



JMN SPECIALTIES, INC.

“The Chemical Solution”

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CLEANING STEPS & PROCEDURES GLYCOL DEHYDRATION SYSTEMS

- Determine the type and severity of contamination.
- Select Chemical product.
- Match the pumps and hoses to the chemical cleaner.
- At the job site, go through safety orientation.
- Set up pumps, hoses and waste tanks.
- Turn off heat to unit.
- Drain the system. Retain the TEG for re-use, reclaiming or disposal.
- If reboiler fire tube is cracked or leaking, tube must be pulled for repairs.
- Disassemble the system components for replacement of still column packing, and hooking up of jumper hoses for circulating chemical.
- Prepare the cleaning solution by mixing with fresh water. Solvents should be used as received. Water based cleaners, including acids should be mixed with water.
- Once the pumps and hoses are set in place, chemical may be pumped into the system and circulation started.
- Once circulation is established, supply heat of 140-160 deg. F
- Normal circulation is 8-10 hours depending on the type and severity of contamination.
- While circulating, manually clean filters, strainer, heat exchangers and related piping.
- After circulation and system is clean, turn off system heat.
- Drain the cleaning fluid into cuttings boxes.
- Flush system with fresh water until all rinse water is clear, free us suds, solids and pH is that of rinse water.
- Re-assemble the unit, fill with fresh glycol and start-up.

BACKGROUND

The main components of a glycol system consist of a glycol tower, glycol reboiler, glycol surge tank, glycol hydrocarbon separator, sock and carbon filters, glycol heat exchangers, and the glycol pumps.

When the complete system is to be chemically cleaned, it is always best to bypass the pumps and related piping. This typically includes the glycol separator, filters and heat exchangers. These may be cleaned manually or jumper hoses applied to circulate independent of the reboiler, surge and tower.

Circulation of cleaners through a glycol unit should follow the normal flow of the glycol. If the system design is such that a stall column is installed between the reboiler and surge tank, reverse flow is recommended. If the packing in the stall column can be removed, reverse flow is not required if the packing is removed. A stall column is a packed section between the reboiler and surge. Dry gas is flowed into the column to strip out trace amounts of water from the glycol leaving the reboiler. It serves a separate function from that of the still column.

The still column located on top of the reboiler normally consists of the upper vent connection, upper and lower connections to the reflux coil and the glycol inlet connection. The unit is designed where the glycol enters the still column above the packing so that as the glycol cascades down through the packing, the steam exiting the column is in intimate contact with the inlet glycol.

Because the reboiler operates at 375-400 deg. F, the packing in the still column often becomes fouled. As the fouling occurs, glycol will often build up in the still column and exit out the steam outlet. Often the glycol "belches" glycol out the still column and vent connections. When this occurs, the unit should be taken out of service and the still column packing cleaned and/or replaced. Consideration should be given to total system cleaning at this time.

The still column packing may often be chemically cleaned in place. But if the plugging of the packing is extreme, it is best to replace the packing. This is for the sake of economy and efficiency.

The reboiler and surge tank may be chemically cleaned in place by filling the reboiler and surge with a chemical solution and connecting a pump suction to the bottom connection of the surge tank and pumping to the glycol inlet of the still column.

By operating the circulation pumps as described, the chemical is circulated in the normal flow pattern. The reboiler then can be used as a heat source to bring the chemical cleaners to the most effective operating temperature.

Additionally, by using the reboiler as a heat source, the other components in the system may be circulated using auxiliary pumps. Of course, additional chemical is required and very detailed monitoring is required to prevent overflows of the reboiler. ***Remember that liquids expand when heated. The reboiler should not be overfilled if using as the heat source for chemical cleaning.***

For simplicity, it is often best to circulate the reboiler and related components separate from the tower. This will help minimize over-flow potential and chemical volume required for the job.

The auxiliary vessels (glycol/hydrocarbon sep. and filters) may be filled with chemical and allowed to soak while the main component circulation is on going.

After the required circulation time, the system should be drained and flushed with fresh water until no chemical residue remains. Be sure that all low spots and dead ends in the lines are flushed well. The heat exchangers should be tested to ensure integrity and that plugging has been removed.

The tower configuration may differ from system to system. There are tray towers, packed towers, similar to the still column, and structured packing. Normal and routine cleaning of tray style towers is simple. The packed and towers with structured packing are more difficult. Mainly because with the packed and structured packing, the tower must be completely liquid filled. With tray style, chemical volumes are calculated on about six inches of chemical on each tray.

Circulation of the tower should follow the normal flow of the glycol. The only exception is if downcomers are plugged and extreme action is required to prevent tower replacement. This is not uncommon when the tower has been put back into service after long term storage. During improper storage, rust scale forms on the internal walls and then collapses onto the trays during reinstallation. This rust scale is difficult to remove without entering the tower. Inhibited hydrochloric acid solutions are used for the rust removal.

A common sense approach to cleaning glycol systems should be used:

- Screen chemicals with type of contamination being removed and metallurgy of system being cleaned.
- Maintain chemical MSDS at the job site at all times.
- Use pumps and hoses whose compatibility with chemicals has been determined.
- Use jumper hoses around piping and equipment that can be cleaned manually.
- Normal circulation is almost always with the glycol flow.
- Try to use the re-boiler as a heat source for the chemical if possible.
- Monitor cleaning with strategically placed, contaminated coupons.
- Manually rinse and drain the low spots and blinded piping in the lines.
- Do not leave water on tower trays.

Personnel should always have the proper safety training and a complete orientation of the facilities upon which work is being performed. Safety is paramount for contractors in today's business climate.

NOTE: This paper does not cover every aspect of glycol cleaning. It is meant to be a simple guide of some of the important aspects to a successful job.