DuBois Best Practices

Industrial Spray Washer Descaling Procedure

This is a Step-by-step procedure to follow to clean and descale a spray washer. Use for semi-annual maintenance or when starting up a new washer or restarting a washer that has been out of service.

PPE must be worn and standard lock out and safety procedures must be observed.

- Read and understand the product Technical Data Sheet(s). Read and understand the product Material Safety Data Sheets(s).
- **ENVIRO CLEAN 110** (Descaling Acid) is inhibited hydrochloric acid:
- Hydrochloric Acid can burn or destroy living tissue such as skin, eyes, and respiratory tract
- When heated, vapors can be produced, which can be irritating to your nose and throat when inhaled
- When using **ENVIRO CLEAN 110**, precautions for handling any strong acid should be observed and utilized. Consult MSDS for detailed information.
- Individuals that will transfer **ENVIRO CLEAN 110** from the shipping container into the washer must wear personal protection equipment that includes: full-face respirator with acid gas filters, goggles, acid resistant gloves and apron, acid resistant boots.
- Once transfer of **ENVIRO CLEAN 110** is complete, individuals involved with the descaling process must wear the following personal protection equipment: acid resistant gloves, boots and apron , face shield, and safety glasses
- Use only the following pumps to transfer **ENVIRO CLEAN 110** into the washer from a shipping container. Hypalon Drum Pump, Lutz B36 electric, Wilden air powered diaphragm pump
- Use only polypropylene or polyethylene tubing to and from the transfer pump.

ENVIRONMENTAL

- Check with the local municipality and/or your wastewater treatment operators for pH discharge limits. As a guideline, the pH of spent descaling solution should be between 6 and 9 before releasing
- Before releasing wastewater created during descaling, use pH paper and record the pH observed.

WASHER DESCALING PROCEDURE

During the following procedure repair and/or replace all parts as needed. Step by Step Instructions

1. Communicate with appropriate personnel about this activity.
2. Check the capacity of the wastewater system to ensure that there is enough capacity to dump tanks.
3. Remove all parts from conveyor.
4. Lock Out & Tag Out power to conveyor and washer.
5. Remove all nozzles, place in empty 5-gallon HDPE plastic buckets.

6. Clean plugged nozzles; In order to achieve proper chemical contact, the nozzles need to be cleaned and properly aligned to achieve a spray pattern that will give an even amount of chemical contact over the surface of the entire part. If the nozzles become clogged, the function of the nozzle is negatively affected. It is important that the nozzles be cleaned on a regular basis. Unfortunately, a lot of companies clean the nozzles by poking a metal wire through the orifice; this degrades the orifice. If you simply poke out the obstruction, it will quickly re-lodge and plug the nozzle again as soon as the pump is turned on. The best way to clean your nozzles is to have two sets of nozzles; clean one set by soaking in **ENVIRO CLEAN 110** while the other is in use. You may want to consider disposing of the old nozzles and purchasing new ones instead of cleaning the nozzles.
7. Remove Lock Out & Tag Out to power to washer. Turn all pumps on and run for 5 minutes. Turn off pumps.
8. Lock Out & Tag Out power to washer.
9. Remove all end caps from risers (or open all ball valves if caps have been replaced by ball valves).
10. Remove Lock Out & Tag Out to power to washer. Turn pumps on for 5 minutes to flush out solids in the pipes. Turn off power to the pumps.
11. Lock Out & Tag Out power to washer.
12. Once the pipes have been cleaned out, replace the caps or shut off all ball valves.
13. Drain and vacuum debris from all stages (cleaner, phosphatizer & rinse tanks).
14. Fill the tank to approximately 2/3 full of the normal operating level with fresh water. (Be sure the water level is above the heating surface and pump intake.)
15. Remove Lock Out & Tag Out from the power. Start the exhaust fans at each end of the washer. These steps should confine the acid fumes to the interior of the washer.
16. Assure washer ventilation system is operating. Use air flow meter or tape a small piece of paper to silhouette (entrance) of washer.
17. Obtain spill supplies (spill kit and neutralizer), personnel protection equipment (acid suit or apron, acid gloves, face shield, face respirator with acid gas filters, rubber boots), and chemical transfer equipment (Lutz B36 electric pump or Wilden air powered diaphragm pump). Stage in work area.
18. Deliver **ENVIRO CLEAN 110** (Descaling Acid), **HY-THERM 150** (Neutralizer), and **Depress Plus** (Defoamer) to area.
19. Individuals that will transfer ENVIRON CLEAN 110 from the shipping container into the washer must wear personal protection equipment that includes: full-face respirator with acid gas filters, goggles, acid resistant gloves and apron, acid resistant boots.
20. Once transfer of **ENVIRON CLEAN 110** is complete, individuals involved with the descaling process must wear the following personal protection equipment: acid resistant gloves, boots and apron , face shield, and safety glasses.
21. After filling tank 2/3 full of water, add **ENVIRO CLEAN 110** at approximately 10% by volume to the washer. When adding **ENVIRO CLEAN 110**, use only a Lutz B36 electric pump or Wilden air powered diaphragm pump; make sure that the open end of the hose is immersed beneath the water level in the tank This will eliminate splashing of **ENVIRO CLEAN 110** and the generation of fumes. Do not inhale the fumes. Remember to observe the required precautions as specified in the Material Safety Data Sheet.
22. Add 1-2 gallons of 25% by volume **Depress Plus** (defoamer) to each washer stage. If washers foam over, the liquid on the ground must be contained and neutralized using spill and neutralization kit.
23. Fill the tank up to the normal operating level with fresh water and turn on the heat.
24. Close all stage lids.
25. Turn the pump(s) on in the wash stage. At 120° - 150° F, a 10 % solution of **ENVIRO CLEAN 110** should clean the washer in approximately 4 - 6 hours (assuming a 1/8” scale layer, a ¼” scale layer will take approximately 8 hours to clean). After 4 hours, turn off pumps, Lock Out & Tag Out power to pumps and inspect the interior of the washer for descale effectiveness. Decide to proceed with the neutralization step or continue the descale operation.

26. Remove Lock Out & Tag Out to power to washer and continue the descaling process as needed.
27. For neutralization, use **HYTHERM 150**. To achieve a pH between 6 and 9, add approximately 2 –4 quarts of **Hy-Therm 150** (50% Caustic) for each gallon of **ENVIRO CLEAN 110** used (Please note that this is an estimate based on past experience. You may need less than one quart or more than 4 quarts depending on the amount of scale in the washer, the make-up of the scale, and the alkalinity of the water at the facility. You don't want to be in a position where you do not have enough neutralizer to complete the job, so it is best to have more than you think you need). NOTE: Add caustic gradually while washer circulation pumps are running to completely mix entire bath. Allow time for caustic to mix in the tank before checking pH. Add more caustic as needed to achieve the required pH value.
28. Test pH of the solution and record value. Release neutralized water to wastewater system.
29. Completely drain all stages (tanks).
30. Fill the wash stage with fresh water and turn both the heat and pump(s) on for 20-30 minutes and then drain the water out. Flush out the tank bottom. Use a sump sucker to remove particulate debris from the bottom of the tank.
31. Re-fill all stages with fresh water.
32. Turn-on pumps and conveyor chain. Run for 20-30 minutes. Drain stages.
33. Lock Out & Tag Out power to washer. Replace nozzles on risers with clean or new nozzles.
34. Check nozzle alignment: Turn on pump stage by stage to check for any blockage or irregular spray patterns coming from the nozzles. Nozzles that show obstructions should be removed and cleaned. Worn or damaged nozzles should be replaced. Nozzle alignment should be checked by visual inspection of the spray direction and pattern, especially when a cleaned or new nozzle is replaced on the riser.
35. Remove Lock Out & Tag Out to power.
36. Clean up area around washer where descaling took place.
37. Recharge all stages with appropriate chemistry. Bring stage conditions up to proper operating parameters (reference Washer Operating Manual).
38. Before production starts, bring all stages up to proper operating parameters (reference Washer Operating Manual).
39. Clean and store personal protection equipment, chemical transfer pumps, vacuums, sump sucker.