

SECTION 11220

REPLACEMENT OF LIME SOFTENING UNIT DRIVE

PART 1 GENERAL

1.01 SCOPE

- A. This Specification describes the requirements for furnishing one (1) new bolt-in drive mechanism to replace the existing bridge-mounted gear reducer and drive motor on the Owner's existing Lime Softening Unit No. 1, observation during installation, testing, and startup (installation by others). Upon delivery of the equipment specified under this section, the equipment will be installed by an installer selected by Owner (Installer). Supplier/Manufacturer shall provide manufacturer's services specified in Part 3 of this specification during the installation, testing, and start-up period.

Lime Softening Unit No. 1 is a #29 NS Accelator manufactured by Infilco Degremont, Inc. which was previously equipped with a Model KDNS 500 drive manufactured by Siemens Flender. The old gearbox and drive unit has been removed. The replacement drive unit shall be fully compatible with the existing mounting footprint on the existing support bridge, the existing flanged output shaft coupling and rotor-impeller mixer mechanism, and all electrical and power supply connections.

- B. The required equipment to be provided under this specification includes, but is not limited to, the following:
1. One (1) 50 horsepower inverter-duty rated electrical drive motor, lantern ring, and flexible coupling. New stainless steel fasteners shall be provided for attaching the new motor to the mounting pedestal.
 2. One (1) bolt-in replacement gear reducer with baseplate for attachment to the existing drive platform structure. The new baseplate shall be fabricated to match the existing footprint on the bridge support, and to mate with the existing flanged output shaft coupling. New stainless steel fasteners shall be provided for connecting the new gear reducer to the existing bridge support structure.
 3. One (1) NEMA 4X box with all associated safety devices pre-wired in NEMA 4X box, with terminal strip for field wiring.
 4. Prior to preparing a bid, the Supplier/Manufacturer shall inspect the existing lime softening unit. Supplier/Manufacturer shall be responsible for ensuring that the provided equipment is compatible with all interfaces with existing equipment, structures, and electrical wiring, including but not limited to the motor mounting pedestal, bridge support base, electrical wire length and connections, etc.

- C. The Supplier/Manufacturer shall be responsible for coordinating all interfaces between the existing attachment footprint on the existing bridge support and to the existing flanged output shaft coupling.

1.02 QUALITY ASSURANCE

- A. Qualifications: All of the equipment specified herein shall be furnished by a single manufacturer who regularly engages in the production of this type of equipment and who is fully experienced, reputable and qualified in the manufacture of the equipment to be furnished. Each component and ancillary equipment item furnished under this specification shall be new and unused, and of the type, size, design, and efficiency installed in previous projects. The system components shall be designed, constructed, and delivered in accordance with the best practices and methods.

The manufacturer of the equipment shall have at least ten (10) years' experience in the design and manufacture of the type of equipment proposed and shall provide a list of at least ten (10) similar installations, five (5) years old or older still in operation.

Replacement drive unit shall be manufactured by Infilco Degremont, Inc., Envirodyne Systems, Inc., Siemens Flender, or approved equal.

- B. The equipment specified in this Section shall be furnished, coordinated, serviced, and guaranteed by one supplier who shall be experienced in the design, manufacture, coordination, installation, and servicing of equipment of the type, size, and complexity specified in this Section. The supplier shall have a permanent organization of office and field technical personnel and facilities necessary for fulfilling all requirements of this Specification. The supplier shall have an established service organization in the State of Florida capable of providing fully knowledgeable, experienced service personnel and replacement parts at the Project site nor later than 24 hours after telephone notification by the Owner. If such a service facility does not exist for the supplier, then the supplier shall guarantee by written notice with their submittal that they shall provide service personnel to the job site upon notification from the Owner within 48 hours and shall provide spare parts within 24 hours after notification by Owner.
- C. The equipment shall comply with the following referenced standards:
 - 1. Anti-Friction Bearing Manufacturer's Association (AFBMA)
 - 2. American Gear Manufacturer's Association (AGMA)
 - 3. American National Standards Institute (ANSI)
 - 4. American Society for Testing and Materials (ASTM)
 - 5. National Electrical Manufacturers Association (NEMA)
 - 6. American Welding Society (AWS)

1.03 SUBMITTALS

- A. Materials and Shop Drawings: Copies of all materials required to establish compliance with these specifications shall be submitted to the Owner for review and approval prior to shipment. Submittals shall include at least the following:
1. Equipment catalog cut sheets.
 2. Outline dimensions of all equipment.
 3. Cross sectional drawings of all equipment with parts identification and materials specifications.
 4. Fabrication and erection drawings.
 5. Motor nameplate data and specifications sheet for all electric motors.
 6. Bill of material.
 7. Details of connections to existing and Supplier/Manufacturer-supplied equipment.
 8. Electrical schematics and interconnecting wiring diagrams showing extent of factory prewiring.
 9. Manufacturer's drawings with parts list for all accessory equipment.
 10. Shop painting specification(s).
 11. Special tools to be supplied.
 12. Recommended spare parts with current pricing.
 13. List of local facilities to obtain parts for all equipment.
 14. Test data for equipment as specified herein.
 15. List of manufacturer-approved service organizations for all equipment.
 16. Handling and storage instructions.
 17. Operation and maintenance manuals.
 18. Certification by the manufacturer of the output rating of the rotor-impeller mixer selected, including all ratings for the gear drive and the mechanical adjustable speed drive unit.
- B. Operating Instructions:
1. Three (3) paper copies and one electronic (searchable .pdf file) copy of an operating and maintenance manual shall be furnished. The manual shall be prepared specifically for this installation and shall include all required catalog cuts, drawings, equipment lists, descriptions, and necessary information that are required to instruct operating and maintenance personnel unfamiliar with all of the equipment specified herein. A complete, corrected and approved copy of the shop drawing submittal shall be included with each manual provided.
 2. A factory representative who has a complete knowledge of proper operation

and maintenance requirements for the equipment shall be provided for a minimum of one (1) eight-hour working day to instruct representatives of the Owner on proper operation and maintenance of the equipment. Provide at least ten (10) days advance notice to the Owner before scheduling the instruction day. This work is in addition to, but may be conducted in conjunction with, the inspection of installation and test run as provided under Part 3. The operation and maintenance manuals shall be provided at a time in advance of the instruction/training period that is approved by the Owner. If there are difficulties in operation of the equipment due to the manufacturer's design or fabrication, additional service required to make approved modifications, repairs, or corrections to the equipment shall be provided at no additional cost to the Owner.

- C. Equipment Certification: the Supplier/Manufacturer shall submit to the Owner a certified report from the factory service representative certifying that the drive equipment operates satisfactorily under the specified operating conditions. The certified report shall include all requirements as stated in Paragraph 3.03, Manufacturer's Services.

1.04 WARRANTY AND GUARANTEES

- A. All equipment supplied under this Section shall be warranted for a period of one (1) year by the manufacturer and Supplier/Manufacturer. The warranty period shall commence upon Owner acceptance.
- B. The equipment shall be warranted to be free from defects in workmanship, design, and materials. If any part of the equipment should fail during the warranty period, it shall be replaced at no expense to the Owner. If a defect in workmanship, design, or materials is found during the warranty period that interferes with the intended function of the equipment, the warranty period shall be extended for one (1) year from the date that correction under the warranty is completed.

1.05 SHIPPING REQUIREMENTS

- A. All assemblies shall be shipped in convenient sections, or as specified herein and permitted by carrier regulations, properly match-marked and identified for ease of field erection.
- B. All equipment shall be handled during delivery and storage in a manner to prevent damage of any nature in accordance with the manufacturer's approved instructions.
- C. All electrical controls and equipment shall be stored in a clean, dry, weather tight building upon delivery to the Project site.

PART 2 PRODUCTS

2.01 GENERAL

- A. The unit shall be suitable for installation on the existing steel support bridge on the existing Lime Softening Unit No. 1.

2.02 MATERIALS

- A. Structural steel: ASTM A36
- B. Steel Galvanizing: ASTM A123
- C. Structural Aluminum: ASTM B209, ASTM B221, ASTM B308, Alloy 6061-T6
- D. Structural Stainless Steel: ASTM A666, Type 304L, annealed
- E. Castings: ASTM A48, gray iron having a minimum tensile strength of 20,000 pounds per square inch (psi)
- F. Bolting Materials:
 - 1. Anchor Bolts or high Strength Bolting Requirements; ASTM A320, B&M, Class 2, Type 316 stainless steel, high strength bolts.
 - 2. Commercial Strength Bolting Requirements: ASTM F593, Type 316 stainless steel bolts and ASTM F594, Type 316 stainless steel nuts.
 - 3. Washers: Type 316 stainless steel.
 - 4. Nuts shall have a hardness that is lower than that of the bolts and the washers by a difference of 50 Brinnell hardness to prevent galling.
- G. Welding: According to the latest edition of AWS standards. All welding for mild steel components of the solids contact softening unit shall be continuous and seal welded throughout shop fabrication and field erection.

2.03 ROTOR-IMPELLER MIXER GEAR REDUCER

- A. The rotor-impeller mixer drive shall be furnished with an integral electric motor/mechanical drive unit which is mounted on a common steel base with the mixer drive. The integral electric drive motor shall have a NEMA C-Face mounting flange which shall be mounted to the drive unit with an adapter provided by the drive manufacturer. The motor shall be provided by the drive unit manufacturer and shall have the characteristics specified below in paragraph 2.04. The drive unit shall be flanged-mounted to the rotor impeller mixer drive.
- B. The integral gear reducer shall be totally enclosed, oil lubricated, air cooled, and specifically designed for the intended service. The gear reducer shall be rated for

a minimum of 1.86 million inch-pounds with a 2.84 service factor (minimum) based on the drive motor horsepower and shall be designed for a normal shaft output shaft operating speed of 2.5 to 5 rpm. The unit shall be designed for continuous, 24 hour per day duty with frequent dynamic impacts, simultaneous with maximum static loading and size not less than two times the drive motor nameplate rated torque. The gear reducer shall have a minimum efficiency of 96%.

- C. Gearing. Gearing shall be manufactured to AGMA Quality Class 10+ finish on bevel sets and Quality Class 11+ on all helical gears. All gears shall be formed on automatic cutting machines. All bevel gears, pinions, and gear wheels shall be made of case-hardened nickel-chromium steel, heat treated after cutting and lapped on proper machines after treatment. Gearing shall be cut with a 25 degree pressure angle. Gears shall be carburized and ground to simultaneously provide maximum strength, torque capacity, surface durability, and low noise performance within the rated capacity. All gears shall be designed, both regarding surface durability and bending strength, for a theoretical life span of at least 100,000 hours.
- D. Shafts. Gear unit shafts shall be solid, precision ground made from heat-treated hardened and tempered chrome-molybdenum alloy steel. Shafts shall be mounted on anti-friction tapered roller bearings of double row, self-aligning spherical roller bearings, capable of handling design radial and thrust loads simultaneously and having an L-10 bearing life expectancy of 100,000 hours minimum. Output shaft bearing span shall be extended to provide adequate low speed shaft bending moment capacity for the design shaft loads.
- E. Housing. The gear unit housing shall be rigidly constructed of fabricated steel or cast iron, and machined to ensure proper alignment of shafts and gears under rated loads. The unit shall be designed to withstand continuously and in either direction all internal loading developed at full motor power. The gear unit shall also be designed to withstand all external loading produced by thrust, out-of-balance, and vibration from normal operating conditions. Housing shall be equipped with lifting lugs of adequate size for safely handling the gear reducer.
- F. Lubrication. Gear reducer shall be oil lubricated, with an oil bath with ample capacity suitable for continuous operation. Oil and grease seals shall be provided to prevent loss of oil and both moisture and dust entrance into bearings and gear unit. Shaft seals for the gear reducer shall be double-lipped to keep oil in and contaminants out. Lubrication shall be achieved by an internal forced lubrication system, directly driven by one of the reducer shafts. The oil circulating system shall be designed to ensure adequate lubrication of all bearings and gears during operation and to prevent the possibility of a dry start-up. The gear reducer shall be furnished with an oil immersion heater, desiccant type oil breather, externally accessible cartridge oil filter, high oil temperature switch, oil level switch, oil pressure switch, and an oil flow switch. Switches shall be rated NEMA 4X. Field wiring and control circuits are to be coordinated by Supplier/Manufacturer with the existing wiring. Housing shall be designed to provide simple, complete oil

drainage of the unit with a valve and quick disconnect accessible from the main operating platform. The outboard bearing shall be grease lubricated with fittings brought to a convenient location external to the gear unit. All lubricants shall be food grade and NSF-approved for use in potable water applications.

- G. Miscellaneous. All internal surfaces shall be treated at the point of manufacture and protected to prevent corrosion during shipment and/or storage. The gear unit shall be filled with oil and tested by the manufacturer prior to shipment. Tests shall include running the gear reducer at the factory for a minimum of 24 hours continuous with no abnormal vibration and with noise levels not exceeding 85 dB when measured from a point 3 feet away from the housing. Certified results of the testing shall be submitted to the Owner for approval prior to shipment.

Prior to shipment, the oil shall be drained and the breather replaced with a pipe plug to effectively seal the internal gear unit against the entrance of air. The breather and other separate parts shall be fastened to the gear unit for shipment. The drained oil shall be placed in suitable containers and shipped with the gear reducer to serve as the initial break-in lubricants for startup, unless otherwise recommended by the manufacturer. The manufacturer shall attach to the unit an instruction leaflet fully describing procedures for proper storage and installation.

2.04 ELECTRIC MOTOR

A. General:

1. The motor for the mixer drive shall be TEFC, single speed, 1,800 RPM, premium efficiency, suitable for outdoor duty in a chemical environment, inverter-duty rated for maximum 2:1 turndown, with Class F insulation, Class B temperature rise, 40 degree C ambient and 1.15 service factor.
2. The motor shall be built in accordance with the latest NEMA, IEEE, ANSI, and AFBMA standards where applicable.
3. Motors shall be as manufactured by Baldor Electric Company, U.S. Electric Motors, General Electric Company, or Westinghouse Company, or approved equal.
4. The motor shall be non-overloading, without use of the service factor, for the maximum design torque of the equipment.

B. Performance Requirements:

1. Motors shall be rated for operation on 3 phase, 460-volt power supply.
2. Motors shall be rated at a minimum horsepower, with a nominal premium duty efficiency noted, as follows:

Mixer drive motor	50 HP, 86% efficient
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3. Motors shall be free of objectionable noise and vibration. Units shall operate with a maximum sound level not to exceed 85 dBA as measured 5 feet from

any surface.

4. Maximum temperature rise of motor windings shall not exceed 80°C, as measured by resistance, when motor is operated continuously at service factor horsepower, rated voltage, and frequency in ambient air temperature of 40°C.

C. Construction:

1. The motor shall be suitable for operation in moist, outdoor air, corrosive/severe duty.
2. The motor shall be of all cast iron construction for frame, end brackets, conduit box, and fan shroud. Motor shall be of such design and proportions as to hold all motor components rigidly in proper position and provide adequate protection for the type of enclosure employed.
3. Motor windings for stator and rotor leads shall be manufactured using solid copper wire. Windings shall be adequately insulated and securely braced to resist failure due to electrical stresses and vibrations.
4. A neoprene shaft slinger shall be provided and lead wires shall be nonbraided and nonwicking to prevent entrance of moisture and contaminants.
5. All leads shall be brought out to a separate terminal box and shall be marked and identified. The terminal box shall be split construction, double gasketed, containing provisions for grounding the motor and shall comply with NEMA standards for minimum volume.
6. The motor shall have stainless steel breather drains at both ends to allow proper drainage of condensation.
7. The shaft shall be made of high-grade machine steel or steel forging of size and design adequate to withstand the load stresses normally encountered in motors of the particular rating.
8. Stator and rotor cores shall be made of low loss, non-aging electrical sheet steel with insulated laminations. Stator coils shall be random wound and of size, shape, insulation and number of turns required. Coils shall be epoxy sealed after fabrication.
9. The motor shall be equipped with permanently sealed, lubricated for the bearing life, vacuum degassed steel ball bearings made to AFBMA Standards, and be of ample capacity for the motor rating. Bearings shall have a minimum B₁₀ bearings life of 100,000 hours.
10. Nameplate shall be stainless steel fastened with stainless steel pins or screws. Lifting lugs or "O" type bolts shall be supplied on all motors. Enclosures shall have stainless steel screening and shall be protected from corrosion, fungus and insects.
11. All grease plugs, fittings, bolts, nuts, and screws shall be stainless steel. Bolts and nuts shall have hex heads. Conduit boxes shall be gasketed. Lead wires

between motor frame and conduit box shall be gasketed.

12. Each motor shall be provided with a heat overload protection device to protect the motor from overheating during operation. The device shall immediately stop the drive motor in the event of excessive heat buildup.
13. Each motor shall be provided with a 120 volt single phase, suitably sized, space heater to maintain the motor temperature of at least 40°C, or 10°C above ambient temperature, whichever is greater. The space heater shall operate when the motor is not running to prevent condensation from forming in the motor enclosure.

2.05 SHOP COATINGS

- A. Surface preparation: After fabrication, all surfaces of the drive unit and accessories except galvanized, non-ferrous, undamaged shop primed coated, or previously finished coated surfaces shall be prepared for shop coating as follows:
 1. Remove all weld spatter and slag. All sharp edges and corners shall be rounded to a smooth contour by grinding.
 2. All ferrous surfaces shall be white metal abrasive blast cleaned to SSPC-SP5 to remove all visible oil, grease, dirt, dust, mill scale, rust, oxides, corrosion products, and other foreign matter. Blast profile shall be 1 to 3 mils.
- B. Shop Primer: All abrasive blasted surfaces, except plate edges or areas to be field welded shall be coated with a universal high solids, high build, chemical resistant epoxy-polyamide primer. Shop primer shall be applied in one or more coats to achieve a minimum dry film thickness of 5 mils. Shop primer shall be equal to Kop-Coat 340 Gold Primer. Shop primer used shall be compatible with the intended finish coats to be applied in the field. Shop primer shall be NSF-approved for potable water applications.

2.06 ANCHOR BOLTS AND HARDWARE

- A. All anchor bolts, assembly bolts, hanger rods, washer, nuts, clips, and other hardware items for installation shall be provided by the drive unit manufacturer. All bolt diameters and lengths shall be as required by the manufacturer. All threads for nuts and bolts shall be in accordance with ANSEI B1.1, Class 2A fit, coarse thread series. All nuts, bolts, and washers for structural anchor bolts and connections shall be manufactured of Type 316 stainless steel (Grade B8M), in accordance with ASTM A320, Class 2. All other nuts, bolts, and washers used for anchors, equipment assembly, hanger rods, etc. for the unit shall be Type 316 stainless steel, Alloy Group 2, Condition "a" in accordance with ASTM F593 for bolts and studs and ASTM F594 for nuts. All washers, clips, and other hardware shall be Type 316 stainless steel. Nuts shall have a hardness that is lower than

that of the bolts and washers by a difference of 50 Brinnell hardness to prevent galling during installation.

2.07 SPECIAL TOOLS AND SPARE PARTS

- A. One set of all special tools required for normal operation and maintenance shall be provided. All such tools shall be furnished in a suitable non-metallic tool chest complete with lock and duplicate keys.
- B. The Supplier/Manufacturer shall furnish manufacturer-recommended spare parts necessary for the first five years of operation. As a minimum, the following spare parts shall be provided.
 - 1. One (1) set seals for mixer drive shaft.
 - 2. One (1) repair kit for mixer mechanical drive unit.
 - 3. Ten percent spares for each type and size of indicator lights and fuses used for control panels.
 - 4. One year supply of each type of lubricant required (food grade).
 - 5. One (1) spare motor-to-gearbox coupling.
- C. All spare parts shall be properly packaged for long periods of storage and packed in containers with are clearly identified with indelible markings as to the contents including the following: model numbers, parts numbers, manufacturer of part, manufacturer's local representative, and shall be tagged as spare parts. Instructions for preparation and installation of each spare part or group of parts shall be packed with the spare part or parts.
- D. Spare parts and lubricants, as received, shall be turned over to the Owner immediately upon receipt by the Supplier/Manufacturer. Verification of delivery to the Owner shall be submitted to the Engineer.

PART 3 EXECUTION

3.01 INSTALLATION (NOT USED)

3.02 FIELD PAINTING (NOT USED)

3.03 MANUFACTURER'S SERVICES

- A. The Supplier/Manufacturer shall provide the services of a trained, competent, qualified and experienced factory field representative during installation (by others), inspection, testing, and start-up of the equipment. To provide adequate inspection, testing, and start-up services for the drive unit, the factory representative shall have a complete knowledge of proper installation, operation and maintenance of the drive unit. The Supplier/Manufacturer shall provide factory

services a minimum of two (2) visits for a total minimum duration of three (3) days for the project. It is assumed that each visit will be one to two days in duration. One visit shall be during installation of equipment and one visit shall be during checkout, start-up, and training of the Owner's personnel.

- B. The purpose of the services provided by the factory representative will be for the performance of the following work:
1. Verify that the Installer is proceeding properly during the installation of equipment.
 2. Following installation but before the equipment is operated by others, the representative shall inspect the completed installation for soundness, completeness, correctness, alignment, arrangement, proper lubrication, vibration, control settings, and operation of the mechanical, adjustable speed mixer operation. The factory representative shall make or cause to be made any and all adjustments, corrections, or repairs necessary.
 3. Start-up of the equipment in the presence of the Installer and Owner's operating personnel.
 4. Training of Owner's operating personnel in proper operation and maintenance procedures, lubrication, startup/shutdown procedures, response to emergency conditions, and troubleshooting. The responsibility of the Supplier/Manufacturer and the factory service representative with regard to start-up shall be fulfilled when the start-up is complete, the equipment is functioning properly and has been accepted by the Owner.
 - a. The training period for the Owner's operating personnel shall be scheduled at least ten (10) days in advance with the Engineer and shall take place prior to plant start-up and acceptance by the Engineer. The final copies of operation and maintenance manuals shall have been delivered to the Engineer prior to scheduling the instruction period.
- C. Upon completion of his work, the manufacturer's factory representative shall submit to the Engineer, three (3) copies of a written report for the drive unit, as a result of his inspection, adjustments, corrections, repairs, start-up and testing. The report shall include descriptions of the inspections, adjustments, corrections and repairs made, testing, and start-up and training of the Owner's personnel. The report shall also include a notarized certification signed by the manufacturer's factory representative that the installed equipment:
1. Has been installed and lubricated per manufacturer's requirements.
 2. Has been accurately aligned and proper running clearances set.
 3. Is free from undue stress imposed by piping or mounting bolts.
 4. The equipment has been tested as required below in paragraph 3.04 and is in conformance with nominal operating parameters. Test procedures and results shall be included in the report.

5. Is ready for permanent operation on a continuous basis, is free from any known defects, and that nothing in the installation will render the manufacturer's warranty null and void.
- D. The Supplier/Manufacturer's attention is directed to the fact that the services specified for the manufacturer's field engineer represent an absolute minimum acceptable level of service, and are not intended to limit the responsibilities of the Supplier/Manufacturer to comply with all requirements of the Contract Documents. The Supplier/Manufacturer shall procure, at no additional cost to the Owner, all services required, including additional or extended visits to the jobsite by manufacturer's representatives, to comply with all said requirements.

3.04 INSPECTION AND TESTING

- A. Upon completion of installation, the Supplier/Manufacturer, in the presence of the Owner and a qualified manufacturer's representative, shall perform a preliminary test on the drive unit to ensure the functioning of all component parts to the satisfaction of the Owner. The Supplier/Manufacturer shall furnish all labor, equipment, water and power required to perform each test.
- B. Approval of the preliminary test by the Owner shall not constitute final acceptance of the equipment furnished.
- C. Upon approval of the preliminary test, the Supplier/Manufacturer, in the presence of the Owner and a qualified manufacturer's representative, shall perform a field test to demonstrate the ability to meet or exceed the specified design criteria and proper function for the purpose intended.
- D. The field test on the drive unit shall be undertaken with water in the unit filled up to the high water elevation shown on the Drawings. The Owner will provide water for filling the unit for the test runs. The test runs on the unit shall determine acceptable normal running noise, vibration, speed and direction.
- E. Vibration Analysis Testing: The manufacturer shall provide the services of a qualified factory representative to perform tests at the installation to verify that the drive unit rotor-impeller mixer operates within acceptable vibration severity limits and to determine baseline vibration spectra for future use in identifying maintenance actions. These tests shall be performed in the presence of the Engineer using a dual channel, spectrum analyzer. The manufacturer shall also be responsible for determining actions to correct vibrations that exceed acceptable limits. A report with spectral plots shall be submitted to the Engineer documenting all test results and recommended corrective measures, if any.
- F. Within 120 days of initiation of operation of the plant, a full load operating test shall be performed under the direction of the Owner and a qualified manufacturer's representative. The purpose of the full load operating test will be to determine if, under actual operating conditions, the required treatment parameters, as specified

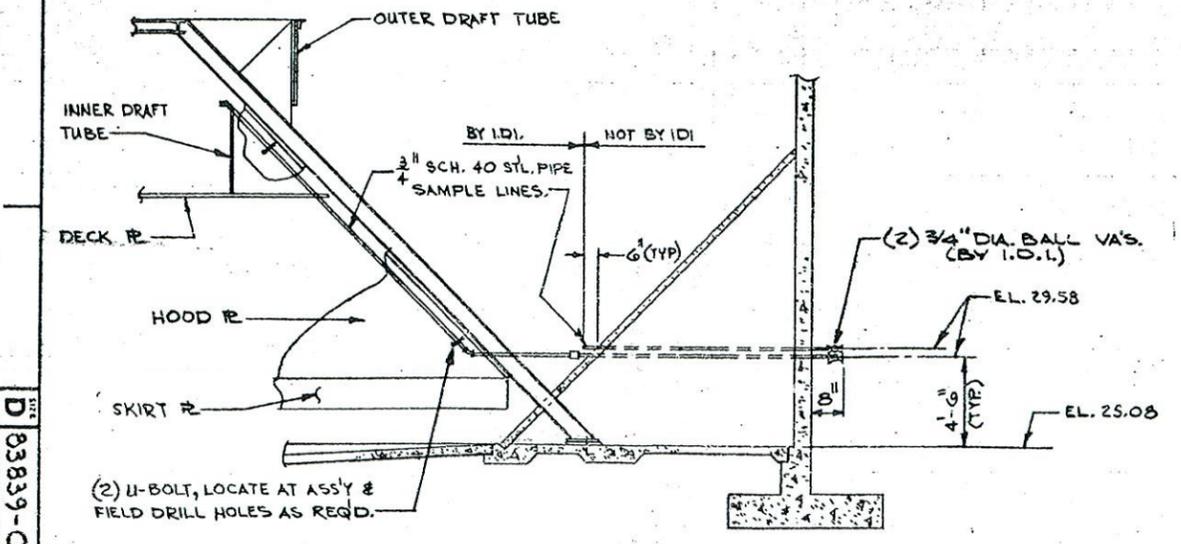
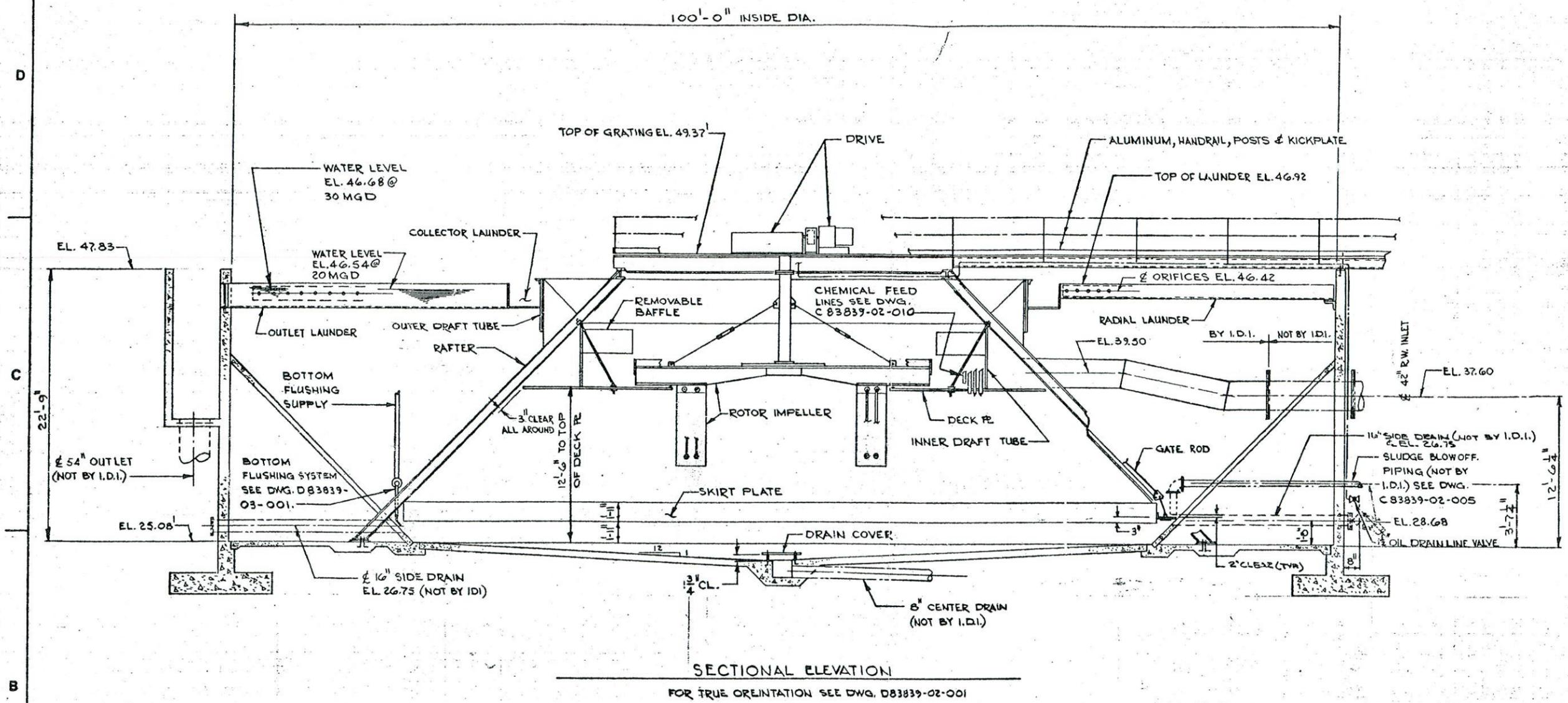
in paragraph 2.04, are in compliance. The Supplier/Manufacturer shall furnish all labor, materials and equipment required for such test and shall correct any deficiencies noted, by repairing or replacing the defective component, and retest as required, until the equipment meets the satisfaction of the Owner. A minimum operating time of five (5) consecutive 24-hour days shall be allocated to satisfy the full load operating test requirements.

3.05 DISINFECTION

- A. Following painting and paint curing, the lime softening unit shall be disinfected by the Owner before putting the unit into service. The unit shall be disinfected in accordance with the requirements of AWWA Standard C652, latest revision.

END OF SECTION

NOTES:
 1) SEE DWG. D83839-02-001 FOR GENERAL NOTES.



TYPICAL SAMPLE LINE DETAILS
 FOR TRUE ORIENTATION SEE PLAN-DWG D83839-02-001

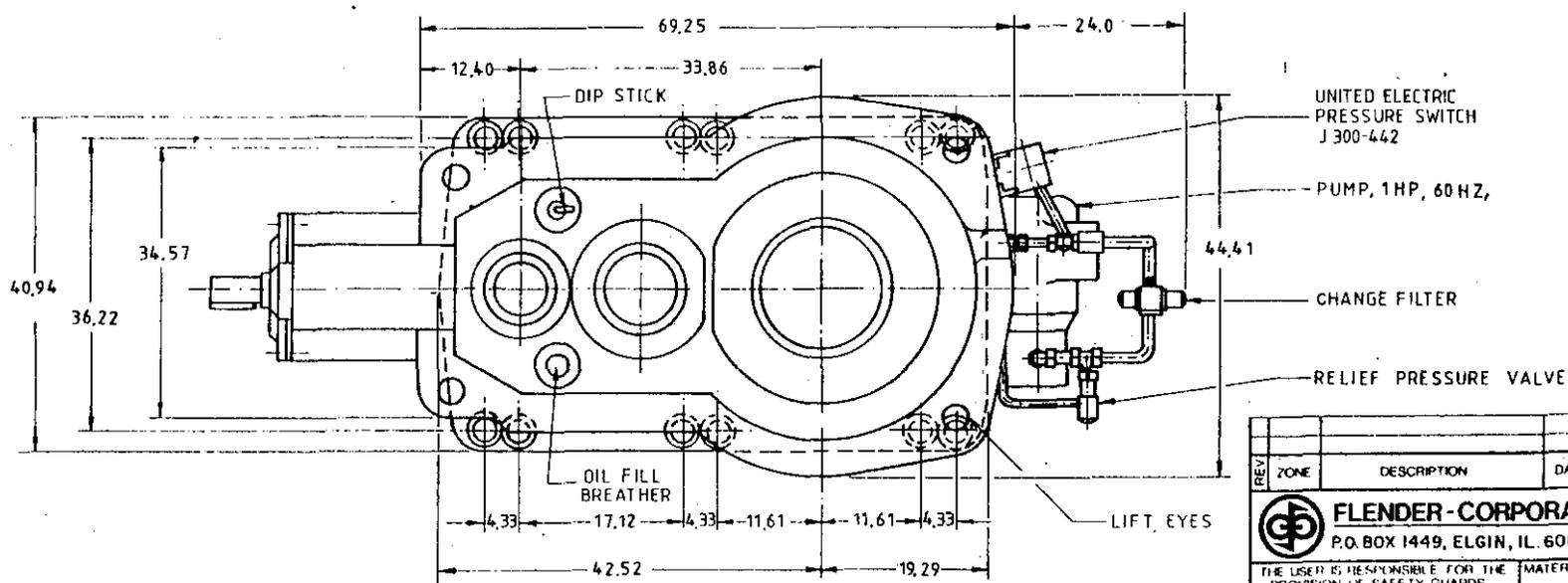
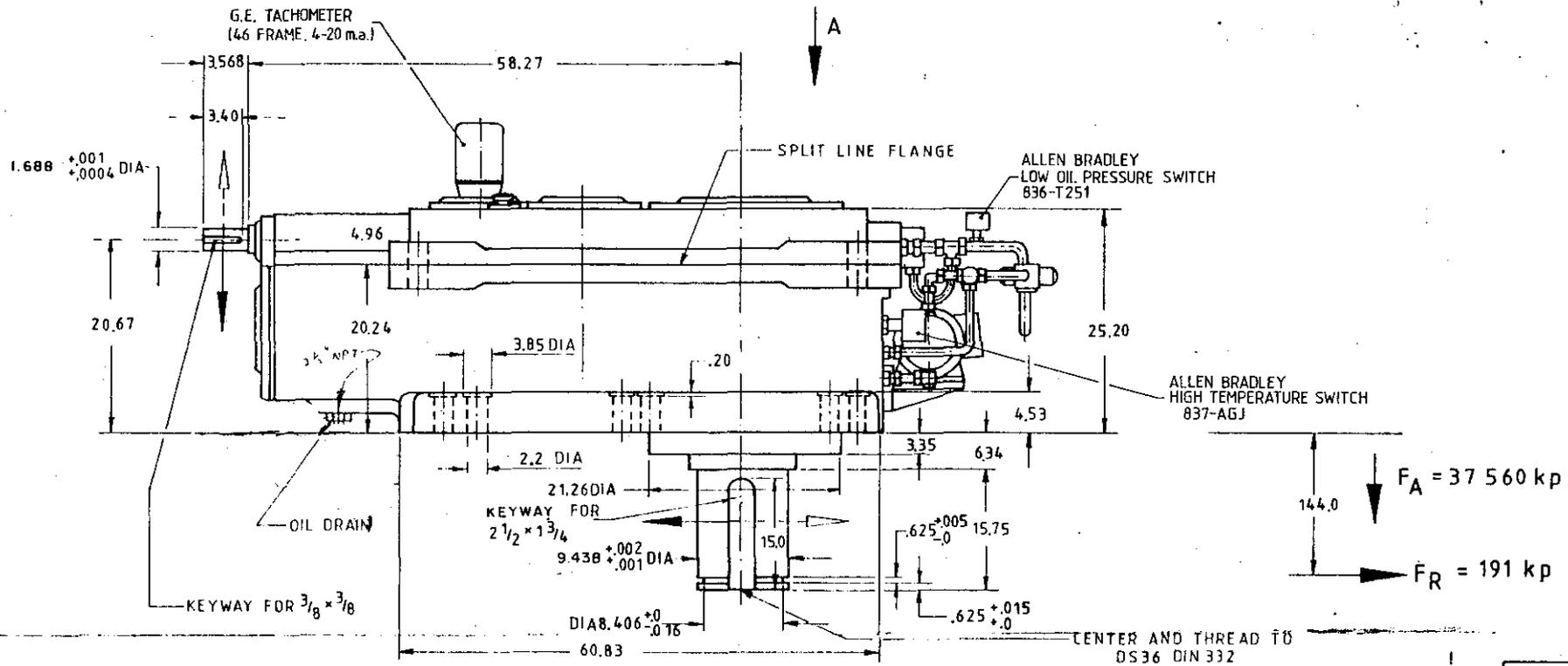
Inflico Degremont Inc.
 Information Only - Return not required.
 Preliminary - Not to be used for construction.
 For Approval - Requests for change can add to price and delay shipment.
 Certified

For THE CITY OF POMFANO BEACH, FL
 WTP
 Cust. Ord. No. 030-0043
 Inflico Degremont Inc. No. 83-539
 Date 3/7/84 Item No. 0201

REV. NO.	DATE	BY	CHKD.	APP.	DATE
1	7-11-83	B. BOGIN			
2	8-25-83	AG			
3	8-25-83	AG			
4	8-25-83	AG			
5	8-25-83	AG			
6	8-25-83	AG			
7	8-25-83	AG			
8	8-25-83	AG			
GRATING EL. WAS 49.35' ADDED WATER LEVEL @ 30MGD - EL. 46.40					
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO INFILICO DEGREMONT INCORPORATED. IT IS SUBMITTED IN CONFIDENCE AND IS TO BE USED SOLELY FOR THE PURPOSE FOR WHICH IT IS FURNISHED AND RETURNED UPON REQUEST. THIS DRAWING AND SUCH INFORMATION IS NOT TO BE REPRODUCED, TRANSMITTED, DISCLOSED OR USED OTHERWISE IN WHOLE OR IN PART WITHOUT THE WRITTEN AUTHORIZATION OF INFILICO DEGREMONT INCORPORATED.					
Inflico Degremont Inc. Post Office Box 29599 Richmond, Virginia 23228			SECTIONAL ELEVATION LAYOUT		
#29 NS. ACCELERATOR 100' 0" DIA.			SCALE: NTS MICRO		
D 83839-02-002			A		

D 83839-02-002

8 7 6 5 4 3 2 1



VIEW A

CERTIFIED DRAWING	
FOR	<i>Infilco Department</i>
ORDER NO.	70085
FLENDER ORDER NO.	480-308-101-10
CERTIFIED BY	H.L. JOLLY
DATE	8-30-83
ENGINEER	MICHAEL J. BROWN
SERIAL NO.	480-308-101-1-1
TYPE	KDNS 500
DRIVER	1750
INSTRUMENT	507
INSTRUMENT	50
CATALOG NUMBER	125
CAPACITY	CG 25
SCALE	1:100

DRAWN	8-30-83	H.L.J.
CHECKED		
DATE		
EX-PT		
BY		
FLENDER-CORPORATION P.O. BOX 1449, ELGIN, IL. 60120		
THE USER IS RESPONSIBLE FOR THE PROVISION OF SAFETY GUARDS ALL DIMENSIONS IN INCHES		
MATERIAL	SCALE	SIZE TYPE DRAWING NO
WEIGHT (LBS)	MADE FROM	SUPPLEMENTED
10000		
DIMENSION SHEET KDNS 500 C SK 00933		