Hart Engineering Corporation

SUBMITTAL:
11320-02

PROJECT: 9900. - Veolia/Taunton WWTF Phase 1 Improvements **DATE: 05/09/2022**

SUBMITTAL: 11320-02 - Primary Clarifier O&M Manual
REVISION: 0
STATUS: Eng
SPEC #: 11320

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Item	Revision	Description	Status	Date Sent	Date Returned
11320-02	0	Primary Clarifier O&M Manual	Eng	05/09/2022	
Notes:					

Additional Notes:

Status Codes
1-APP – No Exceptions Taken
2-ANR – Make Corrections Noted
3-R&R – Revise and Resubmit
4-REJ – Rejected
5-IPO – For Information Purposes Only
6-NRR – Not Required for Review
ENG – Submitted to Engineer

Sincerely,
Hart Engineering Corporation

_____ DATE: 05/09/2022

Installation, Operation, and Maintenance Manual

Revision: -

For:

Taunton WWTF
Taunton, Massachusetts

Equipment:

Four (4) 55’ Diameter COP™ Clarifier Mechanisms
Specification Section: 11320
WesTech Model Number: COPC2

WesTech Contact:

Project Manager: Scott Albertson
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WesTech Job Number 24587A
May 2022

For:
Taunton WWTF
Taunton, Massachusetts

Equipment:
Four (4) 55’ Diameter COP™ Clarifier Mechanisms
WesTech Model Number: COPC2

Engineer:
Beta Engineers

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WesTech Job Number 24587A
May 2022

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WesTech

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WesTech Product Line Card

Water and Wastewater Treatment Equipment and Solutions

- *Municipal*
- *Industrial*
- *Minerals*
- *Services and Operations*

Aerators - Water

ATOMERATOR™ Pressurized Aerator
Cascade Aerator
Forced and Induced Draft Aerator

Anaerobic Digestion

Ana-Flo™ UASB – Upflow Anaerobic Sludge Blanket
Digester Cover - Radial Beam and Truss Style
DuoSphere™ Dual Membrane Gasholder
ExtremeDuty™ Mechanical Sludge Mixer
Sludge Heating System

Biological Treatment

BioDoc™ Rotary Distributor
HydroDoc™ Rotary Distributor
LANDY-7 Slow Speed Surface Aerator
OxyStream™ Oxidation Ditch
PakTOR™ Packed Bed Reactor
STM-Aerotor™ IFAS System

Clarification

Adsorption Clarifier® System
Backwash Clarifier
Conventional Clarifier
CONTRAFAST® Thickening Clarifier
CONTRAFLO® Solids Contact Clarifier
COP™ Spiral Blade Clarifier
COP™ Suction Header Clarifier
Flocculating Clarifier
Metallurgical Clarifier
Pin Bed Clarifier
RapiSand™ Ballasted Flocculation
Sludge Sucker™ Sludge Removal System
Solids CONTACT CLARIFIER™
Suction Header Clarifier
Suction Pipe Clarifier
SuperSettler™ Inclined Plate Clarifier
Zickert Shark™ Sludge Removal System

Combined Sewer Overflow

WWETCO FlexFilter™

Dewatering

Filter Press
Horizontal Belt Filter
Rotary Vacuum Drum Filter
Vacuum Disc Filter

Dissolved Air Flotation (DAF)

Circular / Rectangular DAF Units
Dissolved Gas Flotation (DGF)
Dissolved Nitrogen Flotation (DNF)
R5 DAF Pre-Engineered Unit

Drives

Cage Drive
Drives with Lift
Dual Drive
Shaft Drive
Replacement, Retrofit, and Rebuild Options

Flocculation

Axial Blade Flocculators
Horizontal Paddle Flocculators
Vertical Paddle Flocculators

Filtration - Granular Media

CenTROL® Gravity Filter
ESSD® Washtroughs
Gravity Filtration System
LAZERFLO™ Low-Profile Underdrain
Manganese ANTHRA/SAND™
MULTIBLOCK® Filter Underdrain
MULTICELL® Horizontal Pressure Filter
MULTICRETE™ II Filter Underdrain
MULTIWASH® Filtration Process
MULTIWASH® PRO Trough
Pressure Filters [Vertical and Horizontal]
SuperSand™ Continous Backwash Filter





Filtration - Specialty

Ion Exchange System
Granular Activated Carbon Contactor (GAC)
SuperDisc™ Disc Filter
SuperDrum™ Drum Filter
WWETCO FlexFilter™

Headworks Grit Removal and Screening

CleanFlo™ SHEAR™ Rotary Drum Screen
Grit Collector
Shafted Grit Screw Classifier
Vortex Grit Chamber

Industrial Screening

Linear Screen
Resin / Carbon Interstage Screen
WTR Cup and Drum Screen
WTR Fish Recovery and Return Screen
WTR Stationary Screen
WTR Talon Rake™ and Bar Screen
WTR Traveling Water Screen

Membrane Filtration

AltaPac™ Ultrafiltration Membrane System
Electrodeionization (EDI)
Nanofiltration and Reverse Osmosis System
Ultrafiltration Membrane System
VersaFilter™ Open-Platform Membrane System

Oil/Water Separation

Oil/ Water Separators
Dissolved Air Flotation (DAF)

Package Treatment Systems

AERALATER® Iron and Manganese Removal System
AltaPac™ Ultrafiltration Membrane Package System
Aquarius® Package Water Treatment Plant
Multi-Tech™ Pressurized Package System
RapiSand Plus™ Package Treatment Plant
Trident® HS Package Treatment Plant
Trident® HSC Package Treatment Plant
Trident® HSR Package Treatment Plant
Trident® Package Treatment Plant
Tri-Mite® Package Treatment Plant
Water Boy™ Package Treatment System

Tankage

Anchor Channel Tanks
Bolt Together Tanks
Elevated Tanks
Field Erection
Shop-Built Tanks

Thickening

AltaFlo™ High-Rate Thickener
CONTRAFAST® Thickening Clarifier
Conventional Sludge Thickener
Deep Bed™ Paste Thickener
EvenFlo® Feedwell
HiDensity™ Paste Thickener
HiFlo™ High-Rate Thickener
MudMax™ Bed-Level Instrument
Rotary Drum Thickener
TOP™ Thickener Optimization Package
Titan™ Traction Thickener

WesTech Services and Operations

Mobile and Rental Solutions
Plant Operations and Services
Systems Integration
Pilot Plants
Aftermarket Services
Laboratory Services

Many of these products are available as mobile/rental equipment or pilot plants.

WESTECH®

Warnings Summary

WesTech recommends that this page be thoroughly read and understood before erecting and operating the equipment. The procedures must be followed, as WesTech will not accept responsibility for damage to the equipment that has not been handled per the manufacturer's instructions. A summary of the warnings is listed below. For additional information, please refer to the related sections.

Warning: Operating and maintaining this equipment has inherent risks. It is your responsibility to read and understand the Operation and Maintenance Manual before working with the equipment. This page is intended to summarize the warnings associated with WesTech's equipment. Where equipment manufactured by others has been provided in conjunction with WesTech equipment, additional warnings specific to that piece of equipment may only be contained in that section of the Manual. Please read and understand all warnings provided in this Manual.

Warnings in the Manual

Section One: (Structural Lifting Precautions)

- Do not pull, drag, push, or dump the structural component off the delivery trucks.
- Stand clear as the equipment is lifted.

Section Two: (Torque Test Procedures)

- Test Warnings: Review the precautions for the personnel during the torque test.

Section Two: (Tank Grouting Procedure)

- The torque control must be connected before starting the grouting with drive unit power. This is a protective device for the drive unit and mechanism. Bypassing it directly to the motor drive will void the warranty.

Section Two: (Surface Treatment)

- Do not paint the drive unit. The torque device has moving parts which if painted will cause overload and result in damage to the mechanism.

Section Three: (Safety Instructions)

- Review the safety procedures for all authorized personnel before working on the equipment.
- Place “warning” signs in the area of moving parts.

Section Three: (Storage and Shutdown Precautions)

- Caution: When the clarifier mechanism is taken out of service for short or long periods the mechanism should be adequately blocked or tied off such that the force from wind does not rotate the mechanism backward. Backward rotation will damage electrical wiring and other mechanical parts.

Section Three: (Emergency Procedures and Troubleshooting)

- Do not attempt to continue running the mechanism when an overload condition is indicated. Identify the trouble and resolve it.
- Do not start up the mechanism with a load of sludge in the tank.
- Do not tamper with the overload alarm switch adjustments to keep the machine running under overloaded conditions. Such tampering will void the warranty.

Section Four: (General)

- Field Charges and Modifications: No field charges will be allowed without prior approval from WesTech.
- Sandblasting Warning: Do not media blast the WesTech drive unit. If sandblasting is done in the vicinity, the WesTech drive unit including motor(s) and reducer(s) must be fully covered and sealed off to protect against abrasive media intrusion. All external openings and areas between the housing, gear hub, and drive cover must be covered and

taped closed. Contamination of the drive lubricants by abrasive media can lead to catastrophic failure of the drive unit. After sandblasting and before start-up, inspect the gear cavity through the pinion inspection port and gear inspection port for any presence of blasting material. If abrasive media is present, please contact WesTech Engineering with photos for evaluation and further instructions. Failure to observe this warning will void the drive warranty.

- Lubrication Warning: Do not operate the drive unit, including the motor and reducer, without proper lubrication. Refer to Drive; Maintenance; Drive Lubrication. Failure to observe this warning will void the drive warranty.
- Torque Control Settings Warning: Do not alter the factory set positions of the torque limit switch actuators in the torque box. This can cause serious damage to the drive and rake mechanism. Failure to observe this warning will void the drive warranty.
- Maintenance and Operation Warning: To prevent personal injury, only trained employees should be allowed to work on or around the drive. Lockout all electrical power before performing maintenance on any moving part of the drive. Failure to observe this warning will void the drive warranty.
- Do not open the torque control device if the drive unit has stopped due to high torque. Energy is stored in the drive train and torque control spring and should be released before undertaking any maintenance or repairs. Failure to observe this warning will void the drive warranty.

Section Four: (Installation)

- Connect the drive motor for proper direction of rotation as shown on the general arrangement and drive assembly drawings. WesTech will not accept responsibility for any damage caused by the drive rotating in the wrong direction.
- Welding Warning: Do not allow current to pass through the precision bearing balls in the drive unit if field welding is required after the drive is installed. Do not weld on the drive unit itself. Failure to observe this warning will void the drive warranty.

Section Four: (Maintenance)

- Do not use the same grease for the motor as used on the drive gears and bearings. Incompatible grease will cause the failure of lubrication and irreparable damage to gears and bearings.
- Do not mix mineral gear oil with synthetic oil without consulting with the oil supplier.

Section One: Equipment Information

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Warranty

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One Year Warranty

WesTech equipment is backed by WesTech's reputation as a quality manufacturer, and by many years of experience in the design of reliable equipment.

Equipment manufactured or sold by WesTech Engineering, Inc., once paid for in full, is backed by the following warranty:

For the benefit of the original user, WesTech warrants all new equipment manufactured by WesTech Engineering, Inc. to be free from defects in material and workmanship, and will replace or repair, F.O.B. its factories or other location designated by it, any part or parts returned to it which WesTech's examination shall show to have failed under normal use and service by the original user within one (1) year following initial start-up, or eighteen (18) months from notification of ready to ship to the purchaser, whichever occurs first.

Such repair or replacement shall be free of charge for all items except for those items such as resin, filter media and the like that are consumable and normally replaced during maintenance, with respect to which, repair or replacement shall be subject to a pro-rata charge based upon WesTech's estimate of the percentage of normal service life realized from the part. WesTech's obligation under this warranty is conditioned upon its receiving prompt notice of claimed defects, which shall in no event be later than thirty (30) days following expiration of the warranty period, and is limited to repair or replacement as aforesaid.

This warranty is expressly made by WesTech and accepted by purchaser in lieu of all other warranties, including warranties of merchantability and fitness for particular purpose, whether written, oral, express, implied, or statutory. WesTech neither assumes nor authorizes any other person to assume for it any other liability with respect to its equipment. WesTech shall not be liable for normal wear and tear, corrosion, or any contingent, incidental, or consequential damage or expense due to partial or complete inoperability of its equipment for any reason whatsoever.

This warranty shall not apply to equipment or parts thereof which have been altered or repaired outside of a WesTech factory, or damaged by improper installation, application, or maintenance, or subjected to misuse, abuse, neglect, accident, or incomplete adherence to all manufacturer’s requirements, including, but not limited to, Operations & Maintenance Manual guidelines & procedures.

This warranty applies only to equipment made or sold by WesTech Engineering, Inc.

WesTech Engineering, Inc. makes no warranty with respect to parts, accessories, or components purchased by the customer from others. The warranties which apply to such items are those offered by their respective manufacturers.

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General Description

This WesTech COP™ Clarifier is designed to continuously separate and remove the suspended solids as well as scum and floating material from waste influent.

The clarified overflow is removed at the tank periphery. Enough detention time is allowed to permit the solids in the feed to settle during the time of flow from the influent to the point of overflow collection. The overflow collection scheme should be adjusted to continuously remove a uniform amount of liquid per unit length of the periphery and to eliminate irregular flow at any one place. Any irregularity will cause a convergence of flow at certain points, and the velocity at those points will be such as to carry fine solids with the overflow. The rakes move the settled solids to the center where they are pumped out.

The COP™ Clarifier system consists of the following:

Center Cage: Provides support for and transfers motive force to the rake arms.

Center Column: Provides structural support for the mechanism. Also serves as the influent pipe for flow entering the tank.

Drive Unit: Provides motive force for the rotating mechanism.

Feedwell: Further reduces radial energy of the influent before it enters the clarification zone of the clarifier.

Rake Arm: Scrapes the tank floor and directs sludge to the center of the tank for removal.

Scum Box: Transports floating material and scum out of the tank through the scum pipe.

Scum Flushing Assembly: Allows clarified effluent to enter through the side of the scum box to flush out the scum that has accumulated in the sides and bottom of the scum box.

Skimmer: Removes floating scum material from the surface of the water, and deposits it into the scum box.

Walkway and Platform: Provides access to the drive unit.

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General Precautions

The erection instructions enclosed are provided to assist in the assembly and adjustment of this mechanism. These procedures are not intended as a substitute for the experience of the persons assigned to erecting and assembling this equipment. WesTech strongly suggests that these instructions be studied before erecting, assembling, and adjusting.

During the assembly of this equipment, it will be necessary to install, adjust, and maintain certain accessory items, which are not manufactured by WesTech. This accessory equipment must be stored, handled, adjusted, and maintained per instructions provided by the manufacturer of that equipment. This is necessary to be assured of prompt and full participation in the warranty protection on the equipment. WesTech will not accept responsibility for damage to equipment that has not been handled per the manufacturer's instructions.

Packing List

The Contractor's packing list consists of a sheet containing an itemized listing of parts.

The packing list contains:

1. A description of the item.
2. Sizes and lengths of nuts and bolts. These fasteners will ship tagged with the item numbers.
3. The number of parts per assembled unit.
4. The total quantity of parts shipped.
5. An indication of direct shipment from the supplier or the fabricator.
6. The date and job number of the shipment.

The packing list will be found in one of the crates shipped directly from Salt Lake City, Utah. The list should be kept in a readily accessible and safe place. Many contractors prefer to keep this list in some type of binder for protection and quick reference.

This list is particularly useful during erection for locating small parts and fasteners. When coordinated with the erection drawings, equipment tagging, and piece marking, the contractor's packing list can become an invaluable erection tool.

Equipment Tags

Each shipping piece has been tagged or piece marked for convenience. Typically, the part number and item number will be marked on all items. The piece marked items received will have a mark such as "Part Number 1020 A" or “Item 101" which may be cross-referenced with the packing list and general erection drawings.

Receiving Material

The equipment pieces and components received may have been shipped from:

1. WesTech Engineering, LLC in Salt Lake City, Utah
2. A Fabricator acting under WesTech Engineering, LLC instructions.
3. A “buy-out” distributor such as a motor or pump manufacturer.

Since there will often be more than one shipment to the job site, it is important to coordinate the receiving and storage of all items accordingly. All material has been thoroughly checked and inspected before shipment. However, there may be times when equipment is missing, damaged in transit, or received with broken packaging. When receiving equipment, it is necessary to properly acknowledge receipt and any shortage or damage on the shipping documents. This must be done in a manner that helps assign responsibility to the proper party for the various parts of shipping and receiving equipment.

When receiving a shipment, the following procedures must be followed. These procedures are also listed on the bill of lading the shipping company provides and must be signed to prove the delivery of the goods. If the following procedures are not followed, WesTech will not be liable for any shortages or damage to your shipments.

Receiving Procedure

1. Before signing the bill of lading in receipt of the goods shown thereon, and before the driver leaves, do the following:
    a. After inspecting the shipment, note any damage or shortages (according to what is listed on the bill of lading. Be as detailed as necessary.
    b. Have the driver sign the notation in acknowledgment.

c. Retain a copy (of the notated bill of lading) for use in filing a freight claim.

d. If there is damage, notify WesTech 801.265.1000 immediately so that arrangements can be made with the carrier, if necessary, to have the damaged goods inspected by their agent.

2. After signing the bill of lading and receiving the shipment, do the following:

   a. Use the attached/enclosed packing list to further inspect the entire shipment for shortages and/or damage and retain this list for future reference.

   b. Notify WesTech within three (3) working days from the date of receipt, of any further shortages or concealed damage. If certain items are missing or damaged, make notes of this on the shipping papers to protect all interests and notify WesTech 801.265.1000 immediately.

Handling and Storage

Please handle the equipment properly when unloading and erecting. All cartons, electrical equipment, and gear drives should be stored under cover and protected from moisture, grit, and mud. All rolled steel sections must be stored on edge or blocked up to prevent distortion. If allowed to lie flat, these items may lose their shape which could hinder the erection and proper alignment of the equipment.

Long structural shapes should be checked for the proper camber. This would include beams, trusses, walkways, etc. The equipment has been designed with a positive camber so that items do not appear to be sagging after erection.

Painting

The material supplied for this job has received surface preparation and paint following the specific contract plans and specifications.

Any indentations, marks, and/or scratches caused by loading and unloading the equipment must be immediately touched up in the field before storage.

In the event the equipment supplied has been painted with only a primer coat, this notification should be adhered to. Shop primer paints are intended to serve only as a bonding coat between the metallic surface and the protective finish and serve only as a minimal

Note: Shop primer paint durability.

protective finish. Unless otherwise noted in the contract documents, WesTech will not be responsible for the condition of primed or finish painted surfaces after the equipment leaves our shops. Customers are invited to inspect coatings in our shops for proper surface preparation and application before shipment. WesTech assumes no responsibility for field surface preparation or touch-up of shipping damage to the paint. Painting of surfaces requiring touch-up or painting of fasteners will be done by the customer's painting contractor after the mechanism is erected.

Shop primed surfaces should be finish coated within the time specified by the paint manufacturer. WesTech cannot be held responsible for shop-primed surfaces that have deteriorated due to time and exposure.

Fasteners

All stainless steel erection fasteners shall incorporate anti-seize during assembly. Failure to utilize this will cause significant extra time by the erection and maintenance crews.

Foundation Anchor Bolts

If required, WesTech Engineering ships anchor bolts direct to the job site upon receipt of the approved prints. Notify WesTech immediately if anchor bolts are not received as promised.

Anchor bolts must be placed accurately to avoid future erection difficulties. Where applicable and upon request, WesTech can furnish a template for positioning the anchor bolts. If a template has not been furnished, remember that the location and projection of all anchorage are critical. The specified amount of projection and location are shown on the general arrangement drawings. Before equipment installation, clean the threads of all anchorage bolts and oil them.

If using epoxy anchors, confirm the expiration date of the epoxy, typically posted on the packing, before mixing and application. WesTech will guarantee the effectiveness of the epoxy up to the aforementioned date. Installer to adhere to epoxy installation procedures noted on the packaging.

Installation, Operation and Maintenance Manual

Keep an Installation, Operation, and Maintenance Manual in the area where the operators can familiarize themselves with it and have it

for reference. The manual is useless if the operator and foreman do not have access to it.

Further Assistance

If a problem is encountered while installing or operating the equipment that cannot be solved by referring to this manual, feel free to contact WesTech Engineering, LLC, 3665 South West Temple, Salt Lake City, Utah, 84115 phone 801.265.1000 or fax 801.265.1080.

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Shortages, Discrepancies, and Field Charges

Please notify WesTech Engineering, LLC immediately if any apparent manufacturing discrepancies or shortages are encountered with machinery since no field charges for alterations or shortages will be accepted unless authorized in writing by our authorized representative.

Fabricated steel parts and assemblies furnished by WesTech Engineering, LLC are manufactured following best shop practices and standards. However, some misfits and imperfect work may arise. In such cases, the American Institute of Steel Construction Manual, Fifteenth Edition, "Code of Standard Practice", will apply to the erection of this equipment. It reads as follows:

> “7.14. Corrections and Errors
>
> The correction of minor misfits by moderate amounts of reaming, grinding, welding, or cutting, and the drawing of elements into line with drift pins, shall be considered normal erection operations. Errors that cannot be corrected using the foregoing means, or that require major changes in member or Connection configuration, shall be promptly reported to the Owner’s Designated Representatives for Design and Construction and the Fabricator by the Erector, to enable the responsible entity to either correct the error or approve the most efficient and economical method of correction to be used by others."
>
> Commentary:
>
> “As used in this Section, the term “moderate” refers to the amount of reaming, grinding, welding, or cutting that must be done on the project (as a whole) not the amount that is required at an individual location. It is not intended to address limitations on the amount of material that is removed by reaming at an individual bolt hole, for example, which is limited by the bolt-hole size and tolerance requirements in the AISC and RCSC Specifications.”

Company policy dictates that no field charges will be allowed without prior approval. Written authority must be given in the form of a WesTech inspection and change work form with an attached warranty tracking number. The warranty tracking number will be issued when the extent of such modifications and the price for performing these modifications have been agreed upon.

In general, when parts require replacement, and WesTech agrees that replacement is necessary, WesTech will furnish the parts. The contractor will remove the defective parts and install the replacement parts at a cost agreed upon by both parties.

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Structural Lifting Precautions

All structural components should be lifted and handled as instructed below. Proper handling is necessary to protect special coverings and to ensure ease of assembly during equipment installation.

WesTech will not accept charges for repair or replacement of equipment or materials damaged due to improper handling. Report any damage to WesTech and make a notation on shipping papers to this effect.

Warning: Do not pull, drag, push, or dump the structural components off the delivery trucks.

Lifting Recommendations

Observe these precautions when lifting or handling structural components.

Warning: Stand clear as the equipment is lifted.

1. Make sure the equipment being lifted or the lifting equipment cannot come into contact with overhead electrical cables, etc.
2. Make sure the rigging and hoist equipment have adequate capacity. Weights for major components are listed on the Parts Lists.
3. All rigging and lifting should be done by experienced personnel.
4. Before the equipment is removed from the delivery trucks, check to be sure the blocking, bracing, and banding securing it to the carrier have been removed and are ready for moving.
5. Use multiple-point lifting whenever possible.
6. When lifting structural members of this equipment, such as rake arms, cages, walkways, etc. avoid twisting or bending the members. Use spreader beams, as necessary, to fully support the pieces as they are lifted.
7. Make sure shop-provided camber is maintained when lifting rake arms and walkways.
8. Lift the equipment an inch or two off of the trailer to be sure it is free to be moved and balanced correctly. Adjust as necessary.
9. Never move the equipment suddenly or in jerks and never allow it to strike the ground, tank, or other equipment.

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Section Two: Installation Instructions

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Suggested Erection Sequence

The sequence listed below is suggested only and should not take precedence over the experience of the erector. If due to special circumstances or the equipment available, the erector may decide to vary this order. Detailed sheets follow which explain each of the steps outlined below.

To assist in the construction of the clarifier, a list containing drawing numbers and drawing descriptions has been included in the table of contents. References to drawings will be made using the drawing description only but drawing numbers can be accessed quickly using this list.

1. Install anchor bolts and benchmarks.
2. Install center column.
3. Install center cage.
4. Install drive unit. (Refer to Section Four: Drive Unit)
5. Install Feedwell and supports.
6. Install rake arms with blades.
7. Install Corner Sweep
8. Install scum box and supports.
9. Install scum flushing valve.
10. Install skimming mechanism and supports.
11. Install walkway, flooring, and handrail.
12. Perform final check for level.
13. Perform torque test.
14. Install piping and electrical items.

Please note that WesTech does not provide the following items unless otherwise noted:

- Concrete, concrete reinforcing, or grout.
- Piping, valves, pipe supports, fittings, wall brackets.
- Electrical wiring, conduit, or electrical equipment.
- Shimming materials.
- Caulk or mastic.
- Field painting or paint.
- Field welding or weld rod.
- Water for testing.
- Grease or lubricating oil.

Torque Ratings

Anti-seize must be applied to all stainless fasteners before assembly.

Note: Installer must torque all bolts to these ratings unless stated otherwise.

Bolt Diameter (Inches)	Torque Rating (foot-pounds)
1/4	8
5/16	12
3/8	21
7/16	33
1/2	45
9/16	59
5/8	97
3/4	130
7/8	202
1	271
1 1/8	408
1 1/4	504
1 1/2	732

Figure 2.1: Torque Ratings

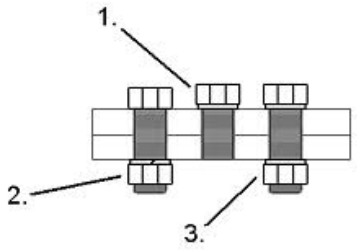

Figure 2.2: Washer Assembly

1. Flat washer, threaded assembly = foot-pounds x 80 percent
2. Lock washer, nut = foot-pounds x 100 percent
3. Two (2) flat washers, nut = foot-pounds x 90 percent

All structural fasteners should be checked for proper torque annually.

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Anchor Bolts and Benchmarks

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Install column anchors, making sure the bolt circle is concentric with the tank wall.
2. Install walkway anchors with respect to the walkway centerline as noted in (1) above.
3. Install scum box anchors with respect to the water level and the final position of the scum box. These anchors must be in proper position to ensure correct operation of the skimming equipment and optimize the scum removal process.
4. Install anchors for the weirs and baffles making sure that the bolt spacing and location are correct. The anchor bolts for the baffle supports should be installed after the weir anchor bolts have been located.
5. Prior to equipment installation, clean and lubricate all anchor bolt threads.
6. Using a surveyor's level, benchmark the tank wall at four equally spaced locations (90 degrees apart) and approximately 2 feet above tank bottom. These marks will be used later to check final level of the drive. They should be oriented 45 degrees from walkway centerline. See Figure 2.AB.1.

Note: If epoxy anchors are used, conform to manufacturer's recommended installation instructions.

Important: The column and walkway anchor bolts must be installed with respect to the centerline of the walkway as shown on the general arrangement drawing. Use V-notches in column flanges for reference.

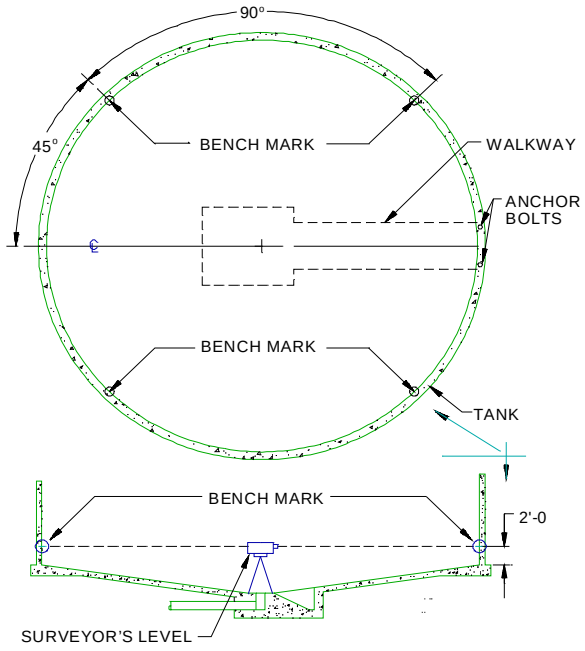

Figure 2.AB.1. Bench Mark Drawing.

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Center Column

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Locate the v-notches on the center column flanges. There are two (2) V-notches, one in both the top and bottom flange. These notches must line up with the walkway centerline at the tank wall. See Figure 2.CL.1.
2. Measure the top flange diameter of the column. If this dimension is larger than the width of the cage, place the center cage in the tank first over the influent opening and then set the center column into the center cage.
3. Place leveling nut and flat washer on each anchor at the proper elevation; a minimum of 2 inches off rough concrete or as specified.
4. Lower center column onto the anchor bolts so that it sits on the first set of flat washers and leveling nuts. Blocks or shims may be used to support and level the column. Install the second set of washers and hex nuts on the anchor bolts on the topside of the flange on the anchors and loosely tighten. Verify that the top of column elevation matches the elevation shown on the general arrangement – elevation view drawing in the Operation and Maintenance Manual.
5. Using a level and plumb bob, adjust leveling nuts and/or shims so that the column is plumb in 2 directions (90 degrees apart).
6. Tighten the hex nuts on top of the bottom flange after the column has been plumbed.
7. If an access port is provided in the lower section of the column, install the neoprene gasket and access port cover over the port opening and bolt into place.

Grouting

Prior to the center column being grouted in place, the drive unit and complete mechanism must be installed, positioned and leveled. Unless otherwise instructed, it is recommended that WesTech visit the site and do the installation inspection prior to column being grouted. It is essential that plumb condition be maintained and checked before placing non-shrink grout under the bottom flange. Grout is not by WesTech.

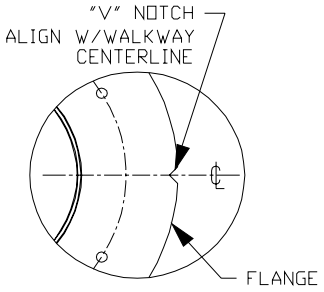

Figure 2.CL.1.

Note: The center column can be grouted in place after the drive unit; column and center cage has been leveled and plumbed if access is restricted due to installed components around the column.

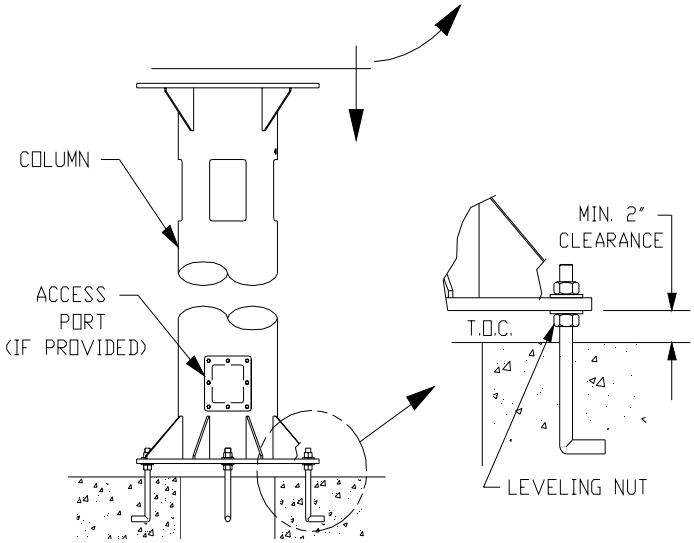

Figure 2.CL.2.

Center Cage

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

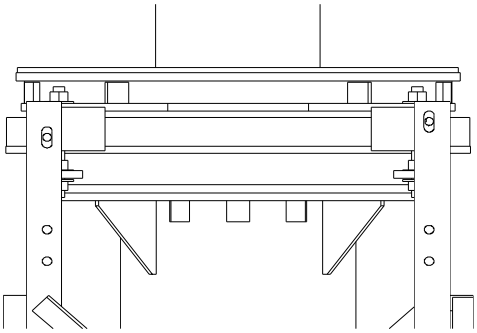

Figure 2.CG.1.

1. Lift the center cage and place over the installed center column making sure the connections for the drive unit are located at the top of the cage.
2. Place the center cage onto blocking on the bottom of the tank to support the cage during installation. The blocking provides the clearance required for the sludge removal mechanism.

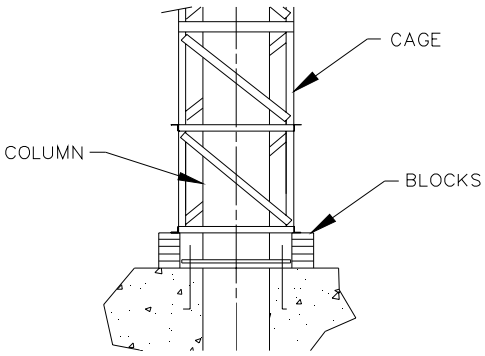

Figure 2.CG.2.

3. Drive unit must be installed and leveled before further erection of the cage. Refer to Drive Unit section for assembly directions.
4. Raise center cage and attach to the drive unit adapter connections using vertical adjusting bolts and mounting fasteners. Leave mounting fasteners loose until after adjustments are made. Mounting fasteners should be centered in the slots on the cage as a starting point for adjustments. See Figure 2.CG.4.
5. Remove blocking and adjust the center cage for uniform concentricity about the column. Fully tighten fasteners.

Note: Recheck vertical adjustments on the center cage after the sludge removal system has been installed. The center cage must remain concentric with the column.

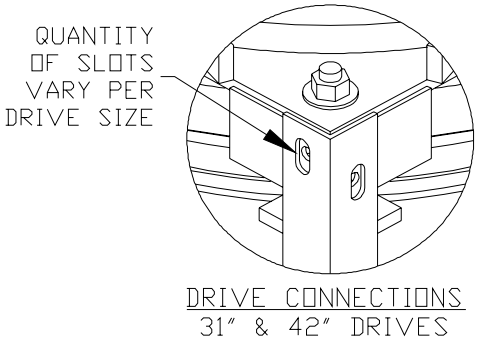

Figure 2.CG.3.

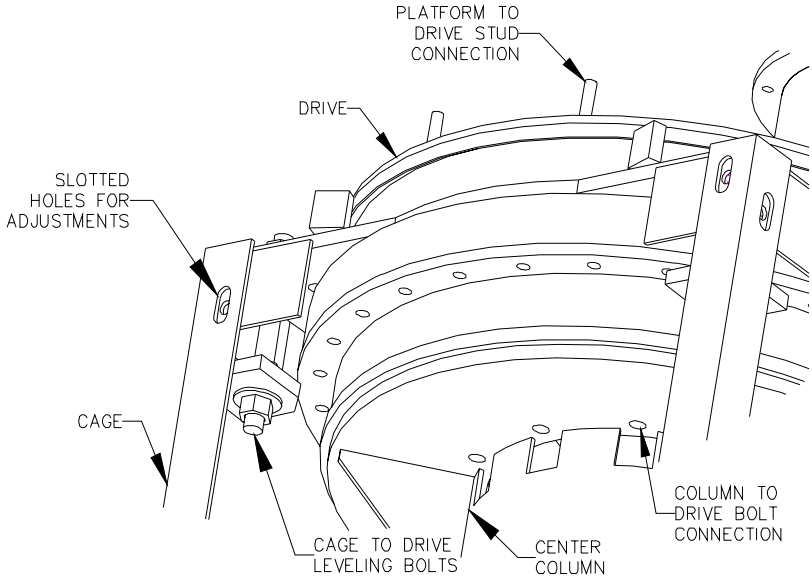

Figure 2.CG.4.

Feedwell and Supports

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Bolt the feedwell support beams to the center cage. Be sure the installed configuration matches that shown on the erection drawings. The supports may be located either above the feedwell (Figure 2.FW.1) or below the feedwell (Figure 2.FW.2).
2. Assemble the feedwell sections on temporary blocking on the floor of the tank around the center column with the scum port openings located at the top of the feedwell. See Figure 2.FW.1. Refer to the general arrangement drawing for the number of feedwell sections provided.
3. Bolt all of the feedwell sections together, if possible. Bolt on the scum port baffles, if provided.
4. Raise the entire assembled feedwell and bolt to support beams. If all the feedwell sections could not be bolted together, bolt the assembled sections to the supports. Brace individual sections until all sections of the feedwell have been installed and all connections are tightened.
5. Support the feedwell at several locations with the use of spreader bars, so that the feedwell is not distorted and support beams are not unevenly loaded during erection.
6. Adjust feedwell for level and concentricity about center column and cage. Tighten all connecting bolts. Check elevation of feedwell with respect to water level to ensure proper equipment configuration. The top of the feedwell will be 6 inches above the water level unless otherwise specified.

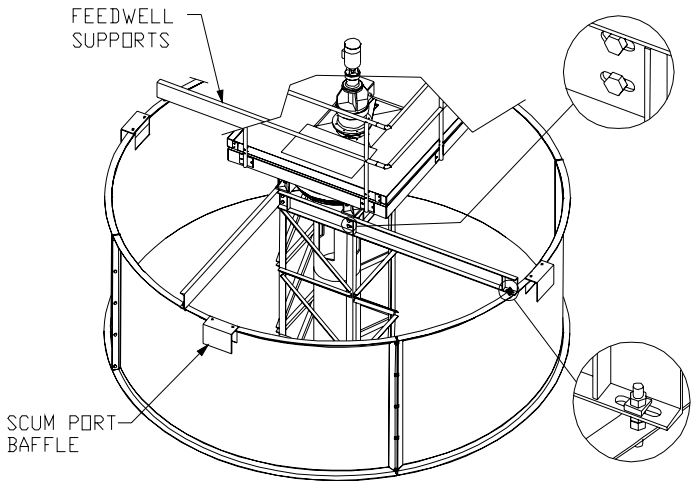

Figure 2.FW.1.

Note: The temporary blocking below the feedwell provides clearance for the lifting straps to be inserted underneath the feedwell section. Do not use the scum port openings to lift the feedwell.

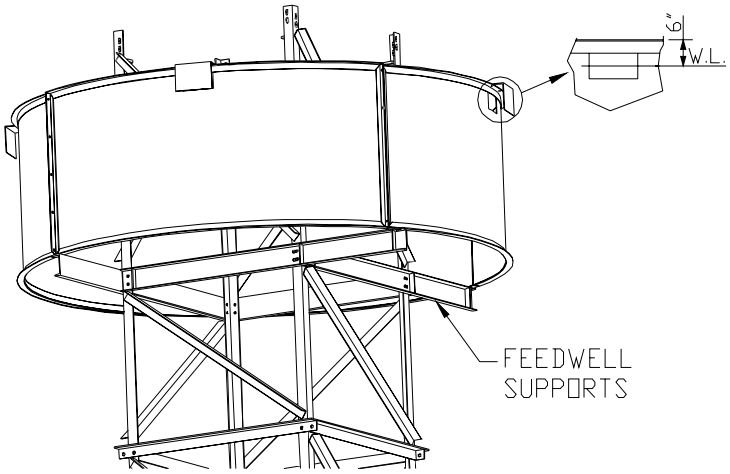

Figure 2.FW.2.

Rake Arms with Blades

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Place rake arms in line with their position of attachment to the center cage. Use blocks or jacks to support the arms.
2. Bolt the lower rake arm connection loosely to the bottom cage connection using extreme care not to disturb the center cage or drive unit.

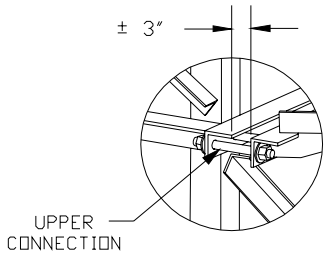

Figure 2.RA.1.

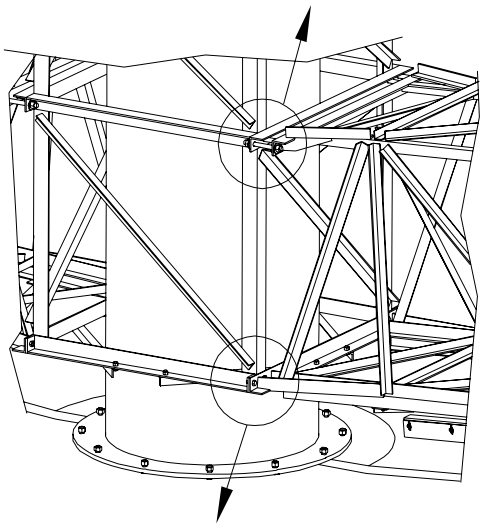

Figure 2.RA.2.

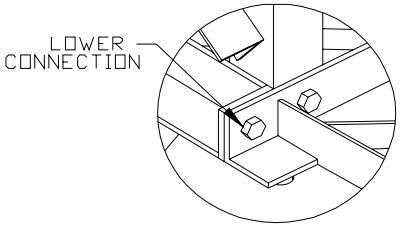

Figure 2.RA.3.

3. Bolt the upper rake arm connection to the center cage and adjust to leave approximately a 3 inch clearance between the toe of the angle on the cage and heel of the angle on the rake arm. The rake arms are not level or parallel to the tank floor. Opposite rake arm should be attached simultaneously to avoid distortion of the center cage.

4. Install cage braces on the bottom of the cage and rake arms as shown on the assembly drawings.

5. Install the rake blade supports, spiral rake blades and outrake blades. See Figure 2.RA.4.

Caution: Do not use the adjustment rods in the upper rake arm connection to lift the rake arms into position.

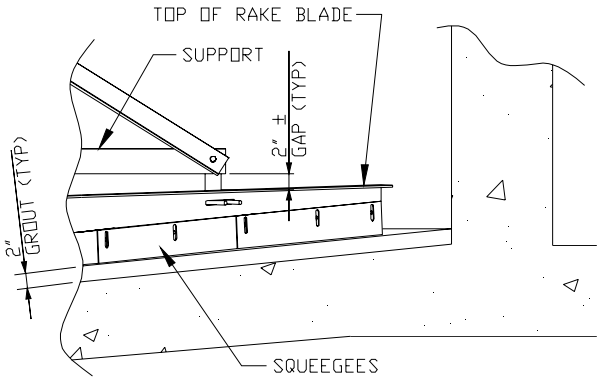

Figure 2.RA.4.

6. Adjust both rake arms to have equal clearance with the tank bottom to avoid uneven loads.

7. Leave 3 ½ inches of clearance between the bottom of the blade and the top of the rough concrete tank bottom or 1 ½ inches from the finished tank bottom if no grout will be used.

Note: Rake arms can be adjusted by means of a reference mark on the tank floor or by a pile of sand leveled by the arms. Use a jack under the arms to assist in this adjustment.

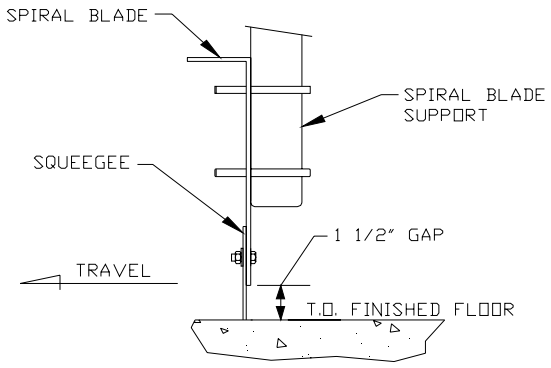

Figure 2.RA.5.

8. Re-check step 6 after the final check for level is complete and adjust as needed.

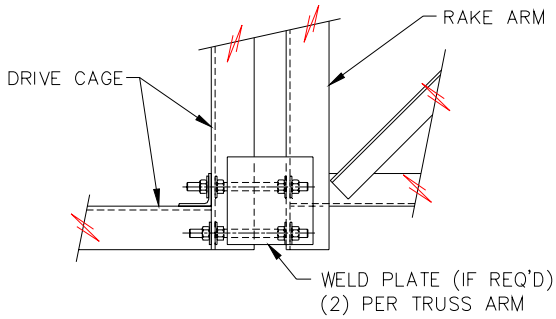

Figure 2.RA.6.

Squeegees

The contractor shall grout or finish the tank bottom after the rake arms have been leveled and before squeegee installation. Grout is not by WesTech.

9. Install adjustable squeegees on the leading side of the rake blades after completion of final adjustments and touch up painting. Overlap the squeegees at the end of each section. Adjust squeegees to clear the highest spots of the finished tank floor in order to avoid any jerking in the scraping operation. (The squeegees can touch on the high spots.)

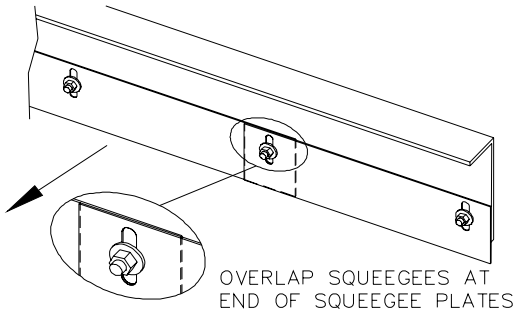

Figure 2.RA.7.

10. Rotate the mechanism again to check clearance around the tank floor. After final adjustments tighten the squeegee bolts to snug condition only.

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Corner Sweep

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Assemble/attach the pivot arms of the corner sweep mechanism to the pivot posts and corner sweep blades. Refer to erection drawings.
2. Temporarily locate and tighten set collars in their approximate locations.
3. Assemble/attach the pivot posts to the rake arm using pivot post plate and fasteners.
4. Assemble/attach the wall roller assembly to corner sweep blade using fasteners.
5. Assemble/attach the rake wheel assembly to corner sweep blade using fasteners.
6. Make sure that the wall roller contacts the wall properly. Shim the pivot post connections as required to ensure that the corner sweep arms are square and parallel.
7. Check that the mechanism swings freely. In not, contact WesTech immediately.
8. Assemble/attach the arm axle, lever arm and supports to the rake arm using fasteners. The arm axle apparatus must be perpendicular to the top members of the rake arms.
9. Verify final position of set collars and match drill 7/16 inch diameter hole through set collar and associated piece. Install and tighten fastener.
10. Attach the lever arm. Attach corner sweep counter weight.
11. Assemble the tie rods and accessories to the lever arm and pivot arm. Adjust the rod until there is no slack between the connections when the corner sweep mechanism is at its farthest reaching position.
12. Operate corner sweep mechanism making sure that the counterweight is sufficient but not excessive to return the mechanism to its outer position.
13. Attach the squeegees per the rake arm installation instructions using fasteners.

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Scum Box and Supports

Note: Weir and scum baffle must be installed before installation of scumbox.

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Bolt scum supports to scum box.
2. Attach scum box and supports to the tank wall on installed epoxy anchors. Check for proper elevation at the upper edge of the trough and verify the scum box is level.
3. With scum box in position field drill holes in scum baffle for connection bolts and opening for scum flushing valve (if applicable) using the scum box as a template for the mounting holes. See Figure 2.SB.1.

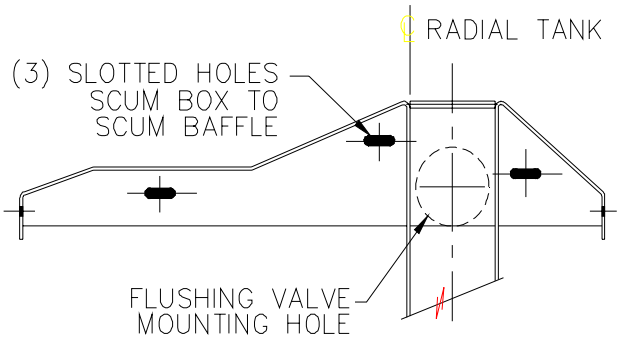

Figure 2.SB.1.

4. Connect the scum discharge pipe to the scum line (provided by others) using the flexible coupling provided by WesTech. See Figure 2.SB.2.

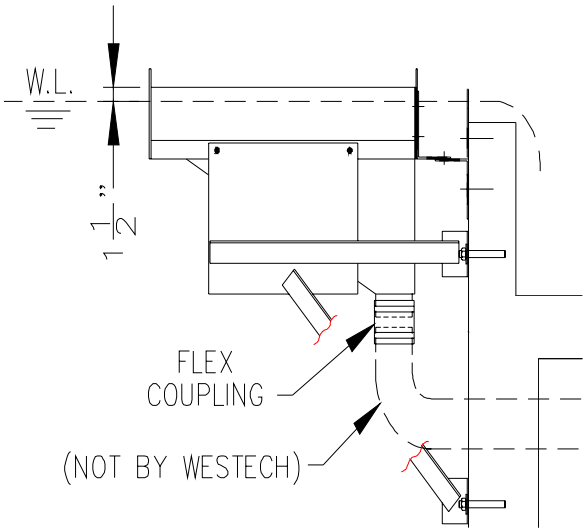

Figure 2.SB.2.

5. Tighten all connections after all adjustments are made and the scum box is level and at the correct elevation. Vertical adjustments can be made at the scum box supports at the wall. See Figure 2.SB.3.

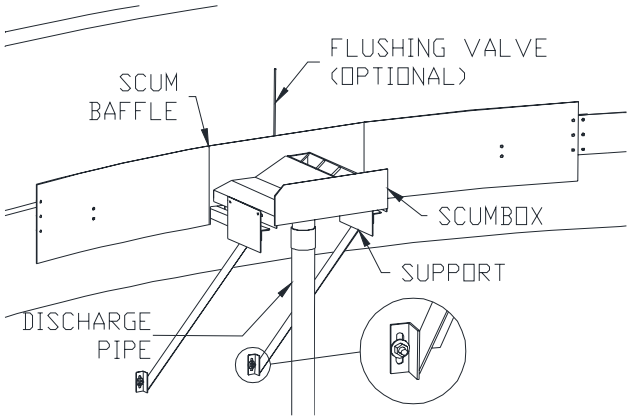

Figure 2.SB.3.

6. Recheck the final elevation of the scum box as part of the final adjustment of the entire mechanism. The final elevation of the scum box must be set so that the bottom wiper on the hinged skimmer is in uniform contact or parallel with the leading edge of the crest of the trough. The top of the scum ramp will be 1 ½ inches above the water level. See Figure 2.SB.2.

Scum Flushing Valve

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Install the scum flushing valve to the scum box. This may require cutting an approximately 6 ½ inch diameter hole in the baffle (See Figure 2.SFV.1). Apply caulking to prevent leakage at baffle (See Figure 2.SFV.1).

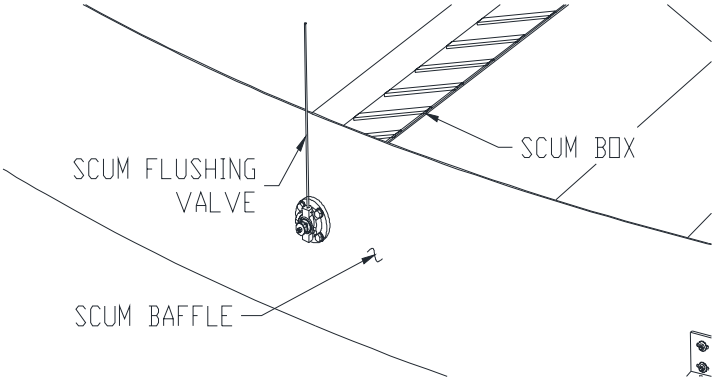

Figure 2.SFV.1.

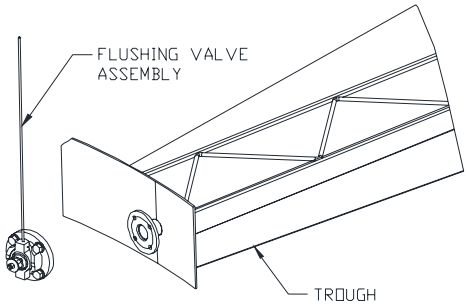

Figure 2.SFV.2.

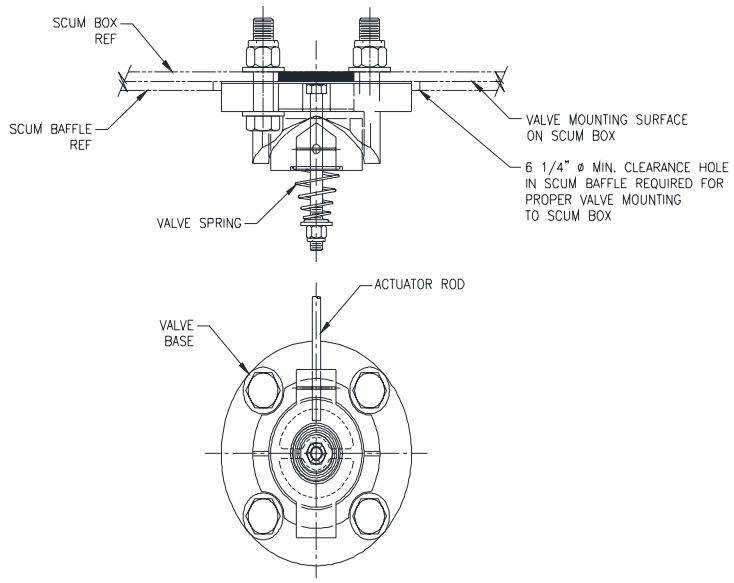

Figure 2.SFV.3.

2. Place a 2” pipe flange gasket between scum flushing valve and scum box.
3. Use a cross pattern and tighten mounting bolts evenly.

Skimming Mechanism and Supports

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Install skimmer blade and vertical supports as shown on the general assembly drawings. Make sure to support the skimmer arm while installing the vertical skimmer supports on the leading side of the truss arm.

2. One Skimmer Arm: Install a counter weight on the opposite truss support arm if only one skimmer is supplied.

   Two Skimmer Arms: Skimmer arms shall be attached simultaneously to avoid unequal loading of the feedwell which may cause distortion.

3. Bolt the skimmer blade to the feedwell rim angle as shown in Figure 2.SMS.1 and Figure 2.SMS.3 with the two brackets supplied. The feedwell rim angle is sandwiched between the two brackets. The top of the skimmer blade is 3 inches above the water level.

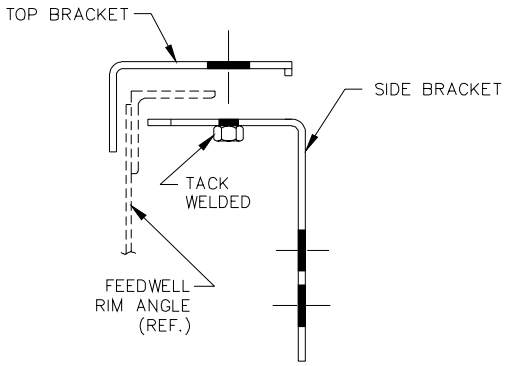

Figure 2.SMS.1.

4. Assemble hinged skimmer, hinged skimmer support, extension spring, set collars, neoprene wiper blades and all other fittings for the skimmer wiper assembly. See scum skimmer general arrangement drawing.

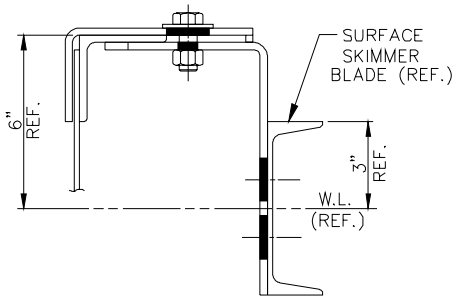

Figure 2.SMS.2.

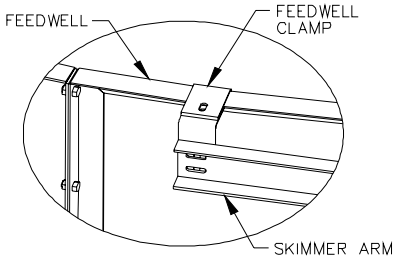

Figure 2.SMS.3.

5. Remove all blocking and supports from under the skimmer arm. Check the skimmer blade for level before proceeding.

6. Adjust hinged scum wiper assembly and spring tension as required to make sure that the contact between the scum baffle and skimmer wiper is maintained at all times. Aluminum 'S' arms should be perpendicular to scum box as shown on general arrangement drawings.

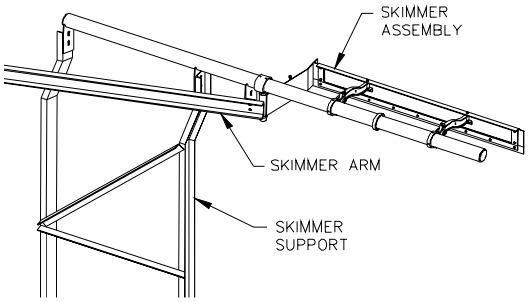

Figure 2.SMS.4.

7. After final leveling of the entire mechanism, rotate the mechanism and check that the skimmer wipers are in contact with the scum baffle all around the perimeter of the tank and levels skimmer with the scum beach ramp.

8. Install scum flushing actuator (if supplied) on the end of the skimmer pipe support if a scum flushing valve is provided for the scum box. The flushing valve actuator must extend out over the scum baffle to make contact with the actuator handle.

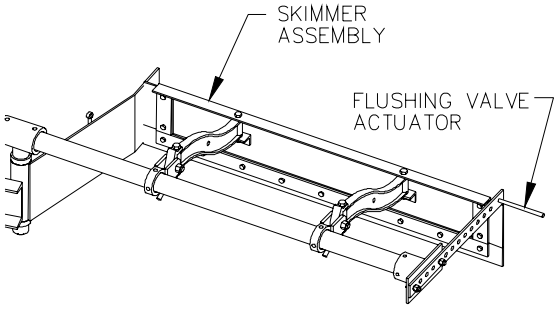

Figure 2.SMS.5.

Walkway and Flooring

All sketches are for illustration only. Refer to the general arrangement and general erection drawings for specific directions.

1. Place one (1) hex nut, one (1) washer, Ultra High Molecular Weight Polyethylene bearing and stainless steel slide plates on the epoxy anchor in the location shown on the erection drawings on the tank wall. Install the second hex nut and washer after the walkway has been set in place.

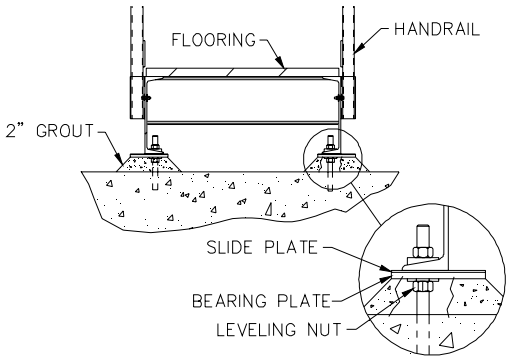

Figure 2.WW.1. Channel Walkway.

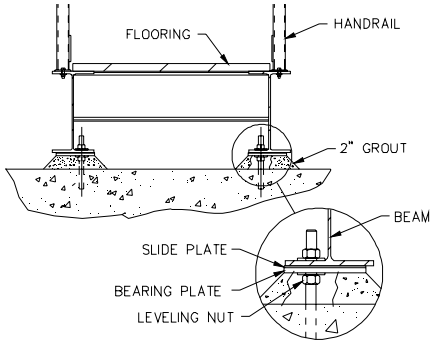

Figure 2.WW.2. Wide Flange Walkway

2. Contractor is required to block out a 2 inch gap between the top of the tank wall and the bottom of the bearing plate to allow for leveling of the walkway. The bottom hex nut below the bearing plate will serve as a leveling nut. Refer to the general arrangement drawings for the elevation of the walking surface.

Walkway

3. Bolt walkway and center drive platform together on level ground outside of the tank if walkway assembly is provided in multiple sections. Walkways will be shipped in the longest

length possible for shipping. Refer to the erection drawings for specific details.

4. Verify walkway camber has been maintained during shipping. Notify WesTech immediately of any deviations or damages.
5. Install the walkway extension piece (if used) over the slide plate, if required for vertical clearance. Install the second washer and nut before installing the walkway.
6. Install walkway as shown on the drawings. Additional care must be taken when lifting the walkway in place to prevent twisting or bending of members.
7. Check walkway for level after installation and adjust leveling nuts as required. See Figure 2.WW.1.

Note: Contractor has the option to install the flooring on the walkway and the handrail for the center platform before lifting the walkway and center platform into place. The flooring for the center platform cannot be installed until after the center platform has been lifted into place over the drive unit.

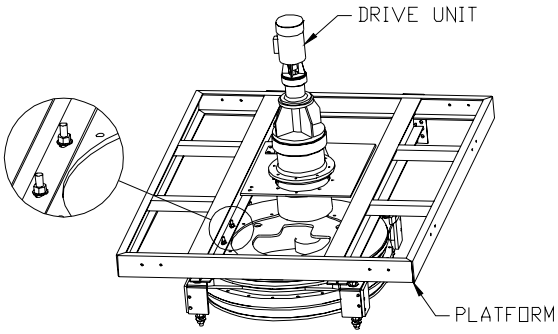

Figure 2.WW.3.

8. Re-check the drive unit for level before tightening fasteners at the drive unit. Hex nuts at wall anchors should be tightened to snug condition only to allow for expansion of walkway.

Flooring

9. Install flooring on the walkway and center drive platform as shown on the erection drawings. Use the flooring clips provided and follow the enclosed manufacturer's assembly drawing.

Handrail

10. Bolt handrail and toe plate to the center platform as shown on the enclosed manufacturer's assembly drawing.

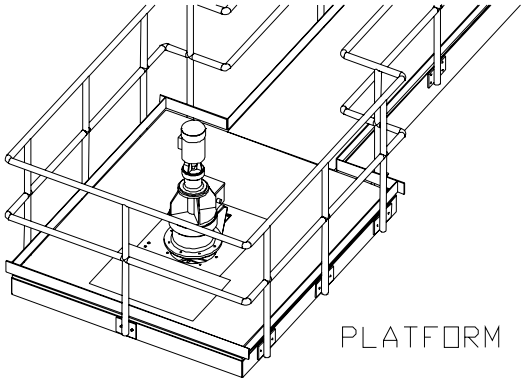

Figure 2.WW.4.

11. Install the WesTech nameplate to the walkway as shown on the erection drawing.

Grout

12. Grout between the bearing plates and tank wall. See Figure 2.WW.1. After the final level for the walkway and drive unit has been achieved. Grout is not by WesTech.

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Final Check for Level

The objective in the final check for level is to verify that the drive unit is level. This will ensure proper operation and will extend drive-bearing life. This will be done by checking the level at the end of one arm, at various points around the tank. The entire mechanism should be assembled at this point, especially parts that attach to the cage or the arms.

1. The tank was benchmarked previously during the tank inspection. These four-level marks (90 degrees apart) will now be used to check the level of the drive.

2. Only one arm is used to check if the drive is level. Rotate the drive and stop the arm at one of the level points marked around the tank. Using a carpenter's level as an extension from that arm to the tank wall, make a second mark on the wall. Repeat procedure rotating the same arm to each of the four marks on the tank.

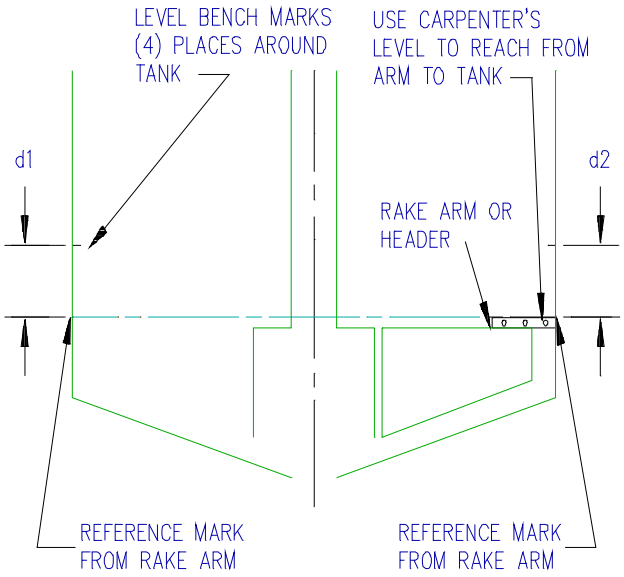

Figure 2.3: Benchmark Drawing

These are shown as the "Reference Marks" in the illustration.

3. If power is not available, remove the fan cover and rotate the drive by turning the fan. Do not push rake arms or otherwise move arms during the leveling.

4. Referring to the illustration, compare the difference in dimensions between the level marks and the rake arm reference marks at diametrically opposite sides of the tank.

5. The difference between the two observed dimensions (d1 minus d2) must not exceed the tolerance shown on the following chart. If the given tolerance is exceeded, adjustments to the drive level should be made.

Tank Diameter	Tolerance (d1 minus d2)
> 0 foot & ≤ 50 foot Diameter	1/4 inch
> 50 foot & ≤ 75 foot Diameter	3/8 inch
> 75 foot & ≤ 100 foot Diameter	1/2 inch
> 100 foot & ≤ 125 foot Diameter	5/8 inch
> 125 foot & ≤ 150 foot Diameter	3/4 inch
> 150 foot & ≤ 175 foot Diameter	7/8 inch
> 175 foot & ≤ 200 foot Diameter	1 inch
> 200 foot & ≤ 225 foot Diameter	1 1/8 inches
> 225 foot & ≤ 250 foot Diameter	1 1/4 inches
> 250 foot & ≤ 275 foot Diameter	1 3/8 inches
> 275 foot & ≤ 300 foot Diameter	1 1/2 inches
> 300 foot & ≤ 350 foot Diameter	1 5/8 inches
> 350 foot & ≤ 400 foot Diameter	1 3/4 inches

Figure 2.4: Drive Leveling Tolerances

6. If shimming is necessary, use leveling bolts on the drive unit. This procedure checks and adjusts the internal drive bearing level, which is not possible until this stage of assembly work. Shim until level tolerances are achieved.
7. In making a final adjustment, care should be taken to tighten the drive mounting bolts equally. Uneven tightening may cause deformation of the bearing races, causing shortened bearing life.
8. Recheck for level after the drive unit has been shimmed, leveling bolts loosened, and drive mounting bolts tightened.
9. The maximum bearing life of the drive unit main bearing is dependent on proper leveling. Perfect final leveling is not practical; however, it should be as accurate as possible. As

the diameter of the mechanism increases, it becomes increasingly difficult to obtain an accurate adjustment.

10. Once leveling and grouting have been completed remove the sandbags and block arms up if necessary.

Final Arm Adjustment

Now that the drive is level to the desired tolerance, re-adjust both arms to sweep the tank identically.

Adjust one arm to sweep so that the center of the blade clears the rough concrete tank bottom by 3-1/2 inches or the finished floor by 1-1/2 inches if no grout will be used. Make this adjustment by jacking the arm and tightening (or loosening) the adjustment studs at the cage. Rotate the opposite arm to the same location where the first arm was adjusted. Adjust the second arm to be the same distance from the tank bottom as the first.

A good way to do this is to place a pile of sand in front of one arm and rake it level with the mechanism. Then, rotate the opposite arm to this same position and adjust it to the raked sand pile.

Note: Welding should only be done after the machine is leveled, the tank grouted, and the squeegees installed and adjusted.

If the cage and rake arms are galvanized, permanently secure the arms by properly shimming and tightening the rake arm to cage connections.

If the cage and rake arms are to be painted, permanently secure the arms by field welding all top connections with weld plate provided.

See the welding figure on the erection drawings in the enclosures section of this operation and maintenance manual.

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Torque Test Procedures

The equipment will be tested to ensure structural and mechanical conformance with the torque requirements as outlined in the equipment specifications. The field test will also include verification of torque box settings such as the warning device and the drive cutout circuitry.

Before testing, the WesTech drive should be run for a period of 3 to 5 hours (or 3 to 5 full revolutions).

Torque will be applied to the mechanism by securing the truss arm with cables anchored to the tank floor (not by WesTech) while manually rotating the drive fan motor shaft or a ratchet puller in the cable assembly. The load through the cable connection will be monitored with a hydraulic load cell and gauge (by WesTech).

The cables should be anchored and attached to the rake arm at a distance from the centerline of the tank, as indicated on the Torque Test Diagram, whereby calculations can be made to determine the torque values.

The torque, indicated as a percentage by the pointer on the drive unit torque box, should be within plus or minus 10 percent of the calculated values from the load cell readings.

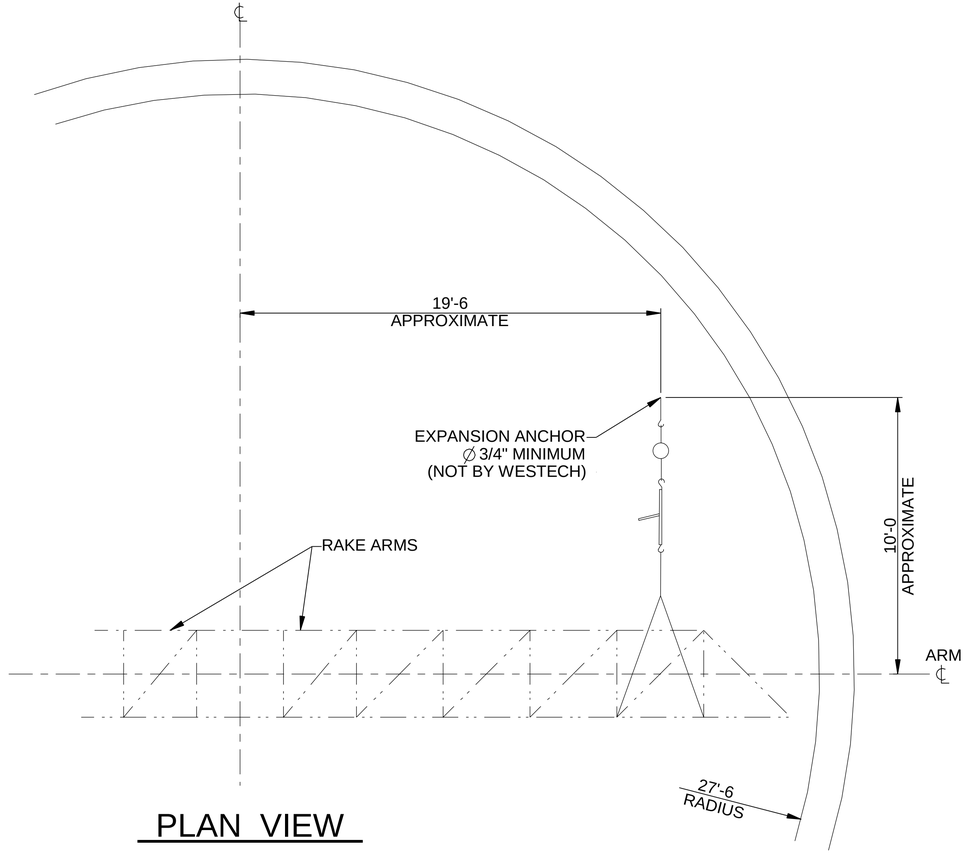
Test Warnings

Review the Torque Test Diagram for the additional test procedures.

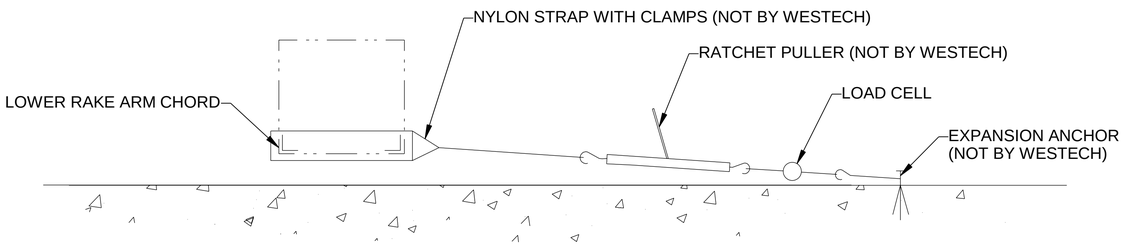
For the protection of personnel during the torque test, the following precautions must be taken:

1. Personnel entering the area of this equipment must be equipped with adequate safety equipment such as safety glasses, safety shoes, and a hard hat.
2. Check to ensure that the cable slings and other components to be used in the test are in good condition (not by WesTech).
3. Make sure that the anchors are properly installed and adequately sized for the loads indicated on the Torque Test Diagram (not by WesTech).
4. Limit the personnel inside the tank to that necessary to perform the test.
5. Keep a safe distance from the rake arms while the test is in progress. Do not stand in front of the leading side of the arms while they are loaded during the test.

6. Do not exceed the maximum load reading specified on the Torque Test Diagram.
7. All personnel in the area of this equipment during the torque test must be educated on these precautions before starting the test.



PLAN VIEW



ELEVATION

NOTES:

1. RAKE ARM MUST BE SECURED AS SHOWN AT TWO OR MORE PANEL POINTS WITH LOAD MEASURING ASSEMBLY.
2. LOAD IS APPLIED BY THE RATCHET PULLER WHILE THE MOTOR OUTPUT SHAFT IS SECURED AGAINST ROTATION.
3. DURING THE TORQUE TEST, THE LOAD INDICATOR AT THE DRIVE WILL INDICATE TORQUE VALUES.
4. ◇4 DO NOT EXCEED THE MAXIMUM LOAD INDICATED ABOVE.
5. ◇5 MINIMIZE LOAD APPLIED TO STRAPS AND LOAD CELL BY USING A PULLEY TO DIVIDE THE LOAD IN HALF WHEN NECESSARY, NEVER EXCEED THE CAPACITY OF THE LOAD CELL OR ANY PART OF THE RIGGING (STRAPS, RATCHET PULLER, ANCHOR, ETC.)
6. PRIOR TO TESTING, WESTECH DRIVE SHOULD RUN FOR A PERIOD OF 3-5 HOURS, OR 3-5 REVOLUTIONS.

TORQUE TEST RECORD

COMPLETED BY: | DATE :

TEST EQUIPMENT: ENERPAC TS5 TM5 | ANALOG 2,000 LB | DIGITAL 10,000 LB
CIRCLE ONE | S/N | ◇5 CIRCLE ONE

CALIBRATION EXPIRES:

REFERENCE: TORQUE (FT-LBS) = LOAD CELL READING (LBS) x DISTANCE (FT)

TORQUE TEST LOADS AT DESIGN ANCHOR DISTANCE				REVISED FOR	TEST RESULTS	
TORQUE BOX DIAL	DESIGN DISTANCE (FT)	LOAD CELL READING (LBS)	TORQUE (FT-LBS)	ACTUAL DISTANCE (FT)	LOAD CELL READING (LBS)	TORQUE (FT-LBS)
UNIT #	19.50					
100%		754	14700			
120%		905	17640			
150%		1131	22050			
◇4						
UNIT #						
100%		754	14700			
120%		905	17640			
150%		1131	22050			
◇4						

TEST VALUES WITHIN ±10% ARE ACCEPTABLE UNLESS OTHERWISE SPECIFIED

COMMENTS / ATTENDEES: _____

TORQUE TEST WITNESSED BY OWNERS AGENT: _____ DATE: _____

PRINTED NAME: _____ TITLE: _____

☐ PASS ☐ FAIL

SIGNATURE: _____

PREPARED FOR: TAUNTON WWTP

ENGINEER: BETA ENGINEERS

CONTRACTOR: TOTAL MECHANICAL SERVICE CORP.
PLYMOUTH, MA

P.O./CONTRACT NUMBER: 2021-26

WESTECH®

TITLE: **TORQUE TEST RECORD**
∅ 55'-0 PRIMARY CLARIFIER
COPC2

DESIGNER	CHECKER	APPROVER	DATE
TH43			

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001894483**	1 OF 1	-

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE

REFERENCE DOCUMENTS

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Surface Treatment

1. All ferrous metal items are furnished with surface preparation and painting as shown on the coating submittal datasheet.
2. The drive unit has received a shop-applied TNEMEC 1074/BB32 finish coat.
3. After completion of the final leveling, the contractor should complete the final painting of all steel members per the engineer's specifications.
4. If the final surface coating is by WesTech, field touch-up will still be required. Touch-up is not by WesTech.

Warning: Do not paint the drive unit. The torque device has moving parts which if painted will cause overload and result in damage to the mechanism.

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Piping and Electrical Installation

1. Unless specifically mentioned in this manual, all piping is by others.
2. All wiring external to motors and controls is by others.
3. Complete external wiring per the wiring diagram.
4. Ensure electrical conduit is properly routed to allow condensate to drain away from electrical switch(es) or device(s).

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Section Three: Startup and Operation

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Field Service Request

WesTech typically requires 3 to 4 weeks' notice to schedule field personnel for the torque test, installation certification, startup, and training. Advise WesTech of acceptable dates for field service as soon as possible.

Verify all items are ready for inspection (all startup functions and tests can be performed with temporary power except for confirmation of proper wiring). Any requested changes in the scheduled flight for a field service trip could result in additional charges.

Our field service personnel are to perform the following:

1. Verification of drive unit rotation and lubrication. These procedures are described in the Installation and Lubrication sections of the Operation and Maintenance Manual.
2. Verification of "Final Check for Level" of the drive unit. This procedure is described in the Installation Instructions and the Installation section of the Operation and Maintenance Manual. A dry run must be done to verify that the clarifier unit has been leveled per the tolerances in the Operation and Maintenance Manual before our arrival on site.
3. Check general clearances and alignments. This will include blade clearances, column, cage, and feedwell concentricity.
4. Observation of the torque test as described in the Installation section of the Operation and Maintenance Manual. Wedge anchor bolts, come-along, cable/chain, and choker will be required. WesTech is to supply the load cell (see Torque Test Diagram in the Operation and Maintenance Manual).
5. Confirm proper wiring. This will include the torque box and any controls or switches.
6. Conduct classroom and field instruction for the facility personnel and the Engineer. Instruction will include the operation and maintenance of the equipment. This will take approximately three to four hours. Please schedule with WesTech and advise all necessary facility personnel and the Engineer to attend this instruction.

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Video/Audio Recording Training Agreement

This agreement is made this _____ day of _____, 20__, by and between WesTech Engineering, LLC (hereinafter referred to as "WesTech"), and _____ (hereinafter referred to as "Owner-Operator").

In consideration for allowing Owner/operator to record WesTech personnel performing maintenance or service, or demonstrating the operation of WesTech supplied equipment, the Owner-Operator and WesTech agree as follows:

1. The video or audio recording is used to aid the Owner-Operator and is not intended to be used as a substitute for safe operating procedure in accord with industry standard(s), training, safety instruction or the operation and maintenance manuals. WesTech assumes no liability for the completeness or accuracy of the recording alone.

2. Any claim for injury or property damage which arises out of or in connection with the use of the recording by the Owner-Operator, its employees, or Agents is the sole responsibility of the Owner-Operator.

3. This video or audio recording is for the Owner-Operator's own use, and the Owner agrees not to sell or transfer the recording to any other party.

4. Upon request, the Owner-Operator must provide WesTech with a copy of the recording.

5. Owner-Operator must affix the following statement to ALL recorded training and read the following statement at each presentation:

   "THIS VIDEOTAPE IS USED TO AID THE OWNER-OPERATOR AND IS NOT INTENDED TO BE USED AS A SUBSTITUTE FOR SAFE OPERATING PROCEDURE IN ACCORD WITH INDUSTRY STANDARDS, TRAINING, SAFETY-INSTRUCTION OR THE OPERATION AND MAINTENANCE MANUALS. WESTECH ASSUMES NO LIABILITY FOR THE COMPLETENESS OR ACCURACY OF THE VIDEOTAPE ALONE."

6. By signing this, the signer is verifying they understand the above agreement.

Not withstanding the reasonableness of the agreements herein, in the event that a court of competent jurisdiction determines that any part of the agreement be held invalid or unenforceable, the remaining parts shall be valid and enforceable as though the invalid and unenforceable parts had not been included in the agreement.

Accepted by:

_____
Signature

_____
Position

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Safety Instructions

1. Only operators who have been trained in safety procedures should be allowed to work on or around this equipment. Limit access to authorized personnel.
2. To prevent personal injury, the mechanism and accessories must be stopped before performing any maintenance or adjustments. Lockout power before performing maintenance.
3. Exercise caution around moving parts. Keep hands, clothing, etc., away from moving parts.
4. Place "Warning" signs in the area of moving parts.
5. Never permit people who have been drinking alcohol, using drugs, or are otherwise impaired to maintain or repair the unit.
6. Inspect equipment frequently for loose bolts or malfunctioning equipment. Fix problems immediately.
7. Operator safety must be stressed. Do not perform maintenance or repairs on moving parts.

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Startup and Operating Procedures

It is suggested that the following instructions are read and understood before operating this unit. Proper maintenance and operating procedure will maximize the unit's efficiency and minimize operational problems.

Principle

Influent and Effluent

Various methods of introducing the feed are used. Generally, the feed is diffused through slots or ports located below the surface at the tank center, into a circular feedwell or baffle, or flows through a pipe running from the side of the tank to a circular feedwell from which it flows out radially towards the peripheral overflow weir. This machine utilizes a center feed pipe discharging into the feedwell.

The effluent is usually removed at the tank periphery. A sufficient detention time is allowed to permit the solids in the feed to settle during the time of flow from the influent to the point of effluent collection. The effluent collection scheme should be adjusted to continuously remove a uniform amount of effluent per unit length of the periphery and to eliminate irregular flow at any one place. Any irregularity will cause a convergence of flow at certain points, and the velocity at these points may be high enough to carry fine solids with the effluent.

Raking Mechanism

The raking mechanism at the tank bottom collects the solids as they settle. The rake blades push solids to the sludge trough for removal. The speed of the raking mechanism has been set for the particular machine and should not be changed without consulting WesTech Engineering, LLC.

Pre Startup Instructions

1. Determine the following:
    a. Clarifier application.
    b. Underflow solids concentration.
    c. Solids concentration of the feed.
    d. Chemical properties of the feed (i.e., alkaline, acid, etc.)

e. Expected overflow clarity.

f. If flocculant will be used, the type and expected dosage.

2. Be familiar with the piping, including:

   a. Method of feeding.

   b. Method of discharging overflow from tank.

   c. Method of discharging the underflow.

3. Be sure the mechanism is lubricated following the lubrication instructions.

4. Recheck mechanism assembly and performance during several revolutions of the arms with the tank dry. Minor adjustments or corrections should be made. If major corrections are necessary, contact WesTech Engineering, LLC, Salt Lake City, Utah, or our authorized representative.

5. Be sure the overflow pumps and overflow pipes, launders, pumps, or other facilities are in good working order.

Startup

A complete check of the entire mechanism should first be performed. It is suggested that arrangements be made for a WesTech trained service representative to perform a final inspection before the tank is filled and the mechanism put into service.

The mechanism is now ready for startup. Inspect the tank and mechanism path for any obstructions. Start the unit while the tank is still empty and watch carefully for correct rotation and possible interferences. Check the torque box alarm and shut down settings for correct operation (settings are given on the drive drawings) by pushing the hand plunger on the torque box. At the given percentage settings, first, an alarm situation should occur (horn, and/or lights, etc.), then mechanism shutdown. Upon shutdown, the mechanism should not re-start until the operator has physically re-pushed the start button. If the unit does not operate at the given settings, check the field wiring for correct installation. If it is still incorrect, call WesTech.

When the torque box settings are correct, allow the mechanism to continue to run for several revolutions. This will allow operators the advantage of observing the mechanism and all of the components in operation. As soon as it is verified that the unit has been installed correctly, it is ready for the introduction of influent. Remember, proper startup and operation depends on one major rule: Withdraw solids at the same rate that they are fed into the tank. Clarifiers are

not designed as storage units. Otherwise, accumulated solids will overflow the mechanism, resulting in equipment shutdown.

There are two common procedures to startup the clarifier:

1. Fill the clarifier with clarified effluent. Then start the mechanism and associated equipment and begin introducing normal influent. As the solids start to settle, the underflow concentration will begin to increase. At this time the sludge blanket should start to develop, then rise. For reasonable clarifier performance, the blanket should be at least as deep as the rake arms at the tank center. A sludge-judge or something similar can help to locate the blanket level. Many plants will operate with the sludge blanket at an average of 3 to 4 feet in depth. This, of course, will fluctuate throughout the day as the flows increase and decrease.

   If the blanket does not develop within a few hours, the underflow withdrawal rate is probably too high. Slow down the sludge withdrawal until the blanket starts to appear.

   If the sludge blanket appears, but the depth continues to increase, then the sludge withdrawal rate must also be increased until a steady-state is achieved. At this steady state, the underflow solids mass should be equivalent to the incoming solids mass. If the sludge blanket continues to rise even at maximum sludge withdrawal rates, then the influent feed rate must be decreased. Generally, clarifiers are conservatively designed, making this case unlikely.

   Should it be impossible to fill the tank with clear water or if the dilute underflow will upset other portions of the process, then the next procedure is possible.

2. Have the mechanism turning while filling the clarifier with regular influent. As soon as the sludge withdrawal system can provide withdrawal, check the rate calculated from expected underflow concentrations and influent solids loading. While the clarifier is running, start monitoring the sludge blanket depth and the underflow solids concentration. Let the blanket depth and the underflow solids concentration build to the range as described in Procedure 1. As soon as possible, bring the process into balance by having the underflow solids withdrawal rate (dry solids pounds per hour) equal to the influent solids loading rate (dry solids pounds per hour).

   It may take time for good results to show. Allow the system to stabilize between adjustments. Note that sampling should be done as often as necessary to maintain the quality

requirements and to determine necessary adjustments. Log all readings and observations.

Dewatering/Shutdown

Approximately once a year, the clarifier should be taken out of service and dewatered. This allows plant personnel to inspect all parts of the mechanism, perform adjustments and maintenance to submerged components, touch-up paint, etc. If you anticipate that the clarifier will be out of service for an extended period, please refer to long-term storage and shutdown procedures elsewhere in this manual.

There are two common clarifier-dewatering procedures:

1. Shut off feed to the clarifier. Use the sludge withdrawal system and/or floor drain(s) (if present) to completely drain the clarifier tank. The mechanism should be allowed to rotate while the tank is being drained. This will ensure that very little sludge remains behind on the clarifier floor when the liquid is gone, and less floor cleanup will be required.

   As the liquid level drops in the tank, carefully watch the mechanism torque indicator. The clarifier mechanism is designed to be balanced when submerged. In some clarifiers, the mechanism can tip slightly as skimmers, rake arms, etc. become non-submerged. This may cause the rake blades on one arm to start dragging slightly on the floor. If the torque indicator shows a sudden jump in torque as the tank is draining, it is probably being caused by an unbalanced condition. In this case, the mechanism should be shut down.

   When the tank is completely drained, a high-pressure hose may be used to wash any remaining sludge from the floor into the sludge pit/drain. The mechanism should also be sprayed clean to aid in inspection.

2. If the clarifier needs to be dewatered more quickly than the sludge withdrawal system and/or drain(s) can accommodate, temporary additional pumps may be used to speed up the tank draining. However, any pumps or hoses lowered into the tank will require that the mechanism be turned off.

   Again, the feed to the clarifier should first be shut off. If possible, use the sludge withdrawal system alone to begin dewatering the tank. This will allow the mechanism to remain in operation and continue to move settled sludge to the outlet. If possible, allow the mechanism and sludge withdrawal system to remove most of the sludge blanket

Caution: If a small amount of liquid is allowed to remain in the tank it may cover the sludge pit or other drains in the clarifier floor. Personnel working in the tank should be very careful to first locate and mark any obscured sludge pits or drains to avoid injury from accidentally falling or stepping in them.

from the tank before using additional pumps. When additional pumps and/or hoses are introduced into the tank, the mechanism must be shut off.

Observe the same cautions and methods as outlined in procedure 1 to complete the tank dewatering.

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Cold Weather Operation

During cold and wet weather conditions, extra precaution needs to be taken to ensure that damage does not occur to the equipment.

These precautions should be followed when extreme weather (i.e. freezing rain, temperature below 32 degrees Fahrenheit/0 degrees Celsius) is expected.

Caution: Do not operate the equipment if ice forms and builds up on the inside of the tank wall. The alarm and motor cutout settings are not set to protect the skimming equipment, nor the mechanism in the event of continuously high torque conditions.

Torque Control

The torque control weekly maintenance schedule should be followed daily during extreme weather (See Torque Control Maintenance). This should help ensure that no mechanical items in the box have frozen. If freezing occurs inside the torque box, there is no overload protection for the equipment.

In addition, check daily for ice build-up on and around the drive/torque box unit and remove as necessary. Daily lubricate the plunger with WD-40.

A condensate heater in the torque box and/or covering the drive can help protect against possible damage resulting from freezing rain.

Skimmer Assembly

The skimmer assembly should be taken out of service during freezing conditions. This can be done by rotating the pivot yoke(s), allowing the blade(s) to clear the top of the scum box. The assembly may also be removed altogether.

When reinstalling, consult the Skimmer Assembly drawing. Be sure that the blade will not catch the front edge of the scum box ramp and is parallel with the scum box opening.

Several severe weather features can be included with your equipment. These include:

- Condensate heaters in the torque box and control panels.
- Slip clutch couplings in the drive train.
- Drive unit housing coverage.
- Local electric control panels with alarm lights, horns, relays, lights, and reset buttons.

These items may or may not have been included with your order. They can be purchased directly through WesTech if desired. When considering these items, it is important to recognize that non-

functioning torque protection causing damaged equipment can be a result of extreme weather, forcing unnecessary shutdowns. If extreme weather is expected, WesTech highly recommends the above procedures.

Storage and Shutdown Precautions

To shut down the clarifier, stop the flow to the unit and lockout power to drive. If the clarifier is to be inoperative for a prolonged period, operate clarifier until cleared of all material and open drain valve to drain unit of all liquid. This is particularly important when the material conveyed tends to harden or become more viscous, or sticky if allowed to stand for a while.

Check that all valves and drains are tightly closed and that the drive is operating normally.

Storing before Installation

It is preferable to store mechanical and electrical items indoors in a dry, well-ventilated enclosure with a temperature as constant as possible. The equipment should also be adequately supported to prevent distortion and undue stress. It should be at least six inches off the floor.

The following instructions also apply if there is to be a period between installation and startup or between startup and the equipment going on stream. These steps are required to protect against corrosion and assure operating conditions.

Whether stored indoors or outdoors, the following steps should be taken:

Short-term Storage or Shutdown

From 30 to 120 Days

Cover with a tarpaulin that allows adequate ventilation, drainage, and inspection access in an area protected against wind, direct sunlight, rain, and snow.

At least once a month, re-lubricate all items that are grease lubricated and grease exterior surfaces of all seals. Inspect all of the equipment for signs of corrosion and take corrective steps as required.

Caution: When the clarifier mechanism is taken out of service for short or long periods of time the mechanism should be adequately blocked or tied off such that the force from the wind does not rotate the mechanism backwards. Backwards rotation will damage electrical wiring and other mechanical parts.

Long-term Storage or Shutdown

Over 120 Days

In addition to those steps shown under "Short Term", the following steps should be taken whether storage is indoors or outdoors:

Periodic checks, frequency-dependent upon ambient conditions, must be made of painted surfaces for deterioration of paint. Wide variations in ambient temperatures are conducive to condensation with its resultant oxidation. Steps should be taken to protect the affected surfaces. Bitumastic coatings tend to become brittle and to chip. Increasing ventilation and reducing humidity are frequently required. Where equipment is well covered and protected, inspection doors, covers, etc. should be blocked open slightly to increase ventilation. Relatively small areas and shafts can be coated with a waterproof grease or rust inhibitor.

Note: All structural fasteners should be checked for proper torque prior to putting back into service.

Mechanism Periodic Maintenance

Monthly Maintenance

Skimmer Operation

Check that the skimmer is operating properly, watch each of the skimmer assemblies (if applicable) skim over the scum box. It should properly dump scum into the scum box and trip the scum-flushing valve (if applicable).

The skimmer should be level as it approaches the scum beach and remains level as it passes the trough opening. Very little scum should escape from the skimmer assembly as it moves up the beach and passes the trough.

Also, examine the neoprene wipers for excessive wear. If there appears to be excessive wear refer to spare parts information included in this manual. The baffle side wiper will wear the most quickly and should therefore be examined more closely.

Flushing Valve Operation

Ensure the flushing valve is opening and closing properly. It is possible to manually open by pushing on the actuator rod; the counterweights should close the valve smoothly and completely once released. If the valve appears to be leaking, the bolts that hold it to the scum box may be too loose and can be tightened.

Annual Maintenance

The clarifier mechanism should be drained and cleaned annually to ensure that any problems are inspected and corrected in a timely fashion

Fasteners

Check each structural fastener for proper torque. If any of the fasteners have loosened, ensure that any portion that has come out of level or plumb is re-leveled/plumbed and tighten the bolt to proper torque. This is particularly important on the cage-to-drive connections, rake-to-cage connections, skimmer support connections, and rake arm-to-rake blade connections.

Squeegees

Ensure the squeegees are properly adjusted relative to the floor, it may be necessary to rotate the clarifier for one or two revolutions to ensure that proper clearance to the floor is maintained at the full circumference.

Additionally, inspect squeegees for excessive wear or damage, and adjust or replace them as necessary.

Seals

Inspect any neoprene seals for excessive wear or damage and replace them as necessary.

Coatings

Examine any areas where the coating has been damaged and properly brush out rusted spots. Touch-up per the manufacturer's requirements.

WesTech Maintenance Log

Equipment Serial #			Unit #			
Month:			Year:			
Weekly Maintenance Tasks (As Applicable)						
Grease Main Bearing		Week 1	Week 2	Week 3	Week 4	Week 5
	Initials					
	Date (d/m)	/	/	/	/	/
Check/Drain Condensate		Week 1	Week 2	Week 3	Week 4	Week 5
	Initials					
	Date (d/m)	/	/	/	/	/
Check/Fill Main Gear Oil		Week 1	Week 2	Week 3	Week 4	Week 5
	Initials					
	Date (d/m)	/	/	/	/	/
Spray Lube Torque Box Plunger		Week 1	Week 2	Week 3	Week 4	Week 5
	Initials					
	Date (d/m)	/	/	/	/	/
Perform Manual Torque Switch Test		Week 1	Week 2	Week 3	Week 4	Week 5
	Initials					
	Date (d/m)	/	/	/	/	/
Always visually inspect equipment for wear when performing maintenance.						
Monthly Maintenance Tasks (As Applicable)						
Grease Cyclo Reducer		Month 1	Month 2	Month 3	Month 4	Month 5
	Initials					
	Date (d/m)	/	/	/	/	/
Grease Upper Bearing		Month 1	Month 2	Month 3	Month 4	Month 5
	Initials					
	Date (d/m)	/	/	/	/	/
Inspect Fasteners for Tightness		Month 1	Month 2	Month 3	Month 4	Month 5
	Initials					
	Date (d/m)	/	/	/	/	/
Yearly Maintenance Tasks (As Applicable)						
Drain & Replace Oil	Initials		Last Performed on:			
	Date (d/m)	/	Date (d/m/y)	/ /		
Inspect/Repair Paint	Initials		Last Performed on:			
	Date (d/m)	/	Date (d/m/y)	/ /		
Drain Tank & Inspect Submerged Components for Wear & Fastener Tightness	Initials		Last Performed on:			
	Date (d/m)	/	Date (d/m/y)	/ /		
Replace Worn Out Items as Needed						

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Emergency Procedures and Troubleshooting

Emergency conditions may be defined as those situations which would drastically interfere with the operation of the mechanism, and which would require immediate remedial measures. Emergency operating procedures for the equipment covered by this manual must necessarily be coordinated with the master plan for the whole treatment plant. It will depend on the degree of automation that has been provided, the availability of the bypass of alternative treatment systems, and the priority attached to maintaining flow.

External emergencies such as a power failure, flow surges exceeding design conditions, or failure of part of the treatment systems are conditions that should be treated in the master plan.

Internal emergencies within the unit will be indicated if the overload alarm sounds or the drive motor stops.

Emergency Procedures

1. Immediately bypass the feed and open the sludge discharge line to drain off any accumulation of sludge.
2. If possible, allow the mechanism to continue running as long as there is no build-up of indicated torque. This could result in an elimination of accumulated sludge.
3. If the overload is so heavy that the cutout switch continues to stop the mechanism, it will be necessary to drain the tank and sluice out the sludge.

Troubleshooting

The Overload Alarm Sounds or the Drive Motor Stops

1. This condition is probably due to an excessive accumulation of solids in the bottom of the tank resulting from the sludge being discharged at an average rate less than the rate of introduction of solids with the feed. An adjustment must be made in the rate of feed introduction. Immediately bypass the feed and open the underflow line to eliminate the accumulation of solids. Allow the mechanism to continue to operate, if possible. If the overload is so heavy that the cutout switch continues to stop the machine, it will be necessary to drain the tank and sluice out the solids.
2. Interference with rake arm operation may also be caused by a foreign object (i.e. rocks, tools, etc.) being dropped into the

tank. Stop the mechanism and see if the object can be removed. (This may have to be done using grappling hooks or "fishing the object out"). If not successful within a short time, it will be necessary to cut off the influent to prevent too great an accumulation of sludge. If the object cannot be removed with the tank filled, it will be necessary to drain the tank and remove it before operating the mechanism. Check the rake arms for any damage or deformation before resuming operations.

3. A rake arm may be dragging on the bottom of the tank. The arm being out of correct alignment or possibly a connection that has failed causes this. To remedy, the tank must be drained, and the arm adjusted or re-attached.
4. A skimmer arm (if supplied) may be dragging on the tank wall. The arm must be adjusted to allow unrestricted movement.

The Underflow (Solids Discharge) Line Becomes Plugged

1. This condition is a result of the underflow being allowed to become too thick. To clear the line, backflush with high-pressure water until the line is cleared.
2. This condition may also be caused by a foreign object getting into the line to cause the plugging. Use the same remedy given in item 1 above. In any event, the source of trouble must be located and corrected before starting the mechanism again.

Problem with the Speed Reducer

See the speed reducer operation and maintenance manual in the drive section.

The Drive Unit Begins to Operate Noisily

See the drive unit operation and maintenance manual in the drive section.

Particulate is Being Carried Out with the Effluent

This condition is due to misalignment of the weir. Re-adjust weirs so the water level is just above the V-notches. This will provide proper effluent flow without the removal of fine solids.

The Scum Box Becomes Plugged

This condition is a result of scum and debris building up in the scum box discharge line. To clear the line, backflush with high-pressure water. It is good practice to keep the cross bars free of scum buildup and debris to prevent this problem.

Do not attempt to continue running the mechanism when an overload condition is indicated; identify the trouble and resolve it.

Do not start up the mechanism with a load of sludge in the tank.

Do not tamper with the overload alarm switch adjustments in an attempt to keep the machine running under overload conditions. Such tampering will void the warranty.

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Section Four: Drive

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General

Introduction

Thoroughly read and familiarize yourself with the instructions in this manual before the drive unit is installed, adjusted, or operated. The drive unit, including the accessory equipment furnished but not built by WesTech, must be stored, installed, operated, and maintained according to these instructions to ensure long stable equipment life and complete warranty coverage.

The instructions in this manual are based on information available at the time of issuance of this manual. WesTech reserves the right to make subsequent changes to the manual without obligation to update existing copies.

Receiving and Inspection

The drive unit has been thoroughly checked and inspected before shipment. Nevertheless, before accepting shipment, check all the items against the packing list for shortages and inspect for evidence of physical damage. In either case, notify the carrier by making notes on the shipping papers and also immediately notify the WesTech project manager.

Inspect painted surfaces for damage. WesTech assumes no responsibility for field touch-up or damage, which occurs to painted surfaces in shipping. Purchasers are invited to inspect the paint on the drive unit in WesTech's shops for proper preparation and application prior to shipment. Field painting of fasteners and other touch-up to painted surfaces will be by the purchaser.

Keep a record of all claims and correspondence (photographs are recommended).

If the drive unit is not to be installed immediately, refer to Drive; General; Storage and Paint Durability.

Field Charges and Modifications

WesTech does not anticipate problems with the installation of the drive unit. However, due to the nature of fabricated steel, a certain amount of minor fit-up and adapting work may be required of the installer. Such work is a normal part of installation work, especially with replacement retrofit drives.

The American Institute of Steel Construction Manual, Fifteenth Edition, "Code of Standard Practice" will apply to the erection of this equipment. It reads as follows:

7.14. Corrections and Errors

The correction of minor misfits by moderate amounts of reaming, grinding, welding or cutting, and the drawing of elements into line with drift pins, shall be considered to be normal erection operations. Errors that cannot be corrected using the foregoing means, or that require major changes in member or *connection* configuration, shall be promptly reported to the *owner's designated representatives for design* and *construction* and the *fabricator* by the *erector*, to enable the responsible entity to either correct the error or approve the most efficient and economical method of correction to be used by others.

Commentary:

As used in this Section, the term "moderate" refers to the amount of reaming, grinding, welding or cutting that must be done on the project as a whole, not the amount that is required at an individual location. It is not intended to address limitations on the amount of material that is removed by reaming at an individual bolt hole, for example, which is limited by the bolt-hole size and tolerance requirements in ANSI/AISC 360 and the RCSC Specification.

The installer should inform WesTech immediately of any problems due to fabrication or engineering error, which can't be corrected by minor fit-up and adaptive work.

Before any re-work is started, the installer must obtain a WesTech warranty tracking number, which must include a cost limitation. WesTech policy dictates that no field charges will be paid without prior approval by WesTech and a warranty tracking number.

The warranty tracking number will be issued when the extent of such modifications and the price for performing these modifications have been agreed upon. In general, when parts require replacement, and WesTech agrees that replacement is necessary, WesTech will furnish the parts. The contractor will remove the defective parts and install the replacement parts at a cost agreed upon by both parties.

Storage and Paint Durability

Pre-Installation Storage

If the drive unit will be stored, or out of use for more than 30 days, the following procedures must be followed in order to protect against corrosion and maintain the warranty.

1. If possible, store the drive unit indoors on a level surface in a dry, well-ventilated place with a relatively constant temperature. The drive should be adequately supported to prevent distortion of the main gear housing. The drive should be at least six inches off the floor.

2. If the drive unit must be stored outdoors:

   Store the drive unit in an area that is out of the way of moving equipment. Cover the drive unit with a tarpaulin that allows adequate ventilation, drainage and inspection access. **Plastic covers should not be used since they tend to trap condensation.** Place the unit in an area protected from wind, direct sunlight, rain, and snow.

   Make sure the threaded holes in the terminal boxes of the motor are taped closed. If the motor is equipped with a heater, temporary power should be connected to the heater, so the motor temperature remains constant.

3. Lubricate the drive with proper lubricants as show on Equipment Lubrication and Name Tag drawing.

4. On a weekly basis, run the drive for a minimum of one hour by connecting temporary power in order to coat all the gear and bearing surfaces with oil (for oil lubricated drives) or grease (for grease lubricated drives). The condensate must be drained at least weekly from the oil drain valve (for oil lubricated drives). Make sure the weep holes are clear for condensate to drain freely (for grease lubricated drives). Perform a megger test of the motor windings when the drive unit is received and prior to startup. Prior to the megger testing, disconnect any sensitive electronic equipment such as VFDs or motor controllers.

5. Inspect painted surfaces for damage. Apply a suitable protective coating to damaged paint areas.

6. For storage instructions for the motor, reducer or other accessory equipment, refer to Drive; Accessory Equipment; in the respective manufacturer's instructions.

Storage after Drive Has Been Installed or in Operation

If the drive unit is to be shut down and remain out of operation for a period longer than 30 days, the following instructions must be followed.

1. Shut off electricity to the drive motor except for heaters (if provided).
2. Follow steps 3-6 under Pre-Installation Storage. Refer to Drive; General; Storage and Paint Durability; Pre-Installation Storage.
3. Perform a megger test of the motor windings when the drive unit is taken out of operation and prior to putting back in operation. Prior to megger testing, disconnect any sensitive electronic equipment such as VFDs or motor controllers. The minimum reading should be one mega ohm for motors rated for 600 volts and less. Any drop below this point necessitates electrical or mechanical drying of motor windings.

Warnings

General Warning

Warning: Operating and maintaining this equipment has inherent risks. It is your responsibility to read and understand the Operation and Maintenance Manual prior to working with the equipment. This page and the following pages are intended to summarize the warnings associated with WesTech's drive equipment. Where equipment manufactured by others has been provided in conjunction with WesTech's equipment, additional warnings specific to that piece of equipment may only be contained in that section of the Manual. Please read and understand all warnings provided in this Manual.

Sandblasting Warning

Do not media blast the WesTech drive unit or near it.

If sandblasting is done in the vicinity, the WesTech drive unit **must** be removed from the sandblasting area. Contamination of the drive by abrasive media can lead to catastrophic failure of the drive unit. If removal of the drive is not possible, please contact WesTech Engineering for further instructions. **Failure to observe this warning will void the drive warranty.**

Lubrication Warning

Do not operate the drive unit, including the motor and reducer, without proper lubrication. For lubrication instructions, refer to Drive; Maintenance; Drive Lubrication. **Failure to observe this warning will void the drive warranty.**

Condensate Warning

Drive main gear housing is susceptible to the formation and accumulation of condensate. Drive unit must be checked regularly for the presence of condensate. Any accumulated condensate must be removed from the drive housing. **Failure to drain condensate can lead to component damage or failure and will void the drive warranty.**

Welding Warning

If field welding is required after the drive is installed, **do not** allow current to pass through the precision bearing balls. This will result in sparking between bearing balls and bearing races and will destroy the precision bearing assembly. **Do not weld on the drive unit itself.** Attach the welding ground directly to the part to be welded. **Failure to observe this warning will void the drive warranty.**

Torque Control Settings Warning

Do not alter the factory-set positions of the torque limit switch actuators in the torque box. This can cause serious damage to the drive and rake mechanism. The 4-20 mA transmitter signal (if provided) should not be used for alarm and motor cutout as it does not correspond precisely with the drive torque control device cams and limit switches. These are set and calibrated in WesTech's manufacturing shops. The 4-20 mA transmitter (if provided) is to be used only for remote monitoring. Over torque cutout requires manual restart, or reset of a latched cutout circuit that prevents auto restart of units with the motor. Units with hand/off/auto selector switches must be checked to ensure proper torque protection when set in auto **and** hand modes. Contact the WesTech project manager if the torque control setting needs to be changed.

Rotating drive parts and cage may destroy electrical conduit if installed too close to the drive unit. Over torque cutout requires manual restart, or reset of a latched cutout circuit that prevents auto restart of the motor. **Failure to observe this warning will void the drive warranty.**

Maintenance and Operation Warning

To prevent personal injury, only trained employees should be allowed to work on or around the drive. Lock out all electrical power before performing maintenance on any moving part of the drive. Employees entering the drive areas should wear adequate safety equipment such as safety glasses, safety shoes, hard hats, etc.

Keep hands, clothing, etc. away from moving parts. Inspect equipment on a weekly basis for any irregularities. Take care of these in a timely manner.

Manually test the limit switches on the torque control device on a weekly basis to make sure the controls are working properly. This can be done by pressing the rod covered by a red rubber cap on the outside of the box. Refer to drawing 7-8222 B1 Torque Control Device.

If the clarifier or thickener has stopped due to high torque, do not open the torque control device. Energy is stored in the drive train and torque control spring. The stored energy should be released prior to undertaking any maintenance or repair. Refer to Drive; Operation; Drive Unit Troubleshooting. **Failure to observe this warning will void the drive warranty.**

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Installation

Lifting the Drive Unit

Lift the drive unit using the lifting lugs provided in the drive base. Keep the drive unit as level as possible during lifting. Spreader bars may be necessary to keep the lifting cables from touching other parts of the unit as this may cause damage. Any lifting lugs on individual components (motor, reducer, etc.) are for lifting those components only during assembly or disassembly and are **not** for lifting the entire drive.

Drive Unit Installation

Make sure both mounting surfaces are clean and free from foreign debris. Place the drive unit on the walkway frame (shaft drive) or the center column (cage drive). The drive should be loosely fastened to the walkway or center column.

The final check for level will be completed after all the items designed to hang from the drive are attached. Refer to Installation Instructions; 'Final Check for Level' and drawing 900-611D Drive Shimming Procedure.

Lubricate the drive unit according to the instructions. Refer to Drive; Maintenance; Drive Lubrication. The accessory equipment (motor, reducer, etc.) should be lubricated according to the respective manufacturer's instructions. Refer to Drive; Accessory Equipment; the respective manufacturer's instructions.

Connect the drive motor for proper direction of rotation as shown on the general arrangement / drive assembly drawings. Refer to drive rotation direction arrow sticker placed on the drive. WesTech will not accept responsibility for any damage caused by the drive rotating in the wrong direction. On multi-pinion drives, be sure all motors are connected to rotate in the same direction. This is done by removing all motors and confirming they all rotate in the same direction. Severe damage to the drive will result if all motors do not run in the same direction.

Connect the motor alarm and cutout limit switches in the torque control device. Refer to Drive; Accessory Equipment; Torque Control Information; TB-46A Electrical Schematic (Suggested). Manually check to make sure that the alarm and motor cut out switches function properly at the torque values specified on the general arrangement drawings. This is done by pressing the rod that is covered by a red rubber cap on the outside of the torque box. Refer to drawing 7-8222 B1 Torque Control Device drawing.

Welding Warning

If field welding is required after the drive is installed, **do not** allow current to pass through the precision bearing balls. This will result in sparking between bearing balls and bearing races and will destroy the precision bearing assembly. **Do not weld on the drive unit itself.** Attach the welding ground directly to the part to be welded. **Failure to observe this warning will void the drive warranty.**

Shimming the Drive

In order to achieve maximum drive bearing life, the drive base must be properly shimmed. After the drive is leveled, shims should be placed in any gap exceeding 0.005 inch between the mounting surface and the drive base. Refer to drawing 900-611D Drive Shimming Procedure. This may require placing shims on both the inside and the outside of the drive base. **Shims are not provided by WesTech and should be supplied by others.**

After the drive is leveled and fully shimmed, loosen jack screws (or external hydraulic jacks) and evenly tighten drive mounting bolts. After the bolts are tightened, the final level must be verified.

Startup

Before starting the drive, make sure the tank and mechanism path are free from any debris and obstructions. Check drive and accessory equipment for proper lubrication. Perform a test on the motor windings to make sure there is no electrical current leakage between the windings. Disconnect any sensitive electronic equipment before performing megger test. Watch for correct rotation of the mechanism and any interference.

For drives with a lift, the lifting mechanism should raise the rake arms at the preset torque. When the lifting device is used, check clearances in the up and down positions of the rake arms.

Observe the drive and other mechanisms for proper and unobstructed operation. The tank is now ready for the influent. A gradual increase in the indicated torque is normal as influent is being introduced. Any irregular or jerking motion in the operation of the rake arms must be immediately investigated and remedied. A minor amount of 'swing' is normal for operation in an empty tank.

Check the alarm switch and motor cutout switch wiring by pressing the rod that is covered by a red rubber cap on the outside of the torque box. Refer to drawing 7-8222 B1 Torque Control Device. An alarm should sound and the motor should shut off when these switches are activated. A latching relay that is manually reset must be used in the control wiring to prevent the mechanism (clarifier, thickener, etc.) from relaxing and overloading itself several times without resolving the cause for overload.

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Maintenance

Drive Disassembly/Assembly

Refer to drawing DRV103 Drive Assembly Procedures and the Assembly Diagram Drawing in the event disassembly of the drive is required for maintenance purposes.

Drive Lubrication

The upper and main bearings were packed with grease at the WesTech manufacturing shop before shipment. For proper lubrication, fresh grease, which is compatible with the grease already used by the WesTech manufacturing shop, must be added in quantities shown on Equipment Lubrication and Name Tag drawing and on the lubrication plate which is located on the lid of the torque box. Grease shall be applied at twice the frequency for the first 500 operating hours so that grease used during wear-in is replaced. The lubrication tag etched on the torque box lid indicates the type of grease used so that the plant can procure compatible grease.

The application of grease is to be done as follows: Lube point #1 is rotating fast so normal pumping is recommended. All other points are rotating so slow that grease should be applied slowly. One ounce is approximately 5 shots from a grease gun. Since gun sizes vary, the operator should determine the number of shots of grease per ounce for his grease gun. Therefore, when 2 oz. are called for weekly or monthly, one slow pump should be applied per one tenth of a revolution. This is roughly one slow shot every 2 minutes which would result in the uniform distribution of grease around the main gear bearing rather than cause the grease to puddle up at one point on the pinion face.

The main gear and lower bearing are oil lubricated. The oil was drained before shipment. Oil should be added before the drive unit is set for startup. Refer to Drive; Maintenance; Drive Lubrication; Recommended Gear Oils table. After adding oil, check the oil level site glass. The oil level should be at the middle of the site glass.

Some motors require grease. Refer to Equipment Lubrication and Name Tags for quantity and frequency. The accessory equipment (motor, reducer, etc.) should be lubricated according to the respective manufacturer's instructions. Refer to Drive; Accessory Equipment; the respective manufacturer's instructions. Most small HP motors have bearings that are sealed for life and do not require lubrication. **Do not use the same grease for the motor as used on the drive gears and bearings.**

Recommended Grease / Gears and Drive Bearings

Ambient Temperature	5° F to 140° F (-15°C to 60°C)	-40° F to 248° F (-40° C to 120° C)
NLGI Grade Number	2	2
Manufacturer	**Lubricant**	**Lubricant**
Mobil Oil Co.	Mobilux EP #2 Mobilith SHC 220 Mobilgrease XHP 222 Unirex N 2	Mobilith SHC 220
Exxon Co.	Beacon 325	Beacon 325
Gulf Oil Corp.	Gulfcrown #2	
American Oil Co.	Amolith #2	
Chevron	Multifak EP2	

Recommended Grease / Sumitomo Cyclo Reducer

Manufacturer	Lubricant
Exxon Co.	Exxon Unirex N2

Recommended Grease / Motors (If Applicable)

Manufacturer	Lubricant
Mobil Oil Co.	Polyrex EM
Exxon Co.	Polyrex EM
Texaco	Polystar
Chevron	SRI
Rykon	Premium #2
Pennzoil	Pen 2 Lube

Recommended Food Grade Grease / Gears & Drive Bearings

Ambient Temperature	5° F to 140° F (-15°C to 60°C)
NLGI Grade Number	2
Manufacturer	**Lubricant**
Shell Oil Co.	Shell Grease FM 2
Mobil Oil Co.	Mobilgrease FM 222 EP Mobil SHC Polyrex 222

Recommended Food Grade Grease / Sumitomo Cyclo Reducer

Manufacturer	Lubricant
Omnilube	FGM2

Recommended Gear Oils

Ambient Temperature	14° F to 104° F (-10° C to 40° C)	32° F to 120° F (0° C to 50° C)	50° F to 140° F (10° C to 60° C)
Viscosity Grade	AGMA 4 EP or ISO 150	AGMA 5 EP or ISO 220	AGMA 6 EP or ISO 320
Manufacturer	**Lubricant**	**Lubricant**	**Lubricant**
Exxon Co. B.P. Oil Co. Gulf Oil Corp. Lubrication Engineers Mobil Oil Co. Shell Oil Co. Chevron Corp.	Spartan EP 150 Energol GR-XP 150 EP Lubricant HD 150 Duolec 1604 Mobilgear 600 XP 150 Omala Oil Co. 150 MEROPA ISO 150	Spartan EP 220 Energol GR-XP 220 EP Lubricant HD 220 Duolec 1605 Mobilgear 600 XP 220 Omala S2 G220 MEROPA ISO 220	Spartan EP 320 Energol GR-XP 320 EP Lubricant HD 320 Duolec 1606 Mobilgear 600 XP 320 Omala Oil Co. 320 MEROPA 320

Equivalent Synthetic Gear Oils

Ambient Temperature	14° F to 140° F (-10°C to 60°C)
ISO Viscosity Grade	220
Manufacturer	**Lubricant**
Lubrication Engineers Mobil Oil Co. Amsoil Chevron Corp.	Synolec 9832 Mobil SHC Gear 220 SGM TEGRA ISO 220

Synthetic Food Grade Gear Oils

Ambient Temperature	Pours at -21C and -6F
ISO Viscosity Grade	150
Manufacturer	**Lubricant**
Mobil Oil Co.	Mobil SHC CIBUS 150

Recommended Oil Torque Box

Use a light spray oil like WD-40 or Anti-Seize.

When considering the use of lubricants other than those listed above, it is recommended that the decision be made in consultation with a local lubricant supplier, who can assist in determining whether the alternative is compatible with, and performs equivalently to, those lubricants listed above. WesTech cannot determine the suitability of lubricants for use in our products other than those listed above.

It is WesTech's experience that synthetic oil performs better and lasts longer than regular oil. Synthetic oil has the following advantages: it separates more easily from water, has a stronger boundary layer resulting in better lubrication, and generally has a longer service life. It is recommended that the customer change the mineral gear oil yearly (after the initial 500 hour run-in period) or get it analyzed by an independent laboratory for extended service intervals.

Synthetic oil may be used for three to five years based on yearly lab analysis and recommendations from local providers.

Do not mix mineral gear oil with synthetic oil without consulting with the oil supplier. This may adversely affect the performance of the lubricant for some combinations of mineral and synthetic oil. Damage to drive components may result from non-compatible oils.

Yearly Drive Maintenance

Shutdown and lockout power to the drive unit. Check and re-tighten all exposed fasteners of the drive. For torque values of the fasteners, refer to drawing DRV103 Drive Assembly Procedures.

Weekly Drive Maintenance

Lubrication instructions and recommended lubricants (oil and grease) for gears and bearings as specified are to be followed. Refer to Drive; Maintenance; Drive Lubrication. This will provide long life and trouble-free operation of the drive unit.

Condensate Removal

Oil lubricated gear housings require regular check and removal of condensate. Check for condensate weekly and drain accordingly. Site specific conditions may allow checking/removing condensate at different intervals. **Failure to drain condensate can lead to component damage or failure and will void the drive warranty.**

Grease lubricated gear housings are provided with weep holes for continuous condensate removal. Keep weep holes clean and clear of obstructions for proper drainage of condensate.

Drive Torque Control Lubrication

Apply spray oil (WD-40 or equal) to the torque box plunger weekly. Check the plunger for smooth movement. The torque control weekly maintenance schedule should be followed **daily** when temperatures are below freezing. This will help ensure that no mechanical items in the box have frozen. If freezing occurs inside the torque box, there is no overload protection for the equipment. In addition, check daily for ice build-up on and around the drive/torque box unit and remove as necessary. Using a condensate heater in the torque box and/or covering the drive can help protect against possible damage resulting from freezing rain. For additional information on the torque control device, refer to drawing 7-8222 B1 Torque Control Device.

Lubrication of Accessory Equipment

Reducer (Grease Lubricated)

All grease lubricated reducers are pre-lubricated at the reducer manufacturer's factory. Refer to the reducer manufacturer's catalog data for the type and brand of grease used or the lubricant sticker attached to the reducer. Apply grease to the reducer. Refer to Drive; Accessory Equipment; Drive Reducer and lubrication plate located on the cover of the torque box. Some smaller reducers are maintenance free and do not require re-lubrication. Refer to Equipment Lubrication and Name Tag drawing to see if this applies.

Drive Maintenance Log

Break-In Maintenance Requirements	Interval	Initials	Date
Drain and Fill Oil Cavity/Cavities (Before Operating)	0 hours		
Drain and Replace Oil	500 hours		
Preventive Maintenance Requirements			
Grease Cyclo Reducer	M		
Grease Upper Bearing	M		
Grease Main Bearing	W		
Oil Main Gear/Lower Bearing	W		
Oil Torque Box Plunger	W		
Inspection Requirements			
Inspect Fasteners for Tightness	M/A		
Visually Inspect Drive Mech. for Wear	W/A		
Test Torque Box Limit Switches	W		
Check/Drain Condensate	W		
Check/Drain Particulates	S		
Inspect/Repair Drive Unit Paint	A		
Inspect Torque Control Device	A		
Drain and Replace Oil	A		

A - Annually, S - Semiannually, M - Monthly, W - Weekly, D - Daily

Procedure for Ordering Replacement and Spare Parts

Replacement and spare parts may be ordered from the Aftermarket Sales Department at:

WesTech Engineering, LLC
3665 South West Temple
Salt Lake City, Utah 84115
Phone: 801.290.1512
Fax: 801.265.1080
24-hour service/emergency:
801.265.1000
Email: parts@westech-inc.com
Web: www.westech-inc.com

If you would like to talk directly to an Aftermarket Sales representative during normal business hours (8:00 am to 4:30 pm MST), dial 801.290.1512 and this will get you directly to the Aftermarket Sales Department.

To use the 24-hour service/emergency line after hours (4:30 pm to 8:00 am), dial 801.265.1000. **Please indicate to the Answering Service Operator whether your facility is Water, Wastewater or Industrial.** A WesTech Representative will return your call and assist you with the problem.

If you would like to e-mail a spare parts RFQ/order, simply e-mail your request to us at parts@westech-inc.com. Or use our web page www.westech-inc.com and, click Parts & Service tab. The required information is:

- Contact Information
- Part Number/Description
- Site Location
- Project/Serial Number

A Project Manager will confirm that your request has been received and follow up with a quotation or an order acknowledgement.

If a 'Recommended Spare Parts List' was provided in this manual, it is a guide for the appropriate level of spares to keep on hand minimizing lost time due to unscheduled breakdowns.

Should you require further assistance in determining which spare parts are appropriate for your situation please contact WesTech's Aftermarket Sales Department.

To avoid unnecessary delays in obtaining the correct spare or replacement parts for your equipment, be sure to give the following information with each order.

1. Identify equipment using the WesTech Job number. Your equipment is identified as follows:

   WesTech Job Number: 24587A

   WesTech Model Number: Drives

2. Identify the part by name and give the number of the drawing on which this part or assembly appears.
3. Identify the part number.
4. Identify the size and include all pertinent dimensions (such as diameter, length, thickness, bore, pitch, etc.) whenever possible.
5. If parts being ordered are electrical in nature, give all pertinent data such as voltage, amperage, wattage, cycles, speed, power factor, or other information given on the parts nameplate or included in the parts brochure.
6. Submit your written purchase order or request for a quotation, both signing and printing your full name so that WesTech will know whom to contact should further clarification of the inquiry be necessary.
7. Give a bill to address and a shipping address.
8. Give a preferred method of shipping: i.e., UPS, truck freight, air express, etc.
9. Indicate the quantity desired.
10. Provide instructions for proper invoicing.

The minimum order allowed is $100.00.

Item Numbers

Item numbers identify a part shown on general arrangement and general erection drawings. Item numbers are in circles on the drawing with an arrow pointing to the part. On the parts list, item numbers are found in the left most column of the list.

Drawings/Part Numbers

The aforementioned item number may have a corresponding drawing number. These drawing numbers identify any parts that may have shop drawings. Shop drawings are not included in operation and maintenance manual as they are proprietary information.

Both item and drawing numbers are provided as a quick reference should you need to identify or order additional parts during the life of your WesTech equipment.

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
										-
										-
										-
122	1	1	EA	1-17384	1-17384		PINION SHAFT	8620	258	-
										-
124	1	1	EA	2-8965			BEARING, SPHERICAL ROLLER	STL	12	-
										-
										-
127	1	1	EA	2-37805			KEY, SQ, 1.0 x 1.0 x 6.5, ROUND 1 END	1018		-
128	1	1	EA	1-16165	1-16165	-	SPACER, PINION BEARING	A36	4.3	-
										-
										-
										-
132	1	1	EA	1-11908	1-11908	-	COUPLING, CUSTOM RIGID HALF, 1.875 BORE	1018	28	-
132.1	1	1	EA	1-12007	1-12007	-	COUPLING, CUSTOM RIGID HALF, 2.375 BORE	1018	18	-
										-
134	8	8	EA	2-6320			CAP SCR, HEX, 0.25-20UNC x 0.75, FULL THREAD	304	.01	-
134.1	8	8	EA	2-5415			WSHR, LOCK, MDM SPLIT, 0.25	304		-
										-
										-
137	4	4	EA	2-8998			SET SCREW, HEX SKT, CUP PT, 0.375-16UNC x 0.75, ZINC	F912		-
138	4	4	EA	2-7479			CAP SCR, HEX, GRADE 5, 0.5-13UNC x 1.5, ZINC	J429	.13	-
138.1	4	4	EA	2-5733			WSHR, LOCK, MDM SPLIT, 0.5, ZINC	J403	.01	-
139	1	1	EA	2-8958			STUD, FULL THD, GRADE B7, 0.75-10UNC x 13	A193-B7	1.63	-
139.1	1	1	EA	2-10070			NUT, HEX, GRADE 5, 0.75-10UNC, ZINC	J995	.12	-

Figure D.1: Drive Parts List.

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Operation

Operation Instruction – Drive Unit

Inspect the drive for proper lubrication. Refer to Equipment Lubrication and Name Tag drawing and lubrication instructions.

Drive without Lifting Device

Observe the rake mechanism for smoothness of operation. Any irregular motions, springing action, and binding or rubbing must be investigated and adjusted.

Drive Unit Troubleshooting

Before doing any troubleshooting or inspections read and understand Maintenance and Operation Warning. Refer to Drive; Warnings; Maintenance and Operation Warning. There are many hazardous conditions around a drive such as electric shock, risks related to rotating equipment, etc.

Problem	Possible Causes	Corrective Actions
Motor not Rotating	1. Terminal wires are loose or not wired correctly. 2. Fuses have been blown. 3. Circuit breakers have tripped. 4. Burnt out windings due to overload, impaired ventilation, and incorrect power supply. 5. Excessive cold temperatures causing lubricants to flow less easily.	1. Check connections and wire these correctly. 2. Correct cause of overload, replace fuses. 3. Reset and check running amps. 4. Check all that apply, remove cause then replace motor. 5. Provide temporary heat. Change to lower viscosity lubricants, or make sure to run continuously.
Motor Overheating	1. Motor is overloaded. 2. Motor operating on wrong voltage.	1. Remove overload condition. 2. Check supply voltage and connect correct motor wiring.
Motor Operating with Excessive Noise	1. Coupling misaligned. 2. Coupling halves too close. 3. Worn out bearings. 4. Broken fan. 5. Bent fan cover. 6. Loose fasteners.	1. Align coupling. 2. Correct gap per specifications. 3. Replace worn out bearings. 4. Replace fan. 5. Repair or replace fan cover. 6. Tighten fasteners.
Mechanism not Turning	1. Shear pin broken (if provided) 2. Coupling between motor and reducer broken. 3. Sheared or slipped key between drive train components.	1. Replace broken shear pin. 2. Replace broken couplings. 3. Replace sheared key between drive train components.

Problem	Possible Causes	Corrective Actions
Torque Control Device not Operating Correctly Before attempting any work on torque box, contact WesTech for assistance. *Unauthorized adjustment of the torque control device will void the warranty.	1. Incorrect wiring. 2. Check for unauthorized adjustment of the cams. 3. Check for bent, broken, or bound-up parts. 4. Zeroing screw not set properly. 5. Torque arm retaining screw bent or broken	1. Correct the wiring. 2. Contact WesTech for assistance. 3. Replace the bent and broken parts. 4. Set zeroing screw properly. Refer to drawing 7-8222-B1 Torque Control Device. 5. Remove and repair or order replacement from WesTech. Refer to drawing 7-8222 B1 Torque Control Device.
Torque Control Device Shows High Torque	1. Rakes stuck in excessive sludge. 2. Rake interference due to a foreign object. 3. Plugged underflow. 4. Thickener/Clarifier operational problems. 5. Bound up pinion shaft bearings due to presence of frozen condensate or corrosion. 6. Torque control device camshaft is bound up.	1. Remove accumulated solids. 2. Correct the cause of rake interference. 3. Unplug underflow. 4. Correct the operational problems. 5. Provide temporary heat to drive unit or replace corroded parts. 6. Remove torque control device cover and apply lubricant to camshaft.
Reducer or Drive Running with Excessive Noise and Vibrations	1. Lack of lubrication. 2. Loose fasteners. 3. Loose coupling.	1. Check and add grease/oil as required. Refer to Equipment Lubrication and Name Tag drawing. 2. Tighten fasteners. 3. Tighten coupling.
Reducer Overheating**	1. Reducer is overloaded. 2. Incorrect lubricant or quantity of lubricant.	1. Increase pump rate to minimize solids in tank. 2. Contact WesTech for assistance. Overhaul of the reducer may be required.

Problem	Possible Causes	Corrective Actions
Lubricant Leakage from Reducer	1. Seal or shaft worn out. 2. Excessive lubricant. 3. Water contamination. 4. Reducer fasteners are loose.	1. Repair or replace seal and shaft. 2. Reduce frequency of re-lubrication. 3. Find water contamination source and correct it. 4. Tighten fasteners.
Main Gear/Main Bearing Making Noise	1. Lack of lubricant. 2. Condensate water in gear/bearing cavity.	1. Check gear teeth and add grease/oil as required. Refer to Equipment Lubrication and Name Tag drawing. 2. Drain condensate water.
Discolored Oil in Sight Glass (Milky, Dark Brown or Black)	1. Condensate mixing with oil. 2. Oil dissolving grease. 3. Wash down water entering the main bearing. 4. Oxidation of the oil.	1. Drain condensate weekly or as site conditions require. 2. Add 14 ounces of grease to main bearing during one rotation. 3. Do not wash the top of the main gear/bearing. 4. Change the oil. **Note**: If discolored, drain and replace all oil plus add fresh grease. Refer to Equipment Lubrication and Name Tag drawing.

Figure D.2: Troubleshooting Suggestions.

Accessory Equipment

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Drive Motor

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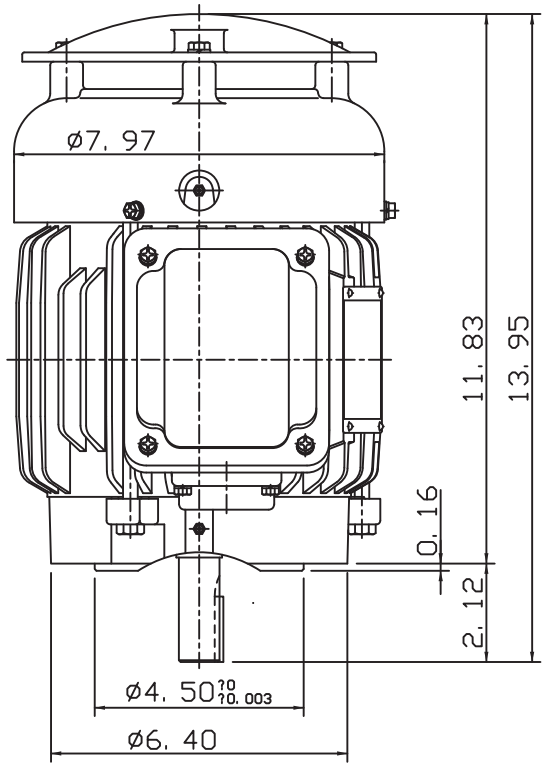
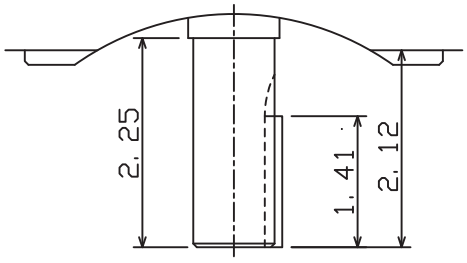
DATE	OUTLINE DIMENSIONS	MOTOR TYPE:
JAN. 4. 2007		AEUH8NDC
CAT. #: EPV0014C	3-PHASE INDUCTION MOTOR	FRAME NO. 143TC

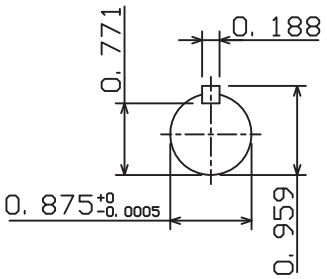
Pole	HP	kW	Hz	VOLT	Syn. Speed r/min(rpm)
4	1	.75	60	230/460	1800

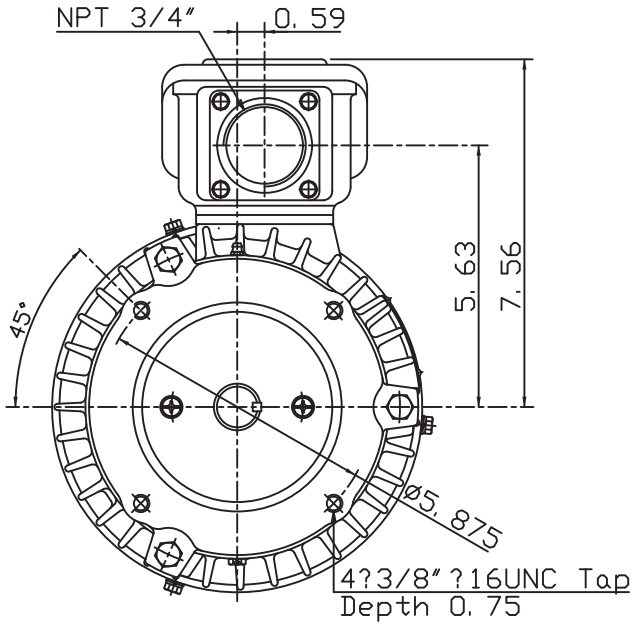
Ins	Rating	Dimension in	Approx Weight	Bearings
F	CONT.	inches	60 LBS	DE: 6205ZZ NDE: 6205ZZ

Totally Enclosed Fan-Cooled Vertical Type. Squirrel-Cage Rotor.









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DWN.	J. H. LIANG	12-23-06	TECO Westinghouse	DWG NO.
CHKD.	H. C. YAN	12-28-06		31049M989070
APPD.	M. C. TSAI	12-28-06		

TECO Westinghouse

ISSUED		ENCLOSURE
8/29/2014	**PERFORMANCE DATA**	TEFC
TYPE	**3-PHASE INDUCTION MOTOR**	CATALOG#
AEUH8NDC		EPV0014C

NAMEPLATE INFORMATION

OUTPUT HP	OUTPUT KW	POLE	FRAME SIZE	VOLTAGE	HZ	RATED AMBIENT	INS. CLASS	NEMA DESIGN	TIME RATING	SERVICE FACTOR
1	0.7	4	143TC	230/460	60	40°C	F	B	CONT.	1.15

VARIABLE FREQUENCY DRIVE SERVICE

VARIABLE TORQUE			
HZ	HP	RPM	TORQUE (lb-ft)
3~60	0.0001~1	90~1800	0.006~3.009

OHMS/PHASE EQUIVALENT WYE CIRCUIT (AT RATED OPERATING TEMPERATURE 25°C)

R1	R2	X1	X2	X_m
8.1425	6.5479	18.783	11.565	313.61

CONSTANT TORQUE				CONSTANT HORSEPOWER			
HZ	HP	RPM	TORQUE (lb-ft)	HZ	HP	RPM	TORQUE (lb-ft)
6~60	.1~1	180~1800	3.009	60~120	1	1800~3600	3.009~1.505

TYPICAL PERFORMANCE

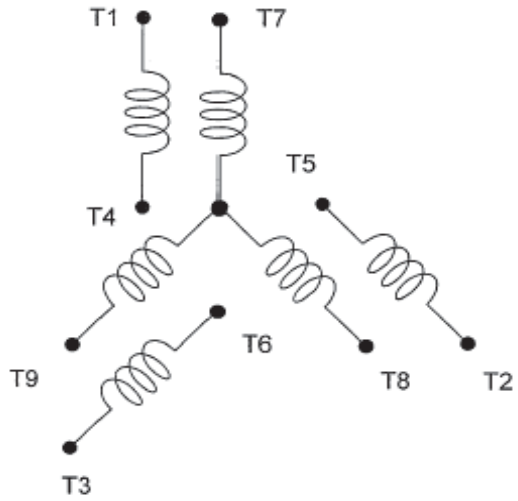
FULL LOAD RPM	EFFICIENCY				POWER FACTOR			SOUND PRESSURE LEVEL @ 3 FT Db(A)
	FULL LOAD		3/4 LOAD %	1/2 LOAD %	FULL LOAD %	3/4 LOAD %	1/2 LOAD %	
	MIN.%	NOM.%						
1745	82.5	85.5	84	81.5	73	64.5	51.5	49

CURRENTS									NEMA KVA CODE LETTER	SAFE STALL TIME IN SECONDS	
NO LOAD			FULL LOAD			LOCKED ROTOR					
AT 208 VOLT	AT 230 VOLT	AT 460 VOLT	AT 208 VOLT	AT 230 VOLT	AT 460 VOLT	AT 208 VOLT	AT 230 VOLT	AT 460 VOLT		COLD	HOT
1.67	1.60	0.8	3.32	3.00	1.50	27.1	30.0	15	N	71	50

TORQUE				INERTIA			ACCEL TIME (DOL)		ALLOWABLE STARTS PER HOUR	
FULL LOAD (lb-ft)	LOCKED ROTOR %FLT	PULL UP %FLT	BREAK DOWN %FLT	ROTOR WR^2 ($lb\text{-}ft^2$)	NEMA LOAD WK^2 ($lb\text{-}ft^2$)	MAX ALLOWABLE WK^2 ($lb\text{-}ft^2$)	NEMA LOAD WK^2 Sec	MAX ALLOWABLE WK^2 Sec	COLD	HOT
3.01	310	280	410	0.086	5.8	46	3.41	26.70	2	1

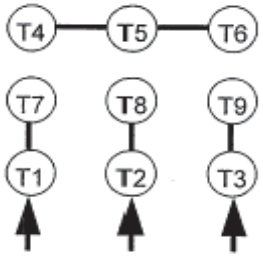
APPROVED:	M. PRATER	DRAWING NO.	31057EPV0014C	REVISION:	1

DATE:	CONNECTION DIAGRAM	CATALOG NO.:
September 13, 2006		**EPV0014C**

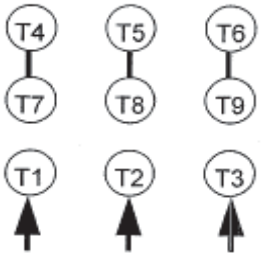


SCHEMATIC - 2Y/Y CONNECTION

ACROSS THE LINE CONNECTION



LINE
230 VOLT CONNECTION



LINE
460 VOLT CONNECTION

TECO Westinghouse

DWG NO.
DAC-1566-2

MAINTENANCE

INSPECTION

Inspect motor at regular intervals. Keep motor clean and ventilation openings clear.

LUBRICATION

1. Frame 143T-256T: Double shielded and pre-lubricated ball-bearing motors without grease fittings and don't need re-lubrication, except on MAX-E1® and MAX-E2® products which have re-greasable features.
2. Frames 280TS, 320-449TZ(TS): Motors having grease fittings and grease discharge devices at brackets. Motors are shipped with grease for initial running. It is necessary to re-lubricate anti-friction bearing motors periodically, depending on size and type of service. See Table 2 to provide maximum bearing life. Excessive or too frequent lubrication may damage the motor.

TABLE 2

Horsepower	Standard Conditions	Severe Conditions	Extreme Conditions
1 Thru 30 Hp, 1800 rpm and below	7 years	3 years	180 days
40 Thru 75 Hp, 1800 rpm and below	210 days	70 days	30 days
100 Thru 150 Hp, 1800 rpm and below	90 days	30 days	15 days
1 Thru 20 Hp, 3600 rpm	5 years	2 years	90 days
25 Thru 75 Hp, 3600 rpm	180 days	60 days	30 days
100 Thru 150 Hp, 3600 rpm	90 days	30 days	15 days

Note:

A. Standard conditions: 8 hours operation per day, normal or light loading, clear and 40°C ambient conditions.
B. Severe conditions: 24-hour operation per day or light shock loading, vibration or in dirty or dusty conditions.
C. Extreme conditions: With heavy shock loading or vibration or dusty conditions.
D. For double shielded bearings, above data (lubrication frequency) means that the bearing must be replaced.

3. Be sure fittings are clean and free from dirt. Using a low-pressure grease gun, pump in the recommended grease until new grease appears at grease discharge hole.
4. Use the POLYUREA grease unless special grease is specified on the nameplate.
5. If re-lubrication is to be performed with the motor running, stay clear of rotating parts. After re-greasing, allow the motor to run for ten to thirty minutes.

Drive Reducer

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GENERAL CONSTRUCTION

Fig. A-1 Speed Reducer – Horizontal Foot Mount, Single Reduction

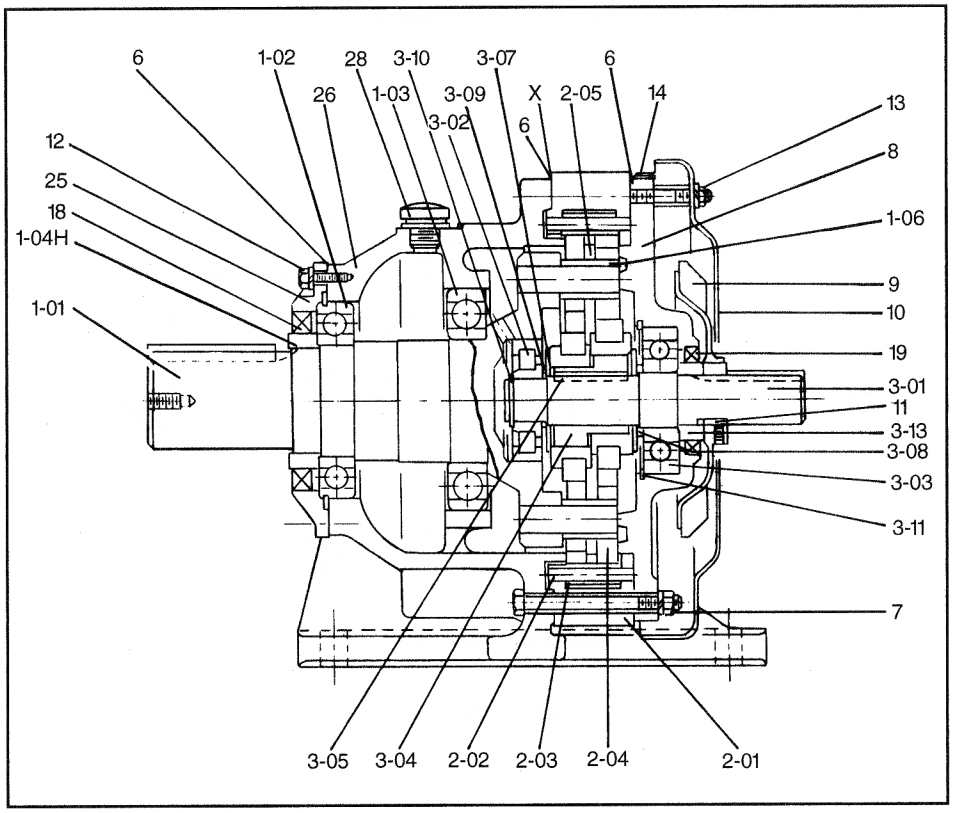
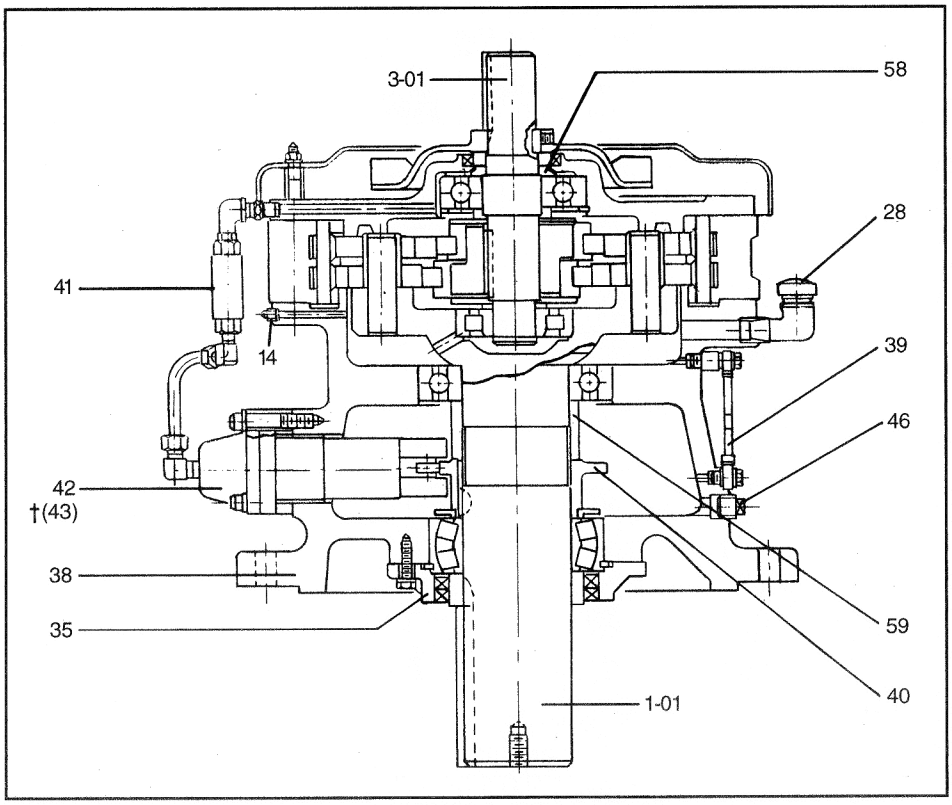


Fig. A-2 Speed Reducer – Vertical Base Mount, Single Reduction



Note: For details of oil seals, bearings or gaskets, refer to A-11 ~ 13.
†Refer to Table A-16 on Pg. A-9 for units which require a positive displacement pump.
*Pt. No. 58 — frame sizes 6195-6275 only; Pt. No. 59 — frame sizes 6205-6275 only.
**See Fig. A-3, Page A-4; ǂ See Fig. A-4, Page A-4.

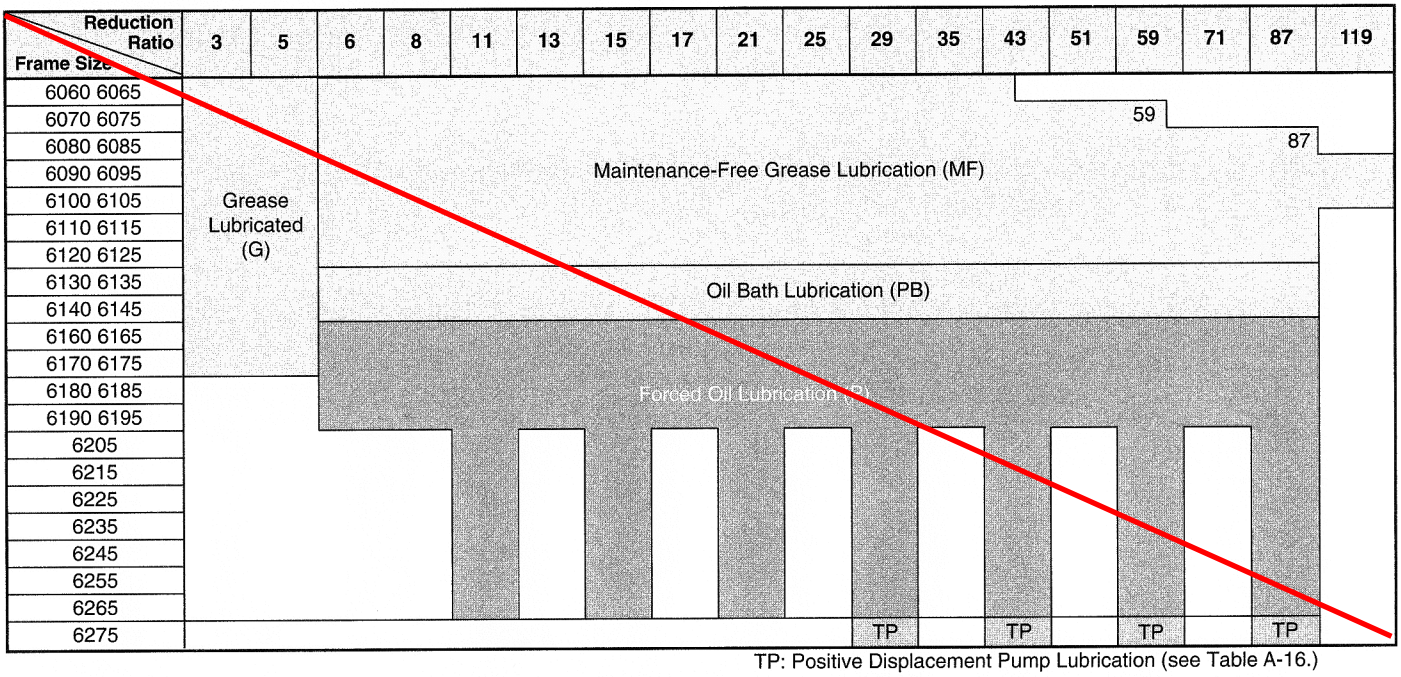
Table A-1. Speed Reducer Main Parts

Part No.	Part Name
1-01	Slow Speed Shaft w/pins
1-02	Bearing A
1-03	Bearing B
1-04H	Oil Seal Collar—Horizontal
1-06	Slow Speed Shaft Rollers
2-01	Ring Gear Housing
2-02	Ring Gear Pins
2-03	Ring Gear Rollers
2-04	Cyclo Disc
2-05	Spacer Ring
3-01	High Speed Shaft
3-02	Bearing C
3-03	Bearing D
3-04	Eccentric Bearing Assembly
3-05	Eccentric Key
**3-06	Balance Weight
3-07	Spacer
3-08	Spacer
3-09	Spacer
3-10	Retaining Ring
3-11	Retaining Ring
3-13	Collar
ǂ 5-01	Intermediate Shaft w/Pins
ǂ 5-02	Bearing F
ǂ 5-03	Bearing G
ǂ 5-04	Eccentric Bearing Assembly
6	Gasket Set
7	Casing Nuts & Bolts
8	High Speed End Shield
9	Cooling Fan & Set Screw
10	Fan Cover
11	Fan Key
12	Bolts For SS Oil Seal Housing
13	Bolts, Spacers For Fan Cover
14	Plug
ǂ 15	Grease Nipple
18	Slow Speed Output Oil Seal
19	High Speed Input Oil Seal
25	Horizontal Oil Seal Housing
26	Horizontal Case
28	Oil Fill Plug
29	Oil Gauge—Horizontal Unit
35	Vertical Oil Seal Housing
38	Vertical Case (Integral V Type)
39	Oil Gauge—Vertical Unit
40	Cam
41	Piping Set & Oil Signal
42	Plunger Pump
43	Positive Displacement Pump
46	Drain Plug
ǂ 55	Intermediate Cover
ǂ 57	Eye Bolt
*58	Oil Slinger
*59	Spacer

LUBRICATION

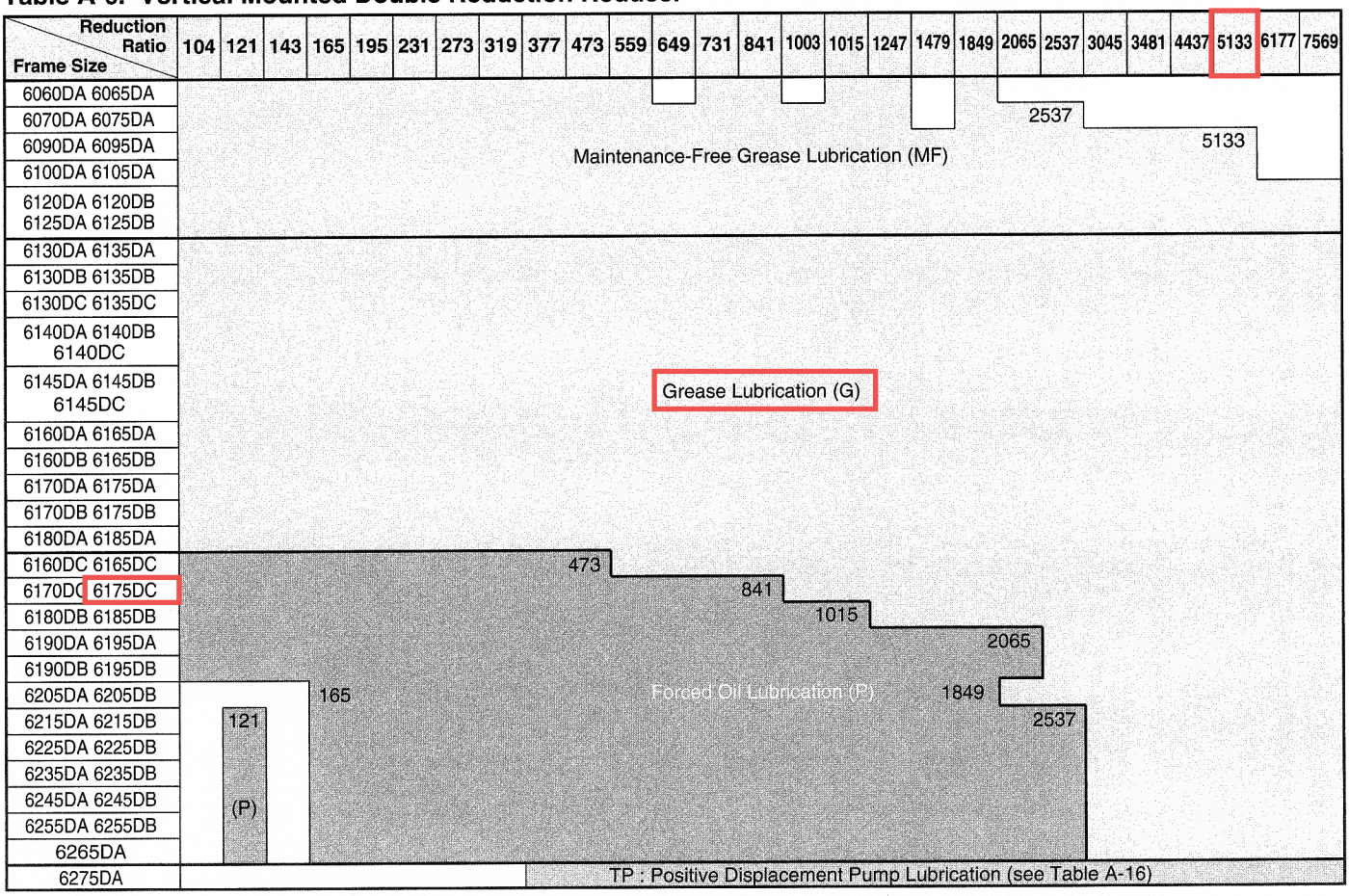
Standard Vertical Mounted Reducer (Slow Speed Shaft Vertical)[1,2,3]

Table A-5. Vertical Mounted Single Reduction Reducer



TP: Positive Displacement Pump Lubrication (see Table A-16.)

Table A-6. Vertical Mounted Double Reduction Reducer



Notes: [1] Please consult the factory for applications where the slow speed shaft is up.
[2] Tables A-5 and A-6 show the standard lubrication method when the Cyclo drive is driven at the standard input speed.
[3] Ratios shown in white in Tables A-5 and A-6 are unavailable for the given unit sizes.

Lubricants

Grease Lubricated Models

Those models listed in Tables A-3 ~ A-6 as grease lubricated are filled with grease before shipment to the customer and are ready for use.

Table A-7. Standard Greases[1]

Ambient Temperature [2]		Cyclo® Disc-Type	Cyclo® Planetary-Type
°F	°C		
14 to 122	-10 to 50	Exxon Unirex N2 Grease	Shell Gadus S2 V220 0 Grease

Table A-8. Grease Replenishment and Change Interval

Model	Condition		Interval[3]
Maintenance Free Type: Single (6060 to 6125) Double Reduction (6065DA to 6125DB)	Replenishment		NOT REQUIRED
	Overhaul[4]		Every 20,000 Hours or Every 4 ~ 5 Years
Non- Maintenance Free Type	Replenishment	Less Than 10 Hours Per Day Operation	Every 3 ~ 6 Months
		10 ~ 24 Hours Per Day Operation	Every 500 ~ 1000
	Change	Speed Reducer Mechanism, High Speed Shaft Bearings (Speed Reducer Type)	Every 2 ~ 3 Years
		Slow Speed Shaft Bearings	Every 3 ~ 5 Years

Replenishment and Change Guidelines

Those units designated as maintenance free in Tables A-3 ~ A-6 do not require replenishment when supplied with standard greases. Certain optional greases do require replenishment. Those units will have a Zerk fitting either on the high speed endshield or near the input shaft bearing housing.

Replenish grease to the reduction mechanism with 1/3 to 1/2 of the quantity listed in Table A-9 or A-10 at the interval recommended in Table A-8. Remove the drain plug from gearbox output section. Replenish grease through the Zerk fitting. After inserting the recommended amount of grease run the unit for five or 10 minutes to circulate the grease and purge any excess. Replace the drain plug and return to service.

When the unit is disassembled for overhauling, refill with the grease quantities indicated in Table A-9 or A-10. Or alternatively, 80% of the space around the reduction mechanism and slow speed shaft bearings of single reduction units, and 50% around the reduction mechanism of both the first and second stage of double reduction units.

Apply grease liberally to the central part (i.e., around the eccentric bearings) of the mechanism. Apply grease to both the slow speed and high speed shaft bearings as you would to ordinary bearings at the time or re-assembly.

If excessive grease is added, agitation heating of the grease will raise the operating temperature of the unit. Avoid excessive greasing, but do not supply an insufficient amount of grease. When the grease is insufficient, it will raise the unit's operating temperature due to breakdown of the lubrication films on the eccentric bearing. In this case, if the operating temperature rises, supply grease immediately.

Table A-9. Single Reduction Grease Quantities[5] oz. (g.)

Frame Size	6060 6065	6070 6075	6080 6085	6090 6095	6100 6105 610H	6110 6115	6120 6125 612H
Speed Reduction Mechanism	0.9 (25)		1.4 (40)	2.1 (60)	4.2 (120)	6.7 (190)	8.8 (250)
Slow Speed Shaft Bearing	0.5 (15)		0.9 (25)	1.1 (30)	1.1 (30)	1.6 (45)	1.9 (55)

Notes: [1] Avoid the use of grease other than shown in Table A-7. For Food-Grade Lubricants, see Appendix D-3.
[2] Consult the factory when the drives are used under widely fluctuating temperatures, ambient temperatures other than those listed in Table A-7, or any other special conditions.
[3] Single reduction frame sizes 6060 ~ 612H and double reduction frame sizes 6060DA ~ 6125DB are maintenance free units. Grease replenishment is not necessary. Where longer life of the drive is expected or if re-lubricating is preferred before the recommended interval, refer to Tables A-7, A-8, A-9 and A-10.
[4] Overhauling consists of disassembling the unit, replacing the seals and gaskets, cleaning the internal parts and then repacking the unit with designated grease.
[5] For non-standard grease units, refer to page Appendix D-2 for grease quantities

BEARINGS, OIL SEALS, GASKETS

Fig. A-9

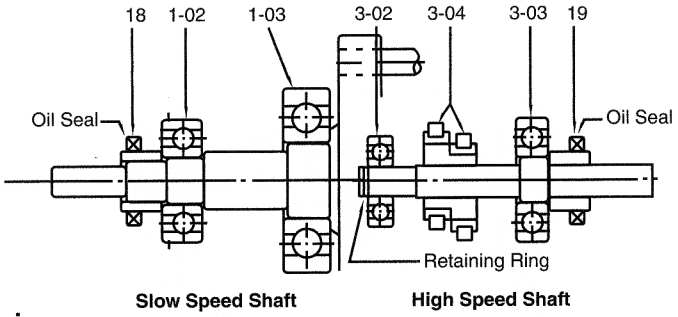


Table A-20. Slow Speed Shaft Bearing

Frame Size		Slow Speed Shaft	
Single Reduction	Double Reduction	Bearing A Part #1-02	Bearing B Part #1-03
6060, 6065	6060DA, 6065DA	6204Z	6909
6070, 6075	6070DA, 6075DA	6204Z	6909
6080, 6085	–	6305Z	6009
6090, 6095	6090DA, 6095DA	6306Z	16011
6100, 6105, 610H	6100DA, 6105DA	6306Z	16011
6110, 6115	–	6307Z	6011
6120, 6125, 612H	6120DA, 6125DA, 6120DB, 6125DB	6308Z	6013
6130, 6135	6130DA, 6135DA, 6130DB, 6135DB, 6130DC, 6135DC	6211NR	6213
6140, 6145,614H	6140DA, 6145DA, 6140DB, 6145DB, 6140DC, 6145DC	22211EXNR	6213
6160, 6165	6160DA, 6165DA, 6160DB, 6165DB, 6160DC, 6165DC	3TM-6213NR[1]	6215[1]
6170, 6175	6170DA, 6175DA, 6170DB, 6175DB, 6170DC, 6175DC	6216NR[1]	6218[1]
6180, 6185	6180DA, 6185DA, 6180DB, 6185DB	6218NR[1]	6220[1]
6190, 6195	6190DA, 6195DA, 6190DB, 6195DB	6221NR[1]	6026[1]
6205	6205DA, 6205DB	22220BNRC2	6222C2
6215	6215DA, 6215DB	23022BNRC2	6224C2
6225	6225DA,6225DB	23024BNRC2	6226C2
6235	6235DA, 6235DB	23026BNRC2	NUP228C2
6245	6245DA, 6245DB	23028BNRC2	NUP230C2
6255	6255DA, 6255DB	23032BNRC2	NUP234C2
6265	6265DA	23034BNRC2	NUP236C2
6275	6275DA	23136BNXR	6340

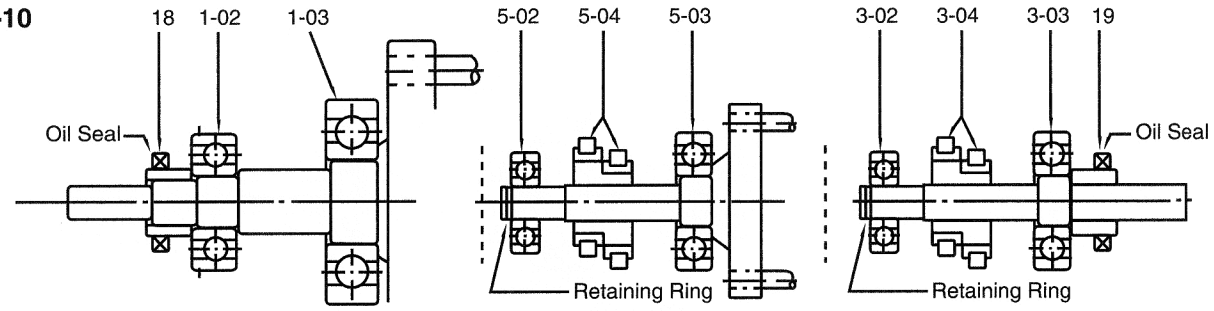
Table A-21. High Speed Shaft Bearing

Frame Size		High Speed Shaft			
Single Reduction	Double Reduction	Bearing C Part #3-02	Bearing D Part #3-03	Eccentric Part #3-04	Qty.
6060, 6065	6060DA, 6065DA, 6070DA, 6075DA	6301	6301Z	607YXX	1
6070, 6075	6090DA, 6095DA, 6100DA, 6105DA, 6120DA, 6125DA, 6130DA, 6135DA, 6140DA, 6145DA	6301	6301Z	607YXX	1
6080, 6085	–	6301SH	6302Z	6004RSH2ZZC3	1
6090, 6095	6120DB, 6125DB, 6130DB, 6135DB, 6140DB, 6145DB, 6160DA, 6165DA, 6170DA, 6175DA	6302RSH2	6302Z	Refer to Table A-22	1
6100, 6105, 610H	6130DC, 6135DC, 6140DC, 6145DC, 6160DB, 6165DB, 6170DB, 6175DB, 6180DA, 6185DA	6302RSH2	6302Z		
6110, 6115	–	6302RSH2	6302Z	611YSS, 611GSS	2
6120, 6125, 612H	6160DC, 6165DC, 6170DC, 6175DC, 6190DA, 6195DA, 6205DA	6304	6305Z	Refer to Table A-22	1
6130, 6135	6180DB, 6185DB, 6190DB, 6195DB, 6205DB, 6215DA, 6225DA	6305	6306		
6140, 6145, 614H	–	6305R	6306		
6160, 6165, 616H	6215DB, 6235DA, 6245DA	6307R	6308		
6170, 6175	6255DA, 6255DB	6406	6407	617YSX	2
6180, 6185	6235DB, 6245DB	6407	6409	618YSX	2
6190, 6195	6255DB, 6265DA, 6275DA	6408	6411	619YSX	2
6205	–	NJ310EV7	21311V1	620GXX	2
6215	–	NJ311EV16	21311V1	621GXX	2
6225	–	NJ312EV11	21312V1	622GXX	2
6235	–	NJ313EV11	21314V1	623GXX	2
6245	–	NJ314EV7	21315V1	624GXX	2
6255	–	NJ316EV1	21318V1	625GXX	2
6265	–	NJ317EV1	21318V1	626GXX	2
6275	–	NJ417	22222BL1	627GXX	2

Note: [1] For grease lubricated models, a sealed bearing should be used, which changes the following letters in the part number to those shown in bold: NR (Std.) – **ZNR;** NXR – **ZNXR;** None – add **Z**.

BEARINGS, OIL SEALS, GASKETS

Fig. A-10



Slow Speed Shaft

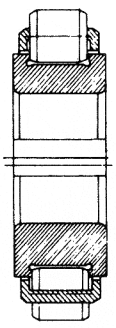
Intermediate Shaft
(For Double Reduction Units)

High Speed Shaft

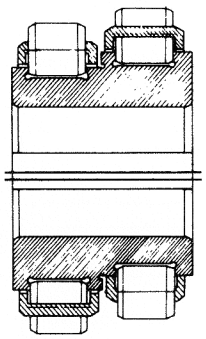
Table A-22. Eccentric Bearing

	Frame Size					
High Speed Shaft, Motor Shaft Part #3-04	**6090, 6095**	**6100, 6105**	**6120, 6125**	**6130, 6135**	**6140, 6145**	**6160, 6165**
Intermediate Shaft Part #5-04 / **Reduction Ratio**	**6090DA 6095DA**	**6100DA 6105DA**	**6120DA, 6125DA 6120DB, 6125DB**	**6130DA, 6135DA 6130DB, 6135DB 6130DC, 6135DC**	**6140DA, 6145DA 6140DB, 6145DB 6140DC, 6145DC**	**6160DA, 6165DA 6160DB, 6165DB 6160DC, 6165DC**
6	60906YRX	6100608YRX	6120608YRX	61406-11YSX	61406-11YSX	6160608YRX2
8	60908-15YSX	6100608YRX	6120608YRX	61406-11YSX	61406-11YSX	6160608YRX2
11	60908-15YSX	61011-15YRX	6121115YSX	61406-11YSX	61406-11YSX	61611-15YSX
13	60908-15YSX	61011-15YRX	6121317YSX	61413-17YSX	61413-17YSX	61611-15YSX
15	60908-15YSX	61011-15YRX	6121115YSX	61413-17YSX	61413-17YSX	61611-15YSX
17	60917YSX	61017YSX	6121317YSX	61413-17YSX	61413-17YSX	61617-25YSX
21	60921YSX	61021YRX	61221YRX	6142125YSX	6142125YSX	61617-25YSX
25	6092529YSX	6102529YRX	6122529YSX	6142125YSX	6142125YSX	61617-25YSX
29	6092529YSX	6102529YRX	6122529YSX	6142935YSX	6142935YSX	6162935YSX
35	60935YSX	61035YRX	61235YRX	6142935YSX	6142935YSX	6162935YSX
43	60943YSX	61043YSX	61243YSX	61443-59YSX	61443-59YSX	6164351YSX
51	60951YRX	61051YRX	6125159YSX	61443-59YSX	61443-59YSX	6164351YSX
59	60959YSX	61059YRX	6125159YSX	61443-59YSX	61443-59YSX	61659YSX
71	60971YRX	61071YRX	6127187YSX	6147187YSX	6147187YSX	61671YRX2
87	60987YSX	61087YRX	6127187YSX	6147187YSX	6147187YSX	61687YSX
119	609119YSX	610119YSX	–	–	–	–

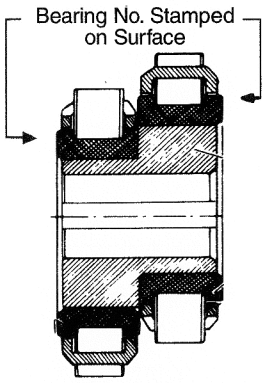
Fig. A-11



Eccentric Bearing Single Type Frame Sizes



Eccentric Bearing Double Type Frame Sizes



Eccentric And Bearings For Eccentric Frame Sizes

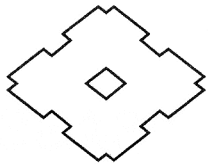


Table A-23. Intermediate Shaft Bearing

Frame Size	Intermediate Shaft				Frame Size	Intermediate Shaft			
	Bearing F Part #5-02	Bearing G Part #5-03	Eccentric Bearing Part #5-04	Qty.		Bearing F Part #5-02	Bearing G Part #5-03	Eccentric Bearing Part #5-04	Qty.
6060DA, 6065DA	6301	6909	607YXX	1	6180DA, 6185DA	6407	6208	618YSX	2
6070DA, 6075DA	6301	6909	607YXX	1	6180DB, 6185DB	6407	6213	618YSX	2
6090DA, 6095DA	6302RSH2	6007	Refer to Table A-22	1	6190DA, 6195DA	6408	6210	619YSX	2
6100DA, 6105DA	6302RSH2	6007			6190DB, 6195DB	6408	6213	619YSX	2
6120DA, 6125DA	6304	6007			6205DA	NJ310EV7	6210	620GXX	2
6120DB, 6125DB	6304	6205			6205DB	NJ310EV7	6310	620GXX	2
6130DA, 6135DA	6305	6007			6215DA, 6215DB	NJ311EV16	6311	621GXX	2
6130DB, 6135DB	6305	6206			6225DA, 6225DB	NJ312EV11	6313	622GXX	2
6130DC, 6135DC	6305	6206			6235DA, 6235DB	NJ313EV11	6314	623GXX	2
6140DA, 6145DA	6305	6007			6245DA	NJ314EV7	6315	624GXX	2
6140DB, 6145DB	6305	6206			6245DB	NJ314EV7	6316	624GXX	2
6140DC, 6145DC	6305	6206			6255DA, 6255DB	NJ316EV1	6318	625GXX	2
6160DA, 6165DA	6307R	6207			6265DA	NJ317EV1	6320	626GXX	2
6160DB, 6165DB					6275DA	NJ417	22220RH	627GXX	2
6160DC, 6165DC	6307R	6208							
6170DA, 6175DA	6406	6207	617YSX	2					
6170DB, 6175DB									
6170DC, 6175DC	6406	6208	617YSX	2					

Table A-24. Oil Seals

Frame Size	Slow Speed Shaft Part #18				High Speed Shaft Part #19		
	Type[1]	Dimension (mm)	Quantity		Type[1]	Dimension (mm)	Quantity
		(I.D. x O.D. x W)	Horizontal Shaft	Vertical Shaft		(I.D. x O.D. x W)	
6060, 6065	D	30 x 47 x 8	1	1	S	17 x 30 x 6	1
6070, 6075	D	30 x 47 x 8	1	1	S	17 x 30 x 6	1
6080, 6085	D	45 x 62 x 9	1	1	S	17 x 30 x 6	1
6090, 6095	D	50 x 72 x 12	1	1	S	20 x 35 x 7	1
6100, 6105	D	50 x 72 x 12	1	1	S	20 x 35 x 7	1
6110, 6115	D	55 x 80 x 12	1	1	S	20 x 35 x 7	1
6120, 6125	D	65 x 90 x 13	1	1	D	32 x 52 x 8	1
6130, 6135	D	68 x 88 x 12	1	2	D	38 x 58 x 11	1
6140, 6145	D	65 x 88 x 12	1	2	D	38 x 58 x 11	1
6160, 6165	D	85 x 110 x 13	1	2	D	55 x 78 x 12	1
6170, 6175	D	95 x 130 x 15	1	2	D	60 x 82 x 12	1
6180, 6185	D	110 x 145 x 15	1	2	D	65 x 88 x 12	1
6190, 6195	D	120 x 155 x 16	1	2	S	70 x 88 x 10	1
6205	D	120 x 155 x 16	1	2	S	70 x 88 x 10	1
6215	D	130 x 160 x 14	1	2	S	75 x 100 x 13	1
6225	D	145 x 175 x 14	1	2	S	75 x 100 x 13	1
6235	D	160 x 190 x 16	1	2	S	85 x 110 x 13	1
6245	D	170 x 200 x 16	1	2	S	95 x 120 x 13	1
6255	D	190 x 225 x 16	1	2	S	110 x 140 x 14	1
6265	D	200 x 240 x 20	1	2	S	110 x 140 x 14	1
6275	D	230 x 270 x 20	1	2	S	120 x 150 x 14	1

Note: [1] D indicates lip (dust proof and seal lip) type.

DISASSEMBLY/ASSEMBLY

Disassembly

SM-CYCLO® Reducers are designed to provide maximum ease when disassembing and reassembling; they require no special maintenance skills.

1. Remove the complete SM-CYCLO® Reducer with adaptor (motorized type) from the driven machine.

2. Remove the plug at the bottom of the oil gauge to drain all oil from the unit.

3. Remove the cooling fan cover and fan from those Speed Reducers (not motorized) equipped with a cooling fan, and stand the unit on a solid base with its high speed shaft side down. Remove the through bolts for the high speed end shield, ring gear housing, and lift the slow speed side, thus separating the unit into two parts so that the inner mechanism can be removed (Figs. A-12 ~ A17).

Note: If the reducer is motorized (C-adaptor and coupling) remove the motor and coupling before following the procedure outlined above. As a final step, remove the adaptor and cooling fan.

4. If the unit will not separate easily, gently drive a wedge at the line X shown in Fig. A-1 on page A-3 (if this produces a burr, be sure to remove it before reassembly).

5. To lift the slow speed side, attach an eyebolt to the tapped hole on the end of the slow speed shaft and use a hoist or chain block (Fig. A-12).

6. Take out the slow speed shaft rollers, item 1-06, page A-3 (Fig. A-13). Check the slow speed shaft pins (1-01) to see whether any rollers have adhered to them.

7. Using both hands, lift out the top cycloid disc (2-04) on the slow speed side (Fig. A-14).

8. Remove the spacer ring (2-05).

9. The eccentric (3-04) can be removed from the input shaft (3-01) after taking out the retaining ring (3-10) and the inner bearing raceway (Figs. A-15, A-16).

Note: In certain sizes, the eccentric bearings are roller bearings without a retainer. Remove bearings of the top disc before proceeding with the next step.

10. Take out the second disc located on the motor side. (Also remove second disc bearings and eccentric with inner bearing raceway if required.)

11. Remove the ring gear housing (2-01).

12. Follow these steps to remove the slow speed shaft (1-01) with its bearings from the casing (26): (a) Remove the horizontal oil seal housing (25). (b) With a wooden or hard rubber mallet, rap the inner end of the slow speed shaft to expose the retaining ring* from the outer raceway of the bearing. (c) Remove the retaining ring. (d) Rap the outer end of the slow speed shaft with a wooden or hard rubber mallet, and remove it from the casing.

13. The high speed shaft (3-01) with bearings is removed from the high speed shaft end shield (8) by tapping the shaft end after first taking off the retaining ring (3-11).

14. The cycloid disc is made from heat-treated bearing steel and the spacer ring is cast iron. Take care not to strike them together while handling.

The above instructions cover complete disassembly. In ordinary cases, however, only the removal of the cycloid discs and the eccentric, and removal of the slow speed shaft from the slow speed end cap is necessary.

***Note:** Retaining ring is part of bearing A (Part No. 1-02).

Assembly

SM-CYCLO® Reducers are reassembled by reversing the disassembly procedure. Care must be taken to exclude dust or foreign matter from the moving parts, and to see that gaskets are properly placed to make the assembly oil-tight.

Following are some helpful points to remember when assembling SM-CYCLO® Reducers.

1. Set the ring gear housing and insert the ring gear pins and rollers; then test-rotate the pins and rollers by hand. (Apply grease liberally to the ring gear pins and rollers before they are inserted in grease lubricated SM-CYCLO® Reducers.)

2. Cycloid discs are a matched pair. Each carries the same number stamped on one side of the disc.

3. Set the cycloid disc with the stamped number face up as shown in Fig. A-17.

4. Insert the spacer (3-07) and then insert the eccentric with bearings by rapping with a wooden or hard rubber mallet (Fig. A-16).

5. Insert the other spacer and the inner bearing raceway. Secure them with the retaining ring (Fig. A-15).

6. Set the spacer ring in place.

7. Insert top disc in such a way that the mark is 180° opposed to the mark on the bottom disc (Fig. A-13).

8. Insert slow speed shaft rollers (Fig. A-13).

9. Put the slow speed shaft pins into the rollers (Fig. A-12). The above instructions are for **eccentric bearings with retainer.** Following are the instructions suggested for **roller bearings without retainer.**

a. First insert the eccentric with inner raceways of bearings by rapping with a wooden or hard rubber mallet.

Fig. A-12

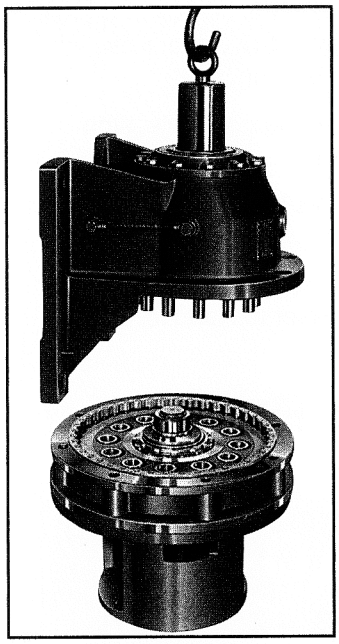


Fig. A-13

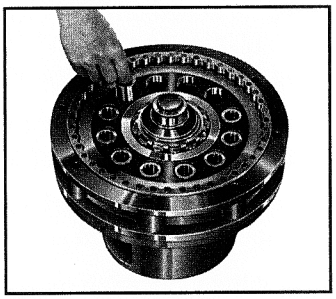


Fig. A-14

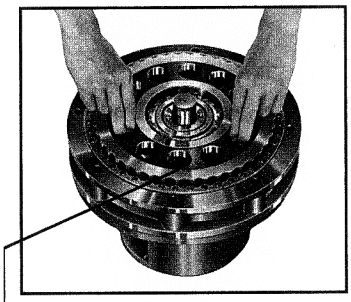


Fig. A-15

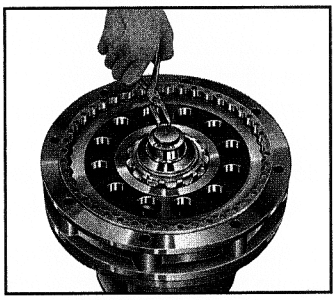


Fig. A-16

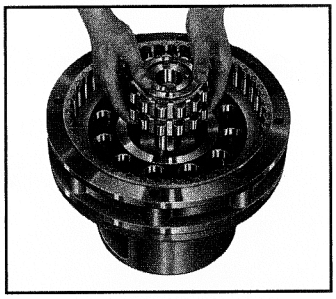
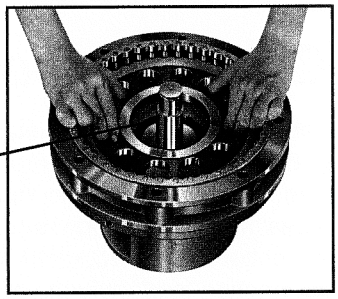


Fig. A-17



Note: Insert second disc with number facing slow speed side, exactly 180° opposed to number on first disc.

Note: Set disc with number facing slow speed side.

b. Apply grease to the raceway of the eccentric on the disc. Fix the rollers and set disc in place.

c. Insert the spacer ring and set second disc in such a way that mark is 180° opposed to mark on the bottom disc.

Eccentric Bearing Replacement Precautions

The eccentric bearings are specially designed for installation on SM-CYCLO® Reducers. They are special roller bearings without outer raceways (refer to the list of bearings on pages A-12 ~ A-13).

It is necessary to insert replacement bearings with numbered surfaces of the inner raceways facing outward. Note that incorrect insertion of the bearings (i.e., insertion of bearings with numbered surfaces inside) causes trouble.

Disassembly and Assembly of Sizes 6060-6095 SM-CYCLO® Reducers

Small sizes 6060-6095 have a single disc system, so they differ in construction from larger sizes in the following ways:

1. A balance weight is provided in lieu of the two-disc system. Refer to figure A-18.

2. The balance weight must be positioned exactly 180° as opposed to that of the eccentric.

3. There are no end plates on either side of the eccentric. In all other respects, 6060-6095 have exactly the same construction as the larger sizes. Follow the instructions given under "Disassembly and Assembly".

Disassembly Of Output Side (6060-612H)

1. With casing supported, tap output shaft until it is disengaged from casing.

2. Remove bearing "A" by using pulling tool.

3. Replace all bearings, gaskets and seals when reassembling. (Pages A-11 ~ A-13).

Assembly Of Output Side (6060-612H)

1. Assemble the "B" bearing (Part No. 1-03) on the slow speed shaft (Part No. 1-01). Heating of "B" bearing is recommended for easier assembly.

Note: Do not exceed temperature of 200°F.

2. Assemble the casing (Part No. 26) over the slow speed shaft (Part No. 1-01), being sure to maintain "X" (Fig. A-18).

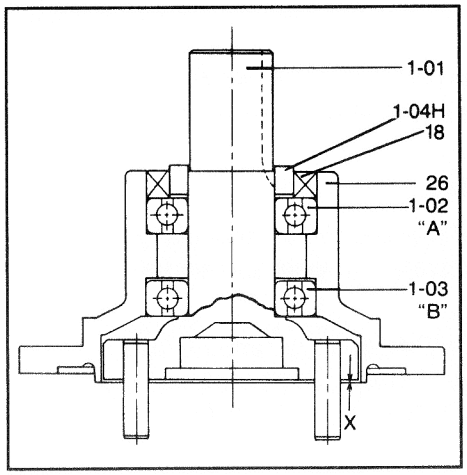
3. Carefully tap bearing "A" (Part No. 1-02) onto the slow speed shaft (Part No. 1-01) until the bearing is flush with the shoulder of the casing.

4. Place the collar (Part No. 1-04H) onto the slow speed shaft (Part No. 1-01). Heating the collar is recommended for easier assembly.

5. Insert the oil seal (Part No. 18), lip in, into the casing (Part No. 26).

Note: Measure for dimension "X" preferably in 3 places to insure proper spacing.

Fig. A-18



X" Dimension (inches)

Frame Size	Dimension
6060/65	0.046 ± 0.007
6070/75 6080/85	0.042 ± 0.007
6090/95	0.046 ± 0.007
6100/05 610H	0.046 ± 0.007
6110/15/20/ 25, 612H	0.042 ± 0.007

DAILY INSPECTION

1. Visually check the oil level gauge on the vertical unit, forced-lubricated type. Check lubrication flow by viewing piping set and oil signal (Part No. 41). Faulty operation is caused by a lack of lubrication oil, damage to the plunger pump (Part No. 42) or the positive displacement pump (Part No. 43) or the clogging of pipes, etc. In case of faulty operation, stop and inspect the unit immediately.

2. A temperature rise of approximately 105°F (40.6°C) above ambient on the surface of the ring gear housing (Part No. 2-01) is allowable if the temperature fluctuation is small. If temperature rises rapidly from a stable condition, add the recommended oil or grease (Tables A-7 and A-11). A rapid temperature rise may be caused from a lack of lubrication.

If after lubricating unit, the problem persists, stop operation and consult factory.

3. When an abnormal sound is heard from inside the unit, stop operation and inspect the unit.

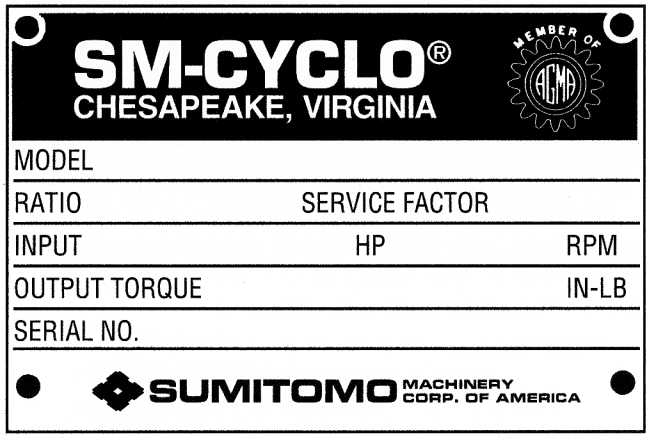
4. If the lubrication oil leaks, replace the damaged or worn part with a new one. (Refer to Part No. 1-04H, Page A-3.)

Ordering Correct Replacement Units Or Parts

The SM-CYCLO® is fully standardized to offer maximum part interchangeability among models of the same frame size. However, there are many frame sizes, models and types in the production range of SM-CYCLO®. Therefore to get correct replacement units or parts, proper information to identify the speed reducer in question is essential. The name plate, which is secured to the body of the drive, provides this identifying data.

Please give the full description shown on the name plate to your distributor. Be sure to include the *SERIAL NUMBER* and *MODEL NUMBER*. This information, along with our production records, will enable us to provide you with the correct replacement unit or parts.

Name Plate on SM-CYCLO®



Storage And Operation After Storage

Storage 6 Months–1 Year

Oil-Lubricated

1. Completely fill unit(s) with a rust-preventive oil (NP20 or equivalent) or a circulating oil (Shell VSI No. 100 or equivalent).

2. At approximately 3 month intervals, rotate the input shaft a sufficient number of times to insure all internal components remain coated. (The higher the ratio, the greater the amount of rotations needed for proper lubrication.)

Grease-Lubricated

Grease-lubricated models do not require any special attention during storage. (Inspect unit before operation.)

Note: For both the *Oil-Lubricated* and *Grease-Lubricated* models, if units are to be stored for a period exceeding 1 year, consult factory.

Operation After Storage 6 Months–1 Year

Oil-Lubricated

1. Completely drain the rust preventive, or circulating oil from unit.

2. Flush unit with the recommended operating oil as shown in Table A-11.

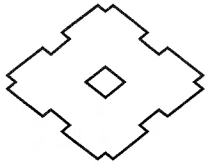
3. After flushing, fill the unit to the proper oil level with the recommended lubricating oil.

Grease-Lubricated

Add ½ of the recommended quantity of new grease as shown in Table A-10.

Note: Consult the factory before operating units stored for periods greater than 1 year.

TROUBLESHOOTING AND REPAIR



This troubleshooting guide is to help you identify and overcome common problems of reducers. If you have a problem not listed below, please consult factory.

PROBLEM WITH THE REDUCER		POSSIBLE CAUSES	SUGGESTED REMEDY
Runs Hot	Overloading	Load exceeds the capacity of the reducer.	Check rated capacity of reducer, replace with unit of sufficient capacity or reduce load.
	Improper Lubrication	Insufficient lubrication.	Check lubricant level and adjust up to recommended levels.
		Excessive lubrication.	Check lubricant level and adjust down to recommended level.
		Wrong lubricant.	Flush out and refill with correct lubricant as recommended.
Runs Noisy	Loose Foundation Bolts	Weak mounting structure.	Inspect mounting of reducer. Tighten loose bolts and/or reinforce mounting and structure.
		Loose hold down bolts.	Tighten bolts.
	Worn Disc	Overloading unit may result in damage to disc.	Disassemble and replace disc. Recheck rated capacity of reducer.
	Failure of Bearings	May be due to lack of lubricant.	Replace bearing. Clean and flush reducer and fill with recommended lubricant.
		Overload.	Check rated capacity of reducer, replace with unit of sufficient capacity or reduce load.
	Insufficient Lubricant	Level of lubricant in the reducer not properly maintained.	Check lubricant level and adjust to factory-recommended level.
	Damaged Pins & Rollers	Overloading of reducer.	Disassemble and replace ring gear pins and rollers. Check load on reducer.
Output Shaft Does Not Turn	Input Shaft Broken	Overloading of reducer can cause damage.	Replace broken shaft. Check rated capacity of reducer.
		Key missing or sheared off on input shaft.	Replace key.
	Eccentric Bearing Broken	Lack of lubricant.	Replace eccentric bearing. Flush and refill with recommended lubricant.
		Coupling loose or disconnected.	Properly align reducer and coupling. Tighten coupling.
Oil Leakage	Worn Seals	Caused by dirt or grit entering seal.	Replace seals. Breather filter may be clogged. Replace or clean filter.
		Overfilled reducer.	Check lubricant level and adjust to recommended level.
		Vent clogged.	Clean or replace element, being sure to prevent any dirt from falling into the reducer.
		Improper mounting position, such as wall or ceiling mount of horizontal reducer.	Mount horizontally or rework reducer to wall or ceiling mount.

Torque Control Drawings

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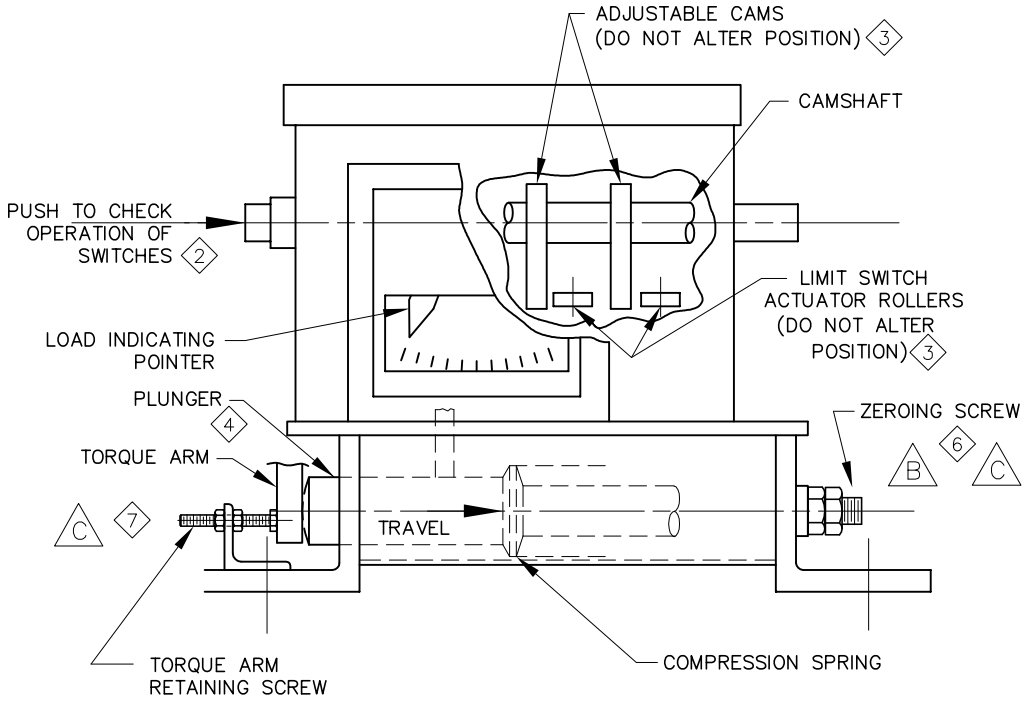


(1) THE TORQUE CONTROL IS AN ELECTRO – MECHANICAL DEVICE DESIGNED TO PROTECT THE DRIVE AND MECHANISM FROM OVERLOAD CAUSED BY EXTREME TORQUE BUILD – UP DUE TO A VARIETY OF UNUSUAL OPERATING CONDITIONS.

THE DEVICE IS ACTUATED BY THE TORQUE ARM OF THE ADAPTER PLATE UPON WHICH THE SPEED REDUCER IS MOUNTED, SUPPORTED BY A PIVOT BEARING, WHICH IS FREE TO ROTATE IN REACTION TO THE TORQUE LOAD BEING IMPOSED UPON THE SPEED REDUCER. THE TORQUE ARM EXERTS A FORCE AGAINST A CALIBRATED COMPRESSION SPRING. AS TORQUE ON THE SCRAPER MECHANISM INCREASES THE SPRING DEFLECTION MOVEMENT IS TRANSMITTED BY A VERTICAL ROD TO THE SHAFT UPON WHICH THE CAMS ARE MOUNTED. THE POSITION OF THE CAMS TO THE ROLLERS OF THE LIMIT SWITCHES HAS BEEN SET IN WESTECH'S SHOP FOR ALARM AND CUTOUT. THE PERCENTAGE OF TORQUE LOAD IS INDICATED BY A POINTER AND A SCALE VISIBLE FROM THE FRONT OF THE UNIT. UNDER NORMAL CONDITIONS TORQUE WILL NOT BE SUFFICIENT TO ACTUATE THE ALARM CONTROLS.

AS THE TORQUE INCREASES AND THE POINTER MOVES TOWARDS THE UPPER PORTION OF THE PERCENTAGE SCALE AN ALARM IS ACTUATED ALERTING THE OPERATOR OF AN IMPENDING OVERLOAD. IF THE OVERLOAD CONDITION IS NOT CORRECTED AND CONTINUES TO BUILD UP UNTIL THE SECOND SWITCH IS ACTUATED, THE DRIVE MOTOR WILL CUT – OUT AND THE MECHANISM WILL AUTOMATICALLY STOP. WITH THE SCRAPER ARMS STOPPED THERE IS NO OVERLOAD FOR THE TORQUE CONTROL TO READ, SO WHILE THE OVERLOAD CONDITION IS BEING CORRECTED, MEANS MUST BE PROVIDED IN THE ELECTRICAL CONTROLS TO PREVENT THE MOTOR FROM COMING ON PREMATURELY.

2 TO CHECK THE OPERATION OF SWITCHES, THE CONDITIONS OF AN OVERLOAD MAY BE SIMULATED BY PUSHING THE BRASS ROD COVERED WITH A RUBBER CAP LOCATED ON THE LEFT SIDE OF THE UNIT. THIS IS TO BE DONE AT THE TIME OF START – UP AND WEEKLY AFTER THE MACHINE IS PUT INTO OPERATION.

3 DO NOT ALTER THE FACTORY SET POSITION OF LIMIT SWITCH ACTUATORS AS DAMAGE TO THE DRIVE AND MECHANISM CAN OCCUR. THIS ALSO VOIDS ANY WARRANTY.

4 SPRAY OIL (WD–40 OR EQUAL) WEEKLY TO LUBRICATE THE PLUNGER FOR FREE MOVEMENT.

A

A

(5) TORQUE TRANSMITTER (OPTIONAL) SHALL BE CALIBRATED TO SHOW 4ma AT ZERO TORQUE AND 20ma AT FULL DIAL TORQUE.

6 NUTS ON ZEROING SCREW CAN BE ADJUSTED TO BRING LOAD INDICATING POINTER UP TO ZERO. TORQUE ARM RETAINING SCREW SHOULD NOT BE USED TO ADJUST THE POINTER.

C

7 RETAINING SCREW IS INTENDED TO KEEP THE TORQUE ARM IN PLACE AND TOUCHING THE PLUNGER AT THE ZERO POSITION ON THE SCALE. THE RETAINING SCREW/BRACKET IS INTENDED TO BEND OR BREAK IF THE DRIVE IS RUN IN REVERSE. THIS PROTECTS THE MECHANISM FROM MORE COSTLY DAMAGE.

REVISION	BY	CHKD	DATE	LTR
ADDED SECOND NUT TO RETAINING SCREW, ADDED NOTES 6 AND 7	TAP	JJ	11–07	C
ADDED SECOND NUT TO ZEROING SCREW	RHS	JAJ	03/06	B
NOTE 5 ADDED, OR EQUAL ADDED	DK	JJ	5–04	A

D

TORQUE CONTROL DEVICE

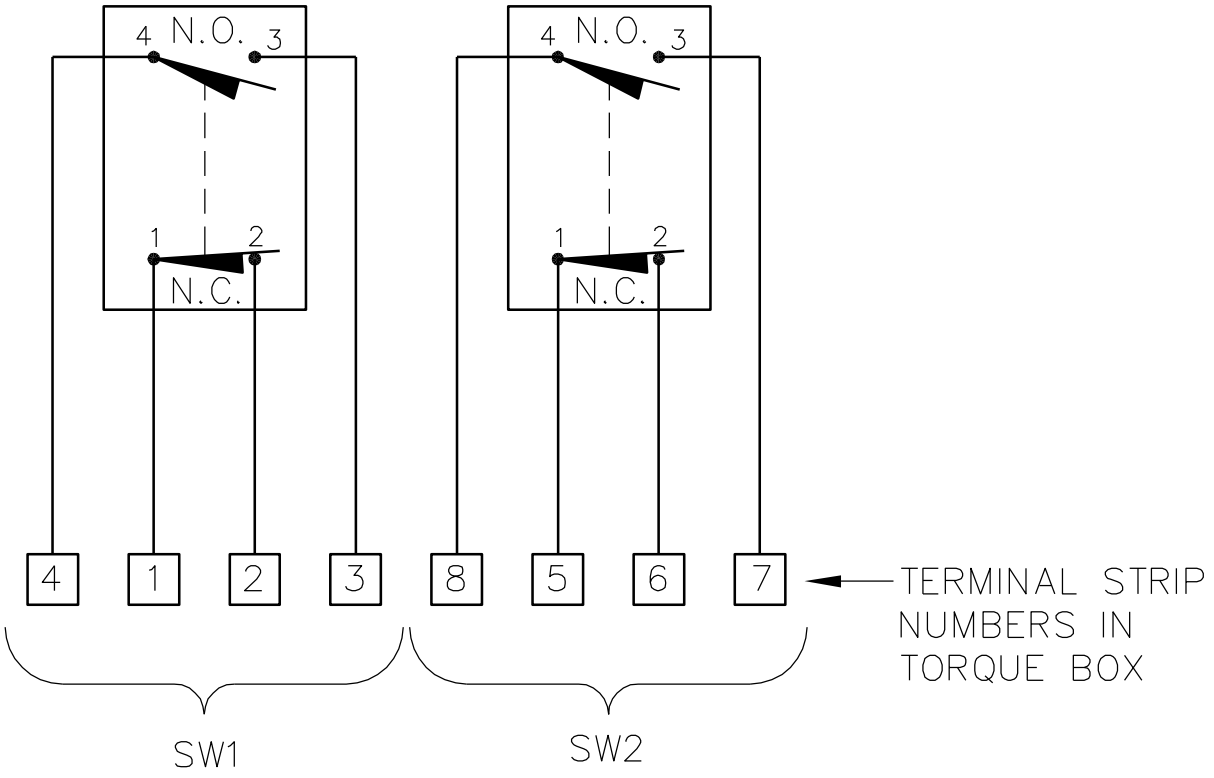
DESCRIPTION								
TYPE				SIZE				
				NONE	11–03	MPW	NK	JJ
DATE	STD. BY	STD.CHKD.	STD.APPVD	SCALE	DATE	PROJ. BY	PROJ.CHKD.	PROJ.APPVD

ALL COMPONENTS MUST BE FABRICATED AND MACHINED ACCORDING TO WESTECH STANDARD SPECIFICATION (DRAWING P24Z–024A), UNLESS SPECIFICALLY NOTED ON THIS DRAWING.

WESTECH

DRAWING NUMBER	PROJECT NUMBER	REV.
7 –8222 B1		C

REVISION	BY	CHKD	DATE	LTR
				A
				B
				C
				D



NOTES:

1. FIELD CONNECTIONS MAY BE WIRED TO N.O. OR N.C. CONTACTS DEPENDING ON FIELD REQUIREMENTS.
2. SWITCH FUNCTIONS SHALL CORRESPOND WITH THE SUGGESTED ELECTRICAL SCHEMATIC
3. TERMINAL ARRANGEMENT IS SEQUENTIALLY TYPICAL FOR 3 OR 4 SWITCH TORQUE BOXES
4. SWITCHES ARE RATED 600 VOLT MAX.
5. MEETS NEMA 3, 4, 4X, 6P, & 13 (B)

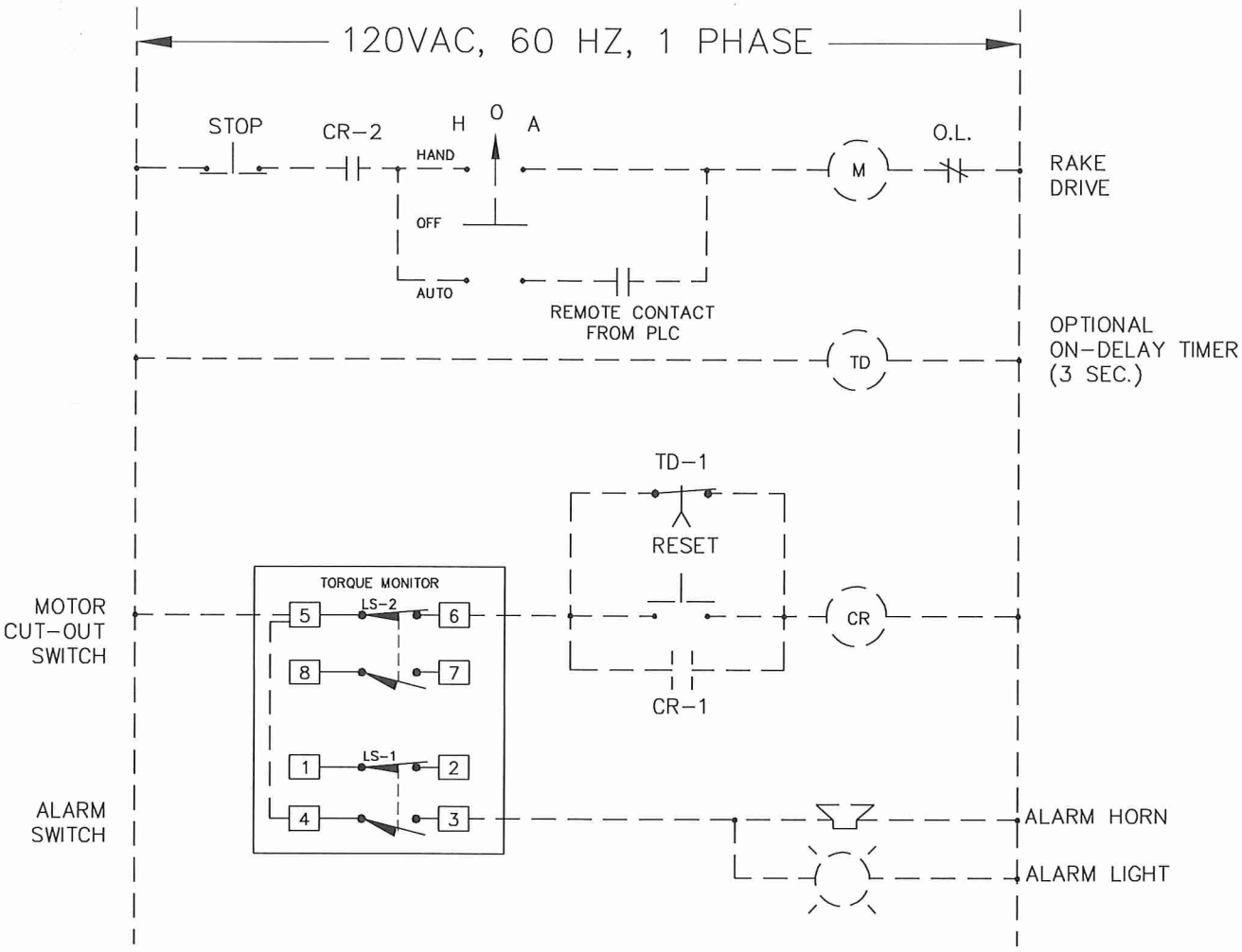
TORQUE BOX – TERMINAL BLOCK

DESCRIPTION								
MICROSWITCH #LSA1A (A)					$1\frac{15}{16} \times 3\frac{7}{16} \times 3\frac{9}{16}$			
TYPE					SIZE			1, X 1
3-88	OTO	MKD	RAC	NONE				
DATE	STD. BY	STD.CHKD.	STD.APPVD	SCALE	DATE	PROJ. BY	PROJ.CHKD.	PROJ.APPVD

ALL COMPONENTS MUST BE FABRICATED AND MACHINED ACCORDING TO WESTECH STANDARD SPECIFICATION (DRAWING P24Z-024A), UNLESS SPECIFICALLY NOTED ON THIS DRAWING.

WESTECH	DRAWING NUMBER	PROJECT NUMBER	REV.
	TB-000A		(B)

REVISION	BY	CHKD	DATE	LTR
				A
				B
				C
				D



NOTES: 1–ALL DASHED LINES REPRESENT WIRING AND EQUIPMENT NOT BY WESTECH ENGINEERING

ELECTRICAL SCHEMATIC (SUGGESTED)

DESCRIPTION

TORKMATIC

MODEL

SIZE 1 X 1

8-22-02	MDW	NET	STD	NONE				
DATE	STD. BY	STD.CHKD.	STD.APPVD	SCALE	DATE	PROJ. BY	PROJ.CHKD.	PROJ.APPVD

WESTECH

DRAWING NUMBER	PROJECT NUMBER	REV.
TB-46A		0

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Section Five: Enclosures

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Procedure for Ordering Spare and Replacement Parts

Spare or replacement parts may be ordered from the Aftermarket Sales Department at:

WesTech Engineering, LLC
3665 South West Temple
Salt Lake City, Utah 84115
Phone: 801.265.1000
Fax: 801.265.1080
Email: parts@westech-inc.com
Web: www.westech-inc.com

If you would like to talk directly to an Aftermarket Sales representative during normal business hours (8:00 am to 4:30 pm MST), dial 801.265.1000 and ask for the Aftermarket Sales Department. You may fax your order to 801.265.1080.

To use the 24-hour service/emergency line after hours (4:30 pm to 8:00 am), dial 801.265.1000. Please indicate to the Answering Service Operator whether your facility is Water, Waste Water, or Industrial. They will inform you that a WesTech Representative will call and assist you with your problem.

If you would like to e-mail a spare parts order, simply e-mail your request to us at parts@westech-inc.com, and a WesTech representative will process your order and follow up with an Order Acknowledgment.

Spare parts may also be requested directly from our web page www.westech-inc.com. Simply go to the web page, click on Parts and Service. If you know the part number and job information you need, you can input it directly. A WesTech Representative will process your request and follow up with a purchase quotation, or a return phone call to confirm that your request has been received.

For convenience, a 'Recommended Spare Parts List' is provided in this manual. This is a guide for the appropriate level of spares to keep on hand minimizing lost time due to unscheduled breakdowns. Each item listed in the Recommended Spare Parts List is identified within one of the following categories:

- Normal maintenance and Wear items.
- Long Lead Items (minimum downtime).

Should you require further assistance in determining which spare parts are appropriate for your particular situation please contact WesTech's After Market Sales department.

To avoid unnecessary delays in obtaining the correct spare or replacement parts for your equipment, be sure to give the following information with each order.

1. Identify equipment using the WesTech Job number. Your equipment is identified as follows:

   WesTech Job Number: 24587A
   WesTech Model Number: COPC2

2. Identify the part by name and give the number of the drawing on which this part or assembly appears.
3. Identify the part number.
4. Identify the size and include all pertinent dimensions (such as diameter, length, thickness, bore, pitch, etc.) whenever possible.
5. If parts being ordered are electrical, give all pertinent data such as voltage, amperage, wattage, cycles, speed, power factor, or other information given on the parts nameplate or included in the parts brochure.
6. Submit your written purchase order or request for a quotation, both signing and printing your full name so that WesTech will know whom to contact should further clarification of the inquiry be necessary. All verbal orders must be verified in writing.
7. Give a return address and a shipping address.
8. Give a preferred method of shipping: i.e., UPS, truck freight, rail freight, air express, etc.
9. Indicate the quantity desired.
10. Provide instructions for proper invoicing.

All spare or repair parts orders are subject to a $100.00 minimum order charge.

Explanation of Parts List and Drawing Numbers

Item Numbers

Item numbers identify a part shown on the general arrangement and general erection drawings. Item numbers are in circles on the drawing with an arrow pointing to the part. On the parts list, item numbers are found in the left-most column of the list. Item numbers are three-digit numbers.

Drawing Numbers

The aforementioned item number may have a corresponding drawing number. These drawing numbers identify any parts that may have shop drawings. Shop drawings are not included in the operation and maintenance manual as they are proprietary information. Drawing numbers are represented by four numeric characters.

Both item and drawing numbers are provided as a quick reference should you need to identify or order additional parts during the life of your WesTech equipment.

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Drawing Number	Dwg Rev	Description of Parts	Material	Weight per Item	Line Rev
							REFERENCE DRAWINGS:			-
					1000	-	GENERAL NOTES			-
					1001	A	GENERAL ARRANGEMENT-TANK CUTAWAY VIEW			-
					1002	-	GENERAL ARRANGEMENT-ELEVATION VIEW			-
					1003	A	GENERAL ARRANGEMENT-PLAN VIEW			-
					1004	A	GENERAL ARRANGEMENT-CONCRETE TANK			-
					1005	-	GENERAL ARRANGEMENT DETAILS			-
					1009	-	GENERAL ARRANGEMENT-CENTER ANCHORAGE DETAIL			-
										-
							CLARIFIER ERECTION DRAWINGS:			-
					1010	-	GENERAL ERECTION-TANK CUTAWAY VIEW			-
					1011	-	GENERAL ERECTION-PLAN VIEW			-
					1012	-	MISCELLANEOUS ERECTION DETAILS			-
					1013	-	RAKE ARM ERECTION DETAIL			-
										-
							REFERENCE SPECIFICATIONS:			-
				WAST0001	WAST0001	E	FIELD ERECTION REFERENCE TAG	----		-
				P24Z-024A	P24Z-024A	E	WESTECH STANDARD SPECIFICATION	----		-
					1014	-	FABRICATION AREA CLEANING REQUIREMENTS GRADE "Z"			-
										-
							REFERENCE PARTS LIST(S):			-

Figure 6.1 Parts List Example

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Recommended Spare Parts List

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WESTECH®

3665 SOUTH WEST TEMPLE, SALT LAKE CITY, UT 84115

Phone (801) 265-1000 / Fax (801) 265-1080

24 Hour Emergency Assistance (801) 265-1000

E-Mail: parts@westech-inc.com

Recommended Spare Parts List

WesTech Job No.: 24587A **Date Prepared:** April 27, 2022 **Prepared by:** SALBERTSON

Proposal Valid for: 90 days **FOB Ship Pt. w/Frt:** Prepay & Add **Payment Terms:** Net 30 Days

In order to increase the life of your equipment, and avoid costly downtime, WesTech recommends that you maintain your equipment at regular intervals. To do this, WesTech recommends, at a minimum, that you have the below mentioned items on hand at all times. Long lead items that could significantly minimize downtime as well as normal maintenance and wear items are included in this list.

Item Number	Drawing Number	Item Description	Recommended Quantity
	Parts List No: 69925		
455	ACL-00021 A	FLOOR CLIP ASSEMBLY (FOR PLATE)	80.00
468	1-13047	SQUEEGEE, 20 GA x 4 x 27, 304 SS,	160.00
740	1-36296-MOD	SKIMMER SCUM FLUSHING VALVE	8.00
750	1-19214	SKIMMER ASSY 3FT, 4"SUPPORT, SINGLE BLADE	8.00
750.1.4	SKXDT011	SKIMMER BOTTOM WIPER 3FT NPRN	8.00
750.1.5	SKXDT015	SKIMMER SIDE WIPER NPRN	8.00
750.1.6	SKXDT045	SKIMMER SIDE BAFFLE WIPER BLADE BLACK UHMWPE	8.00

Please call, for current price and availability

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Mechanism Parts List

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WESTECH

Description **PRIMARY CLARIFIER ERECTION**

Parts List Number **69925** Rev. **-** Quantity **4** Date **2/21/2022**

Job Name **TAUNTON WWTF PHASE 1** Size **55'-0 DIAMETER** Designer **TH43**

Job Number **24587A** Type **COP™ CLARIFIER** Checked **HU02**

Model No **COPC2** Weight **40,232** lbs Approved **PO07**

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
							GENERAL ARRANGEMENT DRAWINGS & GENERAL NOTES:			-
					0000647822	B	GENERAL NOTES			-
					0001881753	A	GENERAL ARRANGEMENT			-
										-
							REFERENCE PARTS LISTS:			-
010	1	4	EA		68468	-	DRIVE ASSEMBLY			-
										-
							SURFACE PREPERATION AND COATING DOCUMENTS:			-
					0001894485	-	COATING DATA SHEET SUBMERGED WASTEWATER			-
										-
							WESTECH STANDARD SPECIFICATIONS & DRAWINGS:			-
					QR-00-063	I	WESTECH WORKMANSHIP STANDARD			-
										-
							FABRICATION/ERECTION DRAWINGS AND BUYOUT PARTS:			-
					0001881288	-	GENERAL ERECTION			-
										-
100	2	8	EA		0001881077	-	RAKE ARM TRUSS	STL	965	-
										-
130	2	8	EA		0001880622	-	SPIRAL BLADE - A	STL	46	-
131	2	8	EA		0001880606	-	SPIRAL BLADE - B	STL	58	-
132	2	8	EA		0001880592	-	SPIRAL BLADE - C	STL	73	-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
										-
140	2	8	EA		0001880438	-	SPIRAL BLADE SUPPORT BRACE - A (INNER TRAILING)	STL	13	-
145	2	8	EA		0001881010	-	SPIRAL BLADE SUPPORT BRACE - D (OUTER LEADING)	STL	18	-
										-
148	2	8	EA		0001881837	-	SPIRAL BLADE SUPPORT - A (INNER TRAILING)	STL	12	-
153	2	8	EA		0001880446	-	SPIRAL BLADE SUPPORT - D (OUTER LEADING)	STL	20	-
										-
156	2	8	EA		0001881648	-	SPIRAL BLADE SUPPORT PIPE - A (TRAILING)	STL	4	-
157	2	8	EA		0001880502	-	SPIRAL BLADE SUPPORT PIPE - B (LEADING)	STL	4	-
										-
164	1	1	EA		0001881364	-	SLUDGE SCRAPER (TANK 4)	STL	17	-
										-
167	1	3	EA		0002110401	-	SLUDGE SCRAPER (TANKS 1-3)	STL	27	-
										-
232	1	4	EA		0001880957	-	CAGE TRUSS	STL	633	-
233	4	16	EA		0001882562	-	CAGE BRACE	STL	7	-
										-
234	1	1	EA		0001881304	-	CENTER COLUMN (TANK 4)	STL	1384	-
										-
237	1	3	EA		0002110485	-	CENTER COLUMN (TANKS 1-3)	STL	1080	-
										-
250	1	3	EA		0001880874	-	WALKWAY WITH PLATFORM (TANKS 1-3)	STL	1482	-
										-
252	1	1	EA		0001894592	-	WALKWAY WITH PLATFORM (TANK 4)	STL	2058	-
										-
260	4	16	EA		0001882292	-	FEEDWELL SECTION	STL	261	-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
264	4	16	EA	1-938	1-938	0	SCUM BAFFLE, FEEDWELL, SST	SST	4	-
270	4	16	EA		0001882373	-	FEEDWELL SUPPORT	STL	61	-
										-
300	2	8	EA		0001882154	-	SKIMMER SUPPORT	STL	266	-
305	2	8	EA		0001880867	-	SKIMMER ARM	STL	102	-
306	2	8	EA		0001881800	-	SKIMMER BLADE	STL	190	-
311	2	8	EA	SKXDT033A	SKXDT033	A	SKIM BLADE WELL CLAMP	STL	7	-
312	2	8	EA	SKXDT034A	SKXDT034	A	SKIMMER BLADE SPLICE SUPPORT 316 SS	316	3	-
314	2	8	EA	FVXDT013C	FVXDT013	D	SKIMMER VALVE ACTUATOR, 304 SS	304	3	-
										-
315	1	4	EA	SDSBX027A	SDSBX027	B	SCUM BOX, 3 FT	STL	264	-
										-
316	1	3	EA		0001942602	-	SCUM BOX SUPPORT - LEADING (TANKS 1-3)	STL	75	-
317	1	3	EA		0001881565	-	SCUM BOX SUPPORT -TRAILING (TANKS 1-3)	STL	71	-
										-
318	1	1	EA		0001942610	-	SCUM BOX SUPPORT - LEADING (TANK 4)	STL	200	-
319	1	1	EA		0001942615	-	SCUM BOX SUPPORT - TRAILING (TANK 4)	STL	161	-
320	2	2	EA		0001942617	-	SCUM BOX SUPPORT BRACE - A (TANK 4)	STL	17	-
321	1	1	EA		0001942593	-	SCUM BOX SUPPORT BRACE - B (TANK 4)	STL	25	-
										-
400	2	8	EA	SDWWB008	SDWWB008	0	SLIDE PLATE, 6" X 8" X 1/8"	UHMW		-
401	2	8	EA	SDWWB007	SDWWB007	0	BEARING PLATE, 6" X 8" X 3/8"	304	5	-
										-
425	1	3	LOT		0001880894	-	GRATING - WALKWAY (TANKS 1-3)	AL		-
										-
427	1	1	LOT		0001894629	-	GRATING - WALKWAY (TANK 4)	AL		-
										-
428	1	4	EA		0002061040	-	STAIR TREAD	AL		-
										-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
441	1	4	EA		0001881964	-	FLOORPLATE - PLATFORM LEFT SIDE	AL		-
442	1	4	EA		0001880959	-	FLOORPLATE - PLATFORM RIGHT SIDE	AL		-
443	1	4	EA		0001881485	-	FLOORPLATE - PLATFORM FRONT	AL		-
444	1	4	EA		0001882171	-	FLOORPLATE - PLATFORM REMOVABLE 1	AL		-
445	1	4	EA		0001881968	-	FLOORPLATE - PLATFORM REMOVABLE 2	AL		-
										-
450	1	3	LOT		0001882634	-	HANDRAIL (TANKS 1-3)	AL		-
										-
452	1	1	LOT		0001894605	-	HANDRAIL (TANK 4)	AL		-
										-
455	20	80	EA	ACL-00021A	ACL-00021 A	B	FLOOR CLIP ASSEMBLY (FOR PLATE)	304		-
										-
457	1	4	EA	2-50020		-	CPLG, PIPE, RDCG, FLEX, 6 HOSE CLAMP x 4 HOSE CLAMP	SST-PVC		-
										-
460	1	4	EA	1-8876	1-8876	-	NAMEPLATE, WESTECH, LARGE	CAST AL		-
461	2	8	EA	3225T15		-	TENSION BAND STRAP , 1-3/4" (HANGERS) W/EPDM CUSHION	---		-
										-
468	40	160	EA	1-13047	1-13047	-	SQUEEGEE, 20 GA x 4 x 27, 304 SS,	304		-
										-
500	1	4	LOT				EPOXY INSTALLATION KIT: SIMPSON SET-3G			-
										-
504	4	16	EA	2-29613		-	STUD, FULL THD, 0.625-11UNC x 7 (EMBEDMENT: 5 1/2")	316	.68	-
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	4	16	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
	1	4	LOT	----------	----------		EPOXY: SIMPSON SET-3G	EPOXY		-
							(SCUM BOX SUPPORT ANCHOR)			-
										-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
505	2	8	EA	2-29649		-	STUD, FULL THD, 0.75-10UNC x 8.5 (EMBEDMENT: 4 1/2")	316		-
	4	16	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	4	16	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
	1	4	LOT	----------	----------		EPOXY: SIMPSON SET-3G	EPOXY		-
							(WALKWAY ANCHOR)			-
										-
507	8	32	EA	2-48271		-	STUD, FULL THD, 0.75-10UNC x 14 (EMBEDMENT: 10")	316		-
	16	64	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	16	64	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
	1	4	LOT	----------	----------		EPOXY: SIMPSON SET-3G	EPOXY		-
							(CENTER COLUMN ANCHOR)			-
										-
519	8	32	EA	2-24676		-	STUD, FULL THD, 1-8UNC x 13	316	2.94	-
	32	128	EA	2-6050		-	NUT, HEX, 1-8UNC	316	.25	-
	32	128	EA	2-5470		-	WSHR, FLAT, 1	316	.07	-
	16	64	EA	2-26325		-	NUT, JAM, 1-8UNC	316		-
							(RAKE ARM TO CAGE - TOP)			-
										-
523	4	16	EA	2-7677		-	STUD, FULL THD, 1-8UNC x 12	316	2.71	-
	16	64	EA	2-6050		-	NUT, HEX, 1-8UNC	316	.25	-
	16	64	EA	2-5470		-	WSHR, FLAT, 1	316	.07	-
							(LEVELING CAGE TO DRIVE)			-
										-
531	8	32	EA	ACL-00025-E	ACL-00025	B	U-BOLT, STRUCTURAL, 1 1/2", W/ 4 N & 2 FW	316		-
							(SPIRAL BLADES TO SUPPORTS)			-
										-
540	2	8	EA	2-6670		-	CAP SCR, HEX, 0.25-20UNC x 1.25	316	.02	-
	2	8	EA	2-6043		-	NUT, HEX, 0.25-20UNC	316	.01	-
	2	8	EA	2-5452		-	WSHR, FLAT, 0.25	316		-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
							(NAMEPLATE TO TENSION BAND/HANDRAIL)			-
										-
560	82	328	EA	2-6675		-	CAP SCR, HEX, 0.375-16UNC x 1.25	316	.06	-
	82	328	EA	2-6045		-	NUT, HEX, 0.375-16UNC	316	.02	-
	164	656	EA	2-5459		-	WSHR, FLAT, 0.375	316	.01	-
							(SQUEEGEE BOLTS)			-
										-
565	49	196	EA	2-6688		-	CAP SCR, HEX, 0.5-13UNC x 1.75	316	.14	-
	49	196	EA	2-6046		-	NUT, HEX, 0.5-13UNC	316	.04	-
	98	392	EA	2-5461		-	WSHR, FLAT, 0.5	316	.02	-
							(HANDRAIL TO WALKWAY WITH PLATFORM)			-
										-
571	8	32	EA	2-6686		-	CAP SCR, HEX, 0.5-13UNC x 1.25, FULL THREAD	316	.14	-
	8	32	EA	2-6046		-	NUT, HEX, 0.5-13UNC	316	.04	-
	8	32	EA	2-5461		-	WSHR, FLAT, 0.5	316	.02	-
							(SCUM BAFFLE TO FEEDWELL)			-
										-
580	4	16	EA	2-6675		-	CAP SCR, HEX, 0.375-16UNC x 1.25	316	.06	-
	4	16	EA	2-6045		-	NUT, HEX, 0.375-16UNC	316	.02	-
	8	32	EA	2-5459		-	WSHR, FLAT, 0.375	316	.01	-
							(STAIR TREAD BOLTS)			-
										-
602	8	32	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	8	32	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	16	64	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SKIMMER BLADE TO SUPPORT)			-
										-
603	8	32	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	8	32	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
	16	64	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SPIRAL BLADE PIPE SUPPORT TO RAKE ARM)			-
										-
604	4	16	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	8	32	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SPIRAL BLADE SUPPORT BRACE TO RAKE ARM)			-
										-
607	4	16	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	8	32	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SCUM BOX TO SUPPORT)			-
										-
608	3	12	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	3	12	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	6	24	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SCUM BOX TO BAFFLE)			-
										-
614	4	16	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	8	32	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SPIRAL BLADE SUPPORT TO RAKE ARM)			-
										-
615	4	16	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	8	32	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SPIRAL BLADE SUPPORT TO BRACE)			-
										-
616	4	16	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	8	32	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SPIRAL BLADE SPLICE)			-
										-
618	4	16	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	8	32	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SLUDGE SCRAPER TO RAKE ARM)			-
										-
619	4	16	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	8	32	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(CLAMP PLATE TO SKIMMER BLADE)			-
										-
620	8	32	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	8	32	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	16	64	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SKIMMER ARM TO SUPPORT)			-
										-
622	16	64	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	16	64	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	32	128	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(FEEDWELL SPLICE)			-
										-
642	4	16	EA	2-6687		-	CAP SCR, HEX, 0.5-13UNC x 1.5	316	.12	-
	4	16	EA	2-6046		-	NUT, HEX, 0.5-13UNC	316	.04	-
	8	32	EA	2-5461		-	WSHR, FLAT, 0.5	316	.02	-
							(FLUSHING VALVE ACUTATOR TO SKIMMER ARM)			-
										-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
646	8	32	EA	2-6721		-	CAP SCR, HEX, 0.75-10UNC x 2	316	.34	-
	8	32	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	16	64	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
							(CAGE BRACE TO CAGE/RAKE ARM)			-
										-
647	16	64	EA	2-6720		-	CAP SCR, HEX, 0.75-10UNC x 1.75, FULL THREAD	316	.32	-
	16	64	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	32	128	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
							(FEEDWELL SUPPORT TO CAGE)			-
										-
648	8	32	EA	2-6721		-	CAP SCR, HEX, 0.75-10UNC x 2	316	.34	-
	8	32	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	16	64	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
							(RAKE ARM TO CAGE)			-
										-
649	8	32	EA	2-35153		-	CAP SCR, HEX, 0.75-10UNC x 1, FULL THREAD	316	.22	-
	8	32	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
							(CAGE TO DRIVE)			-
										-
650	8	32	EA	2-6721		-	CAP SCR, HEX, 0.75-10UNC x 2	316	.34	-
	8	32	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	16	64	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
							(SKIMMER SUPPORT TO RAKE ARM)			-
										-
651	12	48	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	12	48	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	24	96	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(FEEDWELL TO FEEDWELL SUPPORT)			-
										-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
653	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	4	16	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(PLATFORM TO DRIVE)			-
										-
655	6	6	EA	2-6708		-	CAP SCR, HEX, 0.625-11UNC x 1.75	316	.2	-
	6	6	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	12	48	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
							(SCUM BOX SUPPORT TO BRACES - TANK 4)			-
										-
665	9	36	EA	2-6724		-	CAP SCR, HEX, 0.75-10UNC x 2.75	316	.55	-
	9	36	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	18	72	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
							(DRIVE TO COLUMN)			-
										-
680	2	8	EA	2-50848		-	CAP SCR, HEX, 1.5-6UNC x 8	316		-
	2	8	EA	2-6057		-	NUT, HEX, 1.5-6UNC	316	.93	-
	6	24	EA	2-11741		-	WSHR, FLAT, 1.5	316	.25	-
	2	8	EA	2-48905		-	NUT, JAM, 1.5-6UNC	316		-
							(WALL ROLLER TO CORNER SWEEP BLADE)			-
										-
682	4	16	EA	2-6711		-	CAP SCR, HEX, 0.625-11UNC x 2.5	316	.26	-
	4	16	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	8	32	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-
	4	16	EA	2-39282		-	NUT, JAM, 0.625-11UNC	316		-
							(TIE ROD TO PIVOT ARM / LEVER ARM)			-
										-
684	8	32	EA	2-6710		-	CAP SCR, HEX, 0.625-11UNC x 2.25	316	.24	-
	8	32	EA	2-6047		-	NUT, HEX, 0.625-11UNC	316	.07	-
	16	64	EA	2-5463		-	WSHR, FLAT, 0.625	316	.03	-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
	8	32	EA	2-39282		-	NUT, JAM, 0.625-11UNC	316		-
							(AXLE SUPPORTS TO RAKE ARM)			-
										-
685	16	64	EA	2-6721		-	CAP SCR, HEX, 0.75-10UNC x 2	316	.34	-
	16	64	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	32	128	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
	16	64	EA	2-39311		-	NUT, JAM, 0.75-10UNC	316	.07	-
							(PIVOT POSTS AND BRACKETS)			-
										-
686	12	48	EA	2-6680		-	CAP SCR, HEX, 0.375-16UNC x 2.5	316	.09	-
	12	48	EA	2-6045		-	NUT, HEX, 0.375-16UNC	316	.02	-
	24	96	EA	2-5459		-	WSHR, FLAT, 0.375	316	.01	-
	12	48	EA	2-39272		-	NUT, JAM, 0.375-16UNC	316		-
							(LEVER ARMS TO ARM AXLE)			-
										-
690	8	32	EA	2-6062		-	NUT, LOCK, NYL INSERT, 0.5-13UNC	316	.04	-
							(COUNTER WEIGHT LOCK NUT)			-
										-
695	4	16	EA	2-6048		-	NUT, HEX, 0.75-10UNC	316	.12	-
	4	16	EA	2-5466		-	WSHR, FLAT, 0.75	316	.05	-
	4	16	EA	2-39311		-	NUT, JAM, 0.75-10UNC	316	.07	-
							(PIVOT POST TO BRACKET)			-
										-
700	2	8	EA		0001883551	-	PIVOT ARM - TRAILING SIDE	STL	79	-
701	2	8	EA		0001883515	-	PIVOT ARM - LEADING SIDE	STL	45	-
702	2	8	EA		0001883509	-	LEVER ARM	STL	14	-
703	4	16	EA		0001883539	-	LEVER ARM - COUNTER WEIGHT	STL	14	-
704	4	16	EA		0001883497	-	PIVOT POST BRACKET	STL	2	-
706	2	8	EA		0001883524	-	ARM AXLE	STL	12	-
707	4	16	EA		0001883556	-	ARM AXLE SUPPORT	STL	14	-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
708	2	8	EA		0001883505	-	CORNER SWEEP BLADE	STL	183	-
709	2	8	EA		0001883521	-	PIVOT POST - LEADING SIDE	STL	8	-
710	2	8	EA		0001883507	-	PIVOT POST - TRAILING SIDE	STL	8	-
712	12	48	EA		0001883526	-	COUNTER WEIGHT	STL	20	-
715	2	8	EA		0001883579	-	TIE-ROD	316	19	-
720	6	24	EA				SET SCREW TWO-PIECE SHAFT COLLAR, 1" (LOAD BEARING AT PIVOT ARMS & ARM AXLE SUPPORTS)	303		-
721	4	16	EA				TWO-PIECE SHAFT COLLAR, 1" (BUSHING KEEPER AT PIVOT ARMS)	NYL		-
724	2	8	EA		0001883504	-	WALL ROLLER	NYL-MDS		-
725	20	80	EA		0001883590	-	BUSHING	NYL-MDS		-
										-
740	2	8	EA	1-36296-MOD	1-36296-MOD	B	SKIMMER SCUM FLUSHING VALVE 316SS HARDWARE, NYLOCK NUTS, SAE WASHERS, 0.125 NEOPRENE GASKET	304-URE	1.9	-
										-
750	2	8	EA	1-19214	1-19214	B	SKIMMER ASSY 3FT, 4"SUPPORT, SINGLE BLADE	304	77.1	-
750.1	2	8	EA	1-19200	1-19200	A	ASSEMBLY, SKIMMER BLADE, SINGLE BLADE, 3 FT WIDE	304	24	-
750.1.1	2	8	EA	SKXDT004C	SKXDT004	C	SKIMMER BLADE, 3FT 304 SS	304	19	-
750.1.2	2	8	EA	SKXDT009C	SKXDT009C	B	SKIMMER BOTTOM REATINER 3FT 304SS	304	4	-
750.1.3	2	8	EA	SKXDT017D	SKXDT017	A	SKIMMER SIDE RETAINER 304 SS	304	.5	-
750.1.4	2	8	EA	SKXDT011C	SKXDT011	C	SKIMMER BOTTOM WIPER 3FT NPRN	NPRN CLI	4	-
750.1.5	2	8	EACH	SKXDT015A	SKXDT015	A	SKIMMER SIDE WIPER NPRN	NPRN CLI		-
750.1.6	2	8	EA	SKXDT045A	SKXDT045	B	SKIMMER SIDE BAFFLE WIPER BLADE BLACK UHMWPE	UHMWPE		-
750.1.7	18	72	EA	2-6355		-	CAP SCR, HEX, 0.375-16UNC x 1.5	304	.06	-
750.1.8	18	72	EA	2-5887		-	NUT, HEX, 0.375-16UNC	304	.02	-
750.1.9	18	72	EA	2-5433		-	WSHR, LOCK, MDM SPLIT, 0.375	304	.02	-
750.1.10	4	16	EA	2-5404		-	WSHR, FLAT, 0.375	304	.01	-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
750.2	4	16	EA	1-33511	1-33511	-	ASSEMBLY, SKIMMER SUPPORT ARM, 4 IN	AL-HDG STL	11	-
750.2.1	4	16	EA	SKXDT029A	SKXDT029	D	PIVOT YOKE, FOR 4 IN PIPE	ZP STL	8	-
750.2.2	4	16	EA	SKXDT019A	SKXDT019	-	SKIMMER SUPPORT ARM ALUMINUM	CAST AL	2	-
750.2.3	4	16	EA	SKXDT020A	SKXDT020	A	SKIMMER PIVOT ALUMINUM	CAST AL	1	-
750.2.4	4	16	EA	2-6479		-	CAP SCR, HEX, 0.625-11UNC x 2.75	304	.29	-
750.2.5	4	16	EA	2-5892		-	NUT, HEX, 0.625-11UNC	304	.07	-
750.2.6	4	16	EA	2-5435		-	WSHR, LOCK, MDM SPLIT, 0.625	304	.03	-
750.2.7	8	32	EA	2-6456		-	CAP SCR, HEX, 0.5-13UNC x 4.5	304	.28	-
750.2.8	8	32	EA	2-5890		-	NUT, HEX, 0.5-13UNC	304	.04	-
750.2.9	8	32	EA	2-5434		-	WSHR, LOCK, MDM SPLIT, 0.5	304	.01	-
750.3	2	8	EA	SKXDT023B	SKXDT023	0	SKIMMER HINGED HDG	HDG STL	19	-
750.4	2	8	EA	1-19190	1-19190	A	ASSEMBLY, HINGED SKIMMER SUPPORT, 4 IN PIPE	HDGSTL-SST	11	-
750.4.1	2	8	EA	SKXDT028B	SKXDT028	D	SKIMMER HINGESD SUPPORT 4" PIPE HDG	HDG STL	10	-
750.4.2	2	8	EA	2-3816	2-3816	-	SKIMMER COLLAR 2" ID, 3" OD, 7/8" WIDTH, SET SCREW SS	303	.95	-
750.5	2	8	EA	1-33520	1-33520	B	ASSEMBLY, SKIMMER SPRING & SUPPORT, 4 IN PIPE	SST	1.4	-
750.5.1	2	8	EA	1-23591	1-23591	A	SKIMMER STRAP, PIPE, LOOP STYLE, 4 NPS, SST, 0.375 BOLT HOLE	304-304L	.3	-
750.5.2	2	8	EA	2-19262		-	SKIMMER SPRING EXTENSION HOOK W/ENDS	302	1	-
750.5.3	2	8	EA	2-11614		-	CAP SCR, HEX, 0.375-16UNC x 0.875, FULL THREAD	304	.04	-
750.5.4	2	8	EA	2-5433		-	WSHR, LOCK, MDM SPLIT, 0.375	304	.02	-
750.5.5	2	8	EA	2-5887		-	NUT, HEX, 0.375-16UNC	304	.02	-

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Drive Parts List

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WESTECH®

Description **DRIVE ASSEMBLY**

Parts List Number **68468** Rev.

Job Name **TAUNTON WWTF PHASE 1**

Job Number **24587A**

Model No **8050**

Quantity **4**

Size **31**

Type **COP™ CLARIFIER**

Weight **7,692.6** lbs

Date **10/13/2021**

Designer **DA80**

Checked **AM73**

Approved **AM73**

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
							DRIVE FABRICATION/ASSEMBLY NOTES			-
										-
				0001858210	0001858210	-	DRIVE GENERAL ARRANGEMENT			-
				0001858211	0001858211	-	DRIVE GENERAL ARRANGEMENT-ELEVATION			-
				0001858212	0001858212	-	DRIVE GENERAL ARRANGEMENT-PLAN			-
										-
							REFERENCE DRAWINGS:			-
										-
	1	4		0001858213	0001858213	-	EQUIPMENT LUBRICATION AND NAME TAG			-
					QR-00-063		WESTECH WORKMANSHIP STANDARD			-
							ALL REFERENCES TO P24Z-024A AND A60B-001A HAVE BEEN SUPERSEDED BY QR-00-063.			-
					A60B-001A	E	FABRICATION AREA CLEANING REQUIREMENTS - "D"			-
					DRV103	E	DRIVE ASSEMBLY PROCEDURES FASTENER TORQUE	----		-
					DRV105	B	SEALANT ADHESIVE SPECIFICATION PRODUCTS AND PURPOSE	---		-
					DRV111	0	STANDARD SPECIFICATIONS - DRIVES TOLERANCES FABRICATION WELDING DIMENSIONS MATERIALS			-
					DRV109	A	REQUIRED COATING APPLICATION STEPS	----		-
					DRV114	-	GENERAL STICKER PLACEMENT CAGE AND SHAFT DRIVES	---		-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
					C31-OGA	B	ASSEMBLY DIAGRAM			-
	1	4		MS-0303A	MS-0303A	0	STICKER, DIRECTION OF ROTATION CLOCKWISE	VINYL		-
	1	4		MS-0305A	MS-0305A	0	STICKER, STORAGE PROCEDURE BLACK TEXT YELLOW BACKGROUND	---		-
	1	4		MS-0312A	MS-0312A	A	STICKER, DANGER KEEP HANDS CLEAR	VINYL		-
	1	4		MS-0313A	MS-0313A	A	STICKER, KEEP HANDS AWAY FROM GEARS	VINYL		-
	1	4		MS-0314A	MS-0314A	A	STICKER, CAUTION MOVING PARTS LOCATED BELOW DECK	VINYL		-
	1	4		MS-0315A	MS-0315A	0	STICKER, MIN MAX	VINYL		-
	1	4		MS-0379A	MS-0379A	0	STICKER, ATTENTION SEE INSTALLATION INSTRUCTIONS	VINYL		-
	1	4		MS-0384A	MS-0384A	0	TAG, LUBRICATION AND INSPECTION 2 5/8 X 5 1/4 WATERPROOF	TYVEK		-
										-
							SURFACE PREPARATION AND PAINTING:			-
					0000952300	-	STANDARD SPEC, DRIVE ASSEMBLY - COATING SUBMITTAL DATA SHEET	---		-
										-
							ALL ASSEMBLY FASTENERS TO BE AS FOLLOWS, UNLESS NOTED OTEHRWISE:			-
							CAP SCREWS, HEX HEAD - J429 GRADE 5, ZINC			-
							HEX NUTS - J995 GRADE 5 ZINC			-
							LOCK WASHERS - J403, ZINC			-
							HARDENED FLAT WASHERS - F436, YELLOW ZINC			-
										-
										-
101	1	4		----------			TORQUE CONTROL DEVICE	SST	46	-
										-
103	1	4	EA	2-46217		-	SPEED REDUCER, CYCLOIDAL	CI-STL	300	-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
										-
										-
105	1	4	EA	2-14488		-	MOTOR, 1HP, 1800RPM, 230/460VAC, SEVERE DUTY, INVERTER DUTY	CI-STL	59	-
										-
										-
										-
										-
										-
111	1	4	EA	111-189B05	111-189B05	A	TORQUE ARM, RH	A36	21	-
112	1	4	EA	312-156C05	312-156C05	0	CASTING, UPPER BEARING HOUSING	CI	42	-
112.1	1	4		1-23528	1-23528	A	HOUSING, UPPER BEARING - MACHINING	CI	33	-
113	1	4	EA	2-6442		-	RETAINING RING, 3.75, EXT	STL		-
114	1	4	EA	2-6451	MS-0194A	-	SHAFT SEAL, LOWER, BRG HSG SEAL, LIP, 4.625 BORE, 3.62 SHAFT, 0.4382 WIDTH	NPRN-STL	1	-
115	1	4	EA	2-8429	MS-0289A	-	SHAFT SEAL, UPPER, BRG HSG	NPRN-STL	1	-
116	2	8	EA	2-6285	BR-0053A	-	BEARING, BALL, DEEP GROOVE	STL	3	-
117	1	4	EA	2-6439	RR-0025A	-	RETAINING RING, 1.75, EXT	STL		-
118	1	4					UPPER BEARING LUBE LINE (112 TO 412)	BRS-CU		-
119	1	4	EA	2-11787		-	FITTING, GREASE, ZERK, STRAIGHT, 0.25 PTF MALE, ZINC	STL		-
120	1	4	EA	1-46259	1-46259	-	REDUCER SHAFT ADAPTER	1045	59	-
121	1	4	EA	121C070C09	121C070C09	C	PINION SHAFT	4140	43	-
										-
123	1	4	EACH	123C016B05	123C016B05	A	PINION GEAR, 15 TOOTH	ALLOY STL	21	-
124	1	4	EA	2-6364		-	BEARING, CYLINDRICAL ROLLER	STL	6	-
125	1	4	EA	2-46776			KEY, RECT, 20mm x 12mm x 187, SQUARE 2 ENDS	1018	.8	-
126	1	4		2-6445		-	FITTING, GREASE, PRESSURE RELIEF, STRAIGHT, 0.125	STL		-
127	1	4	EA	2-3039	RR-0018A	-	RETAINING RING, 5.75, INT	1090		-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
128	1	4	EA	2-7111		-	RETAINING RING, 3.5, EXT	STL		-
129	1	4					KEY 7/8 x 7/8 x 3-1/4 (123 TO 121)	1018		-
130	1	4	EACH	2-11581		-	O-RING, 9" ID	EPDM		-
										-
132	1	4					SHAFT COUPLING W/KEY (ORDERED W/103)	NBR-STL		-
133	8	32		2-7524		-	CAP SCR, HEX, GRADE 5, 0.625-11UNC x 1.5, ZINC (120 TO 121)	J429		-
133.1	8	32		2-5734		-	WSHR, LOCK, MDM SPLIT, 0.625, ZINC	J403		-
										-
135	4	16		2-6353		-	CAP SCR, HEX, 0.375-16UNC x 1 (105 TO 103)	304		-
135.1	4	16		2-5433		-	WSHR, LOCK, MDM SPLIT, 0.375	304		-
										-
										-
										-
										-
										-
141	5	20					CAPSCREW HEX HD 1/2 x 2 1/2 W/N,LW (103 TO 111)	SST		-
										-
										-
										-
										-
										-
										-
										-
										-
401	4	16					WALKWAY MOUNTING STUD COVER			-
403	1	4	EA	403C001C04	403C001C04	A	GEAR/BEARING 31.2 INT PITCH DIA	---	327	-
										-
										-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
406	1	4		1-23529	1-23529	B	GEAR HUB	A36	183	-
										-
408	1	4		1-23530	1-23530	C	HOUSING, GEAR - WELDMENT/MACHINING, RAKE	A36	497	-
										-
410	1	4		1-23532	1-23532	A	COVER, HOUSING	A36	102	-
411	1	4		1-8884	1-8884	B	TORQUE CONTROL SPACER	STL	59	-
										-
412	1	4		1-23533	1-23533	C	TORQUE CONTROL ADAPTER	A36	109	-
										-
414	7	28	EACH	2-11580		-	O-RING, 0.625" ID	EPDM		-
415	1	4	EA	1-12982	1-12982	B	O-RING, CUSTOM	NPRN		-
416	10	40	FT	2-13628		-	SEAL STRIP, .125" THICK, BULK MATERIAL BULK MATERIAL,	NPRN		-
										-
418	2	8					MAIN BEARING LUBE LINE (403 TO 412)	BRS-CU		-
419	2	8	EA	2-11787		-	FITTING, GREASE, ZERK, STRAIGHT, 0.25 PTF MALE, ZINC	STL		-
										-
										-
422	10	40	LFT	6542K64			BANDING	304		-
422.1	1	4	EA	6542K74		-	BUCKLE	---		-
424	30	120		2-7532		-	CAP SCR, HEX, GRADE 5, 0.625-11UNC x 4.5, ZINC (403 TO 408)	J429		-
424.1	30	120		2-10333		-	WSHR, FLAT, SAE THRU-HARDENED, 0.625, YLW ZINC	F436		-
424.2	30	120		2-10285		-	NUT, HEX, GRADE 5, 0.625-11UNC, ZINC	J995		-
425	8	32		2-7526		-	CAP SCR, HEX, GRADE 5, 0.625-11UNC x 2, ZINC	J429		-
425.1	8	32		2-5734		-	WSHR, LOCK, MDM SPLIT, 0.625, ZINC	J403		-
425.2	8	32		2-10285		-	NUT, HEX, GRADE 5, 0.625-11UNC, ZINC	J995		-
										-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
										-
431	6	24		2-7526		-	CAP SCR, HEX, GRADE 5, 0.625-11UNC x 2, ZINC (410 TO 408)	J429		-
431.1	6	24		2-5734		-	WSHR, LOCK, MDM SPLIT, 0.625, ZINC	J403		-
431.2	6	24		2-10285		-	NUT, HEX, GRADE 5, 0.625-11UNC, ZINC	J995		-
432	1	4		2-12712		-	EYEBOLT, LIFT WITH SHLDR, 0.625-11UNC x 2.5, ZINC (410 TO 408 - FOR LIFTING)	FST		-
432.1	1	4		2-5734		-	WSHR, LOCK, MDM SPLIT, 0.625, ZINC	J403		-
432.2	1	4		2-10285		-	NUT, HEX, GRADE 5, 0.625-11UNC, ZINC	J995		-
										-
435	15	60		2-7526		-	CAP SCR, HEX, GRADE 5, 0.625-11UNC x 2, ZINC (403 TO 406)	J429		-
435.1	15	60		2-10333		-	WSHR, FLAT, SAE THRU-HARDENED, 0.625, YLW ZINC	F436		-
436	7	28		2-10285		-	NUT, HEX, GRADE 5, 0.625-11UNC, ZINC (411 & 112 TO 408 & 410)	J995		-
436.1	7	28		2-5734		-	WSHR, LOCK, MDM SPLIT, 0.625, ZINC	J403		-
										-
438	4	16		2-7535		-	CAP SCR, HEX, GRADE 5, 0.75-16UNF x 3, ZINC (LEVELING DRIVE)	J429		-
										-
										-
441	1	4	EA	2-3139		-	OIL LEVEL SITE GAUGE	NP STL		-
										-
443	1	4		2-3195		-	NIPPLE, PIPE, PLAIN, TBE, NPT, SCH 40, 1 x CLOSE	304-304L		-
444	1	4		1-1091	1-1091	0	OIL CAP, MODIFIED	STL	1	-
445	1	4	EACH	2-3292		-	VALVE, BALL, 1, FNPT, 2 PC, FULL PORT, 400LB, LKG LVR, QTR TURN, 1, FNPT	BRS	1.24	-
446	1	4		1-34426	1-34426	-	PORT COVER	A36	3	-
447	1	4	EA	1-34427	1-34427	-	GASKET, PINION PORT COVER	NPRN		-

Item Number	Quantity per Assembly	Quantity per order	Units	Part Number	Document Number	Doc Rev	Description of Parts	Material	Weight per Item	Line Rev
448	6	24		2-5887		-	NUT, HEX, 0.375-16UNC (446 & 447 TO 408) (449 & 450 TO 410)	304		-
448.1	6	24		2-5433		-	WSHR, LOCK, MDM SPLIT, 0.375	304		-
449	1	4		1-4515	1-4515	0	OIL FILL PORT	STL	2	-
450	1	4	EA	1-1214	1-1214	A	GASKET, INSPECTION PORT (GEAR INSPECTION PORT)	NPRN	.1	-
										-

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Drawings

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1. A STAR DENOTES VARIANCE FROM CONTRACT DOCUMENTS AND SHOULD BE PARTICULARLY NOTED. ★

2. CONTRACTOR TO VERIFY OR SUPPLY ALL DIMENSIONS SHOWN IN CLOUDS.

3. DIMENSIONS, LOADS, AND OTHER INFORMATION ARE PROVIDED FOR CONFIRMATION OF POSITION AND INTERFACE BETWEEN EQUIPMENT, PLANT STRUCTURE, OTHER SYSTEMS AND APPURTENANCES AS SHOWN ON THE GENERAL ARRANGEMENT DRAWINGS.

4. SUBMITTED DRAWINGS AND INFORMATION ARE NOT TO BE USED FOR CONSTRUCTION OR INSTALLATION PURPOSES UNTIL CUSTOMER APPROVAL HAS BEEN ISSUED. WESTECH WILL NOT PROCEED WITH FABRICATION OR DELIVERY UNTIL SUCH APPROVAL IS RECEIVED.

5. WESTECH IS NOT RESPONSIBLE FOR CONCRETE DESIGN, INCLUDING NECESSARY REINFORCEMENT FOR ANCHOR BOLTS, UNLESS SPECIFICALLY INDICATED.

6. WESTECH IS NOT RESPONSIBLE FOR DAMAGE, INJURY OR LOSS RESULTING FROM IMPROPER USE OF THIS EQUIPMENT.

7. MODIFICATIONS, ADDITIONS OR CORRECTIONS TO THE APPROVED EQUIPMENT WILL NOT BE ACCEPTED BY WESTECH, UNLESS A CHANGE ORDER IS ISSUED AND APPROVED.

8. ROTATING EQUIPMENT IS DESIGNED TO OPERATE ONLY IN THE INDICATED DIRECTION. WESTECH IS NOT RESPONSIBLE FOR DAMAGE IF OPERATED IN THE OPPOSITE DIRECTION.

9. WESTECH DOES NOT FURNISH CONCRETE, GROUT, CONCRETE REINFORCING, PIPING, VALVES, PIPE SUPPORTS OR FITTINGS, WALL BRACKETS, ELECTRICAL WIRING, CONDUIT, ELECTRICAL EQUIPMENT, ERECTION, INSTALLATION, FIELD ASSEMBLY, SHIMMING MATERIALS, CAULK OR MASTIC, FIELD PAINTING OR PAINT, FIELD WELDING OR WELD ROD, WATER FOR TESTING, GREASE, ANTI-SEIZE OR LUBRICATING OIL, UNLESS SPECIFICALLY NOTED.

10. SHOP SURFACE PREPARATION AND SHOP PAINTING OF PRIME COATS ARE DESIGNED TO PROVIDE ONLY A MINIMAL PROTECTION FROM TIME OF APPLICATION PER THE COATING MANUFACTURER'S DATA SHEET. WESTECH DOES NOT GUARANTEE CONDITION OF PREPARED OR PAINTED ITEMS ONCE THE ITEMS LEAVE THE SHOP. CUSTOMER SHOP INSPECTION OF PAINTED ITEMS IS WELCOME TO VERIFY APPLICATION. ALL FIELD SURFACE PREPARATION, FIELD PAINT, TOUCH-UP, AND REPAIR TO SHOP PAINTED SURFACES ARE NOT BY WESTECH. RESPONSIBILITY FOR COMPATIBILITY OF SHOP AND FIELD APPLIED COATINGS IS BY OTHERS.

11. DOCUMENTS DEFINING WESTECH SUPPLIED SURFACE PREPARATION AND SHOP/FIELD PAINT SPECIFICATIONS ARE SUBMITTED WITH THE GENERAL ARRANGEMENT DRAWINGS AND WILL INCLUDE COATING DATA SHEET(S) AND/OR A STAINLESS-STEEL CLEANING GRADE SHEET AND FINISH LEVEL SHEET.

12. WHERE APPLICABLE, ANCHOR BOLT DETAILS ARE SHOWN ON JOB-SPECIFIC DRAWINGS AND SHALL CONFORM TO ONE OR MORE OF THE FOLLOWING SPECIFICATIONS:

- CARBON STEEL HEADED OR ALL-THREAD ROD - ASTM F1554, GRADE 36, GRADE 55, OR GRADE 105
- STAINLESS STEEL HEADED OR ALL-THREAD ROD - ASTM F593, ASTM A193
- ADHESIVE ANCHORS SHALL MEET THE REQUIREMENTS OF ASTM E1512 AND SHALL HAVE A PUBLISHED ICC/ES REPORT.
- WEDGE ANCHORS SHALL HAVE A PUBLISHED ICC/ES REPORT.

13. MATERIALS AND COATINGS OF FASTENERS ARE IDENTIFIED ON JOB-SPECIFIC GENERAL ARRANGEMENT DRAWINGS. BOLTS SHALL CONFORM TO ONE OR MORE OF THE FOLLOWING SPECIFICATIONS WITH DIMENSIONS PER ASME B18.2.1 AND B18.2.2:

- CARBON STEEL - ASTM F3125, GRADE A325, GRADE A490; ASTM A307 GRADE A
- STAINLESS STEEL - AISI TYPE 304 OR 316
- STAINLESS STEEL - ASTM F593/F593M (GENERAL PURPOSE)
- STAINLESS STEEL - ASTM A193 GRADE B8 (304), GRADE B8M (316) (HIGH PRESSURE, HIGH TEMPERATURE)

14. THE FOLLOWING DEFINES THE ACCEPTABLE MATERIALS USED FOR WESTECH SUPPLIED EQUIPMENT AS SPECIFIED AND SHOWN ON THE GENERAL ARRANGEMENT DRAWINGS. ANY MATERIAL OR ITEMS NOT INCLUDED HERE SHALL BE CLEARLY SPECIFIED ON THE GENERAL ARRANGEMENT DRAWINGS.

A. CARBON STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS AND REQUIREMENTS:

- STEEL SHAPES W, WT - ASTM A992/A992M
- STEEL SHAPES M, MT, S, ST, C, MC, L - ASTM A36/A36M
- STEEL PLATES AND BARS - ASTM A36/A36M; A572/A572M GRADE 50; A529/A529M
- STEEL SHAPE HP - ASTM A572/A572M GRADE 50
- STEEL PIPE - ASTM A53/A53M GRADE B, ASTM 106/A106M, API 5L
- HOLLOW STRUCTURAL SECTIONS (HSS), ROUND, SQUARE, RECTANGULAR - ASTM A500/A500M GRADE C; A1085/A1085M
- SHEETS - A1011/A1011M
- PIPE FITTINGS - ASTM A234/A234M; ASME B16.11
- ALL WELDING SHALL CONFORM TO THE LATEST AWS D1.1 CODE OR ASME BPVC SECTION IX.
- ALL SUBMERGED STRUCTURAL STEEL MEMBERS SHALL HAVE A MINIMUM 1/4" THICKNESS UNLESS NOTED OTHERWISE.
- SOME SHAPES MAY BE FORMED BY BENDING AND/OR WELDING. B

B. STAINLESS STEEL SHALL MEET THE FOLLOWING SPECIFICATIONS AND REQUIREMENTS:

- AUSTENITIC BARS, ROUND AND SQUARES, AND HOT ROLLED EXTRUDED SHAPES SUCH AS ANGLES, TEES, AND CHANNELS - ASTM A276; ASTM A484/A484M; ASTM A564/A564M
- AUSTENITIC LASER-FUSED BARS, PLATES, ANGLES, TEES, CHANNELS, AND W SHAPES - ASTM A1069/A1069M
- AUSTENITIC PLATES, SHEETS, STRIPS - ASTM A240/A240M; ASTM A480/A480M
- AUSTENITIC PIPES - ASTM A312/A312M
- AUSTENITIC HOLLOW STRUCTURAL SHAPES (HSS), ROUND, SQUARE, RECTANGULAR - ASTM A554
- PIPE FITTINGS - ASTM A182; ASME SA 182; ASME B16.11
- DUPLEX PLATES, SHEETS, STRIPS - ASTM A240/A240M; ASTM A480/A480M
- DUPLEX PIPES - ASTM A790/A790M
- DUPLEX HOLLOW STRUCTURAL SHAPES - MADE FROM PLATE A
- ALL WELDING SHALL CONFORM TO THE LATEST AWS D1.6 CODE OR ASME BPVC SECTION IX.
- SOME SHAPES MAY BE FORMED BY BENDING AND/OR WELDING.

C. ALUMINUM SHALL MEET THE FOLLOWING SPECIFICATIONS AND REQUIREMENTS:

- EXTRUDED BARS, RODS, WIRE, STRUCTURAL PROFILES AND TUBES - ASTM B221/B221M
- STANDARD STRUCTURAL PROFILES - ASTM B308/B308M (FOR ALLOY 6061-T6 ONLY)
- PLATE AND SHEET - ASTM B209/B209M
- DRAWN SEAMLESS TUBE - ASTM B210/B210M; ASTM B483/B483M
- EXTRUDED SEAMLESS TUBE AND PIPE - ASTM B241/B241M; B429/B428M
- PIPE FITTINGS - ASTM B361
- ALL WELDING SHALL CONFORM TO THE LATEST AWS D1.2 CODE.
- SOME SHAPES MAY BE FORMED BY BENDING AND/OR WELDING.

D. TANK MATERIALS SHALL CONFORM TO THE SPECIFICATIONS IN API 650 OR AWWA D100 AS NOTED ON THE GENERAL ARRANGEMENT DRAWINGS. SPECIFIED MATERIALS ARE SHOWN ON THE GENERAL ARRANGEMENT DRAWINGS. ALL WELDING SHALL CONFORM TO THE ASME BPVC - SECTION IX.

B **E. ASME STAMPED PRESSURE VESSELS** SHALL CONFORM TO ASME BPVC SECTION VIII OR SECTION X (FOR FRP TANKS), THE DESIGN CALCULATIONS AND THE GENERAL ARRANGEMENT DRAWINGS.

B 15. ITEMS SHOWN, NOTED OR DESCRIBED ON THE GENERAL ARRANGEMENT DRAWINGS SUPERSEDE ANY CONFLICTING ITEMS WITHIN THESE NOTES.

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE
B	ADD NOTE 15, ADD BEND NOTE UNDER 14.A (LAST BULLET), ADD "ASME STAMPED" & "OR SECTION X" TO NOTE 14E	---	WH17	ARS/ST14	2021/04/12
A	REMOVED "SEE 10.B.2" FROM END OF 14.B BULLET POINT 9	---	WH17	ARS/ST14	2020/11/24

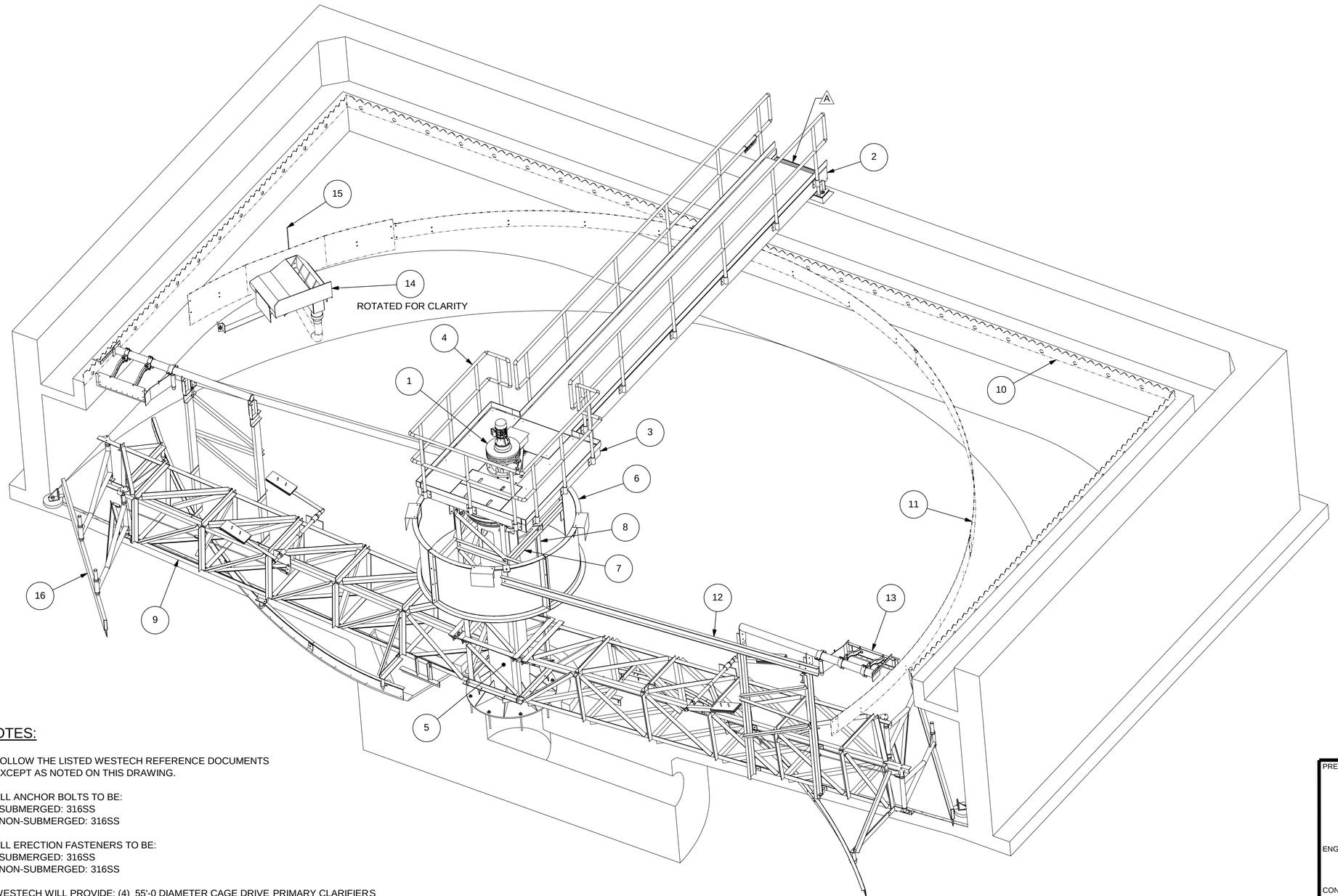
REFERENCE DOCUMENTS

WESTECH®

TITLE **GENERAL NOTES**

DESIGNER	CHECKER	APPROVER	DATE
WH17	DESIGN/DETAIL COUNCIL	ENGINEERING COUNCIL	2020/11/11

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
-	0000647822	1 OF 1	B



EQUIPMENT LIST

ITEM	DESCRIPTION/REMARKS
1	DRIVE UNIT, 31" WITH TORQUE CONTROL DEVICE, 14700 FT-LBS CONTINUOUS RUNNING TORQUE.
2	WALKWAY, 3'-0 WIDE (STEEL) WITH GRATING, 1-1/4" (ALUMINUM).
3	PLATFORM, 7'-0 LONG x 6'-6 WIDE (STEEL) (WITH MINIMUM 2'-0 CLEARANCE AROUND DRIVE) WITH FLOORPLATE, 1/4" (ALUMINUM).
4	HANDRAIL, 1 1/2" NOMINAL DIAMETER x 3'-6 HIGH, 2-RAIL (ALUMINUM) WITH 4" EXTRUDED KICK PLATE.
5	CENTER INFLUENT COLUMN, 2'-0 OUTSIDE DIAMETER x 1/4" THICK (STEEL) WITH INFLUENT PORTS.
6	FEEDWELL, 8'-0 INSIDE DIAMETER x 3'-6 SIDEDEPTH x 3/16" THICK (STEEL) WITH 4-BAFFLED SCUM PORTS.
7	FEEDWELL SUPPORTS (STEEL).
8	DRIVE CAGE, 3'-0 SQUARE (STEEL).
9	RAKE ARMS, 3'-0 WIDE x 3'-0 HIGH (STEEL) WITH SPIRAL BLADES, SLUDGE SCRAPER BLADES AND ADJUSTABLE SQUEEGEES (304SS).
10	WEIR PLATE (NOT BY WESTECH).
11	BAFFLE PLATE (NOT BY WESTECH).
12	SKIMMER BLADES (STEEL) WITH SUPPORTS.
13	SCUM SKIMMER ASSEMBLIES WITH NEOPRENE WIPERS (SEE DRAWING 1-19214 FOR GENERAL DETAILS).
14	SCUM BOX, 3'-0 x 1/4" THICK (STEEL) WITH SUPPORTS AND 6" DISCHARGE PIPE CONNECTION WITH 6" x 4" FLEXIBLE COUPLING.
15	SCUM FLUSHING VALVE.
16	CORNER SWEEP (STEEL) WITH 2" PIPE TRIANGLE SUPPORT, HSS 8" x 2" x 3/16" SCRAPER BLADE AND SQUEEGEES (304SS).

NOTES:

1. FOLLOW THE LISTED WESTECH REFERENCE DOCUMENTS EXCEPT AS NOTED ON THIS DRAWING.

2. ALL ANCHOR BOLTS TO BE:
   SUBMERGED: 316SS
   NON-SUBMERGED: 316SS

3. ALL ERECTION FASTENERS TO BE:
   SUBMERGED: 316SS
   NON-SUBMERGED: 316SS

4. WESTECH WILL PROVIDE: (4) 55'-0 DIAMETER CAGE DRIVE PRIMARY CLARIFIERS

   SPARE PARTS:

   MECHANISM -
   NONE

   DRIVE UNIT -
   NONE

PRIMARY CLARIFIER PROCESS DESIGN INFORMATION PER UNIT		
AVERAGE DAILY FLOW	2.1 (A)	MGD
DESIGN FLOW (MAXIMUM MONTH)	3.7 (A)	MGD
MAXIMUM SUSTAINED FLOW (MAXIMUM DAY)	6.3	MGD
PEAK HOURLY FLOW	6.3	MGD

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE
A	AVERAGE DAILY FLOW WAS 2.08; DESIGN FLOW (MAXIMUM MONTH) WAS 2.6; CORNER SWEEP RADIUS WAS 16'-0; NEW SHEET 5, SHEET 6 WAS 5, 7 WAS 6; ELEVATION CHANGES PER CONTRACTORS FIELD DIMENSIONS; ADD STEP TO END OF WALKWAY		TH43	PO07	2022-01-17

REFERENCE DOCUMENTS
0001894485
0000722860
1-19214
0001858210
0000647822

PREPARED FOR: TAUNTON WWTP

ENGINEER: BETA ENGINEERS

CONTRACTOR: TOTAL MECHANICAL SERVICE CORP.
PLYMOUTH, MA

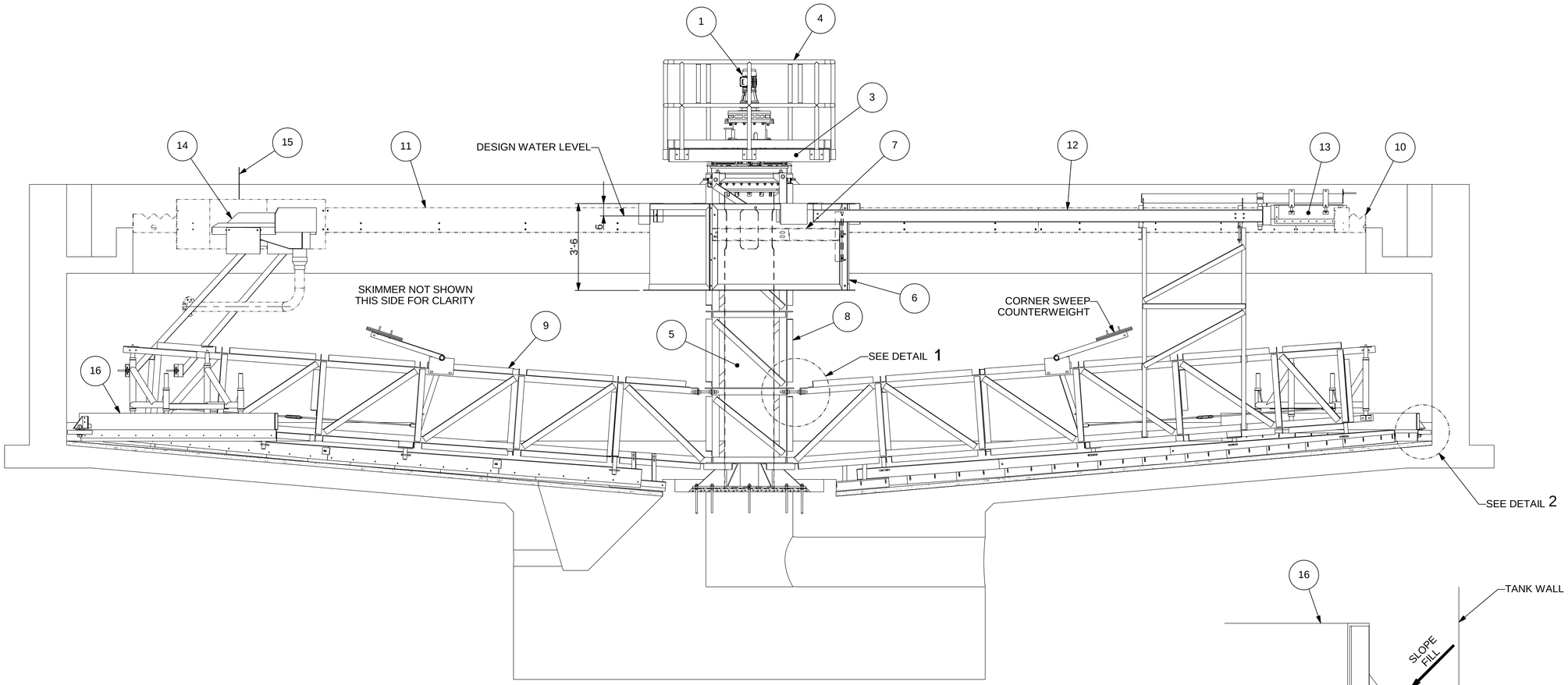
P.O./CONTRACT NUMBER: 2021-26

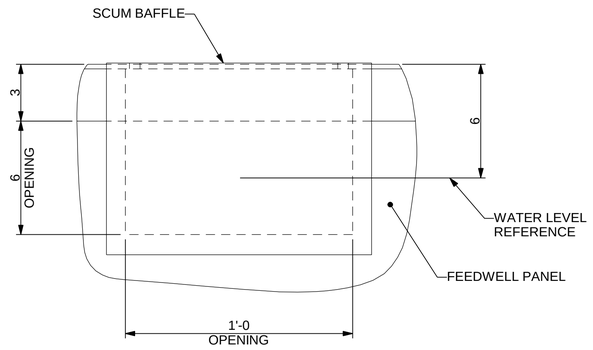
WESTECH®

TITLE: **GENERAL ARRANGEMENT**
∅55'-0 PRIMARY CLARIFIER
COPC2

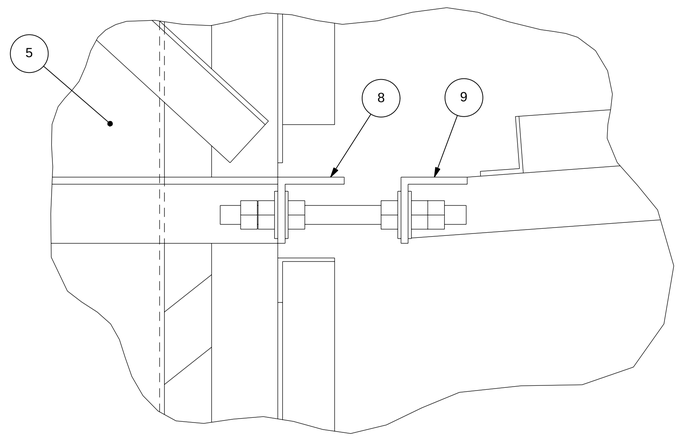
DESIGNER	CHECKER	APPROVER	DATE
TH43	AL116	PO07	2021-11-11

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881753**	1 OF 7	**A**

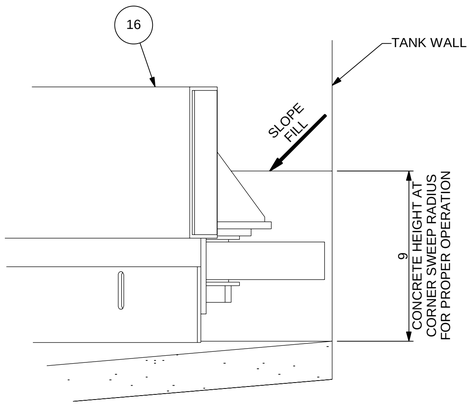




FEEDWELL BAFFLE DETAIL
SCALE 0.250



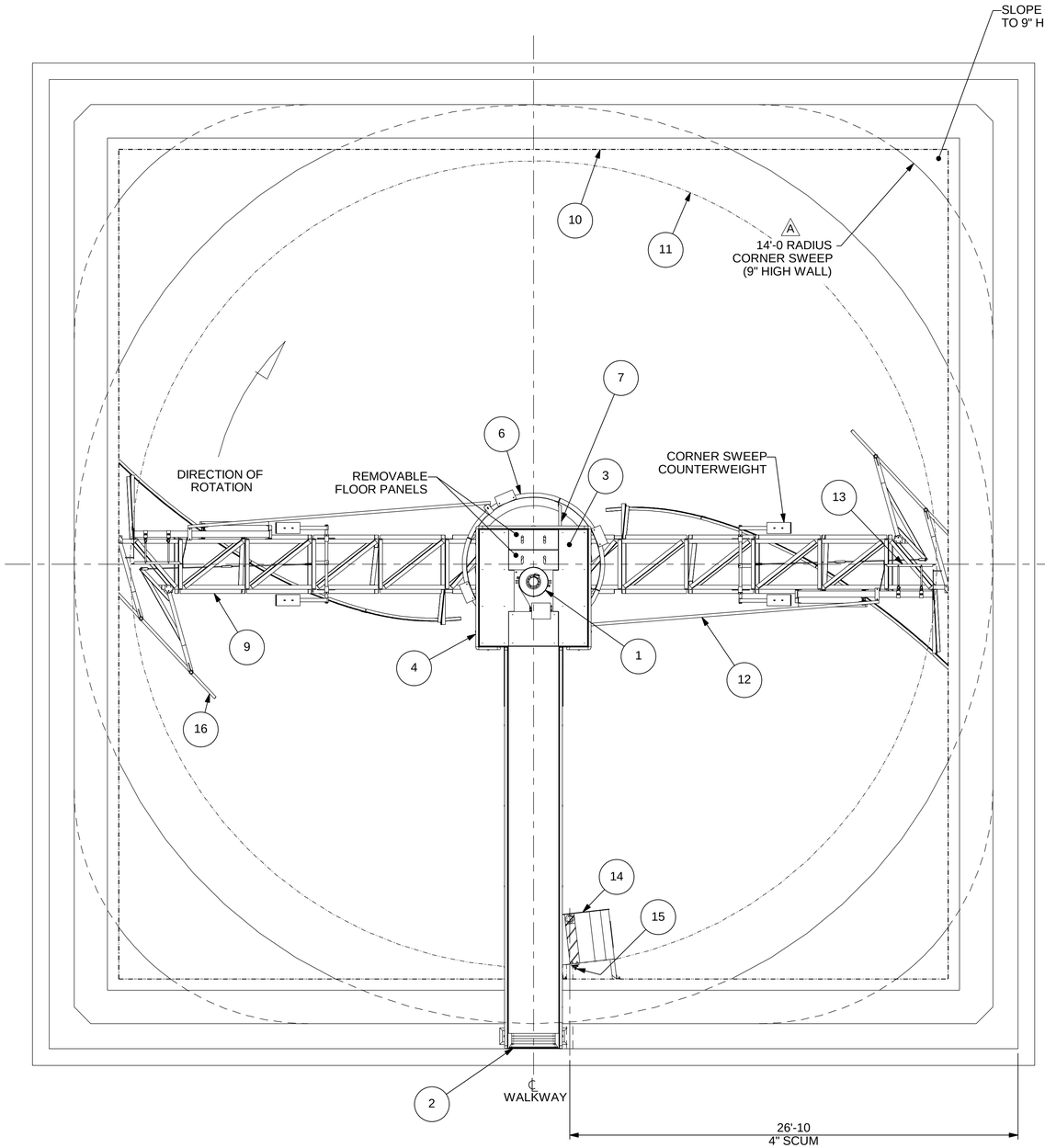
DETAIL 1
SCALE 0.250



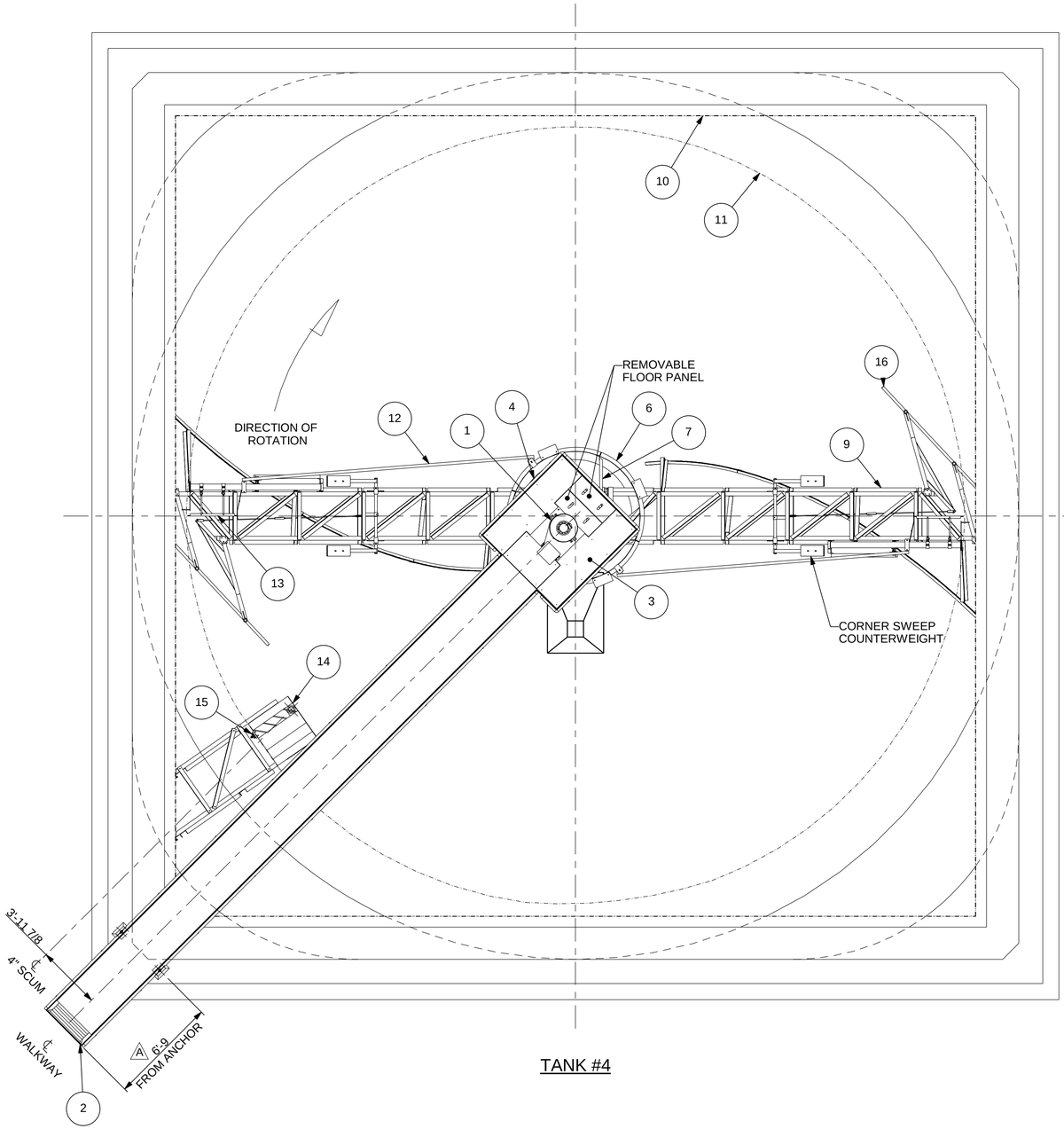
DETAIL 2
CORNER SWEEP TO WALL
SCALE 0.250

TITLE: **GENERAL ARRANGEMENT**
∅55'-0 PRIMARY CLARIFIER
COPC2

DESIGNER	CHECKER	APPROVER	DATE
TH43	AL116	PO07	2021-11-11
JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881753**	2 OF 7	**A**



TANKS #1-3



TANK #4

WESTECH®

TITLE: **GENERAL ARRANGEMENT**

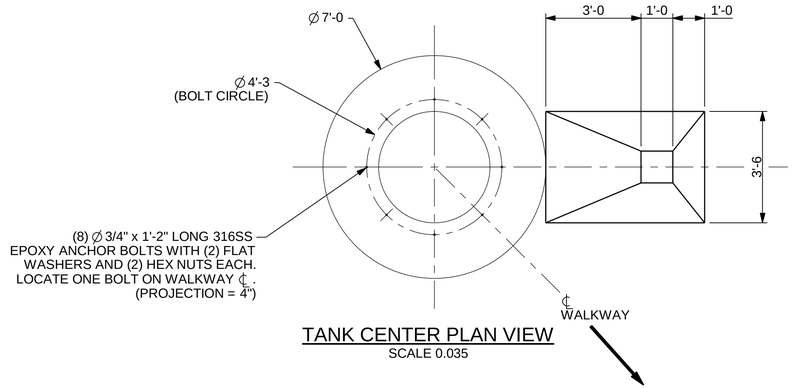
∅55'-0 PRIMARY CLARIFIER

COPC2

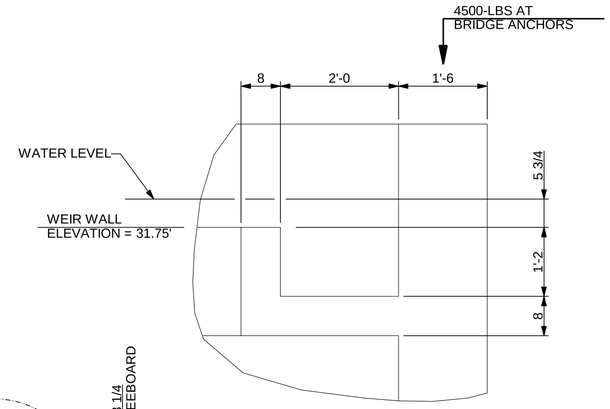
DESIGNER	CHECKER	APPROVER	DATE
TH43	AL116	PO07	2021-11-11

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881753**	3 OF 7	**A**

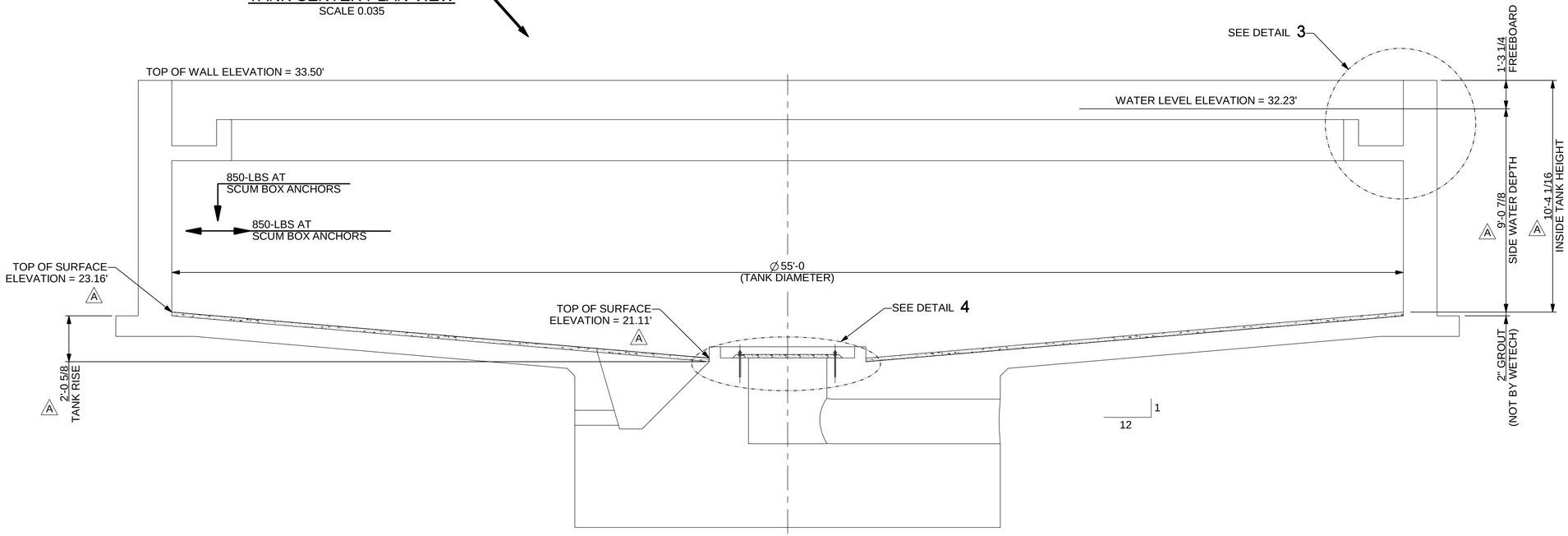
TANK #4 CONCRETE DETAILS



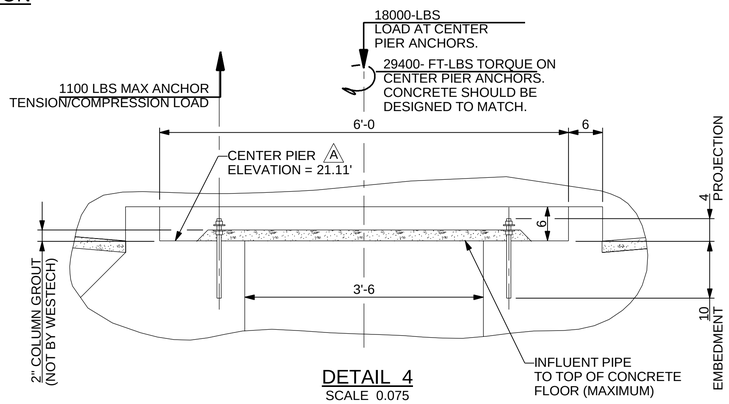
TANK CENTER PLAN VIEW
SCALE 0.035



DETAIL 3
SCALE 0.065



TANK CROSS SECTION



DETAIL 4
SCALE 0.075

NOTES:

1. CONCRETE DESIGN IS NOT BY WESTECH. IT IS THE RESPONSIBILITY OF THE ENGINEER TO ENSURE THAT THE CONCRETE IS ADEQUATE TO SUPPORT THE LOADS SHOWN ON DRAWINGS.
2. ALL LOADS ARE NON-FACTORED UNLESS NOTED OTHERWISE.
3. INFLUENT, EFFLUENT, SLUDGE, AND SCUM PIPE LOCATION PER ENGINEERS DRAWINGS.
4. STANDARD HOLE CLEANING FOR THREADED ROD REQUIRED. REFER TO EPOXY MANUFACTURER'S RECOMMENDED CLEANING REQUIREMENTS.

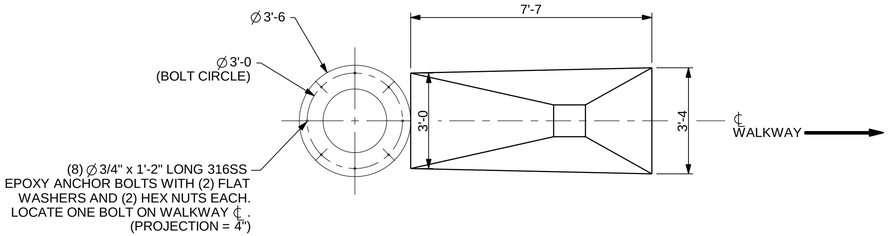
WESTECH®

TITLE: **GENERAL ARRANGEMENT**
∅ 55'-0 PRIMARY CLARIFIER
COPC2

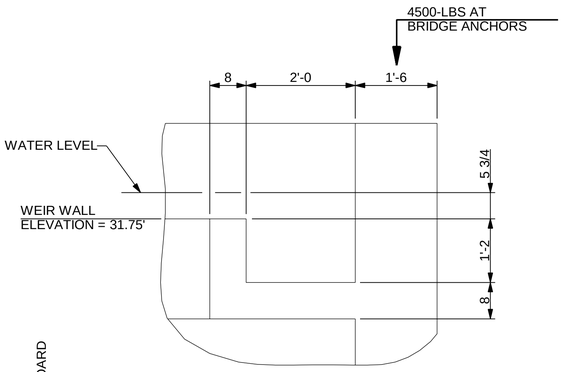
DESIGNER	CHECKER	APPROVER	DATE
TH43	AL116	PO07	2021-11-11

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881753**	4 OF 7	**A**

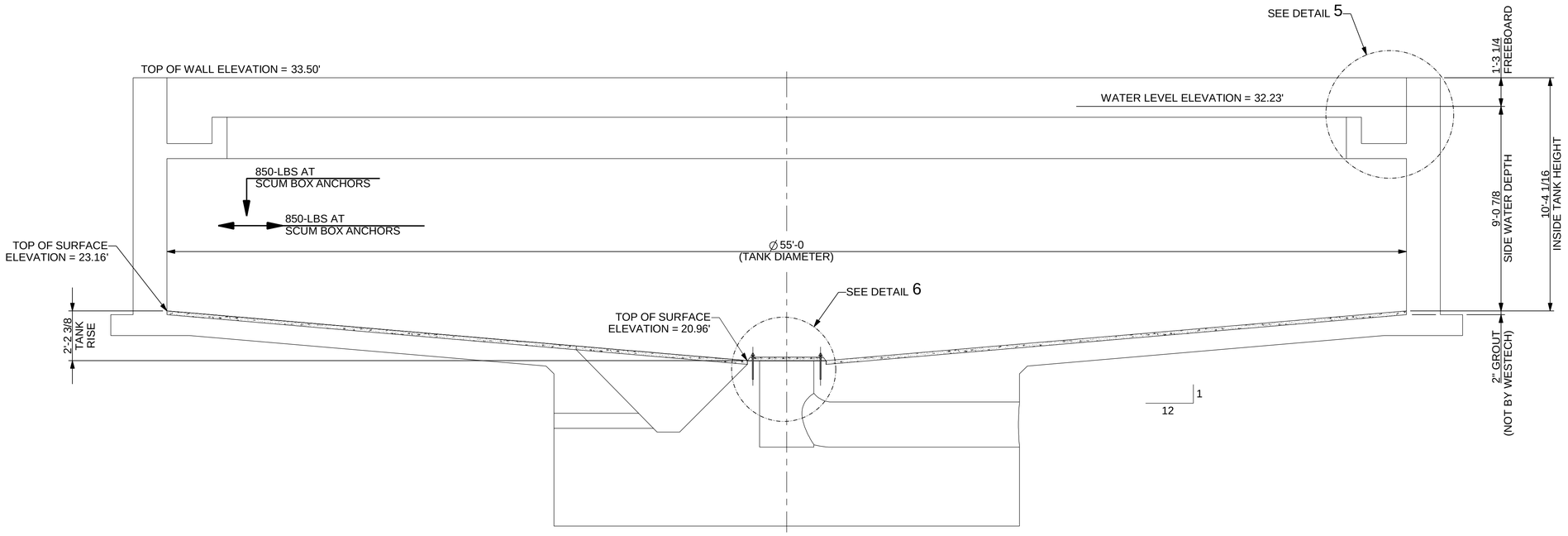
TANKS #1-3 CONCRETE DETAILS

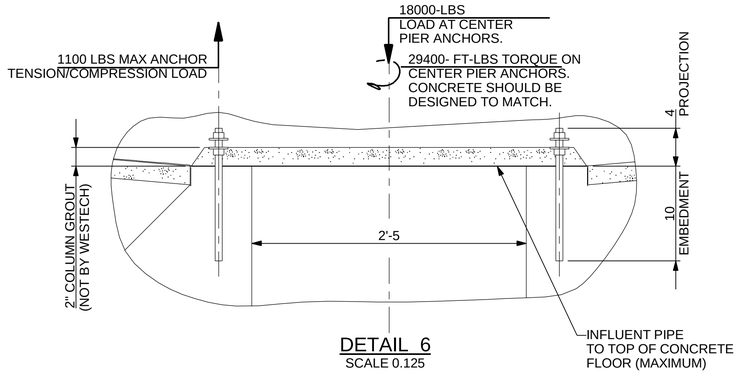


TANK CENTER PLAN VIEW
SCALE 0.035



DETAIL 5
SCALE 0.060





DETAIL 6
SCALE 0.125

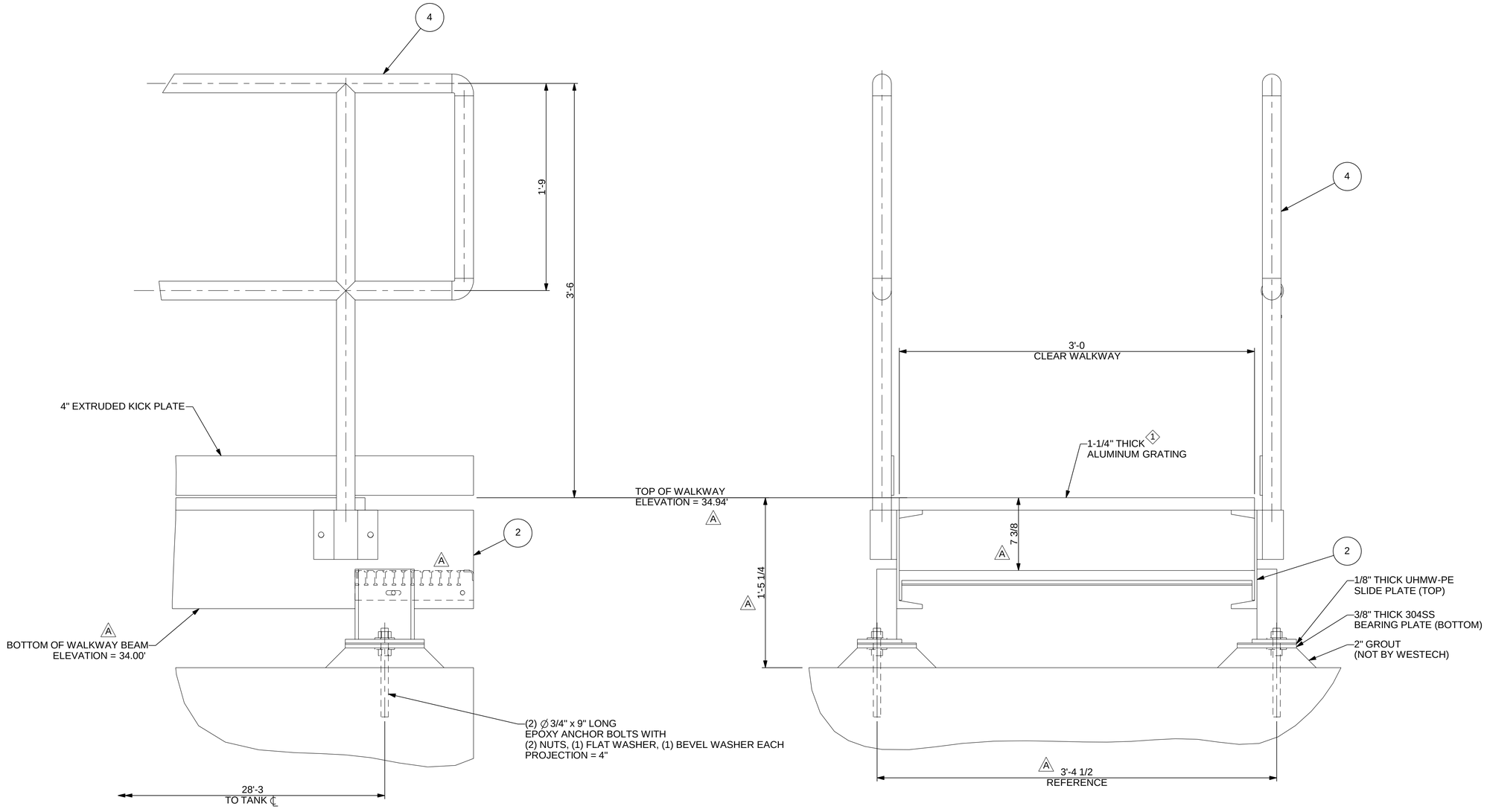
NOTES:

1. CONCRETE DESIGN IS NOT BY WESTECH. IT IS THE RESPONSIBILITY OF THE ENGINEER TO ENSURE THAT THE CONCRETE IS ADEQUATE TO SUPPORT THE LOADS SHOWN ON DRAWINGS.
2. ALL LOADS ARE NON-FACTORED UNLESS NOTED OTHERWISE.
3. INFLUENT, EFFLUENT, SLUDGE, AND SCUM PIPE LOCATION PER ENGINEERS DRAWINGS.
4. STANDARD HOLE CLEANING FOR THREADED ROD REQUIRED. REFER TO EPOXY MANUFACTURER'S RECOMMENDED CLEANING REQUIREMENTS.

WESTECH®

TITLE: **GENERAL ARRANGEMENT**
∅55'-0 PRIMARY CLARIFIER
COPC2

DESIGNER	CHECKER	APPROVER	DATE
TH43	AL116	PO07	2021-11-11
JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	0001881753	A 5 OF 7	A



WALKWAY TO TANK WALL

NOTES:

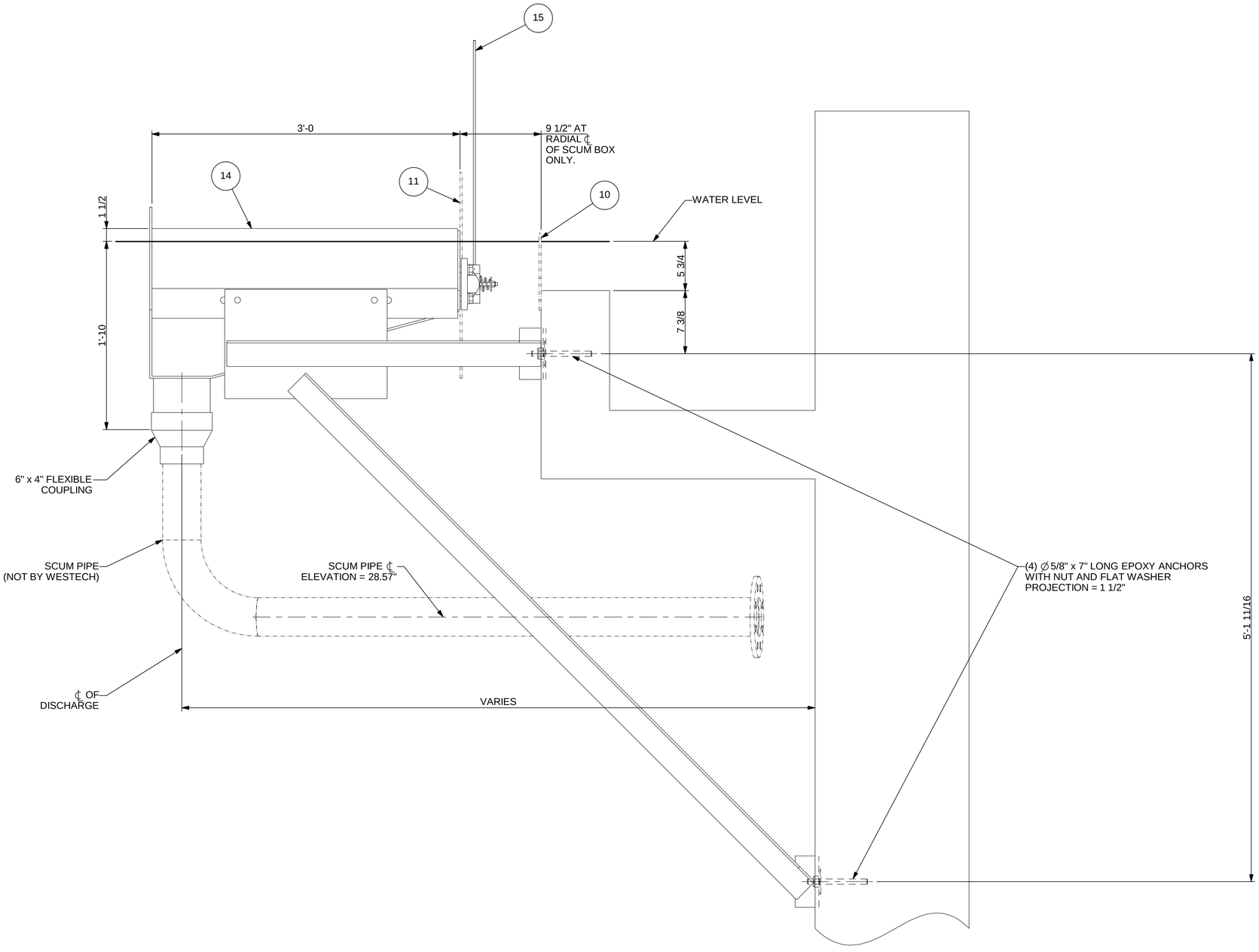
1. GRATING USES SELF-TAPPING SCREWS THAT REQUIRE FIELD DRILLED PILOT HOLES.

WESTECH®

TITLE: **GENERAL ARRANGEMENT**
∅55'-0 PRIMARY CLARIFIER
COPC2

DESIGNER	CHECKER	APPROVER	DATE
TH43	AL116	PO07	2021-11-11

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881753**	A 6 OF 7	**A**



SCUM BOX ELEVATION
(AS SHOWN TANKS 1-3, TANK 4 SIMILAR)
SCALE 0.150

WesTech®

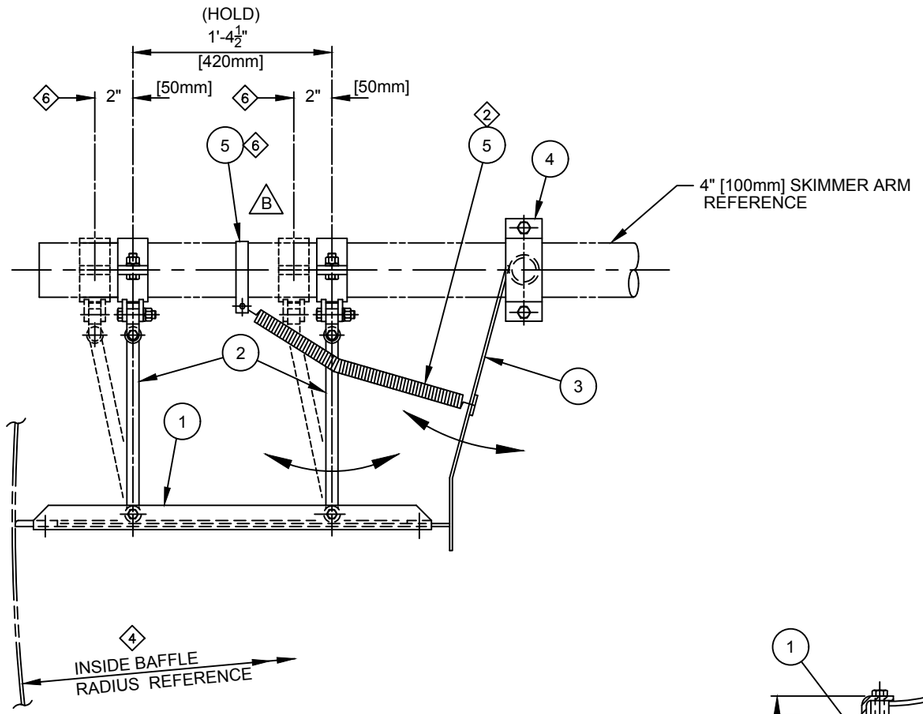
TITLE: **GENERAL ARRANGEMENT**
∅55'-0 PRIMARY CLARIFIER
COPC2

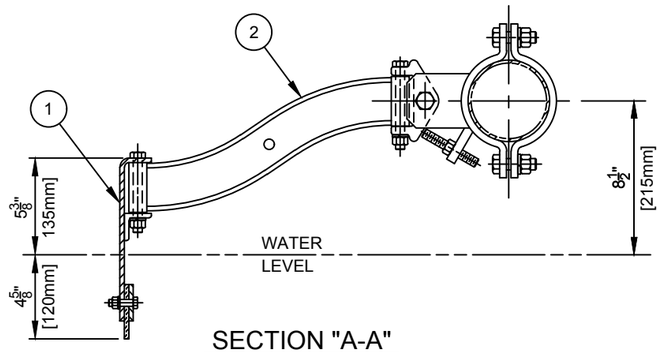
DESIGNER	CHECKER	APPROVER	DATE
TH43	AL116	PO07	2021-11-11

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881753**	A 7 OF 7	**A**

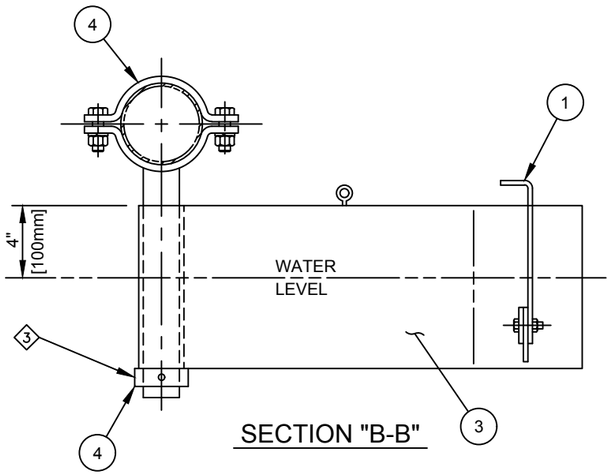
ITEM	QT'Y	MAT'L	PART NO.	DESCRIPTION	WT
1	1	304	1-19200	ASSEMBLY, SKIMMER BLADE	23.7
2	2	AL / HDG	1-33511	ASSEMBLY, SKIMMER SUPPORT ARM, 4 IN	22
3	1	HDG STL	SKXDT023B	HINGED SKIMMER	19
4	1	HDG / 304	1-19190	ASSEMBLY, HINGED SKIMMER SUPPORT, 4 IN PIPE	11
5	1	SST	1-33520	ASSEMBLY, SKIMMER SPRING & SUPPORT, 4 IN PIPE	1.4
				TOTAL EST WT.	77.1

B





SECTION "A-A"



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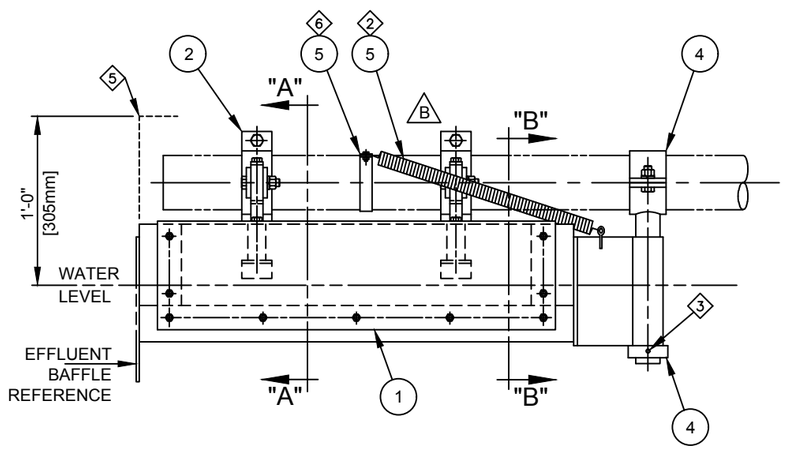


NOTES:

1. WORK WITH MECHANISM ERECTION, GENERAL ARRANGEMENT AND GENERAL NOTES DRAWINGS.
2. ASSEMBLE SPRING (ITEM #5) ABOVE BLADE SUPPORT ARM.
3. INSTALLER TO DRILL A SLIGHT DIMPLE INTO SUPPORT ITEMS FOR ALL SET SCREWS.
4. INSTALLER TO ENSURE THE GAPS BETWEEN BOLTED BAFFLE PANEL SPLICES ARE 1/4" [6mm] OR LESS.
5. INSIDE BAFFLE RADIUS MUST BE UNOBSTRUCTED TO A MINIMUM HEIGHT OF 12" [305mm] FOR PROPER SKIMMER OPERATION.
6. SKIMMER MUST MAINTAIN SCUM BAFFLE CONTACT USING SPRING TENSION PLUS (OPTIONAL) 2" [50mm] (MAX.) SUPPORT OFFSET.

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE
B	CHANGED PIPE STRAP	2416	GA34	JA20	2017-05-08
A	CHANGED WEIGHTS AND MATERIAL	-	GA34	WH17	2017-02-12

REFERENCE DOCUMENTS

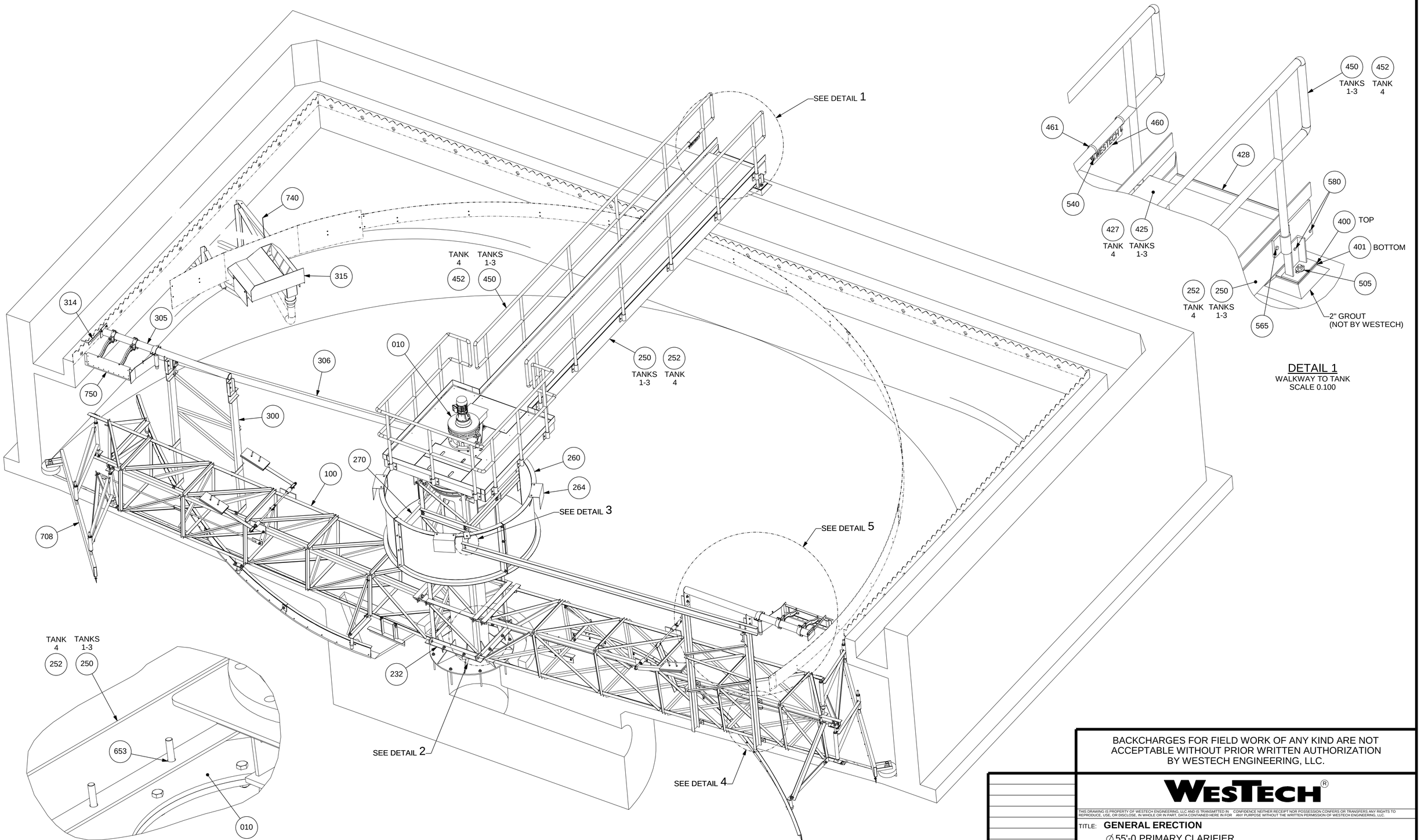
WESTECH

TITLE **ASSEMBLY, SKIMMER, SINGLE BLADE / INSTALLATION**
304, NPRN CLI WIPERS, UHMWPE BAFFLE SIDE WIPER
4" [100mm] SUPPORT / 3'-0" [915mm] WIDE

DESIGNER	CHECKER	APPROVER	DATE
HO63	GA05	WH17	2016/10/05

DOCUMENT NUMBER	SHEET	REV
1-19214	1 OF 1	**B**

C:\Vault\Design\Standard Products\WesTech\Across Products\Scum Skimmers\Assembly, Skimmer\1-19214.dwg



DETAIL 1
WALKWAY TO TANK
SCALE 0.100

DRIVE TO PLATFORM
SCALE 0.250

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE

BACKCHARGES FOR FIELD WORK OF ANY KIND ARE NOT ACCEPTABLE WITHOUT PRIOR WRITTEN AUTHORIZATION BY WESTECH ENGINEERING, LLC.

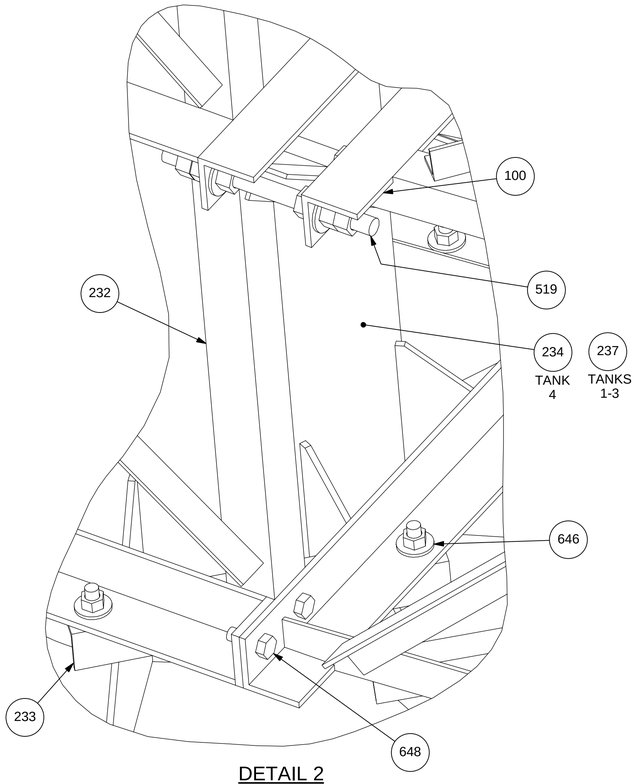
WESTECH®

TITLE: **GENERAL ERECTION**
∅ 55'-0 PRIMARY CLARIFIER
COPC2

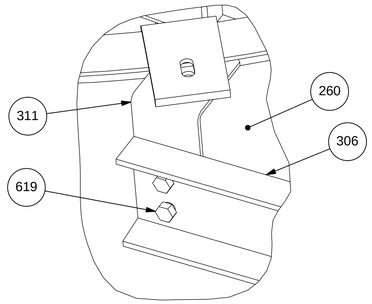
DESIGNER	CHECKER	APPROVER	DATE
TH43	HU02	PO07	2022-03-21

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881288**	1 OF 8	-

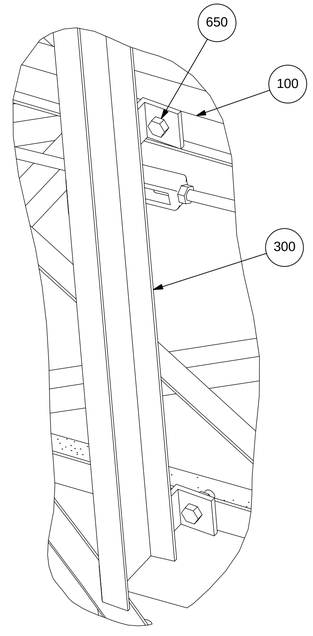
PARTS LIST 69925/68468
0001881753
REFERENCE DOCUMENTS



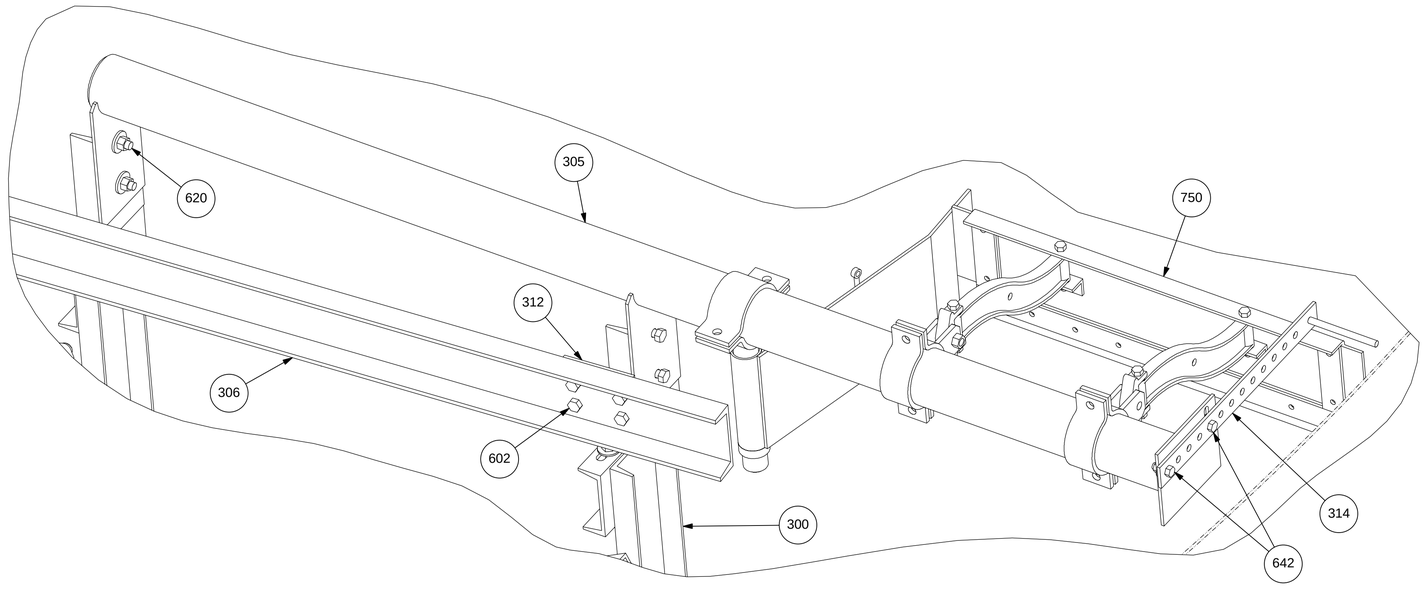
DETAIL 2
CAGE TO RAKE ARM INTERFACE
SCALE 0.250



DETAIL 3
SKIMMER TO FEEDWELL
SCALE 0.250



DETAIL 4
TYPICAL AT ALL SKIMMER SUPPORT
CONNECTIONS TO RAKE ARM
SCALE 0.200



DETAIL 5
SKIMMER ARM TO SUPPORT
SCALE 0.175

BACKCHARGES FOR FIELD WORK OF ANY KIND ARE NOT ACCEPTABLE WITHOUT PRIOR WRITTEN AUTHORIZATION BY WESTECH ENGINEERING, LLC.

WESTECH®

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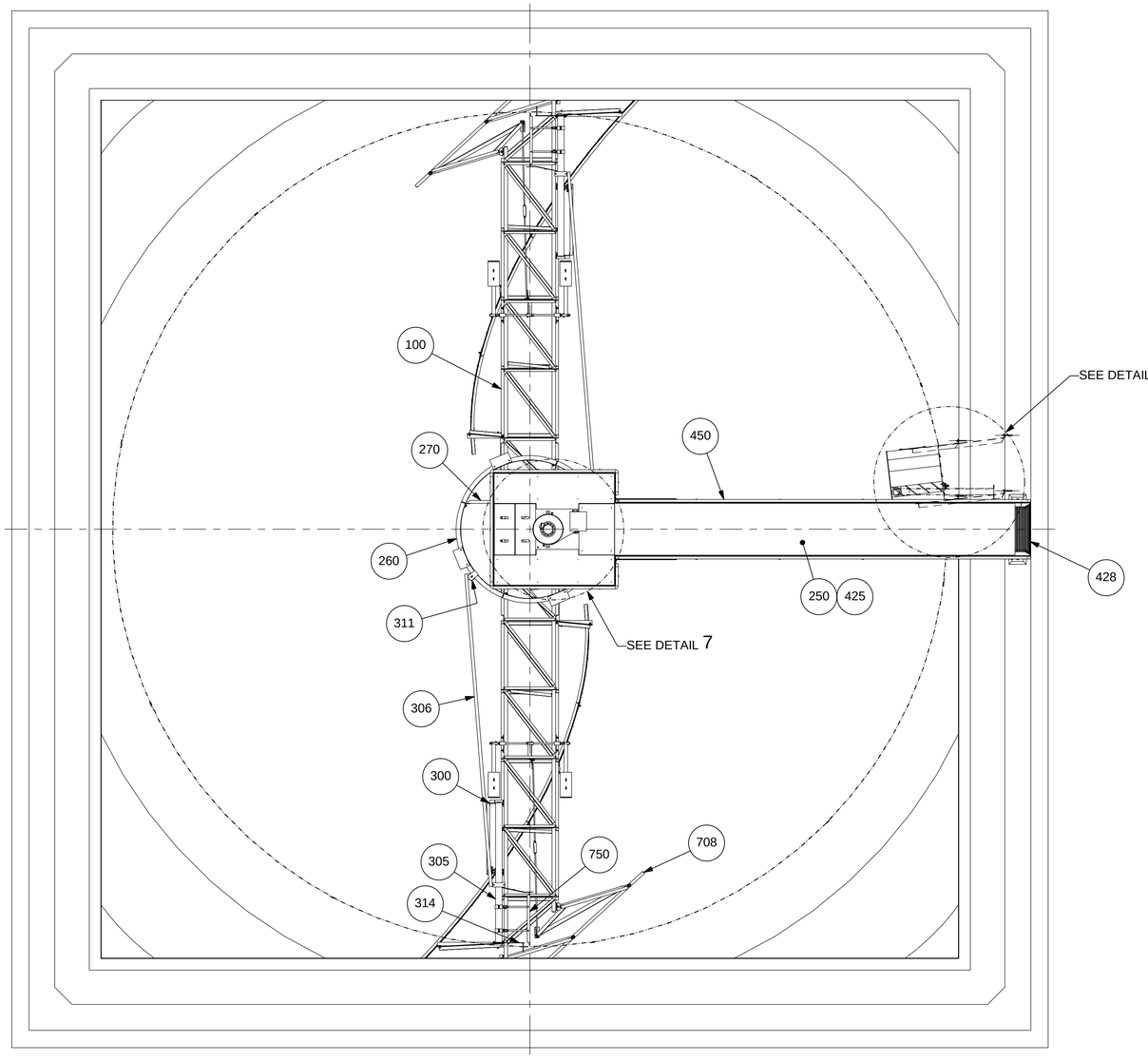
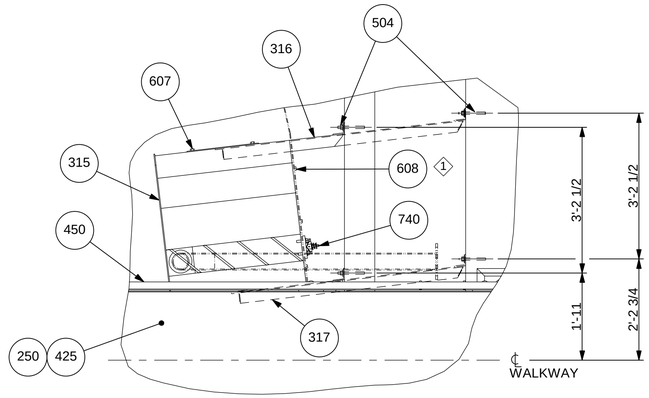
∅55'-0 PRIMARY CLARIFIER
COPC2

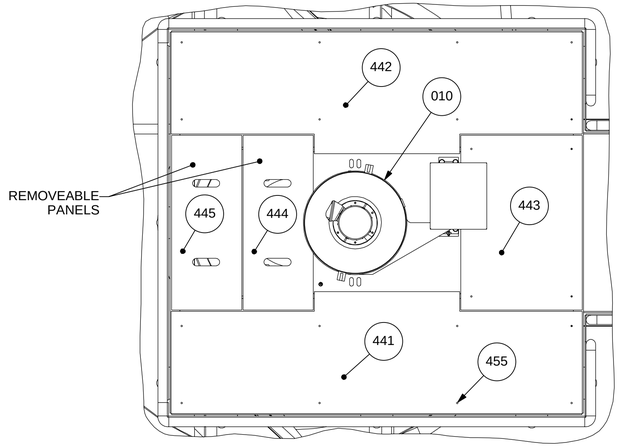
DESIGNER	CHECKER	APPROVER	DATE	
TH43	HU02	PO07	2022-03-21	
JOB NUMBER	DOCUMENT NUMBER		SHEET	REV
24587A	**0001881288**		2 OF 8	**-**



TANKS 1-3



DETAIL 6
SCUM BOX TO WALL (TANKS 1-3)
SCALE 0.050



DETAIL 7
FLOORPLATE ARRANGEMENT (ALL TANKS)
SCALE 0.065

NOTES:

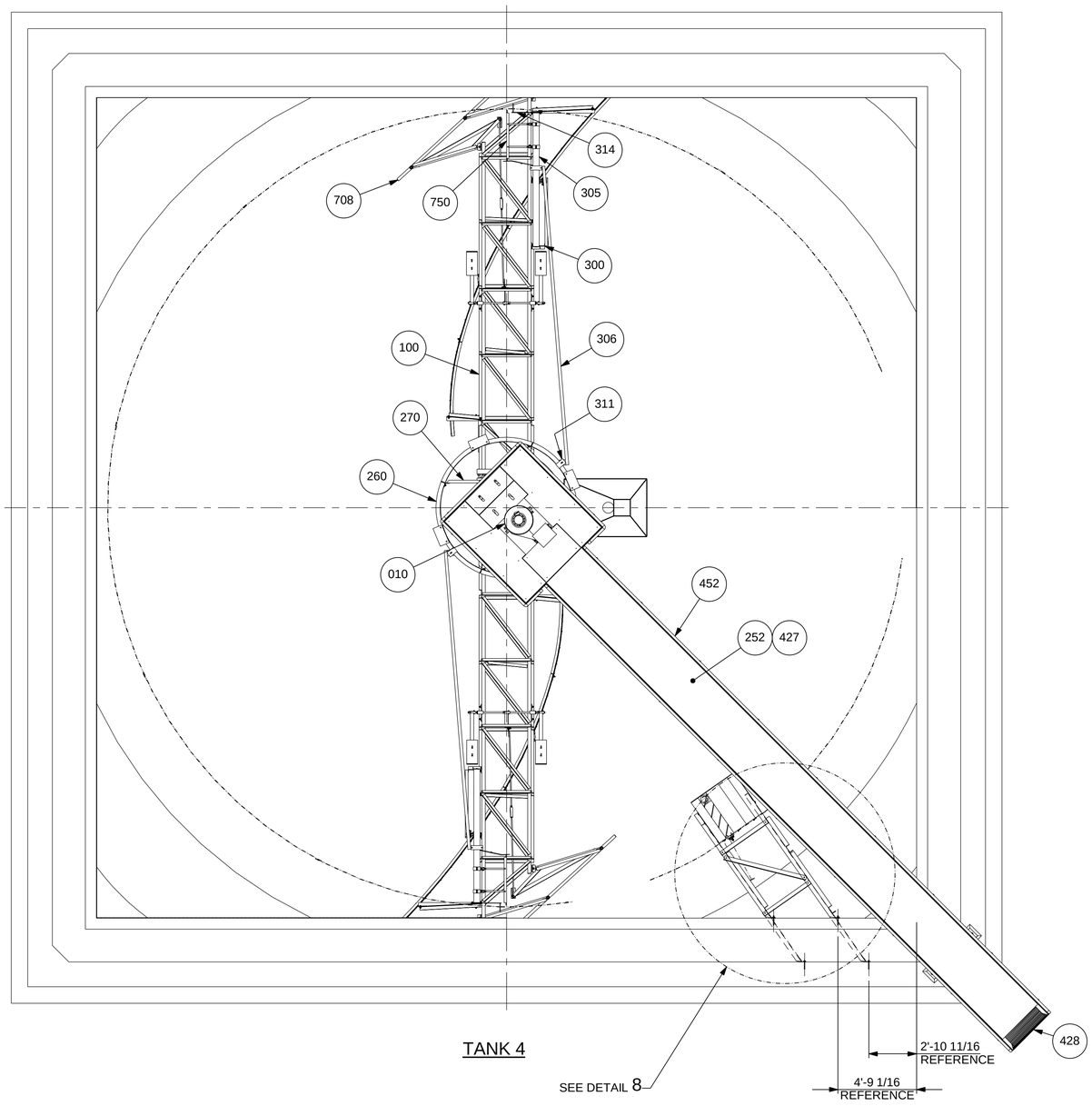
1. FIELD DRILL HOLES IN BAFFLE USING SCUM BOX AS TEMPLATE.

BACKCHARGES FOR FIELD WORK OF ANY KIND ARE NOT ACCEPTABLE WITHOUT PRIOR WRITTEN AUTHORIZATION BY WESTECH ENGINEERING, LLC.

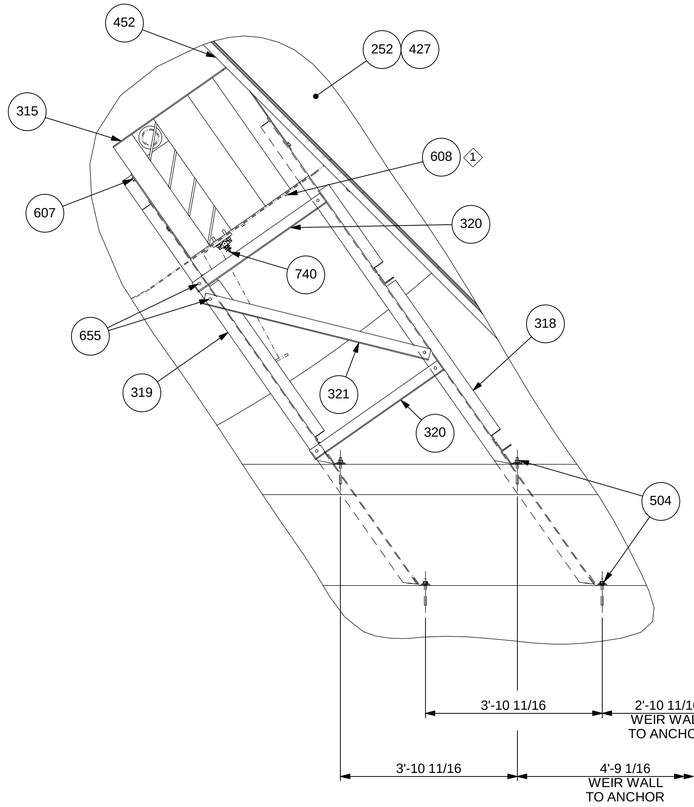
WESTECH®

TITLE: **GENERAL ERECTION**
∅55'-0 PRIMARY CLARIFIER
COPC2

DESIGNER	CHECKER	APPROVER	DATE
TH43	HU02	PO07	2022-03-21
JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881288**	3 OF 8	**-**



TANK 4



DETAIL 8
SCUM BOX TO WALL (TANK 4)
SCALE 0.050

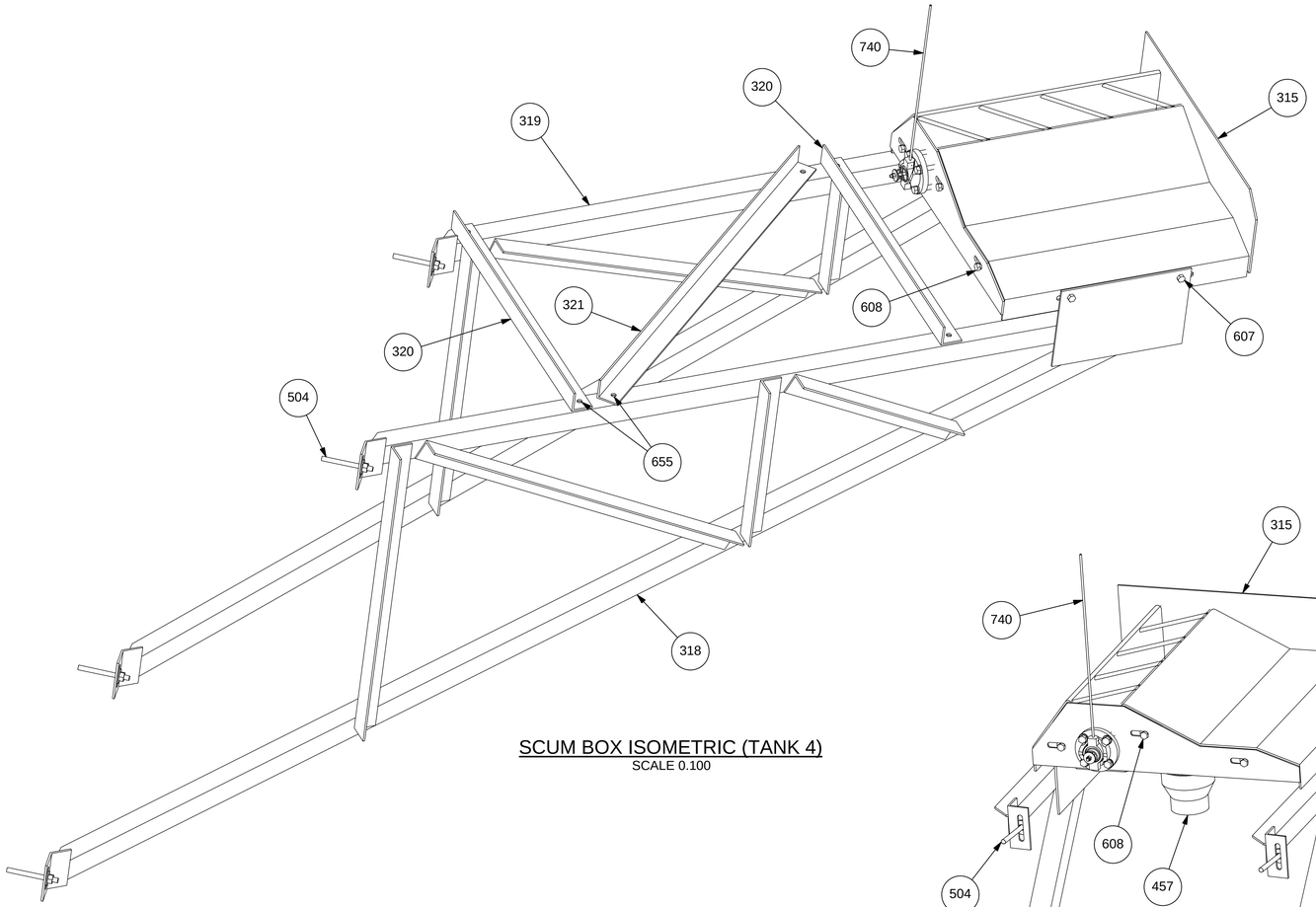
NOTES:

1. FIELD DRILL HOLES IN BAFFLE USING SCUM BOX AS TEMPLATE.

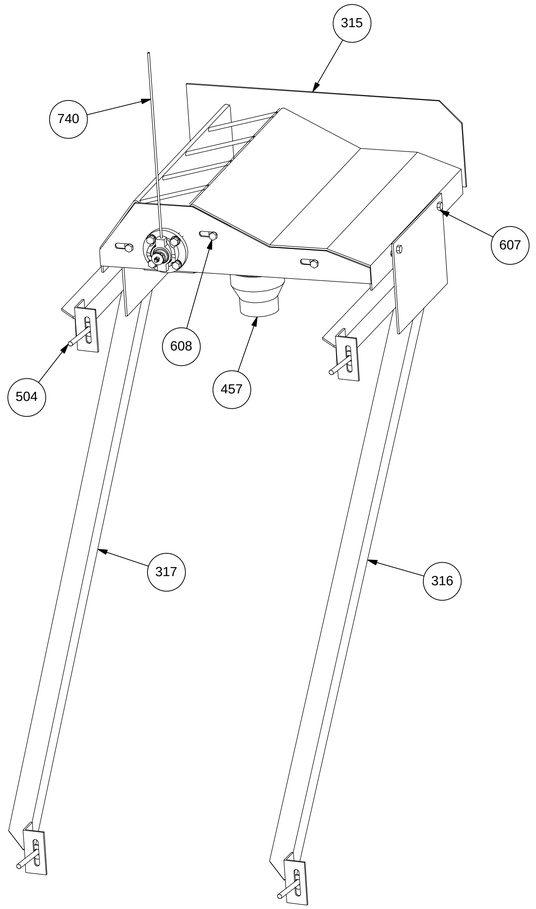
TITLE: **GENERAL ERECTION**
∅55'-0 PRIMARY CLARIFIER
COPC2

DESIGNER	CHECKER	APPROVER	DATE
TH43	HU02	PO07	2022-03-21

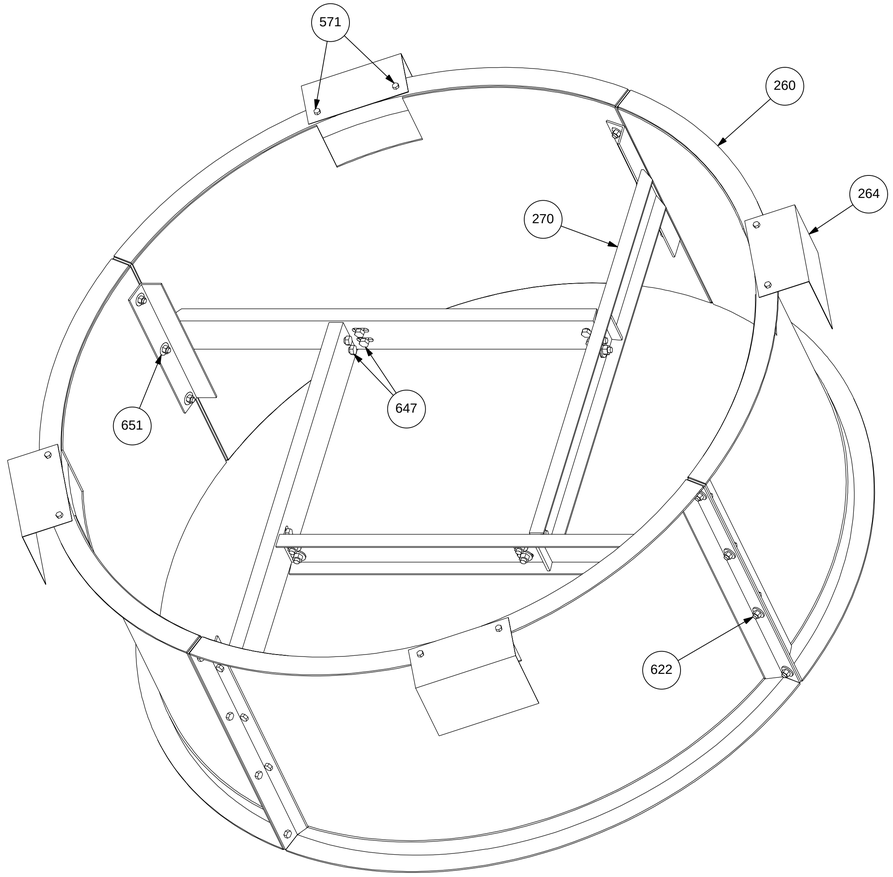
JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881288**	4 OF 8	**-**



SCUM BOX ISOMETRIC (TANK 4)
SCALE 0.100



SCUM BOX ISOMETRIC (TANKS 1-3)
SCALE 0.100



FEEDWELL AND SUPPORTS ISOMETRIC
SCALE 0.100

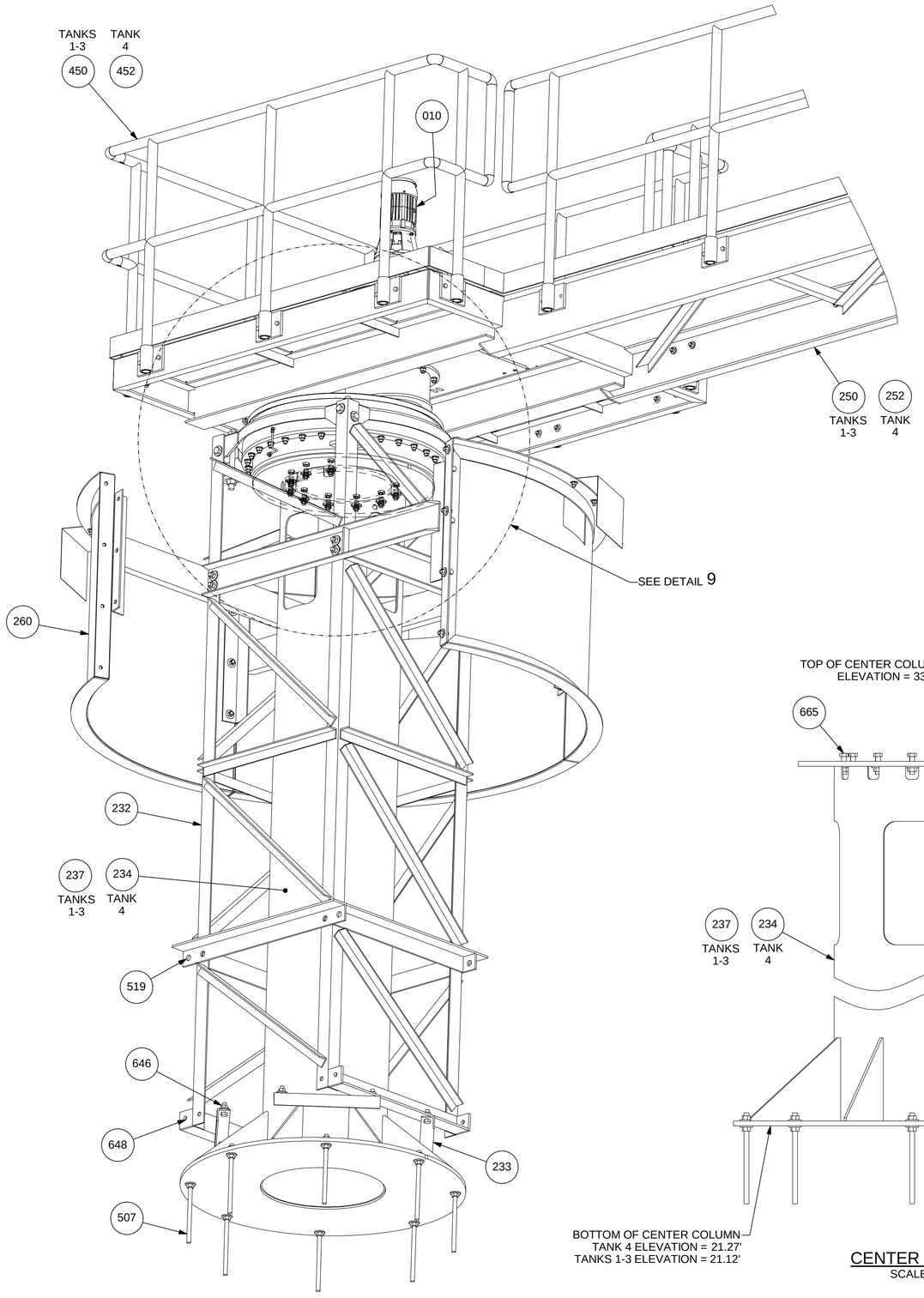
BACKCHARGES FOR FIELD WORK OF ANY KIND ARE NOT ACCEPTABLE WITHOUT PRIOR WRITTEN AUTHORIZATION BY WESTECH ENGINEERING, LLC.

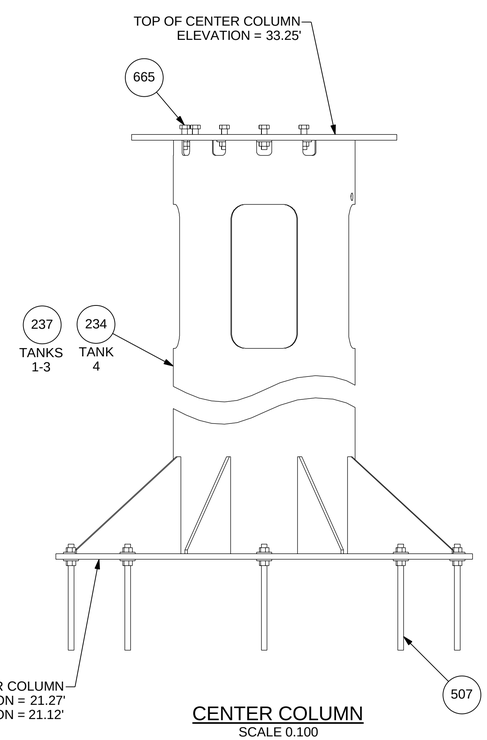
WESTECH®

TITLE: **GENERAL ERECTION**
∅55'-0 PRIMARY CLARIFIER
COPC2

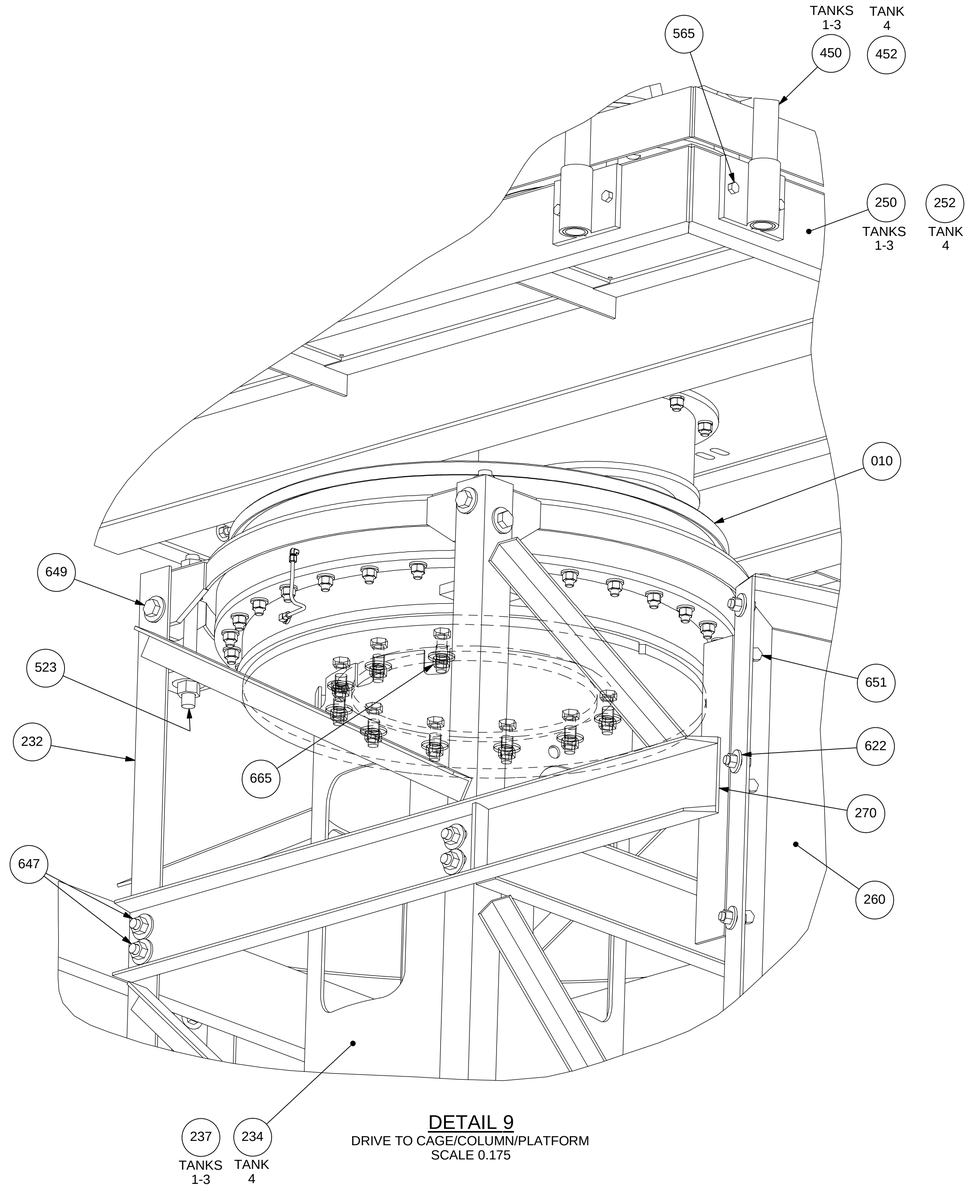
DESIGNER	CHECKER	APPROVER	DATE
TH43	HU02	PO07	2022-03-21

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881288**	5 OF 8	**-**





CENTER COLUMN
SCALE 0.100



DETAIL 9
DRIVE TO CAGE/COLUMN/PLATFORM
SCALE 0.175

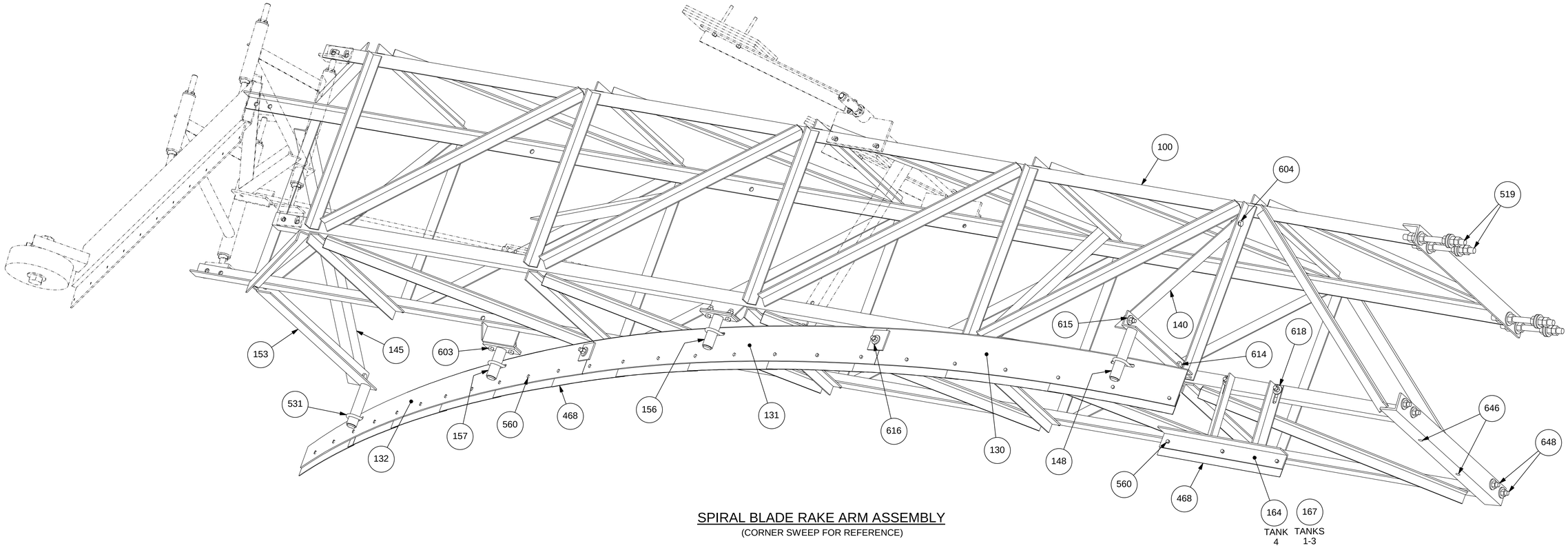
BACKCHARGES FOR FIELD WORK OF ANY KIND ARE NOT ACCEPTABLE WITHOUT PRIOR WRITTEN AUTHORIZATION BY WESTECH ENGINEERING, LLC.

WESTECH®

TITLE: **GENERAL ERECTION**
∅55'-0 PRIMARY CLARIFIER
COPC2

DESIGNER	CHECKER	APPROVER	DATE
TH43	HU02	PO07	2022-03-21

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881288**	6 OF 8	-



SPIRAL BLADE RAKE ARM ASSEMBLY

(CORNER SWEEP FOR REFERENCE)

NOTES:

1. ASSEMBLE BLADES SO THERE WILL BE APPROXIMATELY 2.0" CLEARANCE BELOW SPIRAL BLADE SUPPORT.

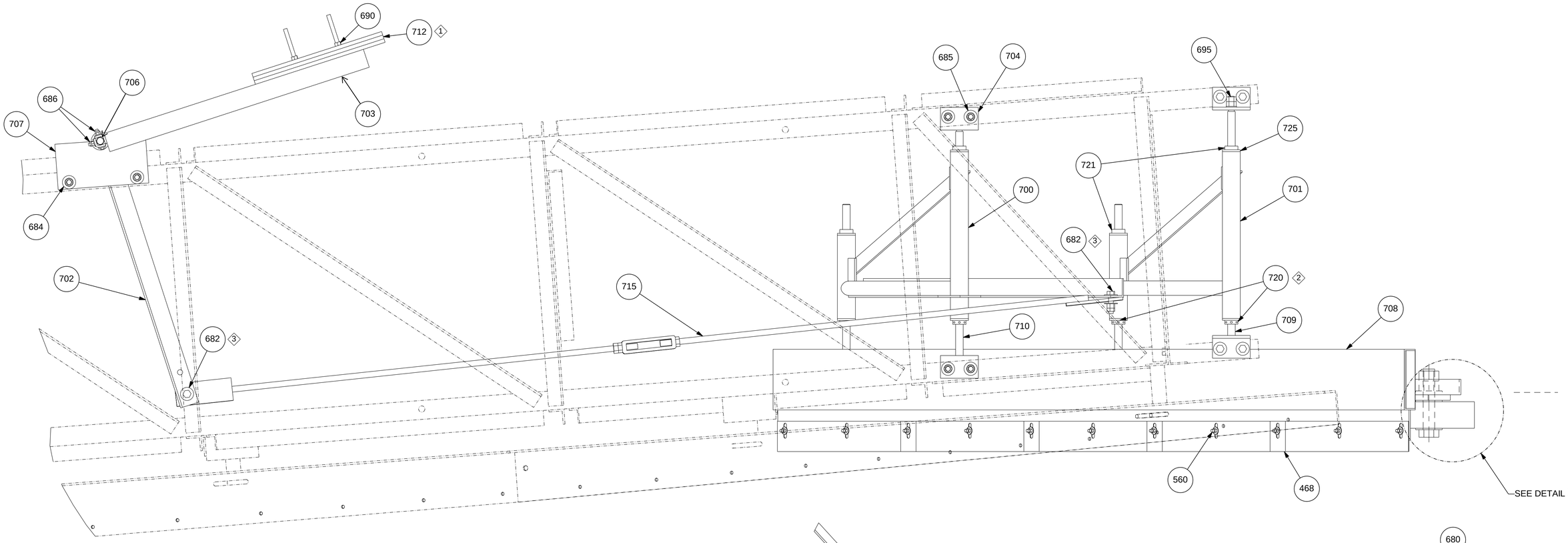
TITLE: **GENERAL ERECTION**

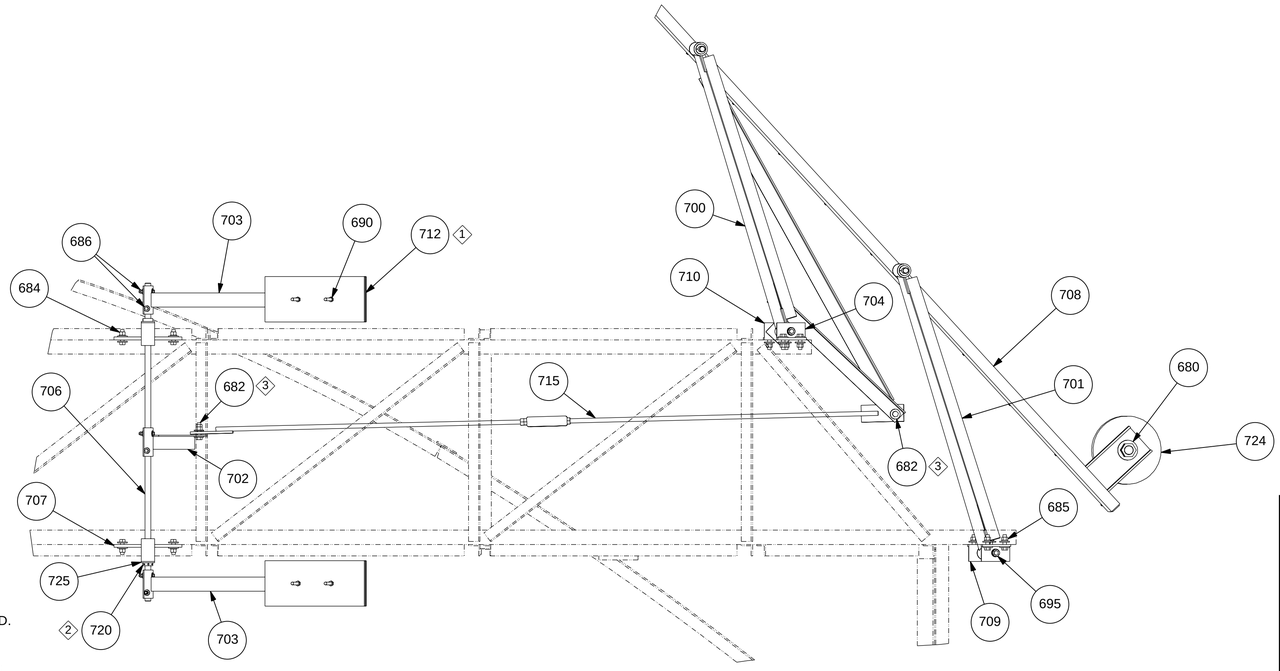
∅55'-0 PRIMARY CLARIFIER

COPC2

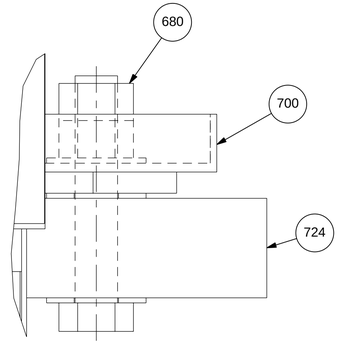
DESIGNER	CHECKER	APPROVER	DATE
TH43	HU02	PO07	2022-03-21

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881288**	7 OF 8	-





CORNER SWEEP ASSEMBLY
(RAKE ARM FOR REFERENCE)



DETAIL 10
SCALE 0.375

NOTES:

1. START WITH 2-COUNTER WEIGHTS ON EACH LEVER ARM, ADD MORE AS NEEDED.
2. FIELD LOCATE 'LOAD BEARING' SHAFT COLLARS (ITEM 720) DURING ASSEMBLY. AFTER ALIGNING MATING PARTS, DIMPLE PIVOT POST & CORNER SWEEP BLADE SHAFTS USING SHAFT COLLARS AS A TEMPLATE. TIGHTEN COLLAR SET SCREWS.
3. ASSEMBLE TIE ROD ENDS LOOSE ENOUGH TO ALLOW ROD MIS-ALIGNMENT DURING OPERATION, THEN LOCK WITH DOUBLE NUT.

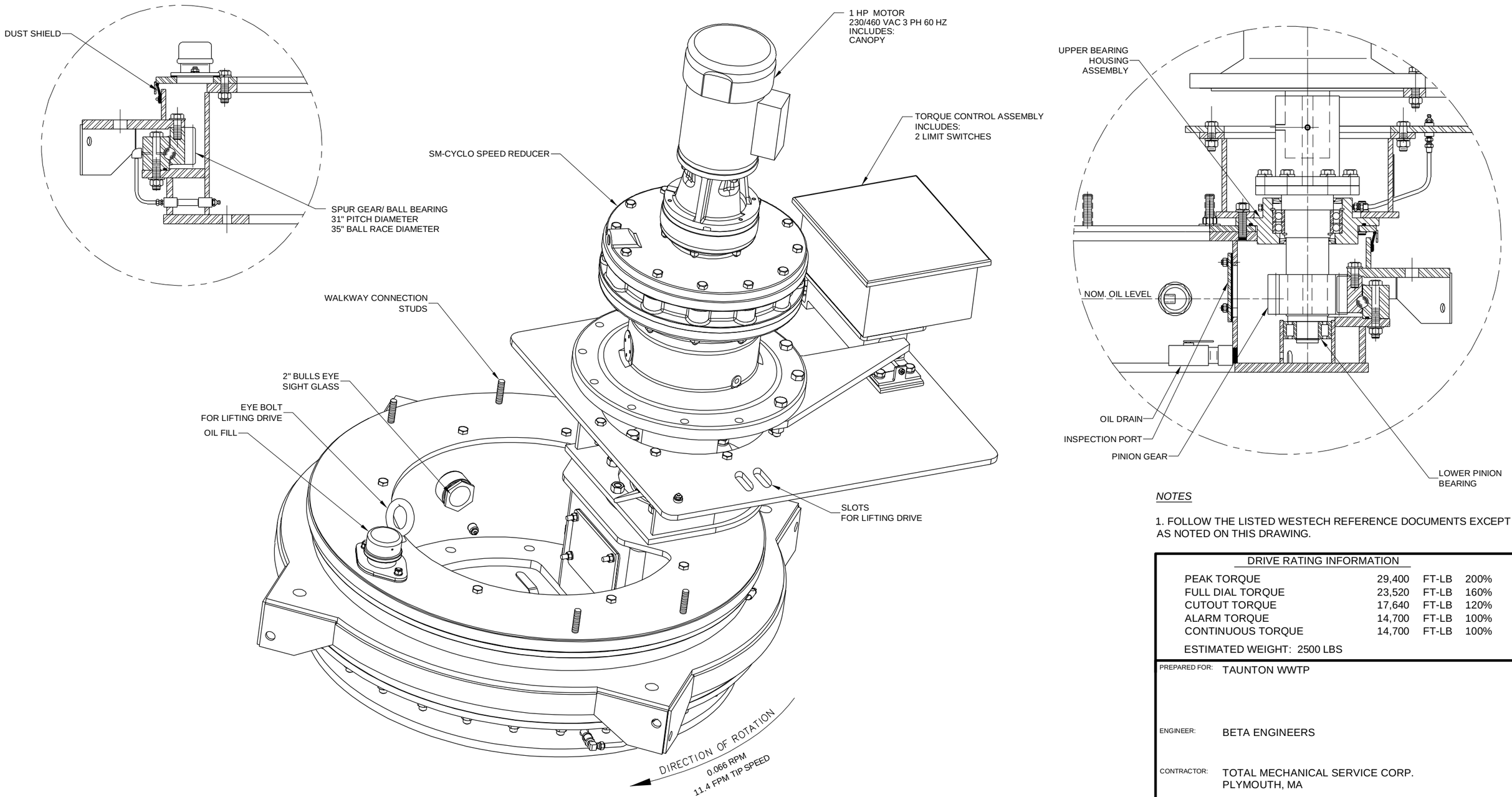
BACKCHARGES FOR FIELD WORK OF ANY KIND ARE NOT ACCEPTABLE WITHOUT PRIOR WRITTEN AUTHORIZATION BY WESTECH ENGINEERING, LLC.

WESTECH®

TITLE: **GENERAL ERECTION**
∅55'-0 PRIMARY CLARIFIER
COPC2

DESIGNER	CHECKER	APPROVER	DATE
TH43	HU02	PO07	2022-03-21

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001881288**	8 OF 8	-



NOTES

1. FOLLOW THE LISTED WESTECH REFERENCE DOCUMENTS EXCEPT AS NOTED ON THIS DRAWING.

DRIVE RATING INFORMATION

PEAK TORQUE	29,400	FT-LB	200%
FULL DIAL TORQUE	23,520	FT-LB	160%
CUTOUT TORQUE	17,640	FT-LB	120%
ALARM TORQUE	14,700	FT-LB	100%
CONTINUOUS TORQUE	14,700	FT-LB	100%

ESTIMATED WEIGHT: 2500 LBS

PREPARED FOR: TAUNTON WWTP

ENGINEER: BETA ENGINEERS

CONTRACTOR: TOTAL MECHANICAL SERVICE CORP.
PLYMOUTH, MA

PO/CONTRACT NUMBER: 2021-26

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE

REFERENCE DOCUMENTS

WESTECH®

TITLE **CAGE DRIVE GENERAL ARRANGEMENT**
8050
31"

DESIGNER	CHECKER	APPROVER	DATE	
DA80	AM43	AM43	2021-10-19	
JOB NUMBER	DOCUMENT NUMBER		SHEET	REV
24587A	**0001858210**		1 OF 1	**-**

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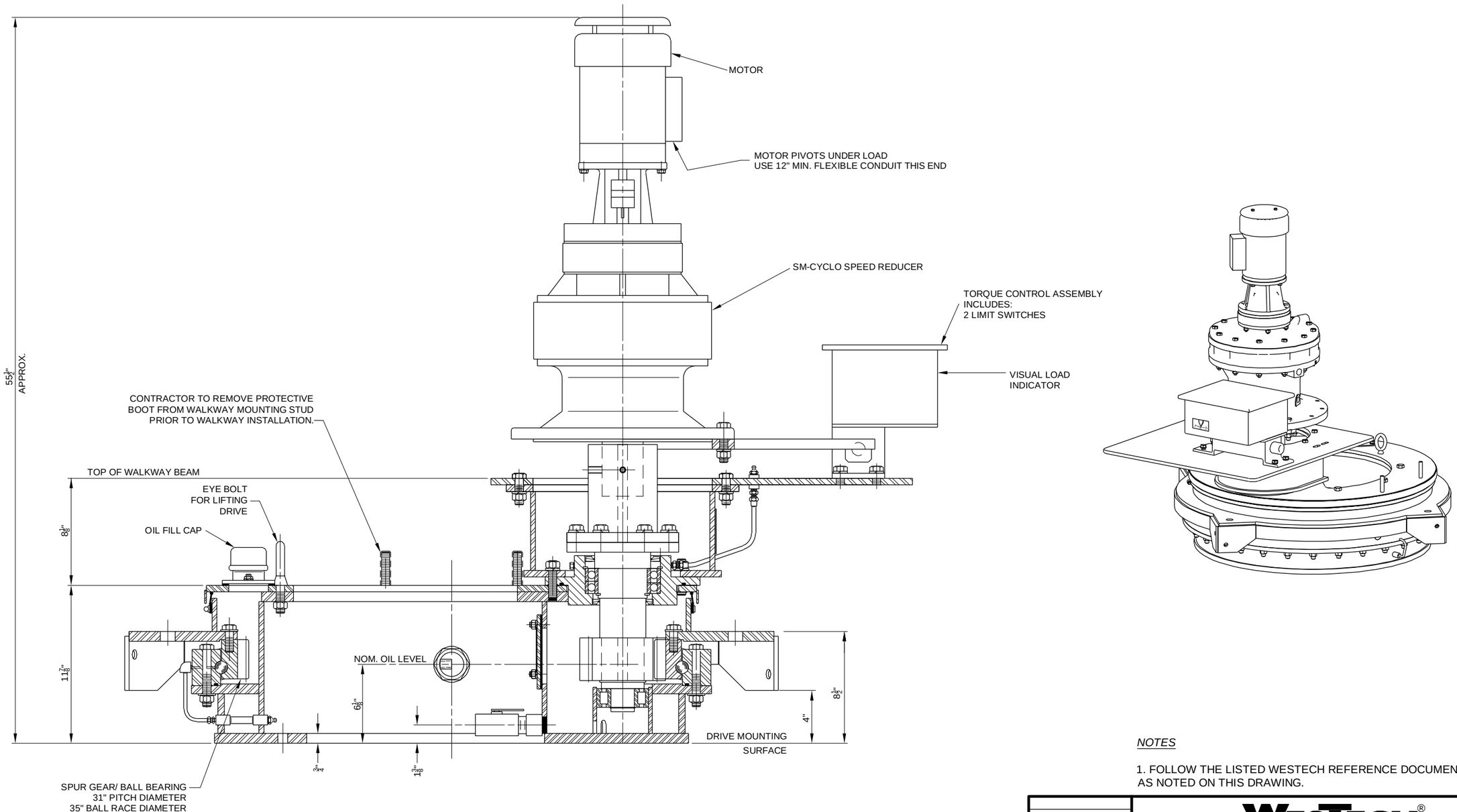

NOTES

1. FOLLOW THE LISTED WESTECH REFERENCE DOCUMENTS EXCEPT AS NOTED ON THIS DRAWING.

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE

0001858210
0001858212
68468
REFERENCE DOCUMENTS

WESTECH®

TITLE **CAGE DRIVE GENERAL ARRANGEMENT - ELEVATION**
8050
31"

DESIGNER	CHECKER	APPROVER	DATE
DA80	AM73	AM43	2021-10-19

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001858211**	1 OF 1	-

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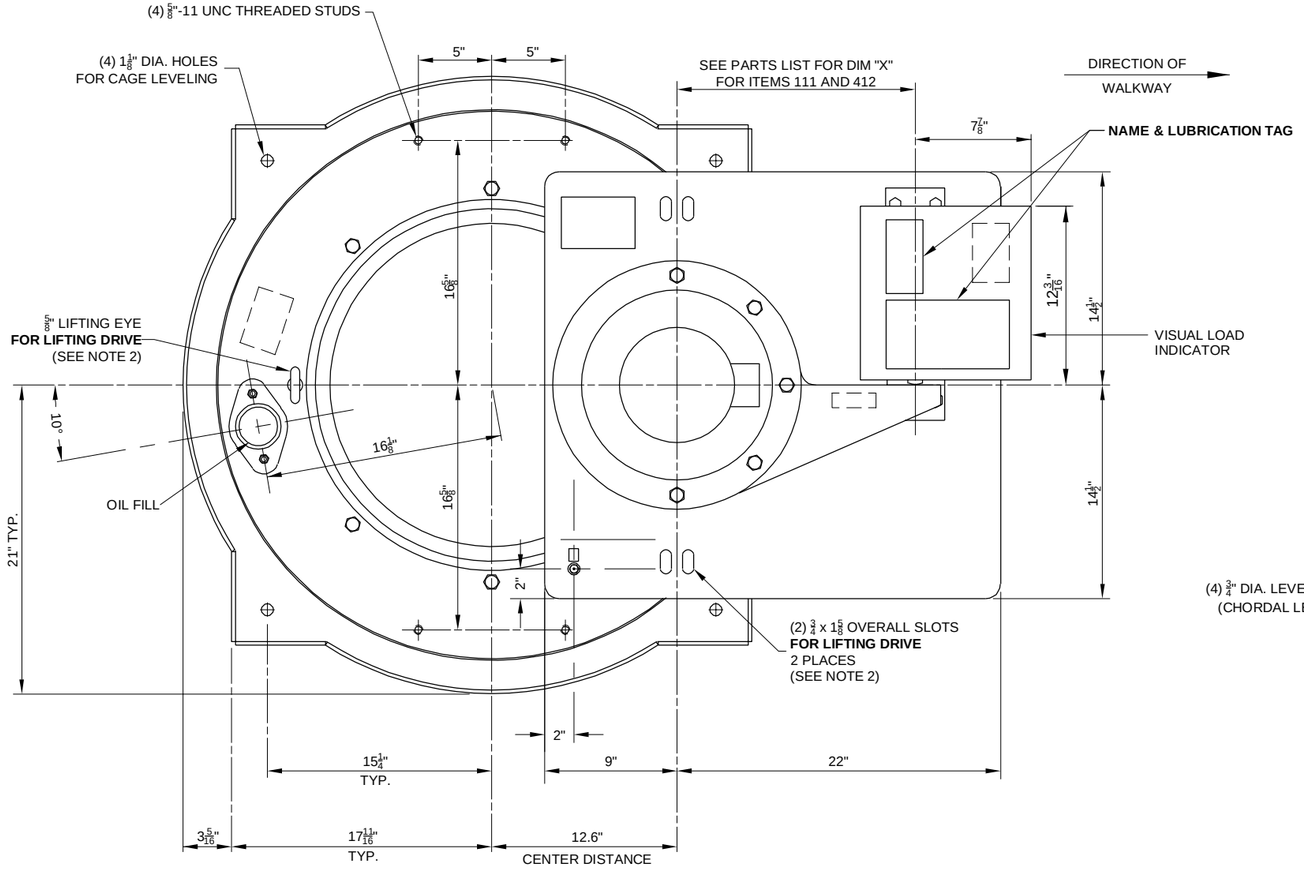
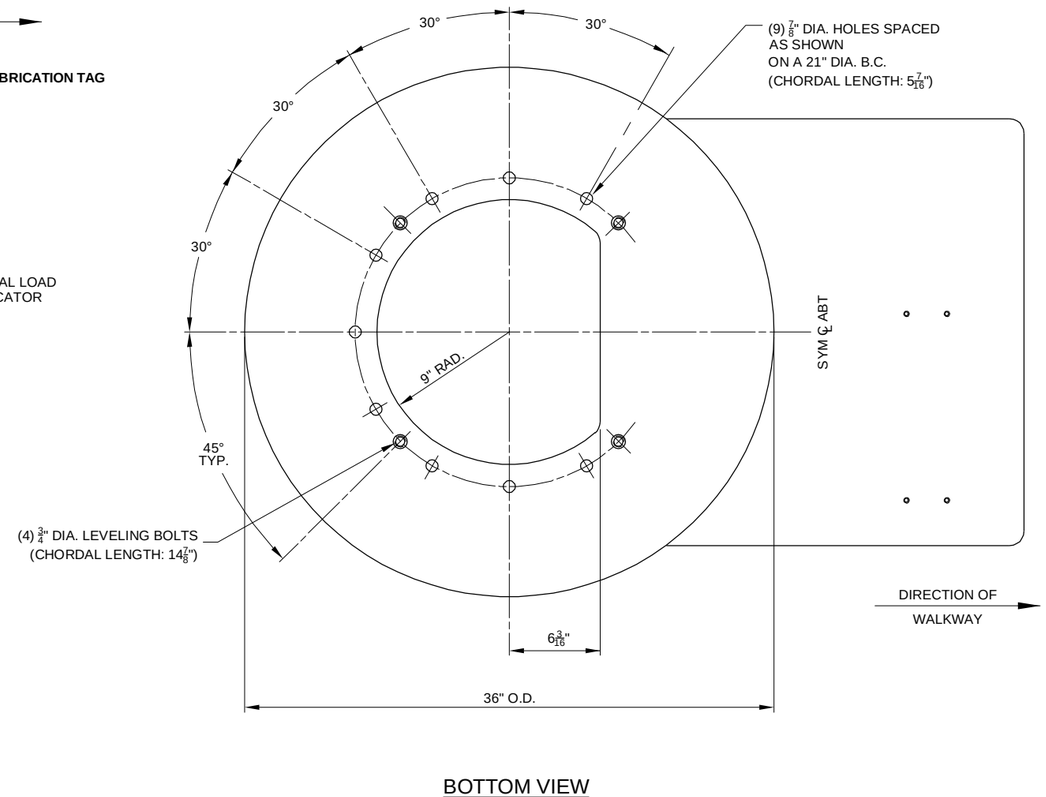
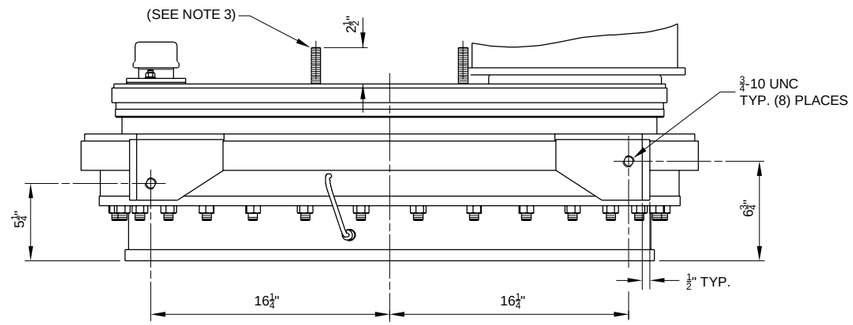




BOTTOM VIEW



NOTES

1. FOLLOW THE LISTED WESTECH REFERENCE DOCUMENTS EXCEPT AS NOTED ON THIS DRAWING.

2. LIFT DRIVE USING ONLY THE LIFT POINTS NOTED ON THE GENERAL ARRANGEMENT DRAWINGS. DO NOT LIFT THE DRIVE USING LIFTING EYES LOCATED ON REDUCER OR MOTOR.

3. CONTRACTOR TO REMOVE PROTECTIVE BOOT FROM WALKWAY MOUNTING STUD PRIOR TO WALKWAY INSTALLATION.

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE

0001858210
0001858211
68468
REFERENCE DOCUMENTS

WESTECH®

TITLE **CAGE DRIVE GENERAL ARRANGEMENT - PLAN**
8050
31"

DESIGNER	CHECKER	APPROVER	DATE
DA80	AM43	AM43	2021-10-19

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	0001858212	1 OF 1	-

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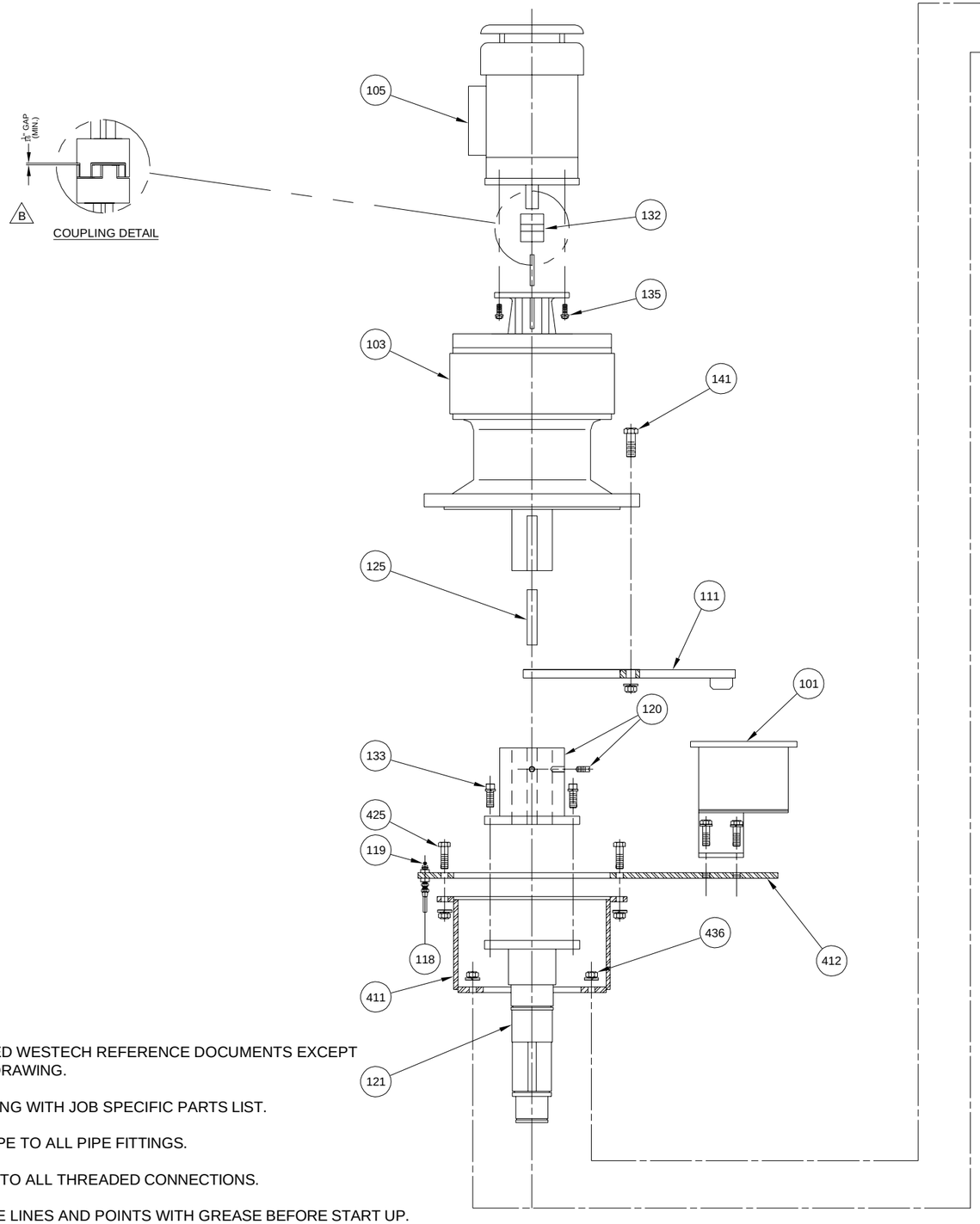

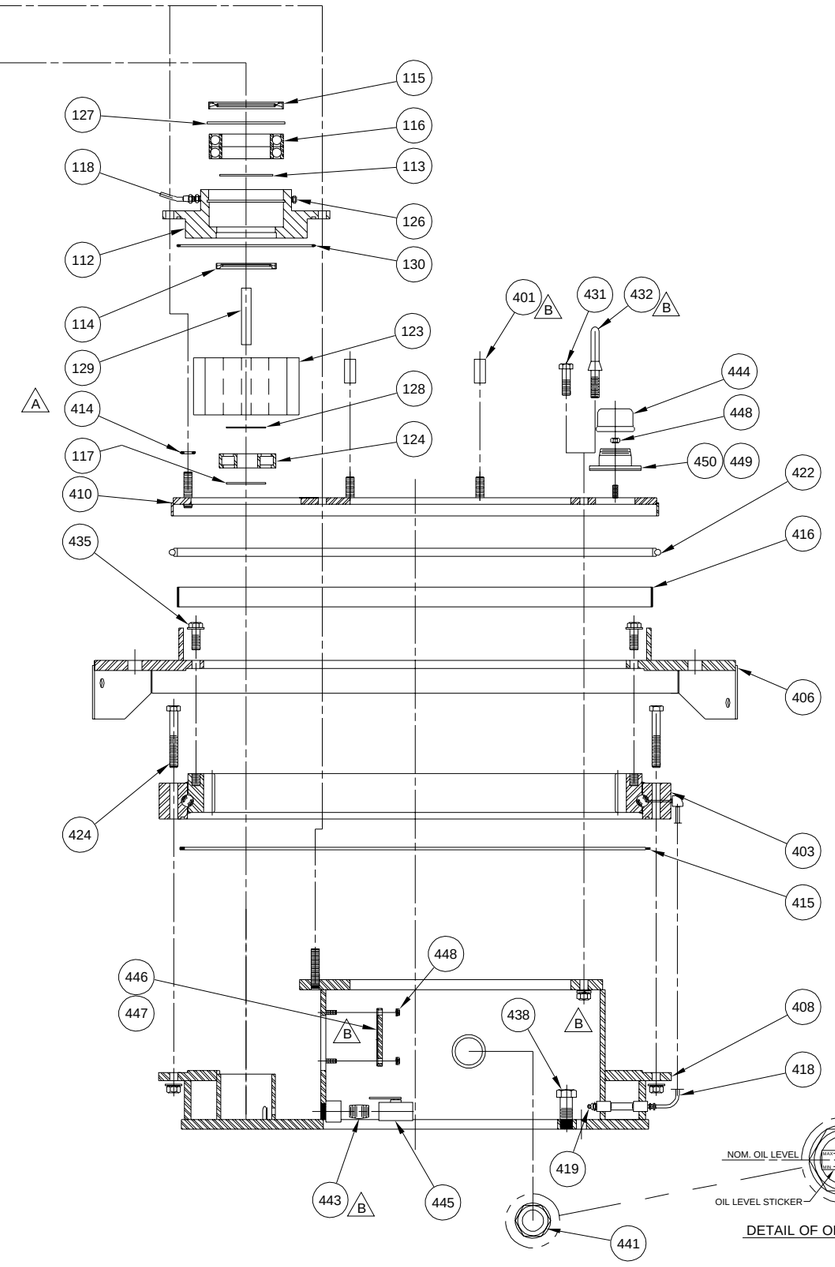

NOTES: B

1. FOLLOW THE LISTED WESTECH REFERENCE DOCUMENTS EXCEPT AS NOTED ON THIS DRAWING.

2. WORK THIS DRAWING WITH JOB SPECIFIC PARTS LIST.

3. APPLY TEFLON TAPE TO ALL PIPE FITTINGS.

4. APPLY ANTI-SEIZE TO ALL THREADED CONNECTIONS.

5. PRIME ALL GREASE LINES AND POINTS WITH GREASE BEFORE START UP.

6. APPLY LPS RUST INHIBITOR TO ALL UNPAINTED MACHINED SURFACES INCLUDING BUYOUT COMPONENTS PRIOR TO ASSEMBLY, EXCEPT FOR MATING SURFACES TO BE SILICONED AND THREADED HOLES.

7. DRV114, DRV111, DRV109, DRV105 AND DRV103 SUPERSEDE PORTIONS OF QR-00-063. B

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE	REFERENCE DOCUMENTS
B	ADD'D 401 & 432, REMOV'D LIFTING EYES FROM 408, CHANG'D 443 TO CLOSE NIPPLE; REMOV'D DIM NOTE; ADD'D COUPLING DET'L, DET'L OF OIL LEVEL GAUGE, REF DOC QR-00-063 & NOTE 7; REMOV'D REF DOC DRV113 & A608-001A	-	RH00	BO13	2015-12-10	DRV114
A	ADDED ITEM 414 PER DECR 124	-	MR	MWP	2/12	DRV111
						DRV109
						DRV105
						DRV103
						QR-00-063

B

WESTECH®

TITLE **ASSEMBLY DIAGRAM**
8050
31" CAGE DRIVE

DESIGNER	CHECKER	APPROVER	DATE
MPW	JJ	JJ	11/9

DOCUMENT NUMBER	SHEET	REV
C31-OGA	1 OF 1	**B**

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STANDARD TORQUE VALUES (FT–LBS)

GRADE MARKING	SPEC.	TENSILE STRENGTH	MATERIAL	SCREW OR BOLT DIA. 1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2
	A 449 SAE 5	105,000	MED. CARBON STEEL QUENCHED & TEMPERED	9	18	31	50	75	150	250	378	583	782	1097	1461	1748
	SAE 8	150,000	MED. CARBON ALLOY QUENCHED & TEMPERED	13	28	46	75	115	225	370	591	893	1410	1964	2633	3150
316	STAINLESS STEEL	–	316	75 IN–LBS	132 IN–LBS	20	31	45	100	130	200	270	410	505		730
	SOCKET HD CAPSCREW	160,000	HIGH CARBON ALLOY QUENCHED & TEMPERED	14	30	50	81	121	240	395	629	964	1523	2120	2843	3402
	SOCKET SET SCREW	212,000 TO 225,000	HIGH CARBON ALLOY QUENCHED & TEMPERED	70 IN–LBS	140 IN–LBS	20	29	43	100	146						

NOTES

1. MULTIPLY THE TORQUE FIGURES IN THE CHART BY
(a) .90 WHEN CAPSCREWS ARE PLATED, OR
(b) .80 WHEN NUTS AND BOLTS ARE PLATED.

2. MULTIPLY THE TORQUE FIGURES IN THE CHART BY .90 WHEN LUBRICANTS SUCH AS NEVER–SEEZ, GRAPHITE, ETC. ARE USED

3. TORQUE VALUES SHALL BE REDUCED ACCORDING TO THE CHART BELOW IF EITHER, OR BOTH OF THE FOLLOWING CONDITIONS EXIST:
(A) THE TENSILE STRENGTH OF THE MATERIAL OF THE TAPPED HOLE IS LESS THAN THE TENSILE STRENGTH OF THE FASTENER.
(B) THE LENGTH OF ENGAGEMENT INTO THE TAPPED HOLE IS LESS THAN THE HEIGHT OF A HEAVY NUT FOR THAT BOLT SIZE.

△D

	HOUSING MATERIAL	COMBINED MULTIPLIER BASED ON CONDITIONS 1a, 2 & 3 EXISTING
p	304LSS	0.70
q	A36 STL	0.50
r	316LSS	0.70
z	DUCTILE IRON	0.50

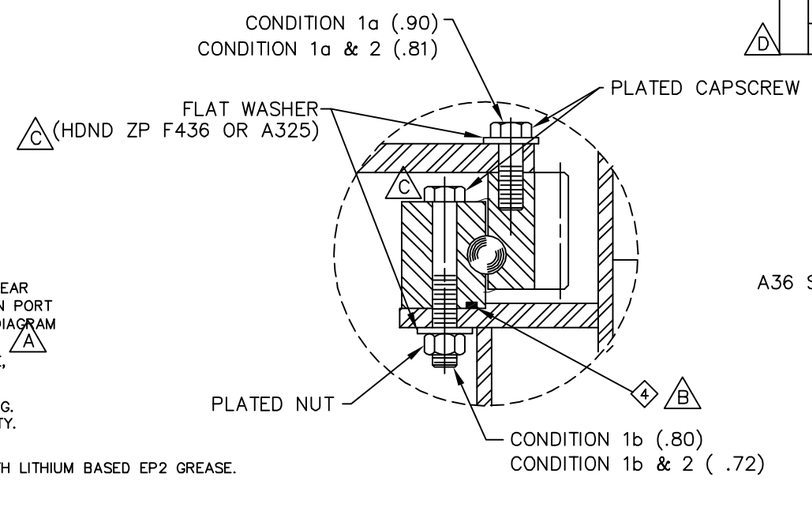
NOTES:

1. CONFIRM THE MAIN BEARING BALL PLUG IS SEALED WITH AN O–RING SEAL OR WITH THREAD SEALER.
2. MAKE SURE THE GEAR HOUSING AND THE GEAR BEARING ARE CLEAN. THE BEARING MOUNTING SURFACE MUST BE FREE OF ANY NICKS OR DENTS.

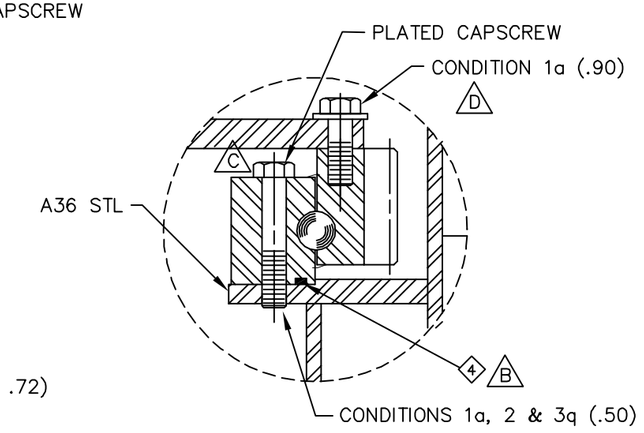
STEP (1): ASSEMBLE THE GEAR BEARING IN THE HOUSING. USING A TORQUE WRENCH, TIGHTEN THE FASTENERS IN A CROSSWISE PATTERN TO THE PROPER TORQUE VALUES (SEE TABLE). ROTATE THE GEAR BEARING RACE THROUGH 360 DEGREES. IF IT DOES NOT ROTATE FREELY. THEN FIND THE CAUSE AND CORRECT IT. △A

STEP (2): ASSEMBLE THE GEAR HUB ON TO THE GEAR BEARING. USING A TORQUE WRENCH, TIGHTEN THE FASTENERS IN A CROSSWISE PATTERN TO THE PROPER TORQUE VALUES (SEE TABLE). ROTATE THE GEAR HUB THROUGH 360 DEGREES. IF IT DOES NOT ROTATE FREELY THEN FIND THE CAUSE AND CORRECT IT. △A

3. SEAL ALL GAPS, MATING SURFACES AND THREADED HOLES BETWEEN THE GEAR HOUSING AND ANY ATTACHMENTS, (HOUSING COVER, GEAR HUB, INSPECTION PORT COVERS, ADAPTERS, ETC.) WITH SPECIFIED SEALANT PER THE ASSEMBLY DIAGRAM AND SEALANT SPECIFICATION DWG. NO. DRV105. △C △A
4. USE THE O–RING ONLY TO SEAL BENEATH THE MAIN BEARING. USE GREASE, NOT SILICONE,TO HOLD THE O–RING IN PLACE DURING INSTALLATION. △B ◇4
5. CHECK GEAR TOOTH CONTACT PATTERN FOR EVERY NON–STD GEAR HOUSING. STANDARD GEAR HOUSINGS WILL BE RANDOMLY CHECKED TO INSURE QUALITY. A MINIMUM CONTACT OF 80% SHALL BE ACHIEVED.
6. THE LOWER PINION BEARING ON ALL DRIVES SHALL BE GREASE PACKED WITH LITHIUM BASED EP2 GREASE. △E
   ADDITIONALLY, FOR GREASE LUBRICATED ITEMS DO THE FOLLOWING:
   (a) PACK OR COAT GEARS WITH LITHIUM BASED EP2 GREASE.
   (b) FILL THE LUBE LINE LEADING TO THAT ITEM WITH LITHIUM BASED EP2 GREASE.
   (c) PLACE A TAG ON THE DRIVE TO INDICATE WHAT TYPE/BRAND OF GREASE WAS USED.
7. ATTACH LUBRICATION LEGEND AND TAGS WITH THE SPECIFIED ADHESIVE PER GENERAL ARRANGEMENT DRAWING AND SEALANT/ADHESIVE SPECIFICATION DWG. NO. DRV105. △C △A
8. ATTACH ROTATION WARNING, AND DIRECTION OF ROTATION STICKERS AS SHOWN ON GENERAL ARRANGEMENT DRAWING.
9. ATTACH STORAGE PROCEDURE STICKER AS INDICATED ON GENERAL ARRANGEMENT DRAWING.
10. APPLY ANTI–SIEZE OR EQUIVALENT TO JAWS/SPIDER OF MOTOR–TO–REDUCER COUPLING DURING ASSEMBLY. △A
11. SET GAP BETWEEN COUPLING HALVES TO A MINIMUM OF 1/16". CONFIRM THAT MOTOR AND REDUCER SHAFTS ARE NOT PUSHING TOGETHER ON THE COUPLING SPIDER AFTER THE MOTOR FASTENERS ARE TIGHTENED. △D
12. ASSEMBLE ALL COMPONENTS, (INCLUDING TORQUE CONTROL DEVICE.) ACCORDING TO THE GENERAL ARRANGMENT DRAWING. REFER TO DWG. NO. 7–8222–B1 FOR PROPER ASSEMBLY OF THE TORQUE ARM, RETAINER, AND RETAINING SCREW. △A
13. MACHINED SURFACES MUST BE FREE OF PAINT AND PRIMER. APPLY LPS3 TO MACHINED SURFACES PER ASSEMBLY DIAGRAM. △B
14. ATTACH THE MAX/MIN OIL LEVEL STICKER TO SITE GLASS AS SHOWN ON THE GENERAL ARRANGMENT DRAWING. △B △C



EXAMPLE A



EXAMPLE B

ADDED TO NOTE 6 TO GREASE PACK LOWER PINION BEARING	MPW	JJ	1–11	△E
DUCTILE IRON ADDED TO TABLE, NEW TEXT ADDED TO NOTE #11.	DK	NK	9–05	△D
FW REMOVED FROM TOP OF BEARING, HDND FW NOTE ADDED, DRV105 WAS HIGH GRADE INDUSTRIAL, NOTE 14 CHANGED TO "AS SHOWN ON GA"	DK	JJ	4–05	△C
NOTES 13 AND 14 ADDED, #4 NOTE DIAMOND ADDED	DK	JJ	4–04	△B
NOTES 2, 3 & 7 CHANGED. NOTES 10, 11, & 12 ADDED	DK	JJ	3–04	△A
REVISION	BY	CHKD	DATE	LTR

DRIVE ASSEMBLY PROCEDURES

DESCRIPTION								
ALL					ALL			
TYPE					SIZE			.5 x 2
9–03	DK	NK	JJ	NONE				
DATE	STD. BY	STD.CHKD.	STD.APPVD	SCALE	DATE	PROJ. BY	PROJ.CHKD.	PROJ.APPVD

ALL COMPONENTS MUST BE FABRICATED AND MACHINED ACCORDING TO WESTECH STANDARD SPECIFICATION (DRAWING P24Z–024A), UNLESS SPECIFICALLY NOTED ON THIS DRAWING.

WESTECH

DRAWING NUMBER	PROJECT NUMBER	REV.
DRV103		△E

a b c d f g h k m n p r v w x y aa ab ac ad af ag ah ak am an ap ar av aw ax ay

LUBRICATION LEGEND

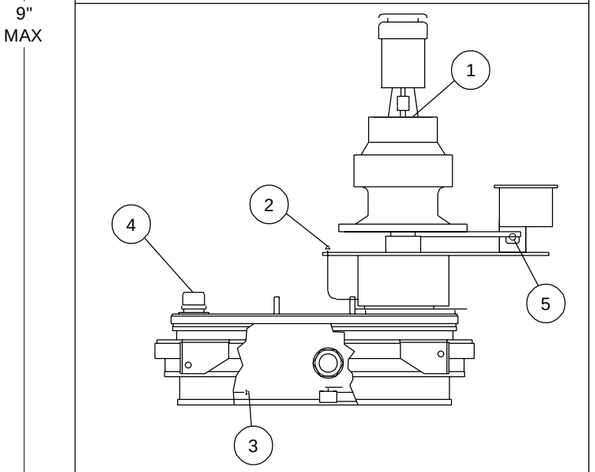
ITEM#	DESCRIPTION	TYPE	AMOUNT TO ADD	SUGGESTED FREQUENCY CHECK/ADD
1	CYCLO REDUCER	(A)	2 fl oz. (60mL)	MONTHLY
2	UPPER BEARING	(A)	2 fl oz. (60mL)	MONTHLY
3	MAIN BEARING	(A)	2 fl oz. (60mL)/ea	WEEKLY
4	MAIN GEAR & LOWER BEARING	(B)	AS REQ'D	WEEKLY
5	T.BOX PLUNGER		SPRAY OIL	WEEKLY

(A) LITHIUM BASED EP2 GREASE
(1 fl oz. = 2 TABLESPOONS) THE OPERATOR SHOULD DETERMINE THE NUMBER OF SHOTS SINCE ALL GREASE GUNS VARY IN VOLUME PER SHOT.

(B) DRAIN CONDENSATE WEEKLY, CHANGE YEARLY W/APPROX. 3-1/2 GAL.. ISO GRADE 220 EP GEAR OIL, FILL TO MIDDLE OF SIGHT GAUGE.
*ACTUAL FREQ. SHALL BE DETERMINED BASED UPON SITE CONDITIONS. OIL MAY BE ANALYZED FOR EXTENDED CHANGE INTERVALS.

* FOR SITE SPECIFIC VISCOSITY, SEE O&M MANUAL.

* FOR LUBE POINTS NOT SHOWN, SEE O&M MANUAL.



9" MAX

5" MAX

SUPPLIED BY
WESTECH®
SALT LAKE CITY, UTAH, U.S.A.
WWW.WESTECH-INC.COM 801-265-1000

SER. NO. 24587A-1,2,3,4
EQUIP. CLARIFIER
SIZE 55' 0" DIA. DATE 2022

STICKER Q'TY	
LABEL #	Q'TY
1	1
2	1
3	2
4	1
5	1

NOTES

1. FOLLOW THE LISTED WESTECH REFERENCE DOCUMENTS EXCEPT AS NOTED ON THIS DRAWING.

REV	REVISION DESCRIPTION	ECN	DESIGNER	APPROVER	DATE

REFERENCE DOCUMENTS

WESTECH®

TITLE **EQUIPMENT LUBRICATION AND NAME TAG**
8050
31"

DESIGNER	CHECKER	APPROVER	DATE
DA80	AM43	AM43	2021-10-19

JOB NUMBER	DOCUMENT NUMBER	SHEET	REV
24587A	**0001858213**	1 OF 1	-

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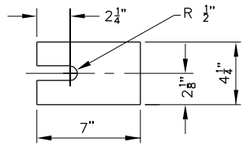
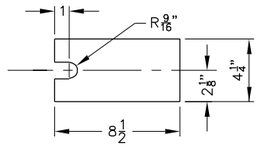
EST. SHIMS REQ'D (CAGE DRIVES)

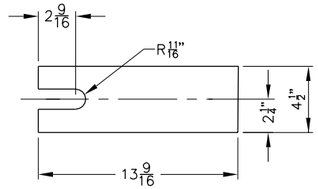
THICKNESS (IN)	SHIM NO.	.010	.015	.030	.060
31" CAGE DRIVE	1	8	8	4	4
42" CAGE DRIVE	2	11	11	6	6
60" CAGE DRIVE	3	11	11	6	6
80" CAGE DRIVE	4	18	18	9	9



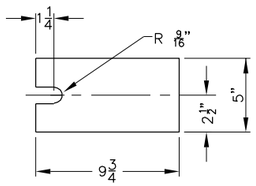
SHIM NO. 1 (SUGGESTED)
31" CAGE DRIVE



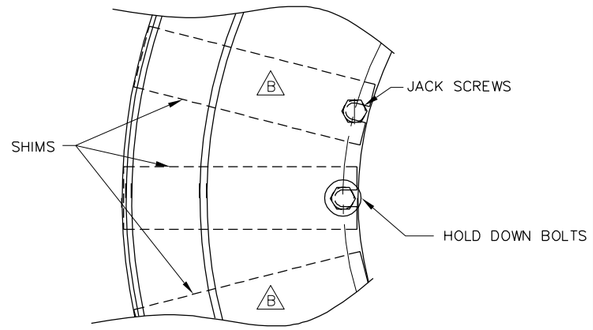
SHIM NO. 2 (SUGGESTED)
42" CAGE DRIVE

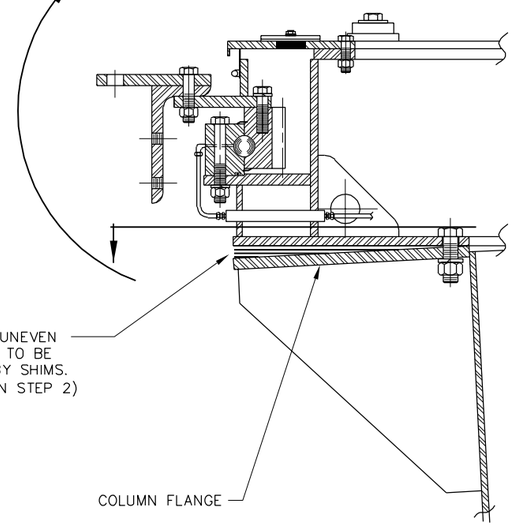


SHIM NO. 3 (SUGGESTED)
60" CAGE DRIVE



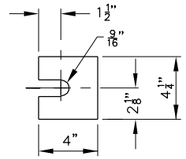
SHIM NO. 4 (SUGGESTED)
80" CAGE DRIVE



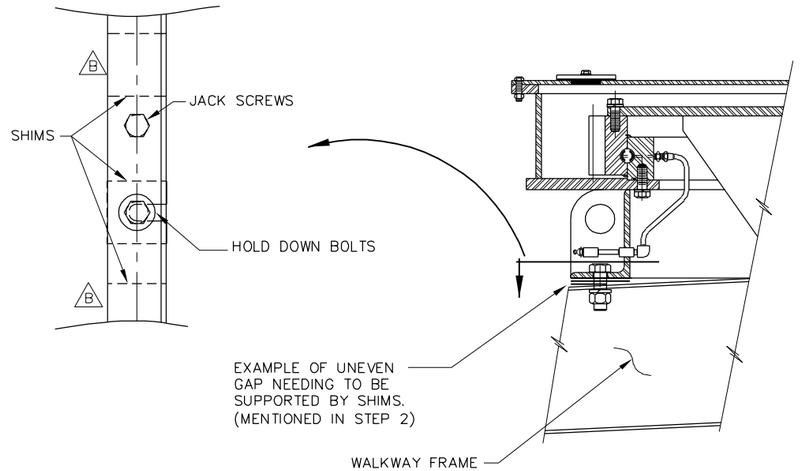


EST. SHIMS REQ'D (ALL SHAFT DRIVES)

THICKNESS (IN)	SHIM NO.	.010	.015	.030	.060
	5	8	8	4	4



SHIM NO. 5 (SUGGESTED)
ALL SHAFT DRIVES



SHIMMING PROCEDURE

1. USE JACK SCREWS TO LEVEL THE DRIVE. REFER TO THE "FINAL CHECK FOR LEVEL" PROCEDURE IN THE OPERATION & MAINTENANCE MANUAL. AFTER THE DRIVE IS LEVELED, UNEVEN GAPS WILL BE PRESENT BETWEEN THE DRIVE HOUSING AND THE COLUMN FLANGE OR WALKWAY FRAME.

FOR COLUMN SUPPORTED – CAGE DRIVES

2.A SHIM UNDER EACH HOLD DOWN BOLT IN A RADIAL LINE FROM THE INSIDE OF THE DRIVE TO THE OUTSIDE AS SHOWN TO FILL ANY GAP EXCEEDING 0.005".

FOR BRIDGE SUPPORTED – SHAFT DRIVES

2.B SHIM UNDER AND BETWEEN EACH HOLD DOWN BOLT AS SHOWN TO FILL ANY GAP EXCEEDING 0.005"

3. TRIM SHIMS AS NECESSARY TO FILL THE UNEVEN GAP BETWEEN MOUNTING SURFACE AND HOUSING. WHEN SHIMMING THE OUTSIDE EDGE AND AWAY FROM A BOLT THE SHIM SHOULD WEDGE IN THE GAP. BE AWARE THIS MAY REQUIRE SHIMMING THE DRIVE FROM BOTH SIDES OF THE MOUNTING SURFACE.

4. LOOSEN JACK SCREWS. TIGHTEN HOLD DOWN BOLTS.

NOTES:

1. SHIM MATERIAL TO BE STAINLESS STEEL
2. SHIMS TO BE SUPPLIED BY OTHERS △C

REVISION	BY	CHKD	DATE	LTR
SHIMMING NOTES CHANGED	K102	BR12	02-17	△A
"TO BE SUPPLIED BY OTHERS" WAS "ARE NOT FURNISHED BY WESTECH"	MTP	JJ	12-12	△A
MORE SHIMS SHOWN, SHIMMING NOTES 1 AND 2 CHANGED.	DK	RBH	8-12	△B
VIEWS ENLARGED, ADDED BOLT, SHIM TABLES CHANGED	JJ	RHS	2-05	△A

DRIVE SHIMMING PROCEDURE

DESCRIPTION

ALL | ALL

MODEL | SIZE

DATE	STD. BY	STD.CHKD.	STD.APPVD	SCALE	DATE	PROJ. BY	PROJ.CHKD.	PROJ.APPVD
				NONE	09/03	NK	JJ	JAJ

WESTECH

DRAWING NUMBER	PROJECT NUMBER	REV.
900-611D		△D