

## K-06: PM Heat Exchanger (Clean)

### SAFETY FIRST

- Follow all Caterpillar facility safety standards when performing this task.
- Flow valves must be closed during repair. Ensure that there is no possibility that a valve will be opened.
- Heat exchanger plates have sharp edges. Wear gloves to protect hands.

### EQUIPMENT

- tape measure or steel scale
- wrenches suitable for strainer, shroud and stack bolts
- water hose
- pressure washer
- replacement plates or gaskets, as necessary

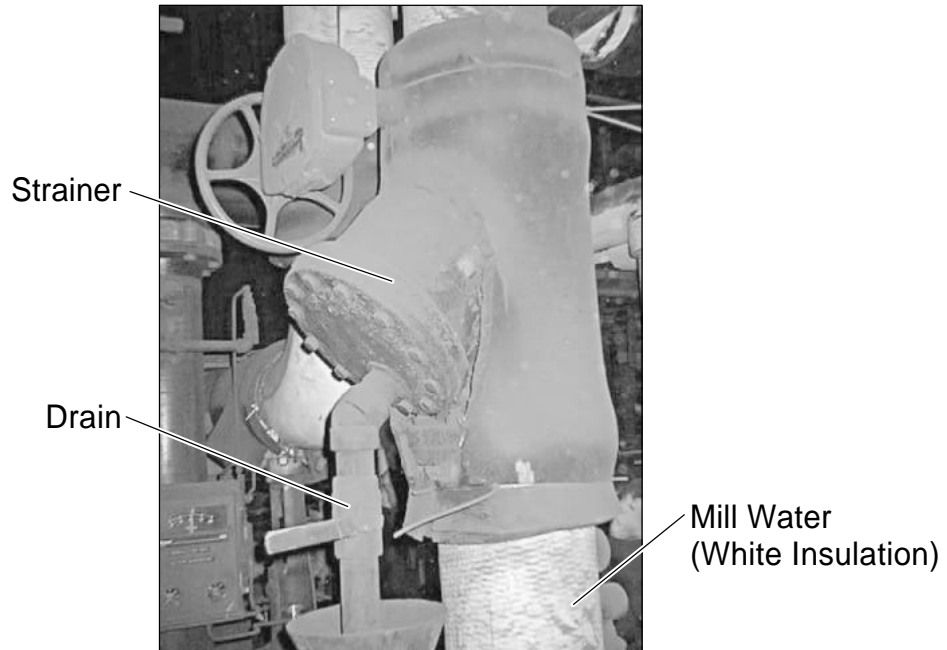
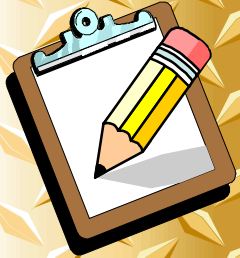
### RESOURCES

- Superchanger Installation and Operation Manual
- installation prints



## PM Heat Exchanger (Clean)

1. Clean the strainers in the mill water systems. See the figure below.



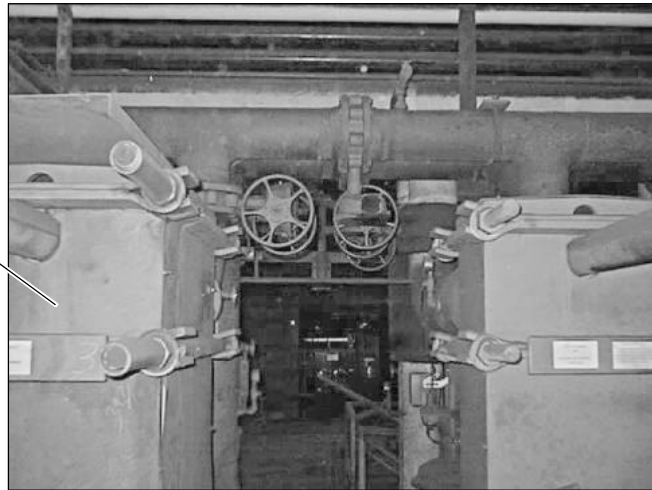
## Strainers

- Use valves to bypass and isolate the strainers.
  - Bleed off the strainer with the valve and leave open.
  - Remove the bolts attaching the strainer cap to the body.
  - Withdraw the strainer basket from the strainer body and use a water hose to flush it out.
  - Reassemble the cleaned strainers using new gaskets, if necessary, and restore flow through them.
2. Inspect the heat exchanger for external leaks.
    - Look under the heat exchanger for leaking water. Check on the coolant side for leaks with mill water supply turned on.

3. Shut down and disassemble the heat exchanger.
- Using flow valves, connect both mill water and furnace water sides of an auxiliary heat exchanger in parallel with the heat exchanger to be repaired. Open the two mill water valves on the auxiliary side first, and then the two furnace water valves. See the figure below.



Heat Exchanger



#### Flow Valves

- Close the inlet valves on both the mill water and furnace water lines and then the outlet valves to isolate the heat exchanger being worked. See the figure below.

Black Pipe

Furnace  
Water Valves

Inlet and Outlet Valves, Mill Water, and Furnace Water

- When all flow to the heat exchanger is shut off, open drain valves and vent valves on both sides of the isolated heat exchanger. See the figure below.

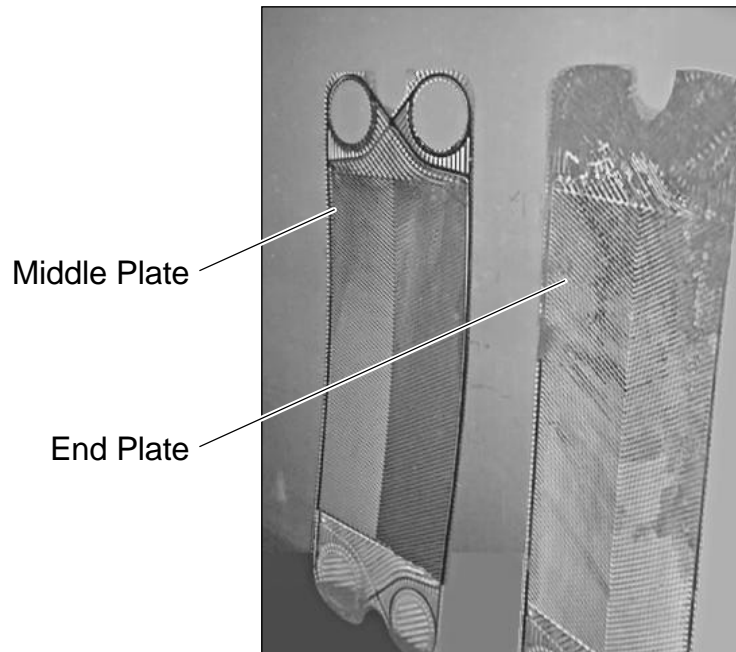
Closed Drain Valve



#### Heat Exchanger Drain Valve

- If necessary, unscrew the pressure gauge installed in some vent valves.
- Take all shrouds off the top and sides.
- Loosen the heat exchanger stack bolts, and pull the moveable end plate back out of the way to provide access to the plates.

- Separate the plates individually, and inspect all plate surfaces and gaskets. See the figure below.



Plates Surfaces

- Replace any corroded or damaged plates.
  - Pressure clean all plates.
4. Reassemble the heat exchanger.
- Be sure the plate type and orientation are correct for the plate position in the stack. See pages 2, 6, 7, and 10 through 14 in the Installation and Operation Manual.
  - Be sure all plates and gaskets are clean before assembling the stack, and that gaskets are firmly glued in position on the plates.
  - Slide the moveable end plate onto the stack.
  - Count the number of plates between the end plates.
  - Consult the heat exchanger prints. If the number of plates specified in the prints is the same as the number actually in the heat exchanger, use the print dimensions for the maximum and minimum stack length.

- If the number of plates is not the same as in the prints, use Table IV, page 4, in the Installation and Operation Manual to calculate the maximum and minimum stack length. See the figure below.

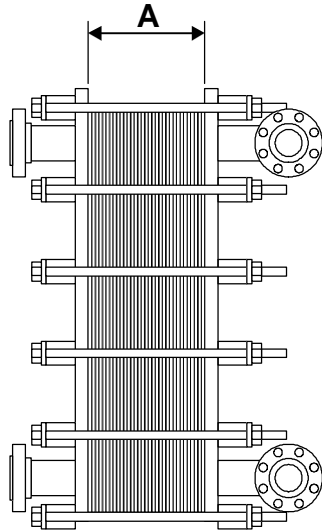


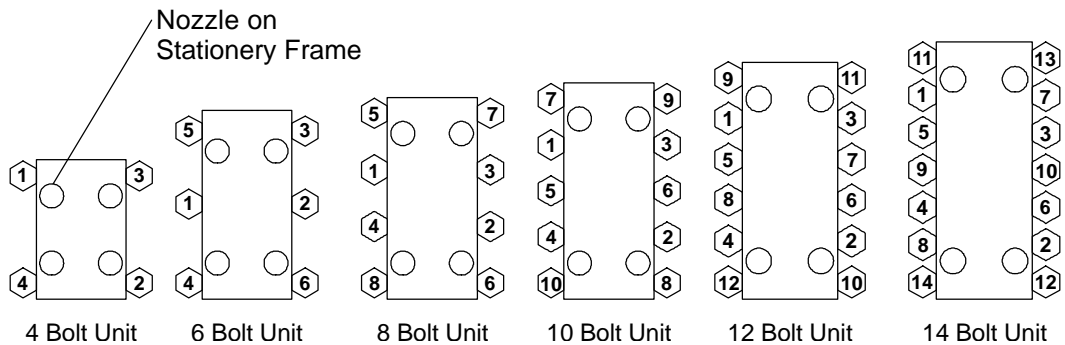
TABLE IV

Plate Type	A Max	A Min
06-T18;06-T28;06-T98	(0.165354)N	(0.165354)N
06-T10;06-T20;06-T90	(0.173228)N	(0.173228)N
UX-416;UX-426;UX-496	(0.157480)N	(0.157480)N
UX-418;UX-428;UX-498	(0.165354)N	(0.165354)N
UX-410;UX-420;UX-490	(0.173228)N	(0.173228)N

N = Number of Plates

Stack Length Table

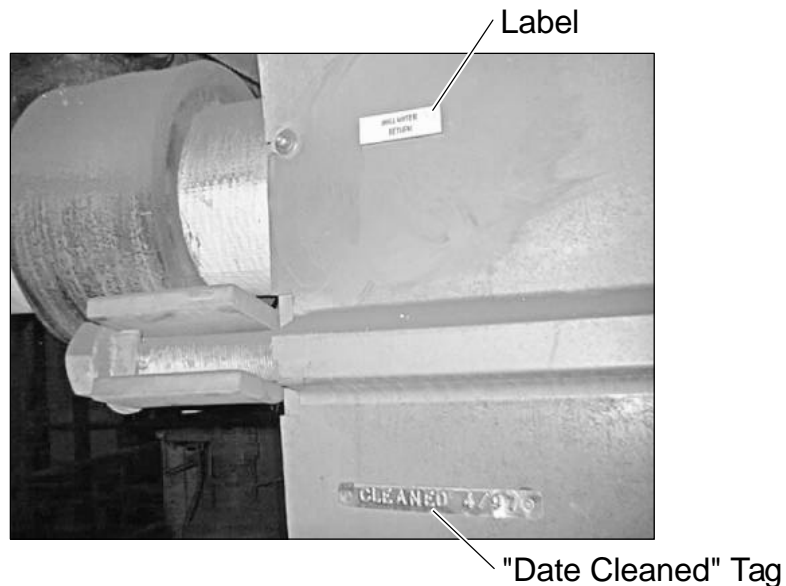
- Tighten the stack bolts according to the tightening sequence shown below, and keeping all dimensions within 1/4 inch as the bolts are tightened.



Bolt Tightening Sequence

- Tighten the bolts to just under the maximum stack length dimension.
- Close drain valves.
- Replace any removed gauges.
- Slowly open flow valves to both sides of the heat exchanger, allowing air to vent.

- When both sides of the heat exchanger are full, close the vent valves.
  - Open all flow valves to the heat exchanger fully.
  - Close flow valves to the auxiliary heat exchanger.
5. Inspect the heat exchanger for external leaks. If there are no leaks, replace the shrouds.
  6. Monitor heat exchanger operation, verifying acceptable pressures, flows, and temperatures.
  7. Attach a label to the heat exchanger showing the date it was cleaned. Attain the labels from the pattern shop. See the figure below.



Heat Exchanger Label