IOM-1

INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

FOR

UET EXCEL-FLO TOP AND SIDE ENTRY MIXERS

SERIES XCEL

United Equipment Technologies, Corp.
60 Buckley Circle, Unit 1a, Manchester, NH 03109

Manual Update: 1-1-93

Manual Destination

Customer Pnucor
Equipment Tag # _____ Customer P.O. # 04107-40330D
Job # 1504 Drawing # _____ Serial # 1504-01
Date April 22nd, 1994 Equipment Reference _____

UET's Warrantee

UET warrantees this exclusive product to be free from defects in material or workmanship, and to be correct for the process specifications as identified by the end user. If this product does not perform as given in the process specifications by the end user, or is found to be defective in material or workmanship, UET will accept the unit's return at no charge to the customer. Said unit will, at the discretion of UET, be repaired or replaced with a new unit, or money shall be refunded to the purchaser in full.

Said unit is made of new material and is free from defect under specified and normal usage, such usage as having been given per the consumer's submitted specifications; however, materials are not guaranteed against chemical attack or abrasion. Mixer components are not guaranteed against normal wear.

This warrantee is in effect for a period of twelve (12) months from start-up, not to exceed eighteen (18) months from shipment.

==========

Customer Records:

Date of Installation:_____

Date of Start-up:_____

Start-up Notes:

QUALITY CHECKLIST

Customer:
Job Number:
Date:
Model:

Assembly

Motor Data Matches Order ____
Gearbox Ratio Matches Order ____
Turbine Diameter Actual ____
Couplings Aligned to Specification ____
Hubs and Keys Fitted to Shaft ____
Blades Fitted to Hubs ____
Shaft Fitted to Gearbox ____
Shaft Dimensions Actual ____
Baseplate/Mounting Flange Matches Order ____
Seal Matches Order ____
Breather Attached ____
Oil Level Checked ____
Mixer Properly Painted ____
Nameplates Attached ____
IOM Manual Included ____
Hardware Included ____

Mechanical Test - Maximum Allowable Units

Mechanical Seal Pressure at 30 PSI
Impeller Static Balance Test at 5 Grams
Gearbox Vibration at 0.003 inch
Noise at 85 dBA
Gearbox Temperature at 186 degrees Fahrenheit
Output Shaft Rotation Clockwise
No Oil Leakage at Gearbox

INDEX

* Optional items may be listed but not found in your IOM Manual depending on your mixer's individual requirements.

GENERAL INFORMATION

This exclusive UET Model XCEL Top or Side Entry Mixer has been crafted of high quality material to the exacting specifications of you, our customer.

Please take time to record the Installation and Start-Up dates as given under the warrantee on page two.

Proper maintenance will provide years of top quality performance and avoid the problem of last minute repair jobs or equipment failure. We strongly recommend the purchase of the UET maintenance parts kits to be kept in stock by the user against the possibility of wear. If you have questions on the operation of your unit, please call the UET engineering staff at (603) 627-9324.

EXCEL-FLO FEATURES

- **High Tech** - Latest advances in engineering design for increased efficiency and durability.

- **User-Friendly Options** - Several convenient gearbox options to meet every customer need and budget.

UET
728 E. INDUSTRIAL PARK DR.
MANCHESTER, NH 03109
UNITED EQUIPMENT TECHNOLOGIES CORP.

DATE / JOB NO.
MODEL XCEL-
MOTOR HP SERVICE FACTOR
OUTPUT SPEED RPM

← **ROTATION**

First Steps....

Inspection

Carefully uncrate and remove wrappings from you UET EXCEL-FLO mixer. Inspect all surfaces for damage. If any such damage is noted, report immediately to your shipper service and to UET.

Mixer is shipped with shaft and turbine detached to maintain shaft tolerance levels. Check for all parts - shipment is usually packed in two or more crates. Foreign shipments may be coated with rust inhibitor which is removeable with kerosene, carbon tetrachloride or other solvent compound.

For long term storage, repack the XCEL mixer after inspecting. If stored for more than one year, all lubricated parts must be inspected and the proper lubricant applied before operating the mixer. See manual section on "Lubrication"

Installation

DO NOT attach shaft to gearbox before mounting without reading the directions on this page and page following.

Step 1: Carefully lift XCEL **gearbox** from its crate and remove packing.

Step 2: (If mixer is under 20" from floor, Step 4 may be needed before mounting gearbox.) Lift mixer to mounting surface, position and bolt in place. All bolts should be tightened an extra 1/2 turn to insure placement.

Step 3: **Using extreme care**, uncrate and remove shaft from packing. DO NOT jar or bend shaft. Incautious handling may result in mixer vibration during operation.

Step 4: Insert shaft with shorter keyway toward gearbox through stuffing box on closed tank units or, for open tank units, directly into the reducer quill until keyway is fully exposed at top of quill.

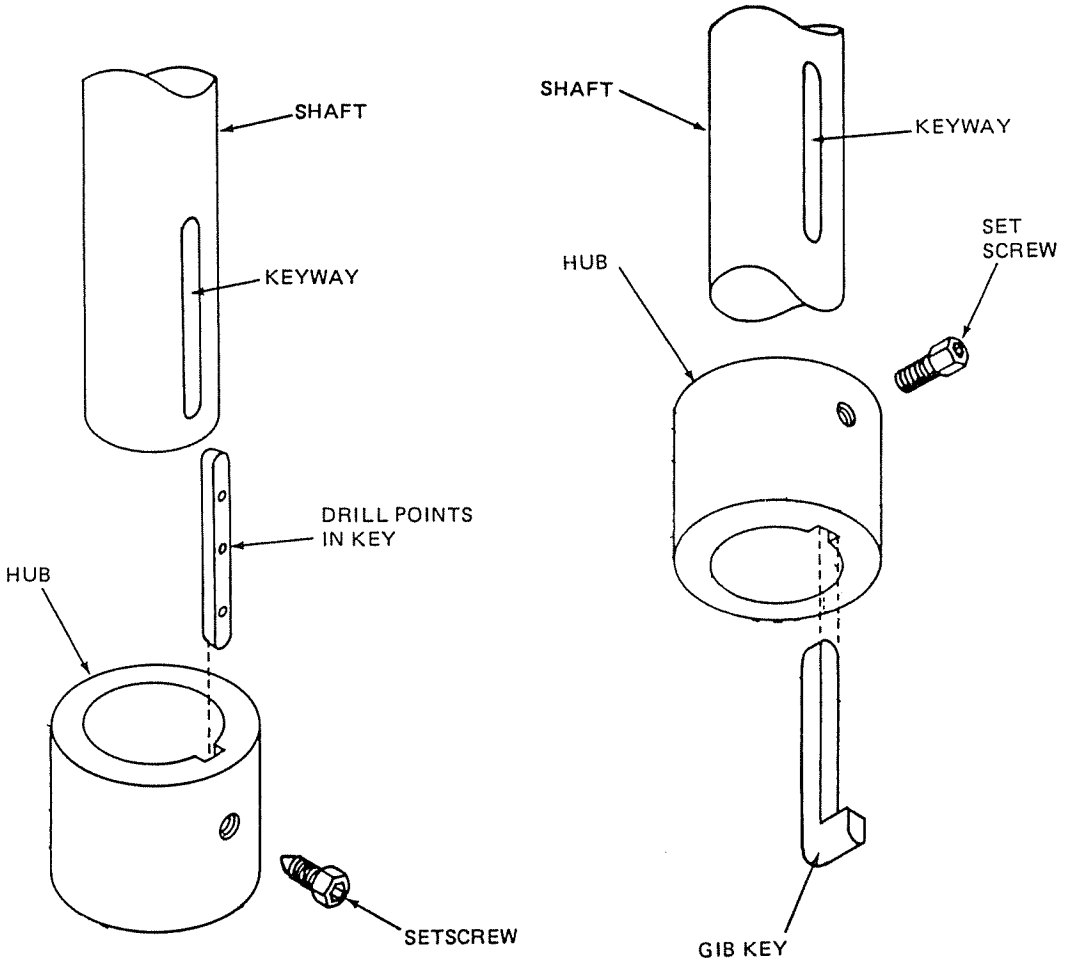
Step 5: Insert shaft key - then lower the shaft until the key can be tightened with the set screw.

Step 6: Attach cap plate.

Step 7: (See Figure 1) Remove turbine/turbine hub from packing and slide hub over shaft end until above keyway. Insert key and lower hub into position. Tighten hub set screw into key.

Step 8: Firmly bolt blades in place on hub.

FIGURE 1
HUB AND KEY INSTALLATION DRAWING



IMPORTANT: If impeller parts are match-marked, install according to match marks. Generally, this only applies to mixers which exceed 100 Rpm.

AFTER INITIAL OPERATION ...

Check all in-tank fasteners for tightness after 1500 hours of operation. Periodic checks must be maintained thereafter - a good habit is to check at scheduled shutdowns. Bolts at all positions must be periodically checked and tightened as indicated in the Torque Value Tables (Pages 30 & 31).

BOLT TORQUE

Low Speed Shaft Coupling Bolts

Refer to the table below for recommended torquing of these bolts (assume you have been supplied with grade 5 bolts). Read across from the bolt diameter that applies. If stainless steel bolts are supplied, locate the proper section on the chart. Recommended torquing must be followed to prevent shearing at bolt. A loose bolt will cause shearing and unsafe operation of your unit, as well as a shock load that will stretch bolts and holes, and may ultimately cause the coupling to fail.

Bolt Torque Table

Bolt Size & Thread	Tensile Strength Area (in)	Stainless Steel Rolled Thread 304, 316, 317 Preload-lb.	Ft.lb. Torque	Grade 5 Preload-Pound	Machine Thread Torque
					(Ft.lb.)
1/4-20	0.0318	1272	5.3	2035	8.5
5/16-18	0.0524	2096	10.9	3353	17.5
3/8-16	0.0775	3100	19.4	4960	31.0
7/16-14	0.1063	4252	31.0	6803	49.5
1/2-13	0.1419	5676	47.3	9081	75.7
9/16-12	0.182	7280	68.3	11648	109.2
5/8-11	0.226	9040	94.2	14464	150.7
3/4-10	0.334	13360	167.0	21376	267.2
7/8-9	0.462	18480	269.5	29568	431.2
1.0-8	0.606	24240	404.0	38783	646.4
1-1/8-7	0.763	30520	572.3	48832	915.6
1-1/4-7	0.969	38760	807.5	62016	1292.0
1-3/8-6	1.155	46200	1058.8	73920	1694.0
1-1/2-6	241.405	56200	1405.0	89920	2248.0

Reducer and Mounting Plate Bolt Torquing

For the same reasons as given before (snapped bolts and elongated holes), all bolts on the Reducer and Mounting Plate must be torqued to the recommended tightness. Refer to the previous table for these values. If you are in a location where no torquing wrench is available, use the general rule of turning the nut 1/2 to 2/3 turn beyond the snug tight position. Always make sure bolts are clean, rust-free and lightly oiled.

Use the recommended lever arm system as given below:

Lever Arm System

Bolt Size	Lever Arm
1/4 - 3/8	6" Handle
7/16 - 5/8	12" Handle
3/4 - 1-1/8	24" Handle
1-1/4 and over	36" Handle

Use with or without lockwashers. Replace any lockwasher showing signs of wear.

Baffles and Mixer Mounting Options:

Baffles

Your UET mixer has been selected to operate at its best per your specifications. If baffles are required, mixer must not be operated until baffles are installed. Baffling controls the pattern of flow and hinders vortexing of tank contents, allowing the contents to be mixed in the most efficient manner.

Mount your XCEL mixer in the center of your fully baffled tank (see Figure 2). Four (4) baffles must be equally spaced within your tank for it to be fully baffled (see baffle specifications on following chart).

Non-baffled Tanks

While baffled tanks are preferred for optimal mixing performance, the unit may be installed as follows to limit vortexing of tank contents:

1. Off-Center Top Mount - As per recommendations of your UET engineer (usually T/6 off-center)

2. Angle Mounting - UET strongly recommends that you DO NOT mount turbine agitators on an angle. Please call UET before considering this alternative.

3. Side entering mixers are normally mounted horizontally as shown on page 14.

Tank Geometry

Square tanks that are not baffled are acceptable if a high degree of mixing intensity is not required. Any cylindrical tanks that are not baffled should be described to your UET contact for recommended mounting.

CAUTION: Inadequate tank mounting supports can set up vibrations which are harmful to the mixer. A safety factor of 250% is recommended for support design when considering torque and bending moment.

PROPER INSTALLATION OF BAFFLES
FIGURE 2

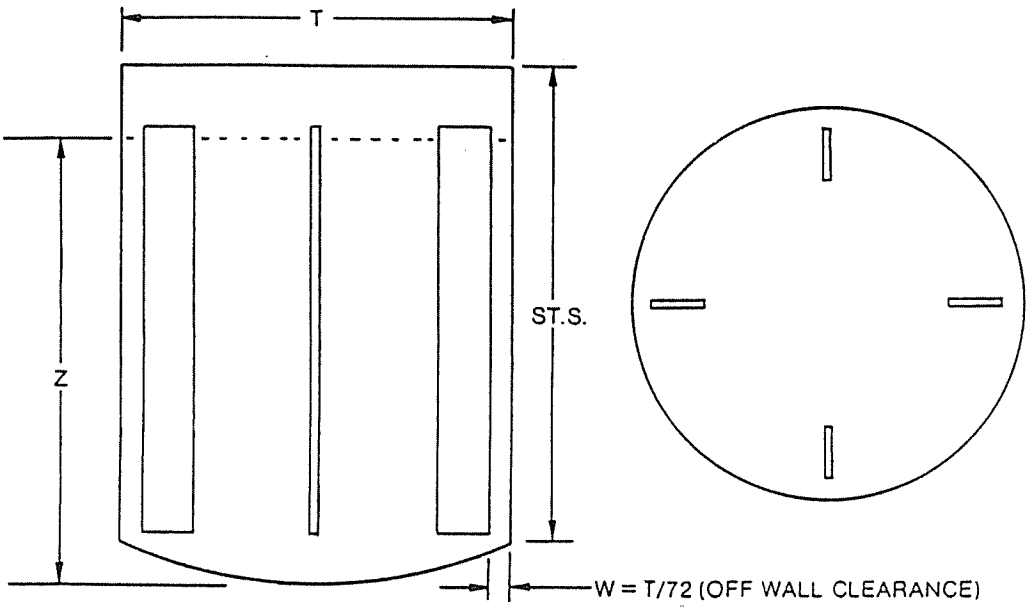


TABLE OF RECOMMENDED BAFFLE PLACEMENT

To be properly effective, four (4) baffles should be placed in the tank such that they are equally spaced about the tank sides, with height running from the lower tangent line to the upper tangent line of the tank. (i.e. along the straight side).

Baffle width is a function of viscosity, as given below:

Viscosity, cps	Baffle Width
0 - 5,000	1/12 tank diameter
5,000 - 10,000	1/18 tank diameter
10,000 - 15,000	1/24 tank diameter
15,000 - 20,000	1/48 tank diameter
20,000+	No Baffles

Proper Impeller Installation

Table of Recommended Impeller Placement

Viscosity	Recommended Number of Impellers	Clearance Off-bottom		Maximum Z/T Ratio	
		Impeller Options: Axial	Hydrofoil	Axial	Hydrofoil
Liquid Level Normal		(Value times diameter)			
<25000 cps	1	1.0 Dia.	2.0 Dia.	1.4 Dia.	2.0 Dia.
<25000 cps	2	1.0 Dia.	2.0 Dia.	2.1 Dia.	3.0 Dia.
>25000 cps	1	1.0 Dia.	-------	1.0 Dia.	-------
>25000 cps	2	1.0 Dia.	-------	1.7 Dia.	-------
Liquid Level Low		(Value times diameter)			
<25000 cps	1	0.5 Dia.	0.5 Dia.	1.2 Dia.	1.5 Dia.
<25000 cps	2	0.5 Dia.	0.5 Dia.	1.75 Dia.	2.5 Dia.
>25000 cps	1	0.5 Dia.	-------	0.9 Dia.	-------
>25000 cps	2	0.5 Dia.	-------	1.5 Dia.	-------

Power Up ...

Motor Connections

Motor installation is covered by the electrical codes operational in your area and according to NEMA and federal codes as well. Your XCEL mixer is supplied with TENV or TEFC type AC motors which have been build specifically to handle the job of mixing. Motor frames usually have wiring directions imprinted on their surface. Follow manufacturers directions in installation.

If your mixer uses a high speed flexible coupling between the motor and gearbox, refer to the flexible coupling section for installation instructions.

Start-Up

UET Mixers are a carefully researched and tested product, designed to bring efficiency to your mixing application. Proper operation will insure many years of trouble-free duty. Keep these principles in mind during operation.

Start-up procedure is as follows:

1. After the proper installation of mixer, shaft and turbine is complete, check the turbine for clearance by rotating it. Your UET contact has given you the recommended clearance from tank bottom to turbine. See also figure 3.

BEFORE OPERATING THE MIXER, ASCERTAIN THAT PROPER LUBRICATION HAS BEEN APPLIED AND THAT THE TANK CONTENTS AMPLY COVER THE TURBINE.

NEVER RUN THE AGITATOR WHEN THE TANK IS DRY or liquid levels are below recommended levels. If tank follows a fill up and draw down sequence, mixer must be shut off before liquid passes through the lower turbine.

2. Turn on the mixer. Allow mixing pattern to become fully established (generally 15 minutes or more). Excessive vibration, shaft runout, excessively loud noise, or bearing, or gear noise signals improper operation. Call UET for help. DO NOT allow the mixer to run under these conditions.

3. Check baffles for readjustment if mixing pattern is not acceptable. If operation is proceeding smoothly, check all fasteners for tightness and adjust accordingly.

NOISE DATA SHEET

Customer:
Job Number:
Spec. No.:
Item No.:

Model No.:

The following data was taken using a general radial model 1564-A calibrated noise meter. The room had a cement floor, block walls, and an insulated steel ceiling.

Frequency, CPS	Max. Allowable dB at 3 feet	Std. Equipment dB at 3 feet
63	107	44
125	97	45
250	90	46
500	84	55
1000	82	60
2000	80	55
4000	80	46
8000	82	44
A-Weighted	85	70

Listed values are typical and may vary with gear ratio and motor. Our equipment will not exceed the maximum allowable sound pressure levels given above.

6. TROUBLESHOOTER GUIDE

Check for these causes of oil leakage:

CAUSE	SOLUTION
Loose cover or end plates	Check for torn gaskets; tighten all bolts
Worn or damaged oil seals	Replace with new seals; Do not tear replacement during insertion
Too much oil	Overflow may be drained after checking oil level
Improper venting	Breathers are clogged; remove foreign matter
Foaming oil	Drain and use non-foaming oil

Increased wear results from continuous operation during extreme vortexing or surging.

Periodic checks for wear will signal when improper operation is occuring. Correction of the problem and a set of spare wearing parts will insure uninterrupted operation.

REDUCER DISASSEMBLY

Shaft and Turbine

Before any further steps are taken, MAKE SURE THAT POWER TO THE UNIT IS TURNED OFF!

1. Remove shaft from the quill by unscrewing set screws.
2. Lift shaft until key in reducer quill is located and remove key.
3. Carefully remove disconnected shaft - DO NOT JAR during this operation.

Reducer

1. Unbolt the motor from it's mounting. Remove motor.
2. Examine seals. Replace any worn seals by removing the seal flange. See Figure #13.
3. Tap on inside of worn seal to remove and insert new seal.
4. Remove all flanges to replace or clean worn bearings.
5. Press out bearing races and insert new ones.

   MAINTAINING THE ORIGINAL POSITIONS OF THE SHIMS AND FLANGES IS NECESSARY FOR PROPER ALIGNMENT BETWEEN WORM AND BRONZE GEAR.

6. DO NOT ATTEMPT TO REPLACE THE GEARS WITHOUT PRIOR EXPERIENCE in blueing the gear and determining wearing patterns. Consequent improper installation can be easily recognized by factory personnel and will void the warrantee.

   A. Gears should be replaced at same time.
   B. Apply blueing to new worm gear and reassemble reducer.
   C. Establish drive pattern by rotating the unit by hand.
   D. Do not change the original number and sizes of shims. Instead, shims may have to be shifted for proper gear contact.

CLEANING THE REDUCER AND BEARINGS

Bearings should be cleaned with solvent, dried and inspected for wear during disassembly of the reducer. Never use steam or water to clean them - bearings will rust in the presence of water. If the bearings pass inspection, they should be oiled lightly to prevent rusting. It is very important to completely lubricate the bearings as they rust quickly on exposure to air. If reassembly is delayed, keep bearings wrapped in oiled paper and place in a clean, dry area.

Recommended Solvents for Cleaning Bearings:

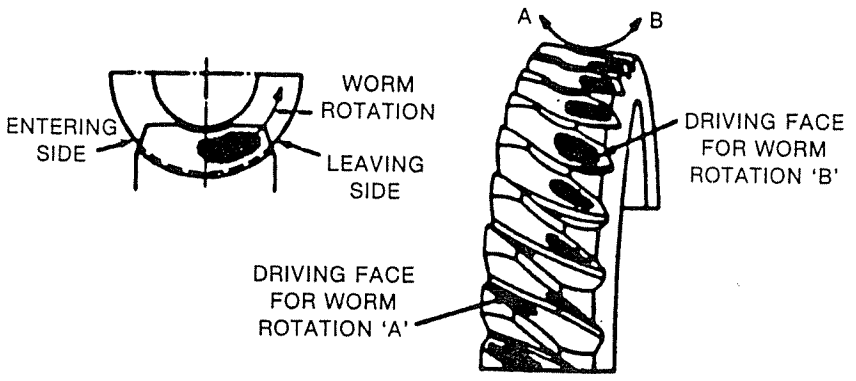
For a minimum quantity or for small bearings, clean in high grade or ordinary kerosene, such as "Mineral Seal". For large bearings or large quantities, use "Neutral Oil" for cleaning (heated to 300 deg. F) and follow with a hot soluble oil wash, 5% solution, heated to 200 deg F.

Other Recommended Cleaners (Alkali):
(Ratio of 2 - 3 ounces cleaner to 1 gallon solution - heated)

Trisodium Phosphate ("Oakite")
Soda Ash
Metasilicate

Follow washing by any cleaner with a thorough drying and a hot oil dip or coat lightly with grease to prevent rust. Do not spin dry bearings; spinning results in damage to bearings.

FIGURE 12



Cleaning the Reducer

Once you have completed all internal repairs and before mounting reducer in its original position, clean thoroughly by flushing with a solvent and blow dry with compressed air.

REASSEMBLING THE REDUCER

DO NOT reassemble the reducer using the old gaskets or seals. Install new gaskets and seals and tighten all flange bolts evenly. Lubricate the quill lightly with grease to protect seal lip.

REASSEMBLING THE SHAFT AND TURBINE

Inspect the shaft for straightness. Shaft straightness should be maintained within 1/4" over 10 feet. Shafts that are not within tolerance levels will cause vibrations so must be straightened. Inspect key seats in both the turbine and shaft.

LUBRICATION SCHEDULE FOR HELICAL & BEVEL GEAR UNITS					
Lubrication Type	Ambient Air Temperature F.	KIN Viscosity at 40 C. (cSt) Approx.	GULF OIL Company	Chevron Oil Company	American Oil Company
Oil	+104 to + 32	210	Gulf E.P. Lubricants 100	Chevron Non-Leaded Gear Compound 220	Spartan EP 220
	+ 77 to + 5	145	Gulf E.P. Lubricants 60	Chevron Non-Leaded Gear Compound 150	Spartan EP150
Grease Used for Normal Application Range -20 F. to 250 F.			Gulfcrown Grease E.P. No. 2	Chevron Dura-Lith Beacon 3	ESSO Multipurpose Grease Temp. Beacon 2

Lubrication Type	Ambient Air Temperature F.	KIN Viscosity at 40 C. (cSt) Approx.	Mobil OIL Company	Shell Oil Company	Texaco Oil Company
Oil	+104 to + 32	210	Mobilgear 630	Shell Omala Oil Oil 220	Meropa 220
	+ 77 to + 5	145	Mobilgear 629	Shell Omala Oil 100	Meropa 150
Grease Used for Normal Application Range -20 F. to 250 F.			Mobilux EP2	Shell Alania Grease R 3	Multifak EP-2 Temp.

RECOMMENDED LUBRICANTS FOR WORM GEAR UNITS

Operating Conditions:

AGMA Lubricant	#7 Compound	#8 Compound
Ambient Temperature:	16 to 50 deg. F	51 TO 110 deg. F
Max. Operating Temp:	185	225
Viscosity @ 210 deg. F, SUS:	90 to 125	125 to 190
Compounded with:	3-10% Acidless Tallow or E.P. Base	3-10% Acidless Tallow or E.P. Base
Recommended Suppliers:		
Cities Service Oil Co.	Trojan Compd. L-2	Trojan Compd. L-4
Gulf Oil Corp.	E.P. Lubrcnt. #115	E.P. Lubricant #145
Shell Oil Co.	Macoma Oil #69	Vulvata Oil #J 78
Sun Oil Co.	Sunep #1110	Sunep #1150 Mobil
Oil Co.	Mobil Compd. #DD	Mobil Cyl. Oil#600W
Texaco	Meropa Lub. #3	Meropa Lub. #6

RECOMMENDED LUBRICATION FOR BEARINGS:

Bearings that are not adequately lubricated by the splash system will have grease fittings. Fiber grease with a work penetration of 310 to 340 at 77 deg. F and an ASTM point of 350 deg. F minimum should be used to pressure lubricate the bearings.

LUBRICANTS NOT RECOMMENDED!!!

Ordinary motor oil (regardless of stated viscosity), automotive rear end oils, and EP lubricants that contain sulphur, chlorine or phosphorus compounds (such compounds are extremely corrosive to bronze).

5. OPERATIONAL OIL TEMPERATURES:

Although hot to the touch, mixer housing containing oil at temperatures of 130 to 200 degrees F is not uncommon and is no cause for concern. Operational temperatures above 200 degrees may signal a problem.

MIXER MAINTENANCE - LUBRICATION

1. Your UET EXCEL-FLO Mixer has an air breather PORT which is either topped by a plug or sealed.

   IF PLUGGED: Remove the temporary pipe plug and install the air breather that is loosely fastened to the unit.

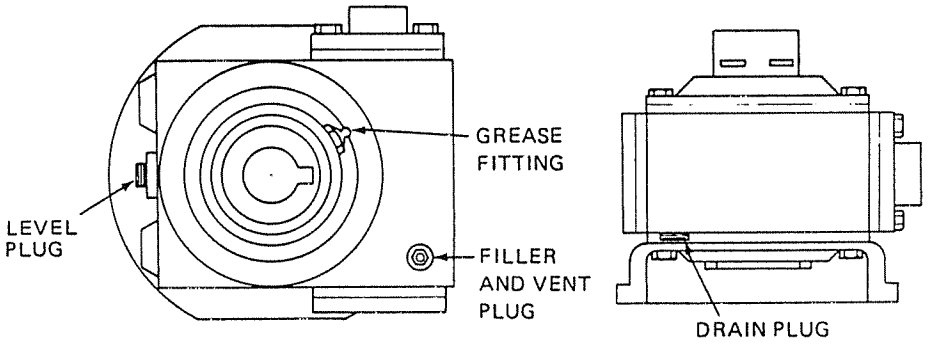
   IF SEALED: Air breather is attached at factory and is sealed with brass pin in the breather top. Lightly tap pin to puncture the seal. Repeatedly lift pin until it moves freely enough to serve as a poppet valve.

2. Refer to Figure 11: This shows recommended fill level for lubricant. Remove plug and check oil level.

3. For proper maintenance of new units, drain oil while warm after 50 hours of operation. Add new oil to the recommended level.

   RECOMMENDED OIL LEVELS AND CHANGES: Oil should be changed every six months or 2500 hours of operation, at the very least, with more frequent changes if moisture condensation or a sludge build-up is noted inside the housing.

FIGURE 11
PLUGS, VENTS AND DRAIN LOCATIONS:



XCEL UNIT MAINTENANCE AND SERVICE RECORD

Date	Description of Work	Comments

RETURN AUTHORIZATION

1. All equipment returned to UET must first be authorized by UET for receipt and issued a RGA number.
2. All returned goods must be accompanied by a purchase order.
3. All returned goods must be shipped to UET prepaid.
4. A charge of $ 75.00 will be accessed for initial inspection of the returned goods.
5. Upon initial inspection of the returned goods, an evaluation and estimate will be issued. The customer is required to authorize any work to be done.
6. If the work required is part of UET's warranty, the work will be done at no charge and the inspection charge will be waived.
7. Any work done that is not part of the warranty will be accessed on the purchase order.
8. Equipment will be returned to the purchaser collect.

Original serial number: _____

Original Date of Purchase: _____

RGA Number: _____

I agree to the above; signed _____ Date _____

Company Name and Address: _____

_____

_____

Notes and special instructions:

PNUCOR
121 Interstate Blvd. • Unit 2
Greenville, South Carolina 29615
Telephone (803) 288-0020
FAX (803) 288-3557

LETTER OF TRANSMITTAL

DATE	JOB NO.
May 2, 1994	7895
ATTENTION: Mr. Selwyn Scoggin	
RE: Pnucor PO# 04107-40330D	
UET Job # 1504	

TO Giles Chemical Corp.
PO Box 370
Waynesville, NC 28786

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☒ UET Manual

QUANTITY	FORM NO	EQUIP NO	DESCRIPTION
1	IOM-1	XCEL	UET installation, operation & maintenance instruction manual

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☒ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

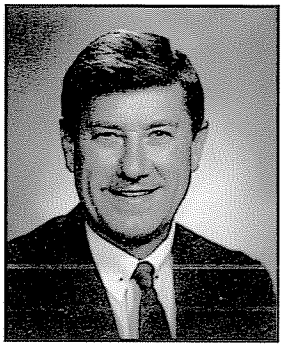
REMARKS _____

COPY TO _____

SIGNED: Roger A. Rainey

PNUCOR

INDUSTRIAL PUMP DIVISION

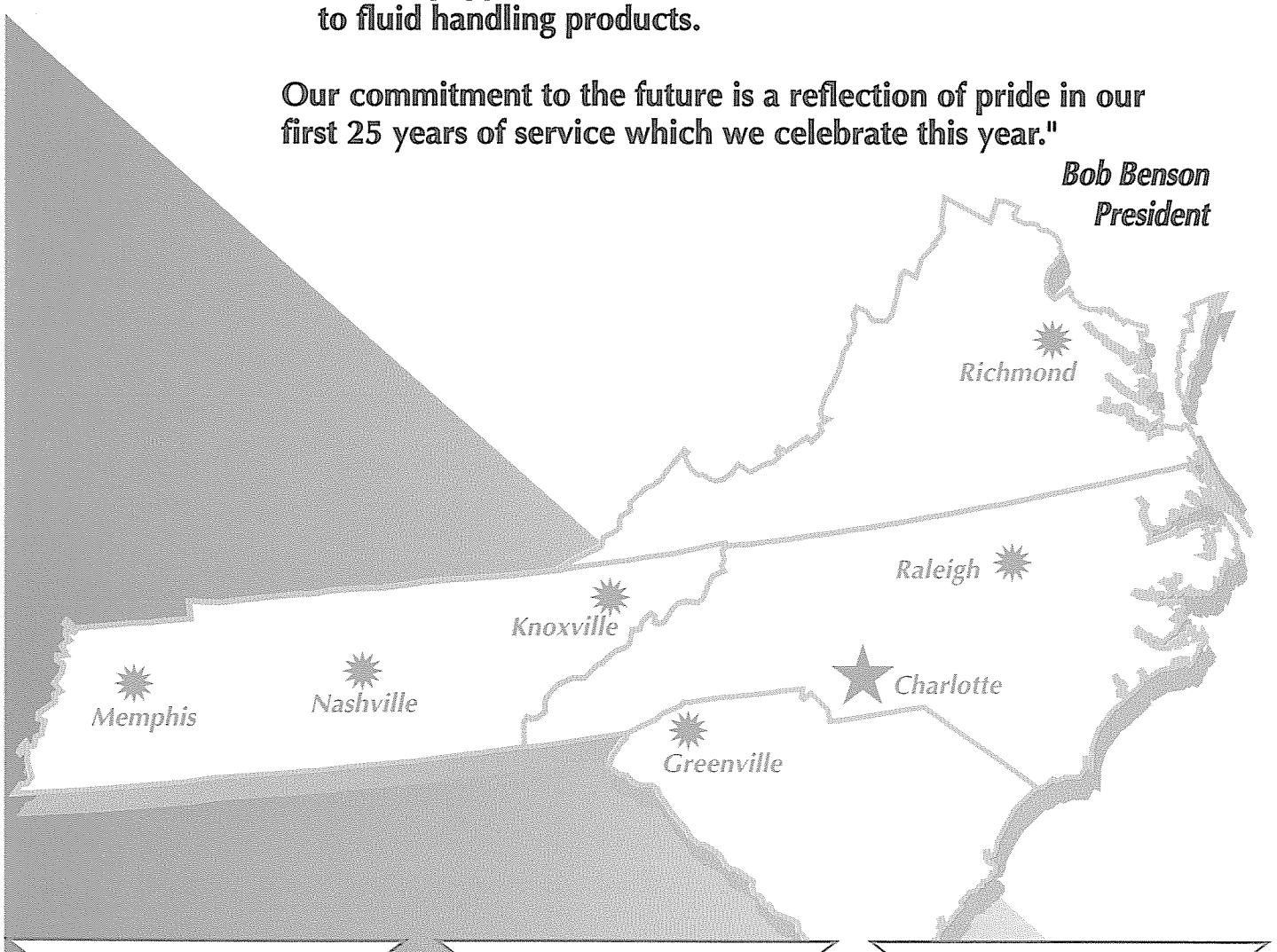


"To continue serving industry's need for industrial pumping equipment, Pnucor has....

... assembled a well-trained, experienced sales and application staff.
... located offices conveniently over our market area.
... a large inventory of equipment, spare parts and consumables.
... built, equipped and staffed a service center dedicated to fluid handling products.

Our commitment to the future is a reflection of pride in our first 25 years of service which we celebrate this year."

Bob Benson
President



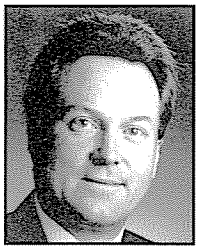
Charlotte, North Carolina
704/588-3333

Raleigh, North Carolina
919/847-8823

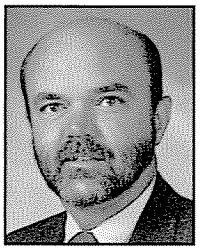
Knoxville, Tennessee
800/849-8096

Greenville, South Carolina
803/288-0020

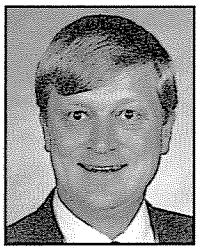
Richmond, Virginia
804/794-0000



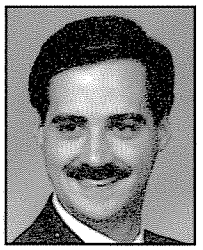
Territorial Manager



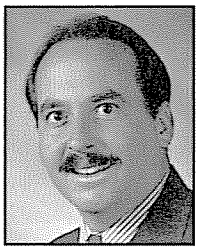
Assistant Territorial Manager



Process Engineer

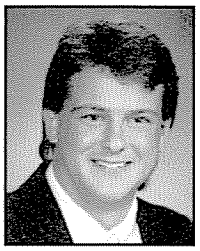


Process Engineer



Process Engineer

Applications Engineer



After Market Manager

Assistant After Market Manager

Sales Secretary

PNUCOR

INDUSTRIAL PUMP DIVISION

Process Engineers
Industrial Pump
and Filtration Technology

CENTRIFUGAL	MANUFACTURER
End Suction	**Ingersoll-Rand & Worthington*, Vanton, Pulsafeeder, Eastern, Price, Waukesha**
Horizontal Split Case	**Ingersoll-Rand & Worthington***
Magnetic Drive Sealless	**Ingersoll-Rand & Worthington*, Pulsafeeder - Isochem, Vanton**
Multi-Stage Horizontal Split Case	**Ingersoll-Rand & Worthington***
Non-Metallic	**Ingersoll-Rand & Worthington*, Vanton**
Regenerative Turbine	**Ingersoll-Rand & Worthington*, MTH**
Slurry	**Ingersoll-Rand & Worthington*, Flygt**
Paper Stock	**Worthington**
Submersible	**Flygt**
Vertical Inline	**Ingersoll-Rand & Worthington***
Vertical Sump	**Ingersoll-Rand & Worthington*, Vanton**
Vertical Turbine	**Ingersoll-Rand & Worthington***
Drum	**Lutz**

POSITIVE DISPLACEMENT	
Gear	**Worthington, Pulsafeeder - ECO, Vican**
Hydraulic Diaphragm	**Hydracell, Pulsafeeder - CHEMmander**
Magnetic Sealless Gear	**Pulsafeeder - Isochem, Tuthill**
Metering	**Pulsafeeder - Precision, Precision II, CHEMmander, Pulsatron**
Peristaltic Hose	**Waukesha, Vanton**
Plunger	**Ingersoll-Rand & Worthington***
Progressive Cavity	**MONOFlo**
Rotary	**Waukesha, Worthington**
Twin Screw	**Worthington - Sier Bath**
Air Operated Diaphragm	**Versamatic, Lutz**

Ingersoll-Dresser Pumps
INGERSOLL-RAND PUMPS
VANTON
WORTHINGTON PUMP
VICAN
MTH PUMPS
PRICE PUMP CO.
Waukesha Fluid Handling
A United Dominion Company
FLYGT
Tuthill Pump Company of California
Pulsafeeder
ECO EASTERN Isochem
ARO
VERSA-MATIC PUMP
Lutz
WANNER ENGINEERING, INC.

*** Ingersoll-Dresser Pumps are the combination of Ingersoll-Rand and Worthington pump lines**

GREENVILLE BRANCH
121 Interstate Boulevard, Unit 2 Greenville, SC 29615
Phone (803) 288-0020 • Fax (803) 288-3557

PNUCOR