Air Conditioning Units

Often the outdoor unit is damaged from a variety of causes, while the indoor unit remains undamaged. This raises the question of whether the undamaged indoor unit should be replaced with the outdoor unit and/or will the air conditioning system function properly if only the outdoor unit is replaced? The homeowner will almost always want both units replaced, however it is your job to determine if that is warranted.

The two units in a central air system (condenser and A-Coil) are designed to work together, and they are normally matched when first installed. When an older condenser is replaced with a higher efficiency unit, without replacing the indoor evaporator coil, the overall SEER is greater than the original system. However, the overall SEER for the replaced unit will be less than an entirely new system.
SEER is defined as: The Seasonal Energy Efficiency Ratio (SEER) measures air conditioning and heat pump cooling efficiency, which is calculated by the cooling output for a typical cooling season divided by the total electric energy input during the same time frame. A higher SEER rating means greater energy efficiency.

Mismatched units **will** usually work, as the overall system efficiency goes up with a high efficiency condenser, but with will not usually reach the maximum efficiency if not matched with a new interior unit. The resulting overall efficiency is greater than the system was before the damage occurred. Replacement of the evaporator coil to match the SEER rating of the new condenser provides no functional advantage beyond an increase in system efficiency.

When replacing a condenser unit with a 10 SEER (or below), it is best matched with a 13 SEER minimum standard for new units. When matching an older unit with a 15 SEER condenser, it is more costly and NOT any more efficient than matching with a 13 SEER condenser. However, you may want to consider replacing evaporative coils that are 20+ years old and are too small for today's basic 13 SEER unit.

When the indoor and outdoor units SEER are severely mismatched, such as a 6 SEER evaporator and a 13 SEER condenser, it may create stress on the system and will possibly result in premature failure, and the entire system should be considered. Discuss this with your claims management.

Age can be an issue as well. Some older units use 1/4" liquid refrigerant lines. Liquid refrigerant lines on newer units are 3/8". If a condenser is replaced on a system with 1/4" liquid refrigerant lines, this could cause the compressor to work harder, which may shorten its life. The refrigerant lines should be able to be replaced with 3/8" lines without replacing the indoor coil.

Freon vs. Puron

The EPA mandated the halting of production of Freon systems at the end of 2010.
New Puron refrigerant compressors work at much higher operating pressures than Freon refrigerant compressors. However, with some modification, it is possible to match Freon evaporators with Puron condensers. The recommendation of an HVAC Tech will determine whether replacement of the entire unit is warranted. Review such decisions with claims management before proceeding.

Determining the manufacturer, model number, SEER ratings and age, of the existing air conditioning system components is imperative when considering whether to replace an undamaged indoor coil. It is recommended taking a clear photo of the AC condenser and interior unit spec plate for reference. Good communication with the HVAC technician regarding the indoor coil and its compatibility with new condenser unit should help to determine what components will require replacement.

Reference Guide for HVAC

How Air Conditioners Work

Taken literally, air conditioning includes the cooling and heating of air, cleaning it and controlling its moisture level to provide for maximum comfort.

An air conditioning system generally consists of the following five mechanical components:

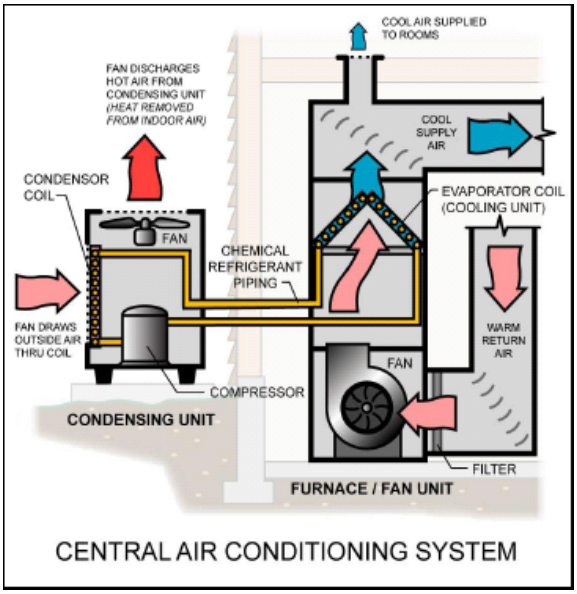
1. Compressor
2. Fan
3. Condenser coil (hot)
4. Evaporator coil (cold)
5. Chemical refrigerant

An air conditioner cools a home with a cold indoor coil called an evaporator, or A-Coil. The condenser, a hot outdoor coil, releases the collected heat outside. The evaporator and condenser coils are tubing surrounded by aluminum fins. This tubing passing through the fins is usually made of copper. A pump, called the compressor, moves refrigerant between the evaporator and the condenser. The compressor forces the refrigerant through the circuit of tubing and fins in the condenser coil. The liquid refrigerant is pumped indoors where it evaporates in the indoor evaporator coil. When the refrigerant evaporates, it pulls heat out of indoor air and thereby cools the home. The hot refrigerant gas is then pumped outdoors, to the condenser, where it is compressed back to liquid, giving up its heat to the air flowing over the condenser's coil of tubing and fins.

Most central air conditioning systems, known as split-systems, include a 'hot' side, outside the home, and a 'cold' side, inside the home.
In a split-system air conditioner, the outdoor metal cabinet contains the condenser coil and compressor. The indoor cabinet contains the evaporator coil. The condenser fan moves air across the condenser coil to increase the transfer

of heat. Obstructing this flow of air will not only reduce efficiency but can lead to compressor failure. The air conditioner's evaporator coil is installed in the cabinet or main supply duct of the furnace.

The cleaning function of air conditioners is performed by filters, which remove dust from the air. When these filters become clogged with dirt, the system must work harder to do its job. This wastes energy and makes utility bills rise. Filters should be checked frequently and cleaned or replaced when necessary.



Sizing Air Conditioners

British Thermal Units (BTU) - The quantity of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

Air Conditioners are rated by the number of British Thermal Units (BTU) of heat they can remove per hour. Another common rating term for air conditioning size is the 'ton', which is 12,000 BTU's per hour.

An air conditioner's efficiency, performance,
durability, and initial cost can depend on matching its size to factors such as:

- How large the home is and how many windows it has;
- How much shade is on the home;
- How much insulation is in the home;
- How much air leaks into the home from outside; and
- How much heat the occupants and appliances in the home generate.

Proper sizing can have a significant impact on air conditioner efficiency. Properly sized equipment can reduce energy usage by as much as thirty-five percent. The potential inefficiency due to improper sizing can be greater than the savings achieved, by replacing inefficient equipment with a high efficiency system.

The most common way of determining the size of an air conditioning unit is in “tons”. The tonnage of a central air-conditioner condenser is located in the model number of the unit is a number divisible by either 12 or 6. This is the tonnage indicator.
For example:

12 =	1 ton unit
24 =	2 ton unit
30 =	2.5 ton unit
36 =	3 ton unit
42 =	3.5 ton unit
48 =	4 ton unit
54 =	4.5 ton unit
60 =	5 ton unit

On the spec plate of the AC unit you will see a model number such as the following:
Model # TAMA0**42**JAZZ… which utilizing the formula would make this a 3.5 ton condenser.

It should be noted that the number can appear at the beginning, end, or middle of the model number. The tonnage indicator will be useful in handling flood, wind and hail and other catastrophic and daily claims.