

AIR COOLED HEAT EXCHANGER **SUGGESTED START UP PROCEDURE**

Before any start up procedure is begun, a thorough inspection of the Air Cooled Exchanger should be made.

- 1.) Be sure all bolted connections are properly tightened.
- 2.) After tube bundle and piping hydrotest, remove hydrotest connections. Be sure tube bundle is properly drained, and if required, dried. Connect process piping and any auxiliary connections.
- 3.) Inspect all process connection, as well as, vent drain, temperature and pressure, or any other auxiliary connections to be sure they are plugged or connected properly.
- 4.) Check mechanical equipment before starting process through the tube bundle(s).
 - a.) Thoroughly check the plenum and fan drive area to be sure all tools and construction materials are removed.
 - b.) Rotate the fan by hand and check fan tip clearance and alignment of belts and sheaves.
 - c.) Check belt tension.
 - d.) Check all fan drive bolts to be sure they are properly tightened. This includes bearing bolts, fan and sheave bushing bolts, set screws, motor bolts and fan blades attachment bolts.
 - e.) If air operated auto-variable pitch fans are used, check for proper pitch with the air off. Fans may go to either minimum or maximum pitch at air failure. Check specifications for requirements. If fan pitch is not satisfactory, set pitch per manufacturer's instructions (see Operation and Maintenance Instructions). If fan pitch is satisfactory, cycle fan through its range, using plant air and an air regulator.

- f.) If air operated louvers are provided, it is advisable to disconnect the air motor linkage and cycle the louvers by hand to assure there is no binding or obstruction of the louvers blades. If binding occurs, check to be sure louver frames are square. Attaching bolts may have to be loosened and frames shifted to ease binding. If louvers operate smoothly, reconnect air motor. Cycle the air motor, using plant air and an air regulator.
 - g.) If manually adjusted pitch fans are provided, check fan pitch and re-pitch per manufacturer's instructions if required.
 - h.) If manual operated louvers are provided, check for binding of the blades, as in instruction (f). Operate louvers to be sure there is no linkage obstruction or binding.
 - i.) Remove condensate drain plugs, if provided, in electric motors and other electrical components to drain any condensation that might have occurred during storage. If space heaters are furnished in electric motors, louver actuators, controls, etc., activate the space heaters and allow approximately 24 hours before starting equipment.
 - j.) After all the applicable steps previously stated are completed; the mechanical equipment may be cycled.
 - k.) Be sure all personnel and equipment are away from the fan and fan drive area. For safety reasons, equipment guards should be installed. Activate the drive motor and let it reach speed. Check for vibration and excessive noise. If vibration or excessive noise occurs, immediately shut motor down, and check for loose connections or insufficient clearance between moving parts. If the system is running smoothly, replace any guards removed and move to the next drive and repeat above steps.
- 5.) This equipment shall not be operated at anytime without safety relief device in the system. Has appropriate relieving capacity and a set pressure not to exceed 110% of stamped MAWP.
- 6.) Start the process through the tube bundle(s). Open the inlet valves slowly and let the process "Warm" the bundles slowly. This will allow the components of the tube bundle to expand at the same rate and lessen the thermal shock.

