



WARNING

Before using this guide, read and understand the unit instructions. Safety dictates that you use a hard hat, safety goggles for the protection of your eyes, and heavy leather gloves to protect your hands and arms. Boiling refrigerant at atmospheric pressure will freeze your eyes and exposed skin if it inadvertently leaks out of the system.

Please note that the Environmental Protection Agency (EPA) requires that technicians be certified to handle refrigerants if they have the potential to release refrigerants into the atmosphere. See the EPA certification course offered at www.777educate.com or visit www.epa.gov for more information. **Do not vent any refrigerant to the atmosphere.**

COMPRESSOR FAILURE and REQUIRED CLEANUP

When finding it necessary to replace a compressor in a unit, a technician needs to know whether the system contains acid or not. Use of an acid test kit will determine acid levels.

There are 2 basic categories of compressor failure:

- ① **ELECTRICAL** - **may** produce acid if this failure occurs over time.
- ② **MECHANICAL** - rarely if ever produces acid.

However, there are two types of electrical failures:

- ① **MILD BURNOUT** - they happen quickly and thus produce very little or no acid.
- ② **SEVERE BURNOUT** - happen over a longer time period and thus produce unacceptable amounts of acid.

IN SUMMARY

There are 2 classes of compressor failures with regard to acid production. Each has its own requirements for change out and cleanup so as to limit the possibility of a repeat failure in the future.

- ① **Mechanical / Mild Burnouts** - DO NOT produce acid
Required a less stringent change out and clean up procedure because there is little or no acid in the system to be eliminated.
- ② **Severe Burnouts** - DO produce acid
Requires a more stringent change out and clean up procedure because there is acid in the system to be eliminated.

Determining whether a system is acid requires an acid test kit which is available at most HVAC/R wholesalers. All brands are different so follow the directions.

-- **MECHANICAL FAILURE OR MILD BURNOUT** --

Compressor oil IS NOT ACID:

If compressor acid test is positive, go to the next page. You have a severe burnout.

- 1) Remove compressor
- 2) Reverse purge condenser coil and evaporator coil with dry nitrogen.
- 3) Install or replace liquid line drier
- 4) Leak check using regulated dry nitrogen according to supplier's specifications including a safety pressure relief valve.
- 5) Follow one time deep, or triple evacuation procedure
- 6) Charge system using manufacturer's method. If manufacturer's method is unknown, charge by weight. If weight is unknown, add a few pounds of liquid and

Capillary Tube or Piston metering device - charge by superheat at the condensing unit.

TXV - charge by amount of subcooling in the condenser, often listed on the rating plate of newer systems.

*Charging by superheat and subcooling is covered in Intermediate A/C (*A/C II).*

If unit is single phase, replace starting components, if used, replace run capacitor, replace contactor, and be certain the refrigerant charge, by weight if possible, is correct. Before applying power to a new compressor be certain the line and low voltage is within the limits set by the manufacturer.

If unit is three phase be certain the rotation of compressor is correct (not applicable to reciprocating compressors but crucial for scrolls), be certain the line and low voltage is within manufacturer's minimum and maximum voltage, be certain voltage on each phase is within 2% of the average voltage, and check for current balance. It's a good idea to also change contactors, capacitors, and start gear if so equipped.

Visit www.behler-young.com/dealertraining.htm for a current eastern and western Michigan seminar schedule.

Visit www.777educate.com for a complete list of courses and a source of other information.

----- SEVERE BURNOUT -----

Compressor oil IS ACID:

- 1) Remove compressor.
- 2) Reverse purge condenser coil and evaporator coil with nitrogen.
- 3) Install or replace **liquid line** drier with the next size larger.
- 4) Install **SUCTION LINE** drier. (Not required if no acid is in the oil).
- 5) Leak check using regulated dry nitrogen according to supplier's specifications with safety pressure relief valve.
- 6) Follow one time deep, or triple evacuation procedure.
- 7) Charge system by weight if possible. If weight is unknown, add a few pounds of liquid and:

Capillary Tube - charge by superheat chart

TXV - charge by condenser subcooling, often listed on the rating plate of newer systems.

Charging by superheat and subcooling is covered in Intermediate A/C (A/C II).

- 8) Operate system for two hours and recheck acid level of crankcase oil. If oil is still acid, change both driers and operate system for another two hours. Continue this process until the crankcase oil is non-acid.

Suction line dryer note:

Maximum suction line dryer **pressure drop (ΔP) = 8 psig** when the drier is used for clean up only (24 hours maximum operation) and, **2 psig maximum ΔP** when the drier is intended for permanent installations. Make sure the drier manufacturer has designed the drier you selected for permanent installations if desired. The general rule says that suction line dryers should be used for temporary clean up only - removal is recommended when the clean up process has been completed..

If unit is single phase, replace starting components, if used, replace run capacitor, replace contactor, and be certain the refrigerant charge, by weight if possible, is correct. Before applying power to a new compressor be certain the line and low voltage is within the limits set by the manufacturer.

If unit is three phase be certain the rotation of compressor is correct (not applicable to reciprocating compressors but crucial for scrolls), be certain the line and low voltage is within manufacturer's minimum and maximum voltage, be certain voltage on each phase is within 2% of the average voltage, and check for current balance. It's a good idea to also change contactors, capacitors, and start gear if so equipped.

Visit www.behler-young.com/dealertraining.htm for a current eastern and western Michigan seminar schedule. Visit www.777educate.com for a complete list of courses and a source of other information.

777 Education and Consulting, Inc.
3131 Brisbane Dr. Lansing MI 48911
(517)371-4101 FAX (517)371-4105