

FILE FOLDER

DESCRIPTION ON TAB:

TC 700 WF

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- Outside/inside of actual folder did contain hand written information**
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North Carolina Department of Environment, Health and
Natural Resources

TC 700

Division of Environmental Management

WELL ABANDONMENT
RECORD

Groundwater Section
P.O. Box 27687

Raleigh, N.C. 27611

CONTRACTOR Cyclone Well Drilling

REG. NO. 2395

1. WELL LOCATION: (Show a sketch of the location on back of form.)

Nearest Town: Camp Geiger

County ONSLow

North Carolina

Quadrangle No. _____

(Road, Community, Subdivision, Lot No.)

2. OWNER: U.S. MARINE Corps

3. ADDRESS: CAMP Geiger NC

4. TOPOGRAPHY: draw, slope, hilltop, valley, flat

5. USE OF WELL: public DATE: 1/16/01

6. TOTAL DEPTH: 69' DIAMETER: 18"

7. CASING REMOVED:

feet	diameter
_____	_____
_____	_____

8. SEALING MATERIAL:

Neat cement	Sand cement
bags of cement <u>12,500</u> <u>185</u>	bags of cement _____
gals. of water <u>535</u>	yds. of sand _____
	gals. of water _____

Other
Type material _____
Amount _____

9. EXPLAIN METHOD OF EMPLACEMENT OF MATERIAL.

pump

WELL DIAGRAM: Draw a detailed sketch of the well showing total depth, depth and diameter of screens remaining in the well, gravel interval, intervals of casing perforations, and depths and types of fill materials used.



69 feet deep
Screen depth NA

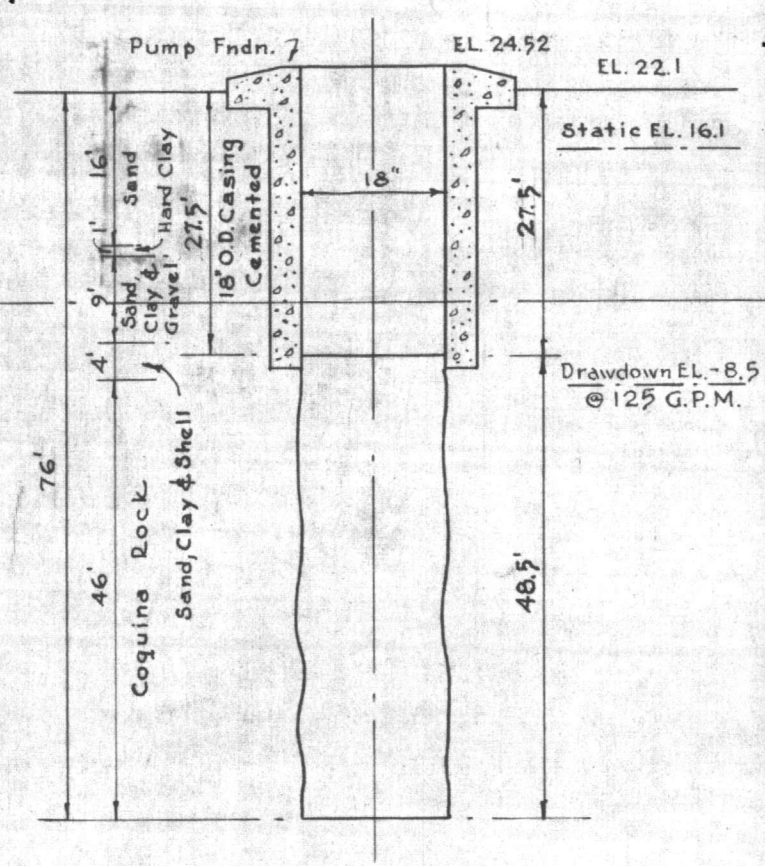
I do hereby certify that this well
abandonment record is true and exact.

David J. Quinn 1/16/01
Signature of Contractor or Agent Date

Provide the well owner a copy of this record.

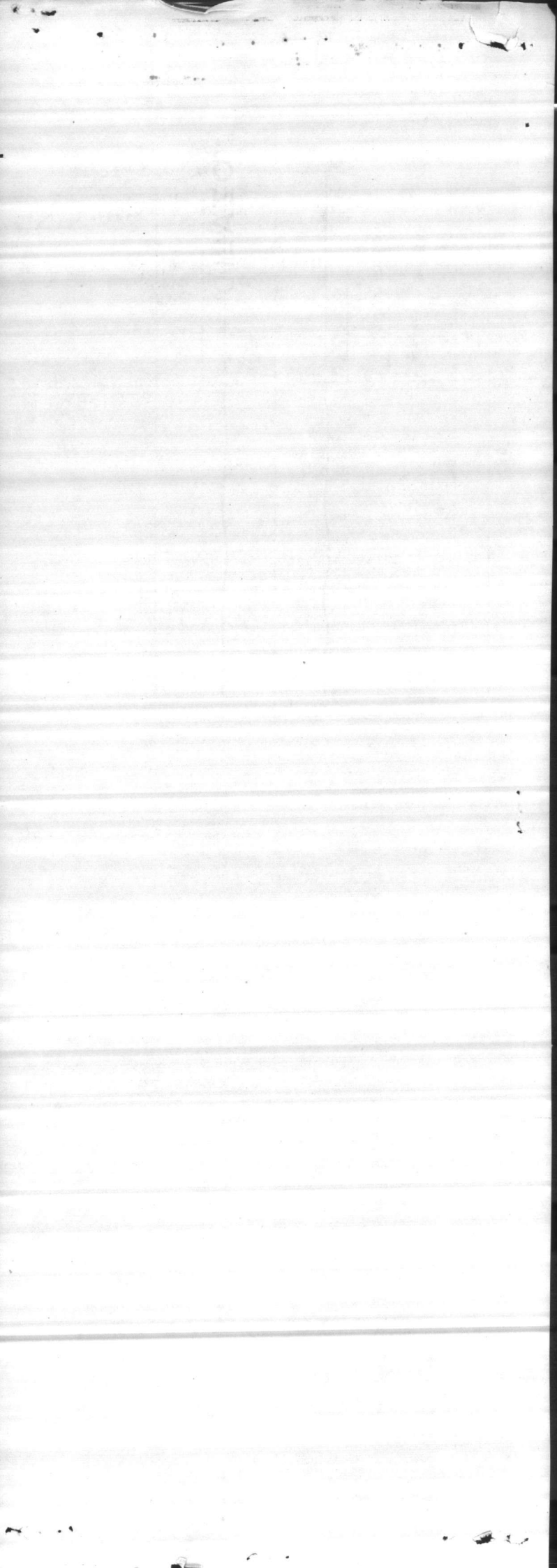
1

125 G.P.M. - SINGLE DRIVE -



9-11-57
74' MEASURED FROM PUMP BASE
P.H.B.

PUMP SETTING 50'
AIRLINE 50'
STATIC 29' ON GAGE



SOURCE INFORMATION GROUND WATER

Date Form Completed

M M D D Y Y
 0 1 2 9 5

PWSID
 0
4
6
7
0
4
2

Owner Assigned Source Code

Well Name (If purchase, name of system)

700 MCAS WATER PLANT 200
 WELL TC

Code

G

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

If Purchase, seller ID#

Source Begin Date

Source exempt—
SWTR? Y N

Direct Influence Date

Availability

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

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

A STREET

Latitude (N)

Longitude (W)

How Determined

GPS Data

No. of Sats. Locked on

3 4 3 5 6

0 7 7 2 7 2 7

G=GPS
 M=Map
 S=Surveyed

Q.# or
 DOP#

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

Vulnerable (VOCs) Y N

Assessment Date

ENTRY POINT INFORMATION

Use Code

Availability

Owner Assigned Entry Point Code

Entry Point Name

C=Ground/Permanent
 D=Ground/non-permanent

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

400

MCAS NEW RIVER

Location:

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

Sources of pollution/distance: 60' to street

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: need paint

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

Condition of house: OK Type of freeze protection: none

Well: Diameter: 18 Type: Open Hole Yield (gpm): 125 Properly sealed? (Y,N)

Properly vented? (Y,N) Casing depth 27 1/2 ft. (If unknown, put 'UNK') Well depth: 76 Meter available? (Y,N) Size: 8x8

Concrete slab adequate? (Y,N) If no, explain: Size of blow-off: 3:0 Sample tap: Before treatment? (Y,N) After treatment? (Y,N)

Pumps: Capacity: GPM: 125 HP: 5 Pump intake depth: 50 Auxiliary Power? (Y,N)

Type pump: VERTICAL TURBINE Height above floor (pump/casing): 2 ft / 3

Storage at well site: Elev: Hydro: Ground:

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

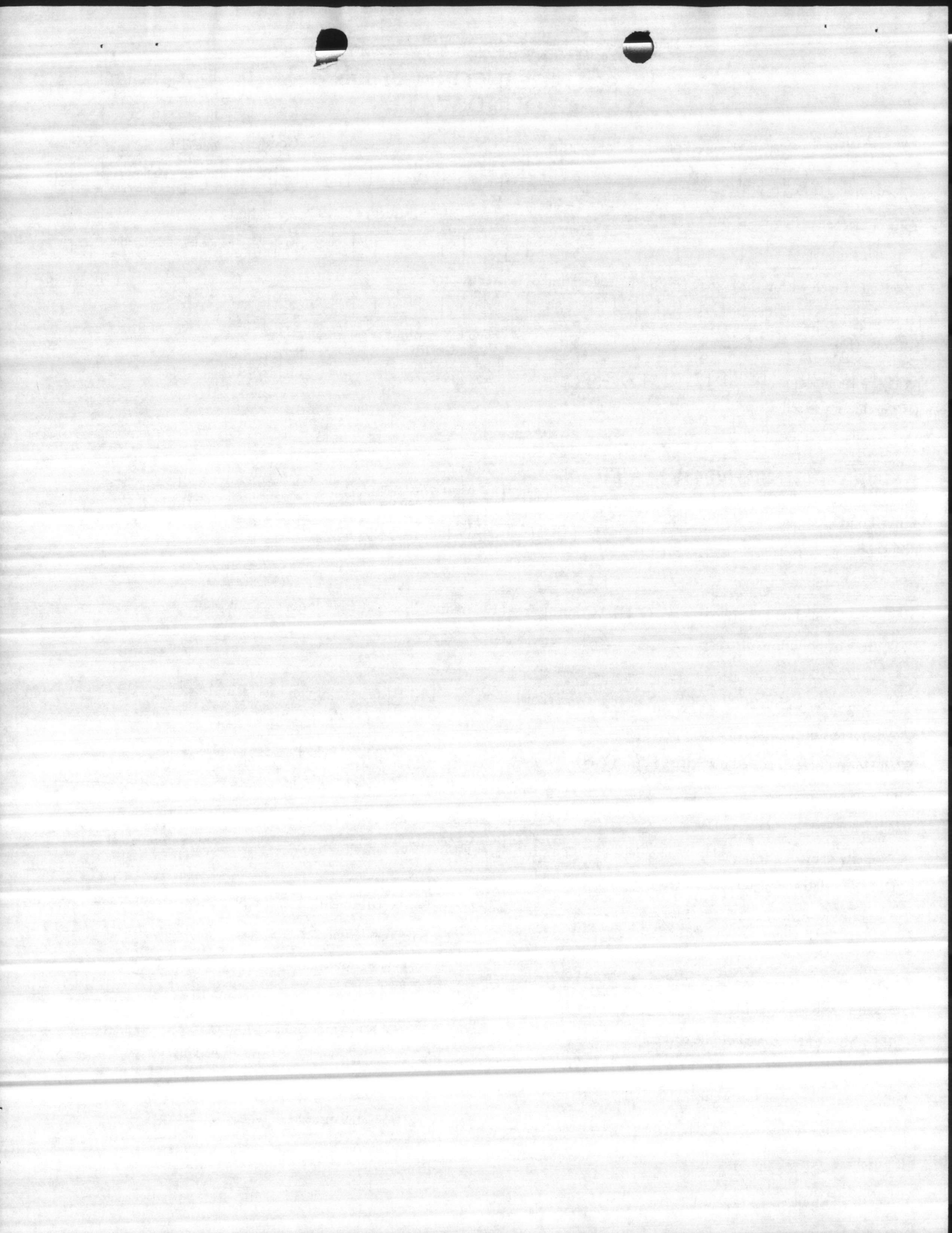
High service pumps: 1. gpm hp 2. gpm hp 3. gpm hp Auxiliary Power? (Y,N)

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? MCAS/WATER PLANT

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

- ① Leaking Pkg
- ② Repair Vent
- ③ No meter
- ④ Seal pump base





Pump & Lighting

315 9TH STREET, S.E. • P.O. BOX 2504 • HICKORY, NC 28601 • PHONE: (704) 324-9705 • FAX: (704) 324-4365

October 4, 1995

Mr. Stanley Miller
PSC Box 20004
Base Maintenance Div. Bin *1)
Camp LeJeune, North Carolina
28542

Dear Stanley:

Subject: **Well 700**

We are pleased to offer the following "American Made" equipment for your consideration on the repair of the pump in the above well.

Design Conditions: 125 GPM @ 70' TDH

One (1) ea. Goulds Model 8IHC, 2 Stage, Vertical Turbine Pump Bowl Assembly, Product Lubricated, with Impellers Trimmed to Above Conditions.

Five (5) ea. 1" X 5" X 10' Goulds Inner Column Assembly

One (1) ea. 1" X 15 1/2" " Stub Shaft for Packing Box Area

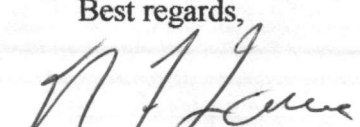
One (1) ea. 1" Packing Box Bushing

Your Cost \$1,768.00

Price includes freight to your location. Price does not include any taxes, anchor bolts, gauges, or other accessories not listed above. Terms are net 30 days.

If I may be of further service to you, please call me.

Best regards,


N. F. "Pete" Lowe
Industrial Sales

*INSTALLED
10-4-95*

NFL

cc: Ed White
Cindy Benfield
File



A Hughes Supply Company



THE STATE OF TEXAS
 COUNTY OF DALLAS
 I, the undersigned, Clerk of the County of Dallas, Texas, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears in the records of the County of Dallas, Texas.

Witness my hand and the seal of the County of Dallas, Texas, this _____ day of _____, 20____.

 County Clerk of Dallas, Texas

I, _____, County Clerk of Dallas, Texas, do hereby certify that the within and foregoing is a true and correct copy of the original as the same appears in the records of the County of Dallas, Texas.

Witness my hand and the seal of the County of Dallas, Texas, this _____ day of _____, 20____.

 County Clerk of Dallas, Texas

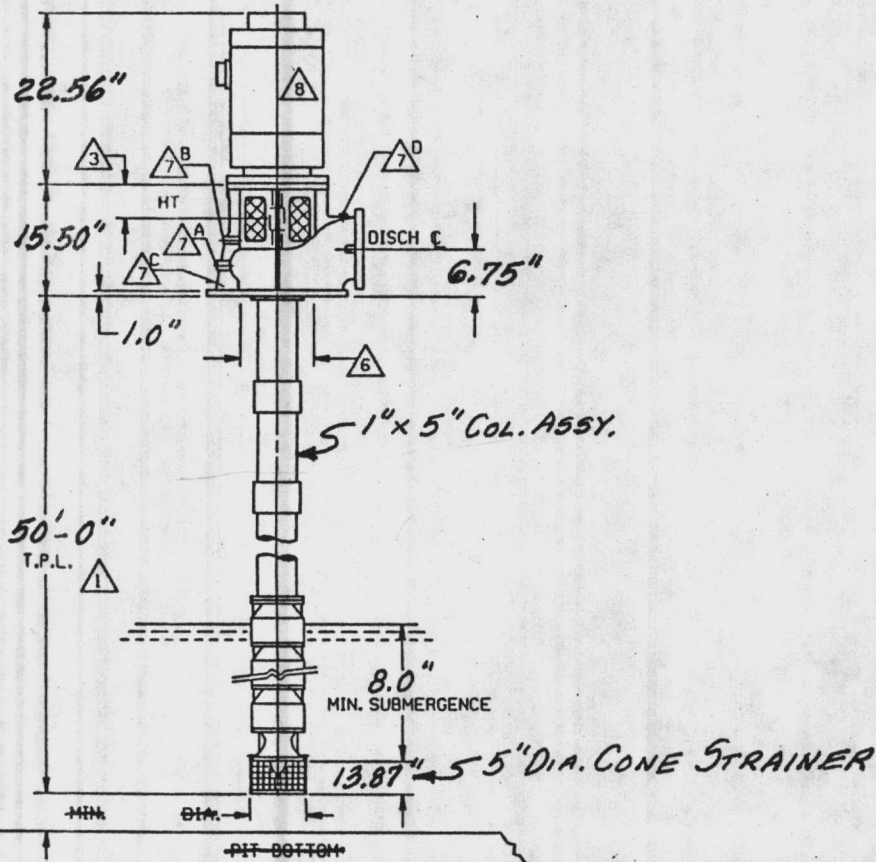
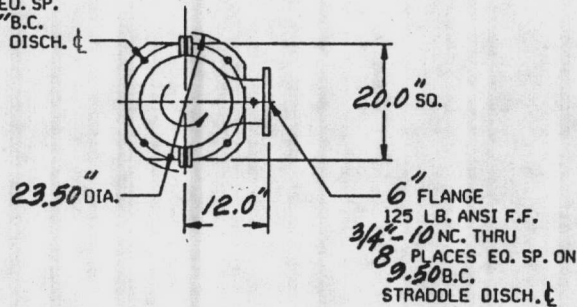
10-4-95

remove strainer & used a gear
pump bearing & shaft back to 50'
will get one price

10-4-22

Received from Mrs. J. H. ...
\$10.00
Total \$10.00

7.5" DIA.
4 HOLES EQ. SP.
ON 21.25" B.C.
STRADDLE DISCH. ⚡



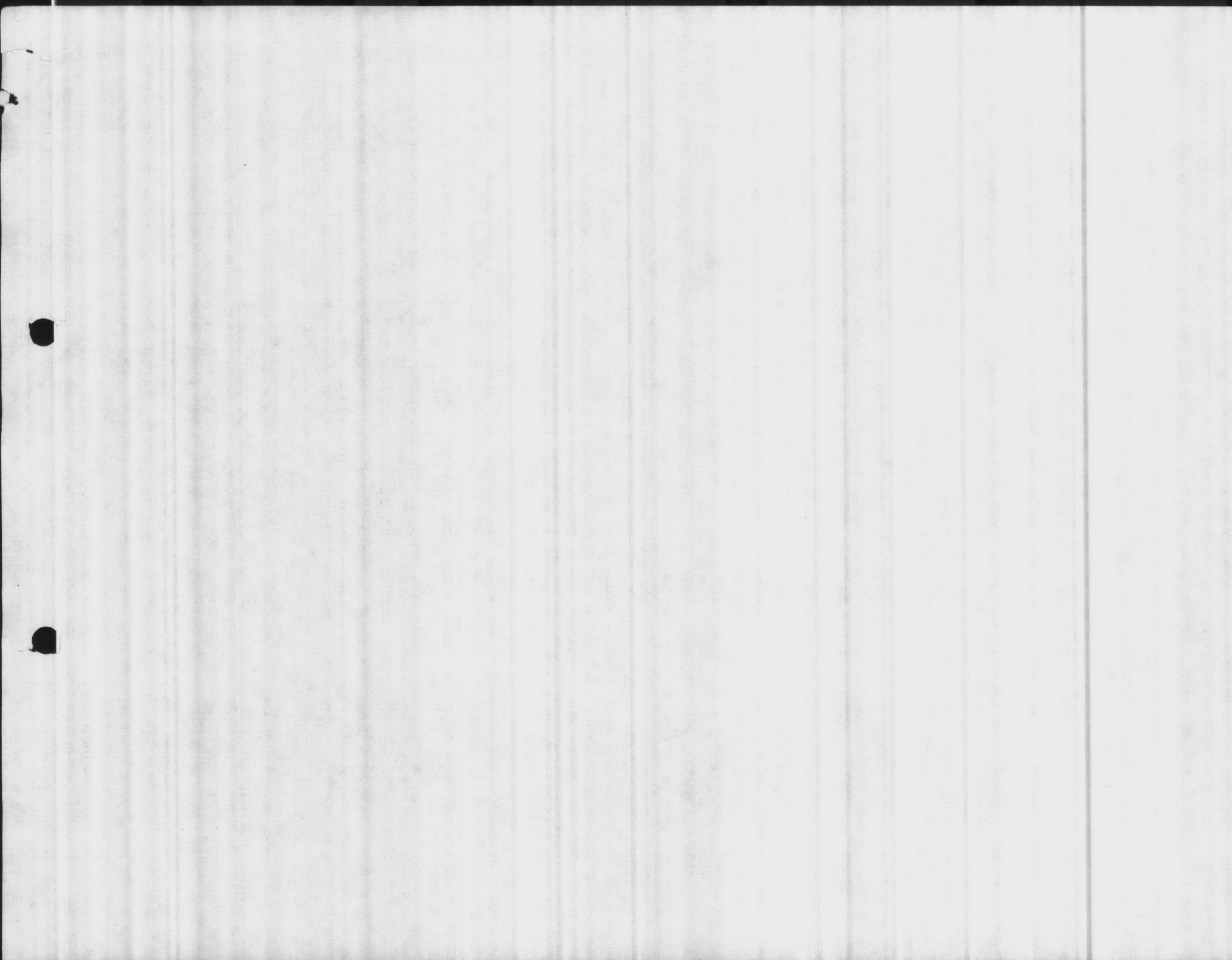
CUSTOMER TENCARVA MACH.
FOR CAMP LEJEUNE
P.O. NO. U1-74343-72
ITEM _____
NO. OF UNITS _____
PUMP SIZE 8IHC NO. OF STGS. 2
GPM 150 T.D.H. 70' FT.
LIQUID WATER
SP.GR. 1.0 TEMP. AMB. VISC. -
COL SIZE 5" SHAFT 1" DIA.
SEAL PACKED STUFFING BOX
CPLG. TYPE THREADED
COUPLING GUARD YES NO
DRIVER MFG. G.E.
HP 5 RPM 1800 VSS VHS
PH. 3 CYCLES 60 VOLTS 230/460
ENCLOSURE WP-I FRAME L213TP
WEIGHT:
PUMP 1610 LBS.
DRIVER 174 LBS.
TOTAL 1784 LBS.

NOTE:
THIS PUMP IS DESIGNED TO BE INSTALLED ON A RIGID FOUNDATION.
THE ACTUAL RESONANT FREQUENCIES OBSERVED ON THE UNIT ARE DETERMINED BY THE INSTALLATION.
COORDINATION WITH THE SYSTEM DESIGNER IS ESSENTIAL TO AVOID OPERATION AT OR NEAR THESE FREQUENCIES.

NO.	NOTES
1	T.P.L. (TOTAL PUMP LENGTH) IS THE DISTANCE TO LOWEST PROJECTION ON PUMP ± 1.00".
2	TOLERANCE ON ALL DIMENSIONS IS ± 1/16" OR ± 1/32" PER 5 FEET, WHICHEVER IS GREATER.
3	HT - DISTANCE DRIVER FACE TO TOP OF OF HEADSHAFT.
4	ALL DIMENSIONS SHOWN ARE IN INCHES UNLESS OTHERWISE STATED.
5	DRAWING IS NOT TO SCALE.
6	MINIMUM DIAMETER RECOMMENDED TO CLEAR PUMP, DRAIN AND COLUMN ASSY. IS 11.0".
7	A - 1/2" N.P.T.-PRELUBE TAP (PRODUCT LUBE ONLY) B - 3/4" N.P.T.-AUXILIARY DRAIN. C - 1/2" N.P.S.F.-SOUND TAP OR DRAIN. D - 1/2" N.P.T.-GAUGE CONN. (PLUGGED)
8	DRIVER MAY BE ROTATED AT 90° INTERVALS ABOUT VERTICAL CENTERLINE. FOR DETAILS REFER TO DRIVER DIMENSION DRAWINGS.
9	BEFORE STARTING PUMP, IMPELLER MUST BE LIFTED _____.
10	TO FOLLOW.

LTR	REVISION	BY	DATE
DO NOT USE FOR CONSTRUCTION UNLESS CERTIFIED			
CERTIFIED BY <u>TED HUBBARD</u>		DATE <u>11-4-91</u>	
TITLE <u>OUTLINE MODEL VIT-CT</u>			
DRAWN BY <u>T. HUBBARD</u>	DATE <u>11-4-91</u>		
GOULDS PUMPS VERTICAL PUMP DIVISION INDUSTRY, CALIFORNIA		S.D. NUMBER 121330	

C=VITCT



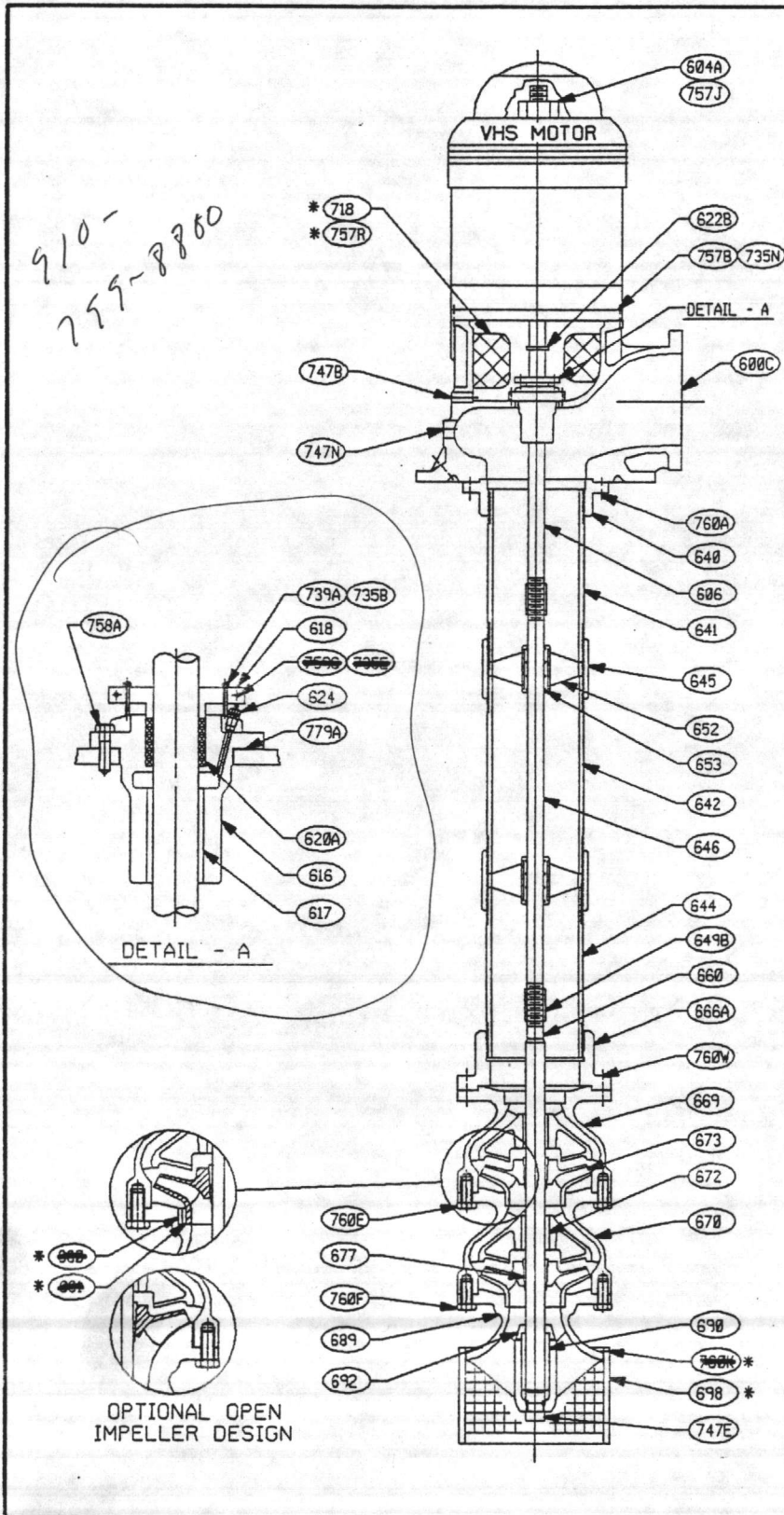


Typical Cross Sectional

VIT-CT Open Lineshaft

9.3.1

October 1, 1986
(New)



910-799-8800

ITEM NO.	DESCRIPTION	MATERIAL
SUB-ASSEMBLY - HEAD & COLUMN		
600C	HEAD	CAST IRON
604A	ADJUSTING NUT	STEEL
606	DRIVESHAFT	416 S.S.
622B	SLINGER	NEOPRENE RUBBER
640	FLANGE - ADAPTER	CAST IRON
641	COLUMN - TOP	STEEL
642	COLUMN - INTMD	STEEL
644	COLUMN - BOTTOM	STEEL
645	COUPLING - COLUMN	STEEL
646	LINESHAFT	416 S.S.
649B	COUPLING-LINESHAFT	416 S.S.
652	RETAINER-BEARING	LEADED RED BRASS
653	BEARING-LINESHAFT	RUBBER
735N	HEX NUT	STEEL
747B	PIPE PLUG - DRAIN	STEEL
747N	PIPE PLUG - LUBE	STEEL
757B	HEX HD CAPSCREW	STEEL
757J	LOCK SCREW	STEEL
760A	HEX HD CAPSCREW	STEEL
SUB-ASSEMBLY - STUFFING BOX		
616	STUFFING BOX	CAST IRON
617	BEARING-STUFF BOX	BRONZE
618	GLAND - SPLIT	LEADED RED BRASS
620A	PACKING	GRAPHITED YARN
624	BLEEDLINE ASS'Y	AS SPECIFIED
735B	HEX NUT	BRASS
735A	STUD	BRASS
758A	HEX HD CAPSCREW	STEEL
779A	GASKET	VELLUMOID
SUB-ASSEMBLY - BOWL		
660	PUMPSHAFT	416 S.S.
666A	BOWL - DISCHARGE	CAST IRON
669	BOWL - TOP	CAST IRON
670	BOWL - INTMD	CAST IRON
672	BEARING - BOWL	BRONZE
673	IMPELLER	LEADED RED BRASS
677	TAPER LOCK	STEEL
689	SUCTION - BELL	CAST IRON
690	BEARING - SUCTION	BRONZE
692	COLLAR - SAND	LEADED RED BRASS
747E	PIPE PLUG - SUCT	STEEL
760E	HEX HD CAPSCREW	STEEL
760F	HEX HD CAPSCREW	STEEL
760V	HEX HD CAPSCREW	STEEL
* OPTIONAL ASSEMBLY ITEMS		
680	WEAR RING - BOWL	AS SPECIFIED
681	WEAR RING - IMP	AS SPECIFIED
698	STRAINER-BASKET/CONE	GALVANIZED STEEL
718	GUARD - COUPLING	EXPANDED METAL
757R	ROLOK SCREW	STEEL
760K	ROLOK SCREW	STEEL

GOULDS PUMPS, INC.
CUSTOMER TENCARY MACH. CO.

P.O. NO. U1-74343-72

ITEM NO. _____

SERVICE CAMPEJEUNE

PUMP SIZE 81HC STGS. 2

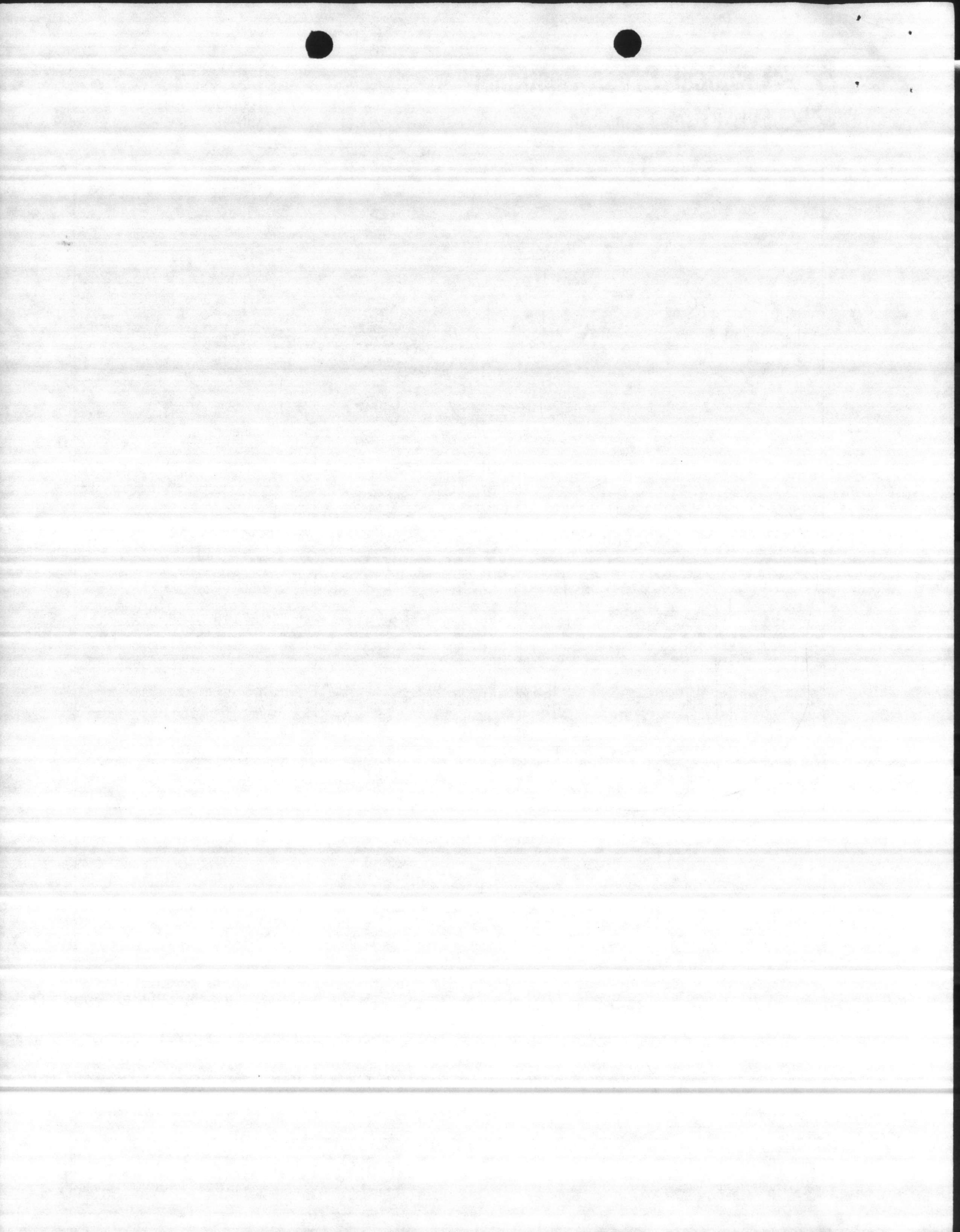
GOULDS S.O. NO. 121330

PRINTED IN U.S.A.

© 1986 Goulds Pumps, Inc.

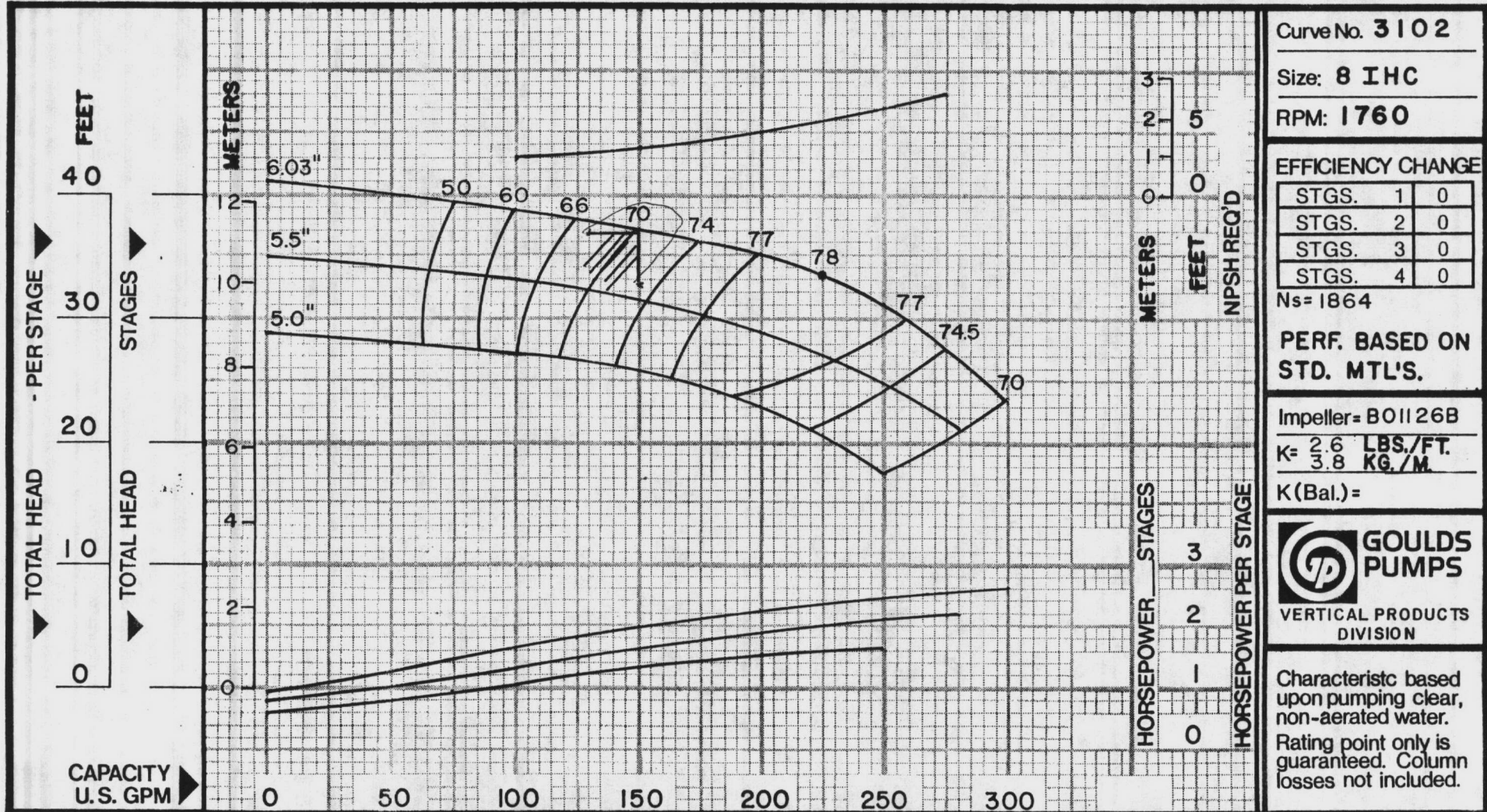
GOULDS PUMPS, INC.
VERTICAL PRODUCTS DIVISION

Attn: MARY 910-799-8801



GOULDS PROPOSAL NO.	GOULDS S.O. NO. 121330	INQUIRY NO.	CUSTOMER P.O. NO. 01-74343-72	P.O. DATE 7-26-91	ITEM NO.	CUSTOMER TENCARVA MACHINERY CO. INC.	
PROJECT CAMP LE JEUNE, N.C.	SERVICE: WATER WELL			GPM CAPACITY 150	F.T. TDH 70	% EFFICIENCY .70	RPM 1760

2 STAGES



Curve No. 3102

Size: 8 IHC

RPM: 1760

EFFICIENCY CHANGE

STGS.	1	0
STGS.	2	0
STGS.	3	0
STGS.	4	0

Ns = 1864

PERF. BASED ON
STD. MTL'S.

Impeller = B01126B

K = $\frac{2.6}{3.8}$ LBS./FT.
KG./M.

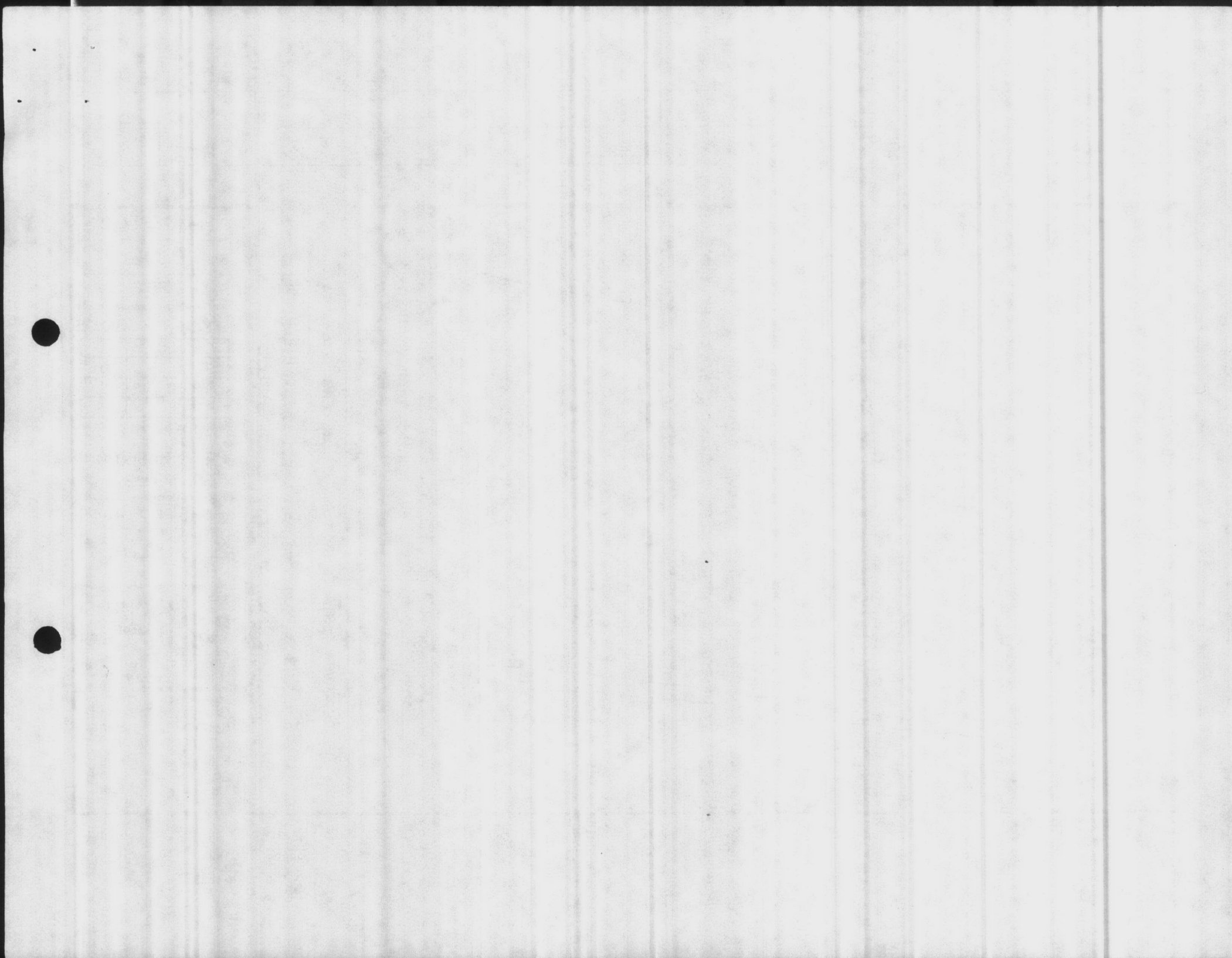
K(Bal.) =



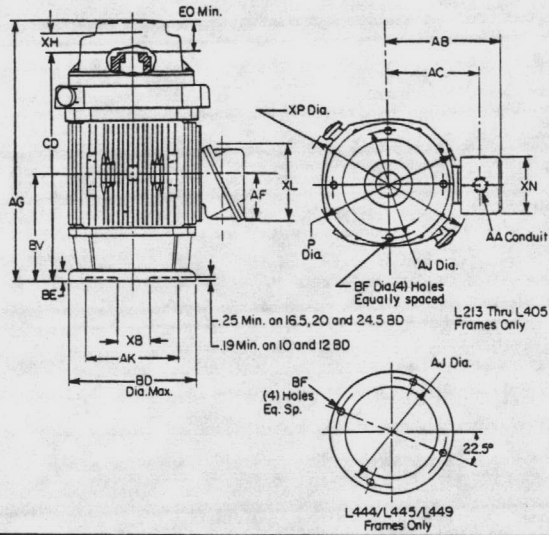
VERTICAL PRODUCTS
DIVISION

Characteristic based upon pumping clear, non-aerated water. Rating point only is guaranteed. Column losses not included.

PAGE
5C26.1A
DATE
MAY 2, 1988
SUPERSEDES
JULY, 1985



DIMENSIONS—For ESTIMATING ONLY



FOR 3000 AND 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 smaller 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

Frame No.	Approx. Net Wt. in Lbs.	Dimensions in Inches													
		P	AG	AJ ①	AK ②	BD	BE	BF	BV	CD	EO MIN	XB	XH ③	XP	
L213TP10/L213TP10	178/174	13.25	22.56	9.125	8.25	10.00	.75	.44	8.59	18.88	2.50	3.50	2.00	14.76	
L254TP10/L256TP10	246/284	15.50	26.75	9.125	8.25	10.00	.75	.44	10.75	23.56	2.75	3.50	2.25	17.20	
L254TP12/L256TP12	254/292	15.50	26.75	9.125	8.25	12.00	.75	.44	10.75	23.56	2.75	3.50	2.25	17.20	
L254TP16/L256TP16	267/305	15.50	26.75	14.750	13.50	16.50	.75	.69	10.75	23.56	2.75	3.50	2.25	17.20	
L284TP10/L286TP10	400/417	16.36	30.44	9.125	8.25	10.00	.75	.44	12.00	25.68	2.75	3.50	2.50	19.32	
L284TP12/L286TP12	400/417	16.36	30.44	9.125	8.25	12.00	.75	.44	12.00	25.68	2.75	3.50	2.50	19.32	
L284TP16/L286TP16	411/428	16.36	30.44	14.750	13.50	16.50	.75	.69	12.00	25.68	2.75	3.50	2.50	19.32	
L324TP12/L326TP12	588/588	20.40	36.93	9.125	8.25	12.00	.75	.44	13.74	31.36	4.00	4.50	3.75	22.10	
L324TP16/L326TP16	613/613	20.40	36.93	14.750	13.50	16.50	.75	.69	13.74	31.36	4.00	4.50	3.75	22.10	
L364TP12/L365TP12	840/910	22.80	40.28	9.125	8.25	12.00	.88	.44	14.34	35.04	4.00	4.50	3.75	24.76	
L364TP16/L365TP16	870/940	22.80	40.28	14.750	13.50	16.50	.88	.69	14.34	35.04	4.00	4.50	3.75	24.76	
L404TP16/L405TP16	1091/1273	25.30	45.30	14.750	13.50	16.50	1.00	.69	16.69	39.75	4.50	4.50	4.00	27.54	
L404TP20/L405TP20	1121/1303	25.30	45.30	14.750	13.50	20.00	1.00	.69	16.69	39.75	4.50	4.50	4.00	27.54	
L444TP16/L445TP16	1680/1830	27.68	53.40	14.750	13.50	16.50	1.00	.69	17.50	47.32	5.00	6.00	4.38	30.80	
L444TP20/L445TP20	1720/1870	27.68	53.40	14.750	13.50	20.00	1.00	.69	17.50	47.32	5.00	6.00	4.38	30.80	
L444TP24/L445TP24	1770/1920	27.68	53.40	14.750	13.50	24.50	1.00	.69	17.50	47.32	5.00	6.00	4.38	30.80	
L449TP16	2130	27.68	61.90	14.750	13.50	16.50	1.00	.69	21.75	55.82	5.00	6.00	4.38	30.80	
L449TP20	2170	27.68	61.90	14.750	13.50	20.00	1.00	.69	21.75	55.82	5.00	6.00	4.38	30.80	
L449TP24	2220	27.68	61.90	14.750	13.50	24.50	1.00	.69	21.75	55.82	5.00	6.00	4.38	30.80	

CONDUIT BOX DIMENSIONS

Frame	Motor Description	Nominal HP	Standard Conduit Boxes								Oversize Conduit Boxes					
			Dimensions in Inches													
			Approx. Vol.	AA	AB	AC	AF	XL	XN	Approx. Vol.	AA	AB	AC	AF	XL	XN
213-215	Standard	10	76	1-11½	9.72	7.65	4.00	6.62	5.31	76	1½-11½	9.72	7.65	4.00	6.62	5.31
254-256	Standard	20	76	1½-11½	9.72	7.65	4.00	6.62	5.31	137	1½-11½	11.78	9.03	4.38	7.59	6.25
284-286	Standard	30	137	1½-11½	12.53	9.78	4.38	7.59	6.25	346	2-11½	13.81	10.19	6.44	10.12	7.00
324-326	Standard	50	346	2-11½	15.08	11.46	6.44	10.12	7.00	346	3-8	15.08	11.46	6.44	10.12	7.00
364-365	Standard	75	346	3-8	16.13	12.51	6.44	10.12	7.00	700	3-8	18.01	13.88	7.00	11.75	10.00
404-405	Standard	125	700	3-8	19.01	14.88	7.00	11.75	10.00	1500	4-8	20.25	15.13	8.12	13.68	17.00
444-445	Standard	200	700	3-8	20.32	16.19	7.00	11.75	10.00	1500	4-8	21.56	16.44	8.12	13.68	17.00
449	Standard	400	1500	4-8	21.56	16.44	8.12	13.68	17.00	2500	(2)4-8	21.54	16.44	8.12	13.68	27.25

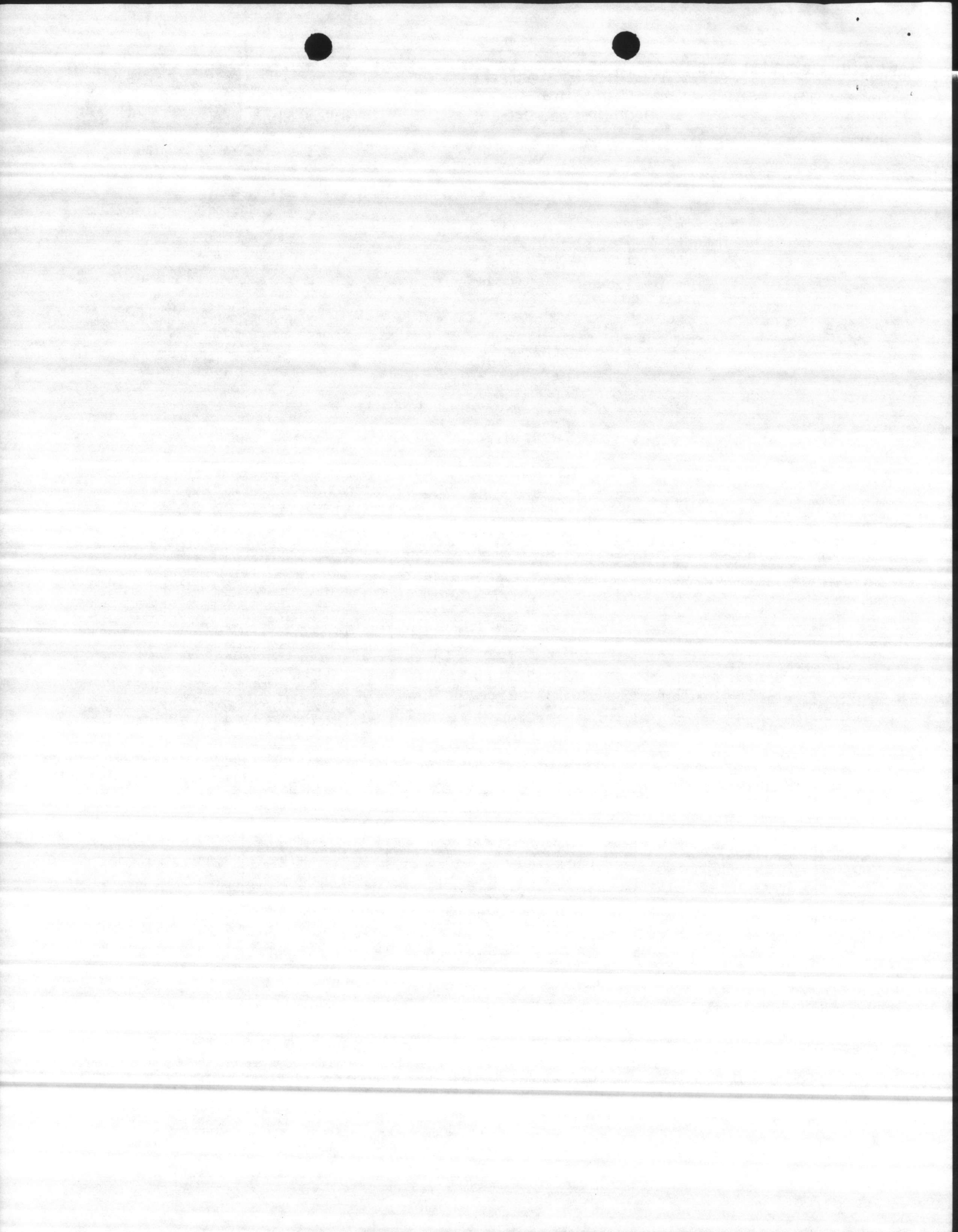
Provided mounting conditions permit, diagonally split conduit box may be turned so that entrance can be made from top, bottom or either side.

THE FRAME NUMBERS SHOWN IN BOLD-FACE TYPE INDICATE STANDARD NEMA BASE SIZES.

- ① AJ centerline of bolt holes within 0.025 inch, for all frames, of true location. True location is defined as angular and diametrical location with reference to the centerline of AK.
- ② AK diameters of 8.250 inches will come within the limits of +0.003 inch, -0.000 inch; diameters of 13.500 inches will come within the limits of +0.005 inch, -0.000 inch.
- ③ The total height of pump shaft and locking nut above top of coupling must not exceed dimension XH.

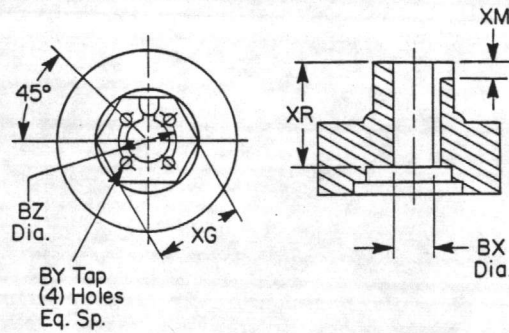
NOTES:

- Maximum frame size for 2-pole motors is 405TP.
- Frames L213 through L286 have grease-lubricated upper guide and lower thrust bearings. Frames L324 through L405 have oil lubricated upper thrust bearing and grease lubricated lower guide bearing. Frames L444/L445/L449 have oil lubricated upper thrust bearing and oil lubricated lower guide bearing.
- Tolerances: Face runout and permissible eccentricity of mounting rabbet for AK, dimension 8.250 inches, 0.004 TIR, for AK dimension 13.500 inches, 0.007 TIR.
- For shipping weight add 10 percent to net weight.



DIMENSIONS—For ESTIMATING ONLY

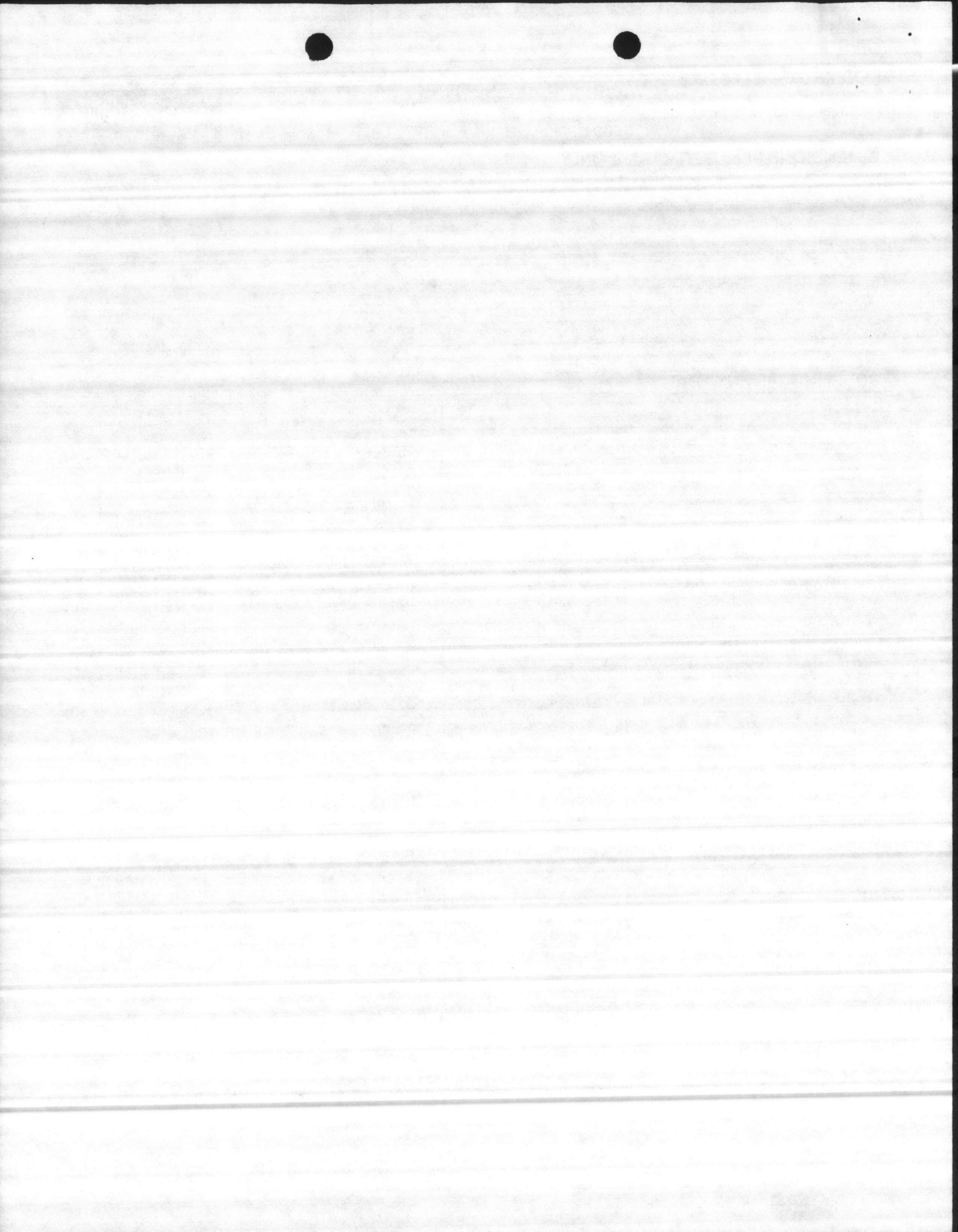
5 H.P.



COUPLING DIMENSIONS

Frame No.	Cat. No.				Dimensions in Inches										
					Self-release or Bolted		Nonreverse Assembly		Keyway		BY	BZ	XG	XR	XM
									Actual	Wide					
L213 L214	192B9950AC-G04		192B9950AA-G04		.752-.751	.188	.094	10-32	1.38	2.25	1.18	.44			
	192B9950AC-G03		192B9950AA-G03		.877-.876	.250	.125	10-32	1.38	2.25	1.18	.44			
	192B9950AC-G02		192B9950AA-G02		.939-.938	.250	.125	10-32	1.38	2.25	1.18	.44			
	192B9950AC-G01		192B9950AA-G01		1.002-1.001	.250	.125	10-32	1.38	2.25	1.18	.44			
L254 and L256	192B9950AL-G05		192B9950AJ-G05		.752-.751	.188	.094	10-32	1.38	2.25	1.50	.44			
	192B9950AL-G04		192B9950AJ-G04		.877-.876	.250	.125	10-32	1.38	2.25	1.50	.44			
	192B9950AL-G03		192B9950AJ-G03		1.002-1.001	.250	.125	10-32	1.38	2.25	1.50	.44			
	192B9950AL-G02		192B9950AJ-G02		1.189-1.188	.250	.125	1/4-20	1.75	2.25	1.50	.44			
	192B9950AL-G01		192B9950AJ-G01		1.252-1.251	.250	.125	1/4-20	1.75	2.25	1.50	.44			
	192B9950AL-G06		192B9950AJ-G07		1.252-1.251	.375	.125	1/4-20	1.75	2.25	1.50	.44			
L284 and L286	192B9950AL-G05		192B9950AJ-G05		.752-.751	.188	.094	10-32	1.38	2.25	1.50	.44			
	192B9950AL-G04		192B9950AJ-G04		.877-.876	.250	.125	10-32	1.38	2.25	1.50	.44			
	192B9950AL-G03		192B9950AJ-G03		1.002-1.001	.250	.125	10-32	1.38	2.25	1.50	.44			
	192B9950AL-G02		192B9950AJ-G02		1.189-1.188	.250	.125	1/4-20	1.75	2.25	1.50	.44			
	192B9950AL-G01		192B9950AJ-G01		1.252-1.251	.250	.125	1/4-20	1.75	2.25	1.50	.44			
	192B9950AL-G07		192B9950AJ-G07		1.252-1.251	.375	.188	1/4-20	1.75	2.25	1.50	.44			
L324 and L326	192B9950AW-G06		192B9950AY-G06		1.002-1.001	.250	.125	10-32	1.38	2.25	1.81	.44			
	192B9950AW-G05		192B9950AY-G05		1.189-1.188	.250	.125	1/4-20	1.75	2.25	1.81	.44			
	192B9950AW-G04		192B9950AY-G04		1.252-1.251	.250	.125	1/4-20	1.75	2.25	1.81	.44			
	192B9950AW-G03		192B9950AY-G03		1.252-1.251	.375	.188	1/4-20	1.75	2.25	1.81	.56			
	192B9950AW-G02		192B9950AY-G02		1.439-1.438	.375	.188	1/4-20	2.12	2.25	1.81	.56			
	192B9950AW-G01		192B9950AY-G01		1.502-1.501	.375	.188	1/4-20	2.12	2.25	1.81	.56			
L364 and L365	192B9950BB-G06		192B9950BC-G06		1.189-1.188	.250	.125	1/4-20	1.75	2.25	2.25	.44			
	192B9950BB-G05		192B9950BC-G05		1.252-1.251	.375	.188	1/4-20	1.75	2.25	2.25	.56			
	192B9950BB-G04		192B9950BC-G04		1.439-1.438	.375	.188	1/4-20	2.12	2.25	2.25	.56			
	192B9950BB-G03		192B9950BC-G03		1.502-1.501	.375	.188	1/4-20	2.12	2.25	2.25	.56			
L404 and L405	1800 RPM and below	3600 RPM	1800 RPM and below	3600 RPM	1.189-1.188	.250	.125	1/4-20	1.75	2.25	2.25	.44			
	192B9950BH-G06	BB-G06	192B9950BJ-G06	BC-G06	1.252-1.251	.375	.188	1/4-20	1.75	2.25	2.25	.56			
	192B9950BH-G05	BB-G05	192B9950BJ-G05	BC-G05	1.439-1.438	.375	.188	1/4-20	2.12	2.25	2.25	.56			
	192B9950BH-G04	BB-G04	192B9950BJ-G04	BC-G04	1.502-1.501	.375	.188	1/4-20	2.12	2.25	2.25	.56			
	192B9950BH-G03	BB-G03	192B9950BJ-G03	BC-G03	1.502-1.501	.375	.188	1/4-20	2.12	2.25	2.25	.56			
	192B9950BH-G02	BB-G02	192B9950BJ-G02	BC-G02	1.6895-1.688	.375	.188	1/4-20	2.50	2.25	2.25	.56			
192B9950BH-G01	BB-G01	192B9950BJ-G01	BC-G01	1.7525-1.751	.375	.188	1/4-20	2.50	2.25	2.25	.56				
L444 and L445 and L449 ⊙	1800 RPM and below		1800 RPM and below		1.5020-1.5010	.375	.188	1/4-20	2.50	4.75	5.25	.56			
	192B9950BK-G13		192B9950BL-G13		1.6895-1.688	.375	.188	1/4-20	2.50	4.75	5.25	.56			
	192B9950BK-G12		192B9950BL-G12		1.7525-1.751	.375	.188	1/4-20	2.50	4.75	5.25	.56			
	192B9950BK-G11		192B9950BL-G11		1.8145-1.813	.500	.250	1/4-20	2.50	4.75	5.25	.69			
	192B9950BK-G10		192B9950BL-G10		1.9395-1.938	.500	.250	1/4-20	2.50	4.75	5.25	.69			
	192B9950BK-G09		192B9950BL-G09		2.0025-2.001	.500	.250	3/8-16	3.25	4.75	5.25	.69			
	192B9950BK-G08		192B9950BL-G08		2.0645-2.063	.500	.250	3/8-16	3.25	4.75	5.25	.69			
	192B9950BK-G07		192B9950BL-G07		2.1275-2.126	.500	.250	3/8-16	3.25	4.75	5.25	.69			
	192B9950BK-G06		192B9950BL-G06		2.1895-2.188	.500	.250	3/8-16	3.25	4.75	5.25	.69			
	192B9950BK-G05		192B9950BL-G05		2.2525-2.251	.500	.250	3/8-16	3.25	4.75	5.25	.69			
	192B9950BK-G04		192B9950BL-G04		2.3775-2.376	.500	.250	3/8-16	3.25	4.75	5.25	.69			
	192B9950BK-G03		192B9950BL-G03		2.4395-2.438	.625	.312	3/8-16	3.25	4.75	5.25	.69			
	192B9950BK-G02		192B9950BL-G02		2.4395-2.438	.625	.312	3/8-16	3.25	4.75	5.25	.69			
	192B9950BK-G01		192B9950BL-G01		2.5025-2.501	.625	.312	3/8-16	3.25	4.75	5.25	.69			

⊙ Small BX bore generally not suitable for 449 frame ratings. Check shaft and key stress before using.

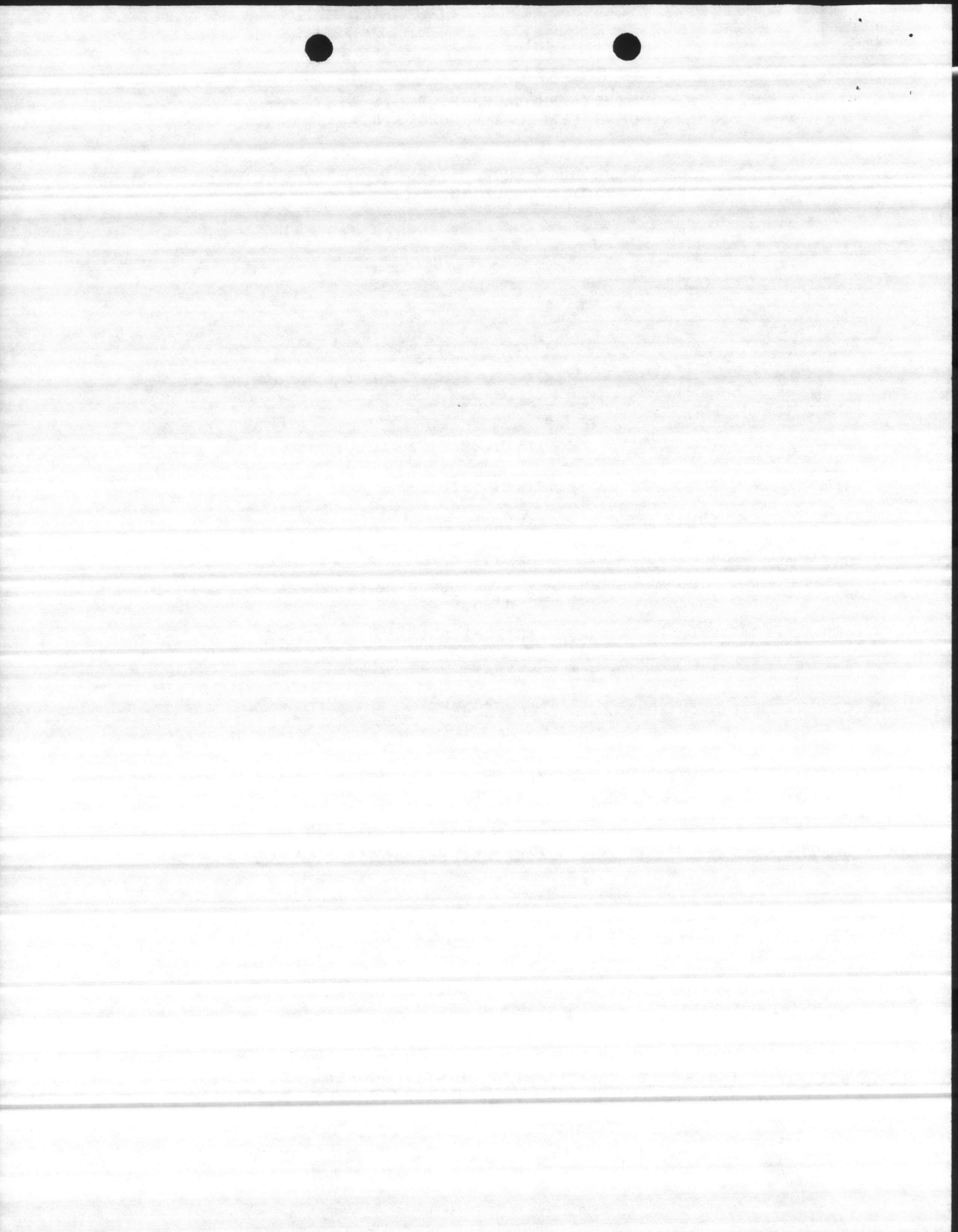


RECOMMENDED REPLACEMENT PARTS LIST
GOULDS PUMPS VERTICAL PRODUCTS DIVISION

SO#: _____ PRODUCT LUBRICATION
 CUST#: _____ PACKED STUFFING BOX
 PO#: _____
 BO#: _____
 ITEM: _____
 SERVICE: _____

<u>ITEM #</u>	<u>QUANTITY</u>	<u>PART NAME</u>
608	1	HEADSHAFT
617	1	BEARING-STUFFING BOX
620A	1 SET	PACKING
646	X	LINESHAFT
649	X	COUPLING-LINESHAFT
653	X	BEARING-LINESHAFT
660	1	PUMPSHAFT
672	N	BEARING-BOWL
673	N	IMPELLER
677	N	TAPER LOCK
690	1	BEARING-SUCTION BELL
779A	1	GASKET-STUFFING BOX TO HEAD

NOTES: X = QUANTITY VARIES WITH LENGTH. CONSULT BILL OF MATERIALS.
 N = NUMBER OF STAGES OF BOWL ASSEMBLY.



TX-BMRS01-000 10:32:57 S DATE 7/31/91 BILL OF MATERIALS FOR MEMPHIS PAGE

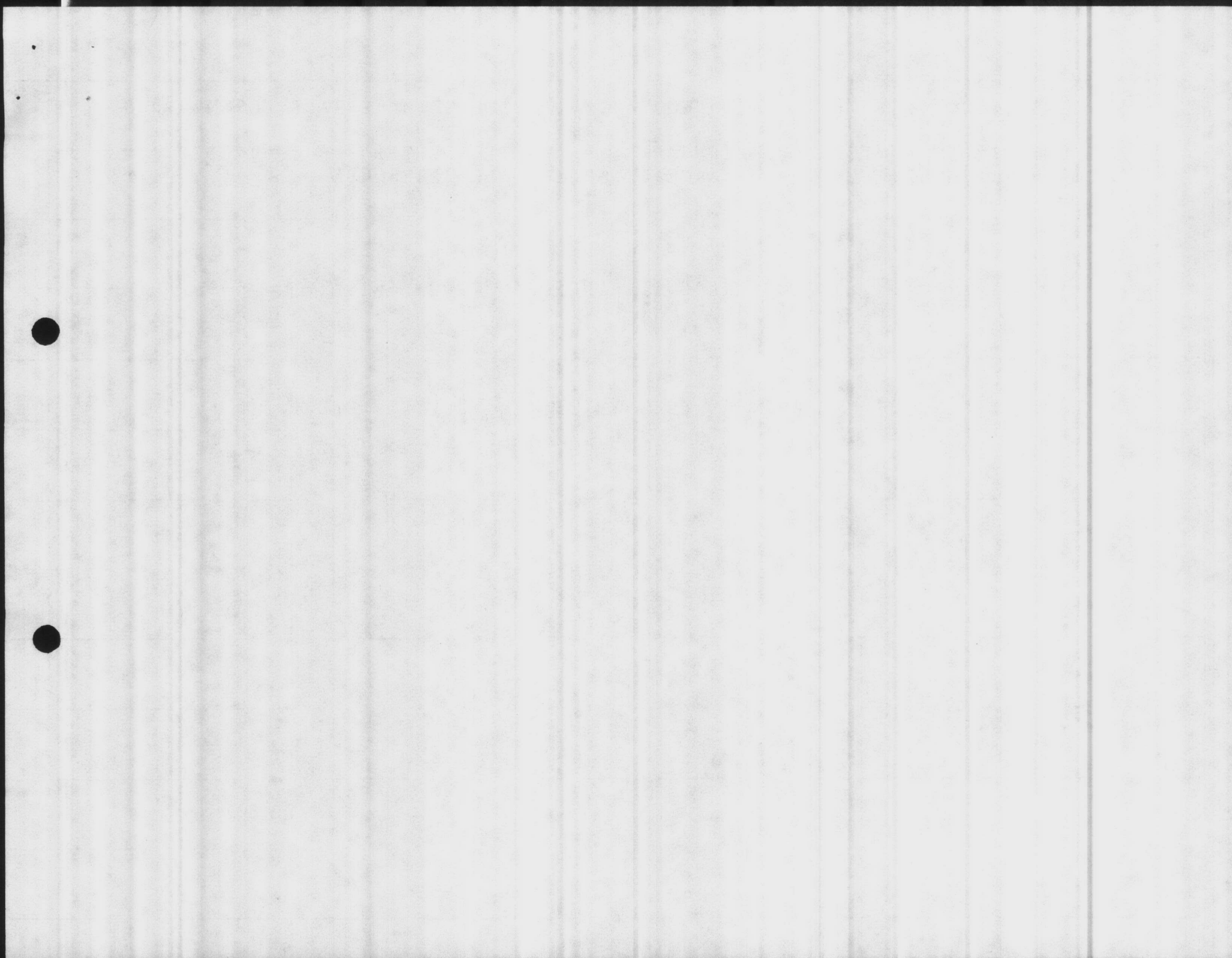
CUSTOMER NAME -- TENCARVA MACH. SERIAL NUMBER -- 121330
INDEX # - MEMPHIS DESCRIPTION MEMPHIS WAREHOUSE

LINE NO	TOTAL QTY	DESCRIPTION	PART #
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1		5HP VHS 1800 WPI 1NRR 230/460V	MISC.
---	--	--------------------------------	-------

TOTAL	1		
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** PART ALLOCATION PROCESS HAS BEEN INITIATED FOR THIS ORDER **



TX-BMRS01-000 10:32:57 S DATE 7/31/91 BILL OF MATERIALS FOR MEMPHIS

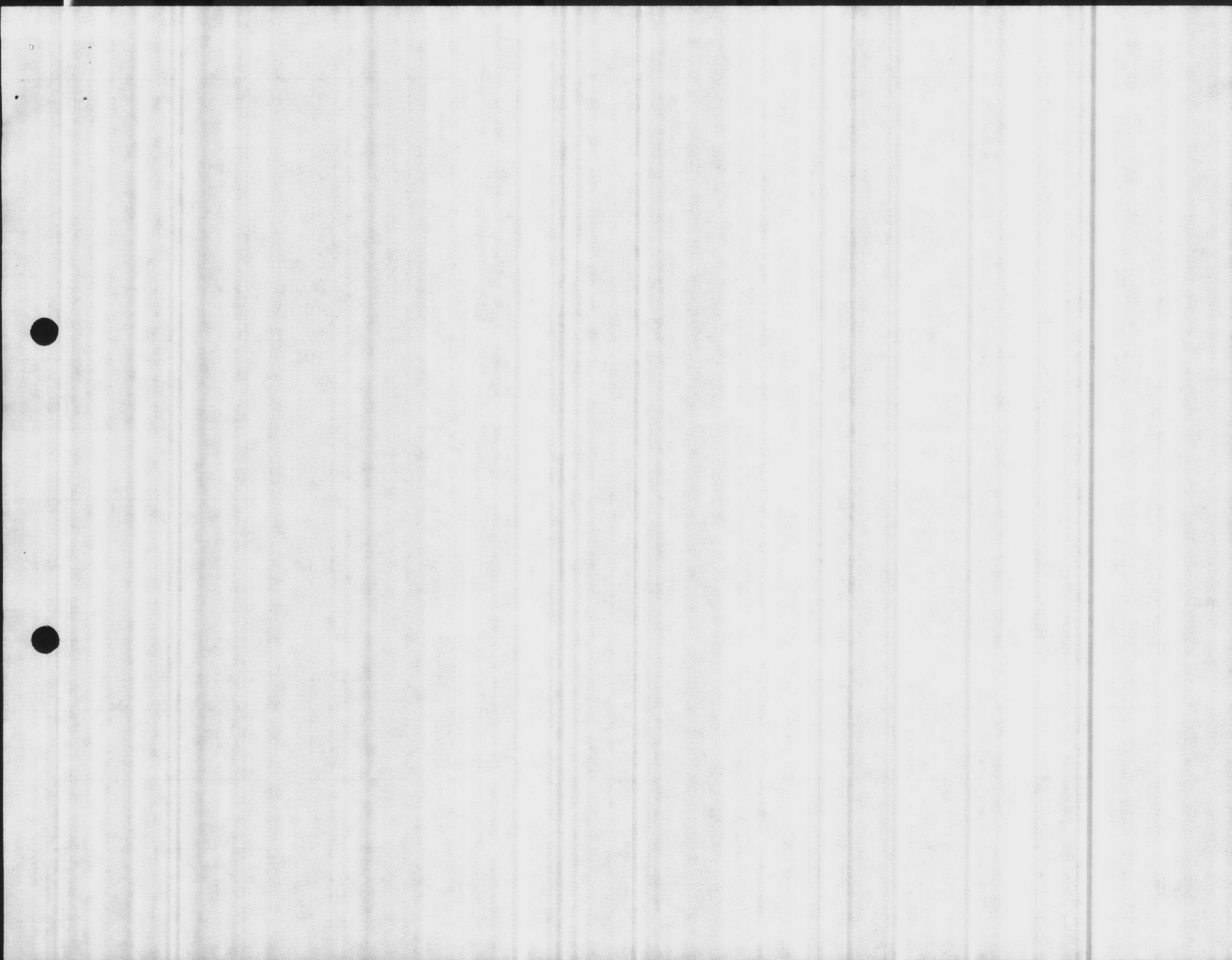
CUSTOMER NAME - TENCARVA MACH. SERIAL NUMBER - 121330
INDEX # - CC05X100W 0000 DESCRIPTION ASSY COL CHROME WL SPCL

LINE NO	TOTAL QTY	DESCRIPTION	PART #
5		COLUMN 5.00" STR THD 1.19-.25" LG	B00074B04 6501
5		LINESHAFT 1.00X10 ELS	A00041B02 2227
7		CPLG LS 1.00" DIA	IE112 2218
5		SPIDER OLS 1.00X5	G00122B08 1102

TOTAL 22

** PART ALLOCATION PROCESS HAS BEEN INITIATED FOR THIS ORDER **

SCORE 27



TX-BMRS01-000 10:32:57 S DATE 7/31/91 BILL OF MATERIALS FOR MEMPHIS

CUSTOMER NAME - TENCARVA MACH. SERIAL NUMBER - 121330

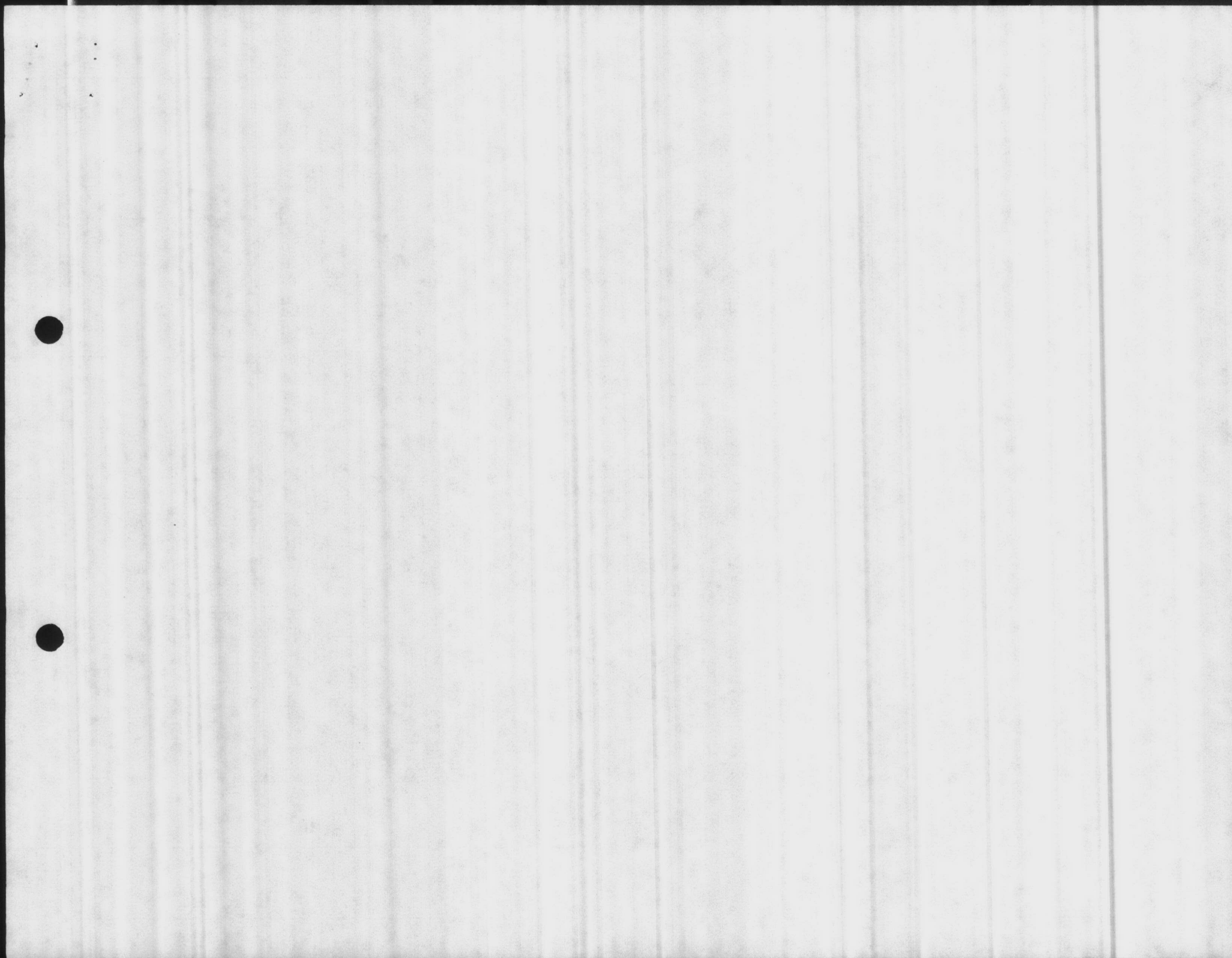
INDEX # - BA0BICW 0000 DESCRIPTION ASSY BOWL BI WL

LINE NO	TOTAL QTY	DESCRIPTION	PART #
7	1	BOWL SUCT BI NO WR 1.18"SFT	B01129B01-1003
9	1	BRG BRZ 1.19"ID1.50"ODX3.50"LG	A01650B 1104
11	2	BOWL INTMD BI NO WR 1.18"SFT	B01124B01 6911
13	2	BRG BRZ 1.50OD 1.19ID 2.25"LG	A01651B 1104
17	1	BOWL DISCK OLS BRD, BI, BRJ, BRA	E01760B 1003
20	24	SCR CAP HEX .37-16UNCX1.00" LG	49511 102 2298
22	2	IMPLR BIHC	B01126B 1102
24	2	TAPERLOCK 8D/J	IE331 2242
26	1	PUMPSHAFT1.00X1.18" BI DS-BOWL	B01812B01 2227
28	1	SAND COLLAR 1.18" SFT	B00513B 1101
29	29	BARSTOCK 1.18"DIA	2227 0118 2227
36	1	NAMEPLATE BOWL UNIT	A00029B 3211
37	2	FASTENER MTL TACK NAME PL .25	A00206B03-0000
40	1	ASSY COSTING BA0BICW 1ST STG	A00104B58 0000
41	1	BA0BICW COST ADD STG	A00107B58 0000
	1	STRAINER CONE 5 M	A8935-2 6952
	1	BRG BRZ 1.19"ID1.50"ODX3.50"LG	A01650B 1104

TOTAL 73

** PART ALLOCATION PROCESS HAS BEEN INITIATED FOR THIS ORDER **

MOORE 27



4

TX-BMRS01-000 10:32:57 S DATE 7/31/91 BILL OF MATERIALS FOR MEMPHIS PA

CUSTOMER NAME TENCARVA MACH. SERIAL NUMBER 121330
INDEX # - DKR06W 0000 DESCRIPTION ASSY DISCH HD 06 WL

SCORE 27

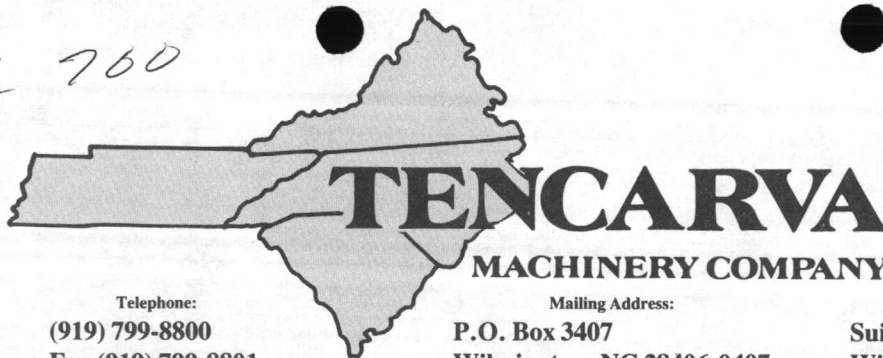
LINE NO	TOTAL QTY	DESCRIPTION	PART #
1	1	DISCH HD 6X12"BD FLG	C01988B 1003
8	1	LINESHAFT 1.00" DIA	C02036B02 2227
10	25	BARSTOCK 1.00"DIA	2227 0100 2227
12	1	NUT ADJ 1.00"	IE459 1018
13	1	SCR PAN HEAD 10-32x1.25	49505 262 2298
14	1	SLINGER 1.0	A5775 2 5121
15	1	GLAND SPLIT 1.00" SFT	B01292B01 1193
17	1	PACKING 1.00"X.38 5 RING	C00779B15 5026
18	1	STUFFING BOX 1.00 SFT RDSN	C01942B 1003
19	1	BRG BRZ 1.00"ID1.25"ODX2.25"LG	IE310 1104
51	1	GASKET STUFF BOX #6 .03 THK	B2749 4 5136
52	2	STUD SB .50-13NCX2.75	91786 84 2130
53	2	NUT HEX .50IN	49507 7 2130
54	6	SCR CAP HEX .50-13 UNC 1.50"LG	49511 204 2210
55	6	WASHER LOCK HEL SPRING .50"	49522 7 6953
58	1	NIPPLE COLUMN 5X12	A5776 4 6521
59	1	RICK LOCK COL ADJ NIPPLE	A964-8 1018
64	2	PLUG PIPE HEX RD .5IN 14NPT	63122 4 2210
65	1	PLUG PIPE HEX RD .75IN 14NPT	63122 5 2210
66	1	PLUG PIPE HEX RD 1.5IN 11NPT	63122 8 2210
68	1	TAG HEAD	A00030B 3211
69	2	FASTENER MTL TACK NAME PL .25	A00206B03 0000
70	4	SCR CAP HEX .37-16 UNC 2.75"LG	49511 109 2210
72	4	NUT HEX STD THD UNC .37"	49507 104 2210
73	4	WASHER LOCK HEL SPRING .37"	49522 5 2210
	1	FLG COL 6.5 THRU THD	B02275E 1003
	1	1" x 15 1/2" Stub Shaft	22270100 2227
TOTAL	73		

** PART ALLOCATION PROCESS HAS BEEN INITIATED FOR THIS ORDER **

9-30-93

10' of well screen on
pump per Pete Law

TC 760



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

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

Shipping Address:
Suite A1, 108 N. Kerr Avenue
Wilmington, NC 28405

TO: Mr. Stanley Miller
Water Treatment Plant
Utilities Division
Base Maintenance Dept.
Camp LeJeune, N. C. 28542

DATE 12-20-91

SUBJECT: YOUR P.O. NO. M67001-91A-0191
Call No. E013 & E014

THE FOLLOWING TECHNICAL DATA IS SUBMITTED FOR YOUR REVIEW (SEE BELOW).

<u>QTY.</u>	<u>DESCRIPTION</u>	<u>DWG. NO.</u>	<u>ITEM NO.</u>
3	Pump Outline		Well Water Pump
3	Pump Cross Section		
3	Pump Typical Curve		
3	Pump Spare Parts List		
3	Motor Drawings		
3	Pump Manuals		
1	Motor Manual		

- PUMP INSTALLATION, OPERATING AND MAINTENANCE MANUALS ATTACHED.
 - YOUR COMPLETE APPROVAL REQUIRED BEFORE ORDER IS SCHEDULED AND RELEASED TO MANUFACTURING. UNLESS A LONGER PERIOD IS STATED IN YOUR PURCHASE ORDER, APPROVAL PRINTS MUST BE RECEIVED IN THIS OFFICE BY _____; DELAY BEYOND THIS DATE WILL RESULT IN EXTENDED DELIVERY.
 - THE ABOVE LITERATURE IS FOR YOUR INFORMATION AND RECORDS, AND DOES NOT REQUIRE YOUR APPROVAL. RETAIN LITERATURE AS YOUR FINAL DISTRIBUTION.
- NOTE: ANY CHANGES MAY AFFECT QUOTED PRICES AND SHIPPING SCHEDULES.

VERY TRULY YOURS,

R.W. Taylor
R. W. Taylor

CC:



10/12/19

10/12/19

10/12/19

10/12/19

10/12/19

10/12/19

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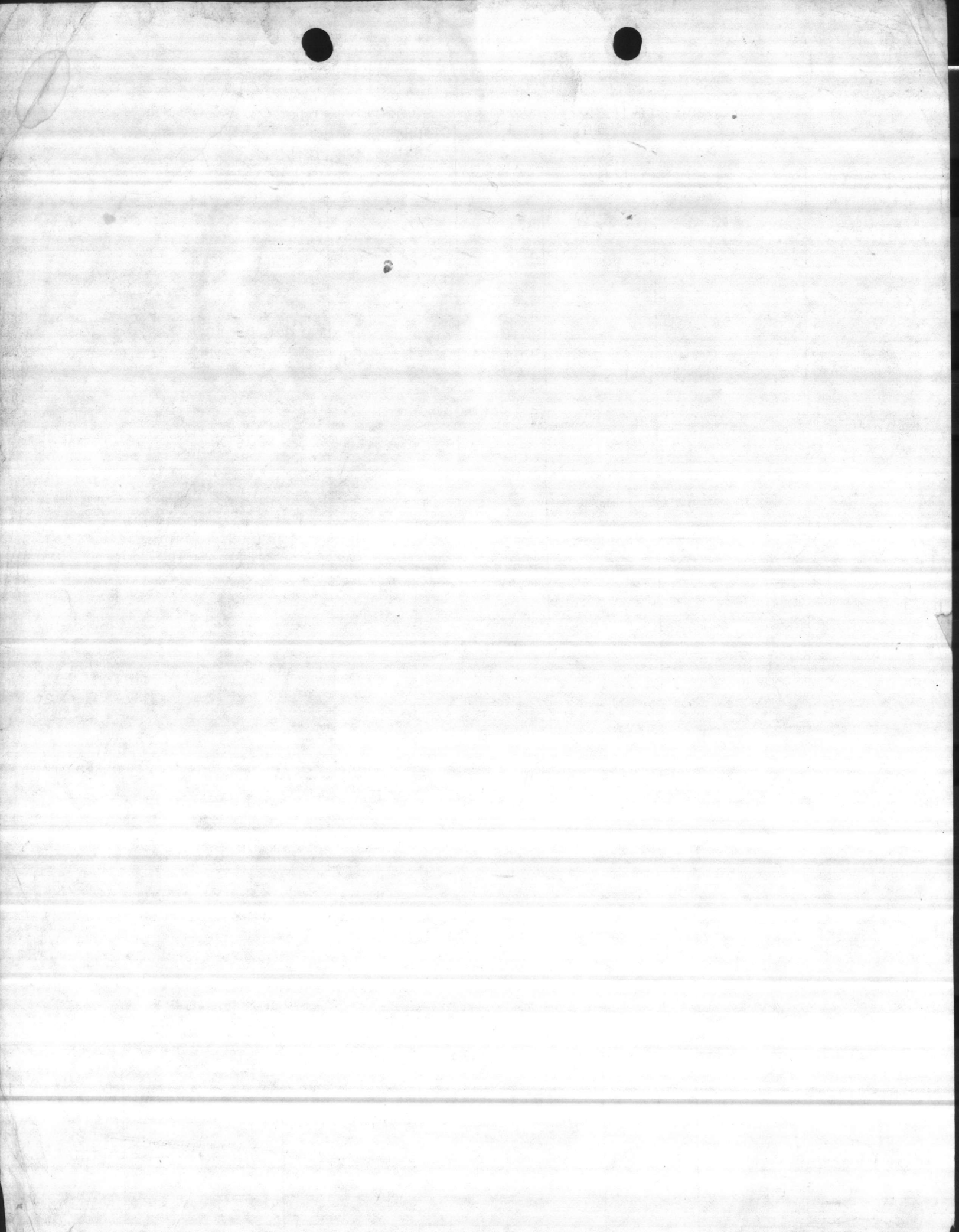
10/12/19

10/12/19

WELL NUMBER TC 700		BY THOMAS BROWN / STEVENSON			DATE 4-13-93	
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
50	7	21	14	22	105	
		32	25	14	130	

REMARKS 4-12-93 replaced 2 sect of shaft & 4 Org.
 stuffing box & bushing
 Dead head @ 28 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE

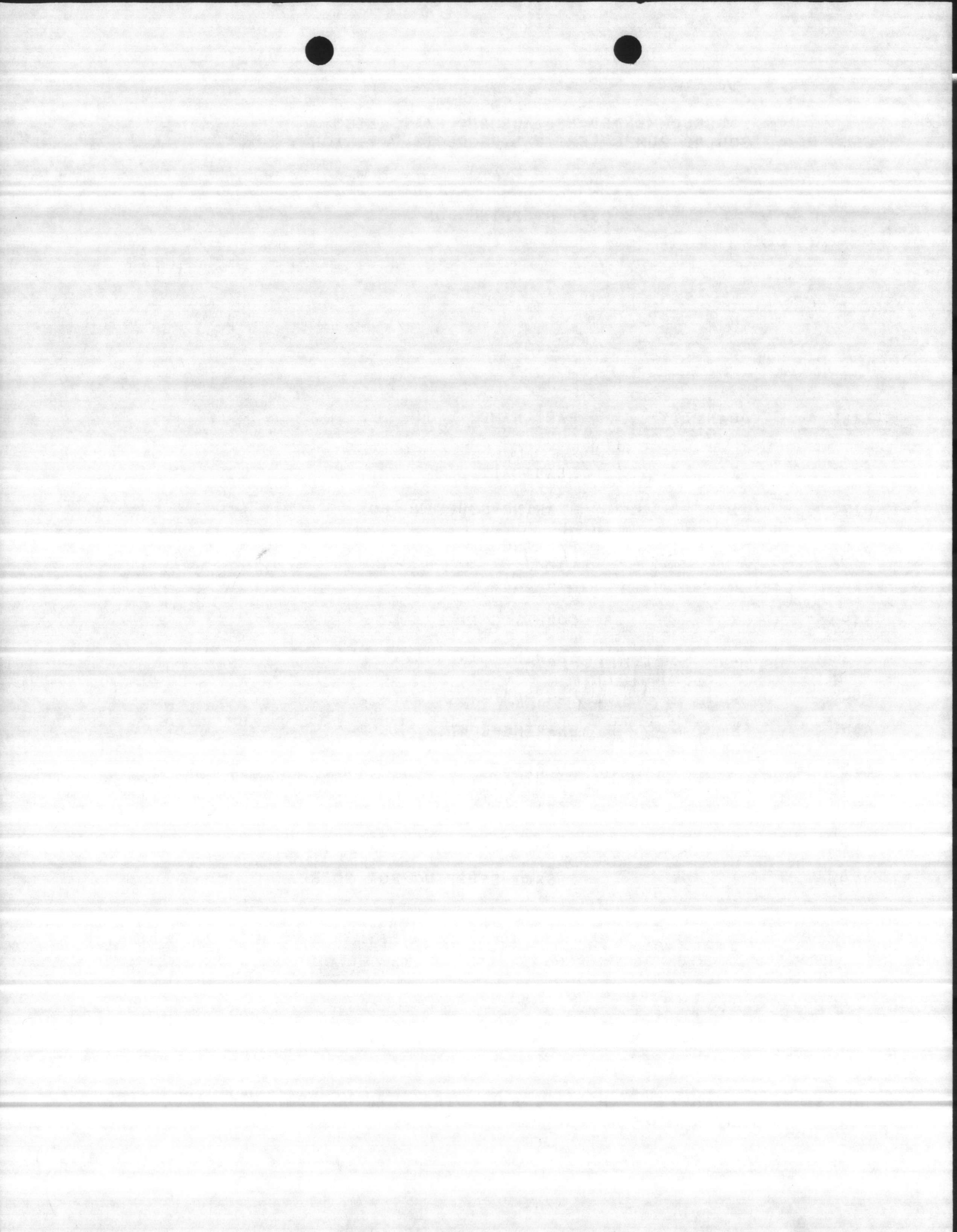


**RECOMMENDED REPLACEMENT PARTS LIST
GOULDS PUMPS VERTICAL PRODUCTS DIVISION**

SO#: _____ PRODUCT LUBRICATION
 CUST#: _____ PACKED STUFFING BOX
 PO#: _____
 BO#: _____
 ITEM: _____
 SERVICE: _____

<u>ITEM #</u>	<u>QUANTITY</u>	<u>PART NAME</u>
608	1	HEADSHAFT
617	1	BEARING-STUFFING BOX
620A	1 SET	PACKING
646	X	LINESHAFT
649	X	COUPLING-LINESHAFT
653	X	BEARING-LINESHAFT
660	1	PUMPSHAFT
672	N	BEARING-BOWL
673	N	IMPELLER
677	N	TAPER LOCK
690	1	BEARING-SUCTION BELL
779A	1	GASKET-STUFFING BOX TO HEAD

NOTES: X = QUANTITY VARIES WITH LENGTH. CONSULT BILL OF MATERIALS.
 N = NUMBER OF STAGES OF BOWL ASSEMBLY.



TX-BMRS01-000 10:32:57 S DATE 7/31/91 BILL OF MATERIALS FOR MEMPHIS

CUSTOMER NAME TENCARVA MACH. SERIAL NUMBER 12-1330

INDEX # - BAOBICW 0000 DESCRIPTION ASSY BOWL 8I WL

LINE NO	TOTAL QTY	DESCRIPTION	PART #
7	1	BOWL SUCT 8I NO WR 1.18"SFT	B01129B01-1003
9	1	BRG BRZ 1.19"ID1.50"ODX3.50"LG	A01650B 1104
11	2	BOWL INTMD 8I NO WR 1.18"SFT	B01124B01 6911
13	2	BRG BRZ 1.50OD 1.19ID 2.25"LG	A01651B 1104
17	1	BOWL DISCH OLS BRD, 8I, BRJ, BRA	B01760B 1003
20	24	SCR CAP HEX .37-16UNCX1.00" LG	49511 102 2298
22	2	IMPLR BIHC	B01126B 1102
24	2	TAPERLOCK 8D/J	IE331 2242
26	1	PUMPSHAFT1.00X1.18" 8I DS-BOWL	B01812B01 2227
28	1	SAND COLLAR 1.18" SFT	B00513B 1101
29	29	BARSTOCK 1.18"DIA	2227 0118 2227
35	1	NAMEPLATE BOWL UNIT	A00029B 3211
37	2	FASTENER MTL TACK NAME PL .25	A00206B03-0000
40	1	ASSY COSTING BAOBICW 1ST STG	A00104B58 0000
41	1	BAOBICW COST ADD STG	A00107B58 0000
	1	STRAINER CONE 5 M	A8935-2 6952
	1	BRG BRZ 1.19"ID1.50"ODX3.50"LG	A01650B 1104

TOTAL 73

** PART ALLOCATION PROCESS HAS BEEN INITIATED FOR THIS ORDER **



Hunt

CONTRACTOR'S SUBMITTAL TRANSMITTAL

LANTDIV NORFOLK 4-4355/3 (Rev. 11-80)

CONTRACT NO 81-C-1644	TRANSMITTAL NO 212	DATE 5-30-86
--------------------------	-----------------------	-----------------

FROM CONTRACTOR
 Harry Pepper & Associates, Inc.
 TO
 Henry Von Oesen & Associates, Inc.

PROJECT TITLE AND LOCATION
 Holcomb Blvd Water Treatment Plant
 MCB, Cp 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
	02734	ROTARY DRILLED WATER WELLS WELL # 2			
1	1.2.1	Shop Drawings	7	A	JRB

CONTRACTOR'S COMMENTS

An Additional fourteen (14) feet of screen was added.

This Shop Drawing replaces Shop Drawing previous submitted. See Transmittal # 108, dated 10-16-85.

COPY OF TRANSMITTAL AND SUBMITTALS TO ROICC: **ONE COPY TO ROICC**

CONTRACTOR REPRESENTATIVE (Signature): *Phil Reese*
 Phil Reese

DATE RECEIVED BY REVIEWER: **6/3/86**

FROM (Reviewer): **Henry von Oesen & Assoc., Inc.**

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

COPIES TO ROICC (2), LANTDIV (1), A-E (1)

DATE: **6/13/86**

SIGNATURE: *M. B...*

16 JUN 1986 12 04

Handwritten signature or initials

SEARCHED INDEXED
SERIALIZED FILED
JUN 16 1986
FBI - MEMPHIS

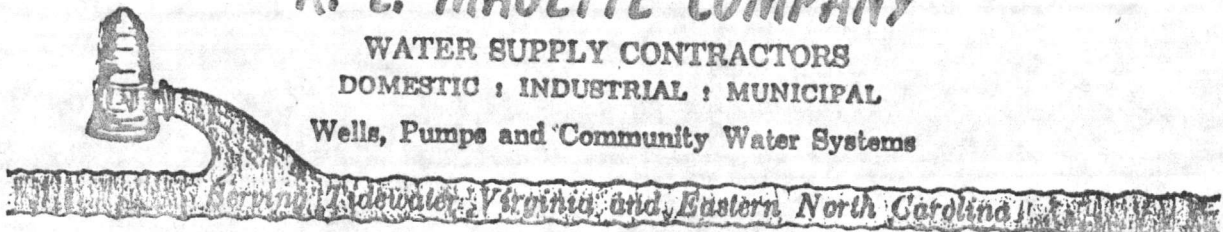
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JAMES EARL RAY
MURKIN

R. L. MAGETTE COMPANY

WATER SUPPLY CONTRACTORS
DOMESTIC : INDUSTRIAL : MUNICIPAL

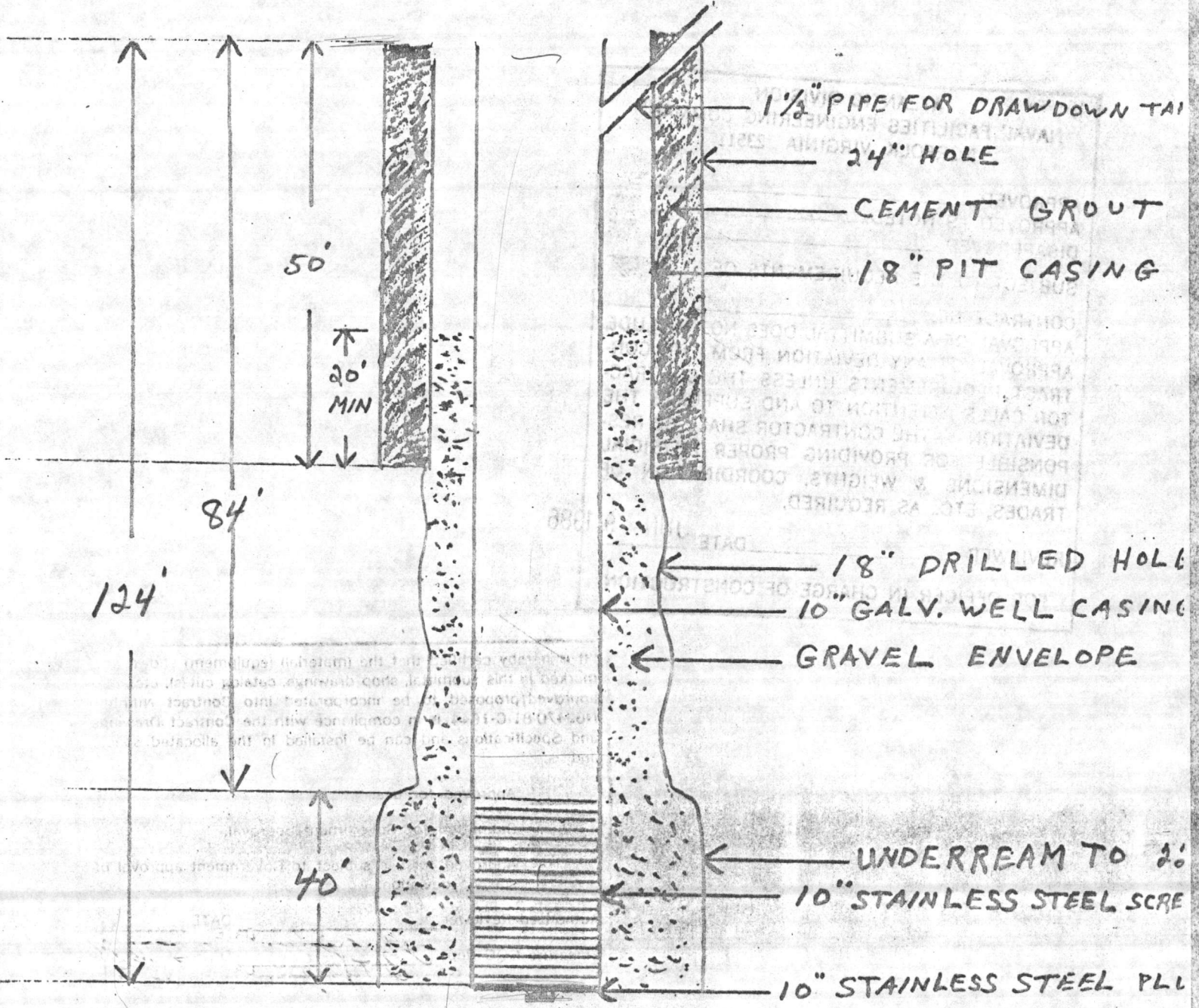
Wells, Pumps and Community Water Systems



P. O. Box 908 Phone - 804 - 357-4103

Smithfield, Virginia 23430

WELL #2



ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA 23511

APPROVED _____
APPROVED AS NOTED _____
DISAPPROVED _____

SUBJECT TO THE REQUIREMENTS OF
CONTRACT NO. N62470-81-C-1644
APPROVAL OF A SUBMITTAL DOES NOT INCLUDE
APPROVAL OF ANY DEVIATION FROM THE CON-
TRACT REQUIREMENTS UNLESS THE CONTRAC-
TOR CALLS ATTENTION TO AND SUPPORTS THE
DEVIATION --- THE CONTRACTOR SHALL BE RES-
PONSIBLE FOR PROVIDING PROPER PHYSICAL
DIMENSIONS & WEIGHTS, COORDINATION OF
TRADES, ETC., AS REQUIRED.

REVIEWER M. Brown DATE JUN 9 1986

FOR OFFICER IN CHARGE OF CONSTRUCTION

"It is hereby certified that the (material) (equipment) shown and marked in this submittal, shop drawings, catalog cut(s), etc., and approved/proposed to be incorporated into Contract Number N62470-81-C-1644 is in compliance with the Contract Drawings and Specifications and can be installed in the allocated space, and is:

- ____ Approved for use.
 Submitted for Government approval.
____ Approved for use subject to Government approval of specific deviation.

Authorized Reviewer _____ DATE _____
Signature CQC Rep. Phil Pease DATE 5-30-86

3-17-94

INSTALLED J-LINE 8 MCA

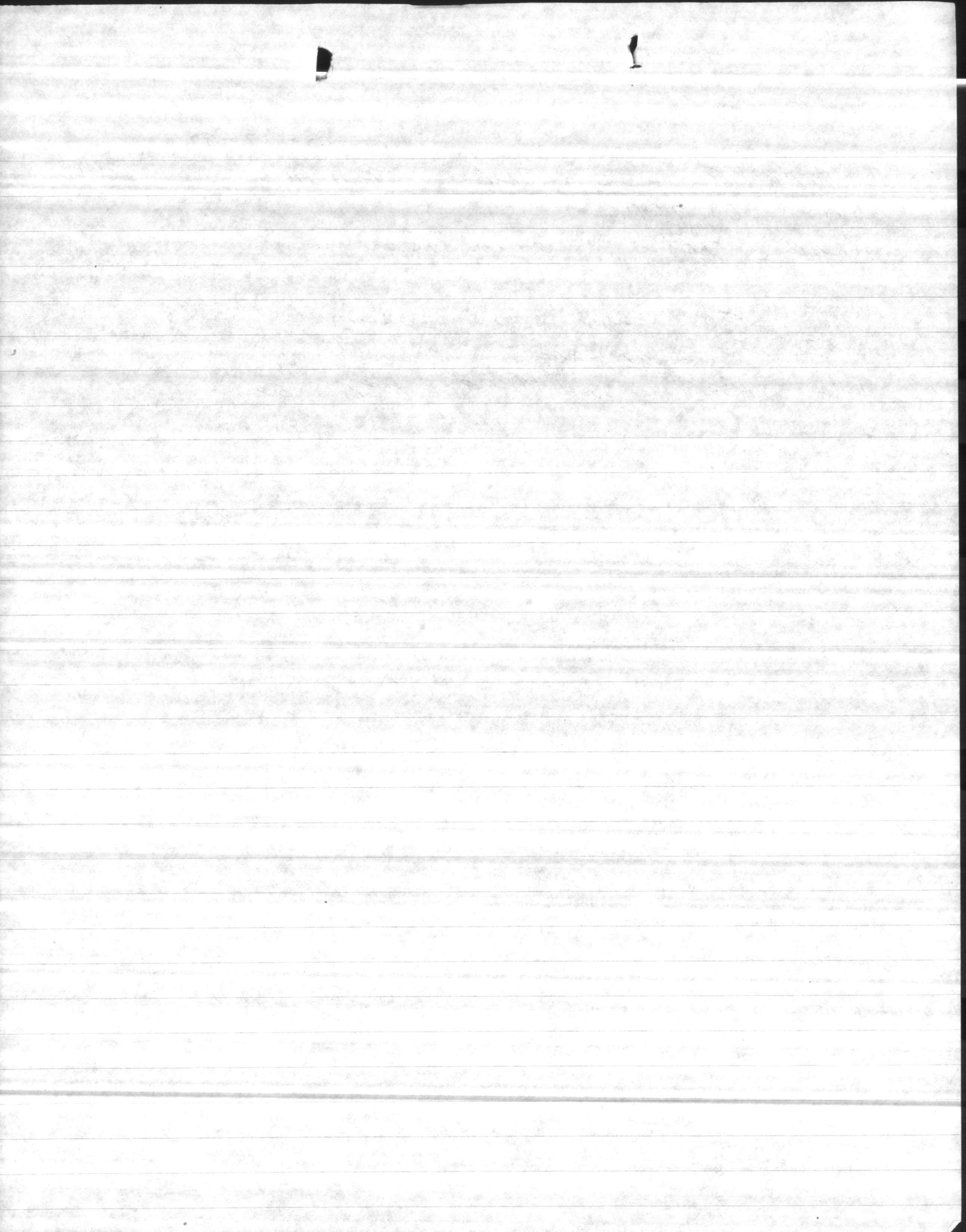
SN 165760

HEAD 70' GPM 150

SET 50' W5" X 10" COLUMN 6" X 5'

TAIL / W STRAINER

1" SHAFT 12 THREAD PER IN



WELL NUMBER TC 700

BY THOMAS / COX

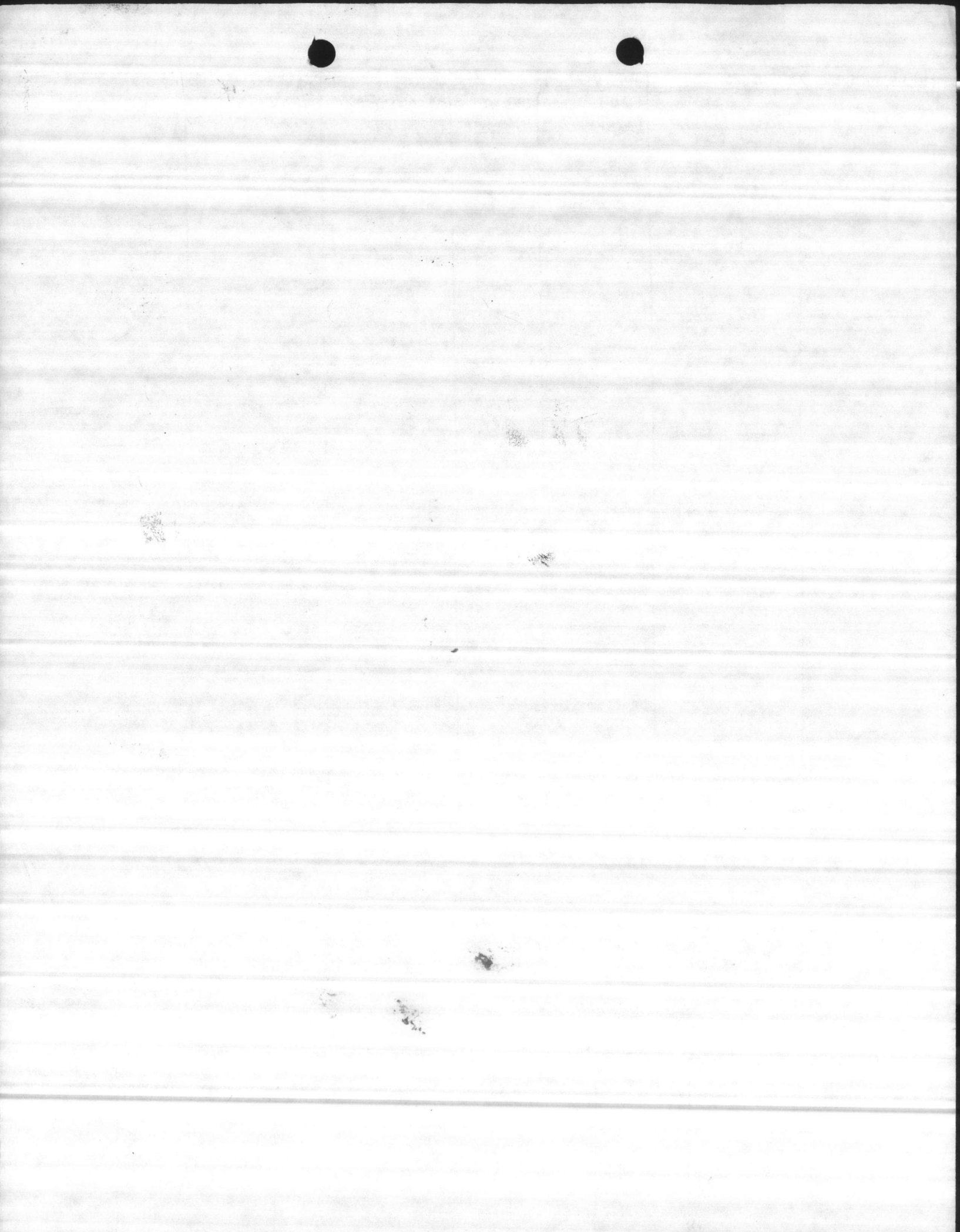
DATE 8-19-91

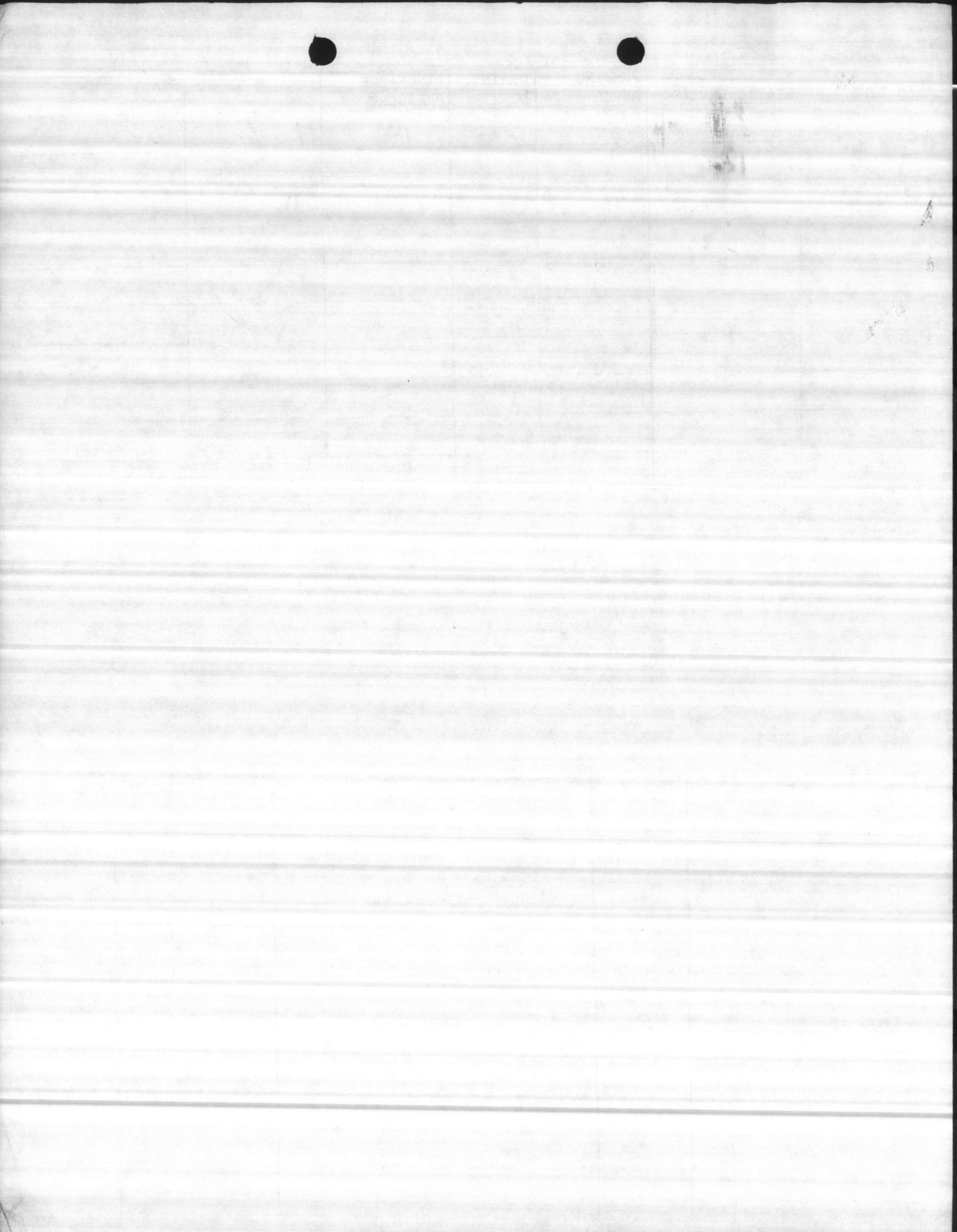
AIR LINE	STATIC LEVEL	PUMPING LEVEL	DRAIN DOWN	DISCHARGE PRESSURE	GPM	START TIME
50'	10'	30	20	20	100	
left set →		38	28	16	125	

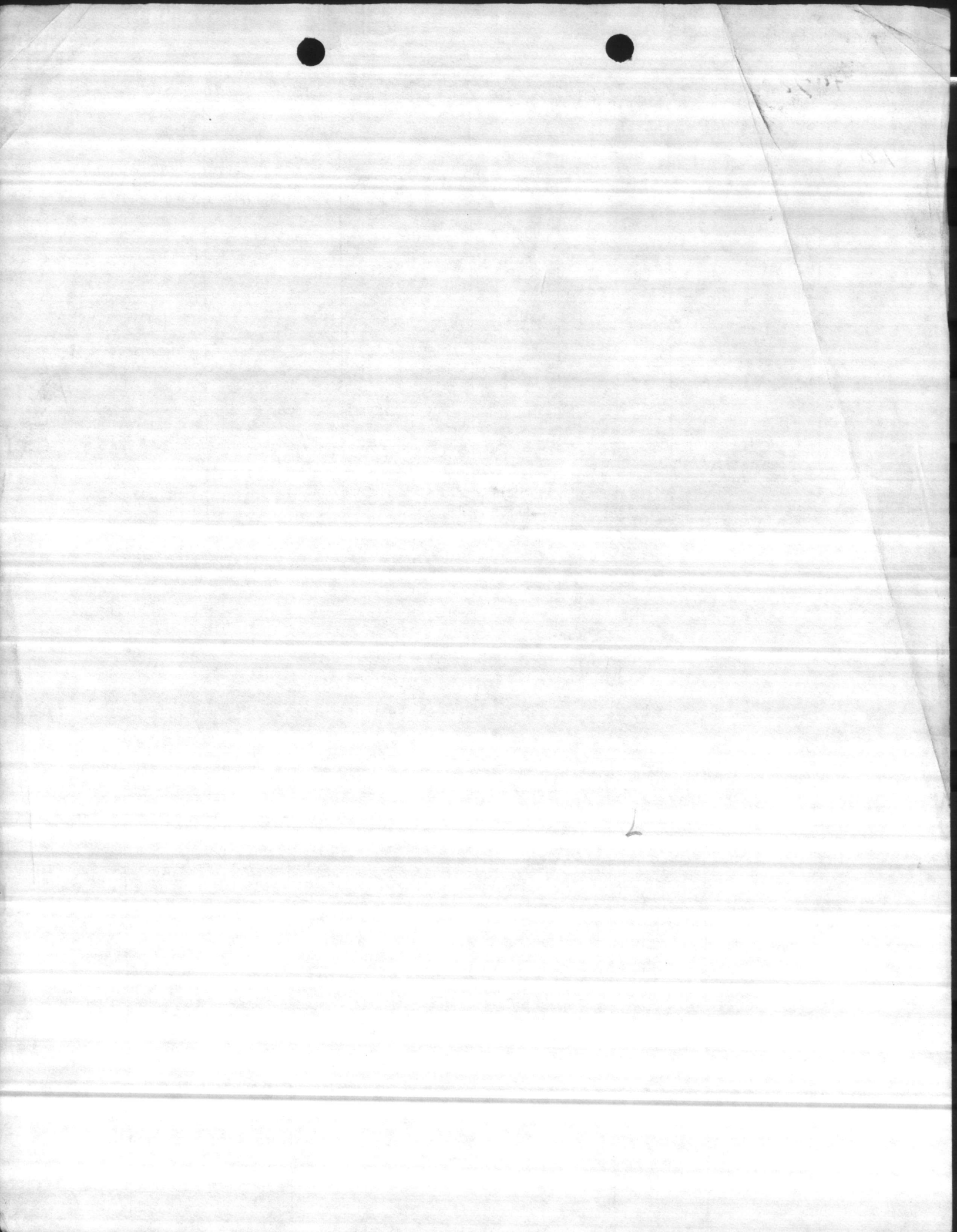
REMARKS

installed cress pump - set @ 50' with 1" shaft
 & 5" column.
 Dead head @ 28 PSI

MANUFACTURER	STAGE	S.N.	TOTAL HEAD	SIZE
GOULD	2	121330 MODEL 81HC	65'	81HC/2







6 X 12 GULD
discharge head flanged
with 5 HP motor

#2374

8 IHC BOWL assy with
50 ft of col 5"
& 1" shaft 5" strainer Galv.

#2490

could discharge and pump
with 2 HP motor

#2254

B.T.H.C. Boat pump with
50 ft of hose
1" lift
2" diameter pipe

#2440

Mr Price

Water Plant

Bldg 20

F WELL TC-700

Received 8/2/77

WRP

FLANGE BOLTS
NOT IN



CHECKED BOX APPLIES		<input checked="" type="checkbox"/> ORDER FOR SUPPLIES OR SERVICES		<input type="checkbox"/> REQUEST FOR QUOTATIONS NO. RETURN COPY(IES) OF THIS QUOTE BY <i>(THIS IS NOT AN ORDER. See DD Form 1155r)</i>		PAGE 1 OF 1	
1. CONTRACT/PURCH ORDER NO. M67001-77-M-3608		2. DELIVERY ORDER NO.		3. DATE OF ORDER 77 JAN 05		4. REQUISITION/PURCH REQUEST NO. M93058-6358-W002	
6. ISSUED BY: Purchasing & Contracting Office Bldg 1211, Marine Corps Base Camp Lejeune, N. Carolina 28542		CODE M67001		7. ADMINISTERED BY: (If other than 6)		8. DELIVERY FOB <input type="checkbox"/> DESTINATION <input checked="" type="checkbox"/> OTHER <i>(See Schedule if other)</i>	
9. CONTRACTOR/QUOTER NAME AND ADDRESS L JOHNSTON PUMP CO. 2901 HAMILTON BLVD. S. PLAINFIELD, N.J. 07080 2/pb/hs		CODE		FACILITY CODE		10. DELIVER TO FOB POINT BY: 28 FEB 77	
14. SHIP TO: Freight Traffic Branch Bldg 1011, Camp Lejeune, N. Carolina M67001-77-M-3608 28542		CODE		15. PAYMENT WILL BE MADE BY: Base Disbursing Officer MCB, Camp Lejeune, North Carolina 28542		11. CHECK IF SMALL BUSINESS <input type="checkbox"/> MBE	
12. DISCOUNT TERMS NET 30		13. MAIL INVOICES TO: (In sextuplicate) SAME AS BLOCK 14		16. TYPE OF ORDER DELIVERY PURCHASE <input checked="" type="checkbox"/>		17. ACCOUNTING AND APPROPRIATION DATA - ACCOUNTING CLASSIFICATION (REV. 7-65) PLUS TRANS	
This delivery order is subject to instructions contained on this side of form only and is issued on another Government agency or in accordance with and subject to terms and conditions of above numbered contract.		Reference your telequote 77 JAN 03		furnish the following on terms specified herein, including: for U. S. purchases, General Provisions of Purchase Order on DD Form 1155r (Except CLAUSE NO. 13 APPLIES ONLY IF THIS BOX <input type="checkbox"/> IS CHECKED, and NO. 15 IF THIS BOX <input type="checkbox"/> IS CHECKED); special provisions		; and delivery as indicated. This purchase is negotiated under authority of 10 USC 2304(a)(3) or as specified in the schedule if within the U. S., its possessions or Puerto Rico; if otherwise, under 2304(a)(6).	
<input type="checkbox"/> If checked, Additional General Provisions apply; Supplier shall sign "Acceptance" on DD Form 1155r and return copies.		ITEM NO.		APPROPRIATION SYMBOL AND SUBHEAD		OBJECT CLASS	
ALL		1771106.2720		000		67001	
0		067001		2D		000000	
AA72333042383T		\$3,488.00		18. ITEM NO.		19. SCHEDULE OF SUPPLIES/SERVICES	
0001.		4320-00-C99-4710 Pump Johnson vertical turbine deep well complete (Less electric motor) Size column assy. 4"X1-1/2"X1" Setting 50' stage 4, Bowl assy 7BC, Suction pipe 4"X10' GPM 110 TDH 70' Head size 10X4 Flanged Column.		20. QUANTITY ORDERED/ACCEPTED*		21. UNIT	
1		ea		3,488.00		\$3,488.00	
23. AMOUNT		24. UNITED STATES OF AMERICA <i>J. C. CRUMLEY</i> PURCHASING OFFICER		25. TOTAL \$3,488.00		29. DIFFERENCES	
26. QUANTITY IN COLUMN 20 HAS BEEN: <input type="checkbox"/> RECEIVED <input type="checkbox"/> INSPECTED <input type="checkbox"/> ACCEPTED, AND CONFORMS TO THE CONTRACT EXCEPT AS NOTED		27. SHIP. NO.		28. D. O. VOUCHER NO.		30. INITIALS	
Date (Signature of authorized Government representative)		31. PAYMENT <input type="checkbox"/> FINAL <input type="checkbox"/> PARTIAL		32. PAID BY 67001-SYM #.5190 MCB CLNC		33. AMOUNT VERIFIED CORRECT FOR	
36. I CERTIFY that this account is correct and proper for payment (Signature and title of Certifying Officer)		39. DATE RECEIVED		40. TOTAL CONTAINERS		41. S/R ACCOUNT NUMBER	
37. RECEIVED AT		38. RECEIVED BY		42. S/R VOUCHER NO.		34. CHECK NUMBER	
35. BILL OF LADING NO.		35. BILL OF LADING NO.		35. BILL OF LADING NO.		35. BILL OF LADING NO.	

THIS PARAGRAPH APPLIES ONLY TO QUOTATIONS SUBMITTED:

Supplies are of domestic origin unless otherwise indicated by quote. The Government reserves the right to consider quotations or modifications thereof received after the date indicated should such action be in the interest of the Government. This is a request for information and quotations furnished are not offers. When quoting, complete blocks 11, 12, 22, 23, 25. If you are unable to quote, please advise. This request does not commit the Government to pay any cost incurred in preparation or the submission of this quotation or to procure or contract for supplies or services.

GENERAL PROVISIONS

1. INSPECTION AND ACCEPTANCE - Inspection and acceptance will be at destination, unless otherwise provided. Until delivery and acceptance, and after any rejections, risk of loss will be on the Contractor unless loss results from negligence of the United States Government. Notwithstanding the requirements for any Government inspection and test contained in specifications applicable to this contract, except where specialized inspections or tests are specified for performance solely by the Government, the Contractor shall perform or have performed the inspections and tests required to substantiate that the supplies and services provided under the contract conform to the drawings, specifications and contract requirements listed herein, including applicable technical requirements for the manufacturers' part numbers specified herein.

2. VARIATION IN QUANTITY - No variation in the quantity of any item called for by this contract will be accepted unless such variation has been caused by conditions of loading, shipping, or packing, or allowances in manufacturing processes, and then only to the extent, if any, specified elsewhere in this contract.

3. PAYMENTS - Invoices shall be submitted in quadruplicate (*one copy shall be marked "Original"*) unless otherwise specified, and shall contain the following information: Contract or Order number, Item number, contract description of supplies or services, sizes, quantities, unit prices and extended totals. Bill of lading number and weight of shipment will be shown for shipments on Government Bills of Lading. Unless otherwise specified, payment will be made on partial deliveries accepted by the Government when the amount due on such deliveries so warrants.

4. DISCOUNTS - In connection with any discount offered, time will be computed from date of delivery of the supplies to carrier when acceptance is at the point of origin, or from date of delivery at destination or port of embarkation when delivery and acceptance are at either of these points, or from the date the correct invoice or voucher is received in the office specified by the Government, if the latter is later than date of delivery. Payment is deemed to be made for the purpose of earning the discount on the date of mailing of the Government check.

5. DISPUTES - (a) Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall mail or otherwise furnish a copy thereof to the Contractor. This decision shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the Secretary. The decision of the Secretary or his duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. The Contractor shall be afforded an opportunity to be heard and to offer evidence in support of his appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision. (b) This "Disputes" clause does not preclude consideration of law questions in connection with decisions provided for in (a) above, provided, that nothing in this contract shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

6. FOREIGN SUPPLIES - This contract is subject to the Buy American Act (41 U.S.C. 10a-d) as implemented by Executive Order 10582 of December 17, 1954, and any restrictions in appropriation acts on the procurement of foreign supplies.

7. CONVICT LABOR - The Contractor agrees not to employ for work under this contract any person undergoing sentence of imprisonment at hard labor.

8. OFFICIALS NOT TO BENEFIT - No member of or Delegate to Congress or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

9. COVENANT AGAINST CONTINGENT FEES - The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration or otherwise recover, the full amount of such commission, percentage, brokerage or contingent fee.

10. GRATUITIES - (a) The Government may, by written notice to the Contractor, terminate the right of the Contractor to proceed under this contract if it is found after notice and hearing, by the Secretary or his duly authorized representative, that gratuities (*in the form of entertainment, gifts or otherwise*) were offered or given by the Contractor, or any agent or representative of the Contractor, to any officer or employee of the Government with a view toward securing a contract or securing favorable treatment with respect to the awarding or amending, or the making of any determinations with respect to the performing of such contract, provided, that the existence of the facts upon which the Secretary or his duly authorized representative makes such findings shall be in issue and may be reviewed in any competent court. (b) In the event this contract is terminated as provided in paragraph (a) hereof the Government shall be entitled (i) to pursue the same remedies against the Contractor as it could pursue in the event of a breach of the contract by the Contractor and (ii) as a penalty in addition to any other damages to which it may be entitled by law to exemplary damages in an amount (*as determined by the Secretary or his duly authorized representative*) which shall be not less than three nor more than ten times the costs incurred by the Contractor in providing any such gratuities to any such officer or employee. (c) The rights and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

11. RENEGOTIATION - This contract, and any subcontract hereunder, is subject to the Renegotiation Act of 1951, as amended (50 U.S.C. App. 1211 et seq.) and shall be deemed to contain all the provisions required by Section 104 thereof, and is subject to any subsequent act of Congress providing for the renegotiation of contracts.

12. CONDITION FOR ASSIGNMENT - This Purchase Order may not be assigned pursuant to the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), unless or until the supplier has been requested and has accepted this order by executing the Acceptance hereon.

13. COMMERCIAL WARRANTY - The Contractor agrees that the supplies or services furnished under this contract shall be covered by the most favorable commercial warranties the Contractor gives to any customer for such supplies or services and that the rights and remedies provided herein are in addition to and do not limit any rights afforded to the Government by any other clause of this contract.

14. PRIORITIES, ALLOCATIONS AND ALLOTMENTS DEFENSE MATERIALS SYSTEM - When the amount of the order is \$500 or more the Contractor shall follow the provisions of DMS Reg. 1 and all other applicable regulations and orders of the Business and Defense Services Administration in obtaining controlled materials and other products and materials needed to fill this order.

15. FAST PAYMENT PROCEDURE -

(a) *General.* This is a fast payment order. Invoices will be paid on the basis of the Contractor's delivery to a post office, common carrier, or, in shipment by other means, to the point of first receipt by the Government.

(b) *Responsibility for Supplies.* Title to the supplies shall vest in the Government upon delivery to a post office or common carrier for shipment to the specified destination. If shipment is by means other than post office or common carrier, title to the supplies shall vest in the Government upon delivery to the point of first receipt by the Government. Notwithstanding any other provision of the purchase order, the Contractor shall assume all responsibility and risk of loss for supplies (i) not received at destination, (ii) damaged in transit, or (iii) not conforming to purchase requirements. The Contractor shall either replace, repair, or correct such supplies promptly at his expense, *provided* instructions to do so are furnished by the Contracting Officer within ninety (90) days from the date title to the supplies vests in the Government.

(c) *Preparation of Invoice.*

(1) Upon delivery of supplies to a post office, common carrier, or in shipments by other means, the point of first receipt by the Government, the Contractor shall prepare an invoice in accordance with Clause 3 of the General Provisions of Purchase Order, except that invoices under a blanket purchase agreement shall be prepared in accordance with the provisions of the agreement. In shipments by either post office or common carrier, the Contractor shall either (A) cite on his invoice the date of shipment, name and address of carrier, bill of lading number or other shipment document number, or (B) attach copies of such documents to his invoice as evidence of shipment. In addition the invoice shall be prominently marked "Fast Pay." In case of delivery by other than post office or common carrier, a receipted copy of the Contractor's delivery document shall be attached to the invoice as evidence of delivery.

(2) If the purchase price excludes the cost of transportation, the Contractor shall enter the prepaid shipping cost on the invoice as a separate item. The cost of parcel post insurance will not be paid by the Government. If transportation charges are separately stated on the invoice, the Contractor agrees to retain related paid freight bills or other transportation billings paid separately for a period of three years and to furnish such bills to the Government when requested for audit purposes.

(d) *Certification of Invoice.* The Contractor agrees that the submission of an invoice to the Government for payment is a certification that the supplies for which the Government is being billed have been shipped or delivered in accordance with shipping instructions issued by the ordering officer, in the quantities shown on the invoice, and that such supplies are in the quantity and of the quality designated by the cited purchase order.

OUTER SHIPPING CONTAINERS SHALL BE MARKED "FAST PAY"

16. (*This clause applies if this contract is for services and is not exempted by applicable regulations of the Department of Labor.*)

SERVICE CONTRACT ACT OF 1965 - Except to the extent that an exemption, variation, or tolerance would apply pursuant to 29 CFR 4.6 if this were a contract in excess of \$2,500, the Contractor and any subcontractor hereunder shall pay all of his employees engaged in performing work on the contract not less than the minimum wage specified under section 6(a)(1) of the Fair Labor Standards Act of 1938, as amended (\$1.60 per hour). However, in cases where section 6(e)(2) of the Fair Labor Standards Act of 1938 is applicable, the rates specified therein will apply. All regulations and interpretations of the Service Contract Act of 1965 expressed in 29 CFR Part 4 are hereby incorporated by reference in this contract.

ADDITIONAL GENERAL PROVISIONS

17. CHANGES - The Contracting Officer may at any time, by a written order, and without notice to the sureties, make changes, within the general scope of this contract, in (i) drawings, designs, or specifications, where the supplies to be furnished are to be specially manufactured for the Government in accordance therewith; (ii) method of shipment or packing; and (iii) place of delivery. If any such change causes an increase or decrease in the cost of, or the time required for performance of this contract, whether changed or not changed by any such order, an equitable adjustment shall be made by written modification of this contract. Any claim by the Contractor for adjustment under this clause must be asserted within 30 days from the date of receipt by the Contractor of the notification of change provided that the Contracting Officer, if he decides that the facts justify such action, may receive and act upon any such claim if asserted prior to final payment, under this contract. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes." However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.

18. TERMINATION FOR DEFAULT - The Contracting Officer, by written notice, may terminate this contract, in whole or in part, for failure of the Contractor to perform any of the provisions hereof. In such event, the Contractor shall be liable for damages, including the excess cost of procuring similar supplies or services; provided that, if (i) it is determined for any reason that the Contractor was not in default or (ii) the Contractor's failure to perform is without his and his subcontractor's control, fault or negligence, the termination shall be deemed to be a termination for convenience under paragraph 15. As used in this provision the term "subcontractor" and "subcontractors" means subcontractors at any tier.

19. TERMINATION FOR CONVENIENCE - The Contracting Officer, by written notice, may terminate this contract, in whole or in part, when it is in the best interest of the Government. If this contract is for supplies and is so terminated, the Contractor shall be compensated in accordance with Section VIII of the Armed Services Procurement Regulation, in effect on this contract's date. To the extent that this contract is for services and is so terminated, the Government shall be liable only for payment in accordance with the payment provisions of this contract for services rendered prior to the effective date of termination.

20. ASSIGNMENT OF CLAIMS - Claims for monies due or to become due under this contract shall be assigned only pursuant to the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15). However, payments to an assignee of monies under this contract shall not, to the extent provided in said Act, as amended, be subject to reduction or set-off. (*See Clause 12.*)

ACCEPTANCE

The Contractor hereby accepts the offer represented by this numbered purchase order as it may previously have been or is now modified, subject to all of the terms and conditions set forth, and agrees to perform the same.

NAME OF CONTRACTOR	
SIGNATURE	
TYPED NAME AND TITLE	DATE SIGNED

REMARKS		
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DOC. IDENT.		ROUT. IDENT.		FSC		NIIN		ADD		UNIT OF ISSUE		QUANTITY		SERV. REQUISITIONER		DATE		SERIAL		SERV. SUPPLEMENTARY ADDRESS		S H FUND		DISTRIBUTION		PROJECT		PRIORITY		ADV. STAT	
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AL999K
WALK THRU

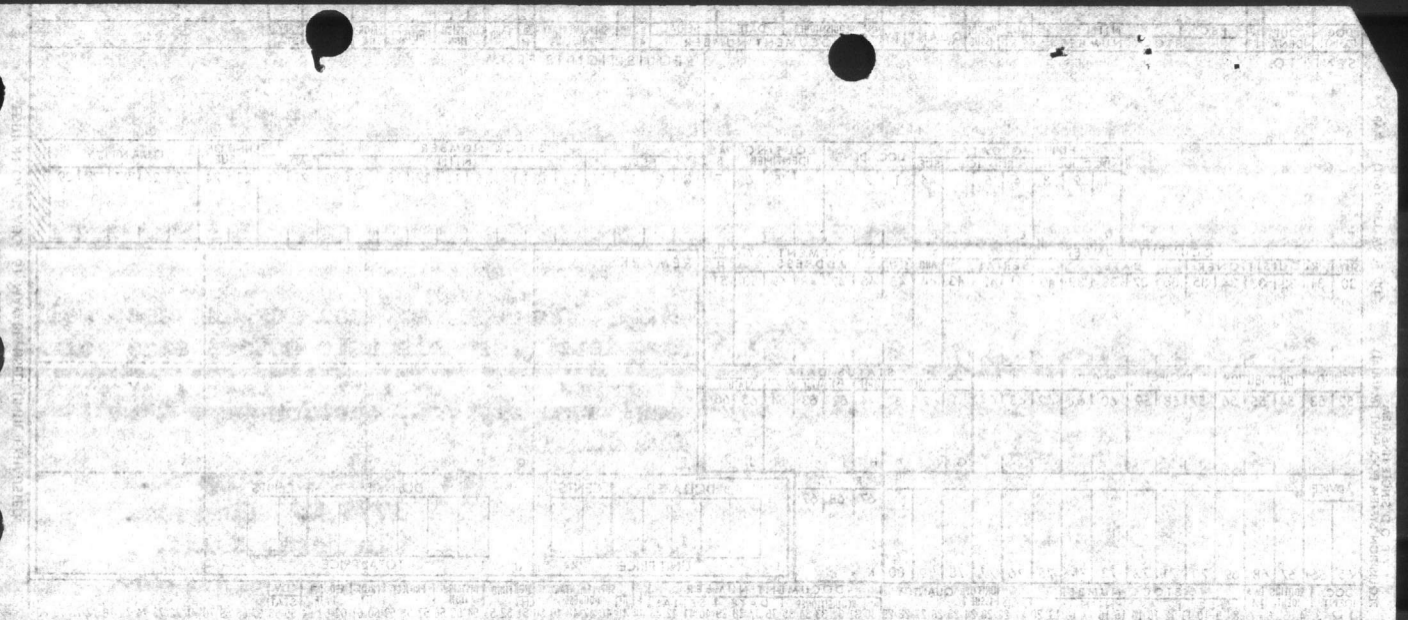
193058
Water Pit(3510)

REMARKS
Pump, Johnston Vertical Turbine deep well complete (less electric motor) size column assembly 4" x 11" setting 50", stage 4 bowl assembly 73C, suction pipe 4" x 10" GPM 110 TH 70"

UNIT PRICE
3,500.00

TOTAL PRICE
3,500.00

Johnston Turbine Co.
1775 E. Allen Ave.
Glendora, Calif.



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Vertical text on the right edge, possibly a page number or reference code.

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. AMENDMENT/MODIFICATION NO. P00001	2. EFFECTIVE DATE 77 JUN 17	3. REQUISITION/PURCHASE REQUEST NO. M93058-6358-W002	4. PROJECT NO. (If applicable)
5. ISSUED BY (CODE) PURCHASING AND CONTRACTING OFFICE BLDG. 1211, MARINE CORPS BASE CAMP LEJEUNE, N. C. 28542		6. ADMINISTERED BY (If other than block 5) (CODE)	

7. CONTRACTOR NAME AND ADDRESS (CODE) FACILITY CODE	8. AMENDMENT OF SOLICITATION NO. DATED (See block 9)
JOHNSTON PUMP CO. 2901 HAMILTON BLVD. SOUTH PLAINFIELD, N.J. 07080	<input type="checkbox"/> AMENDMENT OF SOLICITATION NO. _____
(Street, city, county, state, and ZIP Code)	<input checked="" type="checkbox"/> MODIFICATION OF CONTRACT/ORDER NO. M67001-77-M-3608
	DATED 77 JUN 05 (See block 11)

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers is extended, is not extended. Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment, (b) By acknowledging receipt of this amendment on each copy of the offer submitted, or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

a11 - 177106.2720 000 67001 0 067001 2D 000000 AA72333042383T INCREASE \$410.80

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) This Supplemental Agreement is entered into pursuant to authority of **ASPR 26-301**
It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

MODIFY DESCRIPTION TO READ AS FOLLOWS ON PAGE 2:

THIS IS A CONFIRMING ORDER...Confirms telephonic order of same number and date given your Mr. Lacks by our Mrs. Brydon. DO NOT DUPLICATE SHIPMENT.

TOTAL OF THIS ORDER NOW READS: \$3,898.80

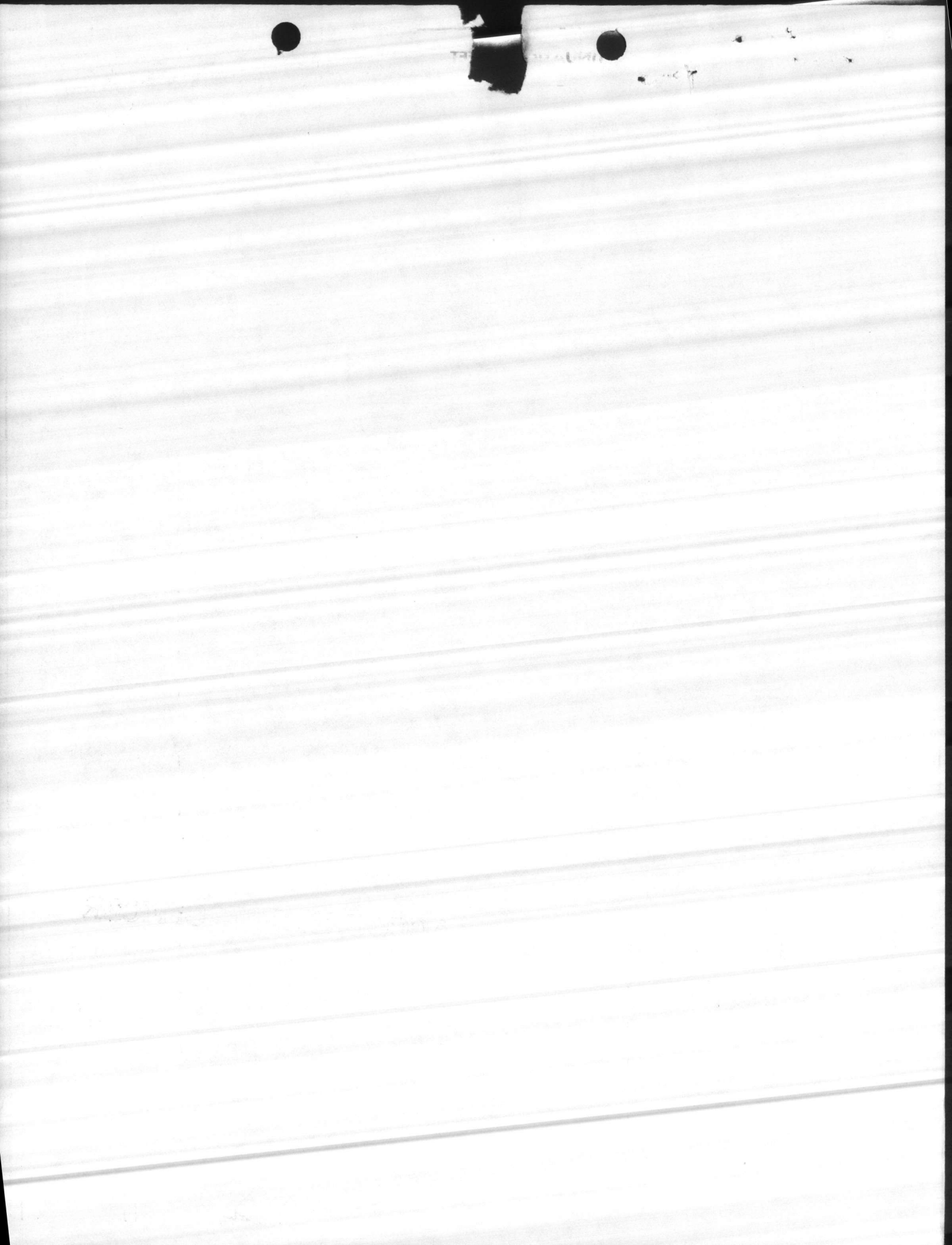
ACCOUNTABLE OFFICER

"Additional General Provisions (Clauses 17-20) of DD Form 1155r are hereby incorporated by reference."

NOTE TO CONTRACTOR: If you find the amendment/modification acceptable, please fill in Blocks 14,15 & 16 (Official copy and Dealer) and return to the Purchasing and Contracting Division, Bldg. 1211, MCB, Camp Lejeune, N.C. 28542 for final signature. Dealer's copy will be returned to contractor after being signed by Purchasing Officer.

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect

13. <input type="checkbox"/> CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT	<input checked="" type="checkbox"/> CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN <u>2</u> COPIES TO ISSUING OFFICE
14. NAME OF CONTRACTOR/OFFEROR	17. UNITED STATES OF AMERICA
BY _____ (Signature of person authorized to sign)	BY _____ (Signature of PURCHASING OFFICER)
15. NAME AND TITLE OF SIGNER (Type or print)	16. DATE SIGNED
	18. NAME IONE O. HOLSONBACK AB
	19. DATE SIGNED



NAME OF OFFEROR OR CONTRACTOR

JOHNSTON PUMP CO.

ITEM NO.	SUPPLIES/SERVICES	QUANTITY	UNIT	UNIT PRICE	AMOUNT
0001	Discharge Head 10" X 4" oil lube w/lifting pins, motor bolts & plug]			
]			
]			
0002	Column Assembly 1" x 1/2" x 4" x 50' oil lube flanged column w/shafts, tubing & bearings]			3488.00
]			
0003	Bowl assembly 7BC 4-STG, Oil Lube]			
]			
0004	Suction pipe 4" x 10' lg]			
]			
0005	Top column flange w/ gasket	1	ea		61.75
0006	Tube tension plate w/cap screws	1	ea		71.50
0007	Tube tension nut w/bearing	1	ea		46.80
0008	Tube tension nipple	1	ea		102.70
0009	Tube packing	1	se		2.60
0010	Oiler assembly w/reservoir solenoid sight feed oil valve & oil line & fittings	1	ea		125.45
				TOTAL	\$3898.80



TENCARVA MACHINERY COMPANY

ORDER FAXED
 Page 1 of 1

BRANCH: P.O. Box 3407
Wilmington, N.C. 28406

WHSE. REF. NO.

CUST. BILLING ADDRESS:

WAREHOUSE LOCATION
 Goulds Pumps, Inc. FAX:901-795-5462 Base Maintenance Receiving
 VPD Service Center Bldg 1301, Door 14, MCB
 Memphis, TN 38118 M67001-91A-0191
Camp Lejeune, N.C. 28542

S
H
I
P
T
O

<input type="checkbox"/>	B/O	TRANSFER ORDER NO.	XXXXXXXXXX				
<input type="checkbox"/>	COMPLETE	SALES TAX	F.O.B. Y.N.	CREDIT	SALESMAN	%	ALTERNATE SALESMAN %
ORDER DATE 7-17-91		SHIP VIA Prepaid Motor Fgt.		DATE SHIPPED	MARK SHIPMENT	WITH CUSTOMER NO. See Below	

QUANTITY ORDERED	QUANTITY SHIPPED	✓	DESCRIPTION
			Mark Shipment: Call No. E013
			Beth Thorn-McKenzie - 6-16-91
			M67001-91A-0191
			For Goulds VIT-CF Pump
			Size 8IHC/2 stage Vertical
			Turbine Well Pump
1			8IHC/2 stage Bowl Assy.
1			5" Galv. Cone Strainer
50"			1" x 5" Column Pipe W.L.
1			12" Adjusting Nipple with Collar

BILLING DATE:

TEXAS WATER COMPANY

DATE OF ORDER

Blank rectangular box for order details.

NO. OF ST. LOCATION

88888

ORDER NO.

Table with multiple columns and rows, containing faint text and numbers.

Main data table with multiple columns and rows, containing faint text and numbers.

DATE OF ORDER

DATE OF ORDER

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~~150 GPM~~

150 GPM

GOULD VIT-CI
MODEL

SIZE 8IH-C

2 stage

50 ft of cond
sl

6 inch Flange

3 HP

1800 RPM WPI

\$4864

1692 LB





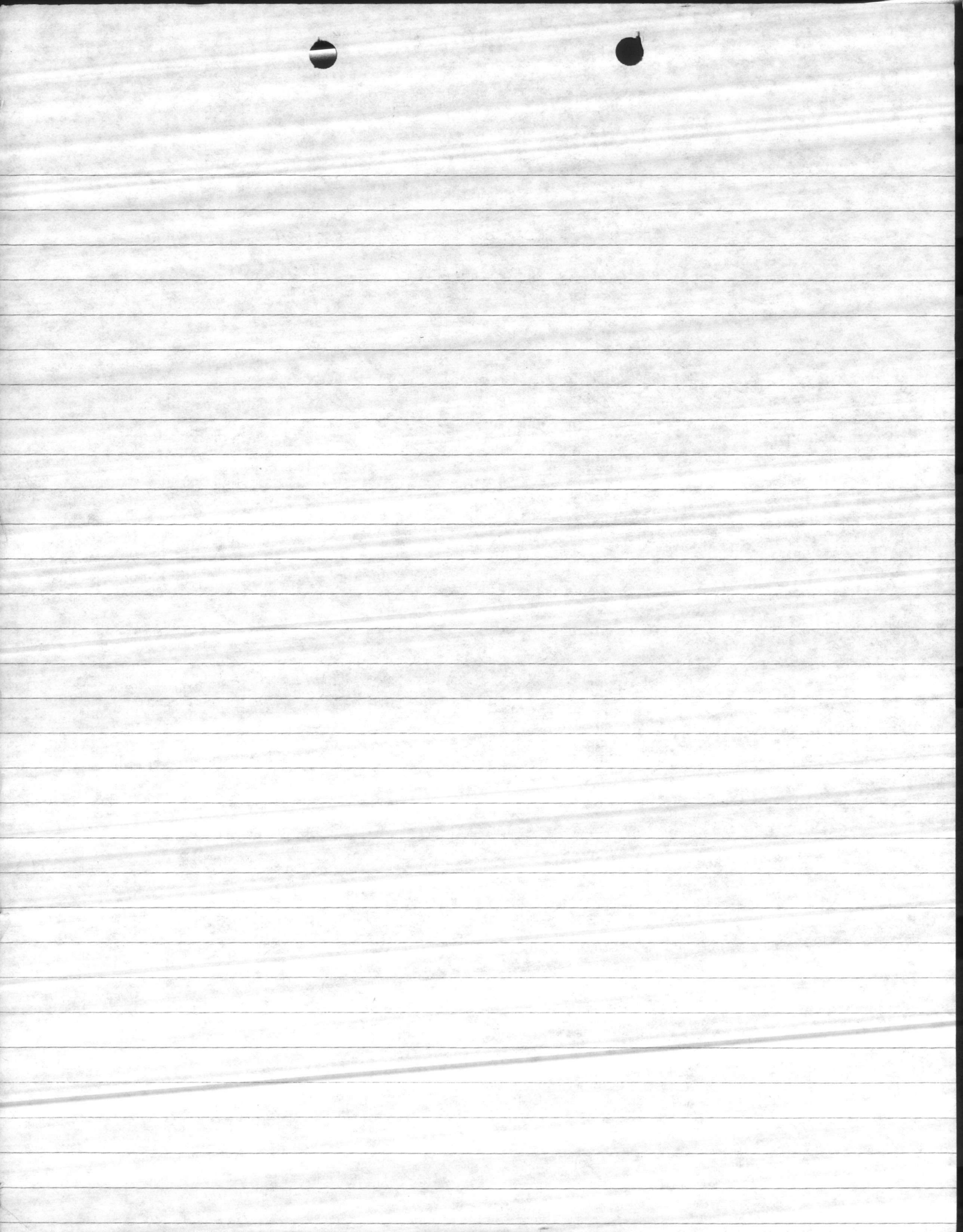
11/17/77
10/1/77

Oct 28 - 1985

TC - 700

A-L	S-L	P-L	D-D	psi	GPM	Time
70	32	55	23	15	100	15

lit @ 15 psi 100 gpm
line pressure 25 lb.





GE Motors

Instructions

Vertical Induction Motors

High Thrust
Hollow and Solid-Shaft
In-Line Solid-Shaft
Frames 182-405 NEMA Type P Base

Weather Protected Type I

SAFETY PRECAUTIONS

WARNING

High voltage and rotating parts can cause serious or fatal injuries. Installation, operation, and maintenance of electric machinery should be performed by qualified personnel. Familiarization with NEMA Publication MG-2, Safety Standard for Construction and Guide for Selection, Installation and Use of Electric Motors and Generators, the National Electrical Code, and sound local practices is recommended.

For equipment covered by this Instruction Book, it is important to observe safety precautions to protect personnel from possible injury. Among the many considerations, personnel should be instructed to:

- Avoid contact with energized circuits or rotating parts.
- Avoid by-passing or rendering inoperative any safeguards or protective devices.
- Avoid use of automatic-reset thermal protection where unexpected starting of equipment might be hazardous to personnel.
- Avoid contact with capacitors until safe discharge procedures have been followed.
- Be sure that the shaft key is fully captive before the motor is energized.

- Avoid extended exposure in close proximity with high noise levels.
- Use proper care and procedures in handling, lifting, installing, operating, and maintaining the equipment.
- Do not lift anything but the motor with the motor lifting means.

Safe maintenance practices by qualified personnel are imperative. Before starting maintenance procedures, be positive that:

- Equipment connected to the shaft will not cause mechanical rotation.
- Main machine windings and all accessory devices associated with the work area are disconnected from electrical power sources.

If a high-potential insulation test is required, procedure and precautions outlined in NEMA Standards MG-1 and MG-2 should be followed.

Failure to properly ground the frame of this machine can cause serious injury to personnel. Grounding should be in accordance with the National Electrical Code and consistent with sound local practice.

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INTRODUCTION

General Electric High-Thrust vertical motors covered by these instructions are carefully constructed of high-quality materials and are designed to give long and trouble-free service when properly installed and maintained. These motors are generally used to drive pumps.

Both HOLLOW-SHAFT and SOLID-SHAFT motors are described in this Instruction Book. Hollow-shaft construction is available in frame sizes 213 and larger and Solid-shaft is available in 182 and larger frames. Figure 1 shows a typical 213-286 frame hollow-shaft high-thrust motor and Figure 2 shows the 324-405 frame construction. The solid-shaft construction is similar except that the top half-coupling is omitted, and the motor shaft extends out the bottom of the motor. See Figures 3 and 4. Solid-shaft high-thrust motors are not suitable for driving loads that impose significant radial load on the motor shaft; **they should not, for example, be used for belt-drive applications.**

Motors may be supplied with different bearing arrangements for various external thrust conditions imposed by the pump, such as different magnitudes of down-thrust and either momentary or continuous up-thrust. A typical high-thrust motor with angular-contact ball bearings is shown in Figures 1 and 2. This standard construction

is for high continuous down-thrust and is suitable for momentary up-thrust capacity of a high-thrust motor. **NOTE THAT ANGULAR-CONTACT BEARINGS CAN ONLY CARRY THRUST IN ONE DIRECTION.**

IN-LINE motors are designed to be mounted on pumps which are directly in the pipe-line and are also covered by this Instruction Book. These motors have two opposed-mounted angular-contact ball thrust bearings at the top end of the motor (182-286 bearings are in bottom end) so they can carry either up or down thrust. The lower guide bearing is a radial-ball type and also carries any radial load imposed by the pump. IN-LINE motors are always of the solid-shaft type.

Since overloading greatly reduces bearing life, the amount of thrust applied should not exceed the recommended values.

This Instruction Book applies to motors with Weather-Protected I enclosures as defined by NEMA. These are "open" motors.

Weather-Protected I motor construction is shown in Figures 1 and 2 for Hollow-shaft motors and Figures 3 and 4 for Solid-shaft machines.

RECEIVING, HANDLING AND STORAGE

Each motor should be carefully examined when received and a claim filed with the carrier for any damage. The nearest office of the General Electric Company may offer guidance.

WARNING: THE MOTOR SHOULD BE LIFTED BY THE LUGS PROVIDED. THESE LUGS ARE INTENDED FOR LIFTING THE MOTOR ONLY AND MUST NOT BE USED TO LIFT ANY ADDITIONAL WEIGHT. BE CAREFUL NOT TO TOUCH OVERHEAD POWER LINES WITH LIFTING EQUIPMENT. FAILURE TO OBSERVE THIS WARNING MAY RESULT IN PERSONAL INJURY OR DEATH.

If the motor is not to be installed immediately, it should be stored in a clean, dry location. Precautions should be taken to prevent the entrance of moisture, dust, or dirt during storage and installation. Precautions are taken by the factory to guard against corrosion. The machined parts are slushed to prevent rust during shipment. Examine the parts carefully for rust and moisture, if the equipment is to be stored, and re-slush where necessary.

Motors are shipped without oil in the bearing reservoirs (320 frame and larger). An oil film remains on the bearings, but if the storage

period is to exceed three months, the reservoirs should be filled. It is suggested that such oil-filled motors be conspicuously tagged in order to prevent mishandling, which would cause oil spillage and subsequent damage to the internal parts of the motor. When filling for storage, fill to the maximum level shown on the gage or approximately 1/2 inch over the mark showing the standstill level. Before operating the motor, drain this oil and refill with fresh oil.

See instructions under RELUBRICATION on page 10 for oil recommendations.

During storage, windings should be protected from excessive moisture absorption by some safe and reliable method of heating. Space heaters, if supplied, may be used for this purpose. The temperature of the windings should always be maintained a few degrees above the temperature of the surrounding air. It is recommended that motors in storage be inspected, the windings meggered, and a log of pertinent data kept. Any significant decrease in insulation resistance should be investigated.

If a motor is to be in storage for over one year, it is recommended that competent technical inspection service be obtained to ensure that the storage has been adequate and that the motor is suitable for service. Contact your nearest General Electric Sales office to arrange for inspection service.

UNPACKING

If the machine or machine parts have been exposed to low temperatures, unpack it only after it has reached the temperature of the room in which it will be unpacked or located; otherwise sweating will occur.

INSTALLATION

WARNING: *INSTALLATION SHOULD BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND CONSISTENT WITH SOUND LOCAL PRACTICES. COUPLING GUARDS SHOULD BE INSTALLED AS NEEDED TO PROTECT AGAINST ACCIDENTAL CONTACT WITH MOVING PARTS. MACHINES ACCESSIBLE TO PERSONNEL SHOULD BE FURTHER GUARDED BY SCREENING, GUARD RAILS, OR OTHER SUITABLE ENCLOSURE TO PREVENT ANYONE FROM COMING IN CONTACT WITH THE EQUIPMENT. THIS IS ESPECIALLY IMPORTANT FOR MOTORS THAT ARE REMOTELY OR AUTOMATICALLY CONTROLLED OR HAVE AUTOMATIC RE-SETTING OVERLOAD RELAYS, SINCE SUCH MOTORS MAY START UNEXPECTEDLY.*

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN INJURY OR DEATH TO PERSONNEL.

LOCATION AND MOUNTING

Allow enough space around the motor to permit free flow of ventilating air and to maintain an ambient temperature not over 40°C. Where a choice of locations is possible, install the motor so that it will be subjected to the least amount of dirt, dust, liquids, or other harmful materials. Mount the motor securely on a level, firm foundation, align accurately with the driven equipment, and tighten bolts securely.

Weather-Protected Type I motors may be installed in indoor locations with relatively high moisture content or sheltered outdoor locations in dry climates.

WARNING: *IF IGNITABLE DUST OR LINT IS PRESENT THE SURFACE TEMPERATURE OF SPACE HEATERS, IF SUPPLIED, SHOULD NOT EXCEED 80 PERCENT OF THE IGNITION TEMPERATURE. REFER TO SPACE HEATER NAMEPLATE OR FACTORY FOR INFORMATION ON SURFACE TEMPERATURE. DUST AND/OR LINT SHOULD NOT BE ALLOWED TO BUILD UP AROUND THE SURFACE OF THE SPACE HEATERS.*

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN DAMAGE TO EQUIPMENT, INJURY TO PERSONNEL, OR BOTH.

WARNING: *INSTALLATION OF THE MACHINE WHERE HAZARDOUS, FLAMMABLE, OR COMBUSTIBLE VAPORS OR DUSTS PRESENT A POSSIBILITY OF EXPLOSION OR FIRE SHOULD BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, ARTICLES 500-503, AND CONSISTENT WITH SOUND LOCAL PRACTICES. EXTREME CARE IS REQUIRED FOR MACHINES SUPPLIED WITH AN EXPLOSION-PROOF OR DUST-IGNITION PROOF ACCESSORY DEVICE OR CONDUIT BOX SINCE ANY NICKS OR BURRS IN THE SEALING SURFACES DURING DISASSEMBLY AND REASSEMBLY MAY DESTROY THE EXPLOSION-PROOF OR DUST-IGNITION PROOF FEATURES. FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN DAMAGE TO THE EQUIPMENT, INJURY TO PERSONNEL, OR BOTH.*

PUMP AND SYSTEM PRECAUTIONS

Some precautions are necessary to assure satisfactory operation of motors in pumping service. The packing gland in the pump head should be kept in good condition so that the liquid being pumped will not be forced out along the shaft and enter the motor through the lower bearing housing.

Motors driving pumps in pressure systems where the pressure is maintained after shut down should be protected from overspeeding by check valves, or non-reverse couplings.

The SYSTEM REED CRITICAL FREQUENCY should be 25% above or below motor operating speed in order to avoid excessive vibration.

ALIGNMENT OF SOLID-SHAFT MOTORS

Accurate mechanical lineup is essential for successful operation. Mechanical vibration and roughness when the motor is running may indicate poor alignment. In general, lineup by straight edge across, and feeler gages between coupling halves is not sufficiently accurate. It is recommended that the lineup be checked with dial indicators. The space between coupling hubs should be maintained as recommended by the coupling manufacturer.

COUPLINGS FOR HOLLOW-SHAFT MOTORS

Vertical hollow-shaft motors are designed for driving deep-well, turbine-type pumps and can be equipped with either self-release, bolted, or non-reverse couplings as described in following sections. These couplings are located at the top of the motor and allow pump impeller position to be adjusted easily. The type of coupling is specified by the customer. Remove the top cap for access to the coupling.

Two slots are provided in the outside rim of the coupling so that a bar can be inserted to keep the assembly from turning while the

adjustment is being made. A coupling bolt can be screwed into one of the extra tapped holes in the top end shield to provide a stop for the bar.

To prevent breakage, coupling bolts must be tightened to torque values indicated below for bolted or non-reverse couplings.

Bolt Size	Torque
1/4	10 lb. ft.
3/8	20 lb. ft.
5/16	37 lb. ft.
1/2	90 lb. ft.
5/8	180 lb. ft.
3/4	320 lb. ft.
1	710 lb. ft.

CAUTION: *IT SHALL BE THE INSTALLER'S RESPONSIBILITY IN ALL CASES TO ASCERTAIN THAT THESE TORQUE VALUES ARE USED AND MAINTAINED. THIS SHALL INCLUDE THOSE INSTANCES WHEN THE COUPLING COMES MOUNTED IN THE MOTOR. FAILURE TO COMPLY MAY CAUSE THE COUPLING BOLTS TO BREAK, WITH RESULTANT EXTENSIVE DAMAGE TO THE EQUIPMENT.*

Self-Release Couplings

Should the motor accidentally be run in the reverse direction, the pump line-shaft joints may unscrew. The self-release coupling acts to limit the amount of this unscrewing. In normal operation, torque from the motor is transmitted by the lower half-coupling through the driving pins to the upper half-coupling, and then to the pump shaft. If reversal occurs and the pump shaft starts to unscrew and lengthen, the upper half of the self-release coupling is lifted up off of the driving pins, thus uncoupling the pump from the motor. See Figure 2, where a self-release coupling is shown to the left of the shaft center-line.

NOTE THAT SELF-RELEASE COUPLINGS CANNOT CARRY UP-THRUST.

Proper functioning of a self-release coupling depends upon several factors. The pump shaft adjusting nut must be securely attached to the top half-coupling, and the top half-coupling must not bind on the lower half. Otherwise, the adjusting nut lock-screw may break instead of the coupling halves separating. Should this happen, the motor would continue to drive the pump line shaft, and the joints would continue to unscrew. Serious damage to both motor and line shaft may result. Clearance between the coupling halves should be checked by placing the top half-coupling in position prior to installing the motor. It should drop into place, and rest solidly on the lower half-coupling, without forcing.

Proper alignment of the pump head-shaft within the motor hollow shaft is also important. After the coupling releases it no longer holds the pump shaft centered. If the alignment is not good, the motor shaft which is still rotating may rub the pump shaft which has stopped, and damage will result.

A third requirement is that the distance between the top of the pump shaft and the inside of the top cap be at least enough to allow the top half-coupling, when it tries to release, to clear the pins before the shaft hits the cap. Check this clearance after the adjusting nut has

been drawn up to its final position. To facilitate making the check, the motor outline prints shows a maximum dimension "XH" from the top of the coupling to the top of the pump shaft. Adhering to this design limit will allow the shaft and coupling to lift enough to clear the pins and still leave a small clearance between the shaft and cap. For standard motors, "XH" is as shown in Table I.

Table I

Frame Size	XH
213-215	2 inch
254-256	2.25 inch
284-286	2.50 inch
324-326	3.75 inch
364-365	3.75 inch
404-405	4.00 inch

Depending upon the circumstances causing reversal and upon which line-shaft joint unscrews, there may be enough energy stored in the rotating parts, at the time the coupling clears the pins, to cause the pump shaft to continue to rise and strike the top cap. However, if the above conditions are met, damage, even in the most severe cases, should be limited to a broken cap.

It is intended that self-release couplings will be called upon to uncouple only infrequently.

NOTE: *ANYTIME A SELF-RELEASE COUPLING UN-COUPLES, IT IS NECESSARY TO REMOVE ALL POWER AND MANUALLY RE-COUPLE.*

Un-coupling is most frequently caused by application of single-phase power after a power supply disturbance, while the motor is being driven in the reverse direction by the pump; this single-phase power causes the motor to take over and drive the pump in the reverse direction and the pump shaft joints will then unscrew. To prevent this, select a motor starter which requires a manual start after any stop (rather than allowing automatic re-start as soon as power is applied to the starter), or incorporates a back-spin timer to keep power from being automatically reapplied to the motor until enough time has elapsed for water back-flow through the pump to stop for the motor to completely stop.

Power supply phase-sequence reversal will also cause the motor to reverse and unscrew the pump shaft, but this rarely occurs. An anti-phase-reversal relay can be incorporated in the motor controller if desired.

To prevent un-coupling on initial start-up, check motor rotation direction before installing the upper half-coupling to be sure direction is correct. To reverse direction of rotation, interchange any two power leads.

Bolted Couplings

Bolted couplings allow up-thrust from the pump to be taken by the motor bearings. This type of coupling is similar to a self-release coupling except that the driving pins are replaced by bolts, which should be securely tightened to hold the two halves of the coupling together so that torque is transmitted by face friction. See torque requirements on page 6. This type of coupling does not have the self-release feature and allows reverse rotation.

See the self-release coupling shown to the left of the motor center-line in Figure 2, which is applicable to bolted couplings except that the headless drive pins are replaced by bolts as explained above.

Non-Reverse Couplings

The non-reverse type of coupling, as shown to the right of the motor centerline in Figures 1 and 2, is also a bolted type, and, in addition, it keeps the pump and motor from rotating in the reverse direction. Thus, it not only prevents damage from overspeeding and damage to water-lubricated pump shaft bearings, when during shutdown the residual water in the system drives the pump in the reverse direction. This type of coupling also allows up-thrust from the pump to be carried by the motor bearings. Motor torque is transmitted to the pump shaft through the two halves of the coupling which are bolted together. See required bolt torques on page 6.

The operation of a non-reverse coupling is explained as follows. When the motor is started in the correct or forward direction, the ratchet pins are lifted by the ratchet teeth, and are held up by centrifugal force and friction when motor speed becomes high enough. When power is removed, the speed decreases, and the pins fall. At the instant of reversal, a pin will catch on a ratchet tooth and prevent backward rotation. The number of pins differs from the number of teeth to multiply the number of stopping positions.

A very rapid decrease in speed can result in acceleration forces great enough to prevent the pins from dropping. This condition is further aggravated when the pins become dirty, and their action sluggish. If the time from shutdown (the instant the "stop" button is pressed) to zero speed is greater than two seconds, operation will be satisfactory.

To permit operation when stopping time is less than two seconds, the pins are spring-loaded. For those cases involving cycling (frequent starting and stopping) and stopping times greater than two seconds, the springs may be removed to decrease wear on the ratchet plate.

Pins and springs are made of heat-treated stainless steel.

A complete non-reverse coupling consists of a self-release coupling plus a non-reverse assembly, which includes pin carrier, pins, springs, pin retaining plate, and cap-screws. On motors covered by this Instruction Book, the ratchet teeth are an integral part of the Endshield Cover casting.

A self-release or a bolted coupling can be converted to a non-reverse coupling on 326-405 frame motors without disturbing the adjustment of the pump shaft nut. The non-reverse assembly will normally be received as a unit. To assemble it onto the motor, loosen the 3 small capscrews that hold the pin-retaining plate so this plate can be centered during assembly. Next, remove the drive-pins or bolts from the lower half-coupling. Then slide the non-reverse assembly down over the top half-coupling. Next insert the long capscrews through the plate, pin carrier, and top coupling and into the lower coupling. Tighten them securely so that torque will be transmitted by friction between the coupling faces rather than through the bolts. See TORQUE REQUIREMENTS on page 6. Finally tighten the 3 small capscrews to secure the pin-retaining plate. On 213-286 frame machines, the pump shaft nut must be removed and the bolted or self-release coupling replaced with a non-reverse coupling.

The top half of the coupling should seat solidly on the lower half and the pins should touch the bottom of the pockets between the teeth in the ratchet. The clearance between the pin-carrier and the top of the ratchet teeth should be between 1/16 and 1/8 inch.

When installing a non-reverse coupling do not use lubricant. Lubrication will lower the coefficient of friction between pins and pin-carrier, and the pins may not stay up when motor reaches full speed.

Motors shipped from stock may have their top couplings and non-reverse assemblies packaged separately. They can be installed as described in previous paragraphs.

POWER SUPPLY AND CONNECTIONS

Wiring and Grounding

WARNING: MOTOR AND CONTROL WIRING, OVERLOAD PROTECTION, AND GROUNDING SHOULD BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND CONSISTENT WITH SOUND LOCAL PRACTICES.

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN DAMAGE TO THE EQUIPMENT, INJURY TO PERSONNEL, OR BOTH.

Stator winding connections should be made as shown on the connection diagram or in accordance with the wiring diagram attached to the inside of the conduit box cover. For 3-Lead motors no connection diagram is needed or supplied.

The motor frame may be grounded by attaching a ground strap from a known ground point to the grounding bolt in the conduit box.

Allowable Voltage and Frequency

The power supply must agree with the motor nameplate voltage and frequency. Motors will operate (but with characteristics somewhat different from nameplate values) on line voltages within ± 10 percent of nameplate value or frequency within ± 5 percent, and a combined variation not to exceed ± 10 percent.

Position of the Conduit Box

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

LUBRICATION

Motors with oil-lubricated bearings (324-405 frames) are shipped without oil. Before starting the motor, fill each reservoir to the standstill level shown on the sight gage. Be careful to keep dirt out of the lubricant and bearing housing.

Use only the oil specified on the lubrication nameplate or the lubrication instructions supplied with each motor. See RELUBRICATION and TABLE II on pages 10 and 11, and LUBE NAMEPLATE for oil grade and viscosity and further instructions.

If reservoirs have had oil in them during storage period, drain out this old oil and refill reservoir with fresh oil when installing the motor for operation.

OPERATION

CAUTION: BEFORE ENERGIZING THE MOTOR FOR THE FIRST TIME OR AFTER AN EXTENDED SHUT DOWN, IT IS ADVISABLE TO CHECK INSULATION RESISTANCE, POWER SUPPLY AND MECHANICAL FREEDOM OF THE MOTOR. IF THE MOTOR HAS BEEN STORED IN A DAMP LOCATION, DRY IT OUT THOROUGHLY BEFORE OPERATING.

WARNING: BE SURE THAT THE MOTOR IS NOT RUNNING AND THE POWER SUPPLY IS DISCONNECTED BEFORE WORKING ON MOTOR.

STEPS PRIOR TO INITIAL START-UP OR START-UP AFTER A LONG IDLE PERIOD

1. Check insulation resistance as indicated in the caution above.

WARNING: BEFORE MEASURING INSULATION RESISTANCE, THE MACHINE MUST BE AT STANDSTILL AND ALL WINDINGS TO BE TESTED MUST BE ELECTRICALLY CONNECTED TO THE FRAME AND TO GROUND FOR A TIME SUFFICIENT TO REMOVE ALL RESIDUAL ELECTROSTATIC CHARGE.

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN INJURY TO PERSONNEL.

In accordance with established standards, the recommended minimum insulation resistance for the stator winding is as follows:

$$R_S = \frac{V_S}{1000} + 1$$

Where RS is the recommended minimum insulation resistance in megohms at 40°C of the entire stator winding obtained by applying direct potential to the entire winding for one minute, and VS is rated machine voltage.

NOTE: SEE IEEE RECOMMENDED PRACTICE FOR TESTING INSULATION RESISTANCE OF ROTATING MACHINES, PUBLICATION NO. 43, FOR MORE COMPLETE INFORMATION.

If the insulation resistance is lower than this value, it may be wet and it is advisable to eliminate the moisture in one of the following ways:

- A. Dry the stator in an air circulating oven with the air surrounding the part at 95°C to 115°C until the stator has been above 90°C for at least four hours. Then the air temperature may be raised to 135°C to 155°C. Continue to heat until the insulation resistance is constant for a one-half hour period.

- B. Enclose the motor with canvas or similar covering, leaving a hole at the top for moisture to escape. Insert heating units or lamps and leave them on until the insulation resistance is constant for one-half hour period. Be careful not to get heating units so close to the winding that they cause localized damage.

- C. With the rotor locked and using approximately 10 percent of rated voltage, pass a current through the stator windings. Increase the current gradually until the temperature reaches 90°C. Do not exceed this temperature. Maintain a temperature of 90°C until the insulation resistance becomes constant for a one-half hour period.

2. Check bearing oil reservoirs to be sure they have been filled to the proper level with fresh oil. See RELUBRICATION AND TABLE II on pages 10 and 11, and LUBE NAMEPLATE on motor for oil grade and viscosity and further instructions. Be sure filler caps and drain plugs are securely tightened.

3. Whenever possible, examine the interior of the machine for loose objects or debris which may have accumulated, and remove any foreign material.

4. If possible, turn the rotor by hand to be sure that it rotates freely.

5. Check all connections with the connection diagram. Check all accessible factory-made connections for tightness to make sure none has become loose during shipment.

6. If possible leave motor un-coupled (or un-couple it) for initial operation so that motor vibration, noise, current and bearings can be checked un-coupled before they are masked by the pump. To run a VHS motor uncoupled, it is recommended that the pump head-shaft be removed. If this cannot be done remove the upper half-coupling and be sure the pump shaft is well centered in the motor shaft so it will not rub. IF THIS IS DONE, ROTATE MOTOR BY HAND TO BE SURE THERE IS NO INTERFERENCE BETWEEN SHAFTS. Do not try to run motor un-coupled by just removing gib-key.

7. When the driven machine is likely to be damaged by the wrong direction of rotation, it is imperative to un-couple the motor from its load during the initial start and make certain that it rotates in the correct direction. If it is necessary to change rotation, interchange any two line leads. For multispeed motors check each speed independently. On VHS motors do this before installing pump head-shaft and upper half-coupling.

Some motors are designed for unidirectional rotation. Rotation of these motors must be in accordance with the rotation indicated on the nameplate and the outline furnished with the equipment.

INITIAL START

1. After inspecting the machine carefully as outlined above, make the initial start by following the regular sequence of starting operations in the control instructions.

2. Run the motor un-coupled initially, if possible, checking for abnormal noise, vibration or bearing temperatures, and for current and voltage balance. Then check motor operation under load for an initial period of at least one hour to observe whether any unusual noise or hotspots develop.

3. In the event of excessive vibration or unusual noise, remove all power and disconnect the machine from the load and check the mounting and alignment.
4. Space heaters should be de-energized during motor operation.
5. Check line voltage on all 3 phases to be sure it is balanced and within 10% of motor rated voltage with motor drawing load current.
6. Check the operating current against the nameplate value. Do not exceed the value of nameplate amperes X service factor (if any) under steady continuous load. Also check to be sure that current in all three lines is balanced.

JOGGING AND REPEAT STARTS

CAUTION: REPEATED STARTS AND/OR JOGS OF INDUCTION MOTORS GREATLY REDUCE THE LIFE OF THE WINDING INSULATION. THE HEAT PRODUCED BY EACH ACCELERATION OR JOG IS MUCH MORE THAN THAT DISSIPATED BY THE MOTOR AT FULL LOAD. IF IT IS NECESSARY TO REPEATEDLY START OR JOG A MOTOR, IT IS ADVISABLE TO CHECK THE APPLICATION WITH THE LOCAL GENERAL ELECTRIC SALES OFFICE.

7. Check motor heating but do not depend on your hand to determine temperature. Use the temperature detectors furnished in the motor if there are any (eg., RTD's or thermocouples), or use a thermometer. If there is any doubt about the safe operating temperature, take the temperature of the part in question and confer with the nearest sales office of the General Electric Company. Give full details, including all nameplate information.

Overheating of the motor may be caused by improper ventilation, excessive ambient temperature, dirty conditions, excessive current due to overload, unbalanced a-c voltage or (if a variable speed controller is used) harmonics in power supplied to the motor.

MAINTENANCE

WARNING: BEFORE INITIATING MAINTENANCE PROCEDURES, DISCONNECT ALL POWER SOURCES TO THE MOTOR AND ACCESSORIES. FOR MACHINES EQUIPPED WITH SURGE CAPACITORS DO NOT HANDLE CAPACITOR UNTIL IT IS DISCHARGED BY A CONDUCTOR SIMULTANEOUSLY TOUCHING ALL TERMINALS AND LEADS, INCLUDING GROUND. THIS DISCHARGE CONDUCTOR SHOULD BE INSULATED FOR HANDLING.

REPLACE ALL NORMAL GROUNDING CONNECTIONS PRIOR TO OPERATING.

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN INJURY TO PERSONNEL.

GENERAL

Inspect the motor at regular intervals, as determined by service conditions. Keep the motor clean and the ventilation openings clear.

In addition to a daily observation of the overall condition, it is recommended that a regular inspection routine be set up to check periodically the following items:

1. General Cleanliness
2. Insulation and Windings
3. Lubrication and Bearings
4. Coupling bolt tightness

GENERAL CLEANLINESS

The interior and exterior of the machine should be kept free from dirt, oil, grease and conducting dust. Oily vapor, debris, or dust may build up and block off ventilation. Any of these contaminants can lead to early motor failure. Motor should be disassembled and thoroughly cleaned periodically as needed.

Motors may be blown out with dry, compressed air of moderate pressure. However, cleaning by suction is preferred because of the possibility of water in compressed air lines and the danger of blowing metal chips into the insulation with compressed air.

WARNING: TO PREVENT INJURY TO EYES AND RESPIRATORY ORGANS, SAFETY GLASSES AND SUITABLE VENTILATION OR OTHER PROTECTIVE EQUIPMENT SHOULD BE USED. OPERATOR MUST NOT USE COMPRESSED AIR TO REMOVE DIRT OR DUST FROM HIS PERSON OR CLOTHING.

Screens and covers are provided as necessary for protection of the equipment and personnel. All screens must be kept free of dirt and debris to ensure proper ventilation, and kept in place for protection of personnel.

COUPLING MAINTENANCE

The condition of non-reverse couplings should be checked periodically by removing the top cap. If dirt has caused the action of the pins to become sluggish, the pin-carrier should be removed, disassembled, and thoroughly cleaned with a suitable solvent. The parts should then be dried and reassembled in accordance with the instructions given under NON-REVERSE COUPLINGS on page 7.

Sometimes, after a long period of operation with frequent stops and starts, the surface of the holes in the pin-carrier becomes polished, so that friction forces will not longer hold the pins clear of the ratchet teeth when the motor is running. This condition can be remedied by roughening these surfaces with a piece of emery paper wrapped around a rod.

NOTE: WHENEVER THE DISMANTLING OF COUPLINGS IS NECESSARY, THE USE OF WITNESS MARKS WILL ASSURE A BALANCED CONDITION WHEN REASSEMBLY IS COMPLETE.

Bolts on both bolted couplings and non-reverse couplings should be checked periodically to be sure they are tight. See recommended tightening torques on page 6.

RELUBRICATION

Oil Lubricated Bearings

Motors 320 frame size and larger have an oil lubricated upper bearing. The following instructions apply to that bearing. Grease lubricated instructions for all other bearings are included in the next section.

Motors covered by these instructions have oil lubricated bearings. Maintain proper lubrication by checking the oil level periodically and adding oil when necessary. Because of the clearing action of the bearing as the motor accelerates up to speed, and the expansion of the oil as it comes up to operating temperature, the oil level will be higher after the motor has been in operation for a while than it is with the motor at standstill. The normal level, with the motor stopped and the oil cold, is marked **STANDSTILL LEVEL** on the sight gage.

Overfilling should be avoided not only because of the possibility that expansion may force the oil over the oil sleeve and into the motor, but also because operating with the oil level too high prevents the bearing from clearing itself of excess oil. The resultant churning can cause extra loss, high temperatures, and oxidized oil. If, during operation, the oil level goes above the maximum shown on the sight gage, drain enough oil to bring the level back within the operating range. A hole is provided inside the drain plug to make it possible to do this without completely removing the plug.

Do not permit the operating oil level to fall below the minimum shown on the gage. Should it ever become necessary to add excessive amounts of make-up oil, investigate immediately for oil leaks.

Change oil at regular intervals. The time between oil changes depends upon the severity of operating conditions and, hence, must be determined by the motor user. One or two changes a year is average, but special conditions, such as high ambient temperature, may require more frequent changes. Avoid operating motor with oxidized oil.

Use only best grade, oxidation and corrosion inhibited turbine oil produced by reputable oil companies. The viscosity (weight) of the oil to be used depends upon the type and size of the bearing, its load and speed, the ambient temperature, and the amount and temperature of the cooling water (if used). The lubrication nameplate or instruction with each motor specified the viscosity range of oil suitable for average conditions. The usual recommendations are summarized in Table II, Oil Viscosity. Operation in ambient temperatures that are near or below freezing may require preheating the oil or the use of a special oil.

Grease Lubricated Bearings

The thrust bearing on 182-286 (bottom bearing) and the guide bearing on the 182-405 frame (182-286 top bearing and 324-405 bottom

bearing) are generally grease lubricated. The thrust bearings of motors with speeds above 1800 RPM should be regreased every 1000 hours of operation with an interval not to exceed 3 months. For motors with speeds 1800 RPM and below, regrease every 2000 hours of operation with the interval not to exceed 6 months. The guide bearings should be regreased in accordance with attached schedule.

Type Service	Typical Examples	Relubrication Interval
Easy	Infrequent operation	1 year
Standard	One-or-two shift operation	6 months
Severe	Continuous Operation	3 months
Very Severe	Dirty locations and/or high ambient temperatures	2 months

Relubrication should be with General Electric D6A2C5 grease for best results, unless special grease is specified on the nameplate.

The following procedure should be used in regreasing:

1. Stop the unit
2. Disconnect unit from the power supply
3. Remove the relief plug and free the hole of hardened grease.
4. Wipe the lubrication fitting clean and add grease with a hand-operated gun.
5. Leave the relief plug temporarily off. Reconnect the unit and run for about 20 minutes to expel the excess grease
6. Stop the unit; replace the plug
7. Restart the unit

CAUTION: FAILURE TO OBSERVE THE FOREGOING INSTRUCTIONS FOR REGREASING MAY RESULT IN GREASE LEAKAGE AND/OR BEARING DAMAGE.

In some cases, water cooling for the oil is impractical or undesirable, and the normal operating oil temperature will be in range of 170° F to 210° F. Also, in some cases the bearing size, thrust-load and speed are so high that even with water cooling the normal oil temperature may be as high as 210° F. In these cases, it is especially important that proper viscosity, high-grade oil containing an oxidation inhibitor be used. Observe the condition of the oil frequently and change oil when it begins to show signs of deterioration.

Oil-lubricated bearing housings are provided with large settling chambers in which dust, dirt, and sludge collect. Unless the oil has been permitted to oxidize, the draining of the old oil during regular changes will usually provide sufficient flushing action to clean out the reservoir.

Whenever the motor is disassembled for general cleaning and reconditioning, the bearing housing may be washed out with a suitable cleaning solvent. 1, 1, 1 Trichloroethane may be used, following same instructions and cautions as shown for cleaning windings on pages 11 and 12. Avoid using any solvent that will soften the paint used on the interior of the oil reservoir. Be sure that the oil metering hole is clear, and then dry the housing thoroughly before reassembly.

TABLE II
OIL VISCOSITY

(For a particular motor, refer to the lubrication nameplate or instructions.)

Bearing Function and Location	Bearing Type	Oil Viscosity-SUS		
		@ 100° F	@ 210° F	G-E Spec.
Thrust Bearing (In top endshield) 320-405 Frame	Angular Contact Ball	150	45	D6B6A

END-PLAY ADJUSTMENT

General

Most high-thrust motors are designed to withstand only momentary up-thrust. This up-thrust, which can exist for a few seconds during starting, is taken by the guide bearing. To prevent the thrust bearing from losing radial stability during this time, the motor endplay is limited to a small amount by adjustment of the motor shaft nut or by shimming. This adjustment is made at the factory and need not be disturbed on a new motor. However, should the motor be disassembled for any reason, the adjustment must be made during reassembly to avoid damaging the bearings, or having some rotating part rub against a stationary part. The procedure depends upon the type of thrust bearing.

Lower Thrust Bearing — 182-286 Frames, Grease Lubricated

Standard high-thrust motors are designed to withstand only momentary up-thrust. This up-thrust which can exist for a few seconds during starting, is taken by the guide bearing. To prevent the thrust bearing from losing radial stability during this time, the motor end play is limited to a few thousandths of an inch by shims inserted in the housing above the upper bearing. This adjustment is made at the factory and need not be disturbed on a new motor. However, should the motor be disassembled for any reason, the adjustment must be made upon reassembly to avoid damaging the bearings.

Whenever these motors are reassembled, the shims should be replaced and the end play checked to see that it falls within the allowable 0.005 to 0.007 inch. See Figures 1 and 3.

Motors which must withstand continuous up-thrust have a somewhat different construction. The thrust bearing is arranged to take this up-thrust and is clamped in the bearing housing. No shims are used in these motors since the lower bearing is of the type which can withstand axial load in both directions. See Figure 3a.

Ball Thrust Bearing — 324-405 Frames, Oil Lubricated

For a motor with angular-contact ball thrust bearings, refer to Figures 2 and 4. When the motor shaft nut is tightened, the rotor, shaft, and lower bearing seats against the lower bearing cover. Further tightening of the nut preloads the bearings. (Note that shoulder on the shaft below the lower half-coupling is purposely located so that it does not seat against the coupling.)

The best way to adjust the nut is by trial, using an indicator between the lower half-coupling and top endshield, and lifting the rotor to check the end-play after each setting of the nut until between 0.002 and 0.005 inch is obtained. The nut should then be locked with its lockwasher. If equipment is not available to use this method, the following procedure may be used. Tighten the motor shaft nut carefully until all end-play is removed and the rotor just fails to turn freely.

Then back the nut off 1/6 turn and lock with its washer. An assembly nameplate giving this information is mounted on the motor.

Motors which must withstand continuous up-thrust have a somewhat different construction. The upper (thrust) bearing is arranged to take this up-thrust; it consists of angular-contact thrust bearings mounted back-to-back (DB). (See Figure 4a.) The inner rings are locked on the lower half-coupling with a nut and the outer rings are clamped in the endshield with a ring. The shaft shoulder below the lower half-coupling is so located that it seats against the lower half-coupling before the lower bearing comes up against its cover. No special adjustment is necessary when reassembling this type of motor, and the motor shaft nut can be pulled down tight and locked. The end play of the motors using DB-mounted bearings will then be very small, 0.005 inch or less.

BEARING REPLACEMENT

In general, replacement bearings should be of the same type, and installed in the same relative position, as the original bearings.

When removing bearings, apply steady, even pressure parallel to the shaft or lower half-coupling center-line. Apply this pressure to the inner race whenever possible. Angular-contact bearings which have failed, and are especially tight on the coupling, can sometimes be removed by using the following procedure: separate the bearing by forcing the outer race over the balls; then with a torch, apply quick heat to the inner race while also applying pulling pressure.

Angular-contact bearings which are to be stacked together should have their high points of eccentricity (indicated by a burnished spot on the inner race) lined up. All bearings should be of same manufacture and of the type that permits stacking.

Some motors with angular-contact ball bearings are supplied with removable spacer rings under the outer race of the thrust bearing so that the thrust capacity can be increased by adding an extra bearing or bearings. When these bearings are installed, the high points of eccentricity should be lined up with the keyway in the lower half-coupling. If the original bearings have been in service, they should be replaced at the time this conversion is made.

INSULATION AND WINDING MAINTENANCE

General

For long life and satisfactory operation, insulated windings should be kept clean and free of dirt, oil, metal particles, and other contaminants. A variety of satisfactory and acceptable methods are available for keeping equipment clean. The choice of method will depend greatly on time, availability of equipment, and/or the insulation

system. However, vacuum and/or compressed air cleaning with nonmetallic hose tips should precede cleaning with water and detergent or with solvents. Tightly adhering dirt may require gentle brushing or wiping to get it loose.

WARNING: TO PREVENT INJURY TO EYES AND RESPIRATORY ORGANS, SAFETY GLASSES AND SUITABLE VENTILATION OR OTHER PROTECTIVE EQUIPMENT SHOULD BE USED.

Vacuum And Compressed Air Cleaning

Compressed air may be used to remove loose dirt and dust from air passages such as air ducts. Suction should be used to remove dirt and dust particles from winding to void driving particles into the windings and damaging the coils.

CAUTION: CARE MUST BE TAKEN TO MAKE SURE THAT THE AIR SUPPLY IS DRY AND THAT EXCESSIVE AIR PRESSURE IS NOT USED. GENERALLY A PRESSURE OF NOT MORE THAN 30 PSI IS RECOMMENDED.

WARNING: OPERATOR MUST NOT USE COMPRESSED AIR TO REMOVE DIRT OR DUST FROM HIS PERSON OR CLOTHING.

Cleaning With Water and Detergent

This method is very effective in cleaning windings when used with a low-pressure steam jenny (maximum steam flow 30 PSI and 90°C).

CAUTION: TO MINIMIZE POSSIBLE DAMAGE TO VARNISH AND INSULATION, A FAIRLY NEUTRAL NON-CONDUCTING TYPE OF DETERGENT, SUCH AS DUBOIS FLOW, SHOULD BE USED. A PINT OF DETERGENT TO 20 GALLONS OF WATER IS RECOMMENDED.

If a steam jenny is not available, the cleaning solution may be applied with warm water by a spray gun. After the cleaning operation, the windings should be rinsed with water or low-pressure steam.

It is advisable to dry the windings. Refer back to Insulation Resistance on page for instructions on how to proceed.

Cleaning With Solvents

WARNING: MANY CLEANING FLUIDS ARE FLAMMABLE AND/OR TOXIC. TO PREVENT INJURY TO PERSONNEL AND PROPERTY, CARE SHOULD BE TAKEN TO AVOID FLAMES, SPARKS, ETC. SAFETY GLASSES SHOULD BE USED AND CONTACT WITH THE SKIN SHOULD BE AVOIDED. THE AREA SHOULD BE WELL VENTILATED OR PROTECTIVE EQUIPMENT SHOULD BE USED.

Although cleaning with water and detergent is the preferred method, solvent cleaning may be used when heat drying facilities are not available.

1, 1, 1 Trichloroethane* is recommended for use as the cleaning solvent. Solvent cleaning of silicone-insulated windings (Class H insulated machines) is not recommended.

WARNING: WHILE 1, 1, 1 TRICHLOROETHANE IS CONSIDERED TO BE NON-FLAMMABLE AND HAS A RELATIVELY LOW ORDER OF TOXICITY, IT SHOULD BE USED ONLY IN A WELL-VENTILATED AREA THAT IS FREE FROM OPEN FLAMES. AVOID PROLONGED EXPOSURE TO ITS VAPOR.

FAILURE TO OBSERVE THESE PRECAUTIONS MAY RESULT IN INJURY TO PERSONNEL.

Windings cleaned with solvent should be dried thoroughly by circulation of dry air before voltage is applied.

* One commercial source of 1, 1, 1 Trichloroethane is Chlorothene NU, which is a Trade-mark of the Dow Chemical Company, Midland, Michigan.

Revarnishing Windings

After several cleanings with water and detergent, it may be necessary to revarnish the windings. GE 9522 or equivalent varnish treatment is recommended for Class B and Class F systems. This varnish is available from the General Electric Company Insulating Materials Department or GE Service Shops.

All systems treated with varnish No. 9522 or equivalent must be baked until the windings are at 150°C for four hours.

RENEWAL PARTS

When ordering parts, give description and state quantity of parts desired, together with the nameplate rating, model, and serial number of the motor. For couplings, also specify the type, bore, and keyway size.

Requests for additional copies of these instructions or inquiries for specific information should be addressed to the nearest sales office of the General Electric Company.

TROUBLE SHOOTING CHART

Affected Parts	Difficulty	What to Check
Windings	Overheating	<ul style="list-style-type: none"> • Calibration of measuring instrument • Excessive load • Unbalanced a-c current • Improper or restricted ventilation • Excessive ambient temperature • Short circuited coil or windings • Dirty windings • Unbalanced voltage • Harmonics in Power Supply (Variable Frequency Control) • Fan broken
Bearings	Overheating	<ul style="list-style-type: none"> • Calibration of measuring instrument • Worn out or dirty oil • Insufficient oil • Misalignment • Excessive thrust or radial loading • Shaft currents • Improper end-play • Fan broken
Bearing Housing	Oil Leaks	<ul style="list-style-type: none"> • Incorrect grade of oil (type or viscosity) • Loose fittings • Cracked/ Porous casting • Over-filled • Water in oil
Motor	Excessive Vibration	<ul style="list-style-type: none"> • Unbalance • Misalignment • Improper or settled foundation • Non-uniform air gap • Rubbing parts • Bent shaft • Unbalanced stator current • Damaged bearings • Reed Critical Frequency • Incorrect end-play • Fan broken
Motor	Failure to Start	<ul style="list-style-type: none"> • Wrong transformer taps • Wrong connections • Open circuit • Excessive line drop (low voltage at motor) • Excessive load • Rotor rubs • Wrong direction of rotation
Insulation	Low insulation resistance or insulation failure	<ul style="list-style-type: none"> • Moisture, dirt, metal particles, oil or other contaminants on the insulated windings • Wrong voltage • Excessive temperature • Voltage surges/lightning • Mechanical damage • Excessive vibration with resultant mechanical damage • Single-Phasing

NOTES

GENERAL ELECTRIC COMPANY
FORT WAYNE, INDIANA 46801

NOTES

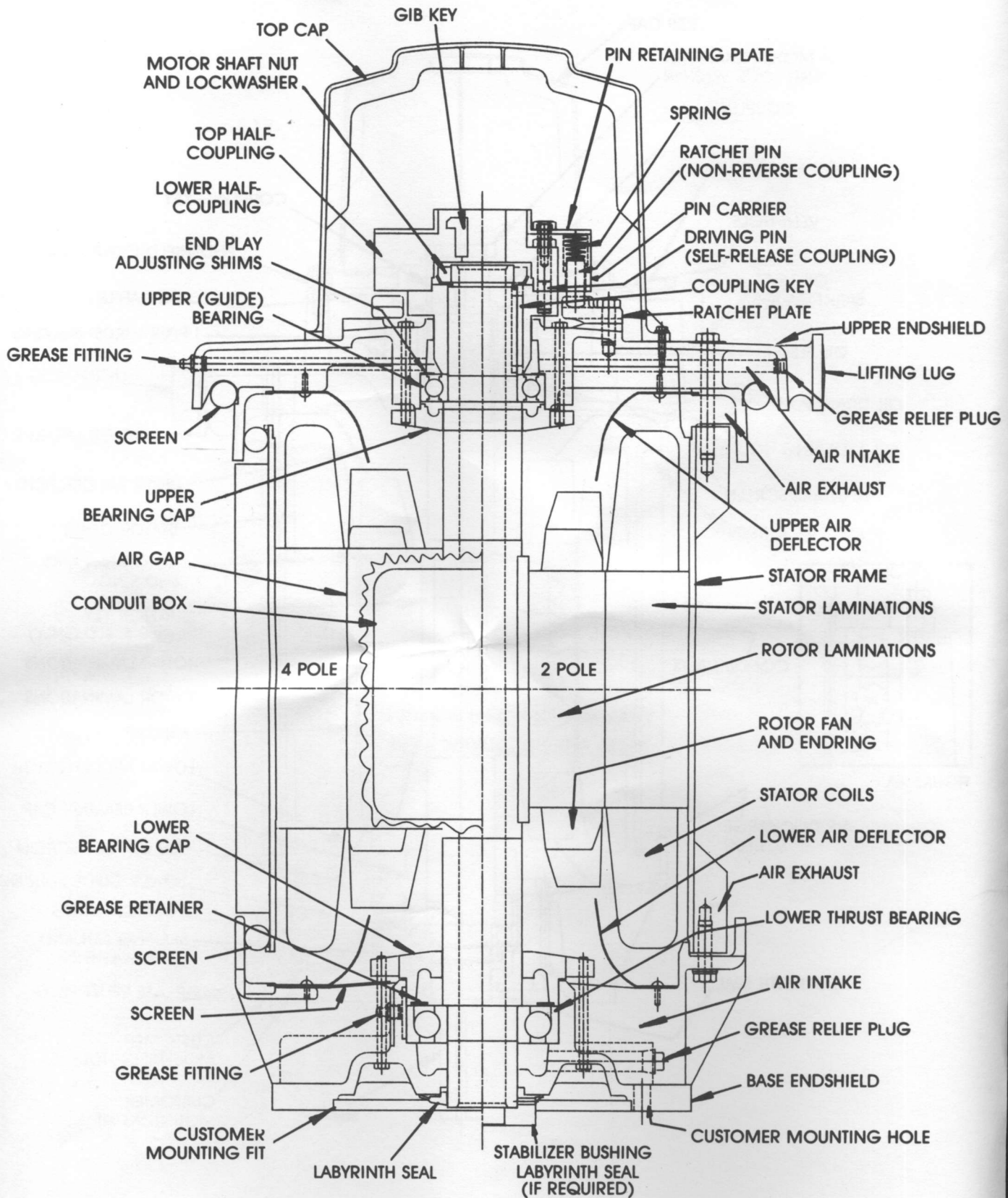


FIGURE 1 — 213-286 FRAME MOTORS

TYPICAL HOLLOW SHAFT HIGH-THRUST WEATHER-PROTECTED I MOTOR WITH ANGULAR-CONTACT BALL LOWER THRUST BEARING.

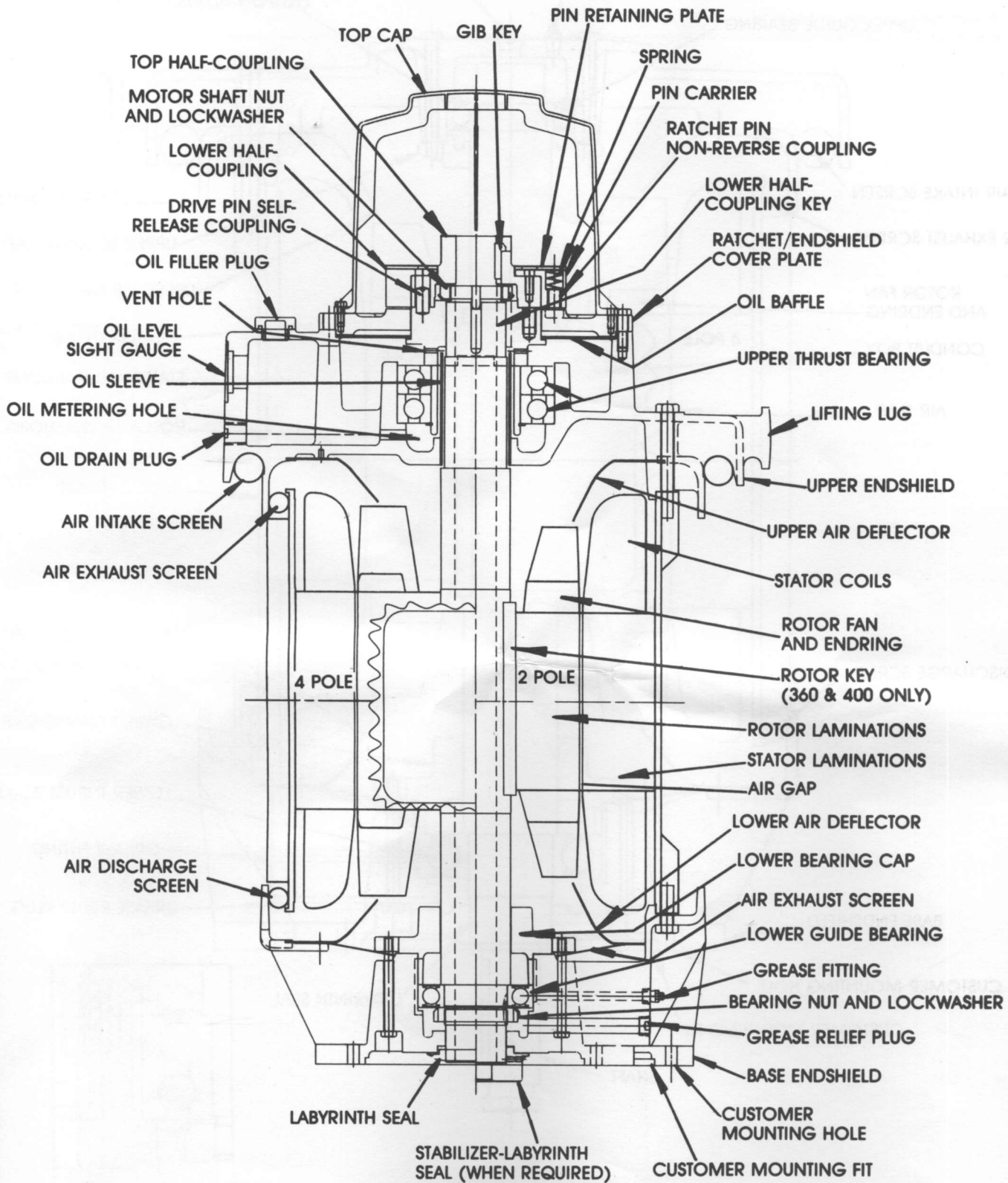


FIGURE 2 — 324-405 FRAME MOTORS

TYPICAL HOLLOW SHAFT HIGH-THRUST WEATHER-PROTECTED I MOTOR WITH ANGULAR-CONTACT BALL UPPER THRUST BEARING.

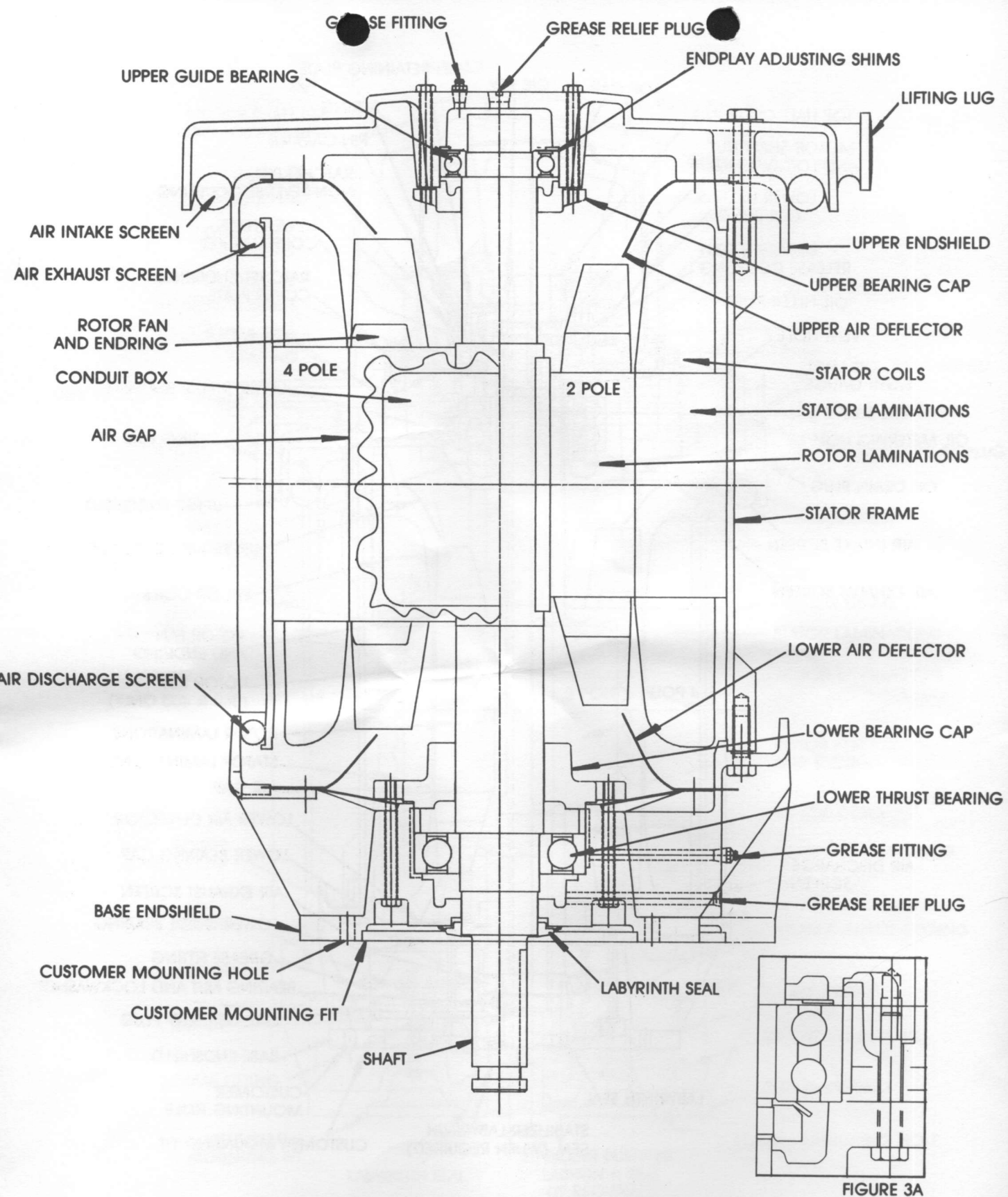


FIGURE 3 — 182-286 FRAME MOTORS

TYPICAL SOLID SHAFT HIGH-THRUST WEATHER PROTECTED MOTOR WITH ANGULAR CONTACT LOWER BEARING. TYPICAL SOLID SHAFT CONSTRUCTION FOR CONTINUOUS UP AND DOWN THRUST IS SHOWN IN FIGURE 3A.

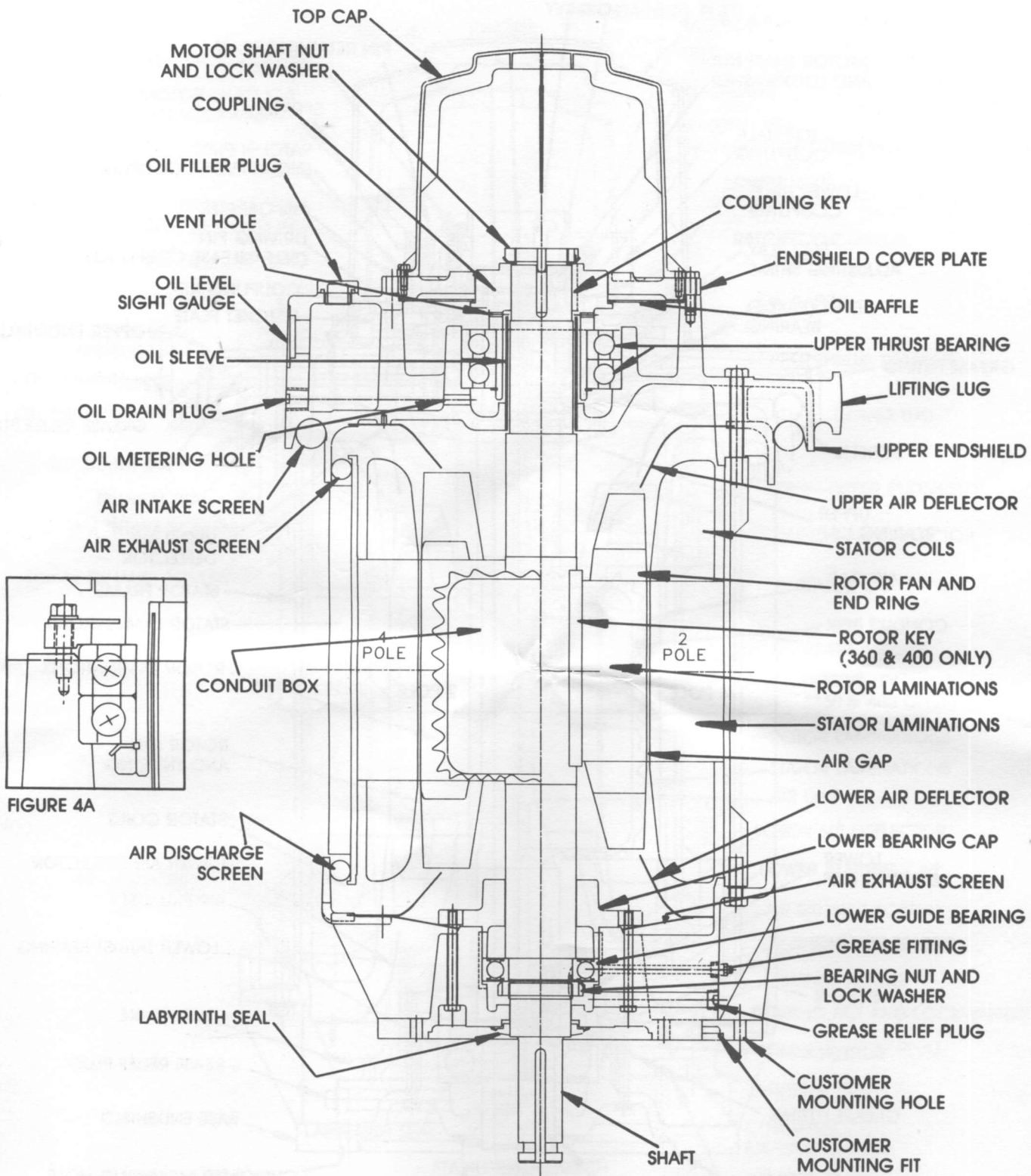


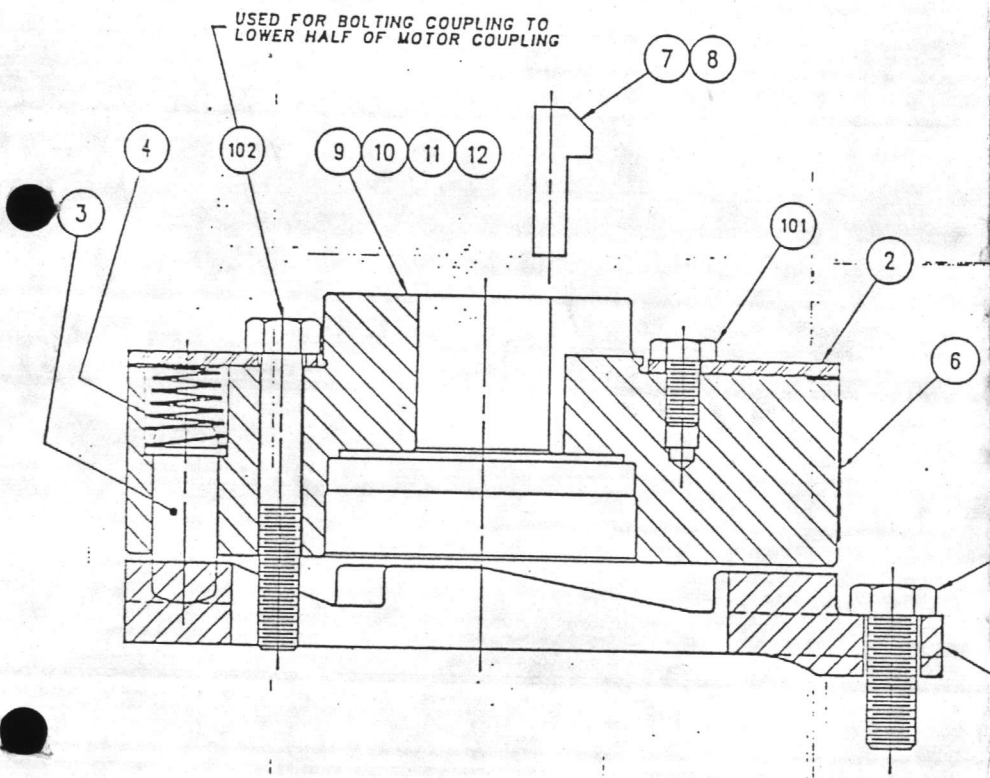
FIGURE 4 — 324-405 FRAME MOTORS

TYPICAL UPPER BEARING CONSTRUCTION FOR WEATHER PROTECTED I SOLID SHAFT MOTORS SUITABLE FOR HIGH DOWN THRUST, MOMENTARY UP-THRUST AND LIMITED ENDPLAY. TYPICAL SOLID SHAFT AND INLINE PUMP MOTOR CONSTRUCTION FOR CONTINUOUS UP AND DOWN THRUST ARE SHOWN IN FIGURE 4A.

F210:B5521AA
 REF. G.E. 192B9950AA
 PLOT CLASS 100,101,116,150
 PLOT SCALE

GE Canada
 COMPONENT MOTORS PETERBOROUGH
 4002B5521AA
 TITLE
COUPLING ASSEMBLY KIT
 FIRST MADE FOR FR. 210 WP-1 VERTICAL MOTOR
 NON-REVERSE

GROUP NO.	AND QUANTITY				PART NO.	NAME	DRAWING NO., DESCRIPTION, MATERIAL
	4	3	2	1			
	X	X	X	X	1	ASSEMBLY	THIS DWG. PT.1
	1	1	1	1	2	PLATE-PIN RETAINER	4002B5921AH PT.1
	5	5	5	5	3	PIN	4001A5921AF PT.1
	5	5	5	5	4	SPRING	4001A5921AH PT.1
	1	1	1	1	5	RATCHET PLATE	4002B5921AG PT.1
	1	1	1	1	6	LABEL	NP226315 (BUY FROM G.E.)
		1	1	1	7	KEY (GIB HEAD)	4001A5921AJ PT.1
	1				8	KEY (GIB HEAD)	4001A5921AJ PT.2
				1	9	COUPLING	4002B5921AF PT.1 (1.001 BORE)
				1	10	COUPLING	4002B5921AF PT.2 (.938 BORE)
		1			11	COUPLING	4002B5921AF PT.3 (.876 BORE)
	1				12	COUPLING	4002B5921AF PT.4 (.751 BORE)
	3	3	3	3	103	CAPSCREW	HEX. HD. STL. 3/8"-16 X 1.00 LG. N22P2508B
	3	3	3	3	102	CAPSCREW	HEX. HD. STL. 5/16"-18 X 2.25 LG. N22P2303B
	3	3	3	3	101	CAPSCREW	HEX. HD. STL. 1/4"-20 X 1.50 LG. N22P2100B



1

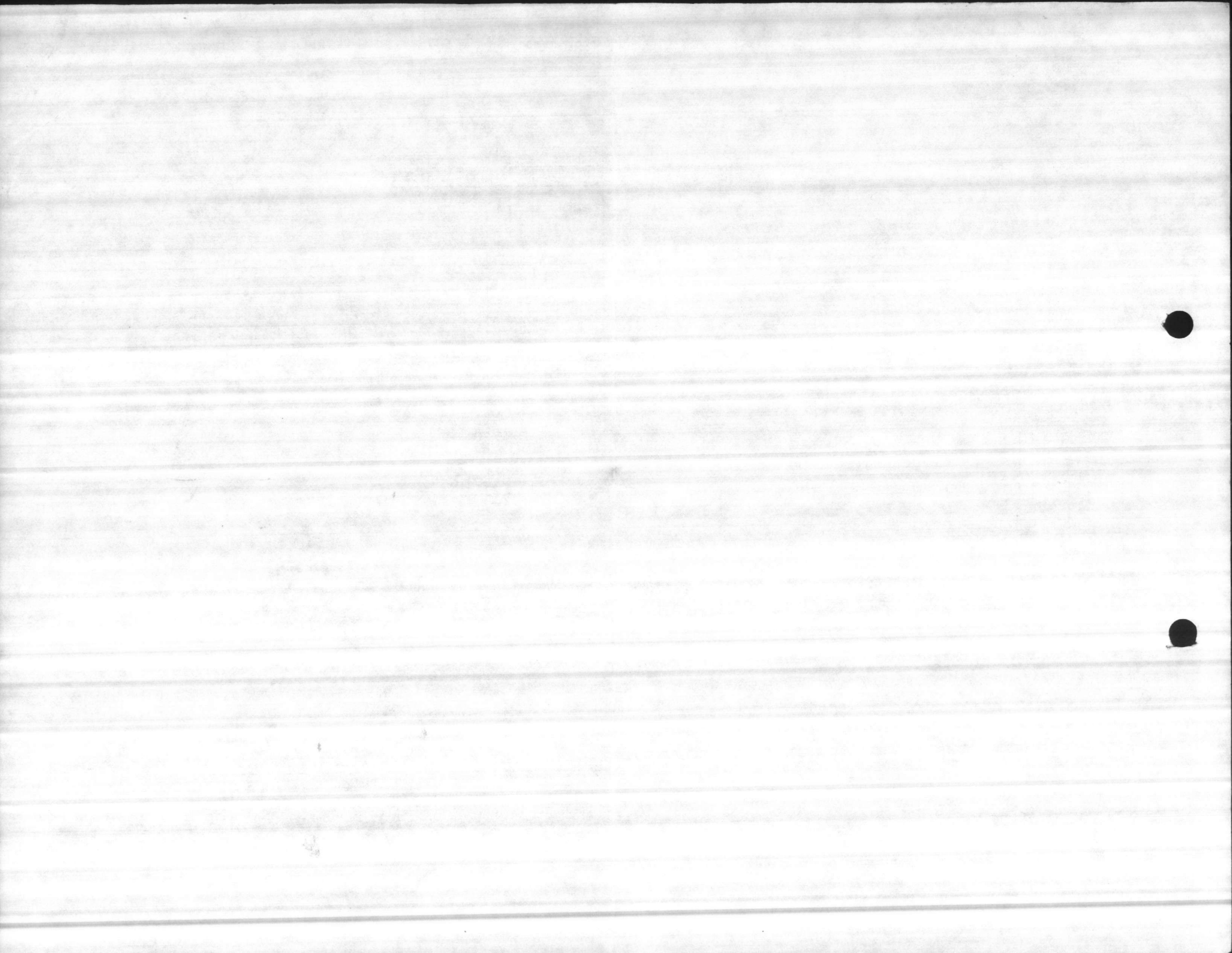
NOTE 1: COUPLING ASSEMBLY SHALL BE BALANCED, SUCH THAT WHEN MOUNTED ON MOTOR THE TOTAL ASSEMBLY WILL MEET VIBRATION LIMIT SPECIFIED ON MODEL LIST.
 NOTE 2: DO NOT LUBRICATE OR USE RUST INHIBITING COMPOUNDS ON RATCHET PLATE OR COUPLING PARTS.

1	ADDED GR.4	OCT. 18/89	GWW
REV	DESCRIPTION	DATE	INT'L

CAD DRAWING - NO MANUAL REVISIONS PERMITTED

PRINTS TO	
NAME	DATE
DRAWN GARY WARRINER	JUNE 02/88
CHECKED GARY WARRINER	JUNE 08/88

4002B5521AA
 CONT. ON SHT. INT. NO. 3



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, 1968

1. AGENCY CODE MC	2. TYPE Q	3. LATITUDE ° 34 ' 43 " 56 N	4. LONGITUDE ° 77 ' 27 " 27 W	5.
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6. AGENCY STATION NO. TC700	7. STATION NAME TC508-7
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8. DRAINAGE BASIN CODE No 6 Letter	9. STATE CODE 32	10. COUNTY CODE 133	11. COUNTY NAME ONslow
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12. PERIOD OF RECORD Began 1941 Discontinued	Y <input type="checkbox"/> Continuous <input type="checkbox"/> Interruption Exceeds 1 Year	13.	14.
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15. SITE	<input type="checkbox"/> 101 Stream	<input type="checkbox"/> 102 Canal	<input type="checkbox"/> 103 Lake	<input type="checkbox"/> 104 Reservoir	<input type="checkbox"/> 105 Estuary	<input type="checkbox"/> 106 Spring	<input checked="" type="checkbox"/> 107 Well	<input type="checkbox"/> 110 Other
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<input type="checkbox"/> 315 Odor	<input type="checkbox"/> 316 Radioactivity	<input checked="" type="checkbox"/> 318 pH (lab)	<input type="checkbox"/> 319 Eh
<input type="checkbox"/> 320 Other	<input type="checkbox"/> 331 Dissolved solids	<input checked="" type="checkbox"/> 332 Chlorides Only	<input type="checkbox"/> 333 Nutrients (Nitrogen and phosphorus compounds)
	<input type="checkbox"/> 334 Common ions	<input checked="" type="checkbox"/> 335 Hardness	<input type="checkbox"/> 336 Radiochemical
	<input type="checkbox"/> 337 Dissolved oxygen	<input type="checkbox"/> 338 Other Gases	<input type="checkbox"/> 339 Other
			<input type="checkbox"/> 351 Pesticides (insecticides, herbicides, etc.)
			<input type="checkbox"/> 352 Synthetic detergents
			<input type="checkbox"/> 353 Other
			<i>Biologic</i>
			<input type="checkbox"/> 361 Coliforms
			<input type="checkbox"/> 362 Other Micro-organisms
			<input type="checkbox"/> 363 BOD
			<input type="checkbox"/> 364 Other
			<i>Sediment</i>
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			<input type="checkbox"/> 372 Particle size
			<input type="checkbox"/> 373 Other

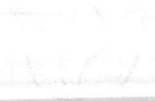
18. SUPPLEMENTARY DATA FOR SITE	<input type="checkbox"/> 421 Surface Water Station	<input type="checkbox"/> 422 Ground Water Station	<input type="checkbox"/> 423 Water Stage or Level	<input checked="" type="checkbox"/> 424 Water discharge	<input type="checkbox"/> 425 Time of Travel	<input type="checkbox"/> 426 Drainage Area
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19. STORAGE OF DATA	<input type="checkbox"/> 501 Periodic Report	<input type="checkbox"/> 502 Areal Report	<input checked="" type="checkbox"/> 503 Not Published	<input type="checkbox"/> 504 Data on Punchcard	<input type="checkbox"/> 505 Data on Magnetic Tape	<input type="checkbox"/> 506 Other
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20. OFFICE AT WHICH DATA AVAILABLE	Office BASE MAINTENANCE DEPARTMENT	Street No. MARINE CORPS BASE	City, State, Zip CAMP LEJEUNE, N. C. 28542	City Code 0735
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21. OFFICE COMPLETING FORM	BASE MAINTENANCE DEPARTMENT
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22. COMPILER'S NAME F. E. TEW, JR.	23. DATE Month Year 19 66
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WATER ANALYSIS

By TC-700

Date 8-20-43

Sample from Well-F Tent Camp

Total Solids _____ PPM Dissolved Solids _____ PPM
Suspended Solids _____ PPM Volatile Solids _____ PPM

Phenol. Alk. as CaCO ₃ <u>0</u> PPM	Silica as SiO ₂ _____ PPM
Total Alk. " " <u>217</u> "	Ferrous Iron as Fe _____ "
Carbonates " " <u>0</u> "	Total Iron as Fe <u>2.2</u> "
Bicarbonates " " <u>217</u> "	Aluminum as Al. _____ "
Chlorides as Cl. <u>10</u> "	Calcium as Ca. _____ "
Sulphates as SO ₄ _____ "	Magnesium as Mg. _____ "
Nitrites as NO ₂ _____ "	Sodium as Na. _____ "
Carbon Dioxide as CO ₂ _____ "	

pH 7.1 Soap Hardness as CaCO₃ 224 PPM

Odor _____ Turbidity _____

REMARKS _____

WATER ANALYSIS

BY

DATE

Sample from

_____	mg	Total Solids
_____	mg	Suspended Solids

_____	mg	Hardness as CaCO ₃
_____	mg	Total Alk.
_____	mg	Calcium
_____	mg	Magnesium
_____	mg	Iron as Fe
_____	mg	Aluminum as Al
_____	mg	Cadmium as Cd
_____	mg	Copper as Cu
_____	mg	Zinc as Zn
_____	mg	Lead as Pb
_____	mg	Chloride as Cl
_____	mg	Sulfate as SO ₄
_____	mg	Nitrate as NO ₃
_____	mg	Carbon Dioxide as CO ₂

PKM

Amplitude

Scale

REMARKS



JAN 31, 1957

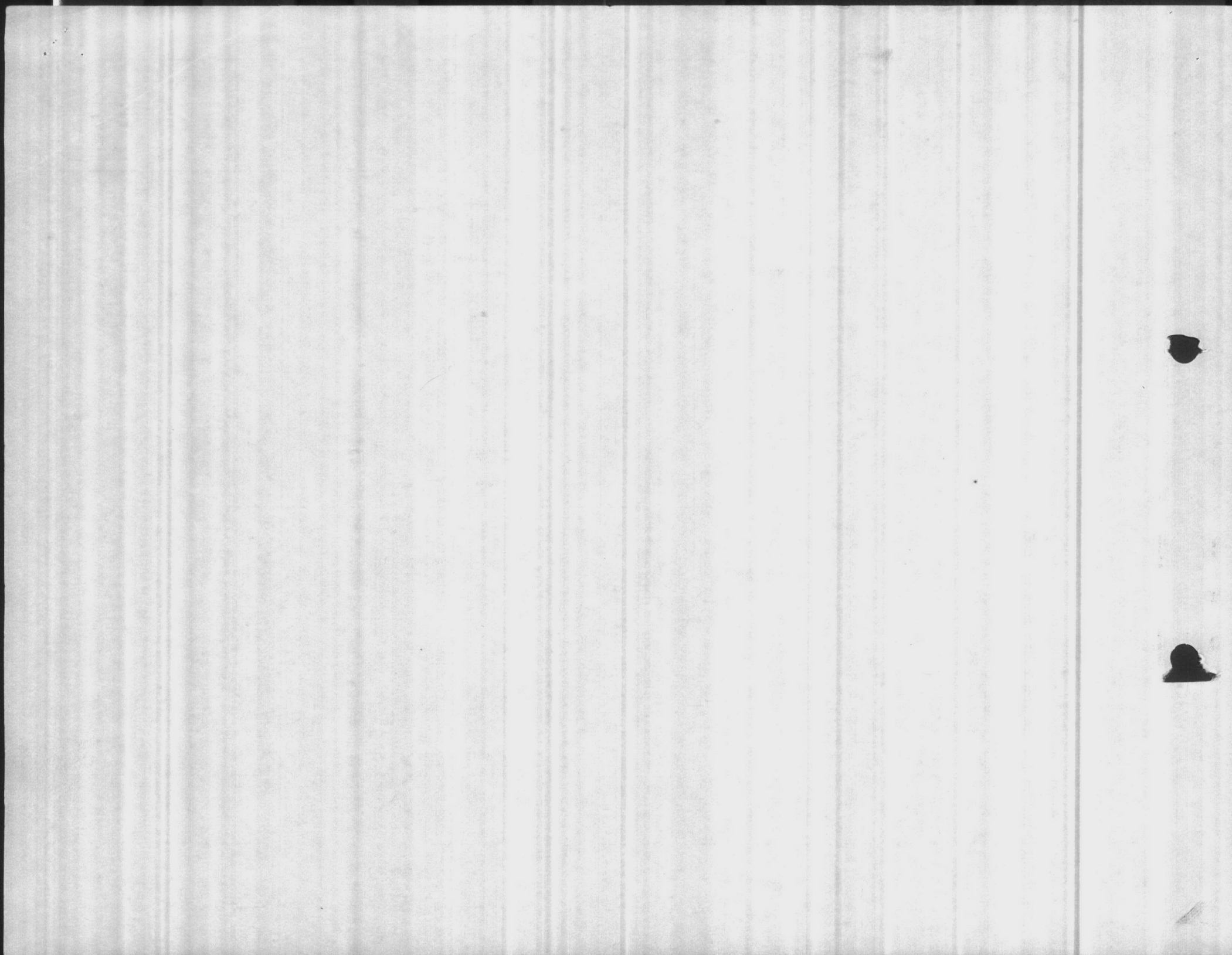
DATA SHEETS

CAMP LEJEUNE
SPEC # 3886

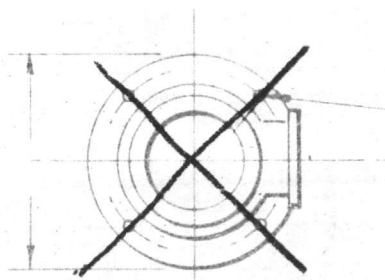
NO. 700-10

CHARLES BRUNING COMPANY, INC.
10 x 10 to the inch
PRINTED IN U. S. A.

WELL F
CAMP GEIGER



JOHNSTON VERTICAL TURBINE PUMP



4- DIA. HOLES

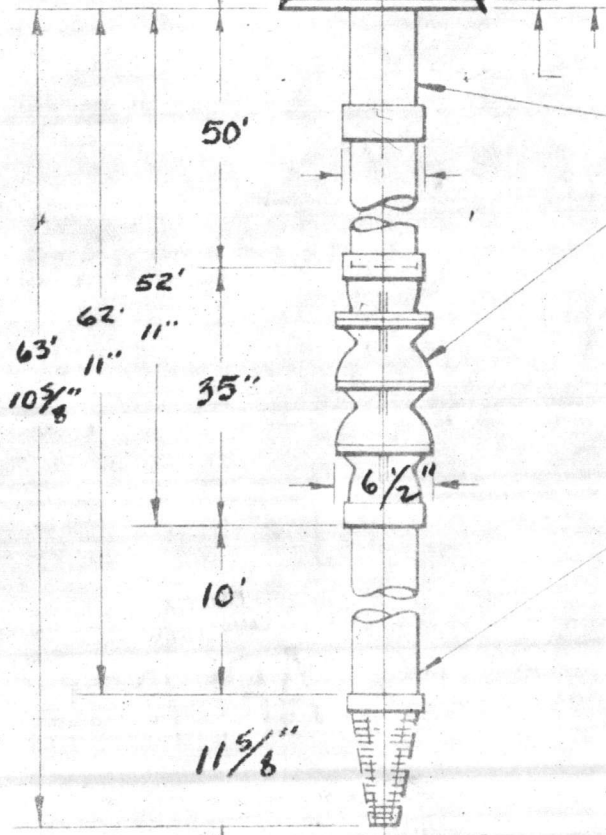
Furnished By Others

VERTICAL HOLLOW SHAFT MOTOR

HP	PHASE	CYCLE
	VOLT	RPM
ENCLOSURE		

Furnished By Others

TYPE "A" DISCHARGE HEAD
X 125# FLANGE



6WI
4" x 1 1/2" x 1" COLUMN ASSEMBLY

4 STAGE 7BC BOWL ASSEMBLY

CONDITIONS:

USGPM
FT. TOTAL HEAD
LIQUID **WATER**
SPEC. GRAV **1.0** °F PUMPING TEMP.

4" SUCTION PIPE 4" CONE STRAINER

CUSTOMER

PC#

DEALER **HEARTER WELL Co.**

PO#

JOHNSTON SERIAL #

JOHNSTON QUOTATION #

NOTE: DO NOT USE FOR CONSTRUCTION
UNLESS CERTIFIED

Pump # F

PUBLIC WORKS DEPARTMENT
CAMP LEJEUNE, NORTH CAROLINA

APPROVED

SUBJECT TO CONTRACT REQUIREMENTS

CONTRACT NO. 3886 SPEC. NO. 3886/52

TITLE Repairs to Hill Pump Campg.

DATE: 8 May 1957 W. J. Evans Jr.
BY DIRECTION OF OFFICER
IN CHARGE OF CONSTRUCTION J. B.

HYDRAULIC PERFORMANCE IS CONTINGENT ON WELL FINISHING PUMP WITH CLEAR, FRESH NON-AERATED OR NON-GASEOUS WATER FREE FROM DETRITUS WITH NO SUCTION LIFT AND TEMPERATURE NOT TO EXCEED 95 DEGREES FAHRENHEIT

NOTE: ALL COLUMN LOSSES ARE INCLUDED

CUSTOMER: _____

P.O.# _____

DEALER: HEATER WELL Co.

P.O.# _____

JOHNSTON SERIAL: _____

Pump # F

CHANGE EFFICIENCY AS FOLLOWS	NUMBER OF POINTS	FOR NUMBER OF STAGES

NOTE: ANY CHANGE IN EFFICIENCY CHANGES EITHER THE HEAD OR HORSEPOWER IN PROPORTION

TOTAL HEAD IN FEET

85
75
65
55
45

Head/Capacity

Operating Conditions:
70 TDH at 110 GPM
Pumping Water Sp. Gr. 1.0

% EFFICIENCY
80
70
60
50

Bowl Efficiency

Brake HP Req'd.

60 70 80 90 100 110 120 130 140 150 160

U. S. GALLONS PER MINUTE

HORSE POWER

3.5
2.5

IMPELLER BRZ
5 3/16" DIA.

JOHNSTON PUMP CO.

PERFORMANCE 4 STAGE



VERTICAL PUMPS

7BC

DEEP WELL TURBINE PUMP

1800

R. P. M.

DATE 4-25-57 BY JDM

PASADENA • CALIFORNIA • USA

CURVE SHEET No. _____

PUBLIC WORKS DEPARTMENT
CAMP LEJEUNE, NORTH CAROLINA

APPROVED

SUBJECT TO CONTRACT REQUIREMENTS

CONTRACT NO. 3886 SPEC. NO. 3886/56
TITLE Repairs to Well Pumps, Camp Geiger
DATE: 8 May 1957 W. J. Evans, Jr.
BY DIRECTION OF OFFICER
IN CHARGE OF CONSTRUCTION: JB

WELL # **F**

PLACE - **Geiger**

DATE - **31 Jan 1957**

ORIGINAL WELL CAPACITY

G.P.M. **125**

ORIGINAL WELL		TESTING	
Depth of Well	76	Depth after Cleaning	76
Pump Size		Test Pump Setting	60
Pump Setting	50	Measured Static Water Level	18
Static Water Level	17.9	Depth of Air Line	55

Static 20' on gauge --

CONDITION OF WELL - **Muck, sand and oil cleaned out of well.**

STATIC LEVEL ON GAUGE

Inches of water in dizometer tube	G.P.M.	30 Min.	45 Min.	60 Min.	1 Hour
	65	PL	PL	PL	PL 28
	75	PL	PL	PL	PL 36
	90	PL	PL	PL	PL 38
	120	PL	PL	PL	PL 33
	135	PL	PL	PL	PL 33
		PL	PL	PL	PL
		PL	PL	PL	PL
		PL	PL	PL	PL
		PL	PL	PL	PL
		PL	PL	PL	PL
		PL	PL	PL	PL

RECOVERY

10 Sec.	50
20	PL 45
30	PL 40
40	PL 36
50	PL 34
60	PL 30
2 Min.	PL 28
4	PL 24
8	PL 23
16	PL 23
32	PL 22

23
42

65

--5 Broke suction and sanded

REPORT ON THE

A large, faint table with multiple columns and rows, possibly containing data or a schedule. The text is illegible due to low contrast.

Well # F-TC

Date	Line Ft.	D.D. El.	G.P.M.	Static El.	Shut of Head	D.D. Ft.
------	-------------	-------------	--------	---------------	-----------------	-------------

Air Line

