hollow shaft motor is used the drive shaft is keyed to a removable motor coupling. Screw on and tighten the drive shaft nut, lifting the shaft until the impellers are drawn against the top of the pump bowl. In this position the shaft cannot be rotated. The nut should then be loosened 1/4 to 1/2 turn or until the shaft turns freely. A gib key is then inserted to prevent the drive shaft nut from working loose.

GROUT BASE AND CONNECT DISCHARGE Grout the discharge ell in position, being careful not to disturb the alignment of the pump head. In case the discharge nipple is to be connected to a water main, a Dresser Coupling should be used. The main should be placed as nearly as possible in line with the discharge nipple. The Dresser Coupling prevents throwing any strain on the pump head if the discharge nipple and main are not exactly in line.

LUBRICATING SYSTEM Connect the hand oil pump, drip feed lubricator or automatic solenoid lubricator to the oil connection in the tension bushing. When first connected allow about one cup full oil to enter the tubing. Then adjust the drip cup or automatic lubricator to allow the following quantity of oil to enter the tubing:

For setting up to 50 feet - 5 drops per minute
For setting up to 100 feet - 10 drops per minute
For setting up to 150 feet - 15 drops per minute
For setting up to 200 feet - 20 drops per minute
For setting up to 250 feet - 25 drops per minute
For setting up to 300 feet - 30 drops per minute

When using a force feed oil pump inject about one cup full of oil for each 24 hours of operation.

The oil should be of a good grade of mineral oil free from grit or foreign matter, with a viscosity rating of approximately S.A.E. 10 and having a relatively low cold pour point.

STARTING PUMP CHECK DIRECTION OF MOTOR ROTATION very carefully before applying power. The pump must operate in a left hand or counter clock-wise direction.

Open pet cock located adjacent to packing box to release air from discharge column, and close as soon as water discharges from pet cock.

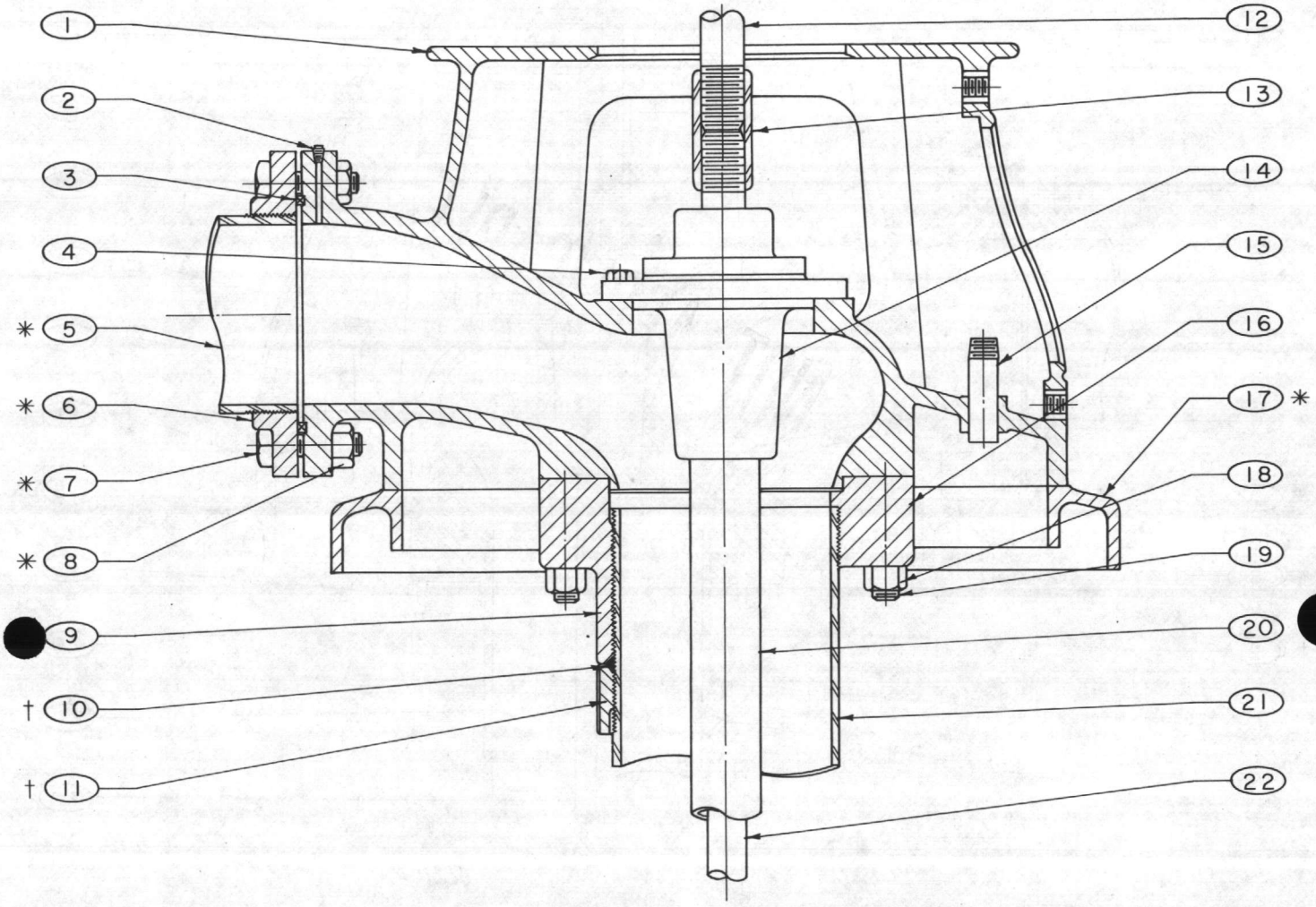
After the pump has been in operation a few hours, shut down and check the adjustment of the pump runners. The pump shaft may have been screwed up tighter by the power applied and thereby shortened.

PRINTED IN U. S. A.

TYPE TF DISCHARGE HEAD

ENCLOSED LINE SHAFT

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.
Layne



*NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER

ITEM NO.		DESCRIPTION
1		DISCHARGE HEAD
2		PIPE PLUG, PRESSURE GAUGE
3		PACKING, COMPANION FLANGE
4		CAPSCREW (STUFFING BOX)
5		DISCHARGE PIPE
6		COMPANION FLANGE
7		MACHINE BOLT, COMPANION FLG.
8		HEX NUT, COMPANION FLANGE
9		ADJ. TOP COLUMN FLANGE
10		PACKING
11		PACKING RING

†USED FOR SETTINGS GREATER THAN 200 FT.

ITEM NO.		DESCRIPTION
12		MOTOR DRIVE SHAFT
13		HEAD COUPLING
14		STUFFING BOX (ASSEMBLY)
15		PIPE NIPPLE (AUXILIARY OPN'G)
16		TOP COLUMN FLANGE
17		BASE PLATE
18		HEX NUT
19		STUD
20		TUBING
21		TOP COLUMN PIPE
22		LINE SHAFT, TOP PIECE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

REVISED 10-1-67
SUPERSEDES ORIGINAL PRICE BOOK ISSUE

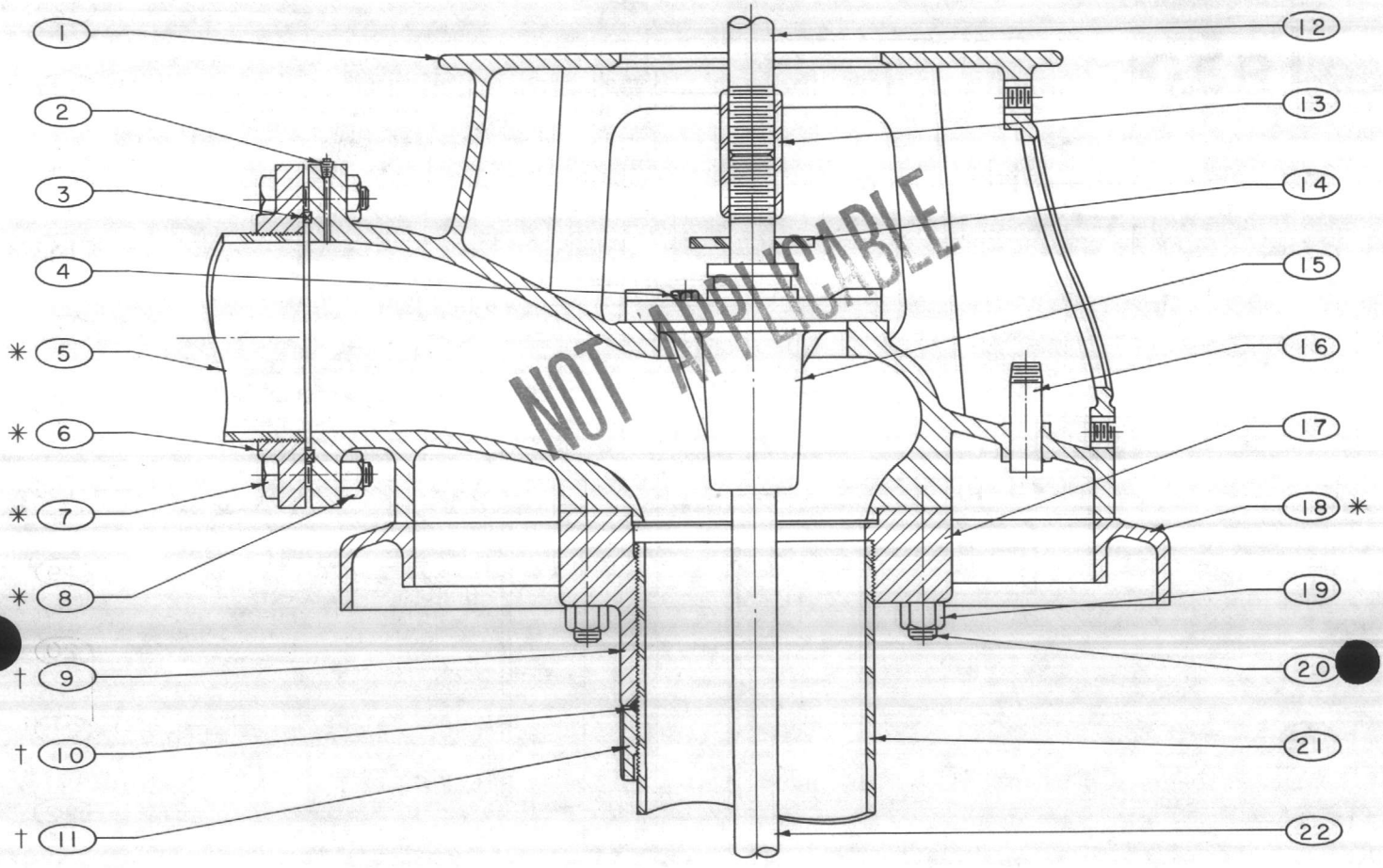
PBS 193

PRINTED IN U.S.A

TYPE TF DISCHARGE HEAD

OPEN LINE SHAFT

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.
Layne



*NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER

†USED FOR SETTINGS GREATER THAN 200 FT.

ITEM NO.		DESCRIPTION
1		DISCHARGE HEAD
2		PIPE PLUG, PRESSURE GAUGE
3		PACKING, COMPANION FLANGE
4		CAPSCREW (STUFFING BOX)
5		DISCHARGE PIPE
6		COMPANION FLANGE
7		MACHINE BOLT, COMPANION FLG.
8		HEX NUT, COMPANION FLANGE
9		ADJ. TOP COLUMN FLANGE
10		PACKING
11		PACKING RING

ITEM NO.		DESCRIPTION
12		MOTOR DRIVE SHAFT
13		HEAD COUPLING
14		WATER SLINGER
15		STUFFING BOX (ASSEMBLY)
16		PIPE NIPPLE (AUXILIARY OPN'G)
17		TOP COLUMN FLANGE
18		BASE PLATE
19		HEX NUT
20		STUD
21		TOP COLUMN PIPE
22		LINE SHAFT, TOP PIECE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

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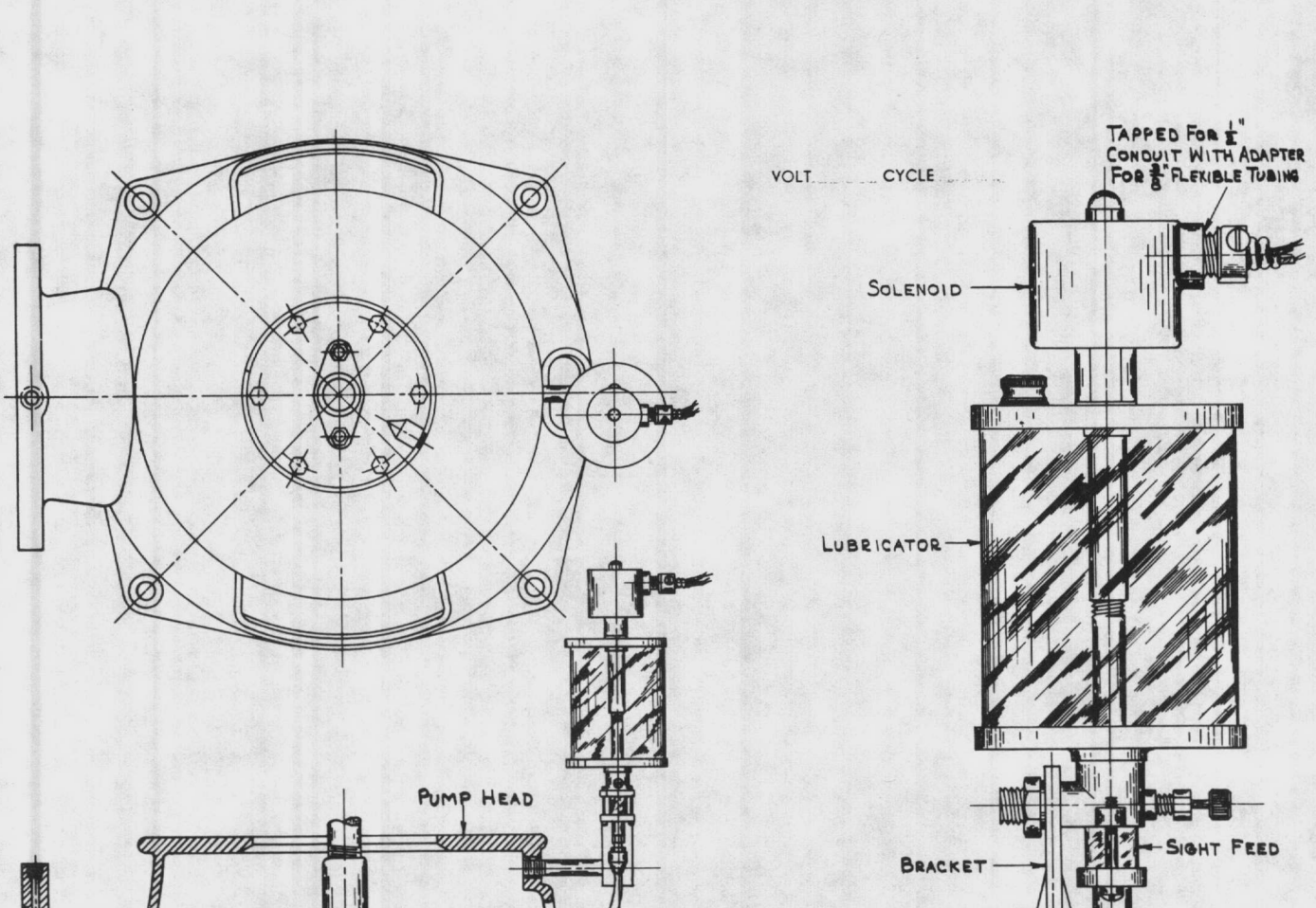

SOLENOID - OPERATED SIGHT FEED LUBRICATOR FOR AUTOMATIC OPERATION

LMA99

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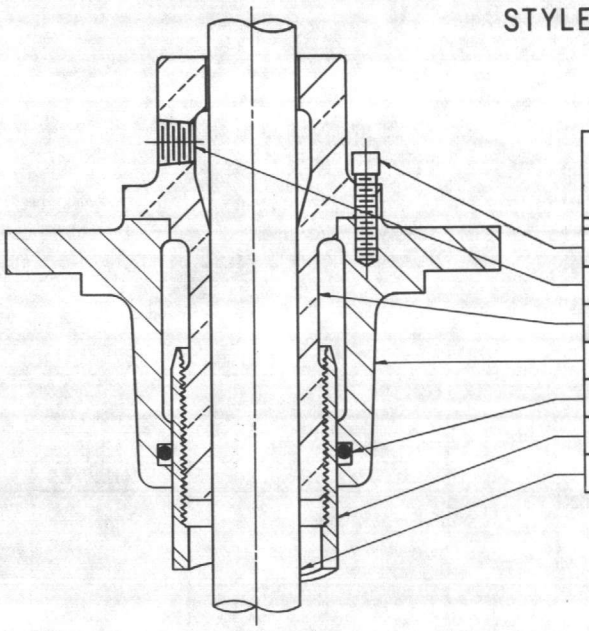
SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

STUFFING BOX ASSEMBLY
OIL LUBRICATION
STYLE 60



PART NAME	MATERIAL	
	STANDARD	SPECIAL
LOCK SCREW	STEEL	
OIL INLET		
TENSION BEARING	BRONZE	
TENSION BOX	CAST IRON	
O-RING	BUNA-N	
TUBING	C.S.-SCH. 80 PIPE	
LINE SHAFT	C-1045 CAR. STL.	

IN ORDERING REPLACEMENT PARTS, SPECIFY PARTS DESCRIPTION AND PUMP SERIAL NO.

INSTALLATION AND OPERATING INSTRUCTIONS

1. REMOVE THE LOCK SCREW AND THE O-RING AND THOROUGHLY CLEAN THE TENSION BOX INCLUDING THE O-RING GROOVE. REMOVE ANY NICKS OR BURRS FROM THE UPPER AND LOWER MOUNTING FACES AND MALE REGISTER WITH A FINE FLAT FILE. RE-INSTALL AND LIGHTLY OIL THE EXPOSED SURFACE OF THE O-RING.

2. CLEAN THE SURFACE OF THE HEAD THAT RECEIVES THE TENSION BOX AND REMOVE ANY NICKS OR BURRS WITH A FINE FLAT FILE.

3. CAREFULLY INSTALL THE TENSION BOX, ALIGN THE MOUNTING HOLES WITH THE TAPS IN THE HEAD AND SEAT THE BOX TO THE HEAD. INSTALL AND EVENLY TIGHTEN THE MOUNTING CAPSCREWS.

4. CLEAN THE TENSION BEARING THOROUGHLY AND REMOVE ANY NICKS OR BURRS FROM THE MOUNTING FACE AND REGISTER WITH A FINE FLAT FILE. REMOVE ANY NICKS OR BURRS FROM THE THREADS WITH A THREE CORNERED FILE.

5. OIL THE THREADS AND THE BORE AND CAREFULLY PLACE THE TENSION BEARING OVER THE SHAFT AND THREAD (RIGHT HAND) INTO THE TUBING. CONTINUE THREADING UNTIL THE LOWER FLANGE FACE FIRMLY CONTACTS THE TENSION BOX FACE.

6. FOR THE PROPER AMOUNT OF TUBE TENSION, REFER TO INSTRUCTIONS PBI 100 PAGE 1 OR 2. FOR SETTINGS LESS THAN 100 FEET, TIGHTEN TO THE NEAREST LOCKING POSITION.

   CHART 1 BELOW GIVES THE AMOUNT OF PULL-UP FOR EACH COMPLETE TURN. OF THE TENSION BEARING.

CHART 1

SIZE TUBING	1 1/4"	1 1/2"	2"	2 1/2"	3" 3 1/2"	4" & UP
NO. THD'S/IN	16	12	10	10	8	10
"A"	.063"	.083"	.100"	.100"	.125"	.100"

"A" = AMOUNT OF PULL-UP FOR EACH COMPLETE TURN OF THE TENSION BEARING.

THE TOTAL NUMBER OF TURNS REQUIRED CAN BE CALCULATED BY DIVIDING THE FIGURE ABOVE INTO THE TENSION FIGURE FROM PBI 100.

EXAMPLE: 500 FEET OF 10" (.279" WALL) x 1 11/16" x 2 1/2": FROM PBI 100, THE PROPER TENSION OR PULL-UP IS FOUND TO BE 0.529" AND FROM CHART 1, THE PULL-UP PER COMPLETE TURN IS 0.100" FOR 2 1/2" 10 THD. TUBING.

TOTAL NO. OF TURNS = $\frac{0.529}{0.100}$ = 5.29 OR APPROXIMATELY 5 1/4.

IF AFTER ADJUSTING THE TENSION BEARING THE PROPER NUMBER OF TURNS, NO SLOT ALIGNS WITH THE LOCK SCREW TAP IN THE BOX, IT IS RECOMMENDED THAT THE BEARING BE BACKED OFF TO THE NEAREST ALIGNMENT POSITION IF IT TAKES MORE THAN AN EIGHTH TURN FORWARD TO ACHIEVE ALIGNMENT.

7. INSTALL AND TIGHTEN THE LOCK SCREW.

8. CONNECT THE LUBRICATOR TO THE OIL CONNECTION IN THE TENSION BEARING.

   FILL THE LUBRICATOR WITH A GOOD GRADE MINERAL OIL HAVING A VISCOSITY RATING OF APPROXIMATELY S.A.E. 10 AND HAVING A RELATIVELY LOW COLD POUR POINT.

CONTINUED ON PAGE 2

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

Layne

STYLE 60 INSTALLATION AND OPERATING INSTRUCTIONS

(CONTINUED)

IMPORTANT:

PRIOR TO INITIAL START-UP AND AFTER A SHUT DOWN OF 150 HOURS OR LONGER, THE LUBRICATOR SHOULD BE ADJUSTED FOR THE RECOMMENDED NUMBER OF DROPS PER MINUTE AS OUTLINED IN CHART 2 AND ALLOWED TO OPERATE AT THIS RATE FOR 20 MINUTES FOR EACH 100 FEET OF SETTING.

FOR NORMAL OPERATION, THE LUBRICATOR SHOULD BE ADJUSTED IN ACCORDANCE WITH CHART 2.

CHART 2

SHAFT SIZE	"A" LUBRICATOR SETTING IN DROPS PER MIN.	"B" DROPS PER MIN. PER EACH 100 FT. SETTING
7/8 - 1 3/16	5	2
1 1/2 - 1 11/16	7	3
1 15/16 - 2 7/16	10	4
2 11/16	12	5

$$\text{TOTAL DROPS/MIN.} = \text{"A"} + \left(\frac{\text{SETTING}}{100} \times \text{"B"}\right)$$

EXAMPLE: 500 FEET OF 1 11/16" x 2 1/2"

$$\text{TOTAL DROPS/MIN.} = 7 \times \left(\frac{500}{100} \times 3\right) = 7 + (5 \times 3) = 7 + 15 = 22$$

9. THE LUBRICATOR SHOULD BE CHECKED PERIODICALLY AND RESET IF REQUIRED TO MAINTAIN THE PROPER FLOW.

   THE APPROXIMATE NUMBER OF HOURS OF CONTINUOUS OPERATION AT VARIOUS FLOW RATES CAN BE FOUND IN CHART 3. IT IS GENERALLY RECOMMENDED THAT THE LUBRICATION BE RE-FILLED WHEN IT IS NO LESS THAN ONE QUARTER FULL.

CHART 3

NUMBER OF HOURS OF CONTINUOUS OPERATION			
FLOW RATE	LUBRICATOR CAPACITY		
DROPS/MIN.	1 QUART	2 QUART	3 QUART
5	110	220	440
10	55	110	220
15	38	75	150
20	28	55	110
25	22	45	90
30	19	38	75
40	14	28	55
50	11	22	45

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

Layne

TUBE TENSION ADJUSTMENT CHART

COLUMN SIZE	SHAFT AND TUBING SIZE	TUBE TENSION IN INCHES SETTING IN FEET									
		100	200	300	400	500	600	700	800	900	1000
3" MC*	1 1/4 x 7/8	0.025	0.103	0.233	0.415	0.649					
(.187)	1 1/2 x 1	0.028	0.115	0.261	0.465	0.726					
4" *	1 1/4 x 7/8	0.020	0.083	0.186	0.333	0.520	0.750	1.021	1.334	1.688	2.084
(.237)	1 1/2 x 1	0.022	0.090	0.202	0.361	0.564	0.813	1.107	1.447	1.831	2.260
SCH. 40S	2 x 1 3/16	0.025	0.103	0.233	0.416	0.650	0.936	1.275	1.666	2.108	2.603
5" *	1 1/4 x 7/8	0.018	0.075	0.171	0.305	0.476	0.686	0.934	1.220	1.544	1.906
(.258)	1 1/2 x 1	0.020	0.081	0.182	0.325	0.508	0.733	0.998	1.303	1.650	2.036
SCH. 40S	2 x 1 3/16	0.022	0.091	0.205	0.366	0.571	0.824	1.121	1.465	1.854	2.289
	1 1/4 x 7/8	0.017	0.071	0.160	0.286	0.447	0.644	0.878	1.146	1.451	1.791
6" *	1 1/2 x 1	0.018	0.075	0.169	0.302	0.472	0.681	0.927	1.211	1.532	1.892
(.280)	2 x 1 3/16	0.020	0.083	0.187	0.333	0.521	0.751	1.022	1.335	1.690	2.086
SCH 40S	2 1/2 x 1 1/2	0.024	0.098	0.220	0.393	0.613	0.884	1.204	1.572	1.990	2.457
	2 1/2 x 1 11/16	0.025	0.102	0.231	0.412	0.643	0.927	1.263	1.649	2.088	2.577
	3 x 1 15/16	0.029	0.119	0.269	0.480	0.750	1.080	1.471	1.922	2.432	3.003
	1 1/2 x 1	0.017	0.071	0.161	0.287	0.449	0.647	0.881	1.151	1.457	1.798
	2 x 1 3/16	0.019	0.077	0.175	0.313	0.488	0.704	0.958	1.252	1.584	1.956
7" *	2 1/2 x 1 1/2	0.022	0.089	0.202	0.360	0.563	0.811	1.105	1.443	1.827	2.255
(.300)	2 1/2 x 1 11/16	0.023	0.093	0.211	0.376	0.587	0.846	1.153	1.506	1.906	2.353
	3 x 1 15/16	0.026	0.107	0.242	0.431	0.673	0.970	1.321	1.726	2.184	2.696
	3 1/2 x 2 3/16	0.030	0.121	0.272	0.485	0.757	1.092	1.486	1.941	2.457	3.034
	3 1/2 x 2 7/16	0.031	0.127	0.287	0.512	0.800	1.153	1.570	2.050	2.595	3.204
	2 x 1 3/16	0.019	0.076	0.173	0.308	0.481	0.694	0.945	1.234	1.562	1.928
8" *	2 1/2 x 1 1/2	0.022	0.088	0.198	0.354	0.552	0.796	1.084	1.416	1.793	2.213
(.277)	2 1/2 x 1 11/16	0.022	0.091	0.206	0.368	0.575	0.829	1.129	1.475	1.867	2.306
SCH 30	3 x 1 15/16	0.026	0.105	0.236	0.421	0.657	0.947	1.290	1.684	2.132	2.632
	3 1/2 x 2 3/16	0.029	0.117	0.265	0.472	0.737	1.062	1.447	1.890	2.392	2.953
	3 1/2 x 2 7/16	0.031	0.124	0.279	0.498	0.778	1.121	1.526	1.993	2.522	3.114
	2 x 1 3/16	0.018	0.074	0.166	0.297	0.464	0.668	0.910	1.189	1.505	1.858
8"	2 1/2 x 1 1/2	0.020	0.083	0.188	0.336	0.525	0.757	1.031	1.347	1.704	2.104
(.322)	2 1/2 x 1 11/16	0.021	0.087	0.196	0.349	0.545	0.786	1.070	1.398	1.769	2.184
SCH. 40S	3 x 1 15/16	0.024	0.098	0.221	0.394	0.616	0.887	1.208	1.579	1.998	2.467
	3 1/2 x 2 3/16	0.027	0.109	0.246	0.439	0.685	0.987	1.344	1.756	2.223	2.744
	3 1/2 x 2 7/16	0.028	0.115	0.259	0.461	0.720	1.038	1.413	1.846	2.336	2.884
	2 x 1 3/16	0.018	0.072	0.163	0.291	0.455	0.655	0.892	1.166	1.476	1.822
	2 1/2 x 1 1/2	0.020	0.081	0.183	0.327	0.511	0.737	1.003	1.311	1.659	2.048
9" *	2 1/2 x 1 11/16	0.021	0.084	0.190	0.339	0.530	0.763	1.040	1.358	1.719	2.122
(.312)	3 x 1 15/16	0.023	0.095	0.213	0.381	0.595	0.857	1.167	1.524	1.929	2.382
	3 1/2 x 2 3/16	0.026	0.105	0.236	0.422	0.658	0.949	1.292	1.688	2.136	2.637
	3 1/2 x 2 7/16	0.027	0.110	0.248	0.442	0.690	0.995	1.355	1.770	2.240	2.766
	2 x 1 3/16	0.018	0.072	0.163	0.291	0.454	0.655	0.891	1.164	1.474	1.819
	2 1/2 x 1 1/2	0.020	0.081	0.183	0.327	0.510	0.736	1.002	1.309	1.656	2.045
10" *	2 1/2 x 1 11/16	0.021	0.084	0.190	0.338	0.529	0.762	1.038	1.355	1.716	2.118
(.279)	3 x 1 15/16	0.023	0.094	0.213	0.380	0.593	0.855	1.164	1.521	1.925	2.377
	3 1/2 x 2 3/16	0.026	0.104	0.236	0.420	0.657	0.946	1.289	1.683	2.131	2.630
	3 1/2 x 2 7/16	0.027	0.110	0.247	0.441	0.689	0.992	1.351	1.765	2.234	2.758
	4 x 2 11/16	0.030	0.122	0.276	0.492	0.769	1.108	1.509	1.971	2.494	3.079
	2 x 1 3/16	0.017	0.071	0.159	0.285	0.445	0.641	0.873	1.141	1.444	1.783
	2 1/2 x 1 1/2	0.019	0.079	0.178	0.318	0.496	0.715	0.974	1.272	1.610	1.988
10"	2 1/2 x 1 11/16	0.020	0.081	0.184	0.328	0.513	0.739	1.007	1.315	1.664	2.055
(.307)	3 x 1 15/16	0.022	0.091	0.205	0.366	0.572	0.824	1.122	1.466	1.855	2.290
SCH. 30	3 1/2 x 2 3/16	0.025	0.100	0.226	0.403	0.629	0.907	1.235	1.614	2.042	2.521
	3 1/2 x 2 7/16	0.026	0.105	0.236	0.422	0.659	0.949	1.292	1.688	2.137	2.638
	4 x 2 11/16	0.029	0.116	0.263	0.469	0.732	1.055	1.436	1.876	2.374	2.931

NOTE: ALL PIPE MARKED * IS SINGER-LAYNE & BOWLER DIV. STANDARD

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

Layne

TUBE TENSION ADJUSTMENT CHART

COLUMN SIZE	SHAFT AND TUBING SIZE	TUBE TENSION IN INCHES									
		SETTING IN FEET									
		100	200	300	400	500	600	700	800	900	1000
10" (.365) 40S	2 x 1 3/16	0.017	0.068	0.154	0.276	0.430	0.620	0.845	1.104	1.397	1.725
	2 1/2 x 1 1/2	0.018	0.075	0.170	0.303	0.474	0.683	0.930	1.215	1.538	1.899
	2 1/2 x 1 11/16	0.019	0.077	0.175	0.312	0.488	0.703	0.958	1.251	1.583	1.955
	3 x 1 15/16	0.021	0.085	0.193	0.344	0.538	0.775	1.055	1.378	1.745	2.154
	3 1/2 x 2 3/16	0.023	0.093	0.210	0.376	0.586	0.845	1.151	1.504	1.903	2.349
	3 1/2 x 2 7/16	0.024	0.097	0.219	0.391	0.611	0.881	1.199	1.567	1.983	2.448
	4 x 2 11/16	0.026	0.107	0.242	0.431	0.673	0.970	1.321	1.725	2.183	2.695
12" * (.330) SCH. 30	2 1/2 x 1 1/2	0.018	0.074	0.166	0.297	0.464	0.670	0.912	1.191	1.508	1.861
	2 1/2 x 1 11/16	0.019	0.076	0.171	0.306	0.477	0.688	0.937	1.225	1.550	1.913
	3 x 1 15/16	0.020	0.083	0.188	0.335	0.524	0.755	1.028	1.342	1.699	2.098
	3 1/2 x 2 3/16	0.022	0.090	0.204	0.364	0.569	0.820	1.116	1.458	1.846	2.278
	3 1/2 x 2 7/16	0.023	0.094	0.212	0.379	0.592	0.853	1.161	1.517	1.919	2.370
	4 x 2 11/16	0.025	0.103	0.233	0.415	0.649	0.935	1.273	1.663	2.105	2.599
12" (.375) "S"	2 1/2 x 1 1/2	0.018	0.072	0.162	0.289	0.451	0.650	0.886	1.157	1.464	1.808
	2 1/2 x 1 11/16	0.018	0.073	0.166	0.296	0.463	0.667	0.908	1.187	1.502	1.854
	3 x 1 15/16	0.020	0.080	0.181	0.322	0.503	0.726	0.988	1.291	1.634	2.017
	3 1/2 x 2 3/16	0.021	0.086	0.195	0.348	0.543	0.783	1.066	1.393	1.763	2.177
	3 1/2 x 2 7/16	0.022	0.090	0.202	0.361	0.563	0.812	1.106	1.444	1.828	2.257
	4 x 2 11/16	0.024	0.098	0.220	0.393	0.614	0.885	1.205	1.574	1.992	2.459
14" * (.375) SCH. 30S	2 1/2 x 1 1/2	0.017	0.070	0.158	0.283	0.442	0.637	0.868	1.133	1.435	1.771
	2 1/2 x 1 11/16	0.018	0.072	0.162	0.290	0.452	0.652	0.888	1.160	1.468	.813
	3 x 1 15/16	0.019	0.078	0.175	0.313	0.489	0.705	0.961	1.255	1.588	1.961
	3 1/2 x 2 3/16	0.021	0.084	0.189	0.337	0.526	0.758	1.032	1.348	1.706	2.106
	3 1/2 x 2 7/16	0.021	0.086	0.195	0.348	0.544	0.784	1.067	1.394	1.765	2.179
	4 x 2 11/16	0.023	0.094	0.212	0.378	0.590	0.850	1.157	1.512	1.914	2.362
16" * (.375) SCH. 30S	3 x 1 15/16	0.018	0.075	0.169	0.302	0.472					
	3 1/2 x 2 3/16	0.020	0.080	0.180	0.322	0.503					
	3 1/2 x 2 7/16	0.020	0.082	0.186	0.332	0.519					
	4 x 2 11/16	0.022	0.089	0.201	0.358	0.559					

NOTE: ALL PIPE MARKED * IS SINGER-LAYNE & BOWLER DIV. STANDARD.

VERTICAL CENTRIFUGAL PUMP

Installation of Pump Bowls and Column

Butt Joint Column

Enclosed Line Shaft

Derrick Installation of a Layne Pump requires a derrick 30 to 40 feet in height and a hand winch or power hoist of sufficient size to handle the total weight.

Foundation The concrete foundation for the pump base should be built in accordance with foundation plans furnished by the factory. Where a separate pump base plate is used it should be set in position in the concrete foundation before the pump bowls and column are installed but not grouted into position until the installation is completed.

Dimensions of Well Check the inside diameter of the well and the outside diameter of the pump bowls and column flanges or couplings to be sure that the pump and column will go in the well with ample clearance. The well casing must be straight and without obstructions that might bend the line shaft. Measure the static level of the water in the well to determine if the pump has been furnished with the proper depth of setting. The pump bowls should be submerged when the pump is operating and we do not recommend or guarantee satisfactory operation with a suction lift.

Check Material Check all parts of the pump against the packing list to find out whether all parts have been received. If any parts are missing claim should be made at once to the railroad company.

Clean All Joints All threads and flanged couplings of the discharge pipe and protective tubing should be carefully cleaned and at the time of installation coated with L A Y N C O T E. Care should be taken that there be absolutely no sand or grit between flanges or couplings when making up the joints.

Suction If a basket suction is used it should be lowered into the well first and held by pipe clamps. The suction pipe is picked up and screwed into the coupling at top of basket suction. The basket suction and suction pipe are then lowered into the well until about 18 inches of suction pipe extend above the well casing. The suction pipe is clamped in this position with pipe clamps. When the suction pipe has only threads at the top end care should be taken to place the clamps under the small lug welded on the pipe.

Pump Bowls The pump bowls should be carefully inspected before placing in the well. Rotate impeller shaft several times by hand to be sure that it does not bind at any point. The impeller shaft should have about ¼-inch or more end play. DO NOT STRAIN SHAFT IN ANY WAY THAT MIGHT BEND IT AND DO NOT LIFT PUMP BOWLS BY THE SHAFT. The pump bowls can best be handled by a pair of pipe clamps. The bowls should be lifted into position and screwed or bolted to the suction pipe. The clamps on the suction pipe are then removed and the bowls and suction pipe lowered into the well until the top of the discharge nozzle is about 18 inches above the well casing or top of foundation. The bowls are then supported at this point by pipe clamps.

Discharge Column Pipe Check the enclosed chart to determine the correct spacing of the spiders in the discharge column. If the discharge pipe screws into the pump bowl be sure to have the coupling at the top end of the first section either with the spider or without the spider as shown on the chart. If the lower section of discharge pipe has a special flange to connect to the pump bowls be sure to arrange the pipe with this flange at the lower end.

Protective Tubing and Shaft The shaft and protective tubing are shipped assembled in 20-ft. or 10-ft. lengths and packed with sufficient lubricant to prevent rusting. A 20-ft. length or 10-ft. length of shaft and tubing is required for each 20-ft. or 10-ft. length of pipe. Remove the protecting cap only from the top end of the tubing, which is the end fitted with the bronze shaft bearing and tubing coupling. Slide the assembled tubing and shafting into the discharge column pipe, making sure that the bronze bearing end of the assembly will be on top.

Installing Discharge Column Pull the tubing about six inches below the lower end of the discharge pipe and tie them together in this position with a piece of rope by taking several half hitches around the pipe and then the tubing.

Raise the assembled section of pipe, tubing and shafting until it is hanging vertically in the derrick with the lower end of the tubing about one inch above a board placed on the foundation. Remove the lower plug from the tubing to release the shaft. Raise the discharge pipe about six inches and take several half hitches around the shaft. This method avoids straining the shaft as the column is swung under the derrick. Swing the discharge pipe into position over the pump bowls and screw the shaft into the shaft coupling until it butts against the impeller shaft.

THE THREADS AND THE ENDS OF THE SHAFTING AND THE SHAFT COUPLINGS MUST BE PERFECTLY CLEAN.

Lower the discharge pipe and tubing and screw the tubing onto the main bearing box about 3 or 4 threads Then coat the threads on the bronze box with L A Y N C O T E and screw the tubing on the box until it butts. The discharge pipe is then bolted or screwed to the pump bowls.

Remove the clamps from the pump bowls and lower the pump bowls with the section of discharge column until the column extends about 18 inches above the well casing or foundation. Clamp the discharge column in this position.

Remove the bronze shaft bearing and tubing coupling and pour about one pint of oil into the tubing. The oil used should be a good grade of mineral oil free from grit and foreign matter, with a viscosity rating approximately SAE 10 and having a relatively low cold pour point.

When the next section of discharge column is in position in the derrick replace the bronze bearing, screwing it into the tubing about 3 or 4 threads. After the spider and spider bushing or aligning ring have been installed (as described below) and the shaft connection is made, lower the discharge pipe and tubing and screw the tubing onto the bronze bearing about 3 or 4 threads. Then coat the threads of the bearing with L A Y N C O T E and screw the tubing on the bearing until the ends butt tightly together. IT IS VERY IMPORTANT THAT EVERY TUBING JOINT BE TIGHT AND to form a seal the ends of the tubing must be smooth and square. While handling and installing the tubing use care to keep from scoring or damaging the ends in any way.

When flanged column is used, slip a bronze spider or aligning ring over the top of the tubing and fit it into the recess in the flange. (Refer to spider spacing chart to determine whether a flange or aligning ring should be used at the joint in question). When screw coupled column is used the spider is cast integral with the coupling. The rubber spider bushings are installed in the spiders before shipment from the factory.

Each section of discharge column is installed as described above. When screw couplings are used care should be taken in starting the pipe in the coupling. The pipe should start by hand and screw by hand to within 5 or 6 threads of butting. If the thread appears tighter than this check carefully for a damaged thread as the pipe should not be forced into the coupling. The last 5 or 6 threads should be made up with a chain tong, making sure that the joint is tight with the pipe butting against the shoulder in the coupling or against the end of the pipe in the coupling as the case might be.

When the line shaft connects to the motor drive shaft below the tension assembly, the motor drive shaft should be attached to the line shaft in the top section of tubing before the top length of discharge column is installed.

The top length of discharge pipe will usually have a special flange or special threads to connect to the bottom of the discharge ell and the top length of shaft will be of special length.

In case the discharge column does not check out within reasonable limits notify the factory to furnish the correct lengths.

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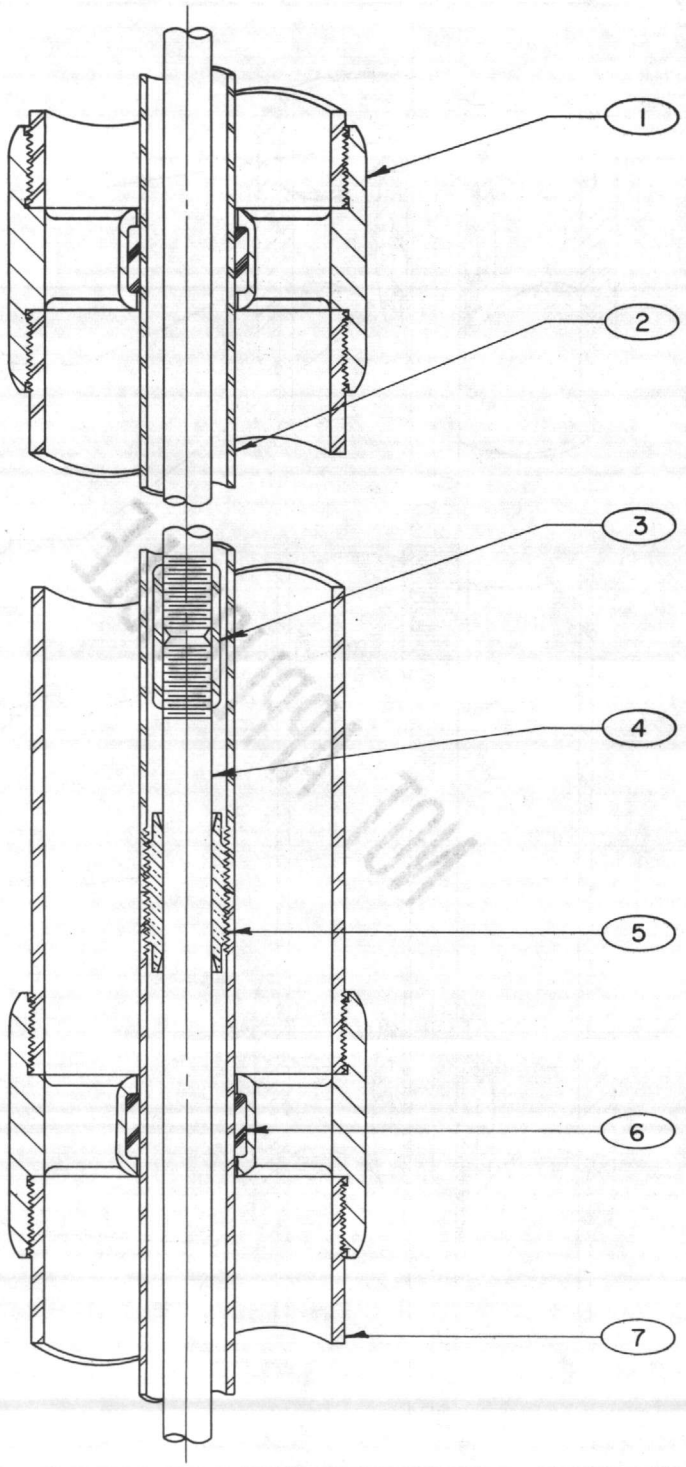
SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

DISCHARGE COLUMN ASSEMBLY

SCREWED TYPE - ENCLOSED LINE SHAFT



ITEM NO.		DESCRIPTION
1		COMBINATION COUPLING
2		SHAFT TUBING
3		SHAFT COUPLING
4		LINE SHAFT

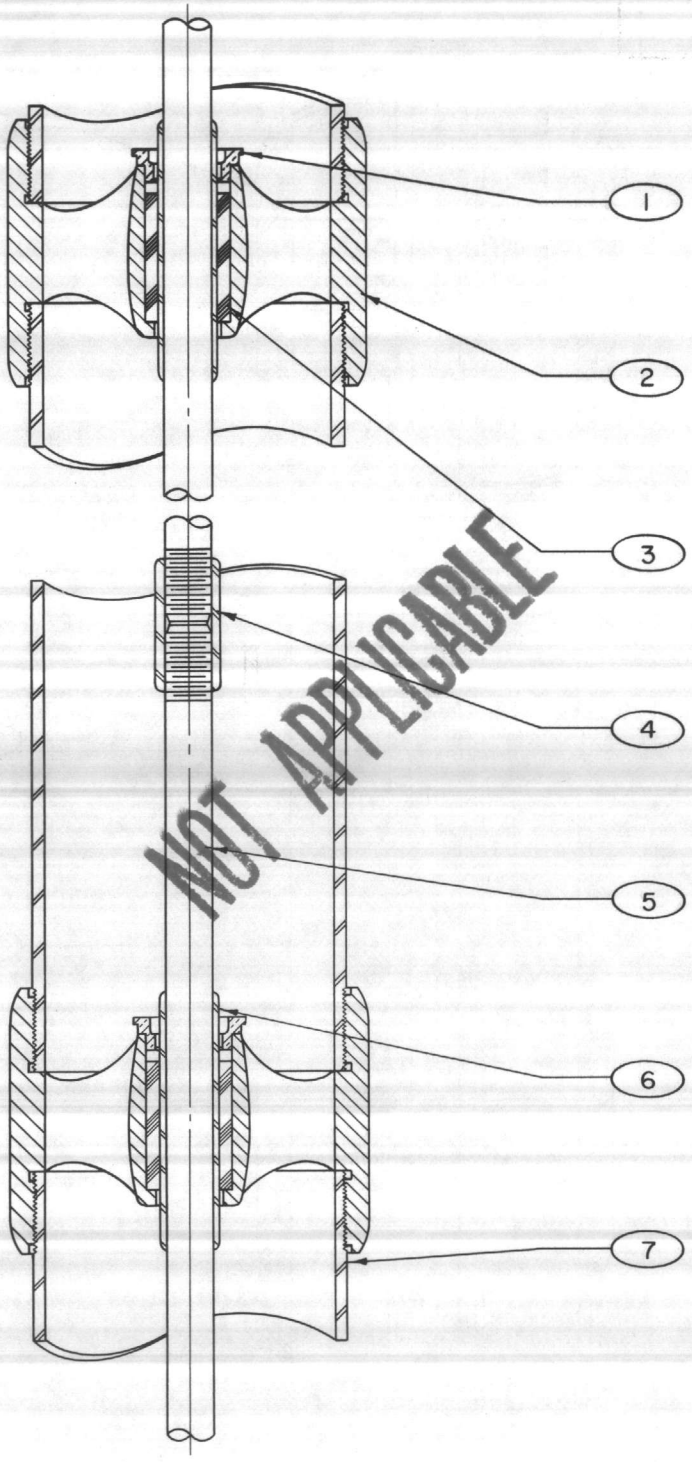
ITEM NO.		DESCRIPTION
5		SHAFT BOX
6		RUBBER BEARING
7		COLUMN PIPE

IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

DISCHARGE COLUMN ASSEMBLY

SCREWED COUPLED - OPEN LINE SHAFT



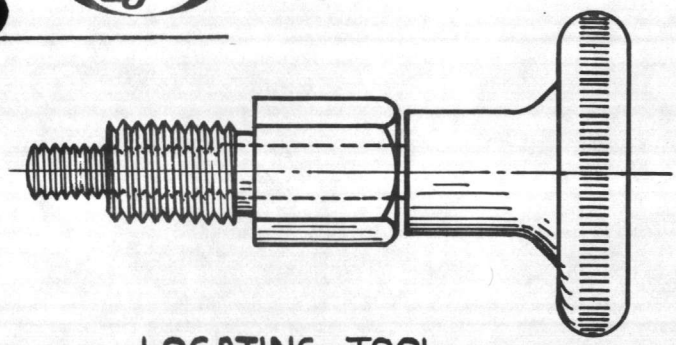
ITEM NO.		DESCRIPTION
1		LOCK RING
2		COMBINATION COUPLING
3		RUBBER BEARING
4		SHAFT COUPLING

ITEM NO.		DESCRIPTION
5		LINE SHAFT
6		MONEL SLEEVE
7		COLUMN PIPE

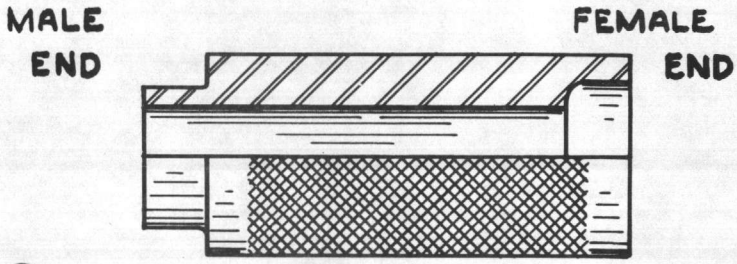
IN ORDERING REPLACEMENT PARTS, SPECIFY PART DESCRIPTION & PUMP SERIAL NO.

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

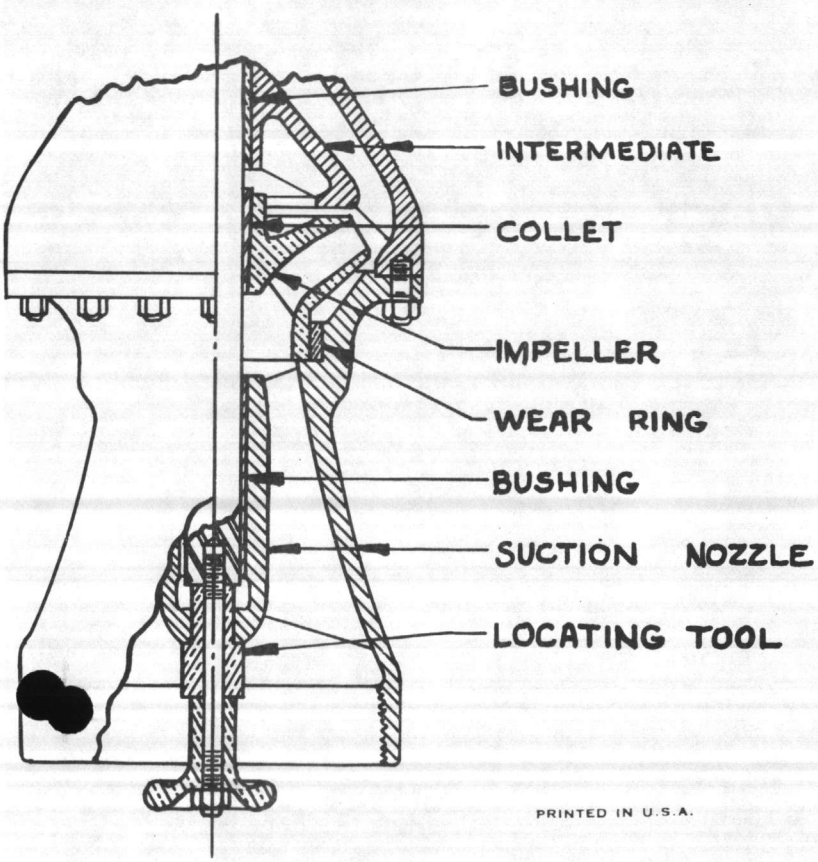
INSTRUCTIONS FOR ASSEMBLYING AND DISMANTLING PUMP BOWLS WITH COLLETS



LOCATING TOOL



COLLET DRIVER



TO ASSEMBLE BOWL

1. Remove cap screw from the bottom of the suction nozzle.
2. Screw locating tool into bottom end of suction nozzle hub.
3. Insert impeller shaft into suction nozzle bearing and turn handwheel of locating tool until impeller shaft is pulled down tight against the shoulder of the tool.
4. Place the impeller over the shaft. Slip the collet over the shaft with the small end first. (A screw driver can be used to spread collet for ease in slipping over shaft). Hold the impeller firmly into the wear ring recess and drive the collet into place with the male end of the collet driver.
5. Remove collet driver and assemble first intermediate stage. Place the next impeller over the shaft and continue to assemble as explained above.
6. When the bowl is completely assembled remove locating tool and replace cap screw in suction nozzle.

TO DISMANTLE BOWL

1. Remove discharge nozzle. Place collet driver over shaft with the female end first and while holding the impeller out of the wear ring recess, drive the impeller off of the collet. Remove the collet and impeller.
2. Remove the intermediate shell and drive the impeller off of the next collet. Continue to dismantle in like manner.

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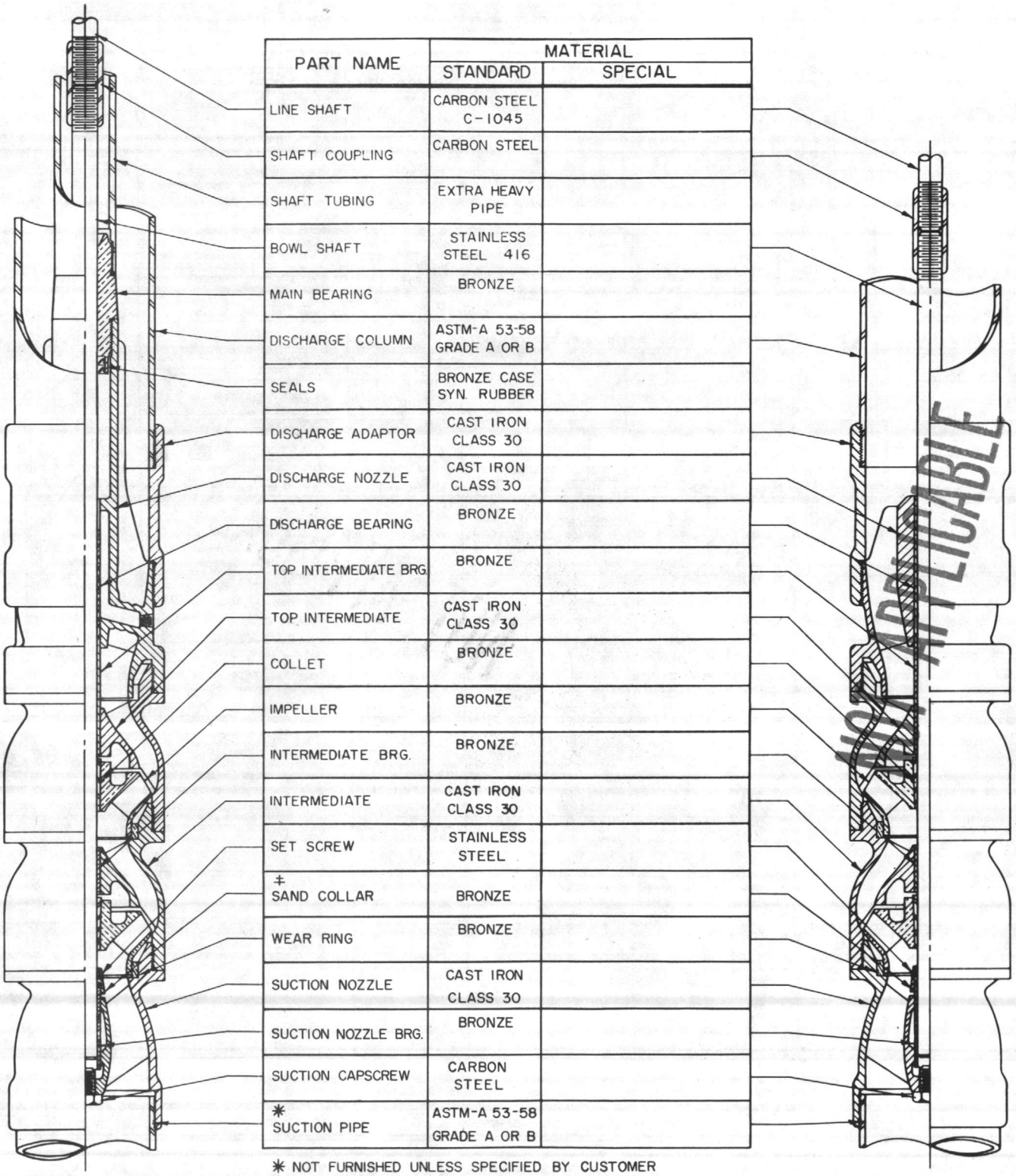
SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.

VERTICAL TURBINE PUMP
DEEP WELL

8" B, DR, PR, RK, T, UR - 10" RK, T, U - 12" T, UR



PART NAME	MATERIAL	
	STANDARD	SPECIAL
LINE SHAFT	CARBON STEEL C-1045	
SHAFT COUPLING	CARBON STEEL	
SHAFT TUBING	EXTRA HEAVY PIPE	
BOWL SHAFT	STAINLESS STEEL 416	
MAIN BEARING	BRONZE	
DISCHARGE COLUMN	ASTM-A 53-58 GRADE A OR B	
SEALS	BRONZE CASE SYN. RUBBER	
DISCHARGE ADAPTOR	CAST IRON CLASS 30	
DISCHARGE NOZZLE	CAST IRON CLASS 30	
DISCHARGE BEARING	BRONZE	
TOP INTERMEDIATE BRG.	BRONZE	
TOP INTERMEDIATE	CAST IRON CLASS 30	
COLLET	BRONZE	
IMPELLER	BRONZE	
INTERMEDIATE BRG.	BRONZE	
INTERMEDIATE	CAST IRON CLASS 30	
SET SCREW	STAINLESS STEEL	
‡ SAND COLLAR	BRONZE	
WEAR RING	BRONZE	
SUCTION NOZZLE	CAST IRON CLASS 30	
SUCTION NOZZLE BRG.	BRONZE	
SUCTION CAPSCREW	CARBON STEEL	
* SUCTION PIPE	ASTM-A 53-58 GRADE A OR B	

* NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER
‡ HARD RUBBER USED ON 8" BOWLS

ENCLOSED LINE SHAFT ☐ ☐ OPEN LINE SHAFT

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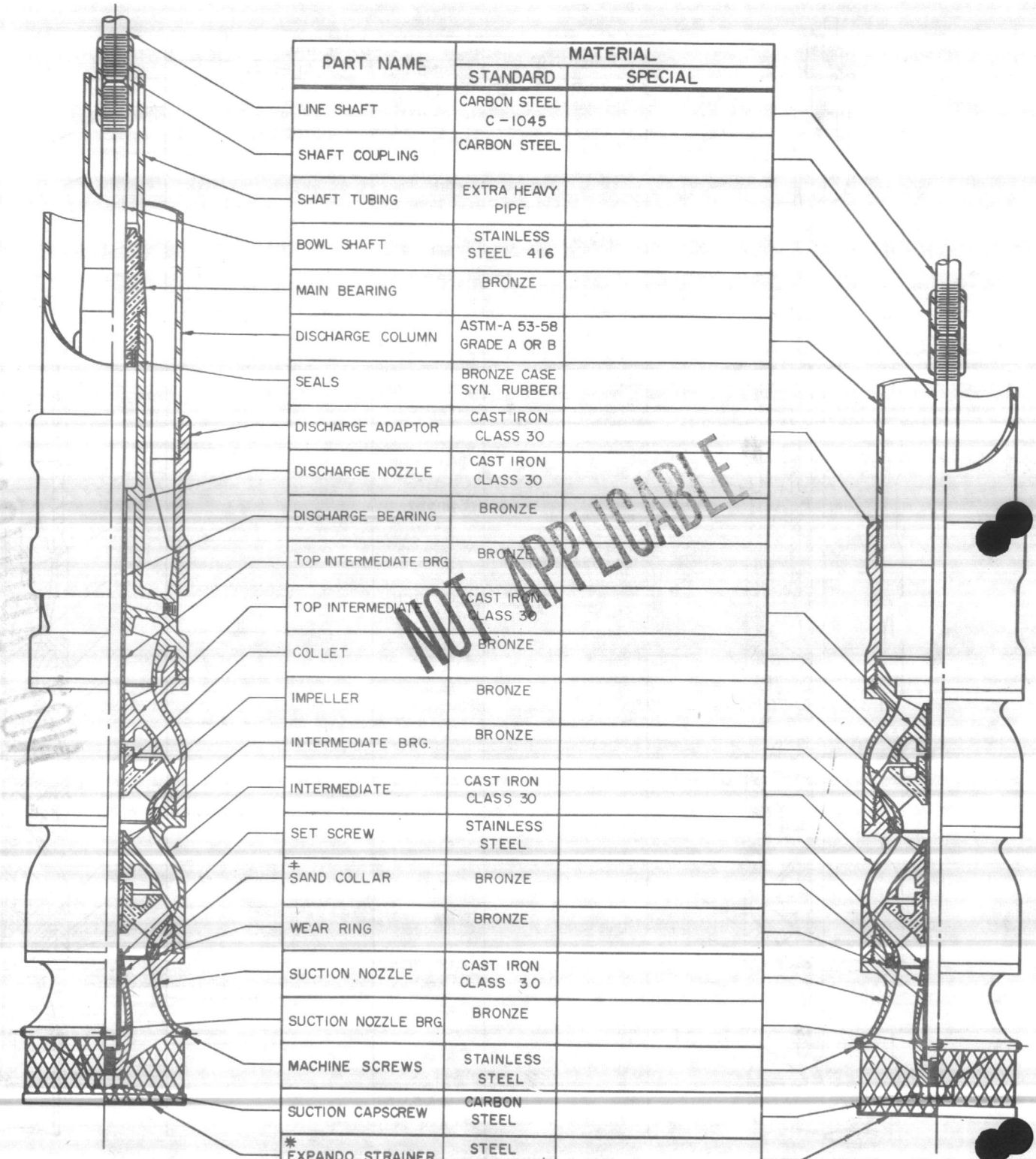
SUPERSEDES ORIGINAL PRICE BOOK ISSUE

PBS 162

VERTICAL TURBINE PUMP
SHORT COUPLED

SINGER
LAYNE & BOWLER DIVISION
MEMPHIS, TENNESSEE U.S.A.
Layne

8" B, DR, PR, RK, T, UR – 10" RK, T, U – 12" T, UR



PART NAME	MATERIAL	
	STANDARD	SPECIAL
LINE SHAFT	CARBON STEEL C – 1045	
SHAFT COUPLING	CARBON STEEL	
SHAFT TUBING	EXTRA HEAVY PIPE	
BOWL SHAFT	STAINLESS STEEL 416	
MAIN BEARING	BRONZE	
DISCHARGE COLUMN	ASTM-A 53-58 GRADE A OR B	
SEALS	BRONZE CASE SYN. RUBBER	
DISCHARGE ADAPTOR	CAST IRON CLASS 30	
DISCHARGE NOZZLE	CAST IRON CLASS 30	
DISCHARGE BEARING	BRONZE	
TOP INTERMEDIATE BRG	BRONZE	
TOP INTERMEDIATE	CAST IRON CLASS 30	
COLLET	BRONZE	
IMPELLER	BRONZE	
INTERMEDIATE BRG.	BRONZE	
INTERMEDIATE	CAST IRON CLASS 30	
SET SCREW	STAINLESS STEEL	
‡ SAND COLLAR	BRONZE	
WEAR RING	BRONZE	
SUCTION NOZZLE	CAST IRON CLASS 30	
SUCTION NOZZLE BRG.	BRONZE	
MACHINE SCREWS	STAINLESS STEEL	
SUCTION CAPSCREW	CARBON STEEL	
* EXPANDO STRAINER	STEEL CADMIUM PLTD	

NOT APPLICABLE

ENCLOSED LINE SHAFT ☐

* NOT FURNISHED UNLESS SPECIFIED BY CUSTOMER
‡ HARD RUBBER USED ON 8" BOWLS

☐ OPEN LINE SHAFT

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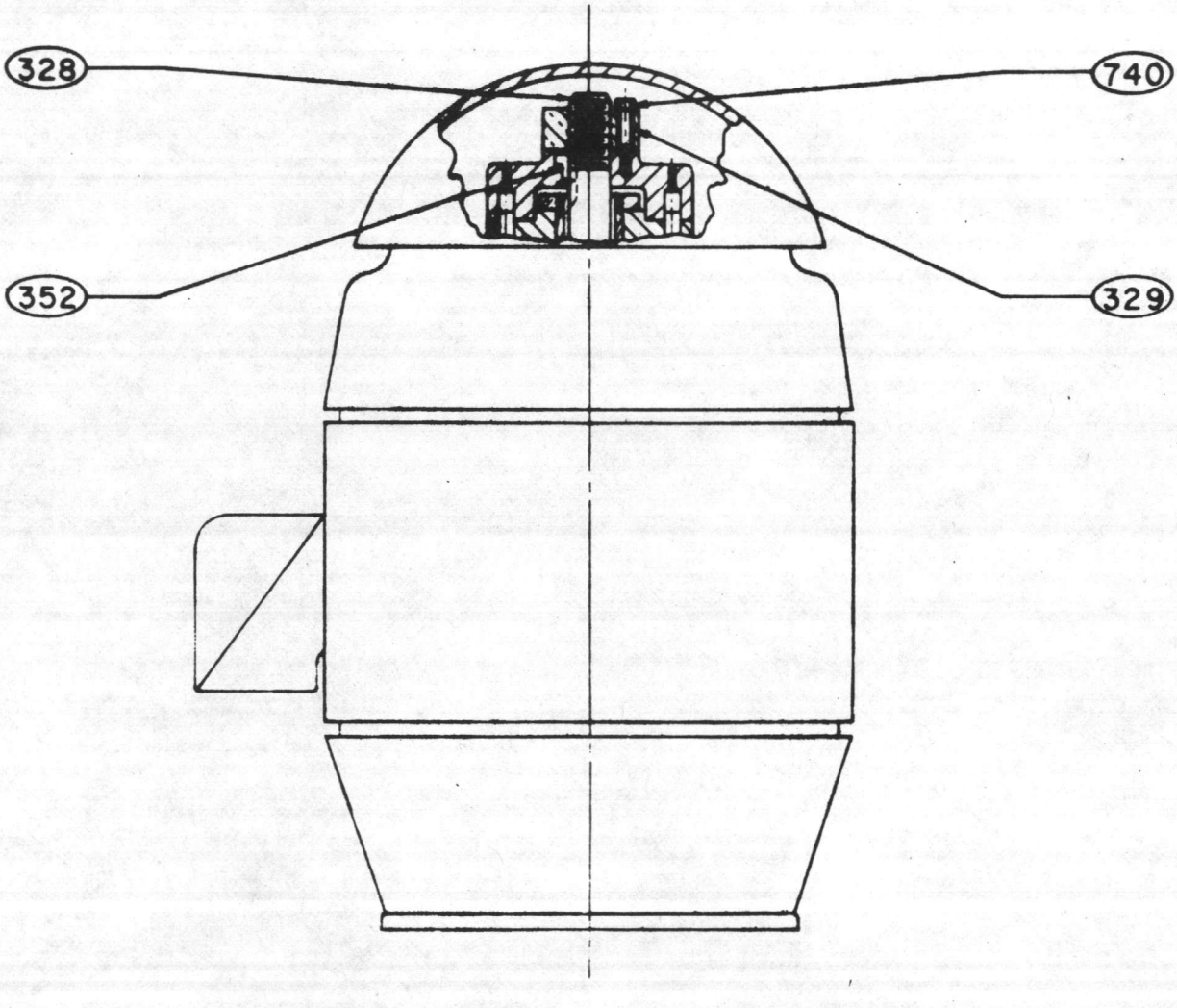
SUPERSEDES ORIGINAL PRICE BOOK ISSUE

ADJUSTING NUT ASSEMBLY
VERTICAL HOLLOW SHAFT MOTOR



PART NO.		DESCRIPTION
328		MOTOR DRIVE SHAFT
329		ADJUSTING NUT
352		GIB. HEAD KEY (CLUTCH)
740		MACHINE SCREW (ADJUSTING NUT)

IN ORDERING REPLACEMENT PARTS, ALWAYS SPECIFY PARTS NO, DESCRIPTION, MOTOR SIZE, TYPE, & PUMP SERIAL NO.

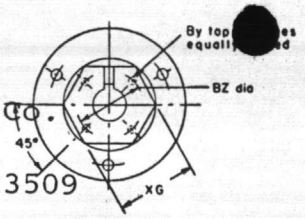
MOTOR MFG..... H.P..... R.P.M. .....

VOLTS..... PHASE..... CY. ..... FRAME .....

Coupling - 1" Non Reverse

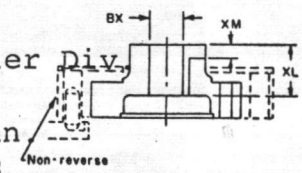
COUPLING DIMENSIONS

5 - Singer
Layne Atlantic Co.
Box 7095
Norfolk, Va. 23509

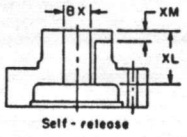


FRAMES 254TP - 286TP
UPPER BRG - MRC 210SFF or Equiv.
LOWER BRG - MRC 7310P or Equiv.

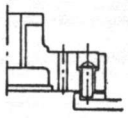
5 - Singer
Layne & Bowler Div.
Box 8097
Memphis, Tenn
38108



B324TP - B445TP



Self-release



Non-reverse
213TP - B286TP

DIMENSIONS OF COUPLINGS IN INCHES

Frame No.	Cat. No. Self-release or Bolted	Cat. No. Nonreverse	BX Bore Nominal	BX Bore Actual □	BY	BZ	XG	XL	XM(**)	KEYWAY Width	KEYWAY Depth
213TP	148X420G1	148X421G2	3/4	0.751	10–32	1 3/8	2 1/4	1 3/16	11/32	3/16	3/32
215TP	148X420G8	148X421G3	7/8	.876	10–32	1 3/8	2 1/4	1 3/16	7/16	1/4	1/8
B254TP	148X420G6	148X421G1	1	1.001	10–32	1 3/8	2 1/4	1 3/16	7/16	1/4	1/8
	148X250G15	148X251G3	3/4	.751	10–32	1 3/8	2 1/4	1 1/2	11/32	3/16	3/32
254TP	148X250G17	148X251G5	7/8	.876	10–32	1 3/8	2 1/4	1 1/2	7/16	1/4	1/8
256TP	148X250G13	148X251G1	1	1.001	10–32	1 3/8	2 1/4	1 1/2	7/16	1/4	1/8
B284TP	148X250G14	148X251G2	1 3/16	1.188	1/4–20	1 3/4	2 1/4	1 1/2	7/16	1/4	1/8
B286TP	148X250G16	148X251G4	1 1/4	1.251	1/4–20	1 3/4	2 1/4	1 1/2	7/16	1/4	1/8
	148X250G22	148X251G7	1 1/4	1.251	1/4–20	1 3/4	2 1/4	1 1/2	9/16	3/8	3/16
	148X399G3	148X400G1	1	1.001	10–32	1 3/8	2 3/8	1 13/16	7/16	1/4	1/8
	148X399G2	Use	1 3/16	1.188	1/4–20	1 3/4	2 3/8	1 13/16	7/16	1/4	1/8
B324TP	148X399G6	with	1 1/4	1.251	1/4–20	1 3/4	2 3/8	1 13/16	7/16	1/4	1/8
B326TP	148X399G5	Self-	1 1/4	1.251	1/4–20	1 3/4	2 3/8	1 13/16	9/16	3/8	3/16
	148X399G7	release	1 7/16	1.438	1/4–20	2 1/8	2 3/8	1 13/16	9/16	3/8	3/16
	148X399G1	Coupling	1 1/2	1.501	1/4–20	2 1/8	2 3/8	1 13/16	9/16	3/8	3/16
	148X403G5		1	1.001	10–32	1 3/8	3 1/4	2	7/16	1/4	1/8
	148X403G6	148X404G1	1 3/16	1.188	1/4–20	1 3/4	3 1/4	2	7/16	1/4	1/8
	148X403G9	Use	1 1/4	1.251	1/4–20	1 3/4	2 1/4	2	9/16	3/8	3/16
B364TP	148X403G2	with	1 3/8	1.376	1/4–20	2 1/8	3 1/4	2	9/16	3/8	3/16
B365TP	148X403G10	Self-	1 7/16	1.438	1/4–20	2 1/8	3 1/4	2	9/16	3/8	3/16
	148X403G4	release	1 1/2	1.501	1/4–20	2 1/8	3 1/4	2	9/16	3/8	3/16
	148X403G8	Coupling	1 11/16	1.688	1/4–20	2 1/2	3 1/4	2	9/16	3/8	3/16
	148X403G1		1 3/4	1.751	1/4–20	2 1/2	3 1/4	2	9/16	3/8	3/16
	148X455G6	174L509G5	1 3/16	1.188	1/4–20	1 3/4	3 1/4	2 1/4	7/16	1/4	1/8
	148X455G5	Use	1 1/4	1.251	1/4–20	1 3/4	3 1/4	2 1/4	9/16	3/8	3/16
B404TP	148X455G2	with	1 7/16	1.438	1/4–20	2 1/8	3 1/4	2 1/4	9/16	3/8	3/16
B405TP	148X455G3	Self-	1 1/2	1.501	1/4–20	2 1/8	3 1/4	2 1/4	9/16	3/8	3/16
	148X455G4	release	1 11/16	1.688	1/4–20	2 1/2	3 1/4	2 1/4	9/16	3/8	3/16
	148X455G7	Coupling	1 3/4	1.751	1/4–20	2 1/2	3 1/4	2 1/4	9/16	3/8	3/16
	148X455G1		1 15/16	1.938	1/4–20	2 1/2	3 1/4	2 1/4	11/16	1/2	1/4
B404TP	148X499G2	174L511G1									
B405TP	148X499G1	Use with	1 3/16	1.188	1/4–20	1 3/4	2 3/4	2 1/4	7/16	1/4	1/8
(2-pole	148X499G3	Self-release	1 1/4	1.251	1/4–20	1 3/4	2 3/4	2 1/4	9/16	3/8	3/16
only)		Coupling	1 1/2	1.501	1/4–20	2 1/8	2 3/4	2 1/4	9/16	3/8	3/16
	148X460G7	148X461G1	1 3/16	1.188	1/4–20	1 3/4	3 3/4	2 3/4	7/16	1/4	1/8
	148X460G5	Use	1 7/16	1.438	1/4–20	2 1/8	3 3/4	2 3/4	9/16	3/8	3/16
B444TP	148X460G4	with	1 1/2	1.501	1/4–20	2 1/8	3 3/4	2 3/4	9/16	3/8	3/16
B445TP	148X460G3	Self-	1 11/16	1.688	1/4–20	2 1/2	3 3/4	2 3/4	9/16	3/8	3/16
	148X460G6	release	1 13/16	1.813	1/4–20	2 1/2	3 3/4	2 3/4	11/16	1/2	1/4
	148X460G2	Coupling	1 15/16	1.938	1/4–20	2 1/2	3 3/4	2 3/4	11/16	1/2	1/4
	148X460G1		2 3/16	2.188	3/8–16	3 1/4	3 3/4	2 3/4	11/16	1/2	1/4

□ Tolerances for the "BX" dimensions are +0.001 inch, −0.000 inch, up to and including 1½ inch diameter, and +0.0015 inch, −0.000 inch for larger diameters.

Nonreverse coupling assemblies, frames 213TP—B286TP are complete, nonreverse assemblies, frames B324TP—B445TP, must be used together with appropriate self-release coupling.

GEM-2296E

L. Atl. #N-17-72
L&B M1011 72D-369

15 HP 1800 RPM 230/460 Volt 3 ph 60 hz

Prints are: For Approval ☐

Prints are: Approved for Construction ☒

Customer Singer

Customer's Order No. M1011 Item

Our Req. No. 405-32284 Item Approved by K. T.

INDUCTION MOTORS—INTEGRAL-HP, 3- AND 2-PHASE SQUIRREL-CAGE
VERTICAL

TRI/CLAD • Hollow-shaft • Shielded (Dripproof)*

High-thrust • Normal-starting-torque • NEMA Type P Base

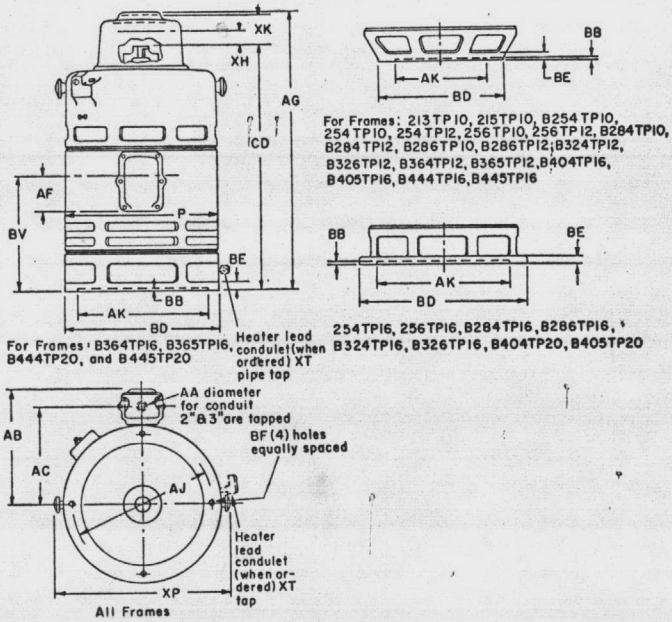
Type K
Frames 213TP10 to B405TP20, 3600 Rpm and Below
Frames B444TP16 to B445TP20, 1800 Rpm and Below θ

Self-release, Bolted or Nonreverse Coupling

GEM-2296E

Sept. 8, 1970

DIMENSIONS



FOR 3600-RPM MOTORS ONLY

For a given pump-shaft diameter, the following table gives the maximum distance between the motor's top coupling and the pump's first line-shaft bearing. This table is based on keeping the headshaft critical at least 25% above operating speed. The selection of a small headshaft diameter may make it necessary to support the headshaft in a close-fitting bushing in the lower end of the motor shaft.

Pump-shaft Diameter in Inches	Maximum Distance Between Top Coupling and Lower Support in Inches
0.750	33
1.000	38
1.187	42
1.437	45
1.500	47
1.688	50
1.750	51

Frame No.	Approx Net Wt in Lb	Dimensions in Inches																
		P	AA	AB	AC	AF	AG	AJ	AK †	BB Min	BD	BE	BF	BV	CD	XH ‡	XK	XP	XT
213TP10	165	10 7/8	1 1/4	9 3/8	7 5/16	3 1/2	23 13/16	9 1/8	8 1/4	3/16	10	3/4	7/16	10 15/16	20 13/16	1 3/4	2 3/4	....	1/2
215TP10	180	10 7/8	1 1/4	9 3/8	7 5/16	3 1/2	23 13/16	9 1/8	8 1/4	3/16	10	3/4	7/16	10 15/16	20 13/16	1 3/4	2 3/4	....	1/2
B254TP10	205	10 7/8	1 1/2	9 3/8	7 5/16	3 1/2	23 13/16	9 1/8	8 1/4	3/16	10	3/4	7/16	10 15/16	20 13/16	1 3/4	2 3/4	....	1/2
254TP10	270	12 13/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	9 1/8	8 1/4	3/16	10	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
254TP12	270	12 13/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	9 1/8	8 1/4	3/16	12	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
254TP16	270	12 13/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	14 3/4	13 1/2	1/4	16 1/2	3/4	11/16	13	23 9/16	1 3/4	2 3/4	....	1/2
256TP10	310	12 13/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	9 1/8	8 1/4	3/16	10	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
256TP12	310	12 13/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	9 1/8	8 1/4	3/16	12	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
256TP16	310	12 13/16	1 1/2	10 3/8	8 5/16	3 1/2	26 1/2	14 3/4	13 1/2	1/4	16 1/2	3/4	11/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B284TP10	330	12 13/16	2	11 3/8	8 7/8	4 5/8	26 1/2	9 1/8	8 1/4	3/16	10	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B284TP12	330	12 13/16	2	11 3/8	8 7/8	4 5/8	26 1/2	9 1/8	8 1/4	3/16	12	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B284TP16	330	12 13/16	2	11 3/8	8 7/8	4 5/8	26 1/2	14 3/4	13 1/2	1/4	16 1/2	3/4	11/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B286TP10	355	12 13/16	2	11 3/8	8 7/8	4 5/8	26 1/2	9 1/8	8 1/4	3/16	10	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B286TP12	355	12 13/16	2	11 3/8	8 7/8	4 5/8	26 1/2	9 1/8	8 1/4	3/16	12	3/4	7/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B286TP16	355	12 13/16	2	11 3/8	8 7/8	4 5/8	26 1/2	14 3/4	13 1/2	1/4	16 1/2	3/4	11/16	13	23 9/16	1 3/4	2 3/4	....	1/2
B324TP12	460	14 1/4	2§	12 3/16	9 11/16	4 5/8	32 7/16	9 1/8	8 1/4	3/16	12	7/8	7/16	15 7/16	28 3/16	3 1/8	4	15 3/4	1/2
B324TP16	460	14 1/4	2§	12 3/16	9 11/16	4 5/8	32 7/16	14 3/4	13 1/2	1/4	16 1/2	7/8	11/16	15 7/16	28 3/16	3 1/8	4	15 3/4	1/2
B326TP12	510	14 1/4	3	13 15/16	10 5/16	6 1/2	32 7/16	9 1/8	8 1/4	3/16	12	7/8	7/16	15 7/16	28 3/16	3 1/8	4	15 3/4	1/2
B326TP16	510	14 1/4	3	13 15/16	10 5/16	6 1/2	32 7/16	14 3/4	13 1/2	1/4	16 1/2	7/8	11/16	15 7/16	28 3/16	3 1/8	4	15 3/4	1/2
B364TP12	600	16 1/4	3	14 13/16	11 3/16	6 1/2	35 7/16	9 1/8	8 1/4	3/16	12	1 1/8	7/16	16 1/8	31 3/16	3 1/8	4	17 7/8	3/4
B364TP16	600	16 1/4	3	14 13/16	11 3/16	6 1/2	35 7/16	14 3/4	13 1/2	1/4	16 1/2	1	11/16	16 1/8	31 3/16	3 1/8	4	17 7/8	3/4
B365TP12	660	16 1/4	3	14 13/16	11 3/16	6 1/2	35 7/16	9 1/8	8 1/4	3/16	12	1 1/8	7/16	16 1/8	31 3/16	3 1/8	4	17 7/8	3/4
B365TP16	660	16 1/4	3	14 13/16	11 3/16	6 1/2	35 7/16	14 3/4	13 1/2	1/4	16 1/2	1	11/16	16 1/8	31 3/16	3 1/8	4	17 7/8	3/4
B404TP16	890	18 7/16	3	15 3/4	12 1/8	6 1/2	41 1/4	14 3/4	13 1/2	1/4	16 1/2	7/8	11/16	19 1/2	36 7/16	3 1/4	4 1/2	20 1/8	3/4
B404TP20	890	18 7/16	3	15 3/4	12 1/8	6 1/2	41 1/4	14 3/4	13 1/2	1/4	20	7/8	11/16	19 1/2	36 7/16	3 1/4	4 1/2	20 1/8	3/4
B405TP16	990	18 7/16	3	15 3/4	12 1/8	6 1/2	41 1/4	14 3/4	13 1/2	1/4	16 1/2	7/8	11/16	19 1/2	36 7/16	3 1/4	4 1/2	20 1/8	3/4
B405TP20	990	18 7/16	3	15 3/4	12 1/8	6 1/2	41 1/4	14 3/4	13 1/2	1/4	20	7/8	11/16	19 1/2	36 7/16	3 1/4	4 1/2	20 1/8	3/4
B444TP16	1180	20 3/8	3	16 15/16	13 5/16	6 1/2	47 1/8	14 3/4	13 1/2	1/4	16 1/2	1 1/8	11/16	23 1/4	41 7/8	3 7/8	5	22	3/4
B444TP20	1180	20 3/8	3	16 15/16	13 5/16	6 1/2	47 1/8	14 3/4	13 1/2	1/4	20	1 1/8	11/16	23 1/4	41 7/8	3 7/8	5	22	3/4
B445TP16	1330	20 3/8	3	16 15/16	13 5/16	6 1/2	47 1/8	14 3/4	13 1/2	1/4	16 1/2	1 1/8	11/16	23 1/4	41 7/8	3 7/8	5	22	3/4
B445TP20	1330	20 3/8	3	16 15/16	13 5/16	6 1/2	47 1/8	14 3/4	13 1/2	1/4	20	1 1/8	11/16	23 1/4	41 7/8	3 7/8	5	22	3/4

Coupling dimensions on reverse side.

* These motors meet NEMA specifications for weather-protected Type 1 motors.

† 'AK' diameters of 8 1/4 inches will come within the limits of +0.003 inch, −0.000 inch; diameters of 13 1/2 inches will come within the limits of +0.005 inch, −0.000 inch.

‡ The total height of pump shaft and locking nut above top of coupling must not exceed dimension XH.

§ For 3600 rpm, Frames B324TP12 and B324TP16, conduit box dimensions are same as for Frames B326TP12 and B326TP16.

θ For 3600 rpm in this frame size, refer to the Company.

Frames 213TP10 through B286TP16 have grease-lubricated upper guide and lower thrust bearings. All other frames have oil-lubricated upper thrust bearing and grease-lubricated lower guide bearing.

For 3600 rpm, Frames B404TP16 through B405TP20 inclusive maximum shaft permissible 1.751 inches.

Nonreverse coupling assemblies, Frames 213TP to B286TP are complete, nonreverse assemblies, Frame B324TP to B445TP, must be used together with appropriate self-release coupling.

Provided mounting conditions permit, conduit box may be turned so that entrance can be made upward, downward, or from either side.

For shipping weight add 5 per cent to the above net weights.

For ESTIMATING ONLY unless endorsed for construction.

652

North Carolina Department of Environment, Health, and Natural Resources
Division of Environmental Health, Public Water Supply Section

SOURCE INFORMATION
GROUND WATER

Date Form Completed: M M D D Y Y: 01 25 95

PWSID: 04-67-041

Owner Assigned Source Code: 653

Well Name (If purchase, name of system): HADNOT POINT 653

Code: S (G=Ground, W=Purchase/G, Y=G w/direct influence, Z=W w/direct influence)

If Purchase, seller ID#:

Source Begin Date (M M Y Y):

Source exempt—SWTR? ☐ Y ☐ N

Direct Influence Date (M M D D Y Y):

Availability: O (P=Permanent, E=Emergency, S=Seasonal, I=Interim, O=Other)

T/B ABANDONED

Location of well within the system (If purchase, location of master meter): OLD PINEY GREEN ROAD

Latitude (N) Deg. Min. Sec.: 34 42 28

Longitude (W) Deg. Min. Sec.: 077 19 49

How Determined: G (G=GPS, M=Map, S=Surveyed)

GPS Data: Q # or DOP #

No. of Sats. Locked on

(If purchase, use seller's primary source lat/long)

Vulnerable (VOCs)? ☐ Y ☐ N

Assessment Date (M M D D Y Y):

ENTRY POINT INFORMATION

Use Code: C (C=Ground/Permanent, D=Ground/non-permanent)

Availability: P (P=Year-round, S=Seasonal, E=Emergency, I=Interim, O=Other)

Owner Assigned Entry Point Code: 100

Entry Point Name: HP653

Location:

Well Site: Owned or controlled? ____ (Y,N) Control Area (100' radius)? ____ (Y,N) If no, explain:

Sources of pollution/distance:

Surface water within 200'? ☐ Y ☐ N If yes, actual distance ☐☐☐ feet If yes, bact. samples collected? ____ (Y,N)

Adequate slope? ____ (Y,N) Flooding? ____ (Y,N) Maintenance:

Well House: Free of stored materials? ____ (Y,N) Properly drained? ____ (Y,N) Locked? ____ (Y,N)

Condition of house: Type of freeze protection:

Well: Diameter: 8" Type: SCREENED Yield (gpm): 197 Properly sealed? ____ (Y,N

Properly vented? ____ (Y,N) Casing depth 40 ft. (If unknown, put 'UNK') Well depth: 250' Meter available? Y (Y,N

Concrete slab adequate? ____ (Y,N) If no, explain: Size:

Size of blow-off: 4" (v) Sample tap: Before treatment? ____ (Y,N) After treatment? ____ (Y,N

Pumps: Capacity: GPM: 200 HP: 10 Pump intake depth: 25 Auxiliary Power? N (Y,N

Type pump: TURTICAL TURBINE Height above floor (pump/casing): 7" /

Storage at well site: Elev: Hydro: Ground:

If hydroautomatic, air volume control? ____ (Y,N) Safety valves? ____ (Y,N) Coded? ____ (Y,N)

High service pumps: 1. ____ gpm ____ hp 2. ____ gpm ____ hp 3. ____ gpm ____ hp Auxiliary Power? ____ (Y,N

Is the water treated at this well? ☒ Y ☐ N If yes, complete back of form.

If other wells are treated here, which ones? If treated elsewhere, where? HP-20 PLANT

If purchase, retreat? ☐ Y ☐ N If yes, complete back of form.

DEHNR 3803 (Revised 12/93)

CONTAMINATED

*

WELL NUMBER 653 | BY Thomas & Brown | DATE 10-30-84

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1245
99	35	44	9	45	104	1255
		53	18	42	111	1305
		54	19	39	140	1315
		57	22	36	159	1325
		60	25	33	172	1335
		62	27	30	185	1345
		64	29	(27)	(197)	1355

REMARKS Last set at 27 PSI 197 GPM

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER 653		BY THOMAS / RAYNOR			DATE 9-13-83	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1055
91	41	55	14	50	108	1105
		58	17	47	122	1116
		64	23	44	146	1127
		67	26	41	164	1137
		71	30	38	180	1147
		73	32	35	192	1200

REMARKS Left set at 192 GPM 35 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

CORBIN CONSTRUCTION COMPANY, INC.
GENERAL CONTRACTORS
POST OFFICE BOX 5004
JACKSONVILLE, NORTH CAROLINA 28540

March 29, 1978

619

Commander, Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 28542 (Code 05)

Re: Contract N62470-76-C-6799
Replace four water wells
Marine Corps Base
Camp Lejeune, N.C.

Gentlemen:

We are enclosing four (4) copies of the following information on well No. 619 located on Piney Green Road, Camp Lejeune, N.C.

Drillers log
Electric log
Water analysis

We estimate this well will produce approximately 175 to 225 gpm by taking the water from the 105-140 foot level and from the 155-185 foot level.

Please advise us of your decision promptly so we may begin developing this well.

Very truly yours,

EAST COAST CONSTRUCTION COMPANY, INC.

W. H. Myers

WHM/mm

cc ROICC
Marine Corps Base, CL

enclosure 1 copy of well data

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

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REVIEWER CCS DATE 4 APR 1978

FOR OFFICER IN CHARGE OF CONSTRUCTION

EAST COAST CONSTRUCTION COMPANY, INC.

GENERAL CONTRACTORS

P. O. BOX 5004 — JACKSONVILLE, NORTH CAROLINA 28540

353-4479 or 353-6044

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

DRILLERS LOG

WELL #619

0 - 20	Sand and Clay
20 - 35	Sand
35 - 45	Clay
45 - 54	Sand and Clay
54 - 56	Soft Limestone
56 - 57	Sand
57 - 100	Soft Limestone
100 - 190	Soft Limestone
190 - 235	Fine Sand
235 - 270	Sand and Clay

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

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REVIEWER CCS DATE 4 APR 1978

FOR OFFICER IN CHARGE OF CONSTRUCTION

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

WATER ANALYSIS LABORATORY
802 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512

(803) 479-4639

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
DEVELOPERS
IRRIGATION.
OTHERS

DATE: 3/22/78

Report To: Carolina Well & Pump Co.
Sanford, N. C.

Date Analyzed: 3/22/78
Sample Number: 170 Feet
WELL No 619

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.4	Carbon Dioxide (CO_2)	2
Iron (Fe)	0.65	Total Acidity ($CaCO_3$)	2
Nitrate (NO_3)	Trace	Calcium Hardness ($CaCO_3$)	153
Fluoride (F)	0.5	Magnesium Hardness ($CaCO_3$))	39
Manganese (Mn)	0	Carbonate Hardness ($CaCO_3$)	192
Total Hardness ($CaCO_3$)	192	Noncarbonate Hardness ($CaCO_3$)	0
Chlorides (Cl)	11	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	12.8	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0	Bicarbonate Alkalinity ($CaCO_3$)	260
Magnesium (Mg)	9.6	Total Alkalinity ($CaCO_3$)	260
Calcium (Ca)	62	Total Dissolved Solids	299
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°)	460
Bicarbonate (HCO_3)	317	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionabl

Water Analysis Laboratory
802 Hamlet Highway
Bennettsville, South Carolina 29512

SIGNED: _____
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER.' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES.' WATER SUPPLY PAPER 1434 (1960). U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

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EAST COAST CONSTRUCTION CO., INC.
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REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

WATER ANALYSIS LABORATORY
802 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512
(803) 479-4639

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
DEVELOPERS
IRRIGATION
OTHERS

DATE 3/22/78

Report To: Carolina Well & Pump Co.
Sanford, N. C.

Date Analyzed: 3/22/78
Sample Number: 131 Feet
WELL # 619

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.3	Carbon Dioxide (CO_2)	2
Iron (Fe)	0.25	Total Acidity ($CaCO_3$)	4
Nitrate (NO_3)	Trace	Calcium Hardness ($CaCO_3$)	187
Fluoride (F)	0.3	Magnesium Hardness ($CaCO_3$))	15
Manganese (Mn)	Trace	Carbonate Hardness ($CaCO_3$)	202
Total Hardness ($CaCO_3$)	202	Noncarbonate Hardness ($CaCO_3$)	0
Chlorides (Cl)	14	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	7.6	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0	Bicarbonate Alkalinity ($CaCO_3$)	240
Magnesium (Mg)	3.6	Total Alkalinity ($CaCO_3$)	240
Calcium (Ca)	74.2	Total Dissolved Solids	208
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°c)	320
Bicarbonate (HCO_3)	293	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionable

Water Analysis Laboratory
802 Hamlet Highway
Bennettsville, South Carolina 29512

SIGNED _____
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: "STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER." APHA. AWWA AND WPCF AND "METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES." WATER SUPPLY PAPER 1454 (1960). U. S. GEOLOGICAL SURVEY. WASHINGTON, D. C.

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FOR OFFICER IN CHARGE OF CONSTRUCTION

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJEUNE, NC

ELECTRIC LOG BY HP-653

JOHNSON-KECK™ DR-61 ELECTRICAL LOGGING SYSTEM

Well # 619 — Owner Camp Lejeune N.C.
Location Piney Green Rd — Date 3-12-78
Bore hole depth 220 ft. dia. 9 in — Casing depth 40 ft. dia. 8 in
Mud resistivity — Temperature — °F
Viscosity — lbs/gal weight — lb/gal type —
Measuring point — ft. above/below ground level
Fluid level in hole 15 — Other logs —
Driller [illegible] — Engineer R. W. Rinehart

Spontaneous Potential (millivolts)
-400 -200 0 200 400 SP
-80 -40 0 40 80

Resistivity (ohm - ft)
(Circle one) Normal - Lat
16 2.5
100 2000 6000 6000
20 400 600 600
100 200 300 400

Depth (ft) 1"=10' 1"=20' 1"=50'

Sample
Sample
Sample
Sample

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

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FOR OFFICER IN CHARGE OF CONSTRUCTION

WATER AND WASTEWATER EQUIPMENT, SALES AND SERVICE

ENVIRONMENTAL PRODUCTS, INC

P. O. BOX 2385 • HICKORY, N. C. 28601 • 704/322-7003

A.P. 654

SUBMITTAL DATA

PROJECT: N62470-76-B-6799, Replace Water Wells
LOCATION: Marine Corp Base, Camp Lejeune, North Carolina
ENGINEER: Naval Facilities Engineering Command, Norfolk, Virginia
CONTRACTOR: East Coast Construction, Jacksonville, North Carolina
SUBJECT: Well 619
CONDITIONS: 225 GPM @ 105' TDH, 1800 RPM
DESCRIPTION:

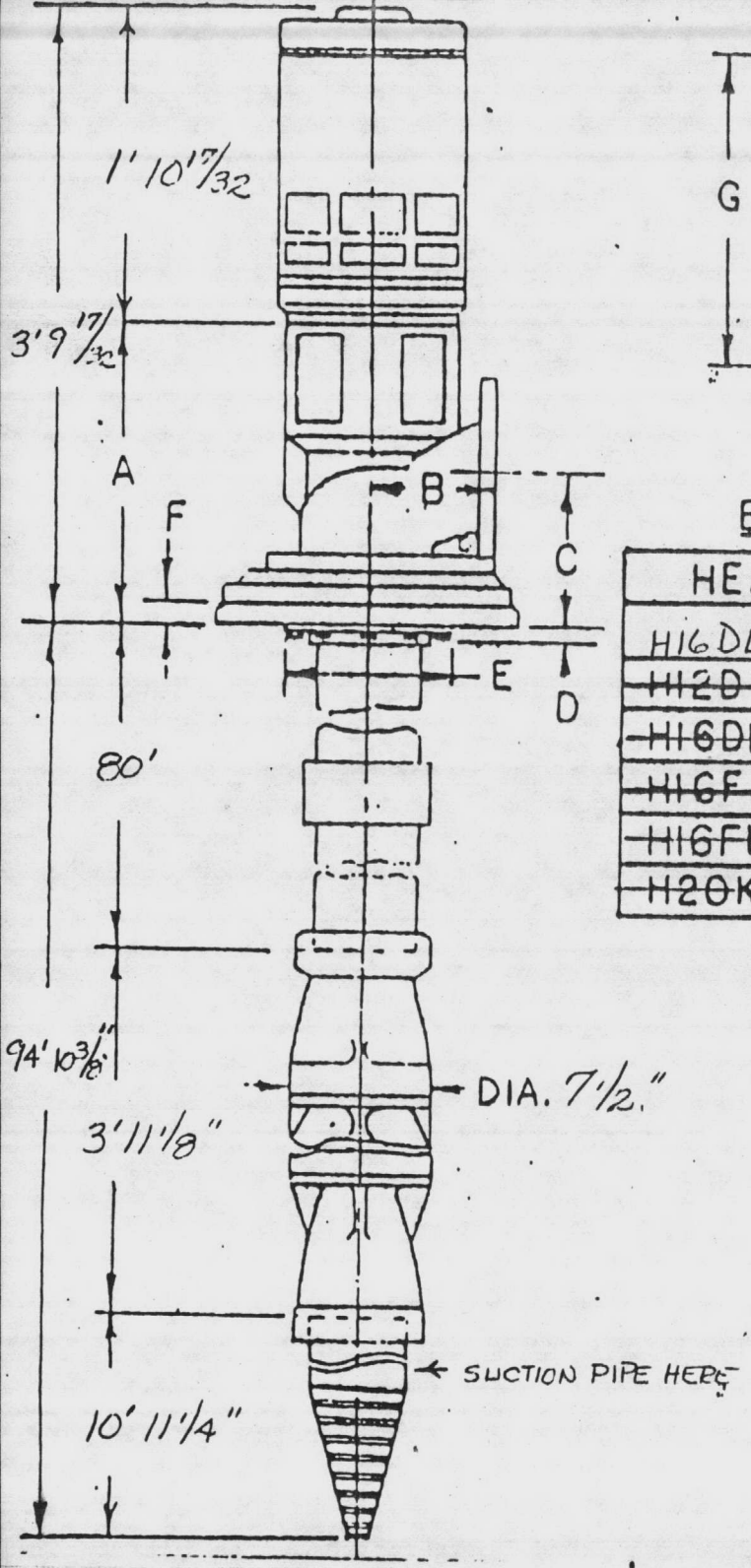
One (1) Crane Deming 5-stage, size L-8, Fig. 4700, vertical turbine bowl assembly, for water lubrication, with bronze impellers designed for the above conditions, fitted for 5" column and 1" shafting, with 5" threaded suction, and including the following:

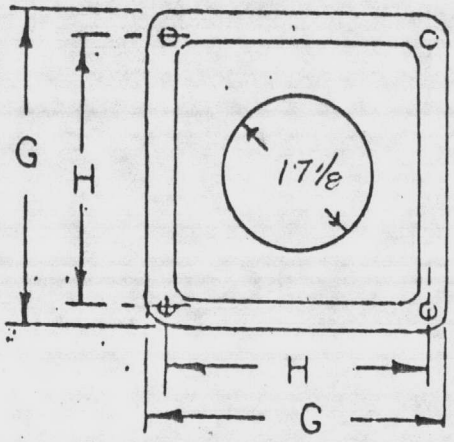
A. One (1) H16DL 16½" x 6" type "C" surface discharge head, fitted for 5" column and 1" water lubricated shafting, for a 6" above ground discharge.
B. One (1) foundation plate (baseplate) for the above discharge head.
C. Two (2) 5' sections of 5" AWWA standard .258 wall, schedule 40, water well column pipe, threaded and coupled with couplings, zinc coated. One to be installed at the top of the bowl assembly, one to connect to bottom of discharge head.
D. Seven (7) 10' sections, same as above, for use as "intermediate column".
E. One (1) 5' section of 1" diameter, C-1045, water lubricated shafting (bottom drive), with coupling, stainless steel shaft sleeve, bronze retainer and rubber bearing (for 5" column).
F. Seven (7) 10' sections of 1" diameter, C-1045, water lubricated shaft assemblies, with couplings, stainless steel shaft sleeves, bronze retainers and rubber bearings (intermediate shaft).
G. One (1) 1" diameter, C-1045 topshaft, with sleeve, suitable for 5' top column, head, gear and motor used.
H. One (1) 10' section of 4" zinc coated pipe (suction pipe).
I. One (1) 4" galvanized cornucopia type strainer.
J. One (1) General Electric type K, 10 HP, 1800 RPM, 3 phase, 60 cycle, 200 volt, vertical solid shaft motor, NEMA desing "B" rated for high thrust, with 1.15 service factor, class "B" insulated, 40° C. ambient, in a L215TP10 frame in a NEMA weather protected type one enclosure.

Note 1. TDH is based on 56' pumping level 20 PSI @ ground level, and column and shaft friction loss of 2.50.
(56 + 46.2 + 2.5= 105)

Note 2. Please confirm overall setting.

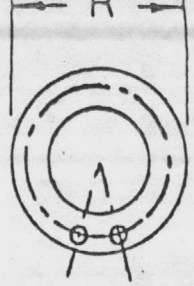
JUNE 30, 1978





4-K DIA. HOLES

BASEPLATE TOP VIEW



L-125 LB ANSI FLG
M-N-HOLES ON
P BOLT CIRCLE
HOLES STRADDLE
VERTICAL ℄

HEAD	A	B	C	D	E	F	G	H	K	L	M	N	P	R
H16DL	23	11 3/8	10	1/4	14 3/4	1 7/16	24	19 3/4	7/8	6	8	7/8	9 1/2	11
~~H20~~	~~23~~	~~8 3/4~~	~~10~~	~~1/4~~	~~14 3/4~~	~~1 7/16~~	~~24~~	~~19 3/4~~	~~7/8~~	~~6~~	~~8~~	~~7/8~~	~~9 1/2~~	~~11~~
~~H16DL~~	~~23~~	~~11 3/8~~	~~10~~	~~1/4~~	~~14 3/4~~	~~1 7/16~~	~~24~~	~~19 3/4~~	~~7/8~~	~~6~~	~~8~~	~~7/8~~	~~9 1/2~~	~~11~~
~~H16F~~	~~23~~	~~11 3/8~~	~~10~~	~~1/4~~	~~14 3/4~~	~~1 7/16~~	~~24~~	~~19 3/4~~	~~7/8~~	~~6~~	~~8~~	~~7/8~~	~~11 3/4~~	~~13 1/2~~
~~H16FL~~	~~23~~	~~11 3/8~~	~~10~~	~~1/4~~	~~14 3/4~~	~~1 7/16~~	~~24~~	~~19 3/4~~	~~7/8~~	~~8~~	~~8~~	~~7/8~~	~~11 3/4~~	~~13 1/2~~
~~H20K~~	~~23~~	~~13 7/8~~	~~10 1/2~~	~~1/4~~	~~14 3/4~~	~~1 7/16~~	~~24~~	~~19 3/4~~	~~7/8~~	~~10~~	~~12~~	~~1~~	~~14 1/4~~	~~16~~

NG-2470-76-B-6799

CERTIFICATION FOR				
CUSTOMER EAST COAST CONSTRUCTION			PO# 440	
JOB & LOCATION WELL 619, MCAS. CAMP LEJEUNE, N.C.				
CONSULTING ENGINEERS NAVAL FACILITIES NAVALSTATION, NORFOLK, VA.				
CONDITIONS	225 GPM	105 TDH	1800 RPM	94' 10 3/8" SETTING
PUMP Crane Deming 5 stage, L-8, Figure 4700, Vert. Turbine				
MOTOR GE type K, 10HP, 1800 RPM, VHS, 3ϕ, 60hz, 200 Volt, WP-1				
COLUMN & SHAFT 5" ZINC COATED T&C, 1" DIAMETER (WATER LUBE)				
SUCTION PIPE 10' of 4" ZINC COATED			STRAINER 4" GALVANIZED CORNUCOPIA	
SCALE - NONE	CERTIFIED BY RTD		DATE: 6/28/78	

ENVIRONMENTAL PRODUCTS, INC. - HICKORY, N. C.

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

619

WATER ANALYSIS LABORATORY
802 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512

(803) 479-4639

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
DEVELOPERS
IRRIGATION
OTHERS

DATE: 3/22/78

Report To: Carolina Well & Pump Co.
Sanford, N. C.

Date Analyzed: 3/22/78
Sample Number: 105 Feet
WELL # 619

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.0	Carbon Dioxide (CO_2)	2
Iron (Fe)	0.3	Total Acidity ($CaCO_3$)	6
Nitrate (NO_3)	Trace	Calcium Hardness ($CaCO_3$)	170
Fluoride (F)	0.35	Magnesium Hardness ($CaCO_3$))	17
Manganese (Mn)	0	Carbonate Hardness ($CaCO_3$)	100
Total Hardness ($CaCO_3$)	187	Noncarbonate Hardness ($CaCO_3$)	87
Chlorides (Cl)	12	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	7.2	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0	Bicarbonate Alkalinity ($CaCO_3$)	100
Magnesium (Mg)	3.5	Total Alkalinity ($CaCO_3$)	100
Calcium (Ca)	68	Total Dissolved Solids	195
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°)	300
Bicarbonate (HCO_3)	122	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionabl

Water Analysis Laboratory
802 Hamlet Highway
Bennettsville, South Carolina 29512

SIGNED: _____
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

APPROVED ✓
APPROVED AS NOTED
DISAPPROVED

SUBJECT TO THE REQUIREMENTS OF
CONTRACT 05-76-6799

APPROVAL OF [illegible] DOES NOT INCLUDE APPROVAL OF [illegible] THE CONTRACT REQUIREMENTS [illegible] CONTRACTOR CALLS ATTENTION TO [illegible] POINTS THE DEVIATION --- THE CONTRACTOR SHALL BE RESPONSIBLE FOR [illegible] TECHNICAL DIMENSIONS [illegible] OF TRADES, ETC., AS [illegible]

REVIEWER CCS DATE 4 APR 1978

FOR OFFICER IN CHARGE OF CONSTRUCTION

EAST COAST CONSTRUCTION CO., INC

CONTRACT N62470-76-C-6799

REPLACE WATER WELLS PUMPING TEST DATA

MARINE CORPS BASE

Sheet 1 of 2

Test conducted by: Carolina Pump Co. for East Coast Const Co. Jacksonville, NC

Well Owner: U.S. Navy Address: Camp Lejeune, NC

Pumped Well No.: 619 Location: Piney Green Road County: Onslow

Observation Well Location: 105

Airline Lengths: Pumped Well Observation Wells

Remarks: Contract N62470-76-C-6799 Replace Four Water Wells

Pumping rate measured with: 6" x 5" Orifice Water levels measured with: Electric Tape

Pump Well Data

Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
6-13-78							
2:00 PM	START		100			16' 5"	START
2:15 "	15 MIN		"			37' 2"	
2:30 "	"		"			38' 2"	
3:00 "	30 MIN		"			38' 2"	
3:30 "	"		"			38' 6"	
4:00 "	"		"			38' 6"	
4:30 "	"		"			38' 7"	
4:45 "	15 MIN		150			44' 1"	
5:00 "	"		"			44' 4"	
5:30 "	30 MIN		"			44' 6"	
6:00 "	"		"			44' 7"	
6:30 "	"		"			44' 7"	
7:00 "	"		"			44' 8"	
7:15 "	15 MIN		200			50' 5"	
7:30 "	"		"			50' 7"	
8:00 "	30 MIN		"			50' 8"	
8:30 "	"		"			50' 9"	
9:00 "	"		"			50' 10"	
9:30 "	"		"			51' 0"	
9:45 "	15 MIN		250			59' 7"	
10:00 "	"		"			59' 10"	
10:30 "	30 MIN		"			60' 0"	
11:00 "	"		"			60' 0"	
11:30 "	"		"			60' 1"	
12:00 AM	"		"			60' 1"	
12:15 "	15 MIN		300			64' 2"	
12:30 "	"		"			64' 4"	
1:00 "	30 MIN		"			64' 4"	
1:30 "	"		"			64' 4"	
2:00 "	"		"			64' 5"	
2:30 "	"		"			64' 5"	
2:45 "	15 MIN		350			72' 2"	
3:00 "	"		"			72' 3"	
3:30 "	30 MIN		"			72' 3"	
4:00 "	"		"			72' 3"	
4:30 "	"		"			72' 4"	
5:00 "	"		"			72' 4"	
5:15 "	15 MIN		400			81' 8"	
5:30 "	"		"			82' 0"	
6:00 "	30 MIN		"			82' 2"	
6:30 "	"		"			82' 2"	
7:00 "	"		"			82' 2"	
7:30 "	"		"			82' 2"	

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

APPROVED ✓
APPROVED AS NOTED
DISAPPROVED
SUBJECT TO THE REQUIREMENTS OF
CONTRACT NO. 05-76-6799
APPROVAL AS SUBMITTED DOES NOT INCLUDE
APPROVAL OF ANY DEVIATION FROM THE CONTRACT REQUIREMENTS UNLESS THE CONTRACTOR
CALLS ATTENTION TO ANY SUCH DEVIATION AND SPECIFICALLY REQUESTS THE DEVIATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING FOR PHYSICAL DIMENSIONS AND FOR COORDINATION OF TRADES, ETC., AS REQUIRED.
17 JUL 1978
REVIEWER CCS DATE
FOR OFFICER IN CHARGE OF CONSTRUCTION

PUMPING TEST DATA

Test conducted by: Carolina Well + Pump Co. for EAST COAST CONST Co Address: _____

Well Owner: U.S. Navy Location: Piney Green Rd County: Onslow

Pumped Well No.: 619 Observation Wells _____

Observation Well Location: _____

Airline Lengths: Pumped Well 99' _____

Remarks: _____

Pumping rate measured with: 6"x5" Orifice Water levels measured with: Electric Tape

Pump Well Data

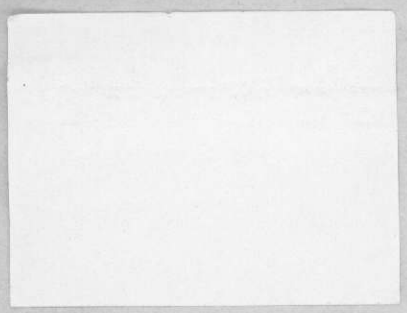
Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
						89' 6"	
7:45 PM	15 MIN		450			89' 7"	
2:00 "	"		"			89' 11"	
2:30 "	30 MIN		"			90' 0"	
9:00 "	"		"			90' 4"	
9:30 "	"		"			90' 7"	
10:00 "	60 MIN		"			91' 0"	
11:00 "	"		"			91' 4"	
12:00 "	"		"			91' 6"	
1:00 "	"		"			91' 7"	
2:00 "	"		"			91' 9"	
3:00 "	"		"			91' 11"	
4:00 "	"		"			92' 2"	
5:00 "	"		"			92' 4"	
6:00 "	"		"			92' 6"	
7:00 "	"		"			92' 7"	
8:00 "	"		"			92' 8"	
9:00 "	"		"			92' 9"	
10:00 "	"		"			92' 10"	
11:00 "	"		"			92' 10"	
12:00 "	"		"			92' 11"	
1:00 AM	"		"			93' 0"	
2:00 "	"		"			93' 2"	
3:00 "	"		"			93' 3"	
4:00 "	"		"			93' 3"	
5:00 "	"		"			93' 4"	
6:00 "	"		"			93' 3"	
7:00 "	"		"			93' 4"	
8:00 "	"		"			93' 4"	
9:00 "	"		"			93' 4"	
10:00 "	"		"			93' 4"	
		Recovery Data					
10:00						31' 5"	
10:05						30' 0"	
10:10						28' 3"	
10:15						27' 10"	
10:20						27' 5"	
10:25						26' 7"	
10:30						26' 2"	
10:35						25' 10"	
10:40						25' 4"	
10:45						25' 0"	
10:50						24' 9"	
10:55						24' 6"	
11:00							

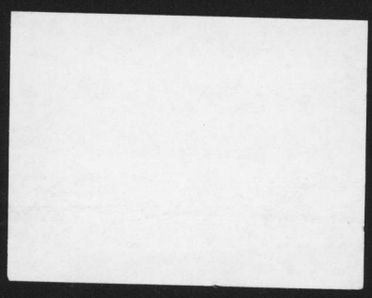
EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-75-C-0622
REPLACE WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

H.P. WELL #653

653
5.5

H.P. WELL #653





TUBE CLEANING SYSTEMS • VALVE

• MARSH/MARSHALLTOWN

6554

HD-10 PH 3 208/220

TYPE HU RPM 1740

BASE FAIRBANKS MORSE

4 HP 3 5 1 1 1/4"

SERVICING INDUSTRIES SINCE 1954

TUBE CLEANING SYSTEMS • V

EYE • MARSHALLTOWN GAUGES

1648 WELL / U.S. MOTOR

FRAME: 256TPM
MODEL: AC43B
PHASE: 3
H.P: 20
RPM: 1770

HEAD - 21 1/2"
MOTOR - 24 3/4"
CONCRETE BASE - 12"

SERVICING INDUSTRIES SINCE 1954

MANUFACTURER'S REPRESENTATIVES AND DISTRIBUTORS
MATT MARSHALL & COMPANY
INDUSTRIAL EQUIPMENT & SUPPLIES
BOILER & BURNER—SALES & SERVICE
GREENSBORO, N.C.
336-292-8477 FAX 336-299-0249
TOLL FREE: 1-800-632-1274
VISA, MASTERCARD, AMERICAN EXPRESS ACCEPTED

WELL 6054

5 10 Col ~~Columns~~ 5'

2 5' Col

AS OF THIS

63 1/4

60 "

72 " 5'

GEAR DRIVE

PUMP TWO SAND

GOWL

FARBAN

COLUMN

LENGTH BOWL SHAFT

55 "

59 "

BOWL SHAFT

60 "

66

CONNECTED BEARING SHAFT PUMP

$\frac{1}{2}$

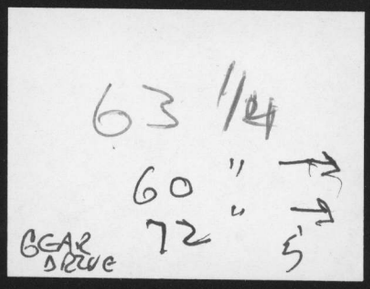
.33

3.14 · .33 · 33 · 50

51

GALS

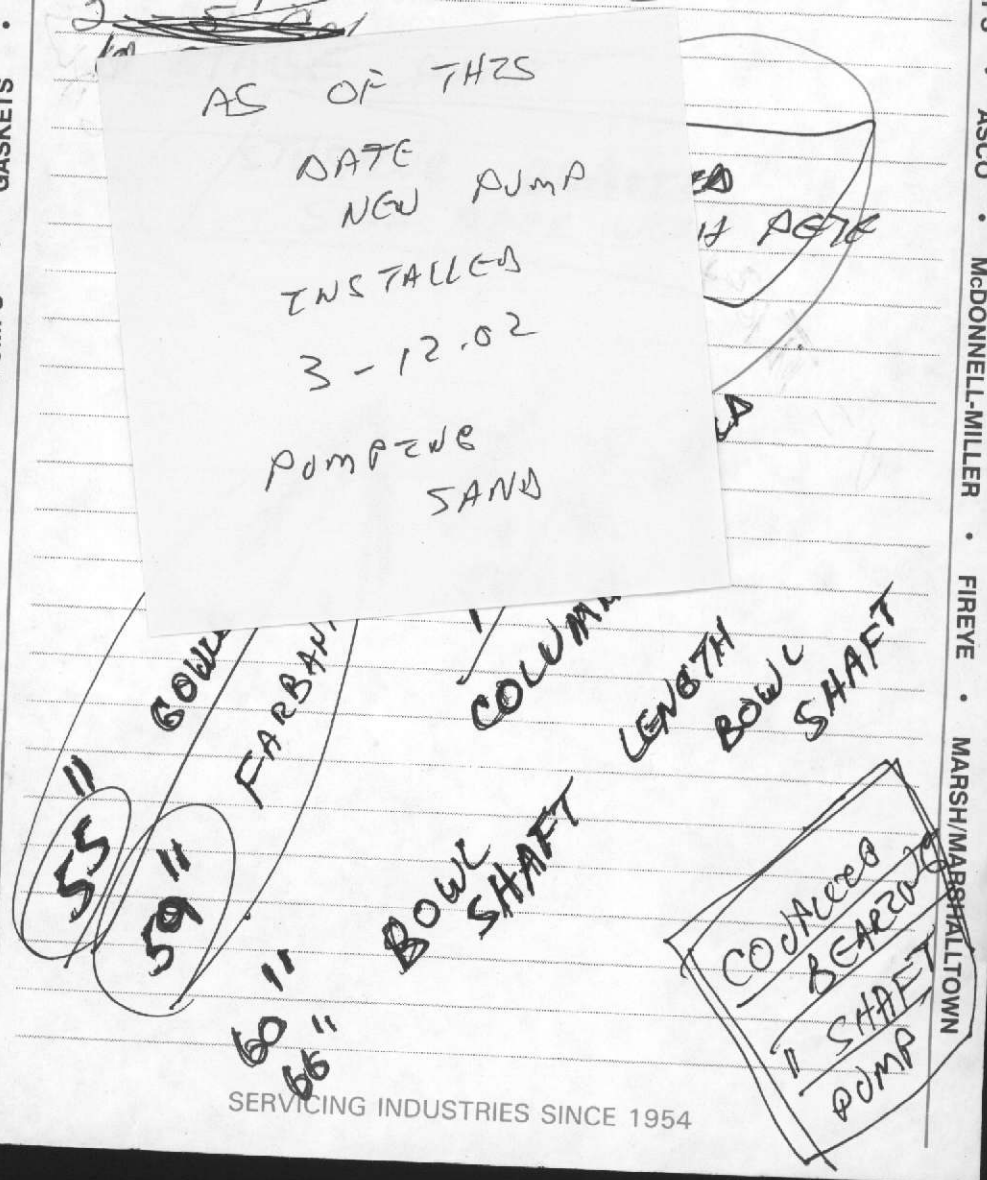
$V = \pi r^2 h$


63 1/4
60 "
72 "
GEAR DRIVE

MANUFACTURER'S REPRESENTATIVES AND DISTRIBUTORS
MATT MARSHALL & COMPANY
INDUSTRIAL EQUIPMENT & SUPPLIES
BOILER & BURNER—SALES & SERVICE
GREENSBORO, N.C.
336-292-8477 FAX 336-299-0249
TOLL FREE: 1-800-632-1274
VISA, MASTERCARD, AMERICAN EXPRESS ACCEPTED

WELL 654

AS OF THIS DATE NEW PUMP INSTALLED 3-12.02 PUMPING SAND



$\frac{1}{2}$

$\frac{1}{2}$

$3.14 \cdot .33 \cdot .33 \cdot 150$

51

GALS

$V = \pi r^2 h$

AS OF THIS

DATE

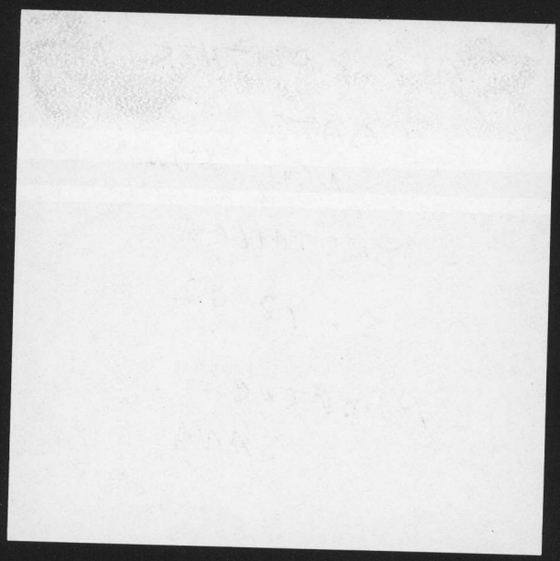
NEW PUMP

INSTALLED

3-12-02

POMPTON

SAND



MANUFACTURER'S REPRESENTATIVES AND DISTRIBUTORS
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BOILER & BURNER—SALES & SERVICE
GREENSBORO, N.C.
336-292-8477 FAX 336-299-0249
TOLL FREE: 1-800-632-1274
VISA, MASTERCARD, AMERICAN EXPRESS ACCEPTED

WELL 654

5 11

6 STAGE PUMP

STUFFING REBUILD
SEND BACK WITH PUMP

FAIRBANKS
12 11 8 11 BOWLS
COLUMN
LENGTH
BOWL
SHAFT

11 BOWLS
FAIRBANK
55 11
59 11
60 11
66 11
BOWL
SHAFT

COUPLED
BEARING
11 SHAFT
PUMP

$\frac{1}{2}$

.33

3.14 .33 33 + 50

5'

GALS

$V = \pi r^2 h$

TENCARVA
MACHINERY COMPANY

Telephone:
(919) 799-8800
Fax: (919) 799-8801

Mailing Address:
P.O. Box 3407
Wilmington, N.C. 28406-0407

Shipping Address:
108 N. Kerr Ave., Suite A1
Wilmington, N.C. 28405-3406

January 18, 1989

Mr. Stan Miller
Water & Wastewater Treatment
Bldg. 670
Marine Corps Base
Camp LeJeune, N. C. 28542

Subject: Order M67001-89M-2005
Well Pump at Bldg. 654

Dear Stan:

We are pleased to furnish information on the bowl assembly being furnished on the subject order. We will be furnishing:

1 Goulds Model 8R-JLO/6 stage Deep Well Turbine Pump, standard bronze fitted bowl assembly to accept your 5" x 1" column and shafting.

We attach information further describing this well pump, along with performance curves and dimensions to show that it should adapt to your existing column pipe.

We thank you for the opportunity to furnish this pump and remain

Very truly yours,

R. W. Tayloe

RWT/md
Attachment

HP
10 HP
5" COLUMN
1" SHAFT COUPLING
5 - 10' COLUMN
2 - 5' COLUMN
STUFFING BOX REQUIRED

V101

DATE 7-25-00

PWSID 04-67-041

WELL # HP 654

WELL NAME HAD NOT POINT HP20

BLDG. HP 654

CODE G.

AVAILABILITY P.

LOCATION SAW MILL ROAD

LATITUDE 34.70809

LONGITUDE 77.32916

WELL DIAMETER 8"

WELL DEPTH 183

SCREEN INTERVAL ---

YIELD 100

STATIC LEVEL 32'

PUMPING LEVEL 55'

PUMP TYPE VERTICAL TURBINE

MOTOR HP 10

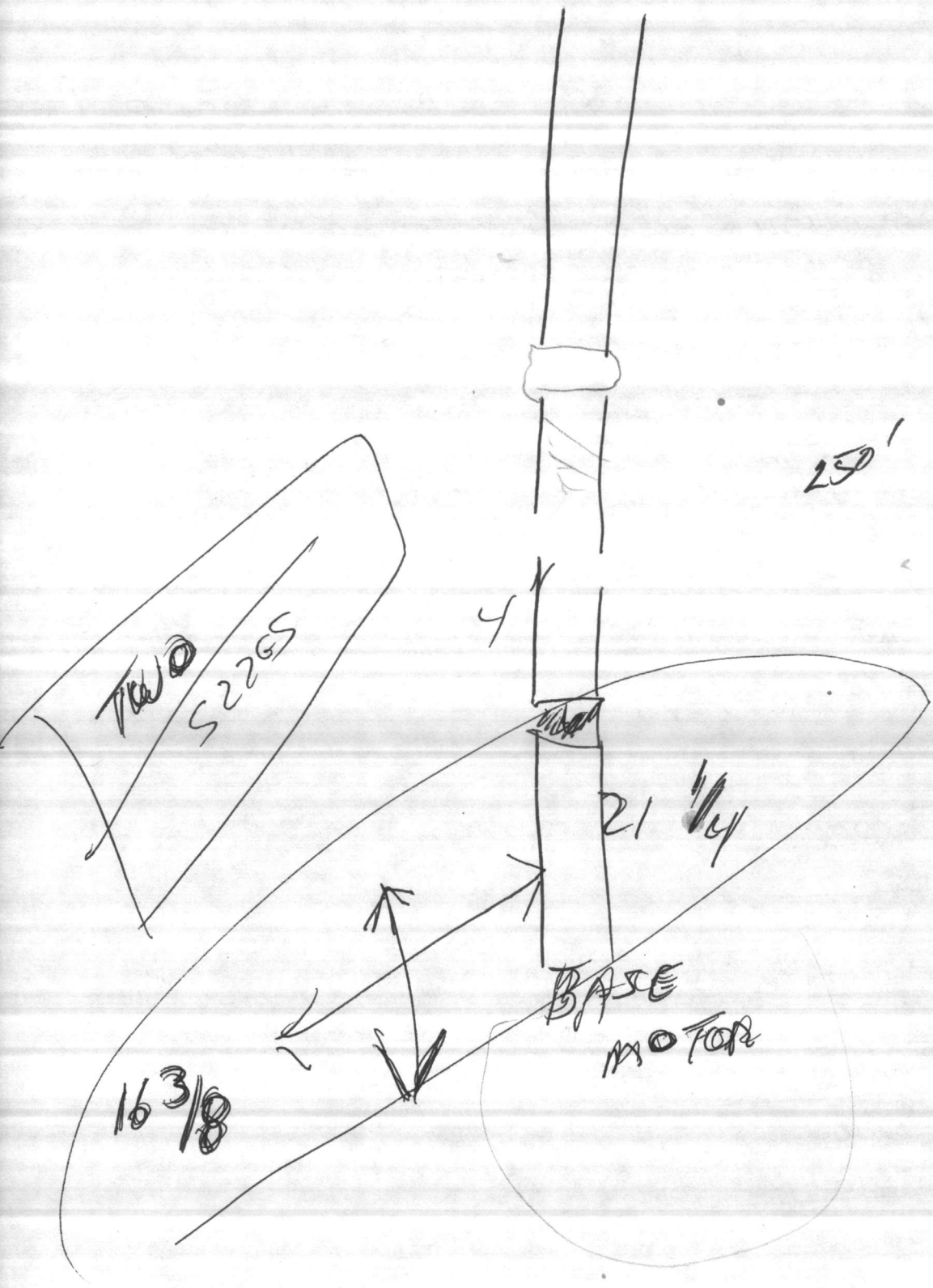
INTAKE DEPTH 70

DESIGN CAPACITY 200

ACTUAL GPM 200

SIZE OF CONCRETE SLAB ---

HEIGHT OF CASING 7"


25'
4'
TWO
SIDES
21 1/4
BASE
MOTOR
16 3/8

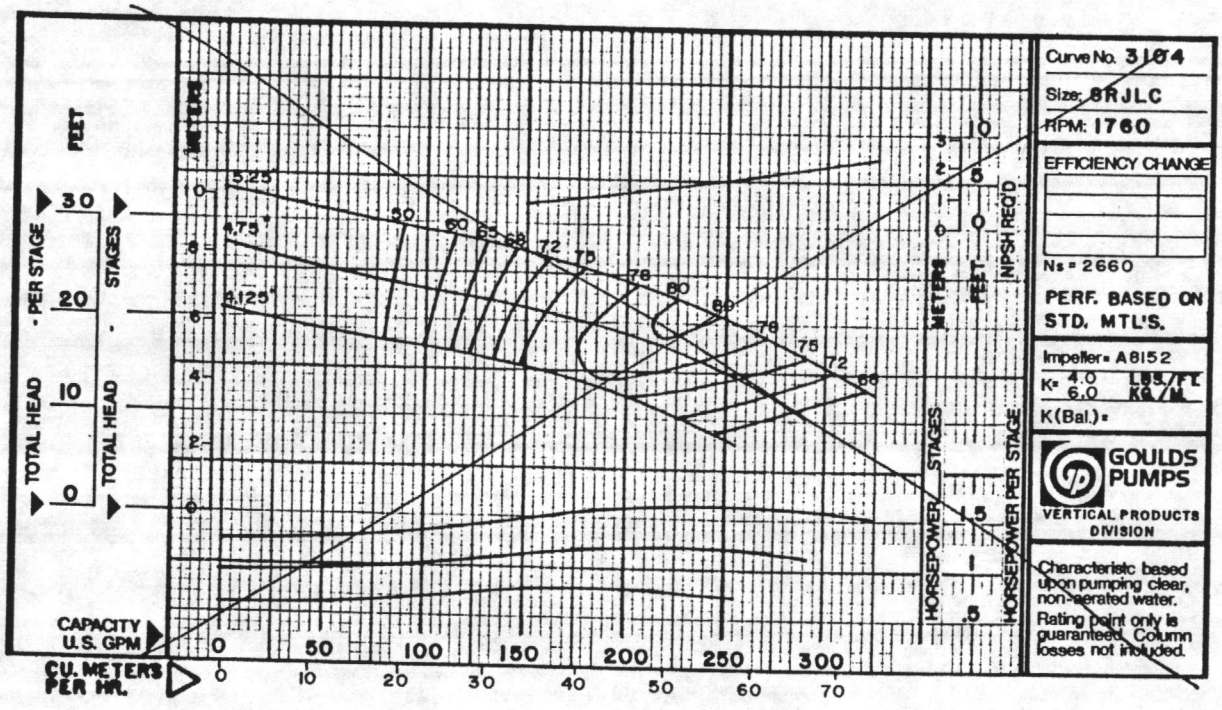
May 1, 1988
(NEW)

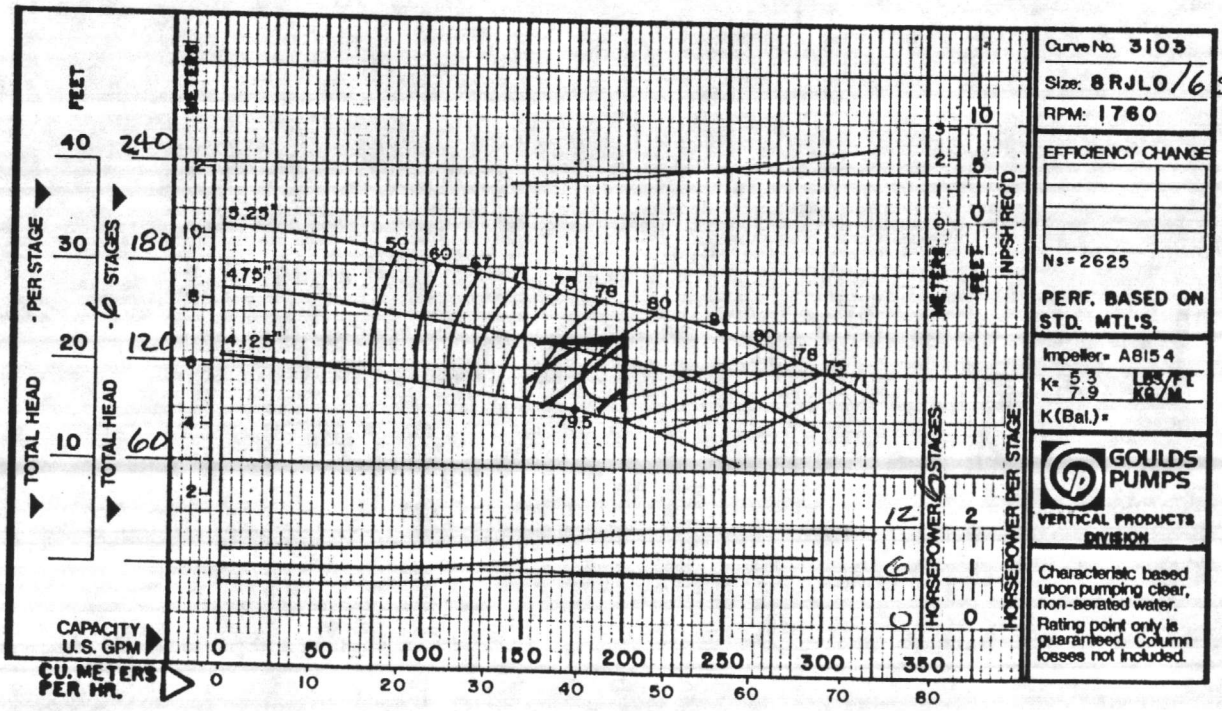
Customer MCB - CAMP LEJEUNE, N.C Project REPLACEMENT BOWL

Goulds Proposal No. _____ Inquiry No. _____

Item No. BLDG. 654 Customer P.O. No. M67001-89M-2005 P.O. Date 1-11-89

Service WATER Capacity 200GPM TDH 137' Efficiency 80% RPM 1760 Curve No. 3103





TENCARVA MACHINERY CO.
P. O. BOX 3407
WILMINGTON, NC 28406-0407
PHONE (919) 799-8800

ENVIRONMENTAL
PRODUCTS, INC
P. O. BOX 2385 • HICKORY, N. C. 28601 • 704/322-7003

SUBMITTAL DATA

PROJECT: N62470-76-B-6799, Replace Water Wells
LOCATION: Marine Corp Base, Camp Lejeune, North Carolina
ENGINEER: Naval Facilities Engineering Command, Norfolk, Virginia
CONTRACTOR: East Coast Construction, Jacksonville, North Carolina
SUBJECT: Well ~~677~~/654
CONDITIONS: 200 GPM @ 136.5'TDH, 1800 RPM
DESCRIPTION:

One (1) Crane Deming 6-stage, size L-8, Fig. 4700, vertical turbine bowl assembly for water lubrication, with bronze impellers designed for the above conditions, fitted for 5" column and 1" shafting, with 4" threaded suction, and including the following:

A. One (1) H16DL 16½" x 6" type "C" surface discharge head, fitted for 5" c and 1" water lubricated shafting, for a 6" above ground discharge.
B. One (1) foundation plate (baseplate) for the above discharge head.
C. Two (2) 5' sections of 5" AWWA standard .258 wall, schedule 40, water w column pipe, threaded and coupled with couplings, zinc coated. One to installed at the top of the bowl assembly, one to connect to bottom of discharge head.
D. Five (5) 10' sections, same as above, for use as "intermediate column"
E. One (1) 5' section of 1" diameter, C-1045, water lubricated shafting (bottom drive), with coupling, stainless steel shaft sleeve, bronze retainer and rubber bearing (for 5" column).
F. Five (5) 10' sections of 1" diameter, C-1045, water lubricated shaft assemblies, with couplings, stainless steel shaft sleeves, bronze retainers and rubber bearings (intermediate shaft).
G. One (1) 1" diameter, C-1045 topshaft, with sleeve, suitable for 5' top column, head, gear and motor used.
H. One (1) 10' section of 4" zinc coated pipe (suction pipe).
I. One (1) 4" galvanized cornucopia type strainer.
J. One (1) Johnson model CH-20, combination, right angle, hollow shaft gear, with non-reverse ratchet, one to one ratio, figure one rotation.
K. One (1) General Electric type K, 10 HP, 1800 RPM, 3 phase, 60 cycle, 200 volt, vertical hollow shaft motor, NEMA design "B" rated for high thrust, with 1.15 service factor, class "B" insulated, 40° C. ambient, in a L213TP10 frame in a NEMA weather protected type one enclosure.
L. One (1) Ford model 172-DF-6002-GR, four cylinder, 172 CID diesel power unit, with four blade fan, governor, air cleaner assembly, fuel tank, wiring harness, instrument panel, ignition switch, starter button, amp. light, oil pressure gauge, top mounted exhaust system hood, 12 volt electric starter, starter relay, battery charging alternator, radiator, SAE standard flywheel housing, power take-off assembly, foot mounted, with battery, rack and battery cables.
M. One (1) La Marche A18J-12V-A1, 1/60/120 automatic battery charger.
N. One (1) section of Parrish #31 drive shafting either 8 3/4" long or 24" long, (your choice), with gear shaft and engine shaft connecting flanges and shaft guard.

83-190
12-5-01

Charles R. Underwood, Inc.
Municipal Pump Sales & Service

2189 Everett Dowdy Road
Sanford, North Carolina 27330

Phone (919) 775-2463
Fax (919) 708-7232

November 20, 2001 Quote # 01301

Commanding General
Att: Base Maintenance Division
Bin 1-83 Marine Corps Base
Camp LeJeune, NC 28542-0004

Att: Danny Hill

Ref: Well # 654

Dear Mr. Hill

We are pleased to offer the following proposal for the parts for the above project. This would be as follows.

- 1 ea. Goulds Model 8RJLO Bowl Assembly designed for the conditions of this well.
- 1 ea. 1" X 60" Stainless Steel Bottom Shaft
- 5 ea. 1" X 120" Stainless Steel Intermediate Shaft
- 1 ea. 1" X 72" Stainless Steel Top Shaft (to fit existing discharge head)
- 6 ea. 5" X 1" Bearing Retainers with Bearings
- 1 ea. Rebuilt Packing Box

Your cost $3,819.00

Price includes freight. Price does not include any taxes, anchor bolts, gauges or other accessories not listed above. Trust this meets with your approval. If you have any questions please give us a call.

Best regards,

N. F. "Pete" Lowe
General Manager

PRIME VENDOR ONLY

DO NOT SUBST.

Charles Underwood, Inc.
N.F. "Pete" Lowe
Camp LeJeune, Well # 654

Goulds Turbine Pump Selection ver: 6.042
11/20/01

PUMP DATA SHEET
Goulds Turbine 60 Hz

Selection file: (untitled)
Catalog: TURB60.MPC v 1.6.4

Curve: 3103

Design Point: Flow: 200 US gpm
Head: 137 ft

Pump: **TURBINE - 1800**
Speed: 1760 rpm

Size: 8RJLO (6 stages)
Dia: 4.9375 in

Limits: Temperature: --- °F
Pressure: 425 psi_g

Sphere size: 0.43 in
Power: --- bhp

Specific Speed: Ns: 2625 Nss: ---

Vertical Turbine: Bowl Size: 7.5 in Max Lateral: 0.63 in
Thrust K Factor: 5.3

Motor: 15 hp Speed: 1800 Frame: 254
NEMA Standard WPI Enclosure
sized for Max Power on Design Curve

Fluid: Water
Temperature: 60 °F
SG: 1
Viscosity: 1.122 cP
Vapor pressure: 0.2568 psi_a
Atm pressure: 14.7 psi_a

NPSHa: --- ft

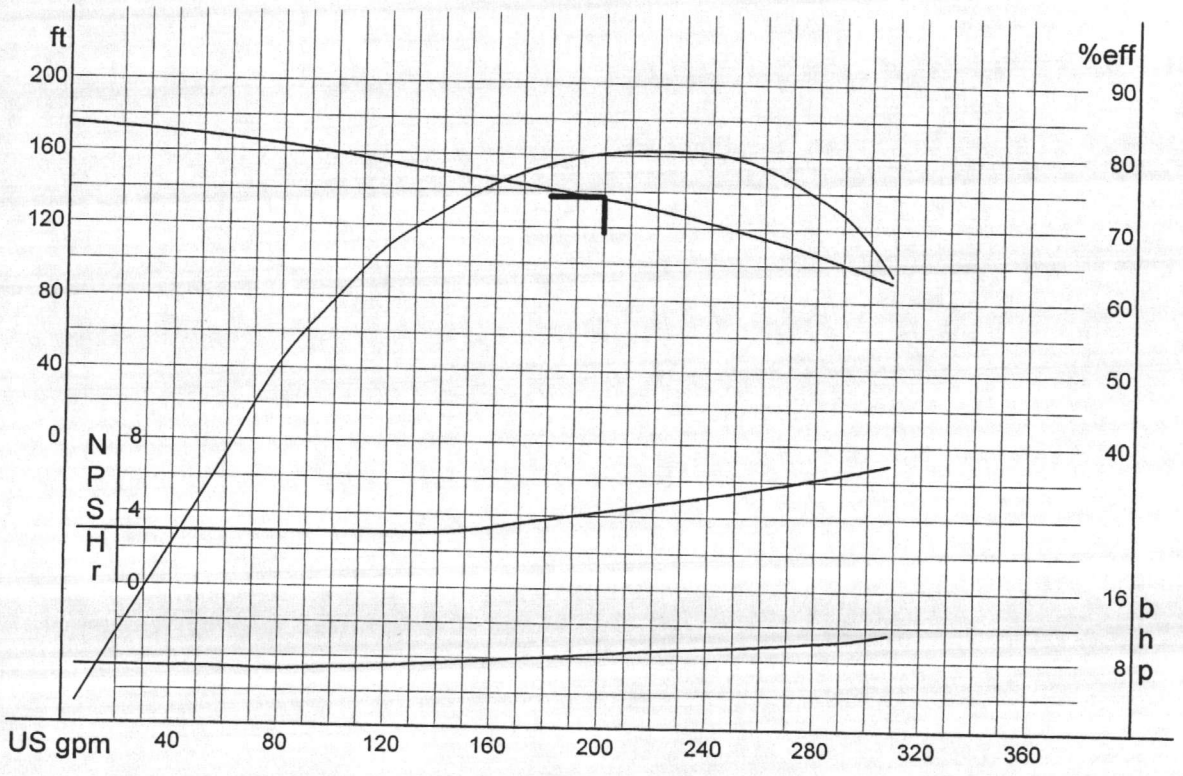
Piping:
System: ---
Suction: --- in
Discharge: --- in

Suction Size-5" Discharge Sizes-5",6"

---- Data Point ----
Flow: 200 US gpm
Head: 136 ft
Eff: 80.1%
Power: 8.55 bhp
NPSHr: 4.22 ft

-- Design Curve --
Shutoff Head: 175 ft
Shutoff dP: 75.7 psi
Min Flow: - US gpm
BEP: 80.6% eff
@ 225 US gpm
NOL Pwr: 11.1 bhp
@ 308 US gpm

-- Max Curve --
Max Pwr: 13.1 bhp
@ 324 US gpm



--- PERFORMANCE EVALUATION ---

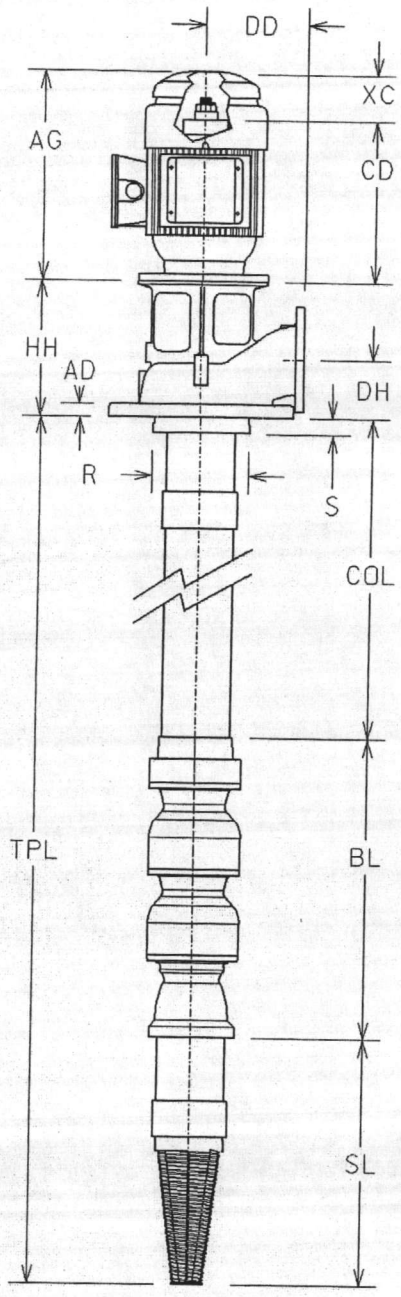
Flow US gpm	Speed rpm	Head ft	Pump %eff	Power bhp	NPSHr ft	Motor %eff	Motor kW	Hrs/yr	Cost /kWh
200	1760	136	80.1	8.55	4.22	90.5	7.04	1500	0.08
160	1760	146	75.9	7.75	3.35	90.5	6.39	3000	0.08
120	1760	155	67.2	6.98	3	89.7	5.81	1000	0.06

Total Annual Power Consumption: 35,532 kWh
Annual Operating Cost: $2,726

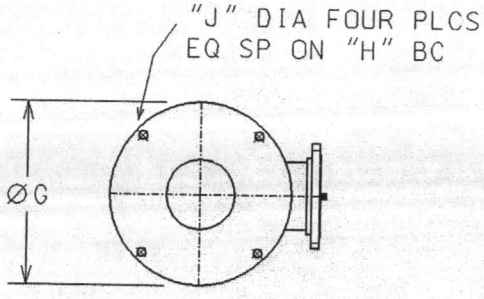
Prepared for Danny Hill

Goulds Turbine Hydraulic Analysis of **DWT-CATM** Pump

Date: 11-20-2001
Version: 2.01P
6 Stage 6x8RJLO



AD:	
AG:	21.25
BD:	10.00
BL:	47.63
CAN:	N/A
CD:	17.56
CL:	N/A
COL:	720.00
DD:	0.00
DH:	0.00
G:	0.00
H:	0.00
HH:	0.00
J:	0.00
R:	
S:	
SL:	133.00
TPL:	900.63
UG:	N/A
V:	
W:	
X:	
XC:	3.34
Y:	
Z:	



DISC HEAD

Pump Data

Size:	8RJLO
Stages:	6
Impellers:	Bronze
Bowl:	Cast Iron
Bearing:	Rubber
Basket:	No
LineShaft Type:	Open
Column:	Steel
Column:	5" Threaded
Bearing Spacing:	10 feet
Section Length:	10 feet
Head:	A:Cast
Flange (Disch.):	6" 125#
Inlet:	
Coupling:	416SS
Seal:	Packing
LineShaft:	416SS 1"
SubBase:	None

Hydraulic Data

Flow (gpm):	200
Pump Head (ft):	105.0
TDH (ft):	136.0
Speed (rpm):	1760
Fluid:	Water
Temperature (F):	60
Viscosity:	1.122
Spec.Grav:	1

Miscellaneous

Thrust At Design:	906
Thrust At Shutoff:	1113
Min Water Level(in):	360

Weight

Pump:	1465
Motor:	172
Total:	1637

Motor Data

Model Number:	B401
Make:	USEM
HP:	10
RPM:	1800
Type:	AUE
Efficiency:	91.0
Frame:	215TP
Ratchet:	NRR

Goulds Turbine Hydraulic Analysis of **DWT-CATM** Pump

Date: 11-20-2001 Version: 2.01P
6 Stage 6x8RJLO

Overall Pump Parameters

Size and Model:	8RJLO	Pump Operating Speed, RPM:	1760
Capacity, GPM:	200	Total Dynamic Head, Ft.:	136.0
Total Pump Length, In.:	900.6	Impeller Trim, In.:	4.9
Pump Type:	OpenSump	Head Type:	A:Cast
Pump K-Factor:	5.3	Number of Stages:	6
		Pumping Level, In.:	360.0

LineShaft-Related Data

Shaft Diameter, In.:	1	Shaft Limit, HP:	70
Shaft Material:	416SS	Matl Correction Fact:	1.18
LineShaft Length, In.:	720.00	Shaft Elongation, w/o Adder:	0.02
		LineShaft Type:	Open

Bowl Data

Total Bowl Length, In.:	47.63	Bowl Diameter, In.:	7.5
		Bowl Shaft Limit, HP:	124

Column Data

Column Diameter, In.:	5	Column Load, Lb.:	75.4
Wall Thickness, In:	Standard	Column Elongation, In.:	0.00

HorsePower Data

Shaft Friction Loss, Hp.:	0.32	Thrust Load Loss, Hp.:	0.12
Bowl HP At Design, Hp.:	8.55	Motor HorsePower, Hp.:	10

Head Data

Column Loss, Ft.:	0.95	Discharge Head Loss, Ft.:	0.06
		Total Loss, Ft.:	1.01

Other Data

Hydraulic Thrust, Lb.:	720.8	Thrust at Design, Lb.:	906.0
Thrust at Shutoff, Lb.:	1112.6	Design NPSH, Ft.:	4.2
Max Lateral, In.:	0.63	Min. Lateral Required, In.:	0.02
		Actual Head above Grade, Ft.:	104.99

Efficiency Data (Efficiencies estimated not guaranteed)

Bowl Efficiency:	80.10	Pump Efficiency:	76.20
Motor Efficiency:	91.00	Overall Efficiency:	69.34
		KWH/1000 gallons:	0.62

Component Weights

Bowl Weight, Lbs.:	265	Column Weight,Lbs.:	1200
Head Weight, Lbs.:	0	Can Weight,Lbs.:	0
Motor Weight, Lbs.:	172	Total Pump Weight,Lbs.:	1637

DATE 7-25-00

PWSID 04-67-041

WELL # HP 654

WELL NAME HAD NOT POINT HP20

BLDG. HP 654

CODE 5.

AVAILABILITY P.

LOCATION SAW MILL ROAD

LATITUDE 34.70809

LONGITUDE 77.32916

WELL DIAMETER 8"

WELL DEPTH ~~183~~ 250'

SCREEN INTERVAL ---

YIELD 100

STATIC LEVEL 32'

PUMPING LEVEL 55'

PUMP TYPE VERTICAL TURBINE

MOTOR HP 10

INTAKE DEPTH 70

DESIGN CAPACITY 200

ACTUAL GPM 200

SIZE OF CONCRETE SLAB ---

HEIGHT OF CASING 2"

North [redacted]lina Department of Environment, Health, and [redacted]
Division of Environmental Health, Public Water Supply Sec[redacted]

SOURCE INFORMATION
GROUND WATER

Date Form Completed (M M D D Y Y): 01 25 95

PWSID: 0467041

Owner Assigned Source Code: 654

Well Name (If purchase, name of system): HADNOT POINT 654

Code: G (G=Ground, W=Purchase/G, Y=G w/direct influence, Z=W w/direct influence)

If Purchase, seller ID#:

Source Begin Date (M M Y Y):

Source exempt—SWTR? ☐ Y ☐ N

Direct Influence Date (M M D D Y Y):

Availability: P (P=Permanent, E=Emergency, S=Seasonal, I=Interim, O=Other)

~~Abandoned~~

Location of well within the system (If purchase, location of master meter): SAW MILL ROAD

Latitude (N) (Deg. Min. Sec.): 34 42 28.86

Longitude (W) (Deg. Min. Sec.): 077 19 47.4

How Determined: G (G=GPS, M=Map, S=Surveyed)

GPS Data: Q3 (Q# or DOP #)

No. of Sats. Locked on: 4

(If purchase, use seller's primary source lat/long)

Vulnerable (VOCs) ☐ Y ☐ N

Assessment Date (M M D D Y Y):

ENTRY POINT INFORMATION

Use Code: C (C=Ground/Permanent, D=Ground/non-permanent)

Availability: P (P=Year-round, S=Seasonal, E=Emergency, I=Interim, O=Other)

Owner Assigned Entry Point Code: 100

Entry Point Name: ~~HP654~~ MCB HADNOT PT WTP

Location:

Well Site: Owned or controlled? Y (Y,N) Control Area (100' radius)? N (Y,N) If no, explain:

Sources of pollution/distance: 75' to dirt Road

Surface water within 200'? N ☐ Y ☐ N If yes, actual distance ☐☐☐ feet If yes, bact. samples collected? ___ (Y,N)

Adequate slope? Y (Y,N) Flooding? N (Y,N) Maintenance:

Well House: Free of stored materials? Y (Y,N) Properly drained? Y (Y,N) Locked? Y (Y,N)

Condition of house: OK Type of freeze protection: None

Well: Diameter: 8" Type: SCREENED Yield (gpm): 200 Properly sealed? Y (Y,N

Properly vented? N (Y,N) Casing depth 50 ft. (If unknown, put 'UNK') Well depth: 183' Meter available? Y (Y,N

Concrete slab adequate? ___ (Y,N) If no, explain: Size:

Size of blow-off: 4"(V) Sample tap: Before treatment? N (Y,N) After treatment? ___ (Y,N

Pumps: Capacity: GPM: ~~200~~ 70 HP: 10 Pump intake depth: 70 Auxiliary Power? Y (Y,N

Type pump: VERTICAL TURBINE Height above floor (pump/casing): 2" /

Storage at well site: Elev: Hydro: Ground:

If hydroautomatic, air volume control? ___ (Y,N) Safety valves? ___ (Y,N) Coded? ___ (Y,N)

High service pumps: 1. ___ gpm ___ hp 2. ___ gpm ___ hp 3. ___ gpm ___ hp Auxiliary Power? ___ (Y,N

Is the water treated at this well? N ☐ Y ☐ N If yes, complete back of form.

If other wells are treated here, which ones? If treated elsewhere, where? HP20 PLANT

If purchase, retreat? ☐ Y ☐ N If yes, complete back of form.

① Repair sample tap
② No casing vent

NOT CONTAMINATED

DEHNR 3803 (Revised 12/93)

WELL NUMBER 654 BY Stevenson & Peterson DATE 2-21-97

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
60	32	55	23	35	100	15

REMARKS

D/H 63

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

28

WELL NUMBER 654 BY Stinson + Peterson DATE 3-16-95

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
60	32	52	20	43	100	10
	Left set	56	24	35	119	

REMARKS D/H 62 PSI

15 PSI - 178 GPM

wide open - 214 GPM - 20 min Did not Brake

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER 654 BY THOMAS / STEVENSON DATE 11-16-93

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
70	32					

REMARKS Dead Head 63 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER 654		BY Thomas / Brown			DATE Sept. 4-92	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
70'	30	45	15	15	104	05
		55	25	10	115	10

REMARKS

Dead head @ 64 PSi

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

WELL NUMBER 654 | BY Thomas Brown | DATE 4-5-90

AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
70	30	35	5	42	110	45
		43	13	35	122	55
		50	20	30	137	10
		52	22	25	149	20
		55	25	20	162	30
~~—~~	15	60	30	15	175	40

REMARKS

Dead head @ 65 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

NUMBER 654 BY THOMAS/SARDINAS DATE 2-9-89

LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
70	32	40	8	48	104	30
		42	10	44	115	40
		45	13	40	128	50
		48	16	35	143	00
		50	18	30	159	03
		53	21	25	170	07
		55	23	20	187	12
		56	24	15	203	18

RKS

Pulled well pump, cleaned well bore & water jetted added 10 LB HTH, cleaned pump & installed SS @ 70' with 3/8 Tubing air line & 70'

Dead head @ 62 PSI

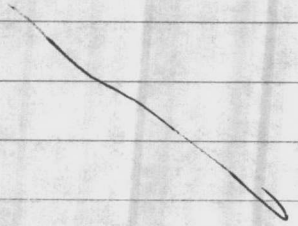
best set @ 203 GPM 15 PSI

FACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

HP 654
10-18-95

AL	SL	PL	DD	PSI	GPM	TIME
70'	26	35	9	57	104	15
		38	12	54	111	15
		43	17	50	130	15
		45	19	45	164	15
		52	26	40	195	15
		55	29	35	214	15
best set →		58	31	30	230	15
		61	35	25	246	15
		65	39	20	267	15

Pump set at 70' with 70' air line
best set on 30 PSI 230 GPM



WELL NUMBER 654		BY THOMAS / CAYNOR			DATE 9-13-83	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1350
103	28	42	14	31	100	1400
		43	15	28	104	1413
		44	16	24	108	1423
		45	17	20	119	1433
		46	18	15	122	1445

REMARKS left at 15 PSI 122 GPM

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

654

DATE	LENGTH OF AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAW DOWN	DISCHARGE PRESSURE	CAP. PER FOOT OF DRAW DOWN	Time
					Start Time		0925
8-3-82	103	38	50	12	42	100	0945
			52	14	39	104	1000
			52	14	36	104	1015
			54	16	33	111	1030
			54	16	30	115	1045
			54	16	27	119	1100
			55	17	24	125	1115
			56	18	20	128	1130

REMARKS: used direct reading gage

set 20 PSI 18'D/D 56'S/L 38'static 128 GPM

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-78-C-8795
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

HP654

ELECTRIC LOG BY

JOHNSON·KECK™ DR·61 ELECTRICAL LOGGING SYSTEM

Well # 617 Owner Camp Lejeune, N.C

Location OLD LOGGING RD 2500'± WEST OF PINEY GREEN RD Date 2-9-78

Borehole depth 250' ft. dia. 8 in. Casing depth 34 ft. dia. 8 in.

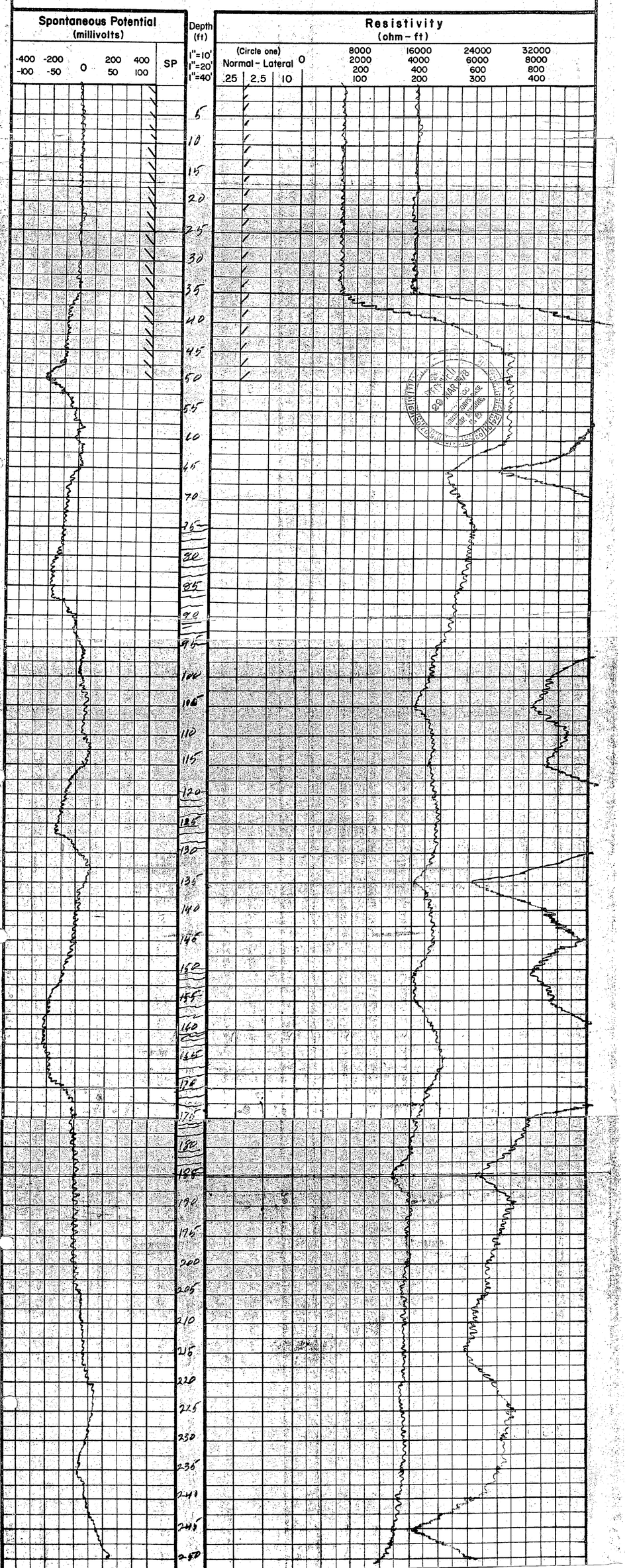
Mud resistivity _____ temperature _____ F

viscosity _____ sec weight _____ lb/gal type _____

Measuring point _____ ft. above/below ground level

Fluid level in hole 11 ft. Other logs _____

Driller C W Brinkley E-log operator C W Brinkley



WATER AND WASTEWATER EQUIPMENT, SALES AND SERVICE

ENVIRONMENTAL PRODUCTS, INC

P. O. BOX 2385 • HICKORY, N. C. 28601 • 704/322-7003

SUBMITTAL DATA

PROJECT: N62470-76-B-6799, Replace Water Wells
LOCATION: Marine Corp Base, Camp Lejeune, North Carolina
ENGINEER: Naval Facilities Engineering Command, Norfolk, Virginia
CONTRACTOR: East Coast Construction, Jacksonville, North Carolina
SUBJECT: Well 617/654
CONDITIONS: 200 GPM @ 136.5'TDH, 1800 RPM
DESCRIPTION:

One (1) Crane Deming 6-stage, size L-8, Fig. 4700, vertical turbine bowl assembly for water lubrication, with bronze impellers designed for the above conditions, fitted for 5" column and 1" shafting, with 4" threaded suction, and including the following:

A. One (1) H16DL 16½" x 6" type "C" surface discharge head, fitted for 5" column and 1" water lubricated shafting, for a 6" above ground discharge.
B. One (1) foundation plate (baseplate) for the above discharge head.
C. Two (2) 5' sections of 5" AWWA standard .258 wall, schedule 40, water well column pipe, threaded and coupled with couplings, zinc coated. One to be installed at the top of the bowl assembly, one to connect to bottom of discharge head.
D. Five (5) 10' sections, same as above, for use as "intermediate column".
E. One (1) 5' section of 1" diameter, C-1045, water lubricated shafting (bottom drive), with coupling, stainless steel shaft sleeve, bronze retainer and rubber bearing (for 5" column).
F. Five (5) 10' sections of 1" diameter, C-1045, water lubricated shaft assemblies, with couplings, stainless steel shaft sleeves, bronze retainers and rubber bearings (intermediate shaft).
G. One (1) 1" diameter, C-1045 topshaft, with sleeve, suitable for 5' top column, head, gear and motor used.
H. One (1) 10' section of 4" zinc coated pipe (suction pipe).
I. One (1) 4" galvanized cornucopia type strainer.
J. One (1) Johnson model CH-20, combination, right angle, hollow shaft gear, with non-reverse ratchet, one to one ratio, figure one rotation.
K. One (1) General Electric type K, 10 HP, 1800 RPM, 3 phase, 60 cycle, 200 volt, vertical hollow shaft motor, NEMA design "B" rated for high thrust, with 1.15 service factor, class "B" insulated, 40° C. ambient, in a L213TP10 frame in a NEMA weather protected type one enclosure.
L. One (1) Ford model 172-DF-6002-GR, four cylinder, 172 CID diesel power unit, with four blade fan, governor, air cleaner assembly, fuel tank, wiring harness, instrument panel, ignition switch, starter button, amp. light, oil pressure gauge, top mounted exhaust system hood, 12 volt electric starter, starter relay, battery charging alternator, radiator, SAE standard flywheel housing, power take-off assembly, foot mounted, with battery, rack and battery cables.
M. One (1) La Marche A18J-12V-A1, 1/60/120 automatic battery charger.
N. One (1) section of Parrish #31 drive shafting either 8 3/4" long or 24" long, (your choice), with gear shaft and engine shaft connecting flanges and shaft guard.

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

APPROVED ✓
APPROVED AS NOTED
DISAPPROVED

SUBJECT TO THE REQUIREMENTS OF
CONTRACT NO. 05-76-6799
APPROVAL OF THIS SUBMITTAL DOES NOT INCLUDE APPROVAL OF ANY DEVIATION FROM THE CONTRACT REQUIREMENTS UNLESS THE CONTRACTOR CALLS ATTENTION TO AND SUPPORTS THE DEVIATION --- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING PROPER PHYSICAL DIMENSIONS & FITTINGS, COORDINATION OF TRADES, ETC., AS REQUIRED.

REVIEWER C.C.S. DATE 27 JUN 1978

FOR OFFICER IN CHARGE OF CONSTRUCTION

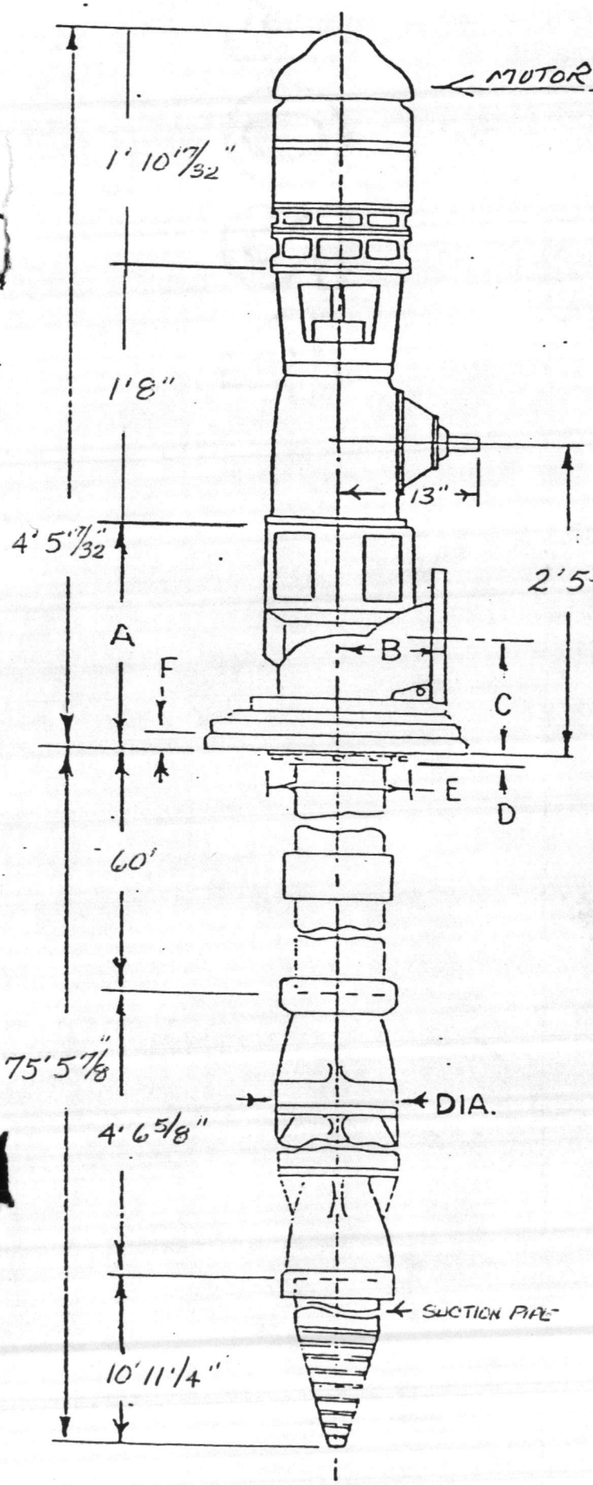
SUBJECT: Well 617

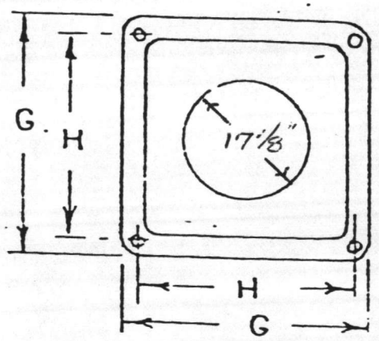
Page Two

Note 1. TDH is based on 41'6" pumping level 40 PSI @ ground level, and column and shaft friction loss of 2.30'.
(41.50 + 92.40 + 2.30 = 136.2) used 136.5

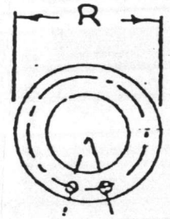
Note 2. Please confirm overall setting.

JUNE 8, 1978





4-K-DIA HOLES



L-125 LB ANSI FLG
M-N-HOLES ON
P-BOLT CIRCLE
HOLES STRADDLE
VERTICAL ℄

BASEPLATE TOP VIEW

HEAD	A	B	C	D	E	F	G	H	K	L	M	N	P	R
H16DL	23	11 3/8	10	1/4	14 3/4	1 7/16	24	19 3/4	7/8	6	8	7/8	9 1/2	11

N62470-76-B-6799

CERTIFICATION FOR				
CUSTOMER EAST COAST CONSTRUCTION				PO# 440
JOB NAME & LOCATION WELL 617 - MCAS CAMP LEJEUNE, N.C.				
CONSULTING ENGINEERS NAVAL FACILITIES, NAVAL STATION, NORFOLK, VA.				
PUMP CONDITIONS	200 GPM	136.5' TDH	1800 RPM	75'5 7/8" SETTING
PUMP CRANE DEMING 6 STAGE, L-8, FIGURE 4700, Vert. Turbine				
MOTOR GE type K, 10HP, 1800 RPM, VHS, 3ϕ, 60hz, 200 volt, WP-1				
GEAR JOHNSON CH-20, COMBINATION, 1:1 RATIO, FIG. 1 RT				
COLUMN & SHAFT 5" ZINC COATED T&C, 1" DIAM. (WATER LUBE)				
SUCTION PIPE 10' of 4" ZINC COATED				
STRAINER 4" GALVANIZED CORNUCOPIA				
CERTIFIED BY RJD		DATE 6/13/78		SCALE — NONE

ENVIRONMENTAL PRODUCTS, INCORPORATED
HICKORY, NORTH CAROLINA

CURVE PAGE 78
SIZE L8 P.C.3188
SUPERSEDES P.C.2572

TS CATALOG - SECTION C - 1750 RPM
VERTICAL TURBINE PUMP CURVES
PERFORMANCE PER STAGE

CRANE-DEMING PUMPS
CRANE CO.
SALEM, OHIO, U.S.A.

SIZE L-8 — SINGLE STAGE PERFORMANCE — **1770 R.P.M.**

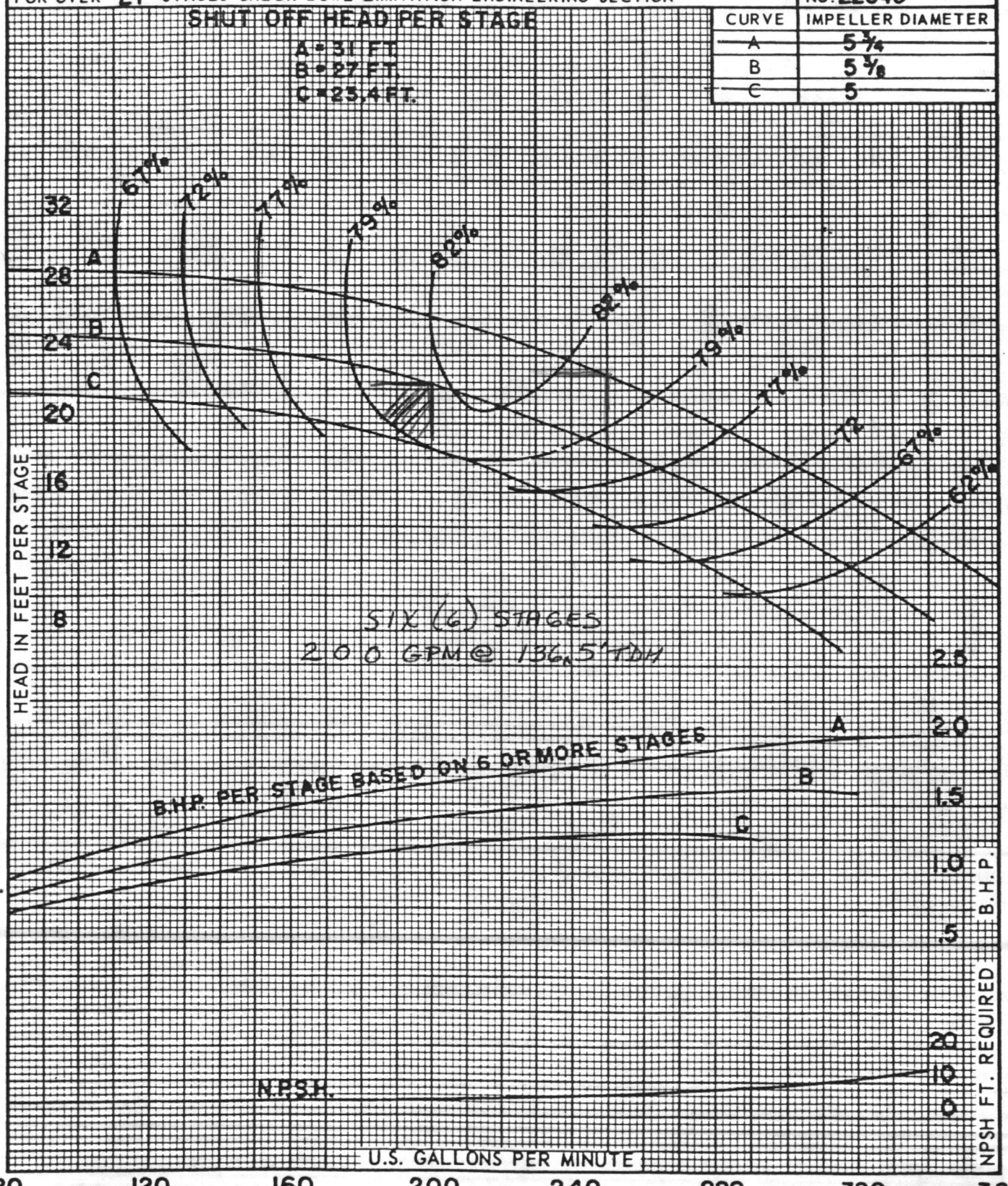
EFFICIENCY CHANGE:		DIMENSIONS	FIG. 4700	FIG. 4750
6 STAGE DEDUCT	0 POINTS	BOWL DIAMETER	7 1/2	7 1/2
~~4-6 STAGE DEDUCT~~	~~1 POINTS~~	IMPELLER SHAFT DIA.		
2-3 STAGE DEDUCT	3 POINTS	LENGTH FIRST STAGE	17 1/8	22 1/8
1 STAGE DEDUCT	6 POINTS	ADDITIONAL STAGE	7 1/2	7 1/2
ENAMELED BOWLS		THRUST FACTOR -	6.3	6.3

SUCTION - I.D. PIPE SIZE 4 " SIZE COLUMN ADAPTER 5 ~~4-6~~ " SEMI-ENC. IMPELLER

FOR OVER 21 STAGES CHECK BOWL LIMITATION ENGINEERING SECTION — NO. 22640

CURVE	IMPELLER DIAMETER
A	5 3/4
B	5 3/8
C	5

SHUT OFF HEAD PER STAGE
A = 31 FT.
B = 27 FT.
C = 23.4 FT.



200 GPM @ 136.5' TDH / 3960 x .80 (eff) = 8.62 BHP

WELL 617 - CAMP LEJEUNE, N.C.
N62470-76-B-6799

MEMO OF
DATA TRANSMITTAL

GENERAL ELECTRIC

Refer to G E Req'n No.
In Correspondence

SMALL AC MOTOR & GENERATOR DEPARTMENT
NASHVILLE MOTOR PLANT
250 E. MAIN • HENDERSONVILLE, TENNESSEE 37075

CUSTOMER Drillers Service Inc.
P.O. Box 1407
Hickory, N.C. 28601

CUSTOMER ORDER NUMBER		G. E. REQUISITION NUMBER	
4602-EPI		340-23284	
FORWARDED: DATE 11/16/77	VIA First Class Mail	COMPLETE X	BALANCE TO FOLLOW

PRINTS ARE:

[X] FOR APPROVAL [ ] APPROVED FOR CONSTRUCTION [ ] FOR REFERENCE [ ] .....

193B2601AA - Outline

Item 1 - New Model
to be rated: K-L215TP10, 10 hp, 1800 RPM, 200 V, 3 ph, 60 hz, S.F. 1.15, CONT, B ins, 40oC amb, DRIPPROOF, VERTICAL HOLLOW SHAFT, HIGH THRUST

GENERAL ELECTRIC

193B2601AA

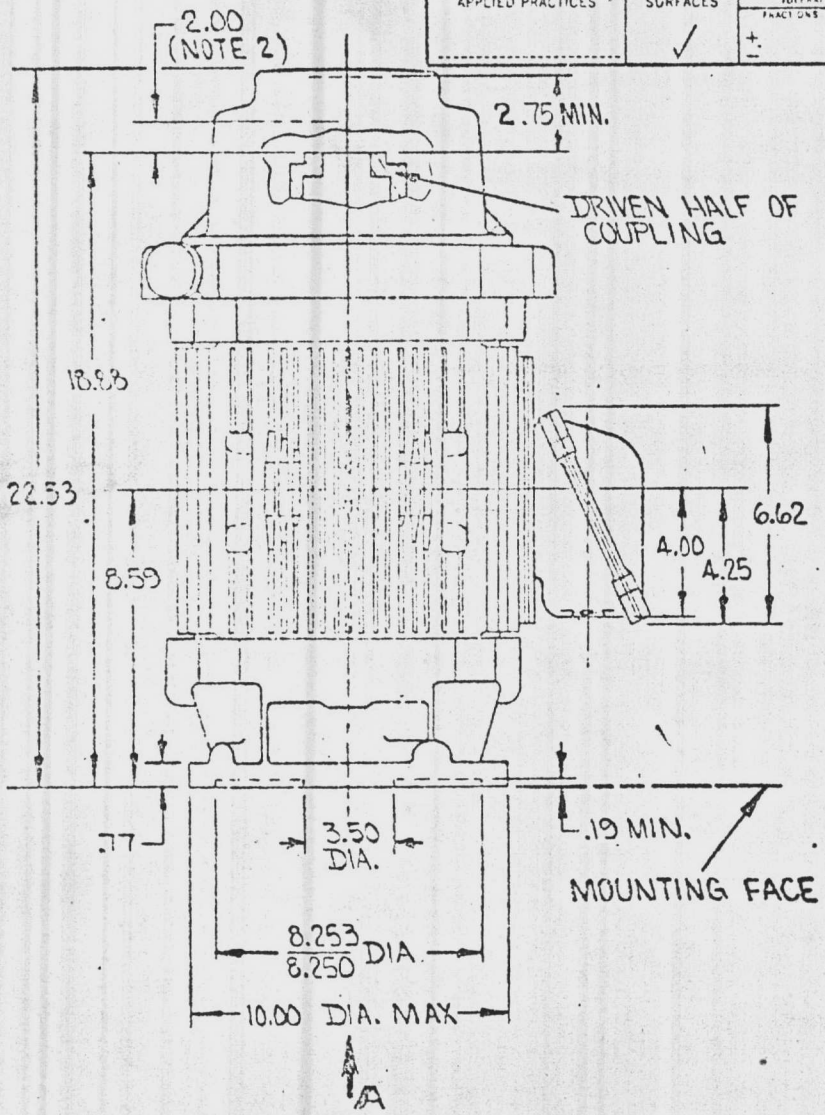
UNLESS OTHERWISE SPECIFIED USE THE FOLLOWING —

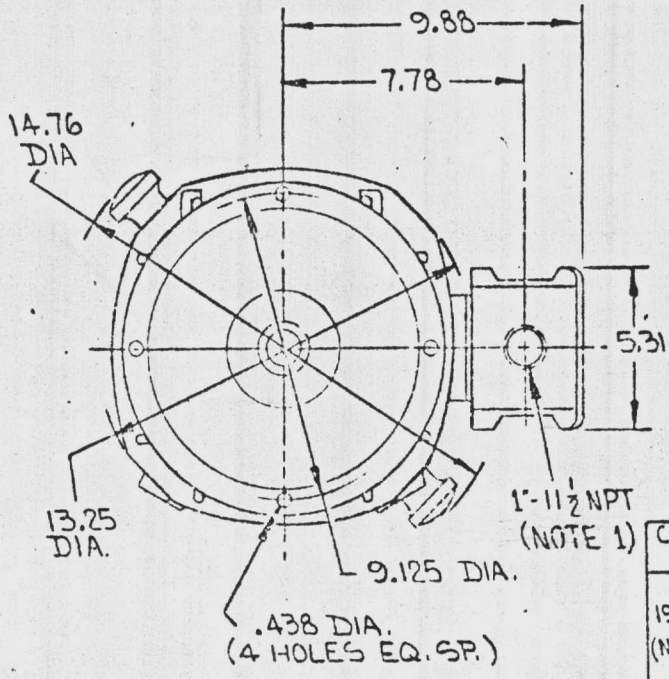
APPLIED PRACTICES	SURFACES	TOLERANCES ON MACHINED DIMENSIONS: FRACTIONS	DECIMALS	ANGLES
	✓	±	±	±

REV NO 193B2601AA

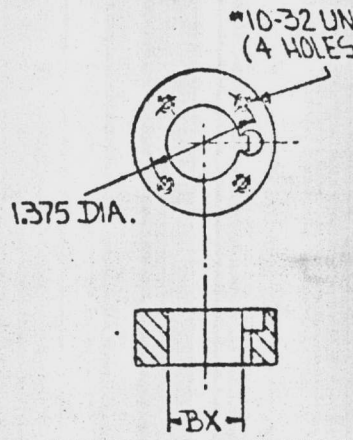
TITLE OUTLINE — HOLLOW SHAFT

FIRST MADE FOR 210 FR · VERT. · OPEN - 'P' BASE





VIEW AT ARROW "A"



DRIVEN HALF OF COUPLING

COUPLING KIT	GR	BORE DIA BX	KEYWAY W	KEYWAY D
192B9950AA (NON-REVERSE)	1	1.002 / 1.001	.250	.125
	2	.939 / .936		
	3	.677 / .676		
	4	.752 / .751	.188	.094
192B9950AC SELF-RELEASE & BOLTED	1	1.002 / 1.001	.250	.125
	2	.939 / .936		
	3	.677 / .676		
	4	.752 / .751	.188	.094

REVISIONS			PRINTS TO
1	S. FIELD	REVISED PER 12-13-76 ECN-76-413	
2	M. SHELTON	2-7-77 MM77101-E	

NOTE 1- CONDUIT BOX MAY BE ASSEMBLED WITH ENTRANCE UP, DOWN, OR TO EITHER SIDE.

NOTE 2- THE TOTAL HEIGHT OF PUMP SHAFT & LOCKING NUT ABOVE TOP OF COUPLING, MUST NOT EXCEED THIS DIMENSION.

DRAFT R. SFIELD Sept. 11, 1976	APPROVALS	S.A.C.M & G	193B2601AA
ISSUED Sept. 13, 1976	A.W.	NASHVILLE	

TENCARVA
MACHINERY COMPANY

Telephone:
(919) 799-8800
Fax: (919) 799-8801

Mailing Address:
P.O. Box 3407
Wilmington, N.C. 28406-0407

Shipping Address:
108 N. Kerr Ave., Suite A1
Wilmington, N.C. 28405-3406

January 18, 1989

Mr. Stan Miller
Water & Wastewater Treatment
Bldg. 670
Marine Corps Base
Camp LeJeune, N. C. 28542

Subject: Order M67001-89M-2005
Well Pump at Bldg. 654

Dear Stan:

We are pleased to furnish information on the bowl assembly being furnished on the subject order. We will be furnishing:

1 Goulds Model 8R-JLO/6 stage Deep Well Turbine Pump, standard bronze fitted bowl assembly to accept your 5" x 1" column and shafting.

We attach information further describing this well pump, along with performance curves and dimensions to show that it should adapt to your existing column pipe.

We thank you for the opportunity to furnish this pump and remain

Very truly yours,

R. W. Tayloe

R. W. Tayloe

RWT/md
Attachment

T. W. Taylor

Goulds Model DWT (VIT-CT)

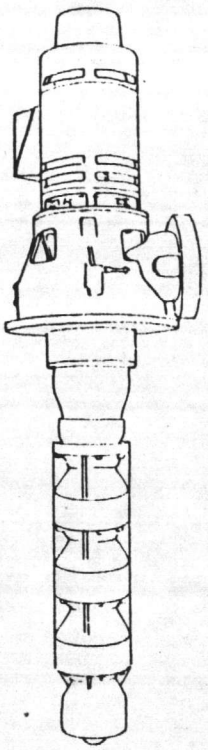
3A.2B1

December 1, 1981

BLDG. 654
8RJLO/6 STAGE

Bowl Assembly

DESCRIPTION	MATERIAL (A)	STANDARD
BOWLS—INTERMEDIATE	CAST IRON (B)	ASTM A48 CL. 30B
IMPELLERS	BRONZE (D)	ASTM B145-4A
LOCK COLLET (Impeller) (B)	MILD STEEL	AISI C1018/EQ
SHAFT	STAINLESS STEEL	AISI 416
COUPLING (Shaft)	MILD STEEL	AISI C1018/EQ
BEARINGS (Intermediate Bowl)	BRONZE OR RUBBER	ASTM B-144-3B
SUCTION BOWL	CAST IRON	ASTM A48 CL. 30B
BEARING (Suction Bowl)	BRONZE (C)	ASTM B-144-3B
DISCHARGE BOWL	CAST IRON	ASTM A48 CL. 30B
BEARING (Discharge Bowl)	BRONZE (C)	ASTM B-144-3B
BEARING (Tube Adapter)	BRONZE (C)	ASTM B-144-3B
CAP SCREWS	MILD STEEL	AISI C1018/EQ
BOLTING	MILD STEEL	AISI C1018/EQ
SAND COLLAR	BRONZE	ASTM B-62
COLUMN	MILD STEEL	ASTM 120



OIL OR WATER LUBRICATED

Column Assembly

OIL LUBRICATED

SAE 1045 shaft and couplings, bronze tube connector bearing, steel enclosing tube and threaded steel outer column and couplings. Rubber tube centering spider supplied at 40 ft. intervals.

WATER LUBRICATED

Over 20' TPL, SAE 1045 shaft with permanent hard chrome overlay at bearing journals. SAE 1045 shaft coupling, bronze bearing retainer, rubber bearing and threaded steel column, ALTERNATE 416SS shafting throughout.

Discharge Head Assembly

OIL LUBRICATED

Cast Iron Discharge Head Casting ASTM A48-CL308*
Steel Column Nipple – 12" Long
Malleable Iron Lock Ring Nut
Cast Iron Tube Tension Plate
Cast Iron Tube Nut W/Bronze Brg.
416 Stainless Headshaft
Steel Adjusting Nut & Gib Key
Steel Tube Tension Nipple
Manual Lubricator Assembly (Electric Solenoid Furnished if Electric Motor Purchased)

WATER LUBRICATED

Cast Iron Discharge Head Casting ASTM A48-CL30B*
Steel Column Nipple – 12" Long
Malleable Iron Lock Ring Nut
Cast Iron Packing Box
Bronze Packing Gland W/Studs & Nuts
416 Stainless Steel Head Shaft
Steel Adjusting Nut & Gib Key
No Prelube Tank and Fittings

* 14x24½ is Fabricated Steel Plate—ASTM 283 GR.D Pipe—ASTM 120

ENGINEERING LIMITATIONS

1. Semi-open impellers are limited to 200 ft. setting since shaft stretch variation due to changing pumping conditions (varying water table and/or discharge pressure) will affect the critical impeller running clearance.
2. Semi-open impellers are limited to a maximum of 10 stages. If these impellers require keyed construction, only a maximum of 3 stages are allowed.
3. Semi-open impellers must not be used when more than one flow condition is to be met, or on pumps that operate in parallel, causing variable flow rates.
4. All applications over 500 ft. setting must be referred to the factory.
5. Prelubrication is recommended for water lubricated rubber bearings when distance between grade and static liquid level is more than 50 ft.
6. Non-reverse ratchets (NRR) are recommended on drivers for all applications where the setting is over 100 ft. For settings of 400 ft. or more the driver manufacturer must be consulted for availability of NRR.
7. For other than 50 and 60 cycle speeds refer to the factory to check on critical speeds. Otherwise bearing spacings indicated in notes 8 and 9 apply.
8. On all water lubricated pumps 5 ft. bearing spacing is required for operation over 2200 RPM. Speeds less than 2200 RPM requires 10 ft. bearing spacing.
9. All pumps with enclosed lineshaft construction are supplied with 5 ft. bearing spacings for all speeds.

NOTE:

(A) Alternate materials available. Contact nearest sales office or factory.
(B) 18B and 18H have keyed impellers, bowls are lined with Heresite or equal.
(C) Suction bowl and discharge bowl bearings not available in rubber.
(D) 18B and 18H have iron impellers. See VIT bowl price page for bronze impellers.

TENCARVA MACHINERY CO.
P. O. BOX 3407
WILMINGTON, NC 28406-0407
PHONE (919) 799-8800

P. O. BOX 3407
WILMINGTON, NC 28406-0407
PHONE (919) 793-8800

60 Hertz Turbine Curves
1800 RPM

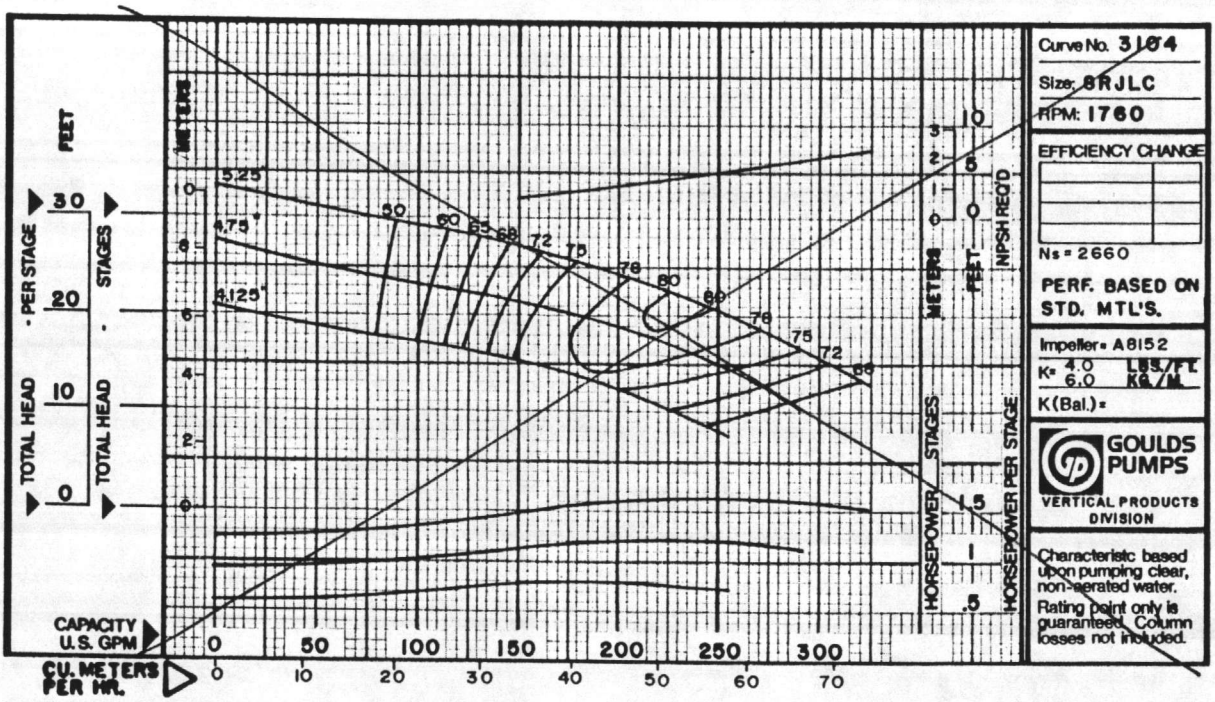
71.10
May 1, 1988
(NEW)

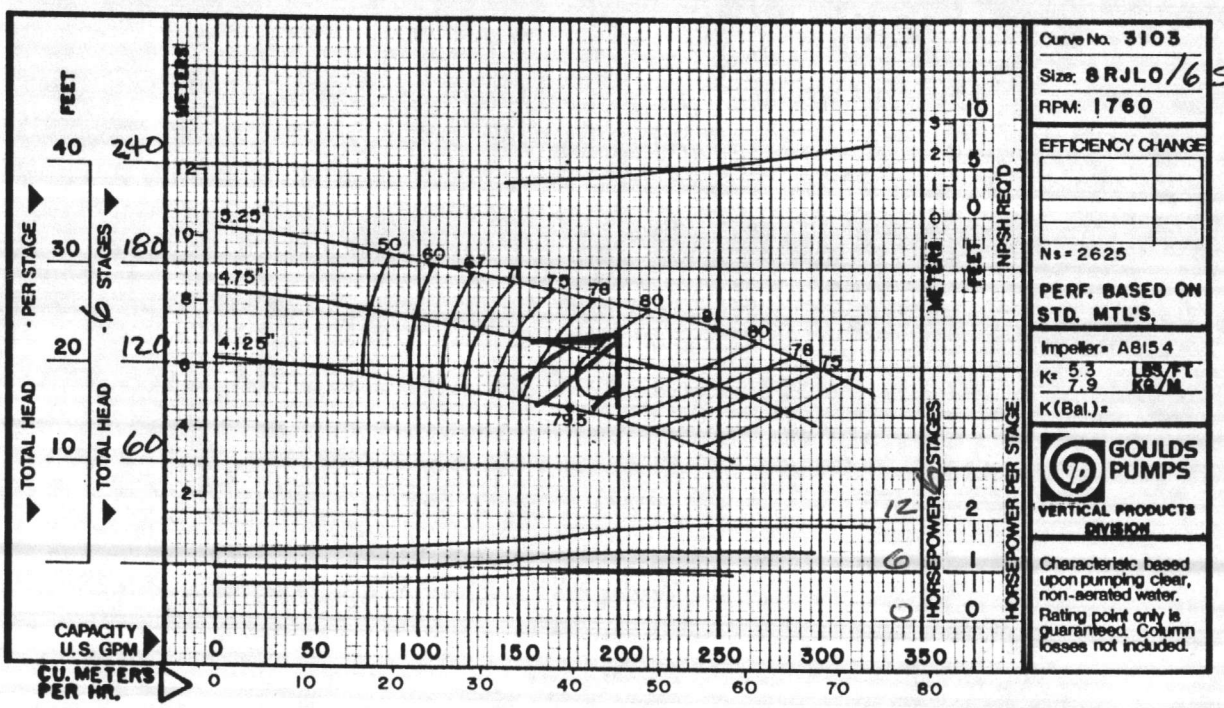
Customer MCB - CAMP LEJEUNE, N.C Project REPLACEMENT BOWL

Goulds Proposal No. _____ Inquiry No. _____

Item No. BLDG. 654 Customer P.O. No. M67001-89M-2005 P.O. Date 1-11-89

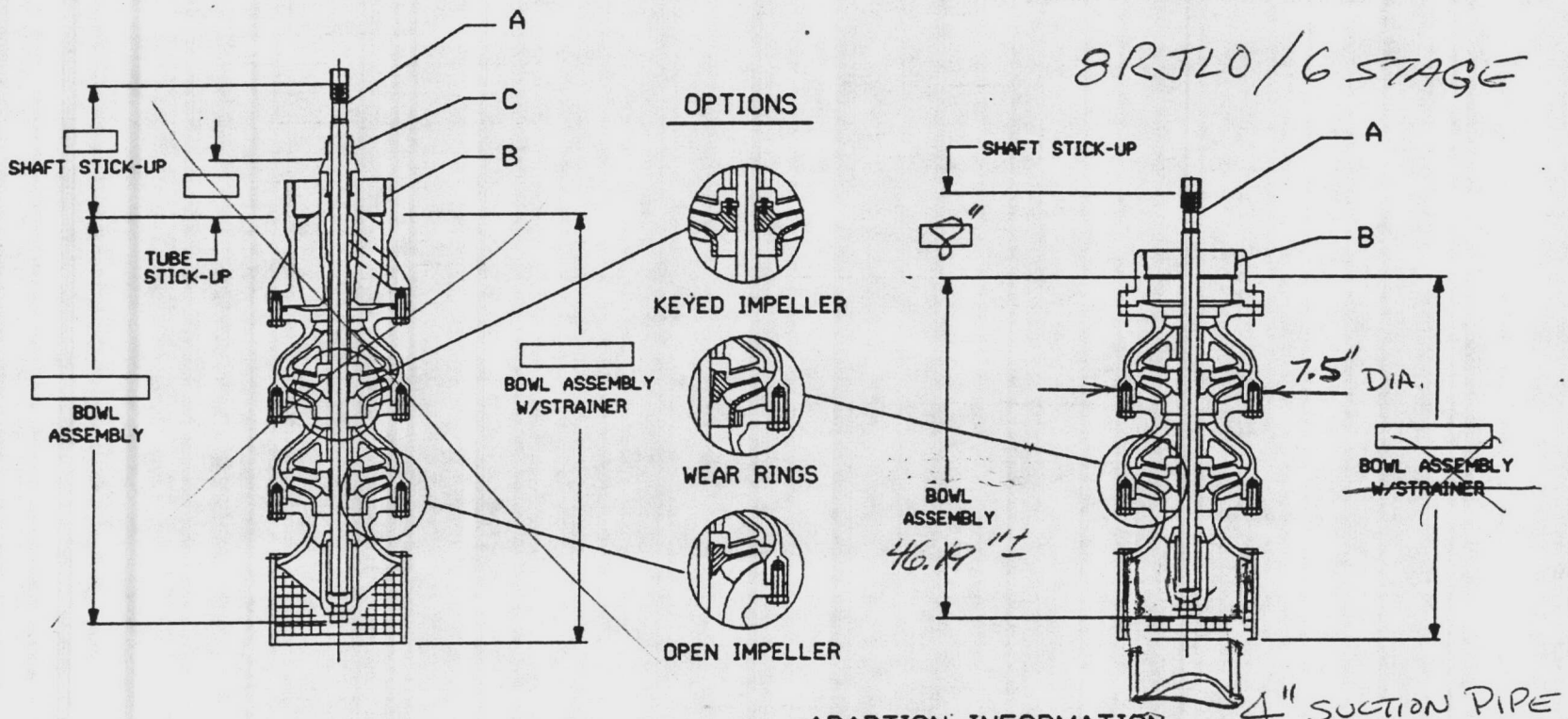
Service WATER Capacity 200GPM TDH 137' Efficiency 80% RPM 1760 Curve No. 3103





TENCARVA MACHINERY CO.
P. O. BOX 3407
WILMINGTON, NC 28406-0407
PHONE (919) 799-8800

8RJLO/6 STAGE



ADAPTION INFORMATION

A - SHAFT: DIAMETER 1" 12TPI
☐ LEFT HAND THREAD

B - COLUMN PIPE SIZE: 5" 8TPI STRAIGHT,

C - TUBE: DIAMETER ____
☐ LEFT HAND THREAD ☐ RIGHT HAND THREAD

ORIGINAL PUMP MFG. CRANE-DEMING FIG 4700 L-8

FILL IN APPROPRIATE DIMENSIONS IN BOXES ABOVE.

GOULDS PUMPS, INC.	
CUSTOMER	MCB CAMP LEJEUNE, N.C.
P.O. NO.	M67001-89M-2005
ITEM NO.	BLDG. 654
SERVICE	WELL WATER
GPM	200
TDH	137'
RPM	1800
PUMP SIZE	8RJLO
STGS.	6
GOULDS S.O. NO.	

1-17-89. R.W.T

TENCARVA MACHINERY CO.
P. O. BOX 3407
WILMINGTON, NC 28406-0407
PHONE (919) 799-8800

GOULDS PUMPS, INC.
VERTICAL PRODUCTS DIVISION

PRINTED IN U.S.A.

CONTRACTOR'S SUBMITTAL TRANSMITTAL

FIELD'S BOOTH

5ND LANTDIV 2355/3 (Rev. 6/76)

CONTRACT NO.	TRANSMITTAL NO.	DATE
N62470-76-C-6799	16	6/13/78

FROM CONTRACTOR
East Coast Construction Company, Inc.

TO
Commander NAVFAC

PROJECT TITLE AND LOCATION
EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

CONTRACTOR USE ONLY

List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☐ Contractor Approved ☒ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
1	15221	Pump data, Well No 617	7	A	CCS 405 6/27/78

CONTRACTOR'S COMMENTS

Note: The designed capacity of this pump is 50% of Well yield. Should you desire to change the GPM, please advise by telephone immediately.

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC	CONTRACTOR REPRESENTATIVE *(Signature)*
One (1)	

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

(1) Approved — A credit proposal should be submitted to ROICC Camley for Reduced pump & motor size

COPIES TO: ROICC (2) LANTDIV (1) A-E (1)	DATE	SIGNATURE
1	6/28	

EAST COAST CONSTRUCTION COMPANY, INC.

GENERAL CONTRACTORS

P. O. BOX 5004 — JACKSONVILLE, NORTH CAROLINA 28540

353-4479 or 353-6044

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

DRILLERS LOG

WELL #617

0 - 10	Sand
10 - 20	Sand
20 - 30	Sand
30 - 40	Sand
40 - 50	Sand
50 - 60	Sand
60 - 70	Sand
70 - 80	Sand
80 - 90	Sand
90 - 100	Sand
100 - 110	Sand
110 - 120	Sand
120 - 130	Sand
130 - 140	Sand
140 - 150	Sand
150 - 160	Sand
160 - 170	Sand Marrow
170 - 180	Sand
180 - 190	Sand
190 - 200	Sand
200 - 210	Sand
210 - 220	Sand
220 - 230	Sand
230 - 240	Sand
240 - 250	Sand


RECEIVED
29 MAR 1978
CIRCUIT
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

EAST COAST CONSTRUCTION COMPANY, INC.

GENERAL CONTRACTORS

P. O. BOX 5004 — JACKSONVILLE, NORTH CAROLINA 28540

353-4479 or 353-6044

March 17, 1978

Commander, Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 23511

Re: Contract N62470-76-C-6799
Replace Four Water Wells, MCB
Camp Lejeune, N. C.

Gentlemen:

We are enclosing four (4) copies of the following information on well No. 617 located on the old logging road 2500' ± West of Piney Green Road.

Drillers log
Electric log
Water analysis from 3 levels

We estimate this well will produce approximately 175-200 gpm by taking the water from the 75-90 foot level, the 120-130 foot level, and the 150-185 foot level. Please advise us of your decision promptly so we may begin developing the permanet well.

Yours very truly,

EAST COAST CONSTRUCTION COMPANY, INC.

W. H. Myers

WHM/sb

cc: ROICC
Marine Corps Base, CLANT

enclosure: 1 copy of well data

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

APPROVED ✓
APPROVED AS NOTED
DISAPPROVED

SUBJECT TO THE REQUIREMENTS OF
CONTRACT NO. 76-6799

APPROVAL OF A SUBMITTAL DOES NOT INCLUDE APPROVAL OF ANY DEVIATION FROM THE CONTRACT REQUIREMENTS UNLESS THE CONTRACTOR CALLS ATTENTION TO AND SUPPORTS THE DEVIATION --- THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING PROPER PHYSICAL DIMENSIONS, WEIGHTS, COORDINATION OF TRADES, AS REQUIRED.

DATE

IN CHARGE OF CONSTRUCTION


RECEIVED
29 MAR 1978
MARINE CORPS BASE
CAMP LEJEUNE, N. C.

617

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

WATER ANALYSIS LABORATORY
902 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512
(803) 479-4639

CONSULTANTS FOR:
INDUSTRY
MUNICIPALITIES
HOME OWNERS
DEVELOPERS
IRRIGATION
OTHERS

DATE May 29, 1978

Report To: Carolina Well & Pump Co.
Sanford, N. C.

Date Analyzed: 5/29/78
Sample Number: Old Logging Road

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.1	Carbon Dioxide (CO_2)	2
Iron (Fe)	0.25	Total Acidity ($CaCO_3$)	4
Nitrate (NO_3)	0	Calcium Hardness ($CaCO_3$)	104
Fluoride (F)	0.4	Magnesium Hardness ($CaCO_3$)	16
Manganese (Mn)	Trace	Carbonate Hardness ($CaCO_3$)	120
Total Hardness ($CaCO_3$)	120	Noncarbonate Hardness ($CaCO_3$)	0
Chlorides (Cl)	8	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	8.2	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0	Bicarbonate Alkalinity ($CaCO_3$)	140
Magnesium (Mg)	3.8	Total Alkalinity ($CaCO_3$)	140
Calcium (Ca)	41.6	Total Dissolved Solids	154
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°)	220
Bicarbonate (HCO_3)	171	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionable

NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

APPROVED ✓
APPROVED AS NOTED
DISAPPROVED
SUBJECT TO THE REQUIREMENTS OF
CONTRACT 05-76-6799
APPROVAL OF THIS ITEM DOES NOT INCLUDE APPROVAL OF ANY DEVIATIONS FROM THE CONTRACT PLANS AND SPECIFICATIONS. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS & SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION, COORDINATION OF TRADES, ETC., AS IS CUSTOMARY.

26 JUN 1978
REVIEWER CCS DATE

FOR OFFICER IN CHARGE OF CONSTRUCTION

SIGNED Water Analysis Lab
902 Hamlet Highway
Bennettsville, South Carolina 29512
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER, APHA, AWWA AND WPCF, AND METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES, WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

302 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512
(803) 479-4639

DEVELOPERS # 617
IRRIGATION Well
OTHERS Camp Lejeune
DATE: 2/9/78 Brinkley

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

Report To: Carolina Well & Pump Co.
Sanford, N. C.

Date Analyzed: 2/9/78
Sample Number: 60 Feet (?)

Analysis Results--Parts Per Million

Determination		Determination	
pH	6.7	Carbon Dioxide (CO_2)	8
Iron (Fe)	0.4	Total Acidity ($CaCO_3$)	12
Nitrate (NO_3)	Trace	Calcium Hardness ($CaCO_3$)	72
Fluoride (F)	0.6	Magnesium Hardness ($CaCO_3$))	11
Manganese (Mn)	Trace	Carbonate Hardness ($CaCO_3$)	20
Total Hardness ($CaCO_3$)	83	Noncarbonate Hardness ($CaCO_3$)	63
Chlorides (Cl)	6	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	12.8	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0	Bicarbonate Alkalinity ($CaCO_3$)	20
Magnesium (Mg)	2.6	Total Alkalinity ($CaCO_3$)	20
Calcium (Ca)	28.8	Total Dissolved Solids	90
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°c)	140
Bicarbonate (HCO_3)	24	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionabl

Water Analysis Laboratory
302 Hamlet Highway
Bennettsville, South Carolina 29512

SIGNED: _____
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

802 HAMLET HIGHWAY
BENNETTSVILLE, SOUTH CAROLINA
29512
(803) 479-4639

HOME OWNERS
DEVELOPERS
IRRIGATION
OTHERS

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

DATE: 2/9/78

WELL No. 617

Report To: Carolina Well & Pump Co.
Sanford, N. C.

Date Analyzed: 2/9/78

Sample Number: 125 Feet

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.5	Carbon Dioxide (CO_2)	0
Iron (Fe)	0.25	Total Acidity ($CaCO_3$)	3
Nitrate (NO_3)	Trace	Calcium Hardness ($CaCO_3$)	138
Fluoride (F)	0.25	Magnesium Hardness ($CaCO_3$))	9
Manganese (Mn)	Trace	Carbonate Hardness ($CaCO_3$)	140
Total Hardness ($CaCO_3$)	147	Noncarbonate Hardness ($CaCO_3$)	7
Chlorides (Cl)	10	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	7.4	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0	Bicarbonate Alkalinity ($CaCO_3$)	140
Magnesium (Mg)	2.2	Total Alkalinity ($CaCO_3$)	140
Calcium (Ca)	55.2	Total Dissolved Solids	156
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°c)	220
Bicarbonate (HCO_3)	171	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionalbe

Water Analysis Laboratory
802 Hamlet Highway
Bennettsville, South Carolina 29512

SIGNED: _____
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTEWATER,' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES,' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.

(803) 479-4639
BENNETTSVILLE, SOUTH CAROLINA
29512

DEVELOPERS
IRRIGATION
OTHERS

EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

DATE 2/9/78

WELL No. 617

Report To: Carolina Well & Pump Co.
Sanford, N. C.

Date Analyzed: 2/9/78

Sample Number: 170 Feet

Analysis Results--Parts Per Million

Determination		Determination	
pH	7.7	Carbon Dioxide (CO_2)	0
Iron (Fe)	0.6	Total Acidity ($CaCO_3$)	2
Nitrate (NO_3)	Trace	Calcium Hardness ($CaCO_3$)	173
Fluoride (F)	0.35	Magnesium Hardness ($CaCO_3$))	12
Manganese (Mn)	Trace	Carbonate Hardness ($CaCO_3$)	185
Total Hardness ($CaCO_3$)	185	Noncarbonate Hardness ($CaCO_3$)	0
Chlorides (Cl)	10	Alkalinity (Phenolphthalein) ($CaCO_3$)	0
Sulfate (SO_4)	14.6	Carbonate Alkalinity ($CaCO_3$)	0
Phosphate (PO_4)	0	Bicarbonate Alkalinity ($CaCO_3$)	200
Magnesium (Mg)	2.9	Total Alkalinity ($CaCO_3$)	200
Calcium (Ca)	69.2	Total Dissolved Solids	189
Carbonate (CO_3)	0	Specific Conductance (micromhos at 25°c)	290
Bicarbonate (HCO_3)	244	Appearance When Analyzed	Clear
Hydroxide (OH)	0	Odor When Analyzed	Not Objectionable

SIGNED: Water Analysis Laboratory
802 Harriet Highway
Bennettsville, South Carolina 29512
LABORATORY DIRECTOR

ANALYTICAL METHODS REFERENCES: 'STANDARD METHODS FOR THE EXAMINATION OF WATER AND WASTE-WATER.' APHA, AWWA AND WPCF AND 'METHODS FOR COLLECTION AND ANALYSIS OF WATER SAMPLES.' WATER SUPPLY PAPER 1454 (1960), U. S. GEOLOGICAL SURVEY, WASHINGTON, D. C.


RECEIVED
29 MAR 1978
MARINE CORPS BASE
CAMP LEJEUNE
N. C.

Sheet 19 2

PUMPING TEST DATA

Test conducted by: Carolina Well & Pump Co. FOR: EAST COAST CONST CO
Well Owner: U.S Navy Address: Camp Lejeune, NC
Pumped Well No.: 617 Location: old Logging Road Wilmington County:
Observation Well Location:
Airline Lengths: Pumped Well Observation Wells
Remarks: CONTRACT N62470-76-C-6799 REPLACE FOUR WATER WELLS

Pumping rate measured with: 5" x 6" orifice Water levels measured with: Electric tape

Pump Well Data

STATIC 15'

Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
5-16-78							
4:00 AM	START		100			15'	Static.
4:15 "	15 MIN		"			29' 8"	
4:30 "	15 MIN		"			30' 0"	
5:00 "	30 "		"			30' 1"	
5:30 "	30 "		"			30' 3"	
6:00 "	30 "		"			30' 4"	
6:30 "	30 "		"			30' 5"	
6:45 "	15 "		150			36' 3"	
7:00 "	15 "		"			36' 6"	
7:30 "	30 "		"			37' 0"	
8:00 "	30 "		"			37' 2"	
8:30 "	30 "		"			37' 4"	
9:00 "	30 "		"			37' 5"	
9:15 "	15 "		200			40' 9"	
9:30 "	15 "		"			40' 10"	
10:00 "	30 "		"			40' 11"	
10:30 "	30 "		"			41' 2"	
11:00 "	30 "		"			41' 5"	
11:30 "	30 "		"			41' 6"	
11:45 "	15 "		250			47' 5"	
12:00 "	15 "		"			47' 8"	
12:30 PM	30 "		"			47' 11"	
1:00 "	30 "		"			48' 3"	
1:30 "	30 "		"			48' 5	
2:00 "	30 "		"			48' 7	
2:15 "	15 "		300			51' 1"	
2:30 "	15 "		"			51' 1"	
3:00 "	30 "		"			51' 2"	
3:30 "	30 "		"			51' 3"	
4:00 "	30 "		"			51' 5"	
4:30 "	30 "		"			51' 6"	
4:45 "	15 "		360			58' 2"	
5:00 "	15 "		360			59' 6"	
5:30	30 "		360			60' 0"	
6:00	30 "		360			60' 4"	
6:30	30 "		360			60' 6"	
7:00	30 "		360			60' 7"	
7:15	15 "		393			63' 3"	
7:30	15 "		"			63' 6"	
8:00	30 "		"			63' 8"	
8:30	30 "		"			63' 9	
9:00	30 "		"			63' 10	
9:30	30 "		"			64' 0"	

page 292

PUMPING TEST DATA

Test conducted by: Carolina Well + Pump Co. FOR: EAST Camp Lejeune #6
Well Owner: U.S. Navy Address: Camp Lejeune, NC
Pumped Well No.: 617 Location: Old Logging Road - MAINSide County: Onslow
Observation Well Location:
Airline Lengths: Pumped Well _____ Observation Wells _____
Remarks:

Pumping rate measured with: 5" x 6" Orifice Water levels measured with: Electric tape

Pump Well Data

Date and Time	Elapsed Time Min.	Piezometer Tube Reading Inches	Pumping Rate GPM	Pump Discharge Pressure	Altitude Gauge Reading Feet	Feet to Water	Remarks
	60 MIN		~~400~~				
10:30PM	~~1 HOUR~~		~~393~~			64' 2"	
11:30 "	"		393			64' 2"	
12:30AM	"		"			64' 3"	
1:30	"		"			64' 3"	
2:30	"		"			64' 3"	
3:30	"		"			64' 2"	
4:30	"		"			64' 3"	
5:30	"		"			64' 3"	
6:30	"		"			64' 3"	
7:30	"		"			64' 3"	
8:30	"		"			64' 3"	
9:30	"		"			64' 4"	
10:30	"		"			64' 5"	
11:30	"		"			64' 4"	
12:30	"		"			64' 5	
1:30	"		"			64' 6"	
2:30	"		"			64' 7"	
3:30	"		"			64' 8"	
4:30	"		"			64' 7"	
5:30	"		"			64' 7"	
6:30	"		"			64' 8"	
7:30	"		"			64' 7"	
		Recovery Data					
7:30						64' 7"	
7:35						27' 0"	
7:40						25' 0"	
7:45						24' 3"	
7:50						23' 8"	
7:55						23' 0	
8:00						22' 8"	
8:05						22' 4"	
8:10						22' 0"	
8:15						21' 10"	
8:20						21' 8"	
8:25						21' 7"	
8:30						21' 6"	

CONTRACTOR'S SUBMITTAL TRANSMITTAL

5ND LANTDIV 4-4355/3 (Rev. 6/76)

FIELD & BOOTH

CONTRACT NO.	TRANSMITTAL NO.	DATE
N62470-76-C-6799	15	6/13/78

FROM CONTRACTOR: East Coast Construction Company, Inc.

TO: COMMANDER NAVFAC

PROJECT TITLE AND LOCATION:
EAST COAST CONSTRUCTION CO., INC.
CONTRACT N62470-76-C-6799
REPLACE FOUR WATER WELLS
MARINE CORPS BASE
CAMP LEJUENE, NC

CONTRACTOR USE ONLY — **REVIEWER USE ONLY**

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☐ Contractor Approved ☒ OICC Approval ☐ Deviation/Substitution For OICC Approval

**ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged.
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
1	15201	Draw Down Test Well No. 617	7	A	CCS 405 6/26/78
2	15201	Chemical Analysis Well 617	7		

CONTRACTOR'S COMMENTS

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC: One (1)

CONTRACTOR REPRESENTATIVE *(Signature)*

DATE RECEIVED BY REVIEWER	FROM (Reviewer)	TO

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on **ONE COPY** of the transmittal form.

REVIEWER'S COMMENTS

617 = 175-200

COPIES TO: ROICC (2) LANTDIV (1) A-E (1)	DATE	SIGNATURE
	6/28	

H.P. WELL #654

WELL NUMBER 655 HP		BY THOMAS/RAYNOR/SUMNER			DATE 10-20-83	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 0855
70	16	51	37	31	100	0910
		45	29	27	104	0930
		48	32	24	108	0947
		49	33	21	115	1000
		51	35	18	119	1010
		52	36	16	122	1024
		55	39	12	128	1030
		56	40	10	130	1040

REMARKS Last set at 10 PSI 130 GPM

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

Air Line - (65J) 70'

Well capped in 1986

Well Demo Somewhere around

91 or 92

LAW & COMPANY

Consulting and Analytical Chemists

ESTABLISHED 1903

Main Office
1711 Castle St.
Wilmington, N.C. 28402
919-762-7082
TWX 510-937-0280

Branch Office
4736 Spruill Ave.
North Charleston, S.C.
803-747-1589

DATE OF REPORT 12/12/80
DATE LOGGED IN 12/12/80

273
GROUNDWATER DEV. CO
P.O.BOX 419
NEW BERN, N.C. 28560

ATTN:

EAST COAST CONSTRUCTION CO. INC.
P. O. BOX 5004
JACKSONVILLE, N. C. 28540

LAB ID / INVOICE # EW4893
DATE & TIME COLLECTED 11/21/80
DATE & TIME REC IN LAB 11/26/80
COLLECTED BY CUSTOMER

SAMPLE DESCRIPTION: WELL WATER

HP 655 TT 25

N-62470-79-C-4976
REPLACE WATER WELLS
MCB, CAMP LEJEUNE, NC

TESTS / SAMPLES	(UNITS)	HADNOT PT	TT
PH EPA 150.1		7.7	8.1
TURBIDITY EPA 180.1	NTU	<1	8.0
TOTAL HARDNESS EPA 130.2	PPM	178.0	116.0
ALKALINITY TOTAL (AS CaCO3) EPA 310.1	PPM	163.5	209.8
ALK,HYDROXIDE AS CaCO3 SM403	PPM	0.0	0.0
ALK,BICARBONATE AS CaCO3 SM403	PPM	163.5	195.2
ALK,CARBONATE AS CaCO3 SM403	PPM	0.0	14.6
CARBON DIOXIDE SM407B	PPM	6.5	3.1
CHLORIDE S.M. 408A	PPM	15.0	9.0
SULFIDES EPA 376.1	PPM	0.0	0.0
IRON EPA 236.1	PPM	<.1	0.5
MANGANESE EPA 243.1	PPM	<.015	<.015
CADMIUM EPA 213.1	PPM	67	37
MAGNESIUM EPA 242.1	PPM	6.1	2.1

TOTAL CHARGES $184

Bruce Babson
LABORATORY SUPERVISOR

WELL NUMBER	655	BY THOMAS/BROWN			DATE 10-19-94	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME 1310
70	20	40	20	28	104	1320
		43	23	25	108	1330
		44	24	22	115	1340
		45	25	19	119	1350
		46	26	16	125	1400
		48	30	13	128	1410
	——	50	32	10	130	1420
		51	33	7	133	1430

REMARKS Test set at 10 PSI 130 GPM

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

EAST COAST CONSTRUCTION COMPANY, INC.
GENERAL CONTRACTORS
Post Office Box 5004
JACKSONVILLE, NORTH CAROLINA 28540

ROUTING ORDER	INT
1	
2	4
3	
4	
5	
6	
7	
8	
RETURN TO	

COMMENTS

June 26, 1981

Officer in Charge of Construction
Building 1005, Marine Corps Base
Camp LeJeune, N.C. 28542

Ref: Contract N62470-79-C-4476
Replace Water Wells, MCB
Camp LeJeune, N.C.

Gentlemen:

We are enclosing five (5) copies of the 24-hour pumping test on Well No. HP655 (Hadnot Point). This well will produce 117 GPM at a pumping level of 51'-2" and a drawdown of 23'-0". The well has a specific capacity of 3.21 GPM per foot of drawdown. The first screen on this well is set at 60'-0" and to maintain an approximate 10'-0" drawdown level above the screens, the capacity will be 117 GPM. You can obtain 3.21 GPM per foot of additional drawdown. With stainless screens you are allowed to pump to the top of the screen which will result in a capacity of 145 GPM.

We are ready to proceed with the completion of the well base, well house, and supporting features. Please advise if you concur in this matter.

Yours very truly,

EAST COAST CONSTRUCTION CO., INC.

W. H. Myers/ck

W. H. Myers

WHM/ck

Enclosures

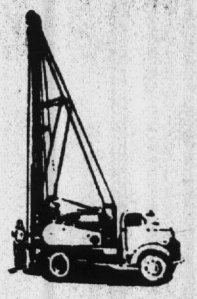
CAROLINA WELL AND PUMP COMPANY, INC.

Complete Well and Pump Service

P. O. BOX 1085 TELEPHONE 776-3415

SANFORD, NORTH CAROLINA 27330

N.W.W.A.
N.C.W.W.A.



Job Camp Lejeune Well No. 625A Date Tested May 7-8, 1981

Location Hadnot Point Tested By Andrews - Galloway

Dia. of Well 18 X 8 Pump Used. Grundfos sub.

Depth of Well 145 Driver Franklin 20 hp elect.

Water Levels by: [X] Electric Dropline Specific Capacity 3.21 GPM per ft. dd.

[ ] Air Line, Length _____ Quality _____

Non-Pumping Level 14' 9" / 14' 4" Temperature _____

Orifice Size 2" meter 1 X 4 X 3 orifice S.W.L. 14' 7.5" - Prod./14' 2" Ob 1

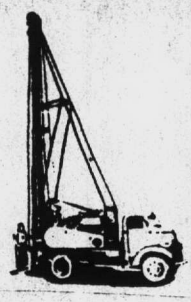
$t - t_1$ Time	Piezometer Reading (in.)	G.P.M.	Air Gauge Reading (feet)	Pumping Level	Drawdown	Prod.	Ob.1		REMARKS
0		0				14'9"	14'4"		Static 5-8-81
15		100 ± 2GPM				42'7.5"	18'1"		
30		100 ± 2GPM				43'2"	19'0"		
45		100 ± 2GPM				43'8"	19'7"		
60		100 ± 2GPM				44'1"	20'4"		Stable
90		100 ± 2GPM				44'4.5"	20'4"		
120		100 ± 2GPM				44'6"	20'4"		
150		100 ± 2GPM				44'8"	20'7"		
180		100 ± 2GPM				45'0"	20'9"		Increase to 117
195		117 ± 2GPM				50'1"	21'9"		
210		117 ± 2GPM				50'3"	22'1"		
225		117 ± 2GPM				50'5"	22'0"		
240		117 ± 2GPM				50'7"	22'2"		
255		117 ± 2GPM				50'7.5"	22'2"		
270		117 ± 2GPM				50'8"	22'7"		Stable
300		117 ± 2GPM				50'9"	22'4.5"		
330		117 ± 2GPM				50'9.5"	22'5"		
345		117 ± 2GPM				50'9.5"	22'5"		
360		117 ± 2GPM				50'9.5"	22'5"		Start Cont.test
420		117 ± 2GPM				50'9.5"	22'5"		
480		117 ± 2GPM				51'0"	22'6"		
540		117 ± 2GPM				51'1"	22'6"		
600		117 ± 2GPM				51'1"	22'6"		
660		117 ± 2GPM				51'1"	22'6"		

CAROLINA WELL AND PUMP COMPANY, INC.

Complete Well and Pump Service

P. O. BOX 1085 TELEPHONE 776-3415

SANFORD, NORTH CAROLINA 27330



N.W.W.A.
N.C.W.W.A.

Job Camp Lejeune continued Well No. _____ Date Tested _____

Location _____ Tested By _____

Dia. of Well _____ Pump Used: _____

Depth of Well _____ Driver _____

Water Levels by: ☐ Electric Dropline Specific Capacity _____

☐ Air Line, Length _____ Quality _____

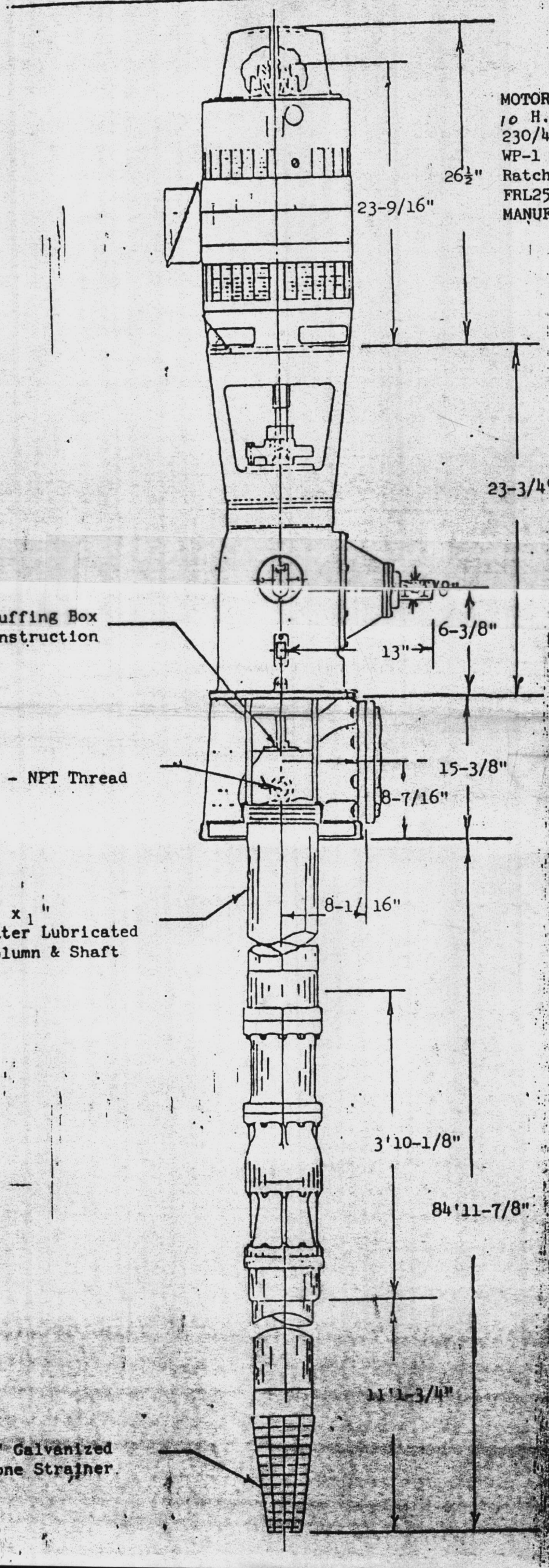
Non-Pumping Level _____ Temperature _____

Orifice Size _____ S.W.L. _____

Time	Piezometer Reading (in.)	G.P.M.	Air Gauge Reading (feet)	Pumping Level	Drawdown	Prod.	Ob.1		REMARKS
720		117 ± 2GPM				51'2"	22'7"		
780		117 ± 2GPM				51'2"	22'7"		
840		117 ± 2GPM				51'2"	22'7"		
900		117 ± 2GPM				51'2"	22'7"		
960		117 ± 2GPM				51'2"	22'8"		
1020		117 ± 2GPM				51'2"	22'8"		
1080		117 ± 2GPM				51'2"	22'8"		
1140		117 ± 2GPM				51'2.5"	22'9"		
1200		117 ± 2GPM				51'2.5"	22'9"		
1260		117 ± 2GPM				51'2"	22'9"		
1320		117 ± 2GPM				51'2.5"	22'9"		
1380		117 ± 2GPM				51'2.5"	22'9"		
1440		117 ± 2GPM				51'2.5"	22'9"		
1500		117 ± 2GPM				51'2"	22'10"		
1600		117 ± 2GPM				51'2.5"	22'10"		
1660		117 ± 2GPM				51'2.5"	22'10"		
1720		117 ± 2GPM				51'2.5"	22'11"		
1780		117 ± 2GPM				51'1"	22'11"		
1840		117 ± 2GPM				51'2"	23'0"		End Pumping

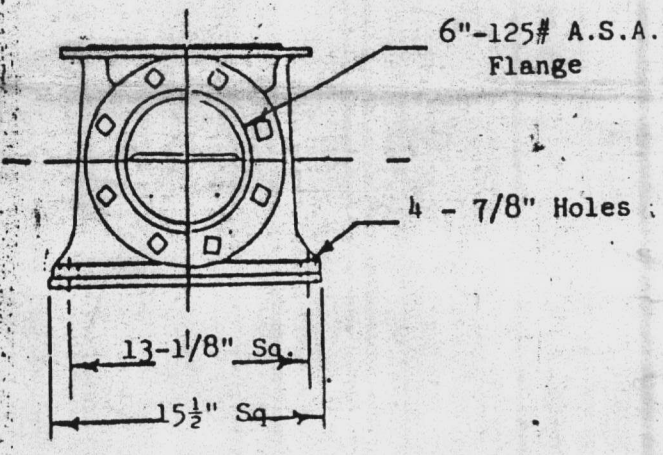
Jacuzzi Turbine Pumps

Montford Point



MOTOR SPECIFICATIONS:
10 H.P. 1800 RPM 3 Phase
230/460V 60HZ V.H.S. H.T. Motor
WP-1 Enclosure Non-Reversing
Ratchet 1" C.B. 10" B.D.
FRL254TP
MANUFACTURED BY: GENERAL ELECTRIC

GEAR DRIVE SPECIFICATIONS:
Model C20 - Combination Type
Non-Reversing Ratchet 1:1 Ratio
With Sliding Clutch
MANUFACTURED BY: AMARILLO



PUMP MODEL 15- 8KSZ6

DIS. HEAD MODEL L6A

#267

DESIGN POINT:

CAPACITY 175 GPM

TOTAL HEAD 143 FEET

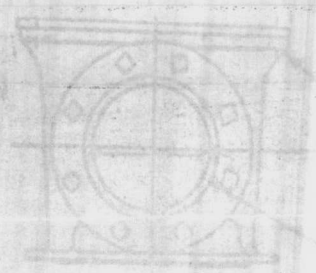
FOR: EAST COAST CONSTRUCTION

JOB: U.S. MARINE CORP AIR STATION
JACKSONVILLE, N.C.

FOUNDATION PLATE DRAWING SEPARATE

BY: E.E. ROWEDDA

84'-11 7/8
11-1 3/4
73-10 1/8
3-10 1/2
70'-



For: East Coast Construction Co.

Job: U. S. Marine Corp Air Station
Jacksonville, N. C.

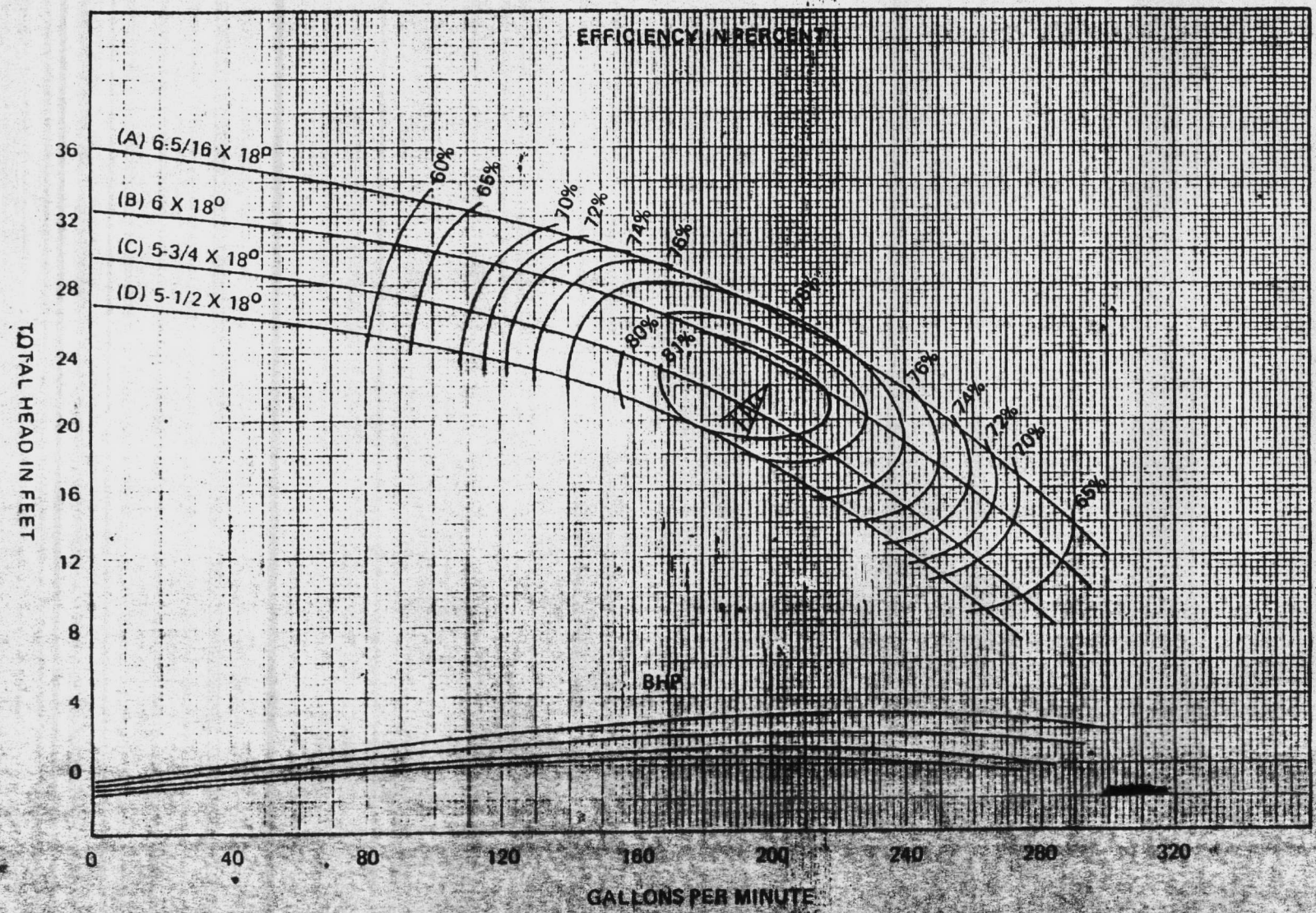
Pump #267

TURBINE PUMP CURVE

8KS
SECTION 2120
JAN. 15, 1970

200 GPM @ 132' TDH

81% EFF. = 8.23 BHP



NUMBER OF BOWLS	CHANGE EFFICIENCY AS FOLLOWS
1	-3
2	-1

Change in efficiency may affect both head and horsepower

Bowl Dia.	7-1/2 In.
Bowl No.	3591-S, C.I., ENAM.
Impeller No.	3693, BRONZE
Eye Area	6.60 Sq. In.
Imp. Type	SEMI-OPEN K = 4.42

STAGE PERFORMANCE

Curve No.	1K-5
R. P. M.	1760
Bowl	8KS

Performance based on pumping clear, fresh water at a temperature not over 85°F., and free of gas, air or abrasives, and with bowls properly adjusted and submerged.

CONTRACTOR'S SUBMITTAL TRANSMITTAL

SND LANTDIV 4-[illegible]/73 (Rev. 9/76)

CONTRACT NO.	TRANSMITTAL NO.	DATE
79-C-4476	5-R	09/28/81

FROM CONTRACTOR: East Coast Construction Co., Inc.

TO: ROICC

PROJECT TITLE AND LOCATION: Replace Water Wells MCAS and Camp Lejeune, North Carolina

CONTRACTOR USE ONLY

*List only one specification division per form.

List only one of the following categories on each transmittal form, and indicate which is being submitted

☐ Contractor Approved ☒ OICC Approval ☐ Deviation/Substitution For OICC Approval

REVIEWER USE ONLY

*ACTION CODES
A-Approved
D-Disapproved
AN-Approved as noted
RA-Receipt acknowledged
C-Comments
R-Resubmit

ITEM NO.	PROJ. SPEC. SECT. & PARA. and/or PROJ. DWG. NO. *	ITEM IDENTIFICATION (Type, size, model no., Mfg. name, dwg. or brochure number)	NO. OF COPIES	ACTION CODES **	REVIEWER'S INITIALS CODE AND DATE
1.	15221	Final pump curves and pump dimension data for:	5	A	GJ 7 Oct 81
		Well nos.: HP 655			
		TT 25			
		M 267			
		TT 71			207

CONTRACTOR'S COMMENTS

Please note that pumps are designed to be 80% efficiency per specs.

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC

CONTRACTOR REPRESENTATIVE (Signature)

DATE RECEIVED BY REVIEWER

FROM (Reviewer): OICC JAXNC AREA

TO: EAST COAST CONSTRUCTION CO., INC.

☐ Submittals are returned with action indicated. Approval of an item does not include approval of any deviation from the contract requirements unless the contractor calls attention to and supports the deviation.

☐ Submittals are forwarded to LANTDIV with A-E recommendations indicated in REVIEWER USE ONLY Section and in comments below on ONE COPY of the transmittal form.

REVIEWER'S COMMENTS

RECEIVED
OCT 16 1981
EAST COAST CONSTRUCTION CO., INC.

COPIES TO:
ROICC (2)
LANTDIV (1)
A-E (1)

DATE: 13 October 1981

SIGNATURE: J. A. ELLIOTT, LTJG, CEC, USN

70-79-C-4476

For: East Coast Construction Co.

Job: U. S. Marine Corp Air Station
Jacksonville, N. C.

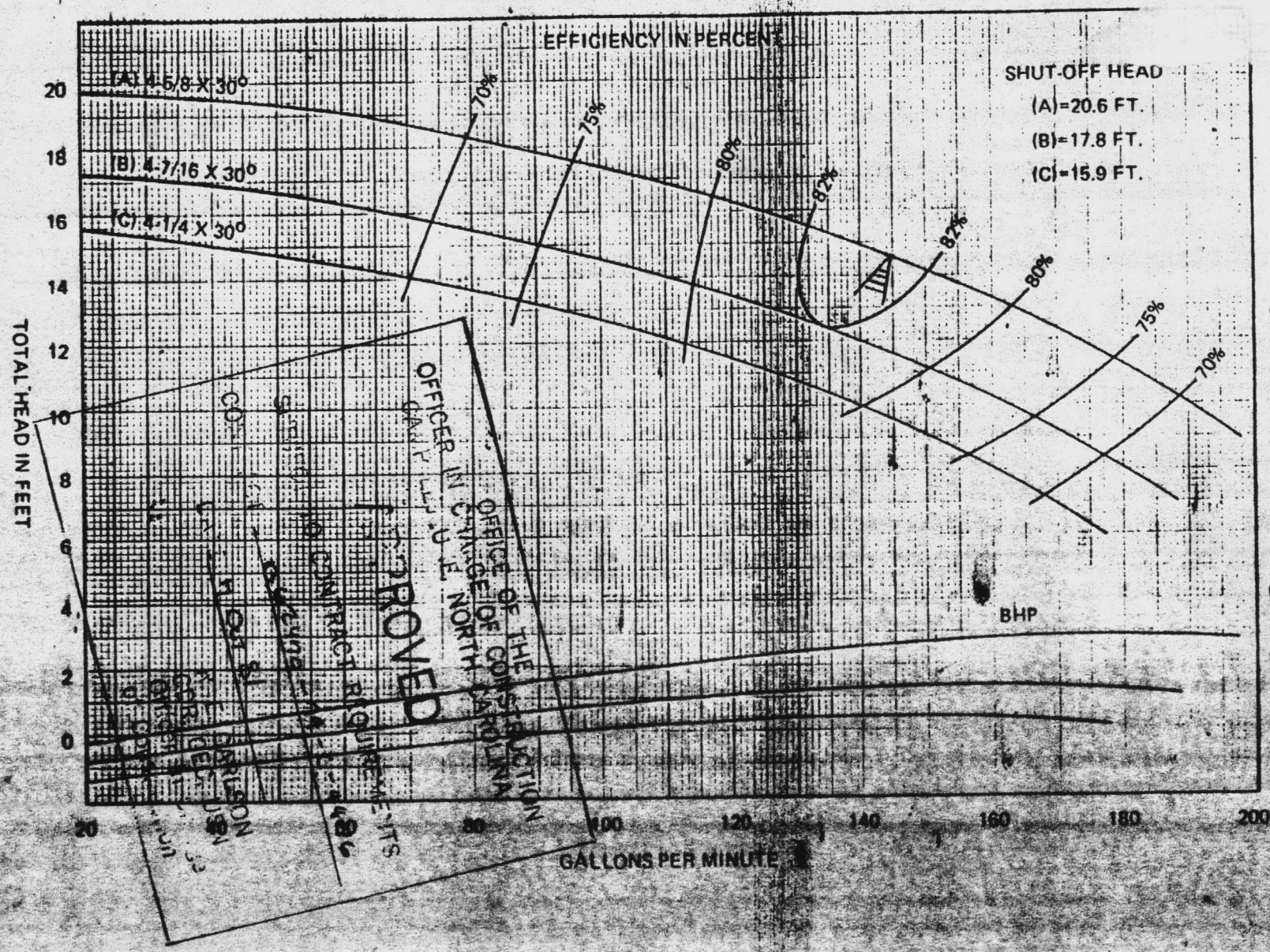
Pump # 655

TURBINE PUMP CURVE

6XS
SECTION 2120
MAY 15, 1970

145 GPM @ 118' TDH

82% EFF. = 5.29 BHP



CHANGE EFFICIENCY AS FOLLOWS	
4	0
3	2
2	4
1	6

Change in efficiency may affect both head and horsepower

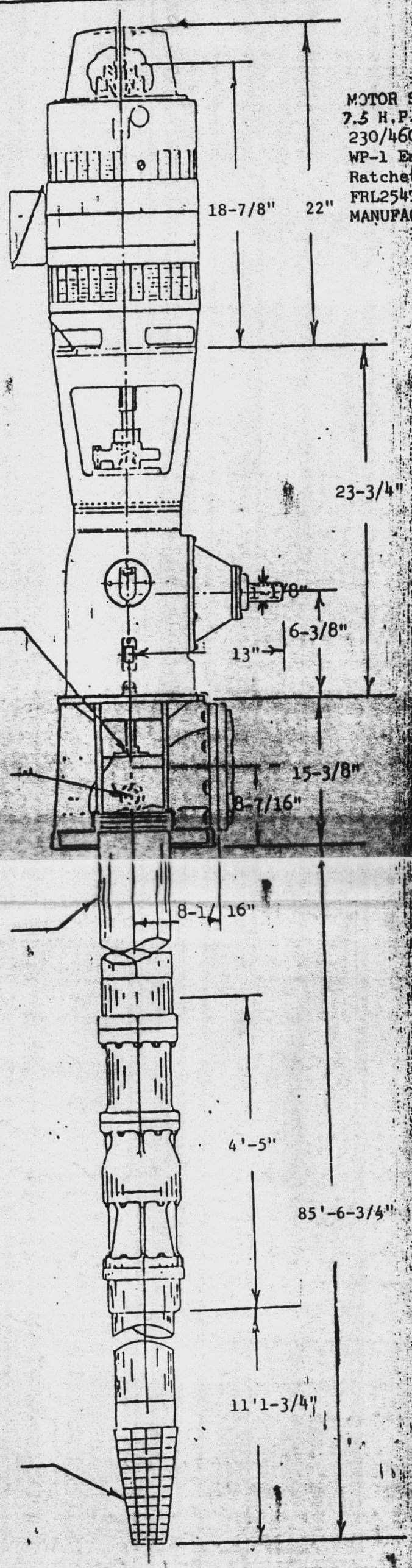
Bowl Dia.	5-9/16 In.
Bowl No.	3473-S, C.I.
Impeller No.	3505, BRONZE
Eye Area	4.01 Sq. In.
Imp. Type	SEMI-OPEN K = 2.35

STAGE PERFORMANCE

Curve No.	6X-6
R. P. M.	1760
Bowl	6XS

Performance based on pumping clear, fresh water at a temperature not over 85°F., and free of gas, air or abrasives, and with bowls properly adjusted and submerged.

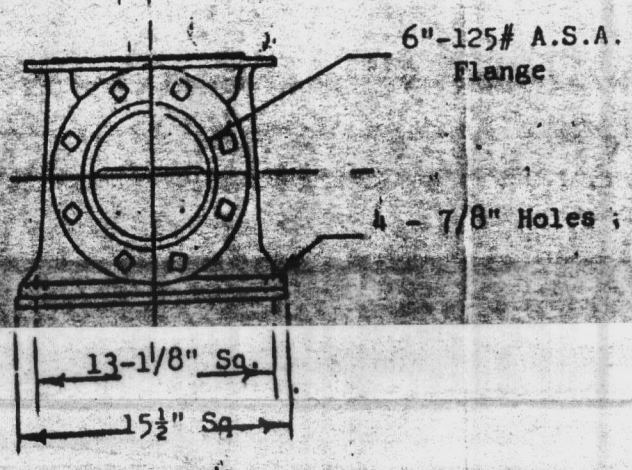
HAGNOT POINT



MOTOR SPECIFICATIONS:
7.5 H.P. 1800 RPM 3 Phase
230/460V 60HZ V.H.S. H.T. Motor
WP-1 Enclosure Non-Reversing
Ratchet 1" C.B. 10" B.D.
FRL254TP
MANUFACTURED BY: GENERAL ELECTRIC

GEAR DRIVE SPECIFICATIONS:

Model C-20 - Combination Type
Non-Reversing Ratchet 1:1 Ratio
With Sliding Clutch
MANUFACTURED BY: Amarillo



PUMP MODEL 10-6XSA8

DIS. HEAD MODEL L5A

#655

DESIGN POINT:

CAPACITY 145 GPM

TOTAL HEAD 119 FEET

FOR: EAST COAST CONSTRUCTION

JOB: U.S. MARINE CORP AIR STATION
JACKSONVILLE, N.C.

FOUNDATION PLATE DRAWING SEPARATE

BY: E.E. ROWEDDA

85-6 3/4
11-1 3/4
74-5
4-5
70'0

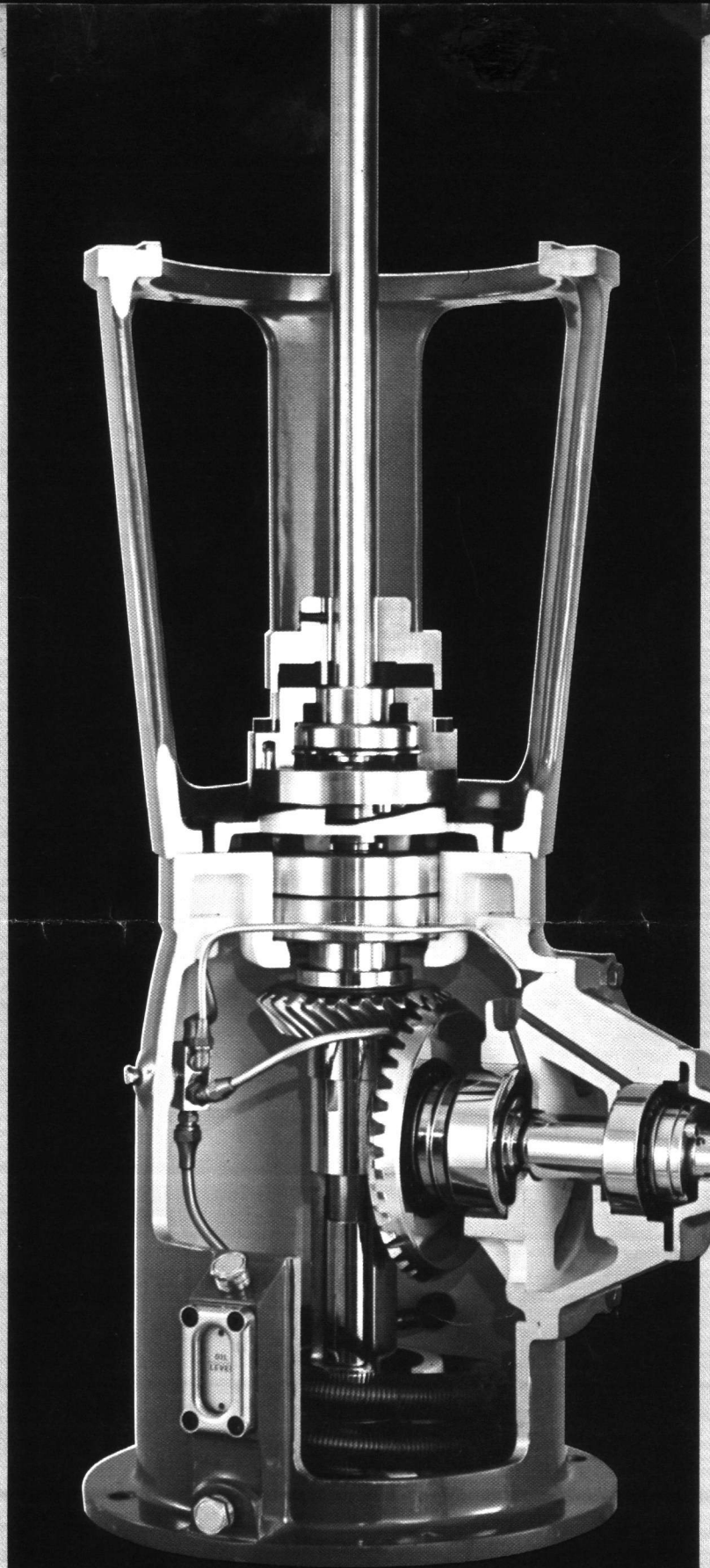
DRILLER'S LOG
Hadnot Point, Camp Lejeune
Jacksonville, North Carolina
11/15/80

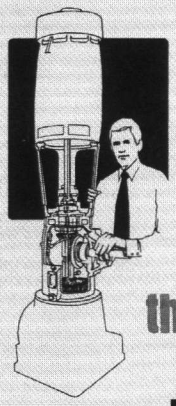
well HP-655
N62470 79-C-4476

Test hole diameter: 9 7/8"
Bit- Medium Formation - 3 cone roller tooth
Drill Rig: Failing 1500
Drill Speed: 2nd Gear - 150 rpm
3rd Gear - 200 rpm
Driller: Frank Quidley, Groundwater Development Company, Inc.

Sample	Depth	Drill Time	Description	Drill Speed
0-10	0-5	5 min	Grey sand w/ silt and roots	2nd
	5-10	5 min	Brown sand with silt	2nd
10-20	10-20	5 min	Tan silty sand	2nd
20-30	20-30	5 min	Tan silty sand	2nd
30-40	30-36	5 min	Tan silty sand	2nd
	36-40	5 min	Tan medium sand	2nd
40-50	40-50	10 min	Tan fine-medium sand	2nd
50-60	50-60	10 min	Tan fine med sand w/(Fe)& cement at 58'	2nd
60-70	60-70	10 min	Grey medium sand	2nd
70-80	70-77	10 min	Grey medium sand	2nd
	77-80	15 min	Grey sand with shell	2nd
80-90	80-90	30 min	Grey shell w/streaks of med. sand	2nd
90-100	90-100	30 min	Grey shell with sand cement	2nd
100-110	100-106	20 min	Grey shell with sand	2nd
	106-110	10 min	Grey shell w/streaks of sand	2nd
110-120	110-116	10 min	Grey sand w/streaks of shell	2nd
	116-120	10 min	Grey fine sand w/streaks of shell	2nd
120-130	120-130	10 min	Grey fine sand w/streaks of shell	2nd
130-140	130-140	10 min	Grey fine sand w/ streaks of shell	2nd
140-150	140-150	10 min	Grey fine sand w/streaks of shell	2nd
150-160	150-160	10 min	Grey very fine sand w/streaks of shell and clay	2nd
160-170	160-170	10 min	Grey-green fine sand w/clay	2nd
170-180	170-175	10 min	Grey sandy clay	2nd
	175-180	15 min	Grey green sand with shell & glauconite	2nd
180-190	180-190	10 min	Grey green sandy clay with shell	2nd
190-200	190-200	20 min	Grey sandy clay with shell hash	2nd

EAST COAST CONSTRUCTION CO. INC.
P. O. BOX 5004
JACKSONVILLE, N. C. 28540





Our combination drive has the right angle on back-up power supply

This drive is designed for normal operation as a direct drive using a top-mounted electric motor. However, in the event of power failure, it is easily converted into a right angle gear drive for engine or turbine operation by lowering a sliding clutch into drive position.

At Amarillo Gear, we have one of the largest selections of Right Angle Gear Drives in the industry. Fourteen standard models are available, from 20 to 1200 HP, in a wide range of ratios. They are easily adaptable to a great number of applications such as water supply systems, water injection systems, lean oil pumps, cooling tower fans, fire control systems, and sewage pumps. Standard models are Factory Mutual approved for use with vertical fire pumps. All drives are factory tested before leaving our plant. If parts are ever needed, we can ship them immediately by air.

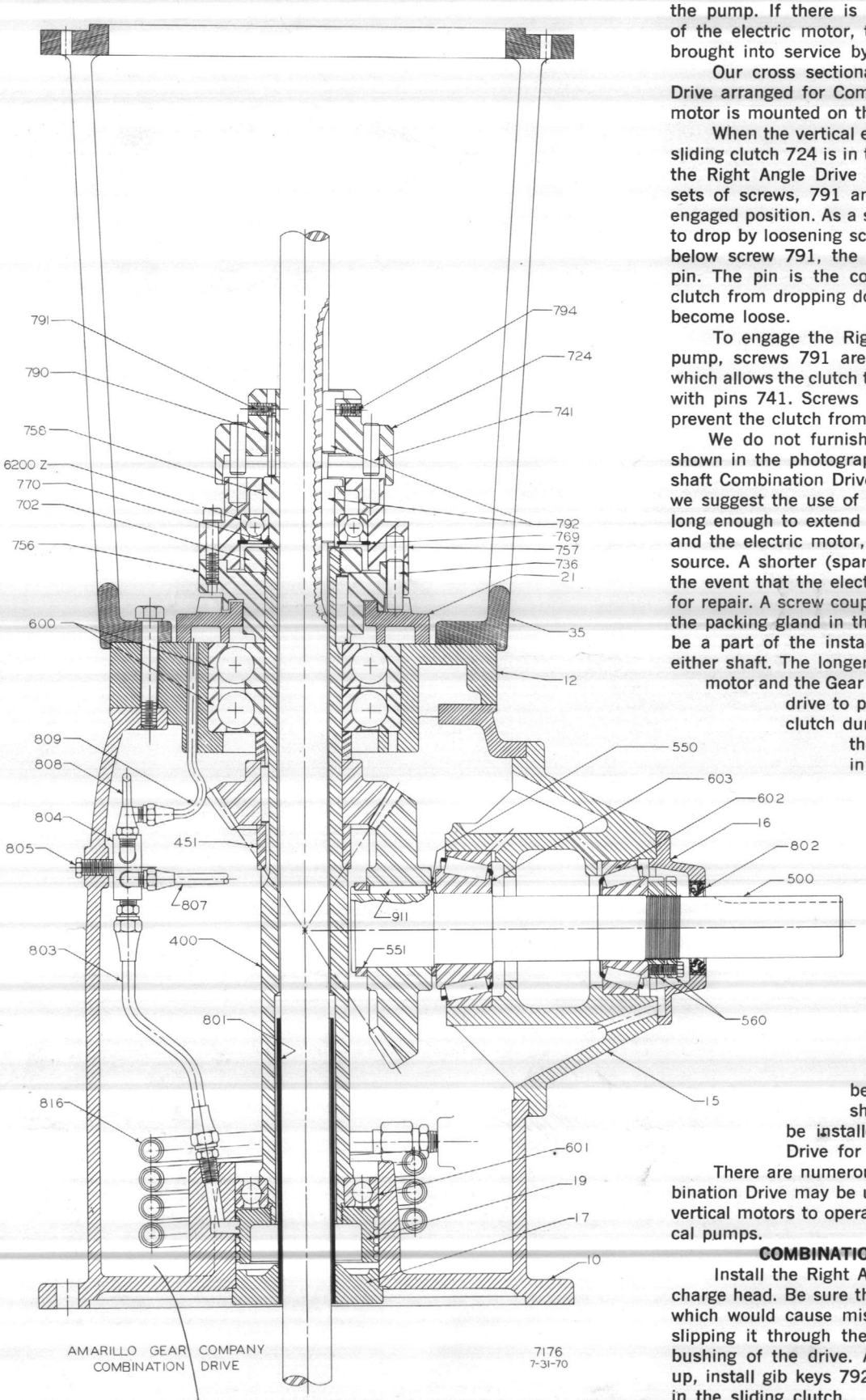
We have been building utmost reliability and maximum efficiency into our gear drives since 1934 and have a large family of satisfied customers. We'd like to make you a member.

amarillo gear company

P. O. Box 1789 • 806/622-1273
Amarillo, Texas 79105

A DIVISION OF THE MARMON GROUP, INC.
(MICHIGAN)

COMBINATION DRIVE with Manually Operated Sliding Clutch



On some pumping installations it is desirable to provide alternate power for driving a turbine or vertical pump: (1) by equipping the installation with a Right Angle Gear Drive and an internal combustion engine, and (2) by using a Right Angle Gear Drive with a stand on which a vertical electric motor is mounted above the drive. This arrangement is referred to as a "combination drive."

The vertical electric motor is normally used to operate the pump. If there is an electric power failure or failure of the electric motor, the Right Angle Gear Drive is then brought into service by engaging the sliding clutch.

Our cross sectional print 7176 shows a Right Angle Drive arranged for Combination Drive. The vertical electric motor is mounted on the stand above the drive.

When the vertical electric motor is operating the pump, sliding clutch 724 is in the raised position which disengages the Right Angle Drive from the vertical pump shaft. Two sets of screws, 791 and 794, hold the clutch in the disengaged position. As a safety measure, pin 790 is permitted to drop by loosening screw 791. When the pin has dropped below screw 791, the screw is then tightened above the pin. The pin is the correct length to prevent the sliding clutch from dropping down and engaging should screw 794 become loose.

To engage the Right Angle Gear Drive to operate the pump, screws 791 are backed out until pin 790 is free, which allows the clutch to move downward until it is engaged with pins 741. Screws 791 and 794 are then tightened to prevent the clutch from working up out of engagement.

We do not furnish or manufacture the vertical shaft shown in the photograph and drawing for standard hollow shaft Combination Drives; however, on Combination Drives we suggest the use of two top shafts. One shaft would be long enough to extend through the Right Angle Gear Drive and the electric motor, which normally is the prime power source. A shorter (spare) shaft would be recommended in the event that the electric motor is damaged and removed for repair. A screw coupling below the gear drive and above the packing gland in the discharge head would necessarily be a part of the installation to accommodate the use of either shaft. The longer shaft used in conjunction with the motor and the Gear Drive should be keyseated above the drive to permit the engagement of the sliding clutch during a temporary power failure. With this arrangement the thrust bearing in the vertical electric motor carries the thrust for both units. The rotor of the electric motor always rotates when the Right Angle Drive is operating the pump. Should the electric motor be removed for any purpose, the spare shaft would be used to replace the longer shaft and the thrust would be transferred to the Right Angle Gear Drive.

A grease lubricated steady ball bearing 6200Z is provided to prevent run-out and vibration in the top shaft.

The Combination Drive may be used with hollow shaft or solid shaft motors. A support bearing may be installed in the base of the Right Angle Drive for a solid shaft drive.

There are numerous arrangements by which the Combination Drive may be used with solid shaft or hollow shaft vertical motors to operate deep well turbine pumps or vertical pumps.

COMBINATION DRIVE INSTALLATION

Install the Right Angle Gear Drive on the surface discharge head. Be sure there are no burrs or dirt on the base which would cause misalignment. Install the top shaft by slipping it through the sliding clutch and steady bearing bushing of the drive. After the top shaft has been made up, install gib keys 792 in the steady bearing bushing and in the sliding clutch.

NORTH CAROLINA
DIVISION OF MINERAL RESOURCES
P.O. BOX 27687
RALEIGH, NORTH CAROLINA 27611

Service: GR-SP-SPR-C'L

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P. O. BOX 5004
JACKSONVILLE, N. C. 28540

Elevation
KB
DF
GL

COMPANY EAST COAST CONSTRUCTION CO.

LAND OWNER CAMP LEJEUNE

P-25

N-62470-77-C-4476
Report Center Well
Hadnot Point HP655
HP 5/80
R=25

0
20
40
60
80
100
120
140
160
180
200

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