Unit Cooler Troubleshooting tips.

A few tips on my personal findings and methods used to trouble shoot unit cooler issues.

1. The ideal thing is to have an audit prepared before making a service trip, this will give a heads up as to the type of equipment, application, desired TD design, TXV selection, nozzle selected at what conditions, unit balance and other issues which could be important in making a correct diagnosis as to the problem reported.

2. At the job the first thing is to obtain the real reason(s) the user is complaining. Then gather all the information available about the installation, such as current operating conditions, evaporator placement, and drain installation, ambient temperature at door openings servicing the cooler, such as conditioned, or non-conditioned space. Also be very careful about the following issues, piping lay out, suction lines trapped correctly, both at bottom and top of risers, pipe runs insulated as needed, lines sized correctly for capacity requirements, velocity required, and flow through branches. Remember suction and liquid lines can have problems outside the fixture as well as inside the box. Supplied electrical power, rack or/and shelving installation, type of product stored in cooler, also observe the cooler condition, as far as type, doors, floors, conveyers or motorized loads, people working inside the area. In other words get all the information available.

3. Evaporator motors, fan blades, and motor mounts need to be in correct operating condition in order to ensure correct air flow across the evaporator. Other issues needing attention would be the conditions of defrost heaters correct placement, and operation, proper electrical power supplied, electrical connections secure, and all components connected correctly.

4. Next observe unit cooler conditions and collect current operation information. Correct unrestricted airflow is mandatory with all evaporators. Suction pressure at the evaporator is necessary in order to correctly calculate superheat at the TXV. Also be very observant of feeding supplied to the evaporator by the txv and distributor assembly, the ability of the evaporator to efficiently exchange heat is totally dependent on having a fully active coil as near to saturated suction temperature of the refrigerant as possible. Remember superheat can be correct with incorrect refrigerant distribution.

5. The electrical compartment is often overlooked as to importance of proper operation. Issues with this panel can be ice accumulations inside the compartment resulting from electrical conduit not vapor tight allowing moisture to flow into the compartment condensing on all cold components, this can result in a large ice or frost accumulation inside the compartment. This condition can affect defrost termination/fan control operations, which can leave defrost heaters operating longer than needed, resulting in heaters creeping or coming out of heater slots, also defrost heaters can suffer damage resulting from ice or frost which can damage electrical wiring.

6. A sufficient and correctly timed defrost schedule is necessary in order to completely defrost the evaporator at each cycle. If the evaporator and condensate pan do not completely clear the accumulated frost load each cycle ice will eventually form enough to create a problem, remember defrost heaters will not remove accumulated ice and frost.

7. Poor defrosting and unusual ice build up in corners and around TXV and distributor tubes is often observed. Reasons for this can be incorrect drain installation, such as other coils connected to the drain line and defrosting at different times, even though a trap may be installed in the common drain line the moisture from one coil on defrost can, and will be transmitted to another coil in refrigeration, this is no different than not using a trap, moisture can and will travel to the coldest place.

8. Suction pressure, suction line temperature, liquid line pressure, liquid line temperature, and correct operating charge at the condensing unit are necessary to properly make a complete system diagnosis. Correct superheat range at the compressor is the only crucial superheat that really matters in refrigeration. Superheat at discus compressor between 15 and 35 degrees in order to protect the compressor from flooding or possibly more importantly from overheating. Superheat for scroll compressors of 10 to 20 degrees. Serious compressor damage can, and will result form operating outside the above conditions. Frost at the compressor does not necessarily mean low superheat, and no frost at the compressor certainly does not mean there is sufficient superheat.

9. The above items are what I typically will check in order to troubleshoot a problem system. In my opinion the unit cooler cannot be fully diagnosed until a complete picture of the system had been taken and all bases have been covered that pertain to the unit cooler operation.

Galen Holzhausen
SR. Field Service Eng.
Heatcraft World Wide Refrigeration