

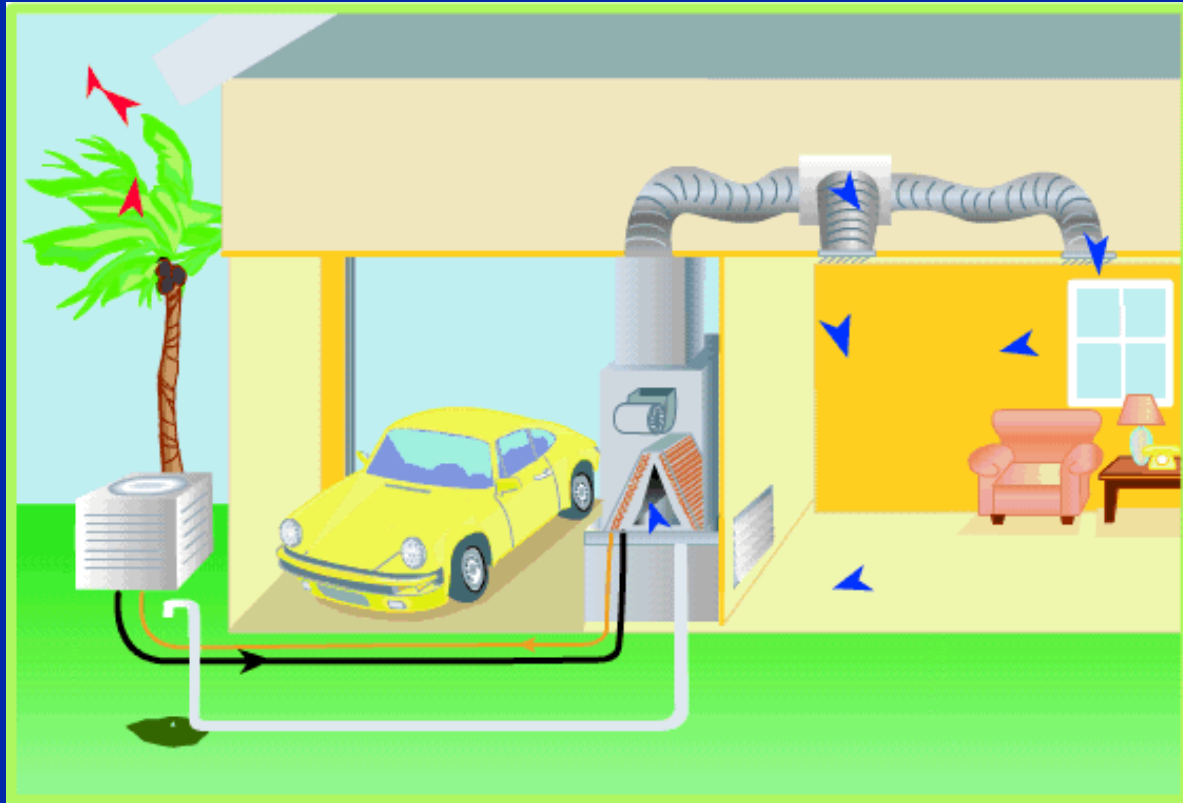
Building Performance Matters



HVAC Equipment Efficiency Overview

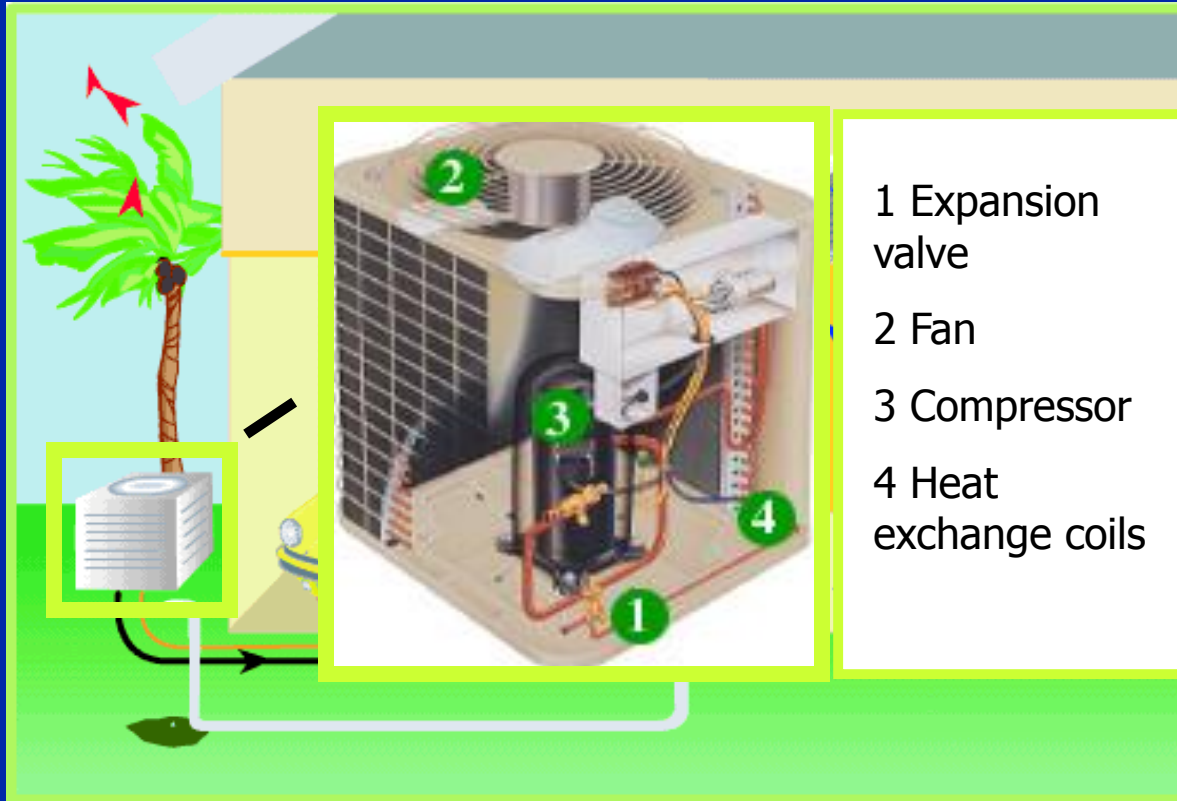


HVAC Components



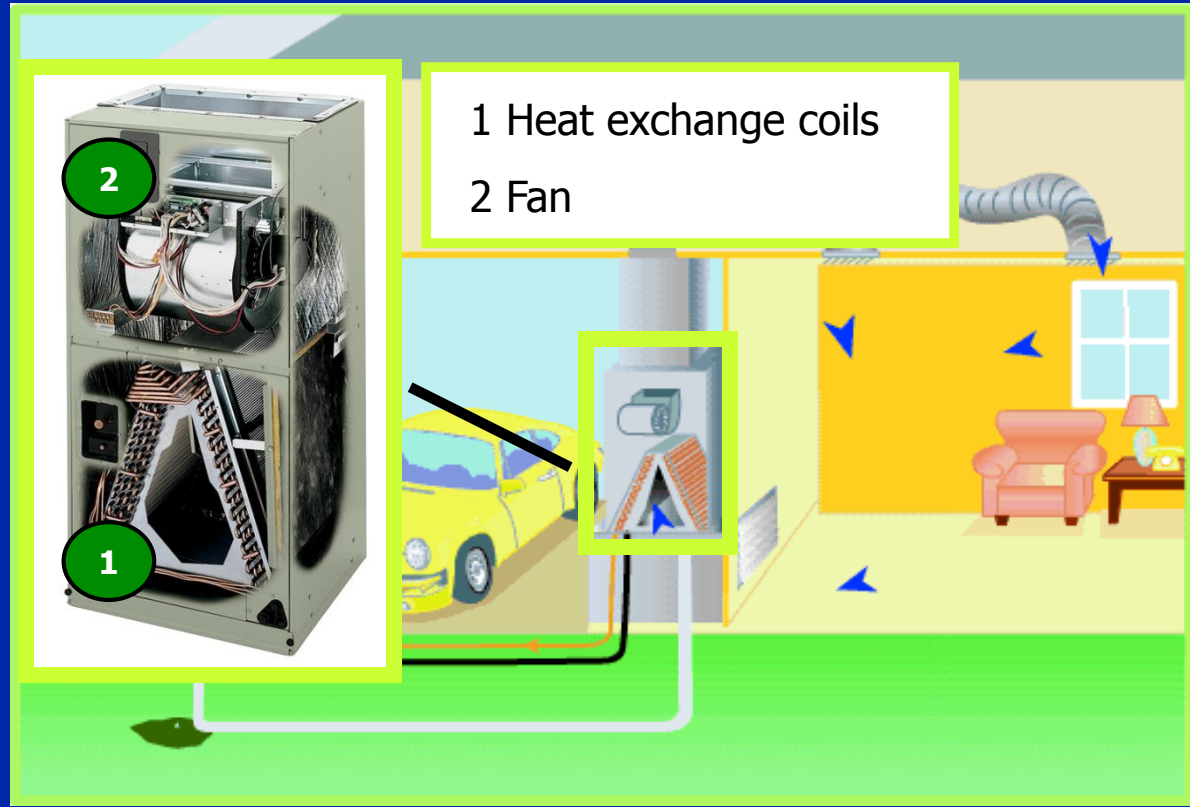


HVAC Components: Condenser



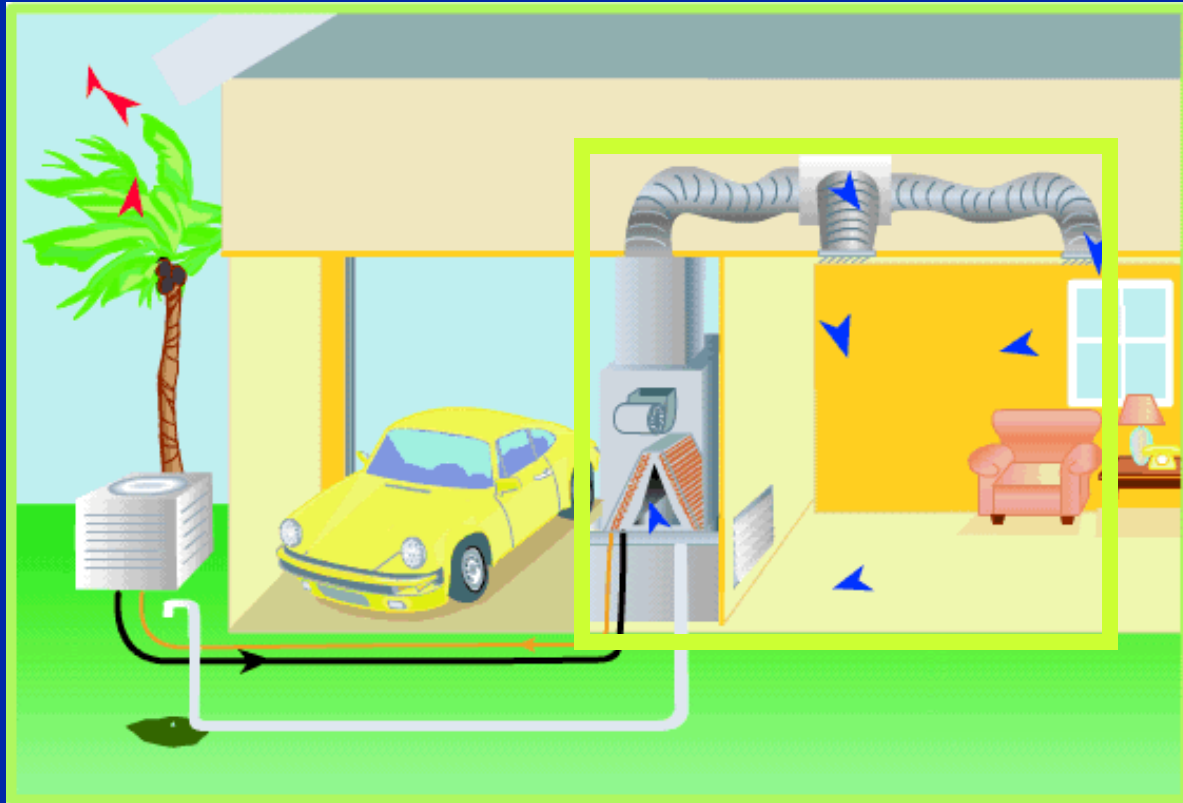


HVAC Components: Air Handler



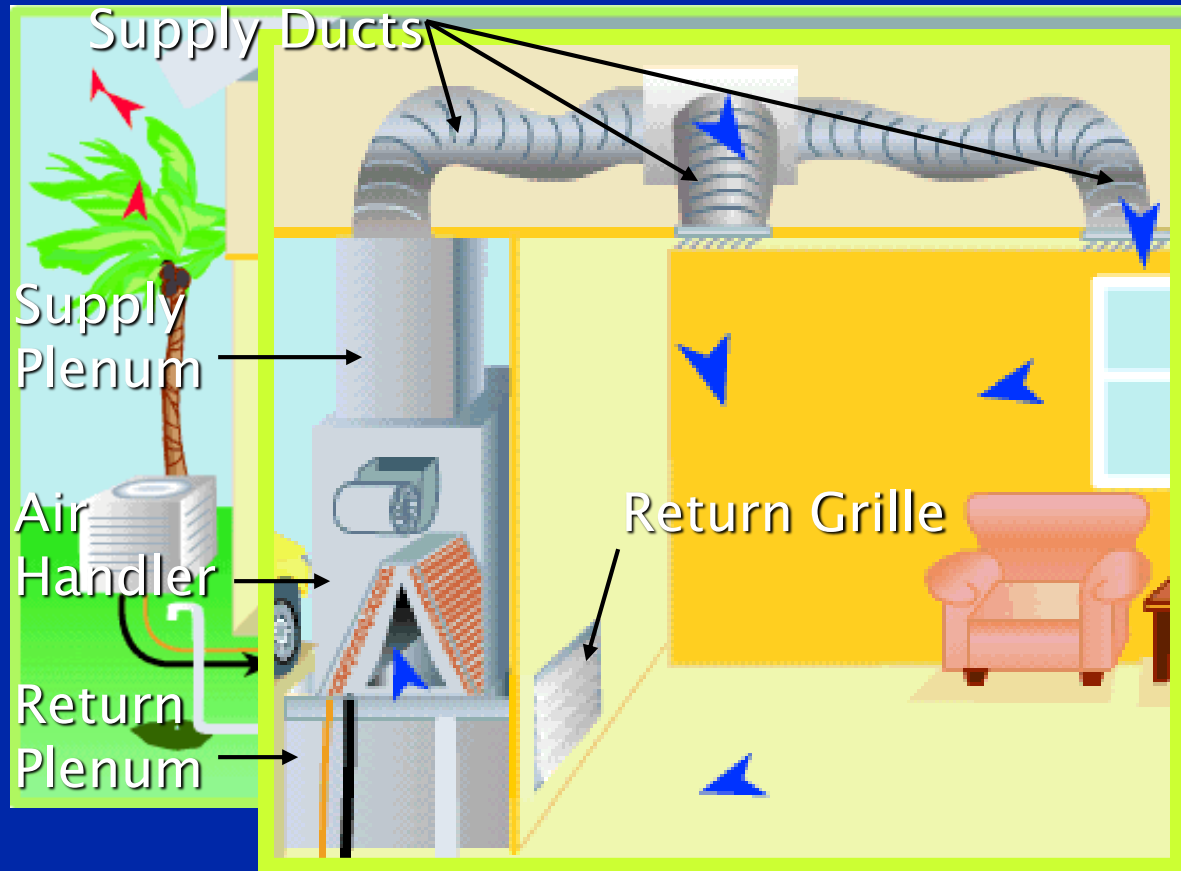


HVAC Components: Duct System





HVAC Components: Duct System





Air Conditioner Efficiencies

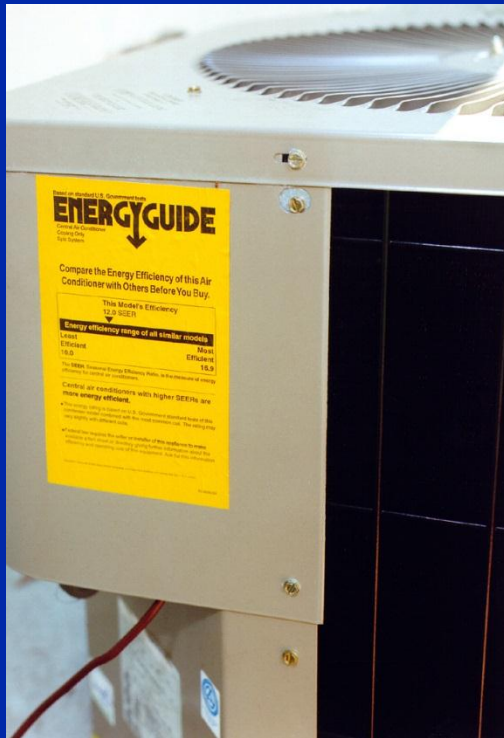


Seasonal
Energy
Efficiency
Ratio

Minimum SEER =
10 Btu's/Whr for central
home systems



Air Conditioner Efficiencies



SEERs range from 10 to over 18 for very efficient AC units.

Going from SEER 10 to SEER 14 for example, will reduce cooling energy costs by about 30%.



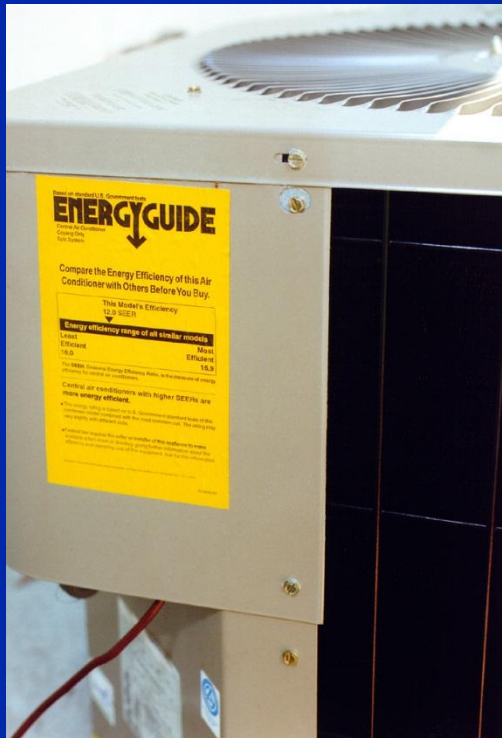
Common Heating System Types



- **Electric Strip**
 - Uses either baseboard or air handler mounted electric resistance strips
 - Low installation cost but least efficient option.



Common Heating System Types



- Electric Strip
- **Heat pump**
 - Air conditioner refrigeration cycle in reverse (heats home instead of cooling it).
 - Cost effective vs. electric strip in all regions except very warm.



Common Heating System Types



- Electric Strip
- Heat pump
- **Gas Furnace**
 - Burns natural gas or liquid propane
 - Similar efficiency to heat pumps



Duct Leakage



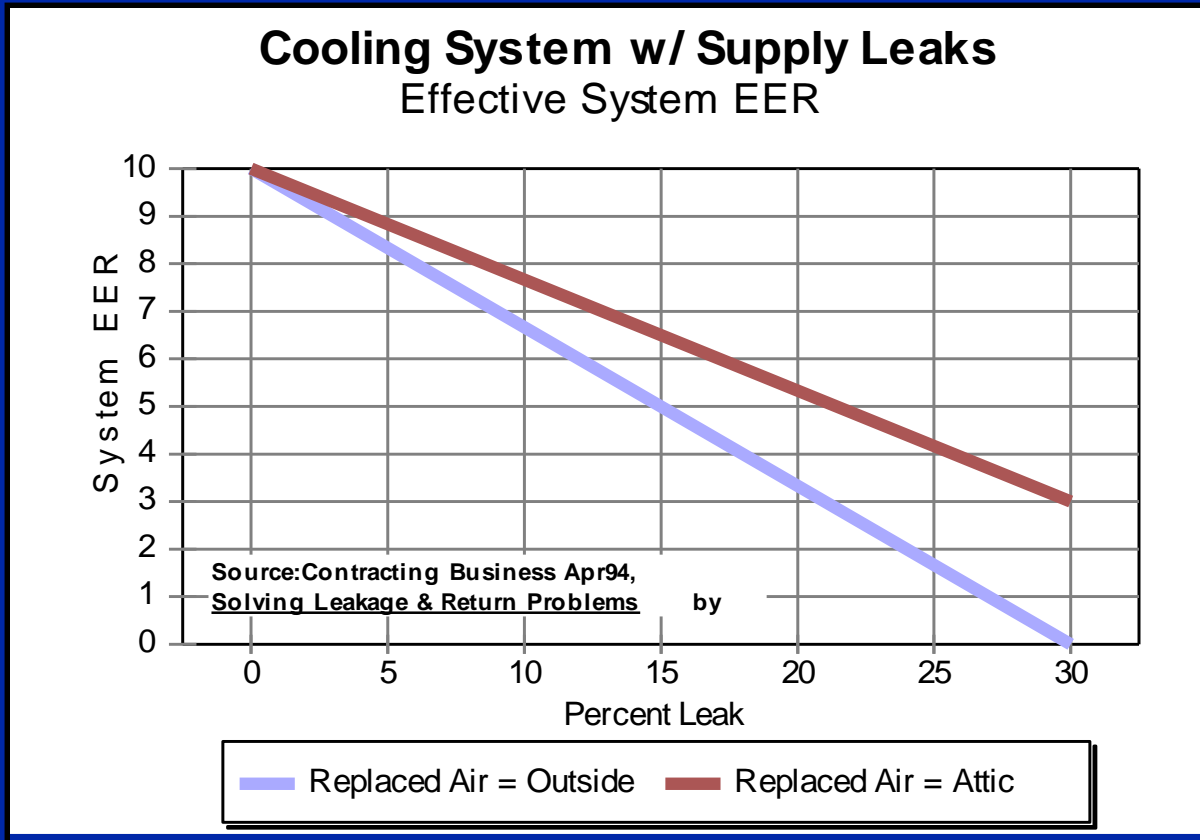


Duct Leakage





Duct Leakage

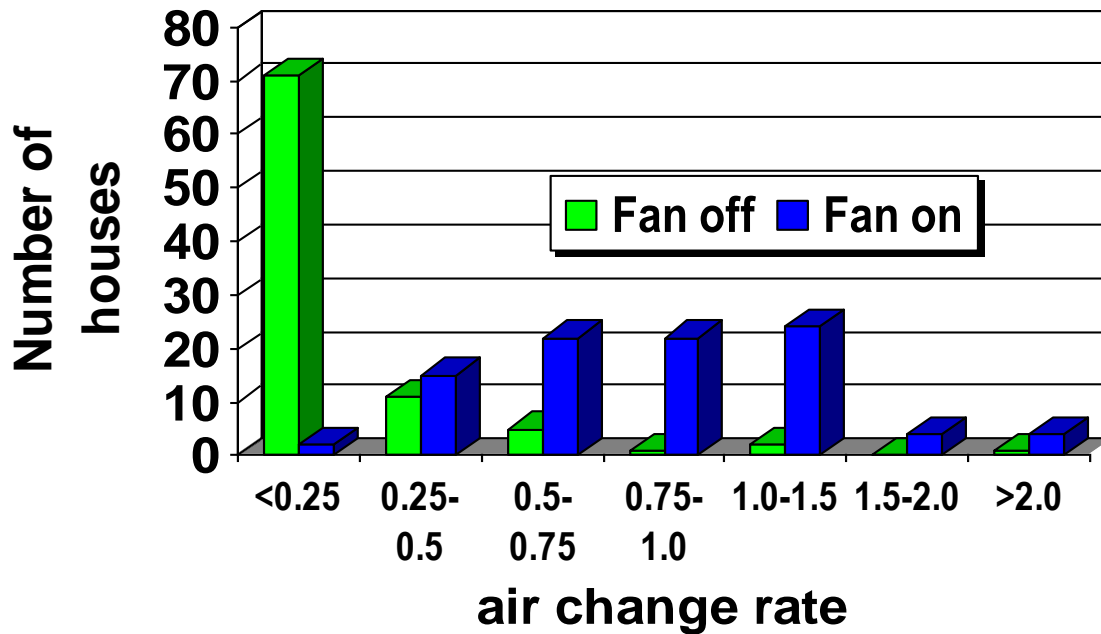




Duct Leakage

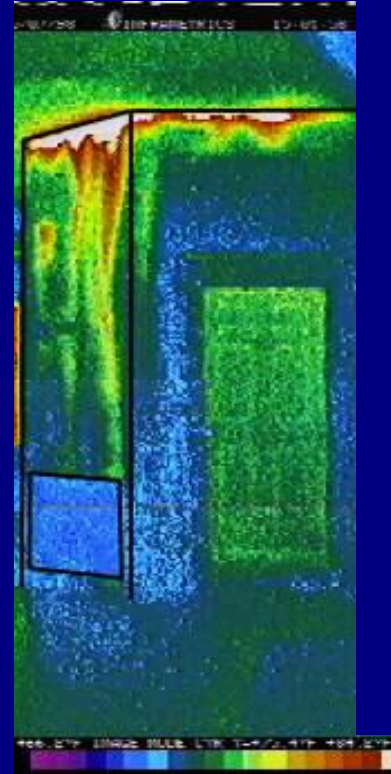
HVAC-induced infiltration

Infiltration rates - Florida Duct Study 1990



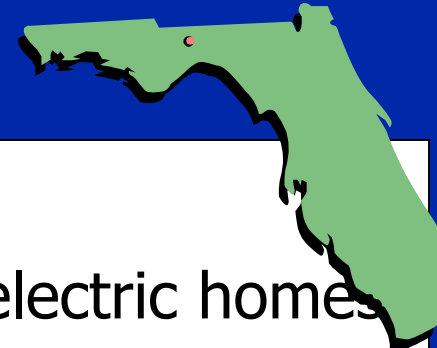


Duct Leakage





Duct Leakage Research 1990

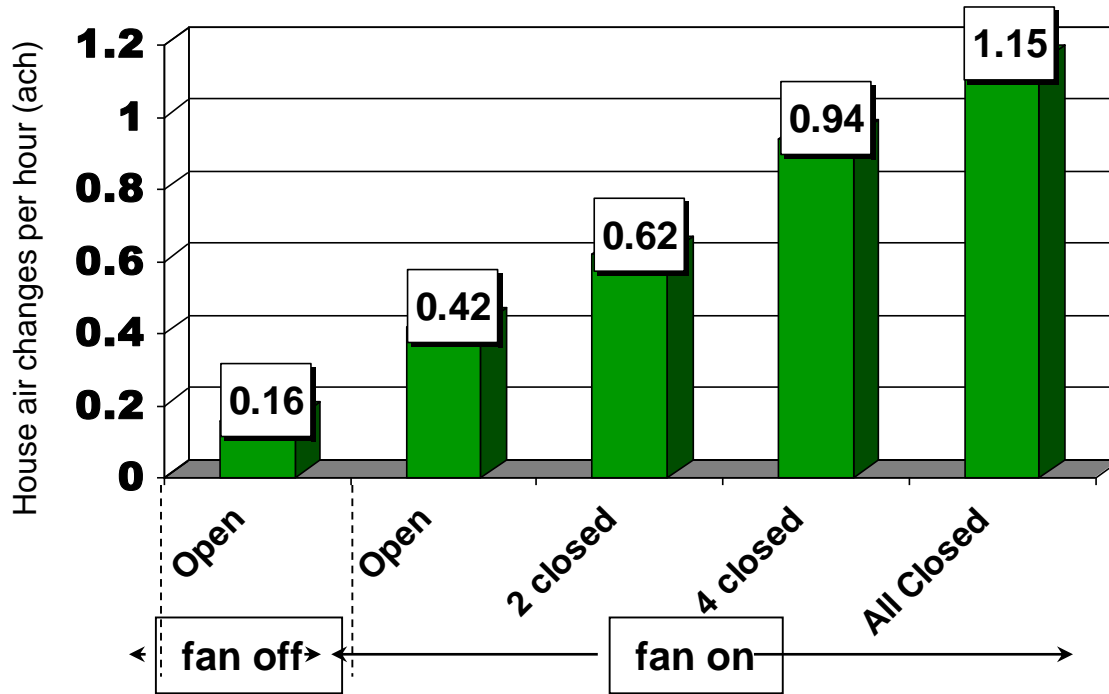


- Florida
 - 50 all electric homes
 - 13% total building leakage in duct system
 - 17% savings
 - \$200 cost



Door Closure

Closing interior doors when AHU fan on





Duct Design Problems



- Utility room door that swings to the return grill.
- When the system turns on, the door is pulled to the grill, blocking air flow.



Summary

HVAC efficiency includes:

- Selecting efficient air conditioning based on your climate.
- Selecting the proper type of and efficiency heating system for your climate
- Designing and sealing air distribution systems properly.