CELLECO HEDEMORA CENTERDISC CDP FILTER

INSTRUCTION MANUAL

Contents

1.0 CDP INSTALLATION PROCEDURE

1.1 INTRODUCTION

The Centerdisc CDP filter comes fully assembled except for the vat drain. The unit requires a minimum amount of installation effort.

The following is a procedure for installing the unit. This procedure is meant as a guide and Celleco Hedemora does not take responsibility for amendments required to fit the specific installation. Review this guide and modify it to meet the requirements of the installation.

1.2 INITIAL CHECKS

Before the filter arrives at the job site, perform the following checks.

1. Check the foundation for proper installation. Since most installations use a structural steel foundation, completely install the steel foundation and paint it before the filter arrives. Level the top of the steel foundation to within plus or minus 1/16 inch. Make sure all sides of the foundation are at the same elevation within plus or minus 1/16 inch. Provide full contact stainless steel shims to account for any discrepancies in level or elevation.

   If a concrete foundation is used, set the top of the concrete 2 inches below final grade. Align and level the filter at the proper elevation using stainless steel shims between the base of the filter and the top of the concrete. Use grout to fill in between the top of the concrete supports and the filter base plates.

2. Inspect the pathway that the filter follows during unloading, transportation to the foundation, and lifting into place. Make provisions to temporarily remove piping, electrical conduit, etc. during unloading, transportation, lifting, and erection.

1.2 UNLOADING

The filter usually comes to the job site by truck. Visually inspect the unit before unloading begins. Closely inspect the top one third of the unit to check for damage due to low bridges, tree limbs, etc. Open the access doors and inspect the insides of the filter. Especially look for damage to the filter bags on the segments.

Leave all shipping dunnage inside the filter in place to prevent internal components from shifting. Lift the filter from the truck using the four lifting horns on the vat ends. Use a spreader bar parallel to the long axis of the machine to prevent damage to the ends of the machine. For safety purposes it is recommended that the lifting horns be used only for handling and for short lifts. See the attached drawing.

1.3 LIFTING THE UNIT

For lifts that are higher than eight feet Celleco Hedemora recommends lifting the filter with an external cradle similar to the one shown on drawing 1003 0209. Celleco Hedemora takes no responsibility for the detailed design of the cradle. Design the cradle to be easily dismantled for easy removal. Bolt the filter to the cradle using the jacking bolts.

Place the cradle and filter combination on top of the foundation. Rerig the crane onto the four lifting horns on the ends of the filter. Unfasten the filter from the lifting cradle. Lift the filter and remove the lifting cradle. Lower the filter onto the foundation.

An alternative method of lifting is to use nylon lifting straps similar to those used to handle paper rolls. Care must be exercised to make sure that the straps have sufficient lifting capacity. Place these straps at the quarter points around the belly of the vat. Weld angle clips to the vat bottom to keep the straps from slipping off the ends of the vat. Use spreader bars to prevent the straps damaging the filter.

1.4 LEVELING, ALIGNING AND INSTALLING THE FILTER

There is a jack screw point on each of the corners of the base plates. Screw a 1-7 NC bolt in each of the nuts welded to the jack screw location. Turn the screws until the filter vat is level to within plus or minus 1/16 inch and at the desired final elevation. If using a structural steel foundation, install stainless steel shims along the full length of the base plates to support the filter on the support foundation. The shims should also be the full width of the base plates.

Remove all dunnage and supports from the filter. Make sure the rotor is able to turn freely.

Place a machinists level (98) on the drive shaft. Level the shaft within plus or minus 1/16 inch along the length of the filter. If the rotor requires leveling, remove the vat seal. Loosen the bolts locking the slide shoes to the vat. See drawing 6091 2027. While watching the level, use the jack bolts in the slide shoe to move the rotor up or down. After the level is within tolerance, tighten the locking bolts on the slide shoe.

1.5 PIPING

Install the feed piping to the filter feed box. Make sure the feed pipe is well supported and that the filter flange is not supporting the weight of the piping. Place any valves in the piping well away (minimum of 10 pipe diameters) from the connections to the filter.

Connect the discharge piping the screw conveyor flange. Again, make sure the discharge pipe is well supported and the screw conveyor flange is not supporting the weight of the piping.

Hook up the air and seal water connections. These connections are found on a manifold located near the drive end of the filter. Make sure each connection has

a union or other method of disconnecting the piping from the filter. Air regulators, filters, and lubricators on the air lines are supplied by the customer.

Connect the three (3) down legs with their rubber boots. The customer supplies the six (6) rubber boots and the clamps. Support the downleg piping below the bottom rubber boot to allow the valve on the filter to move axially. Do not use any supports that will restrict the movement of the valve or the rubber boots. The customer supplies the pipe between the two rubber boots on the atmospheric down leg and the clear downleg. Celleco Hedemora supplies the pipe for the cloudy downleg.

Cut the hole in vat bottom if it is not provided. Weld the drain nozzle into the hole in the bottom of the vat. Install the drain valve and piping.

1.6 DRIVE UNITS

Install the main drive motor, reducer and coupling according to Scott Paper direction. Install the screw conveyor motor, reducer and coupling according to Scott Paper direction. The coupling halves that go on the filter main shaft and the screw conveyor shaft were purchased with the bore too small and no keyway. Field measure the shaft diameters and keyway sizes. The coupling bore should have an interference fit based on 0.0005 inches per inch of shaft diameter. Machine the proper keyway in the coupling bore. Shrink fit the coupling halves on the shafts.

Install the motor and coupling on the oscillation shower drive. The motor is supplied by Scott Paper. The coupling is supplied by Celleco Hedemora and is bored to size. Install the main drive and screw conveyor drive components. Consult Scott Paper for direction.

2.0 OPERATIONS

2.1 DESCRIPTION OF OPERATION

Stock is continuously fed into the vat over a weir. A customer supplied level control (mounted on the vat) and feed valve controls the level in the vat to 3" to 6" below the screw conveyor trough. As a segment submerges in the vat it begins to fill due to hydrostatic pressure. A thin fiber mat begins to form on the segment. As the rotor turns the segment enters the vacuum zone. More water flows through the segment, the rotor and down the droplegs. The thin fiber mat catches more fiber and forms a sheet. The segment rises above the vat level but is still in the vacuum zone. Air is drawn through the sheet, drying it. The sheet leaves the vacuum zone before it reaches the knock-off showers. The stock is knocked off at the 12:00 position into a screw conveyor trough that is located in the center of the rotor. The screw conveyor removes the dewatered stock from the filter. The segment is cleaned by the oscillating showers before it enters the vat again.

The centerdisc filter typically operates in an automatic mode. A variable speed drive controls the rotor drive motor. The speed of the motor is proportional to the vat level. As level increases rotor speed increase and as vat level decreases rotor speed decreases. The Centerdisc CDP Filter runs in a speed range from 0.3 rpm to 1.8 rpm. This control scheme allows the filter to handle changes in feed flow or changes in the properties of the feed flow that might effect drainage (freeness, consistency, temperature).

Process variables to monitor or place interlocks on for the filter are as follows:

1) Equip each drive on the filter with a motion sensor. If the screw conveyor stops, the interlock stops the feed to the filter and stops the main drive. If the main drive stops due to mechanical, electrical or control problems, the interlock stops the feed to the filter. If the oscillating shower drive stops it should set off an alarm but should not shut the filter down.

2) A pressure control provided by the customer monitors the shower water pressure. If the pressure drops below 50% a pressure control alarm alerts the operator. If shower water pressure drops to zero, the filter feed valve closes and the filter shuts down.

3) The variable speed drive control monitors several variables. If the filter reaches max speed (1.8 RPM) the variable speed drive sets off an alarm.

4) The variable speed drive monitors motor amps on the main drive and screw conveyor. Low motor amps on the main drive sets off an alarm. Low amp level is defined as no load amps plus 10%. Low motor amps indicates that the belts between the drove motor and the drive reducer are broken. The drive also monitors high amp load on the main drive motor. High amp load

is defined as full load amps at a 1.0 service factor. High amps indicate that the vat consistency is higher than normal or that there is a binding of the drive train.

5) Interlock a vacuum breaker valve on the suction box. When the drive stops the valve opens and bleeds air into the suction valve. This prevents water from siphoning from the vat while the filter is shut down.

6) Install a rotometer on each seal or lubrication water line. These should be inspected once per shift.

7) Install a vacuum relief valve in parallel with the vacuum breaker valve. This limits the amount of vacuum the unit produces. Set the valve so that it opens at 8 inches of mercury vacuum.

2.1 PRESTART-UP CHECK LIST

Complete the following check list before the Celleco Hedemora representative arrives for initial start-up.

Note: When operation of motors are called for, gear boxes must be lubricated and seal water must be on.

2.1.1 Check for a minimum of 40 psi air to the suction valve air pads. Design air pressure is 60 psi and the maximum air pressure is 90 psi.

2.1.2 With 40 psi air to the air pads, check that the suction valve seats firmly to the wear plate by removing the plate at the twelve o'clock position on the suction valve. Inspect the interface with a feeler gauge. The gap should be no more than 0.015 inches.

2.1.3 Check that the seal water flow to the suction valve is in the range of 1 gpm to 5 gpm at a minimum of 15 psi. Check that the seal water flow to the screw conveyor trough support bushing has a flow of 1 to 5 gpm at 45 psi.

2.1.4 Check that the seal water flow to the screw conveyor bushing has a flow of 1 to 5 gpm at 45 psi.

2.1.5 Check that each slide bearing has lubrication water flow of 0.2 to 1 gpm at 45 psi. Verify the flow with rotometers in each water line. Also visually verify the flow by opening the inspection covers and observing water escaping from the joint between the plastic bearing and the rotor ring. Measure and record the distance the plastic wear surfaces on the slide bearings are from the outer edge of the ring on the rotor. This is for future reference.

2.1.6 Check that the slide bearing flushing water flow is 1 to 5 gpm at 45 psi. Verify the flow with rotometers in each water line. Also visually verify flow by opening inspection cover and observing water

coming from the spray nozzles.

2.1.7 Check that all shower water gauges are on the downstream side of their respective control valves.

2.1.8 Flush all shower lines prior to installing the shower nozzles.

2.1.9 Check knock off shower header nozzles are centered between discs. Adjust the position of the shower pipe if necessary.

2.1.10 Check for 2 to 3 inches clearance between the deflector shields and the discs.

2.1.11 Check that the oscillating shower pipes are centered between discs. Adjust the position of the shower pipe if necessary.

2.1.12 Check that the oscillating shower gearbox contains the correct type and amount of oil. See the manufacturer's maintenance brochure for guidance.

2.1.13 Clean all debris from the vat, feed box and screw conveyor trough.

2.1.14 Check that the oscillating shower bearing contains the proper amount and type of grease. If in doubt grease the bearing with a lithium based NLDG grade 2 grease.

2.1.15 Check the range of motion of the oscillating showers. If the spray pattern does not cover the segments, adjust the motion. Turn the rod end bearings to change the length of the stroke of the drive. Move the rod end bearing to a different hole in the disc on the gearbox to change the length of the swing of the shower.

2.1.16 Run the shower water feed pump and set the following pressures. Use the valves between the filter and the shower header to set the pressures.

Knock off showers . . . . . 140 psig
Oscillating showers . . . . . 110 psig

2.1.17 Clean out any plugged shower nozzles.

2.1.18 Fill the screw conveyor gear reducer with the correct type and quantity of oil. Obtain direction for this from Scott Paper.

2.1.19 Check that the screw conveyor coupling is correctly installed and lubricated. Obtain direction from Scott Paper.

2.1.20 Check that the direction of rotation of the screw conveyor is correct.

2.1.21 Record the no load amps reading on the screw conveyor motor. The no load amps should not exceed 30% of the rated amps on the motor nameplate.

2.1.22 Check that the main drive gear reducer contains the proper type and amount of oil. Obtain direction from Scott Paper.

2.1.23 Remove the top of the pillow block bearing on the main drive. Check the bearing clearance. The clearance should be between .0057 inches and .0018 inches. If the bearing clearance requires changing, refer to SKF bulletin 640-810 for guidance. Make sure that the bearing is packed with grease. Make sure that the bearing housing is 1/3 to 1/2 full of grease. Check that the lines scored in the shaft on each side of the main shaft bearing are centered between the ends of the bearing. If the lines are not equidistant, it is an indication that the shaft has slipped in the bearing. If this happens remove the lip seal, loosen the bearing and move the shaft. Retighten the bearing and reinstall the lip seal.

2.1.24 Check that the main drive coupling is correctly installed and lubricated. Obtain direction from Scott Paper.

2.1.25 Check that the rotor is level by placing a machinists level (98) on the drive shaft. The rotor may settle during shipment or installation and may require reshimming.

2.1.26 Check the direction of rotation of the rotor. Looking at the drive end of the filter, the rotor should turn counter clockwise.

2.1.27 Remove the belts between the main drive motor and the gear reducer. Check that the variable speed drive operates correctly. Proper operation is the responsibility of the variable speed drive manufacturer. Reinstall the belts after checkout.

2.1.28 Check that the lip seal is positioned correctly.

2.1.29 Check that all segments seat and seal firmly on the rotor. If necessary crawl into the screw conveyor to inspect the segment/rotor seal. WARNING! Proper safety precautions including mill lockout procedures must me observed to prevent injury. If this is done remove the belts on the screw conveyor drive. Block the screw conveyor from turning. Use proper safety belts and other safety equipment.

2.1.30 Check that all segment bolts are tight.

2.1.31 Set the air regulator for the doors to 60 psig. Operate the valves that control the doors. The doors should open and close easily.

2.1.32 Operate the main drive at various speed settings starting at 10%. Measure and record the revolutions per minute for the main shaft speed and the ampere load on the motor. Repeat at 10% increments through 100% of the speed range.

2.2 INITIAL START-UP CHECK LIST

The INITIAL START-UP CHECK LIST is normally completed under the supervision of a Celleco Hedemora Field Service Representative. Before starting the INITIAL START-UP CHECK LIST , complete the PRE START-UP CHECK LIST. All items on the PRE-START-UP CHECK LIST must be complete before beginning the INITIAL START-UP CHECK LIST. Give the completed PRESTART-UP CHECK LIST to the Celleco Hedemora Representative when he arrives.

2.2.1 Close the vat drain valve. Do this only after cleaning and flushing the vat.

2.2.2 Set the air pressure for a minimum of 40 psi on the suction valve air pads.

2.2.3 Set the flow divider in the suction valve for an approximate 30%/70% cloudy clear split.

2.2.4 Set the seal water flow to the suction valve for 1 to 5 gpm at 15 psi.

2.2.5 Set the screw conveyor bushing seal water for 1 to 5 gpm at 45 psi.

2.2.6 Set the screw conveyor trough support bushing seal water for 1 to 5 gpm at 45 psi.

2.2.7 Set the slide shoe bearing lubrication water for 0.2 to 1.0 gpm at 45 psi. Verify the flow with a rotometer in each water line and by visually inspecting through the inspection covers.

2.2.8 Set the slide shoe bearing flushing water for 1 to 5 gpm at 45 psi. Verify the flow with a rotometer in each water line and by visually inspecting through the inspection covers.

2.2.9 Start the shower water pump. The pump's operation should be stable before continuing with the start up. Follow the pump manufacturer's recommended start up procedure.

2.2.10 Set the knock off shower pressure at 140 psi.

2.2.11 Set the oscillating shower pressure at 110 psi.

2.2.12 Start the oscillating shower drive motor.

2.2.13 Start the screw conveyor drive motor. This should be done only after the trough has been cleaned and flushed.

2.2.14 Start the main drive motor. Start with the speed control in manual and set for 0.5 RPM.

2.2.15 Start the filter feed pump to feed the filter white water. It is recommended that the filter be operated initially on white water

before introducing stock.

2.2.16 Check the vat for leaks.

2.2.17 Check the suction valve for leaks. Some initial leaking is to be expected until the lip seal seats.

2.2.18 Feed stock to the filter.

2.2.19 Set the vat level control so that the vat level is 3" to 6" below the top of the screw conveyor through. Put the main drive speed control in automatic.

2.2.20 Check the knock off shower for plugged nozzles.

2.2.21 Adjust the spray pattern of any knock off showers that are not peeling the pulp mat from the segments properly.

2.2.22 Check the oscillating showers for plugged nozzles and for the correct spray pattern. The spray pattern should be parallel with the length of the filter.

2.2.23 Check the vacuum in the clear drop leg. The maximum vacuum is 8 in Hg. Celleco Hedemora recommends installation of a vacuum relief valve set for 8 in Hg on the suction valve.

2.2.24 Check the vacuum in the cloudy drop leg. The maximum vacuum is be 8 in Hg. Celleco Hedemora recommends installation of a vacuum relief valve set for 8 in Hg on the suction valve.

2.2.25 Equalize the vacuum from the clear leg by adjusting the valve in the vacuum equalization hose.

2.3 PERFORMANCE CHECKLIST

When operations are stable and close to design parameters, perform the following filter operation checks. Give this information to your Celleco Hedemora salesman who will give you a report of how well your filter is performing.

2.3.1 Check the vacuum in the cloudy and clear drop leg. Record the high, low, and average values. The values should be expressed in inches of mercury.

2.3.2 Check the discharge consistency from the screw conveyor. Grab several samples; mix them together, and test them for consistency. Grab all samples within one revolution of the rotor to give an average of all the disc segments.

2.3.3 Check the consistency in the cloudy leg and in the clear leg discharge. Take several samples within one revolution of the rotor to give an average. Convert the test results of consistency to ppm.

2.3.4 Check the main drive motor amps. The amp load should be below the full load amp value on the motor name plate.

2.3.5 Check the screw conveyor drive motor amps. The amp load should be below the full load amp value on the motor name plate.

2.3.6 Check the oscillating shower drive motor amps. The amp load should be below the full load amp value on the motor name plate.

2.3.7 Test the temperature (degrees Fahrenheit), Consistency (%), freeness (CSF), and if possible the flow rate (GPM) of the feed to the filter.

For saveall operation test all components of the feed mix for temperature, freeness, and consistency. Also not the flow rate of each component flow.

2.4 ROUTINE START UP

2.4.1 Close the vat drain valve.

2.4.2 Set the air pressure to minimum of 40 psi to the suction valve air pads.

2.4.3 Set the seal water flow to the suction valve at 1 to 5 gpm at 15 psi.

2.4.4 Set the screw conveyor bushing seal water at 1 to 5 gpm at 45 psi.

2.4.5 Set the screw conveyor trough support bushing seal water at 1 to 5 gpm at 45 psi.

2.4.6 Set the slide bearing lubrication water at 0.2 to 1.0 gpm at 45 psi.Set the slide bearing flush water to 1.0 to 5.0 gpm at 45 psi.

2.4.7 Start the shower water pump and set the pressures.

Knock off shower . . . . . 140 psi
Oscillating shower . . . . . 110 psi

2.4.8 Start the oscillating shower drive motor.

2.4.9 Start the screw conveyor drive motor.

2.4.10 Start the main drive motor with the speed control in manual and set at approximately 0.5 rpm.

2.4.11 Start the feed pump. When the vat level reaches 3" to 6" below the top of the screw conveyor trough return the speed control to automatic.

2.4.12 Check that the filter is operating properly. (No nozzles plugged,

proper mat formation and knock off)

2.5 ROUTINE SHUT DOWN

2.5.1 Shut off all stock flow to the filter. (i.e. sweetener)

2.5.2 Run the filter on white water only for a minimum of 15 minutes. This is to minimize the amount of stock in the vat.

2.5.3 Inspect the rotating discs to insure that all stock has been cleaned from each segment. If necessary use a wash up hose to remove any residual fiber.

2.5.4 Make note of any shower nozzles that are plugged or misaligned.

2.5.5 Shut down the feed pump to the filter.

2.5.6 Shut down the shower water pump.

2.5.7 Turn off the main drive motor.

2.5.8 Turn off the screw conveyor drive motor.

2.5.9 Turn off the oscillating shower drive motor.

2.5.10 Use the down time to unplug nozzles. Refer to the section on nozzles in the maintenance section of the manual if necessary.

The following should be done if the shutdown exceeds four (4) hours.

2.5.11 Shut off the air pressure to the suction valve air pads.

2.5.12 Increase the seal water pressure to the suction valve to flush any residual stock from the suction valve wear plate interface.

2.5.13 Turn the suction valve water off after flushing for 15 minutes.

2.5.14 Check the rotor/suction valve interface for abnormal wear patterns on the wear plate.

2.5.15 Check the integrity of the lip seal.

2.5.16 Open the drain valve on filter vat.

2.6 TROUBLESHOOTING GUIDE

The following is a list of abnormal operating conditions and potential causes. For severe problems consult Celleco Hedemora, (Refer to section 4.0)

2.6.1 **Problem - Loss of vacuum at the suction box**

Potential Causes

a. The filtrate flow rate in the droplegs may be too low to create the proper vacuum. The design criteria requires a velocity of 10 ft/sec with the minimum velocity of 5 ft/sec and the maximum velocity of 15 ft/sec.

b. The segments may have bags which are ripped. This would prevent the fiber mat from sealing over segments.

c. There could be bad gaskets at the rotor/segment interface which allows air to leak into the rotor.

d. There could be loose segment bolts that could cause the segments and gaskets to not be seated properly. This could allow air to leak into the rotor.

e. Stock or other debris could prevent the wear plate and the suction valve from seating properly, allowing air to leak into the rotor at the interface.

f. A low stock flow to the filter could cause poor mat formation, and prevent the discs from being sealed over.

2.6.2 **Problem - Low speed on the main rotor drive**

Possible Causes

a. The feed rate (gpm) into the filter may be too low to maintain the proper level.

b. The drainage rate of the stock may be greater than expected.

c. The level transmitter may not be functioning properly.

d. The main drive V-belt may be slipping.

e. The variable speed drive may be malfunctioning.

2.6.3 **Problem - High speed on main rotor drive**

Possible Causes

a. The stock flow (tpd) may be to low for the formation of fiber mat on the segments.

b. The feed flow rate (gpm) may be to high to maintain proper level. At an excessive flow rate the filter vat may overflow into the screw conveyor trough.

c. The level transmitter may not be functioning properly.

d. The stock flow (tpd) may be to high, overloading the segments and causing carry over of the stock.

e. The long fiber to fines ratio may be to low (i.e. not enough sweetener in a saveall application) causing the segments to blind over.
f. The variable speed drive may be malfunctioning.

Note: Any of these conditions can lead to a "runaway" condition, where filter speed increases to the maximum possible. At speeds above the 1.5 to 1.8 rpm range drainage is actually lowered and filter performance is hurt. A "runaway" condition should be handled by placing the speed control in manual, slowing the rotor down, lowering the feed flow rate (GPM) and increasing the sweetener flow (TPD).

2.6.4 Problem - Poor fiber mat formation on discs

a. If the long fiber to fines ratio is below 2:1 the segments may blind prematurely, causing a significant loss in capacity.

b. A nonuniform flow over the feed box weir can cause localized areas of high velocity. The high velocity can wash the fiber mat off of the segment before it leaves the vat.

c. With a high speed on the main drive the segment may pass through the mat formation zone of its rotation to quickly for proper mat formation to occur.

d. A low stock (tpd) feed rate may cause poor mat formation.

e. A low feed flow (gpm) can cause stagnant zones which will lead to uneven mat formation.

2.6.5 Problem - Low filter vat level

a. The feed flow rate (gpm) may be too low to maintain proper level.

b. The level transmitter may not be functioning properly.

c. The vat drain valve may be open.

d. The main drive speed may be to high for the flow rate.

2.6.6 Problem - High filter vat level

Possible Causes

a. The feed flow rate (gpm) may be too high to maintain proper

level.

b. The main drive speed may be too slow for the flow rate.

c. The level transmitter may not be functioning properly.

d. During a "runaway" condition (see 2.6.3) the drainage rate may be lowered and the capacity adversely affected.

Note: Any of these conditions can cause the filter vat to overflow the screw conveyor trough, lowering the discharge consistency.

2.6.7 Problem - Premature knock-off of the fiber mat from the segments

Possible Causes

a. A low vacuum, below 3 in. Hg., may not hold the fiber mat to the segments. (see 2.6.1 for low vacuum)

b. A high feed flow rate (gpm) over feed box weir may wash the mat off of the discs.

c. The fiber mat formed may be to heavy to be held up even with adequate vacuum. Speeding the rotor up will cause a thinner mat to be picked up.

d. The knock-off shower nozzles can be pointed to sharply into the direction of rotation, causing premature knock-off.

2.6.8 Problem - High solids in the filtrate

Possible Causes

a. Holes or rips in the bags can allow unfiltered water into the segments and subsequently into the suction valve and droplegs.

b. Bad gaskets on the segments or segments not seated properly (loose segment bolts) can leak unfiltered water.

c. Poor mat formation can lead to high solids levels. The fiber mat is more responsible for the quality of filtering than the bag material. (see 2.6.4)

2.6.9 Problem - Low discharge consistency

a. Disc segmented are "backwashing" into the screw conveyor trough. Backwashing occurs when the segment completely blinds over and water can not drain from it. When the knock-off shower breaks the seal, water trapped in the segment backwashes into the screw conveyor trough rather than flowing through the rotor.

b. High knock-off shower water pressure adds more water to the fiber mat. Operation can be optimized by adjusting the knock-

off shower water to a lower pressure, provided that the mats are still being properly knocked off.

c. A high filter vat level can overflow into the screw conveyor trough. (see 2.6.6)

2.6.10 Problem - Plugged shower nozzles

Possible Causes

a. Fiber or debris can get into the shower water feed and plug the nozzles.

Operate the cleaning sequence on the showers. If this does not unplug the showers, clean them on the next scheduled shutdown. If the plugged showers affect performance, shut down the filter and clean the nozzles.

3.0 MAINTENANCE

3.1 INTRODUCTION

3.2 POST START UP MAINTENANCE

Perform the following within four weeks from initial start up.

3.2.1 Tighten the bolts holding the shaft to the rotor. Tighten the bolts to 2200 inch-pounds torque.

3.2.2 Remove the top of the bearing on the main shaft. Check the clearance on the bearing. Make sure it is between 0.0057 inches and 0.0018 inches. Check that the proper amount of grease is in the bearing. Replace the top on the bearing housing. Check that the main bearing is centered between the two rings scored in the main shaft. If the bearing is not centered, the shaft has slipped and will have to be repositioned.

3.2.3 Prior to shutdown check for plugged nozzles in both the knock off shower and the oscillating shower. Clean all plugged nozzles.

3.2.4 Remove the air springs that apply pressure on the suction valve. Slide the suction valve as far back as possible. Inspect the face of the suction valve and the wear disk. Clean out any stock that has built up on the wear plate. Check that all bolts holding the wear plate to the rotor are tight. Replace the suction valve and air springs. After reassembly apply 60 psi of air pressure on the air springs. Remove the inspection plate at the 12:00 position on the front of the suction valve. Using feeler gauges measure the gap between the back side of the suction valve and the face of the wear plate. Measure the gap as far around as can be reached. The gap should not exceed 0.015 inches.

3.2.5 Check the slide bearings that support the end of the rotor opposite the main drive. The plastic wear surface of the slide bearings should contact the ring on the end of the rotor the full face width of the plastic wear surface. Measure the distance from the edge of the plastic wear surface to the outer edge of the ring on the rotor. Compare this measurement to the one made during installation. If there is a difference of more than 1/8", the rotor is out of alignment an must be realigned.

3.2.6 Check the alignment of all V-belts and couplings. Check the tension on all V-belts.

3.2.7 Check all seal water lines for plugged or restricted lines. Check all rotometers for proper operation.

3.2.8 Check the oil level in the gear reducers. Add oil if necessary. Note: adding oil indicates an oil leak in the gear reducer. Check the gear reducer for oil leaks.

3.2.9 Check the vacuum relief valve and the vacuum breaker valve for proper operation.

3.2.10. Check the vat level control for proper operation.

3.2.11 With no feed to the filter, check the variable speed drive for proper operation. Run the variable speed drive at the 10% rate. Record the revolutions per minute of the main shaft and the motor amperes. Compare this to the values recorded during the PRESTART-UP. Repeat test at 10% increments recording the values and comparing to previous results until 100% of speed is reached. If the values deviate the variable speed drive, motor or drive train should be checked to find out why the deviation occurs.

3.2.12 With no stock in the screw conveyor, record the motor amperes and compare with the values recorded at PRESTART-UP. Deviations indicate motor problems or problems with the conveyor drive or bearings.

3.3 PREVENTIVE MAINTENANCE

The following is a preventative maintenance list. Following these steps will increase the life of the filter.

AT LEAST ONCE PER SHIFT

3.3.1 Check the operating temperature of the gear reducers. If the gear reducers are so hot that a hand cannot be left on the surface of the gear reducer check the temperature of the oil with a thermometer. Oil temperature should not exceed 160°F. If the temperature exceeds this value, it indicates problems in the drive system.

3.3.2 Inspect the rotometers on all seal water flows. If the flow rate is below the acceptable range, serious damage to the equipment may occur.

3.3.3 Inspect the nozzles on all showers. Operate the shower cleaning sequence if there are plugged nozzles. Plugged knock off showers will reduce the efficiency of the filter. Plugged oscillating showers will allow the segment face to "blind over" and will affect filter efficiency.

3.3.4 Check the temperature of the screw conveyor outboard bearing housing.
If the housing is so hot that a hand cannot be left on the surface check the surface temperature with a surface pyrometer. If the surface temperature exceeds temperature should 150°F, it indicates problems with the bearing.

3.3.5 Check the discharge of the screw conveyor. Make sure the thickened stock does not build up in the discharge area. The stock should flow easily down the pipe to the storage chest.

3.3.6 Check the way the sheet knocks off from the segments. If the sheet

does not fully knock off adjust the knock off showers. If the sheet does not fall correctly into the screw conveyor, adjust the knock off showers.

AT LEAST ONCE PER WEEK

3.3.7 Inspect the slide bearings on the end of the filter opposite the drive. The spray nozzle on the slide shoe must be open so that it removes stock from the support ring.

3.3.8 Inspect the V-belt drive. The belts should be tight and not slipping. A "squealing" belts indicate that the belts are loose or worn. Belts that are too tight will damage the bearings in the gear reducer. Follow a V-belt manufacturer's recommendations to obtain the correct belt tension.

3.3.9 Check the oil level in the gear reducers.

AT LEAST ONCE PER MONTH

3.3.10 Inspect the plastic bearing on the oscillating shower opposite the drive. If the gap between the bearing and the shaft exceeds 1/8 inch replace the bearing.

3.3.11 Grease the bearing on the drive end of the oscillating shower pipe.

3.3.12 Grease the main shaft bearing and the screw conveyor outboard bearing.

3.3.13 Inspect the Bags on the segments. Replace any damaged segments on the next planned shutdown.

AT LEAST ONCE PER YEAR

3.3.14 Change the oil in the gear reducers. Send an oil sample to a lubrication testing lab to test for metal, oil contaminates and other items that indicates problems with the gear reducer.

3.3.15 Inspect the plastic wear pads on the slide bearings. If the thickness of the plastic is one inch or less, replace the pads. Replace both pads; do no replace only one pad.

3.3.16 Check the level of the rotor. See the leveling procedure in the PRESTART-UP section of this manual.

3.3.17 Check the alignment of the couplings on both the main drive and the screw conveyor. Consult Scott Paper for details.

3.3.18 Support the weight of the inboard end of the screw conveyor. Remove the bearing cartridge in the end of the screw conveyor and check the wear in the plastic bearing. This is the bearing that holds the inboard end of the screw conveyor on the extension of the main drive shaft. Replace the bearing if the inside diameter exceeds 3.22".

3.3.19 Replace the inboard plastic bearing on the screw conveyor. Because the screw conveyor turns in excess of 150 rpm it recommended that the bearing be replaced once per year regardless of any wear .

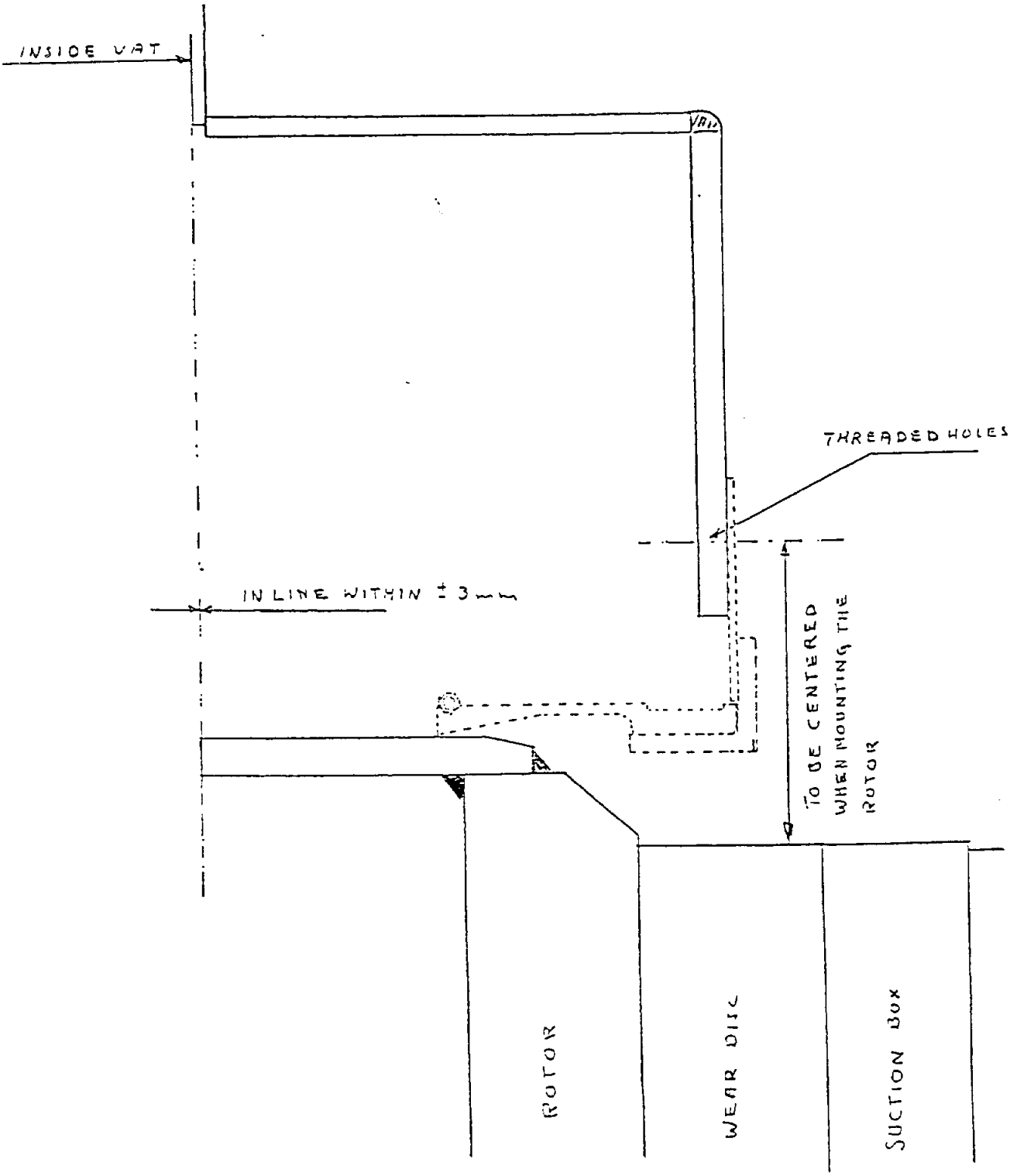
3.3.20 Disassemble the two brush showers. Check for wear on the brushes. Replace any brush sections that are worn.

3.3.21 Replace the V-belts on the two drives. Inspect the sheaves and replace if worn.

3.3.22 Inspect the foundation for the filter. Patch any damage to the concrete foundation. Repair and paint any damaged areas on the structural steel foundation.

3.3.23 Inspect the lip seal. Replace it if it appears worn or has leaked excessively.

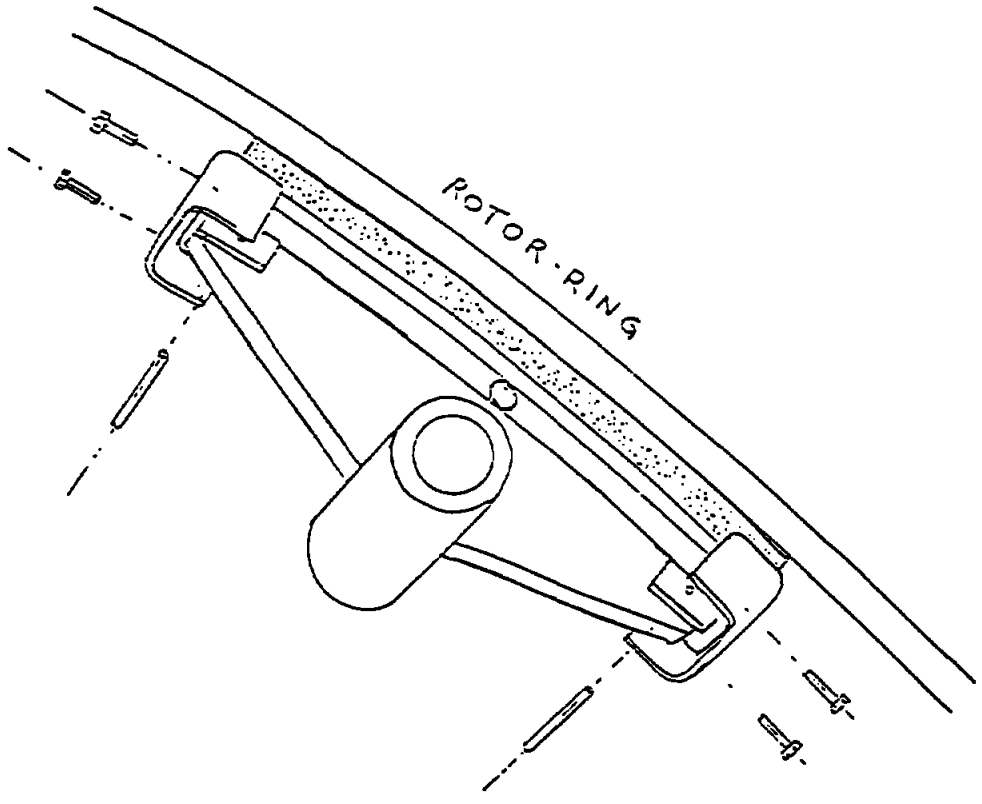
ALL TRANSPORT LOCKING DEVICES TO BE REMOVED.



CELLECO

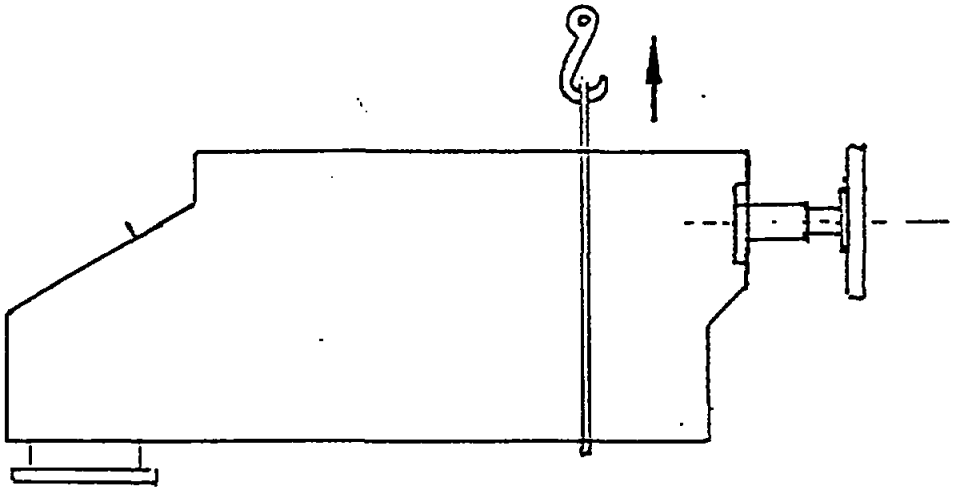
REPLACING OF SLIDE SHOES

1. Perform points 1 - 10 acc. to instructions for Long Time Stop.
2. Stop the rotor in a position that facilitiates later up-lifting.
3. Disconnect lubrication water line.
4. Remove the safety stopper above the rotor.
5. Lift the rotor carefully approx. 1/4". Keep that position.
6. Remove the four (4) bolts. See sketch, and pull out the two (2) guide pins.
7. Remove the bearing plate together with the holder and mount a new bearing plate.



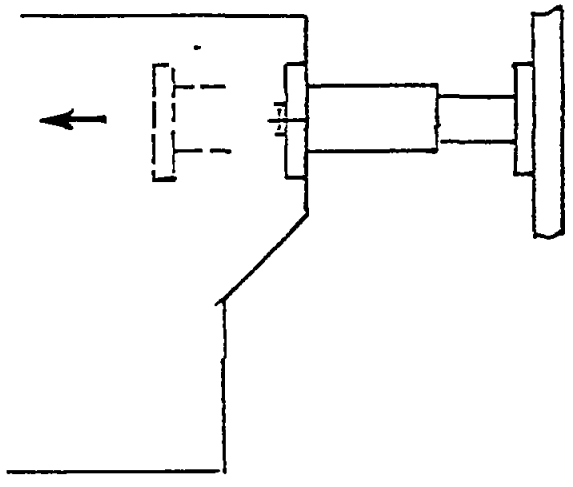
REPLACING OF SUPPORT BEARING OF SCREW CONVEYOR VAT

1. Open the inspection cover.



2. Apply a lifting device to the screw conveyor vat and lift the vat only so much tha the shaft becomes unloaded.

3. Disconnect the seal water line.



4. Loosen the flange and pull out the bearing and bearing housing.

REPLACING OF WEAR PLATE

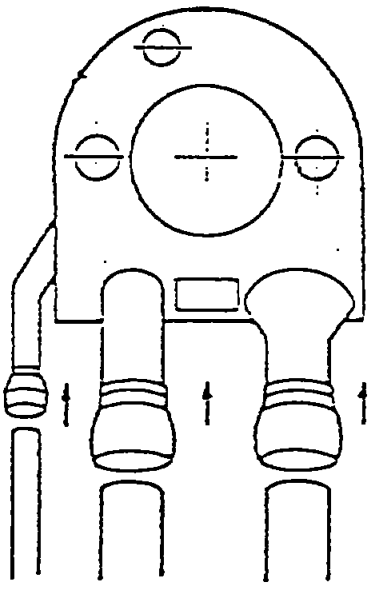
1. Perform items 1 - 10 acc. to instructions for Long Time Stop.

2. Stop the rotor in a position that facilitates later up-lifting.

3. Close seal water and disconnect hoses.

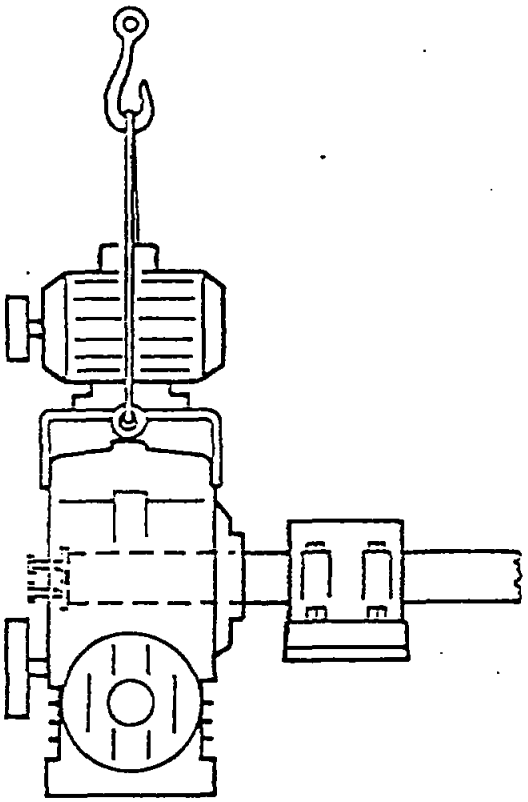
4. Relieve the pressure in the air cushions. Disconnect hoses.

5. Disconnect the rubber bellows.



REPLACING OF WEAR PLATE (cont.)

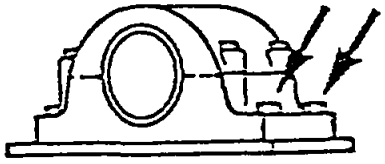
6. Apply lifting device on the gear box.



7. Remove cover, loosen the bolts for shrink disc and with a puller remove the gear box.

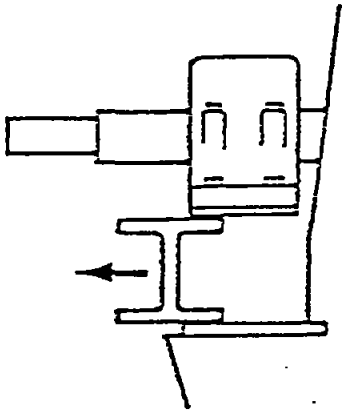
REPLACING OF WEAR PLATE (cont.)

8. Secure suction chamber with the vat.



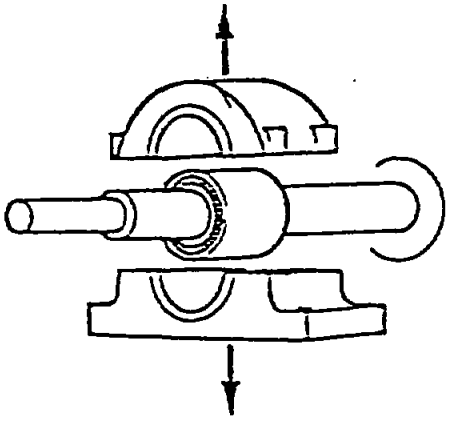
9. Loosen the bolts between the bearing housing and the beam.

10. Apply lifting device to the rotor near the drive end.
Lift the rotor carefully approx. 1/4".



11. Remove the supporting beam.

12. Dismantle bearing housing.
NOTE: Do not remove bearing.



REPLACING OF WEAR PLATE (cont.)

13. Remove suction chamber.

14. The wear plate is now visible and can be replaced.

NOTE: When mounting the new wear plate, loctite 242 must be used on those bolts that are threaded into the rotor.