777 Education and Consulting, Inc. **March 2005 – Newsletter**

Professional HVAC Training – www.777educate.com $4.95

Summer Is Coming

A/C Tune Ups

Late winter/early spring tune ups are a pain for contractors and their technicians. It's too cold to start the compressor and get accurate readings. Liquid refrigerant has migrated to the compressor's crankcase. Starting the compressor under these conditions may result in slugging which may ruin a reciprocating compressor's valves - even with a crankcase heater that has been energized for more than 48 hours, it's a crap shoot. Crankcase heaters are not very effective when the outdoor temperature is below 55^{O} degrees F.

If it's below 70, and your unit does not have a crankcase heater, you may not need to start the unit is you have history on the unit. A unit which has run for several years, with no need for refrigerant, will probably make it through the summer with no need for additional refrigerant. On the other hand, a unit which has required 2 pounds of refrigerant each year for the last 3 years will probably need refrigerant this year unless the leak has been repaired already and the system has run without the need for new refrigerant for over 1 year.

> **Charging** – follow manufacturer's instructions if known. If not known, charge systems utilizing fixed restrictor metering devices using the properties of superheat in the evaporator, or use subcooling in the condensing coil if the metering device is a thermostatic expansion valve (TXV or TEV). Fixed restrictor metering devices include capillary tubes and pistons. In our **Air Conditioning I** class we cover superheat charging and subcooling charging is covered in **Air Conditioning II**.

Also, we teach you how to simulate warmer temperatures for more accurate charging on cooler days in both our A/C I and A/C II seminars.

For a complete list of courses offered in Michigan, including NATE testing dates, go to www.behler-young.com and click on the ***Dealer Training*** arrow.

A/C Start Ups - New Units

If this is a new system start up instead of a tune up, you cannot start the compressor and check unit charge unless the outdoor temperature is at or above the minimum recommended by the manufacturer. Fully read and understand your manufacturer's instructions if you want to minimize warranty calls, provide customers with maximum cooling, minimize operating costs, and maximize equipment life.

You can, however, check line voltage at the cooling contactor, check air flow across the evaporator using the pressure drop data across the evaporator coil, check low voltage wiring and test the low voltage circuitry with the outdoor condensing unit line voltage power supply off,

Indeed these items should have been checked when the unit was installed during last fall or this winter but they surely need checking now.

You need to inform the customer of the proper operation of the system and the need to keep the condensing unit coil clean.

> **Charging** – use manufacturer's instructions only.

A check list used by my contracting business follows. It was used since the early 80's. We used it for Tune Ups and Start Ups of new air conditioners. Use it if it suits your needs.

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Residential Air Conditioning System
Tune Up or Start Up

Tune Up

Condensing Unit
*(**Caution** - turn power off and be alert for critters)*

- ☐ Check Fan blade condition - it may have ice damage.
- ☐ Unit is near level
- ☐ Coil is free of debris
- ☐ Unit if free of leaves and debris
- ☐ Clear air flow paths
- ☐ Refrigerant line set
- ☐ Motor
- ☐ Compressor
- ☐ Contactor

Evaporator Coil
*(**Caution** - turn power off)*

- ☐ Cleanliness
- ☐ Condensate drain
- ☐ Check ΔT across evaporator coil - should be 17 - 21 degrees under "normal" humidity conditions.
  ΔT is _____ degrees F.

  If ΔT is greater than 21 degrees you may have too little air across the evaporator. If the ΔT is less than 17 degrees you may have too little air across the evaporator.

Indoor Blower Compartment
*(**Caution** - turn power off and be alert for critters)*

- ☐ Check fan blades for cleanliness
- ☐ Is rotation correct?
- ☐ Check fan belt if so equipped
- ☐ Air filter condition
- ☐ Lubricate serviceable bearings

Check Charge
(Use manufacturer's instructions if available don't start the compressor if it is too cold outdoors)

- ☐ Outdoor temperature _____
- ☐ Pressures: _____ psig head, _____ psig suction
- ☐ **Fixed Orifice** charge to superheat in the evaporator coil.
  - ▫ Superheat _____ degrees
  - ▫ Evap. Entering wb temp. _____ degrees wb
  - ▫ Suction line temp _____
- ☐ **TXV** charge to subcooling in condenser
  - ▫ Subcooling _____ degrees
  - ▫ Liquid line temp _____

Electrical
*(**Caution** - turn power off)*

- ☐ Tighten and check elec. connections
  - ☐ Indoors
  - ☐ Outdoors
- ☐ Wires are in good condition - mice love the insulation on condensing unit wiring.

Start UP
*(When turning on the power be extremely careful. If the condensing unit **has a single pole contactor every device inside the condensing unit will have 115 volts to ground - you will be the ground if you are not careful)***

- ☐ Turn "**ON**" all power – use caution. Danger exists.
- ☐ Check voltage:
  - ▫ Line voltage _____ volts
  - ▫ Low voltage _____ volts
  - ▫ Voltages within manufacturer's recommendations
- ☐ Check fuse/breaker sizes
- ☐ Tighten and check elec. connections
  - ☐ Indoors
  - ☐ Outdoors
- ☐ Set thermostat to call for cooling – do not call for cooling if it is too cold outdoors - see manufacturer's instructions.

Check charge and air flow

- ☐ Follow manufacturer's recommendations.

- ☐ Outdoor temperature _____

- ☐ Pressures: _____ psig head, _____ psig suction

- ☐ Check ΔT across evaporator coil - should be 17 - 21 degrees under "normal" humidity conditions.
  ΔT is _____ degrees F.

  If ΔT is greater than 21 degrees you may have too little air across the evaporator. If the ΔT is less than 17 degrees you may have too little air across the evaporator.

Finalize- Tune Up or Start Up

- ☐ Attach service sticker
- ☐ Check for condensate leaks
- ☐ Be certain stat shuts unit off
- ☐ Go over operation of the system, including thermostat, with the customer.
- ☐ If unit is old, plant the seed in the customer's mind that replacement may be to their advantage. Repairs on an old system are expensive and they may be without cooling in hot weather.

- ☐ **Sincerely thank our customer** for their business – we use their money to write your paycheck. Without them there would be no paycheck.