THE PYRO-STRIP TANK SYSTEM OPERATION

The PYRO-STRIP Fluidized Sand Tank System utilizes (3) special compressors to fluidize the calibrated quartz sand inside the tank. Two compressors are used to fluidize and the third unit is a back-up compressor for additional fluidization during the sand-scrubbing portion of the cycle. The fluidizing air, premixed with the combustion gas, then burns on the surface of the sand bath by a constant burning pilot. The combustion gas supply is controlled in accordance with the heat energy generated by the burning of the organic materials, which is absorbed by the sand, thus reducing fuel consumption. The AFTERBURNER is to be operating anytime that the system may generate smoke or fumes. The AFTERBURNER Chamber requires a few minutes of operation to be up to the 1400° F. temperature prior to the loading of a basket. The mechanized lid is operated by air cylinders that raise and lower the lid for basket movements. The lid and the exhaust plenum are lined with refractory insulation rated for 2200° F.

The basket of parts can be loaded directly into the tank with the sand being fluidized. The coating will start to combust in a matter of 10 to 15 seconds after immersion in the sand and causing smoke. To minimize the escape of smoke, load the basket directly on top of the unfluidized sand and close the lid. The sand is then re-fluidization from the pendant and the basket lowers itself into the tank. The MINI-CYCLONE maintains the chamber under a slight negative, further minimizing spill of smoke into the plant. The hoist pendant has the fluidization ON/OFF and Lid OPEN/CLOSE controls as well as the Vibrator ON momentary button.

The combustion system is designed with a timer program of on-off burner output. This program is activated each time the batch timer is started by the operator from the Hoist Pendant push-button. The Cycle Timer (White light on the Stalk) lights when the timer is initiated from the pendant. At the end of the time cycle, the White Light shuts off.

The normal heating of the sand is controlled by the TEMPERATURE CONTROLLER that actuates the MAIN BURNER valves. The gas valves are controlled ON/OFF by the two temperature controllers. The MAIN BURNER is timer programmed for a time cycle of approx. ten minutes for complete incineration of the organic matter. During this cycle the temperature of the sand elevates due to the combustion of the organic materials. The balance of time of the stripping cycle is the fluidizing action of the sand removing the residues from the product. The FLUIDIZATION can be increased after the incineration of the coating to further remove residues. The program timers are set for the general cycle requirements for the product being processed. The fluidization agitation allows the removal of almost all ash residues adhered to the treated parts. However, each coating stripped reacts differently to the amount of ash residues, therefore, there is no rule set for any product.

The OXIDATION CONTROLLER, operates the AFTERBURNER, which further incinerates the smoke and fumes generated in the initial heating of the product. This controller monitors the exhaust chamber temperature and maintains the flue gases at 1200° F to 1400° F. The OXIDATION CONTROLLER, can be set to the required temperature to destroy the exhaust fumes. The temperature of the exhaust will vary as the gas flames from the incineration increased the temperature of the sand. Do not operate the OXIDATION CONTROLLER any hotter than 1400° F. unless there is a smoking condition or the coating being stripped requires it for emissions compliance.

The hot gases rise from the burning coating and hot sand to the Post-Combustion Zone and are further oxygenated by the jets of excess air not used for fluidization. This air further incinerates the gases prior to being drawn into the AFTERBURNER CHAMBER for further incineration. The heated gases pass through a flow damper at the end of the chamber. The hot gases are exhausted and mixed with cool plant air to approx. 400° F. before being drawn into the MINICYCLONE for particulate removal. The fan discharges the air into the Discharge Duct where the air is partially recycled through the cyclone and discharged to the atmosphere.
THE PYRO-STRIP AFTERBURNER AND CYCLONE OPERATION

The Tank is equipped with an Integral AFTERBURNER to incinerate the fumes and gases emitted from the hot fluidized sand prior to being discharged to the atmosphere. The AFTERBURNER discharge is partially recirculated in the MINI-CYCLONE Separator to remove dust particles generated during the initial stages of the burn-off process and very fine sand particles. The cyclone discharges the particles in a removable bin for proper disposal.

The hot gases from the Post Combustion Chamber are drawn through a duct transition into the Afterburner chamber where the On-Off Burner maintains a set temperature of 1400° F. The hot gases are drawn through the volume damper that provides the back pressure for proper incineration. Fresh air is mixed with the hot flue gases to dilute and lower the air temperature to approximately 400° F. prior to the cyclones. Inside the cyclone chamber, the air is swirled into each of the multiple cyclones. The vortex suction force of the fan causes a centrifugal force inside the cyclone cone, separating the particles from the airstream.

The flue gases extracted through the cyclone are discharged to the atmosphere by a special fan rated at 650 Deg. F. inlet temperature. The fan normally handles air temperatures lower than 400° F. except during the Stripping Cycle when higher temperatures are being generated. The cyclone air is drawn into the fan and discharged into the Discharge Duct where the air is diverted by (2) quadrant dampers to either partially recycle the air back through the cyclone or discharge a portion to the atmosphere through the stack.

THE PYRO-STRIP HOOK CLEANING PROCESS

The PYRO-STRIP Fluidized Sand Tank System is designed for the rapid burn-off cleaning of hooks, racks, fixtures and reject parts which have been coated with organic paints, powder coating or thermo-plastics materials.

The parts to be stripped can be steel, iron or bronze, and aluminum for recycling. The parts are loaded into a basket that is then hoisted into the Tank where the fluidized hot sand scrubs and burns off the organic material and vaporizes it without damaging or warping the work pieces.

The cleaning cycle takes from 20 to 40 minutes at a temperature of 800° F. to 850° F. The time cycle is regulated by the mass of the load and amount of organic material to be removed. The basket of cleaned parts is lifted with the hoist out of the Tank and set to cool. The work pieces in most cases don’t need any de-ashing, since the bubbling action removes most ash coating from the surface.

The heated sand mass burns the organic coatings on the submerged workpieces. The vaporized residues rise to the surface of the sand and are incinerated by the flame of the pilot and the combustion of the fluidizing air-gas mixture. In this Combustion Zone, oxygenation elevates the flames to nearly 1400° F, incinerating and purifying the flue gases. The system features two temperature settings, located at a different level. One regulates the bath temperature; the second one monitors the temperature at the bottom of the tank so that it does not exceed the high limit settings. The temperature of the sand will increase over 950° F. during the initial burn with the High limit reading being higher than the sand as the energy given off by the coating is consumed and the sand absorbs the energy. Monitor the reading and adjust the size of the load if the sand temperature exceeds 1000° F. When the Main Burner shuts off the sand temperature drops off rapidly.
PYRO-STRIP™ MODEL MLF- 844236- HC TANK SYSTEM

ELECTRICITY
  * **Power:** 480 Volts, 3 Phase, 60 Hz.
  * **Service Required:** 60 Amperes Circuit Breaker

FUEL REQUIREMENTS
  * **Natural Gas or LPG:** 708,365 BTU for normal cold start-up
  * **Gas Pressure:** 6.5 Lbs. Pressure at the Manifold Inlet
  * **Connection:** 1-1/4” dia. Pipe inlet

COMPRESSED AIR
  * **Consumption:** 10 CFM Normal @ Constant 90-100 PSIG pressure
  * **Connection:** 1/2” dia. Pipe inlet

MACHINE DIMENSIONS
  * **Overall Dimensions:** 7’-2” Wide x 8’-0” Long x 7’-8” High, 12’-6” High (Lid Open)
  * **Tank inside Dimensions:** 3’-6” Wide x 7’-0” Long x 4’-6” Deep

BASKET DIMENSIONS
  * **Basket Interior Size:** 3’-0” Wide x 3’-0” High x 6’-6” Long
  * **Basket Hanger:** 8” over Basket Frame (Dual hanger design)

PRODUCTION DATA
  * **Workpiece Specification:** Fixtures and parts of steel, iron or bronze
  * **Workpiece Composite Size:** 3’-3” Wide x 3’-0” High x 6’-9” Long
  * **Workpiece Load Specification:** 700 Lbs. / Load (Excluding Basket)

ORGANIC COATING DATA
  * **Liquid Coatings:** 45 Lbs. / Load, (All types of air dry and baked enamels)
  * **Powder Coatings:** 30 Lbs. / Load, (Epoxy, Polyester, or Hybrids)
  * **Note:** Please refer to the “WORK BY PURCHASER” for additional information regarding process capacity and material restrictions.

EQUIPMENT NOISE LEVEL
  * **Measurement:** The noise level at the operator’s position is lower than 85 dBA

OPERATION AND START-UP TIMETABLE
  * **Daily Start-Up:** 1 to 2 hours (600°F to 800°F)
  * **Heat-up Between Loads:** 8 to 10 Minutes Required
  * **Operating Temperatures:** 600°F to 1000°F

FLUIDIZED BED MEDIA
  * **Classified Sand:** Graded Crystalline Silica, Silicon Dioxide, SiO₂
  * **Initial Machine Charge:** 7600 Lbs. Shipped for Start-Up and Operation
  * **Sand Change:** Every 2000 hours of operation or when cycle times increase due to particle size degradation or parts emerge with excess ash residue.
FLUIDIZED TANK ASSEMBLY

The Pyro-Strip System is equipped with a tank (1) filled with calibrated quartz sand (3). The Compressor (2) injects air to the air distributor (4), which fluidizes the sand mass, and causes it to behave like a boiling liquid, allowing the easy sinking of the basket (8) with parts to be stripped. The sand and product mass are heated by the mixture of gas (6) and the primary air that is ignited on the surface of the fluid bed by a constant burning pilot flame (7).

The flames of the fluidizing air/gas mixture extend over the entire surface of the Combustion Zone (9), rapidly heating the bed to an operating temperature between 800°F to 850°F. The bed’s temperature is controlled by several temperature controllers that regulates the gas flow.

The evaporation of the organic material to be stripped is performed within the sand mass. The effect of sand friction removes all the residues of the combustion from the treated product. The combustion flue gases rising over the tank surface are further incinerated and purified in the Post Combustion Chamber (10) by fresh air (5) discharged from the Post Combustion Manifold (11). This secondary fresh air oxygenates the flue gases to assure a complete combustion. The optional After-Burner (12) can be provided. The Integral Cyclone (13) separates the waste particles (14) from the flue gas airstream and deposits them in a container for proper disposal. The Exhaust Fan (15) discharges the clean flue gases to the atmosphere.
BRIDGE CRANE WITH SCISSORS LIFT

The system is provided with a Bridge Crane for loading the Basket into the Sand Tank with motorized hoist trolley, wire festooning, and (1) Ton Capacity dual hanging point scissors type hoist, control panel and Pendant. The Pendant has multiple function buttons for the loading, unloading of the basket, hoist motions, tank lid open and close, and vibrator. The hoist function is **semi-automatic** with a load/unload logic sequence that eliminates the guesswork of loading the basket and locating the hoist:

- Automatic down stop for loading the basket on the floor and inside the Tank
- Automatic stop over the Tank for Loading and unlatching of the basket in the Tank
- Automatic stop over the Tank for latching and removing the Basket from the Tank
- Vibration of the Basket as it is being removed from the tank. Pendant controlled
- Automatic hoist up limit in all modes
- Tank lid is opened and closed from the hoist pendant
- Time cycle actuation of stripping load from the hoist pendant
- Fluidization ON/OFF Selector Switch control for loading the Basket on top of sand and removing the Basket out of the Tank at the end of the cycle

The advantage of these controls is that the operator does not have to eyeball the placement of basket in the tank or when to stop lowering it. The operation is safer by keeping the operator away from the tank, or from having to go to the Control Panel to operate the Lid controls. The Scissors mechanism is completely guarded with solid panels to prevent injury.

PENDANT FUNCTIONS

<table>
<thead>
<tr>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UP</strong></td>
<td>Raises the basket up to the upper limit for loading over the Tank</td>
</tr>
<tr>
<td><strong>DOWN</strong></td>
<td>Lowers the basket to a switch limit:</td>
</tr>
<tr>
<td></td>
<td>1. <strong>UnLatch Mode</strong>: Basket lowers to the TANK level in the load area</td>
</tr>
<tr>
<td></td>
<td>2. <strong>Latch Mode</strong>: Basket lowers to the TANK level inside the Tank</td>
</tr>
<tr>
<td><strong>FWD</strong></td>
<td>Drives the basket forward towards the Tank</td>
</tr>
<tr>
<td><strong>REV</strong></td>
<td>Drives the basket backwards away from the Tank</td>
</tr>
<tr>
<td><strong>OPEN</strong></td>
<td>Opens the Tank Lid</td>
</tr>
<tr>
<td><strong>CLOSE</strong></td>
<td>Closes the Tank Lid</td>
</tr>
<tr>
<td><strong>VIBRATE</strong></td>
<td>Push-Button actuates the stainless steel shroud and turns ON the Vibrator</td>
</tr>
<tr>
<td><strong>START</strong></td>
<td>Starts the Batch Timer in the control panel and turns ON the White pilot light</td>
</tr>
<tr>
<td><strong>FLUIDIZE</strong></td>
<td>Controls the Discharge Air Valve motor position:</td>
</tr>
<tr>
<td></td>
<td>1. <strong>ON Mode</strong>: The sand fluidizes while lid is OPEN to remove the Basket. Also Starts the Fluidization to self lower the Basket after loading.</td>
</tr>
<tr>
<td></td>
<td>3. <strong>OFF Mode</strong>: Fluidization OFF to place Basket on top of sand inside the Tank and Close the lid.</td>
</tr>
</tbody>
</table>
BASKET LOADING SEQUENCE

LOAD SEQUENCE
1. Set Pendant selector switch to **UNLATCH** position
2. Locate loaded basket on floor position for lifting with Hoist
3. **FWD** Hoist to hook the carriage load pins into basket lifting form rods
4. Set Pendant selector switch to **LATCH** position
5. **UP** Hoist to upper stop position
6. **FWD** Hoist towards Tank
7. Set Pendant selector switch to **OPEN** position: Wait for Tank Lid to open
8. **FLUIDIZER** Switched to OFF to stop the Sand Fluidizing inside the Tank
9. **FWD** Hoist to furthest position over the open Tank
10. **DOWN** Hoist into the Tank: The Basket is lowered on top of the still sand
11. **REV** Hoist to unhook the Carriage from the Basket
12. **UP** Hoist to upper stop position
13. Set Pendant selector switch to **UNLATCH** position
14. **REV** Hoist away from the Tank
15. Set Pendant selector switch to **CLOSE** position: Tank Lid closes
16. **FLUIDIZER** Switched to ON to start the Sand Fluidizing and self lower the Basket
17. **START** to commence the Batch Timer in the panel to start the cycle: White light on

UNLOAD SEQUENCE
1. Set Pendant selector switch to **OPEN** position: Wait for Tank Lid to open
2. Set Pendant selector switch to **UNLATCH** position
3. **FWD** Hoist to nearest position over the open Tank
4. **DOWN** Hoist into the Tank with Carriage load pins between the front of the Tank and the basket lifting rods
5. Set Pendant selector switch to **LATCH** position
6. **FWD** Hoist carriage to engage the basket lifting rods
7. **UP** Hoist while pushing **VIBRATE** button to activate the Vibrator to remove the sand from the basket while over the Tank
8. Set Pendant selector switch to **UNLATCH** position
9. **REV** Hoist to move the **HOT** basket away from the Tank
10. Set Pendant selector switch to **CLOSE** position: Tank Lid closes
11. **DOWN** Hoist to place Basket on the floor to cool before unloading the product
HOIST CONTROLS

<table>
<thead>
<tr>
<th>ACTION</th>
<th>SWITCH LABEL</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper lift limit over Tank</td>
<td>Carriage Height Safety Switch</td>
<td>Switch stops the Scissors from complete collapse</td>
</tr>
<tr>
<td>Lowest basket load limit</td>
<td>Down Not Over Tank Safety Switch</td>
<td>Switch stops the Carriage at lowest point for loading the basket</td>
</tr>
<tr>
<td>Forward Carriage travel limit over Tank</td>
<td>Forward Latching Safety Switch</td>
<td>Switch stops the Carriage at the most forward position for loading the basket into the tank</td>
</tr>
<tr>
<td>Uncoupling the Carriage from the Basket inside the Tank</td>
<td>Reverse Latching Safety Switch</td>
<td>Switch stops the Carriage in reverse inside the tank to engage or release the basket</td>
</tr>
<tr>
<td>Lowering carriage or basket into Tank</td>
<td>Down Over Tank Safety Switch</td>
<td>Switch stops the Carriage inside tank for load/unload of basket</td>
</tr>
</tbody>
</table>

TANK START-UP PREPARATION

Proceed to fill the sand tank with sand up to the level indicated in the interior of the tank only after the installation of the system is completed.

The system is shipped with the gravel bottom and the first layer of sand (up to the frame support level) in the interior of the Tank.

Follow all the safety precautions when filling the Tank with sand. Be sure to dispose of the shipping bags and sweep the area of any sand spills.

Fill the Tank with sand, being careful to spread the sand uniformly across the entire surface. The sand level should be to the upper indicator. The sand level will drop several inches as the sand is fluidized initially. Have sand available to add to the Tank to maintain the desired level.

When the unit is run for the first time, specific instructions are to be followed. After the first start-up, just start the unit by following the START Procedure; no additional action is required at this time.

The temperature of the tank affects the fluidizing action of the sand. If the unit becomes inoperative for more than a week, or the surface temperature goes down lower than 150°F, the unit must be started by following the specific instruction of the first time start-up.

The regulation settings of the system are established on the initial start-up of the system. The system does not require any periodical set-up changes unless there has been modifications to the utility settings or service from the original burning set-up.
START-UP SEQUENCE

1. Turn ON the Disconnect Switch on the Control Panel. Push the Silence Alarm Button.
2. Open gas supply valve, check gas pressure gage settings. The gas pressure has to be a minimum of 6-PSI (400 Mb.) to operate the unit.
3. Turn on the Cyclone Blower: Pull ON/OFF button, the button lens lights green
   - Green light turns ON in the Panel light stack to indicate the Blower is on.
   - Gas Valve Leak Test initiates and completes within a minute.
   - PURGE COMPLETE green pilot lights after 30 seconds on the Panel.
   - Turn on the Blowers: Pull ON/OFF buttons, the button lens lights green
   - The Fluidizer Blower starts with the Discharge Air Valve bypassed to the Post–Combustion Manifold to reduce start-up load on the blowers
   - After 10 seconds, the Discharge Air Valve is diverted to the Fluidizer to percolate the sand and increase fluidization. The air is diverted until the Pilot is ignited.
4. Set Burner Control to (1) to observe the burner flame through the Observation Port.
5. Pull Pilot ON button until pilot is established and the lens lights blue. Discharge Air Valve is rotated by the Control Motor to the pre-set fluidizer pressure.
   - Blue light turns ON in the Panel light stack to indicate the Pilot is on
6. Rotate Burner ON selector switch to (1)
   - Main gas valve is opened and the gas percolates through the sand and ignites
   - Yellow light turns ON in the Panel light stack to indicate the Burner is on
   - The surface of the sand will be a carpet of blue fire in the midst of the fluidization
7. Set the desired sand bed temperature by adjusting the Temperature Controller
8. When the temperature is at 800° F. minimum, start loading the Basket with product
9. Turn on the After-Burner: Pull ON the button, the button lens lights green
   - Burner ignites and heats the Combustion Chamber to 1200° F to 1400° F.

PRODUCT LOADING

1. Select Burner Control mode: Burner OFF when Lid is opened is recommended
2. Follow Load Basket sequence
3. Select the desired process time by rotating the Batch Timer on the Control Panel
4. Push START on the Pendant to start the Batch Timer cycle; Timer pilot lights red
   - White light turns ON in the Panel light stack to indicate the Timer is on.
5. Time cycle ends
   - White light turns OFF in the Panel light stack to indicate the Timer is done
   - Red light turns ON in the Panel light stack to indicate the Load is finished
6. Follow Unload Basket sequences and remove the finished product.
TURN OFF SEQUENCE

1. Rotate Burner OFF selector switch
   - Yellow light turns OFF in the Panel light stack to indicate the Burner is off
   - Wait for (2) minutes before turning off the pilot to assure the combustion of any gas residue left in the sand.

2. Turn off the After-Burner: Push ON/OFF button

3. Push Pilot ON/OFF button until pilot lens blue light is off
   - Blue light turns OFF in the Panel light stack to indicate the Pilot is off
   - Push Silence Alarm button

4. Turn off the Fluidized Blowers: Push ON/OFF the button
   - Green light turns OFF in the Panel light stack to indicate the Blower is off

5. Turn off the Cyclone Blower: Push ON/OFF the button, Button Green light turns Off

6. Shut-Off compressed air valve

7. Shut-Off gas valve

8. Turn OFF Control Panel Disconnect switch