CHARGING A REFRIGERATION SYSTEM

- Correct charge must be added for a refrigeration system to operate as designed
- Added by weighing, measuring, or using operating pressures
- Carefully monitor evaporator superheat, condenser subcooling, operating pressures and compressor amperage

VAPOR REFRIGERANT CHARGING

- Vapor can be added to the high- and low-pressure sides of the system while it is not operating
- Vapor can be added to the low-pressure side of the system while it is operating
- The refrigerant cylinder may need to be warmed in order to build up the pressure to properly charge the system
  - Warm water can be used to heat the cylinder
  - Never use a torch heat the refrigerant cylinder

LIQUID REFRIGERANT CHARGING

- When the system has been evacuated, liquid refrigerant can be added through the liquid line or receiver
- Liquid charging is faster than vapor charging
- The low-pressure control may need to be bypassed during the charging process
- Liquid refrigerant can be charged into the low side of the system if the refrigerant has first been vaporized
- When charging systems with blended refrigerants, the refrigerant must leave the cylinder as a liquid

WEIGHING REFRIGERANT

- Weighing the correct charge into the system can be accomplished with an electronic scale
- Bathroom scales should not be used to weigh refrigerant
- Electronic scales are often used
  - Expensive but very accurate
  - Automatically displays amount of refrigerant removed from cylinder
  - Some units dispense a predetermined amount of refrigerant and then shut off

USING CHARGING CHARTS (FIXED RESTRICTOR-TYPE METERING DEVICES)

- Curves and/or charts supplied by manufacturers
- Used to help technicians properly charge systems
- Since charts and curve vary for manufacturer to manufacturer, always follow directions carefully
- Uses superheat values
- Charge carefully! It is always easier to add refrigerant than remove it

CHARGING NEAR-AZEOTROPIC (ZEOTROPRIC) REFRIGERANT BLENDS

- Blended refrigerants
  - Made up of two or more other refrigerants
  - Have different properties than component refrigerants
- Azeotropic blends
  - Have only one saturation temperature for each pressure
  - Behave like commonly know refrigerants (R-12, R-22)
- Near-azeotropic (zeotropic) blends
  - Temperature glide when they evaporate or condense

CHARGING ZEOTROPIC BLENDS

- Dew point value
  - Where saturated vapor begins to condense
  - Used for superheat calculations
- Bubble point values
  - Where saturated liquid begins to boil
  - Used for subcooling calculations

CHARGING ZEOTROPIC BLENDS

- Fractionation
  - Part of the blend will evaporate or condense before the rest of the blend
  - Will not occur when the refrigerant is in the liquid state
- The component of the blend with the lowest boiling point will leak faster than the other components
- Refrigerant must leave the cylinder as a liquid