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
VAPOUR 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 to heat the refrigerant cylinder.
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
Blended refrigerants
- Made up of two or more other refrigerants
- Have different properties than component refrigerants

Azeotrophic blends
- Have only one saturation temperature for each pressure
- Behave like commonly known refrigerants (R-12, R-22)

Near-azeotropic (zeotropric) 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