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# Maintenance Tips for Screw Presses

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# Maintenance Tips for Screw Presses

**Routine maintenance and typical lubrication schedule**

Screw press efficiency is largely dependent upon the type of maintenance the machine receives. Ruggedly manufactured presses will give long periods of trouble-free service if sound preventive maintenance practices are established and routine lubrication schedules are observed. As a result of this preventative care, press users will get the most value out of their equipment investment with lower processing costs, maximum productivity and optimal residual oil outputs.

This guide outlines a selection of maintenance tips to keep a typical screw press performing well. However, maintenance needs will vary depending on your feedstock and the type of your press system.

To ensure safe, efficient service of all screw press components, trained technicians should study sub-vendor publications and observe their recommended maintenance practices. This includes following all proper shutdown procedures as outlined by the screw press manufacturer and allowing the screw press to cool before servicing.

**Maintenance and Inspection Schedule**

| ITEM | FREQUENCY | COMMENTS |
|---|---|---|
| Record speed and full load amperes of main drive motor | 8 hours | |
| Check oil level in gearbox | 8 hours | Determine reason for oil loss |
| Check for leaks in lubrication system | 8 hours | Repair as needed |
| Check lubrication flow at the low speed thrust bearing housing | 8 hours | |
| Make sure all point of operation guarding is installed | 8 hours | |

**Periodic Cleaning**

Dirt or foreign particles can cause abrasion of key press components. Keep the outside of the screw press reasonably free of dirt and debris using rags or brushes.

**Wearing Parts**

Periodic checks should be conducted on those parts of the press that are subject to wear. These wearing parts must be replaced from time to time in order to maintain peak efficiency of the operation of the screw press to ensure consistency in the quality of the product being processed through it.

The term "wearing parts" refers to all of those parts of the press that are in contact with the product and are worn down due to the work being done to the product. These wearing parts are as follows: Shaft parts, feed hopper bushing, screen bars, breaker bars, discharge bushing and cone tip.



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**Causes & Cures, Recognizing the Symptoms**

1. Worn shaft parts and/or screen bars and bushings will result in a gradual reduction in the capacity and high residual oil.
2. Of utmost importance for best performance is the condition of the worm flights. The leading edge of the flights must be sharp and well defined to give maximum "push" on the material.
3. Some worms are designed and constructed so that they may be reversed after a period of wear to utilize the opposite edge of the flight to maintain a sharp pushing side of the flight. This is normally done about half way through the season unless the material being processed is unusually abrasive.
4. Similarly, if the press has case hardened screen bars, the bars may be reversed for prolonged service unless the wearing face is badly scalloped.
5. Worn bushings in the feed hopper, cage frame and rear frame discharge can cause lack of barrel pressure resulting in capacity losses. They should be replaced when this condition occurs. A worn cone tip and/or its counterpart in the discharge end will result in poor cake thickness regulation control and also pressure loss in the barrel.
6. Adequate cage and shaft cooling are important to the efficient operation of the screw press. The cooler the cooling water, the better. Beware if inlet and outlet cooling water temperatures are nearly the same. This indicates that the cooling water is not removing much heat and measures should be taken to check the water-cooling sleeves in the cage for obstructions. A constant supply of soft water for the cages and shaft will preclude the possibility of chemical deposits, which may in time close or block off the water passages.
7. A regularly scheduled shutdown for inspection of all wearing parts of the screw press is recommended at least 2 to 3 times a year. This will be governed by the amount of abrasion in the material being pressed and will vary from one product to another. Also the process rate will be a determinant of the frequency of these inspections.
8. To avoid costly shutdowns and loss of production due to lack of certain commonly needed parts, we recommend that the customer keep on hand, at all times, a complete set of spare parts as follows:
    a. Screen Bars - enough to completely reline all cages
    b. Screen Bar Spacers - enough to completely space all cages
    c. Breaker Bars - one complete set
    d. Cone Tip - one per press
    e. Main Shaft - one extra for every two presses
    f. Shaft Parts - one complete set for each press
    g. Cage and Frame Bushings - one set
    h. Breaker Bar Cap Screws - two dozen for each press

**Lubrication Specifications**

It is important to establish and strictly maintain a regular lubrication schedule in order to obtain long life from the press bearings and gears. This can prevent costly failures and shutdowns. Care should be taken to use only those lubricants recommended, or their equivalents. Review press lubrication tables with your lubricant supplier to make certain that they are readily available. It is further recommended to conduct a regular inspection of all gears and bearings at least 2 times a year.

Take special care to maintain the oil seals and packing at the junction of the gear case and main shaft to prevent the vegetable oil from entering into the gear case along the shaft and, conversely, the escape of the mineral oil from within the gear case into the product oil.



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**Typical Lubrication Table**

| MACHINE COMPONENT | LUBE POINT/ LUBE LEVEL | LUBE TYPE | FREQUENCY |
|---|---|---|---|
| Screw Press Gearbox | Fill to level at sight glass on side of high speed gearbox lube system (see foundation plan drawing for elevation) | Mineral Oil | Initially after 500 hours, thereafter every 3000 hours of operation, or annually whichever occurs first |
| Screw Press Gearbox (Front bearing cap) | Lube fitting pump until grease extrudes from around seal wipe off excess | NGLI grade 2 grease | Every 3 months |
| Oil Foots Conveyor Bearing (rear of gearbox) | Lube fitting pump grease until it extrudes out around shaft wipe off excess | NGLI grade 2 grease | Every 3 months |
| Idler Sprocket, Oil conveyor drive (rear of gearbox) | Lube fitting pump until grease extrudes wipe off excess | NGLI grade 2 grease | Every 3 months |
| Cone | Filler cap, fill to overflow & replace cap | NGLI grade 2 grease | Every month |
| Cone Roller Bearing | Lube fitting pump until grease extrudes from seal wipe off excess | NGLI grade 2 grease | Every month |
| Force feeder horizontal screw, conveyor gearbox | | Mineral Oil Mobil gear 630 | Every 3000 hours check oil and oil level. Check the seals visually for leakage. Every 2 years change the mineral oil. |
| Force feeder vertical screw, conveyor gearbox | | Mineral Oil Mobil gear 630 | Every 3000 hours check oil and oil level. Check the seals visually for leakage. Every 2 years change the mineral oil. |
| Discharge Cone Gearbox | | Mineral Oil Mobil gear 630 | Every 3000 hours check oil and oil level. Check the seals visually for leakage. Every 2 years change the mineral oil. |

*Machine lubrication materials must be handled and disposed of in accordance with local codes.*



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**Troubleshooting**

The following is a list of various difficulties that may occur with a typical screw press, the cause and remedy for each of the troubles listed.

1. Press stopped under load and will not start
   Cause: The press becomes plugged with material
   Remedy: Open the cages and clean out the material in the press, close cage and follow start-up procedure.
2. Excessive material extruding through the screen bars
   Cause: Too much back pressure on material
   Remedy: Move cone outward to reduce backpressure
   Cause: Screen spacing too wide
   Remedy: Reduce screen spacing
3. Residual oil in cake too high
   Remedy:
   a. Move discharge cone forward.
   b. Adjust speed of force feeder horizontal screw. In some cases, increasing speed will increase pressure to remove more oil, while in other cases, reducing speed will increase residence time to remove more oil.
   c. Adjust feed conditions. Flaking thinner, conditioning hotter and dryer and increasing fiber content (hulls, etc.) typically improves residual oil.
   d. Replace possible worn out worms (rounded flight edges), worn out collars (rounded large diameter edges), worn out breaker bars (rounded lug edges) and worn out cone tip (eroded pushing surface).
4. Throughput rate too low
   Remedy:
   a. Move discharge cone in reverse direction.
   b. Increase speed of force feeder horizontal screw until main drive amps reach 90% of full load, or material backs up out of force feeder relief door.
   c. Adjust feed conditions. Conditioning at lower temperature will reduce oiling in force feeder and feed worm, thereby reducing slippage and increasing feed rate.
   d. Replace possible worn out worms (rounded flight edges), worn out collars (rounded large diameter edges), worn out breaker bars (rounded lug edges) and worn out cone tip (eroded pushing surface).
5. Excessive (> 15% by weight) foots in oil
   Remedy:
   a. Monitor oiling/footing from each section. Reduce spacing in sections with excessive footing, or renew screen bars.
   b. Adjust feed conditions. Free moisture causes excessive footing. Reduce direct water/steam addition to feed stream.
6. Vibration
   Cause: A defective bearing
   Remedy: Check and replace as necessary



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**Screw Press Shutdown Procedures**

1. Shut off the flow of material to the conditioner. A run-around conveyor to bypass the conditioner is recommended, eliminating the need to shut down the entire line.
2. Allow the conditioner to run long enough to empty into the screw press before making any adjustments on either the conditioner or the press.
3. When the conditioner is almost completely empty, start opening the cone until the cake is approximately 1/2" thick (13 millimeters). This cake should be discharged by means of the 3-way cake spout into the run around conveyor for reprocessing later because it will have a high percentage of oil content.
4. When the conditioner is empty, feed a small amount of "raw material" or cake directly into the downspout of the screw press. (Approximately 10 1bs -4.54 kgs) Allow press to run until "raw material" discharge ceases.
5. Shut off power to the conditioner.
6. Shut off power to the force feeder vertical and horizontal screws.
7. Adjust the cone mechanism to "full open" position.
8. Shut off power to the cone drive motor.
9. Allow the press to run for one minute with the cone in this position.
10. Shut off power to the screw press main drive motor.
11. Shut off power to the high speed bearing lubrication system motor.
12. Shut off steam and water to the conditioner and press.

It is recommended that support stands be made to support the cages during maintenance and repair operations.

*Caution: In the event that the preceding shutdown sequence cannot be observed due to mechanical failure or emergency shutdown, do not attempt to restart the screw press with the barrel full of material. If this occurs, the cages are to be hinged open and cleaned out first before start up. Do not reverse the press.*

**Service and Support**

Following the tips in this maintenance guide can help you keep your screw press operating well on a routine basis. For preventative maintenance more tailored to your specific machine, factory-trained French technicians area available on either a semi-annual or annual basis and can help reduce and make for the most efficient use of maintenance time.

French also supplies high-quality replacement parts for your machine that fit your exact needs, the first time and every time thereafter.

This manual provides maintenance information for a typical screw press and is to be used in conjunction with the information and drawings specific to your equipment. The French Oil Mill Machinery Company has no detailed knowledge of your specific press or your process. It is the responsibility of the user to develop safe procedures for operation and maintenance of your equipment, and to ensure that all personnel are trained in these procedures.



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## About The French Oil Mill Machinery Co.

The French Oil Mill Machinery Co. has been the industry technology and quality leader since 1900, serving customers in over 80 countries. French is an ISO-certified, family-owned U. S. company that custom designs, manufactures and supports processing equipment, full press extraction and preparation systems for the extraction of vegetable oil from oil-bearing seeds and nuts for food and industrial uses, including biodiesel and other fuels.

Our heavy duty and durable equipment has an average life span over 50 years and operates with maximum productivity and lower processing costs per ton. For over 110 years our customers have been satisfied with French's process solutions that meet and exceed industry standards of high quality crude oil, meal and oil extraction efficiencies.

French's Aftermarket Sales department provides a complete range of replacement parts for French screw presses and processing equipment, as well as repair and remanufacturing services for components. Knowledgeable factory customer service personnel provide expert application advice and fast, responsive support to keep your equipment performing well.

Our 225,000 square foot corporate office and manufacturing facility are located in Piqua, Ohio.

**Questions?**
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