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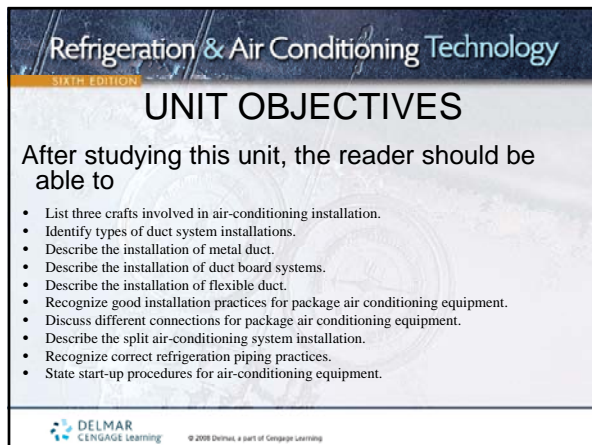
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Refrigeration & Air Conditioning Technology  
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## SQUARE AND RECTANGULAR DUCT

- Duct sections are assembled in the field
- All duct sections must be measured accurately
- Sections connected with "S" fasteners and drive cleats
- Duct systems must be fastened securely
- Flexible duct connections reduce vibration noise

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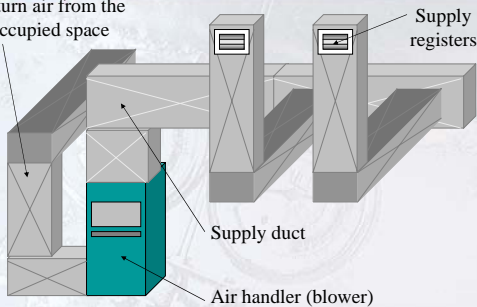
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Return air from the occupied space

Supply registers

Supply duct

Air handler (blower)

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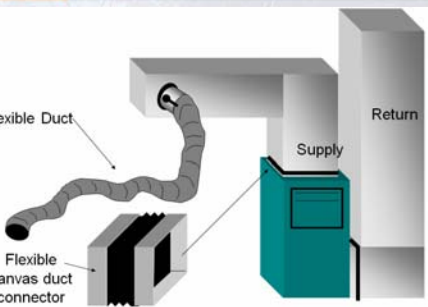
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Flexible Duct

Flexible canvas duct connector

Supply

Return

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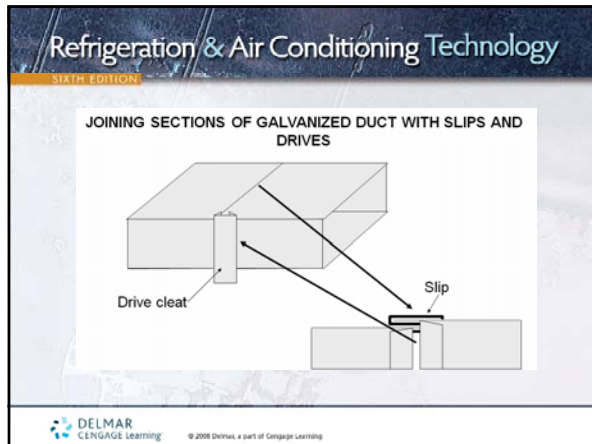
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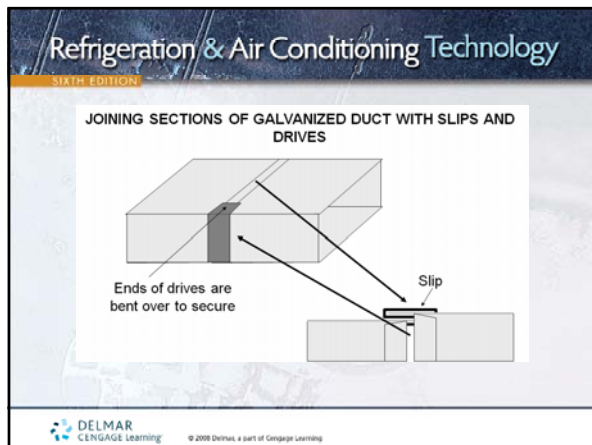
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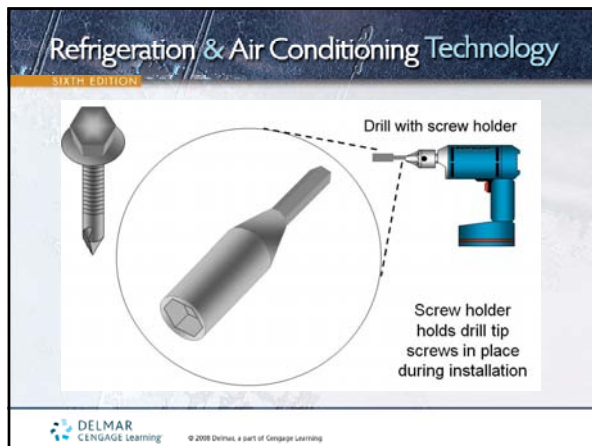
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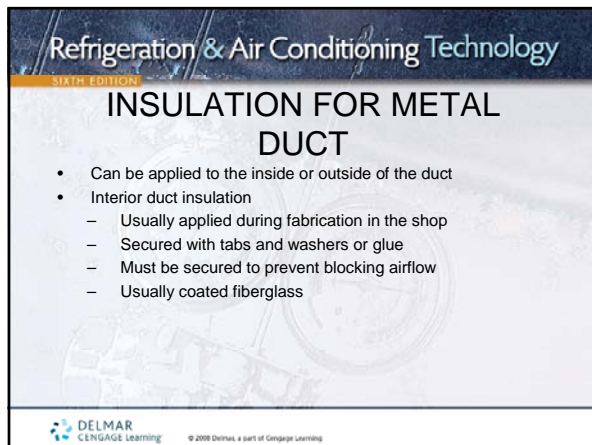
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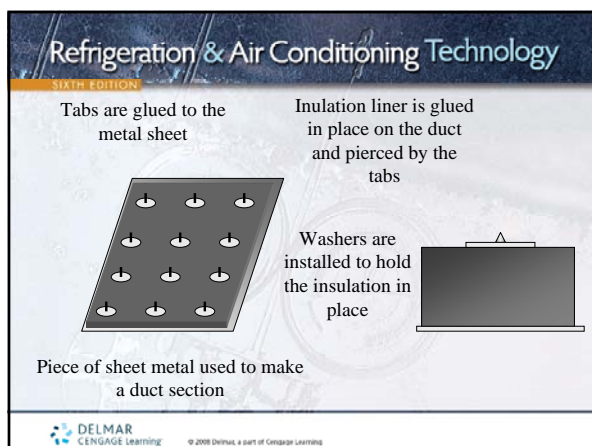
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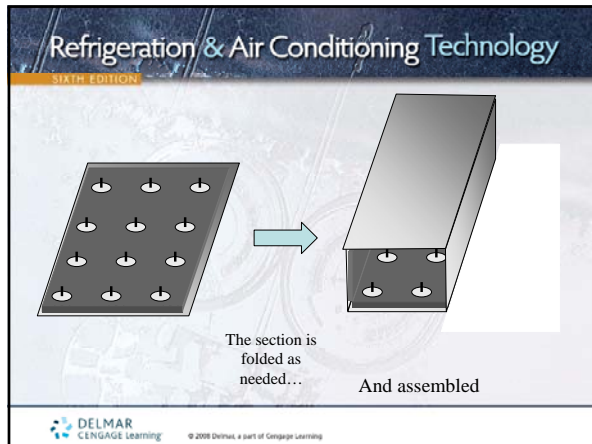
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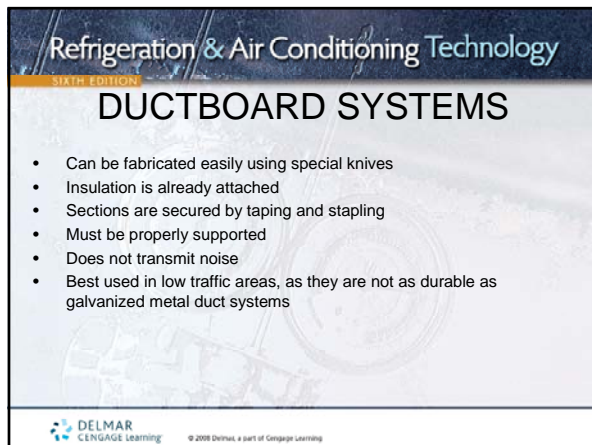
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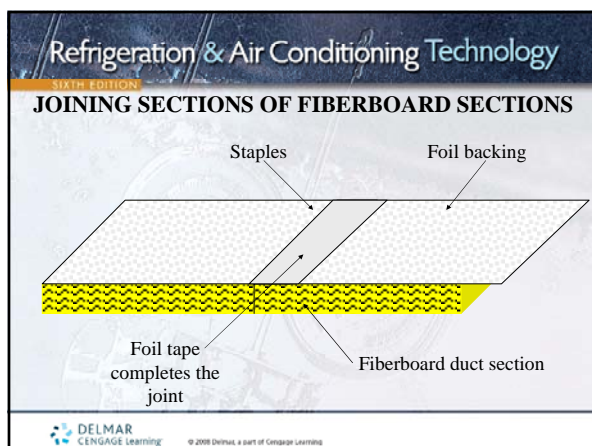
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### SECTION OF FIBERBOARD DUCT MATERIAL



Notches are cut in the board to facilitate the folding of the board into a duct section

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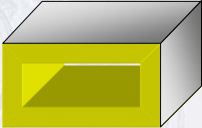
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### SECTION OF FIBERBOARD DUCT MATERIAL

The fiberboard section is then bent to form the duct



Notches are cut in the board to facilitate the folding of the board into a duct section

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### FLEXIBLE DUCT

- Has a flexible liner and may be insulated
- Low initial cost (Materials and labor)
- Used as supply or return duct
- Must be properly supported to prevent collapsing
- Should be stretched to prevent duct from collapsing
- Does not transmit noise well

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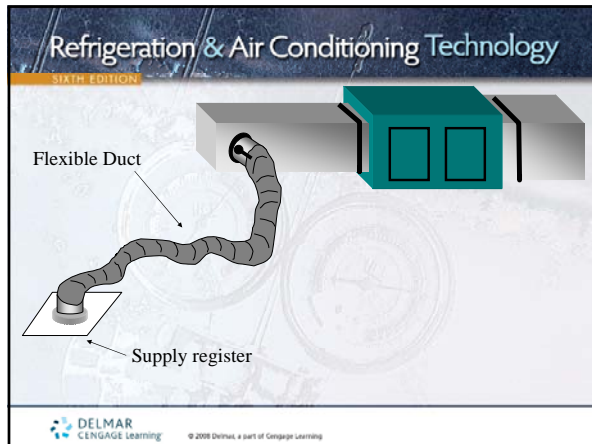
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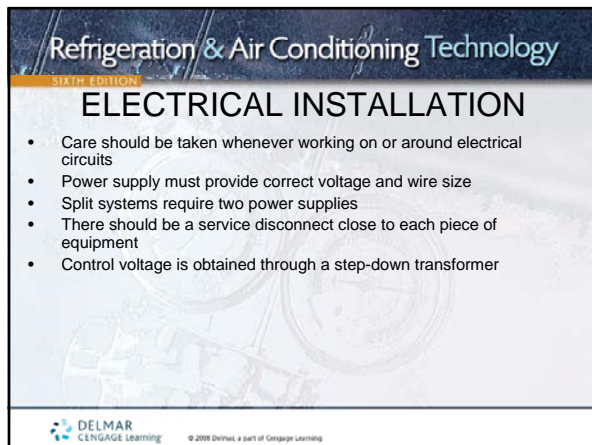
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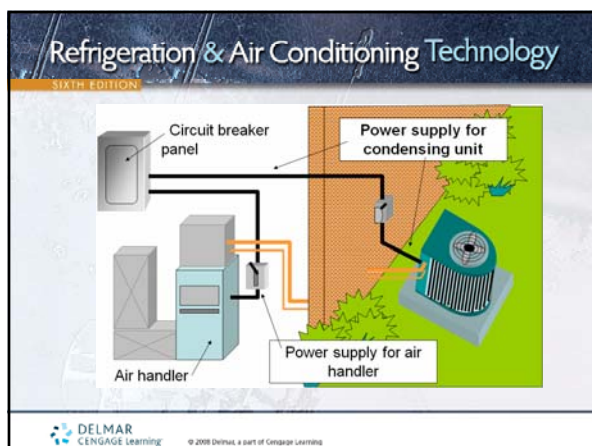
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## Refrigeration & Air Conditioning Technology

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Wire used for running low voltage control wiring is color-coded, usually in the range of 18 gage and comes supplied in a vinyl casing



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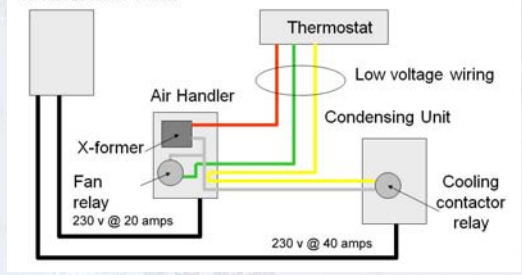
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## Refrigeration & Air Conditioning Technology

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## Refrigeration & Air Conditioning Technology

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### INSTALLING THE PACKAGE SYSTEM

- All components are in one cabinet
- Range from window unit size to over 100 tons
- Air-cooled equipment is most common in residential and light commercial applications
- Unit vibration should not be transmitted to the structure
- Duct connections must be water tight and insulated
- Crankcase heat must be energized before the system is started up

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## INSTALLING SPLIT SYSTEM AIR CONDITIONERS

- Air handler must be secured or mounted properly
- Access to the unit must be considered before installing
- Condensate must be properly removed
- Average condensate is 3 pints per hour per ton
- Auxiliary drain pans
  - Used when the evaporator is above the conditioned space
  - Piped to a conspicuous location

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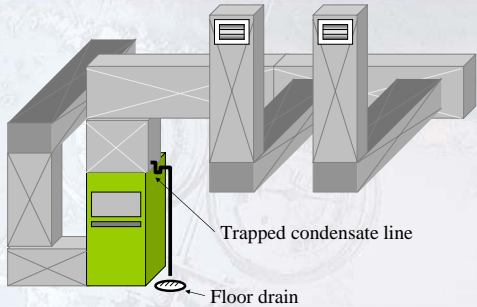
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Trapped condensate line

Floor drain

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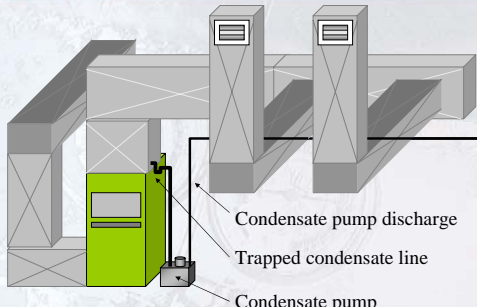
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Condensate pump discharge

Trapped condensate line

Condensate pump

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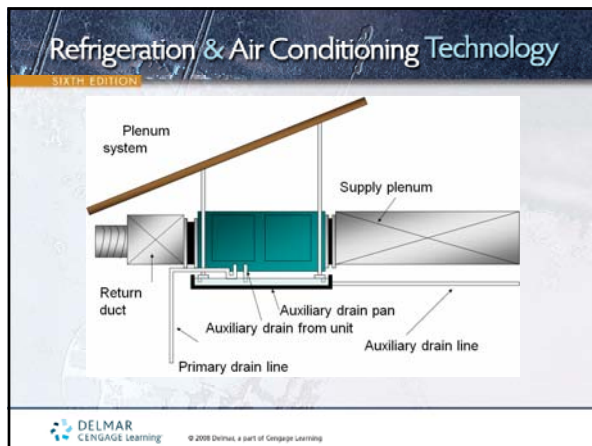
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Refrigeration & Air Conditioning Technology

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## THE SPLIT SYSTEM CONDENSING UNIT

- Discharged air must not re-circulate
- Piping is connected to the condensing unit from the evaporator
- Units must be able to be serviced properly
- Units should be set on pads
- Condensing units should be located in the shade
- Noise should not be objectionable

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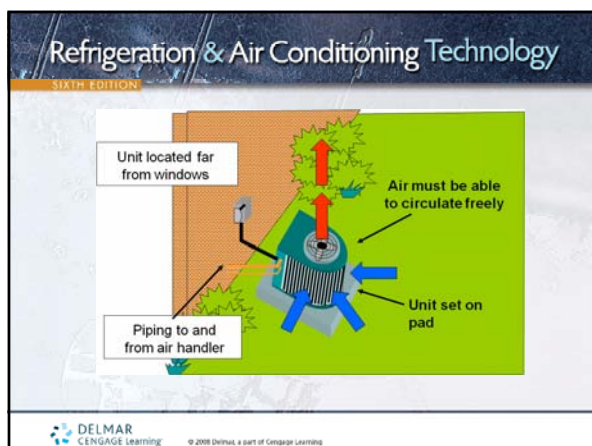
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Refrigeration & Air Conditioning Technology
SIXTH EDITION

# INSTALLING REFRIGERANT PIPING

- Piping runs should be as short as possible
- The refrigerant charge is usually shipped in the condensing unit
- Suction line should be insulated
- Leak check piping before introducing refrigerant
- Properly evacuate system

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# EQUIPMENT STARTUP

- Allow crankcase heater to run overnight before starting system
- Check fan rotation
- Check fan amperage
- Check airflow at registers
- Check the amperage of the compressor
- Check operating pressures and temperatures

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# SUMMARY - 1

- Installations require ductwork, electrical, and mechanical work
- Rectangular galvanized duct sections must be measured and fabricated accurately, properly supported and installed with canvas collars to reduce noise transmission
- Galvanized duct sections are often joined with slips and drives
- Round metal duct sections are connected with self-tapping sheet metal screws

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SUMMARY - 2

- Metal duct systems must be insulated
- Fiberboard duct sections do not need to be insulated and are joined by stapling and taping
- Flexible duct can be used for return and branch duct connections
- Flexible duct should be stretched and properly supported to prevent the material from collapsing
- Always exercise caution when installing electric circuits

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SUMMARY - 3

- Power supplies must match the system requirements
- Split systems require two power supplies
- Package systems require only one power supply
- Low voltage control wiring is obtained through a control transformer
- Package systems have all system components contained in a single cabinet

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SUMMARY - 4

- Condensate from the system must be properly removed: gravity or pump
- Auxiliary drain pans catch condensate overflow and protect living space below the unit
- Condenser discharge air must not recirculate back through the coil
- Condensing units should be positioned so that noise factor is low and service panels are accessible

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SUMMARY - 4

- Refrigerant piping runs should be as short as possible
- The suction line should be insulated
- Piping circuit should be leak checked and evacuated before introducing refrigerant to the system
- When starting up an air conditioning system, be sure to check operating amperages, voltages and system operating pressures

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