Air Conditioner Maintenance

Central air conditioning systems are wonderful features of many homes in the US. In hot and humid climates it's hard to imagine living without AC, although this convenience has been common in only the past 40 years or so.

If you're blessed to have a central air conditioning system, there are a few maintenance items that a homeowner can perform themselves. Keeping up with these tasks will make your AC system run more efficiently (saving you $$$) and also prevent costly repairs.

The first and best known task is to change the air filter periodically. This is essential for good air flow, which will reduce strain on the blower motor and minimize the blower run time ($$).

The least known maintenance item is to keep the evaporator drain clear. The average homeowner has no idea that this is important to prevent water damage inside their homes.

Finally, it is wise to keep the outdoor condenser unit clean for maximum system efficiency (cooler air and reduced run time, $$).

This presentation focuses on central air systems, although some principles apply to window or smaller split units as well.

Air Conditioner Maintenance

Air Filter Replacement

In every heating, ventilating and air conditioning (HVAC) system, air filters protect the air flow path from dust, debris, pet hair and other contaminants that would otherwise build up in the ductwork and on heating or cooling elements. Such a buildup will restrict air flow and reduce heat transfer, making the system work harder to produce the desired temperature. This translates to money since heating and air conditioning are heavy power consumers in most homes.

Note that the heating and cooling systems share the same filter, blower and ductwork, so the filter should be replaced during both heating and cooling seasons.

Depending upon media type and air quality in your home, filters should be replaced monthly or every two to three months, which makes it one of the more frequent maintenance items in a typical dwelling.

Some new intelligent thermostats can even remind you when the filter needs changing, depending on actual air flow volume.

Do not run your heating or cooling system or even just the blower without a filter!

Dust and debris can get caught in the narrow AC evaporator fins without a filter.

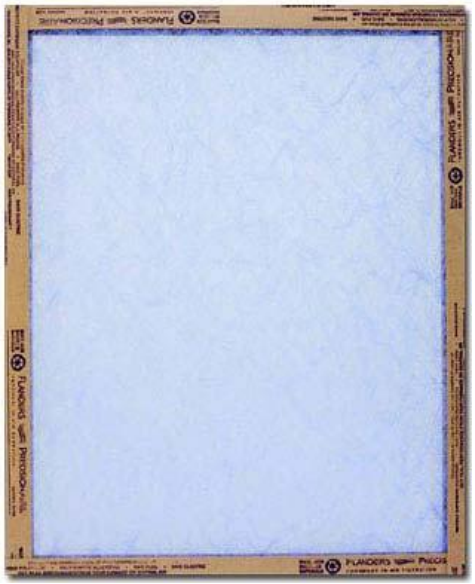
This will make your system work harder, cost more to run, and require expensive professional cleaning in the future.

Air Conditioner Maintenance

Air Filter Replacement

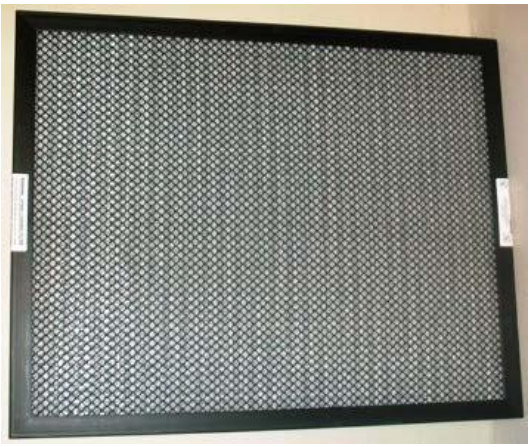
Selection

Basic fiberglass filters cost the least but do not filter as finely and tend to build up dirt more quickly. These should be changed monthly.



Pleated filters cost more than fiberglass but do a better job of filtering finer particles. If you use these they should be changed every two or three months, depending on conditions.

Electrostatic filters are relatively expensive but filter out very tiny particles such as pollen and dust mites. In addition to protecting your equipment, they have a health benefit.



Air Conditioner Maintenance

Air Filter Replacement

Filter size is usually marked on the side of the existing filter. If not, measure the old filter. If it is missing, measure the opening and round up to the nearest full inch. Most are ¾" thick which are classified as 1" filters. A few large systems may have 4" thick filters.
Be aware that if you have more than one air handler, the filters may be different sizes. This is because the return air plenum area is proportional to the heating/cooling volume.

Location of the filter varies from unit to unit. For attic mounted air handlers the filter is commonly located in the return air duct grille in the ceiling or high on the wall. For closet mounted units they will often be found in the return air duct grille just below the door, or behind the closet door just underneath the air handler.
If your unit is not like these, you will need to hunt around for the filter. If you follow the intake duct from the end of the air handler, a filter has to be located somewhere along the path.

Quantity: You may have more than one filter to replace. Two-story homes often have two separate HVAC systems, one for upstairs and another downstairs. Large single-story homes may also have more than one system. A few air handlers use more than one filter. So make sure you know how many air handlers you have and how many filters are used before you go shopping.

Air Conditioner Maintenance

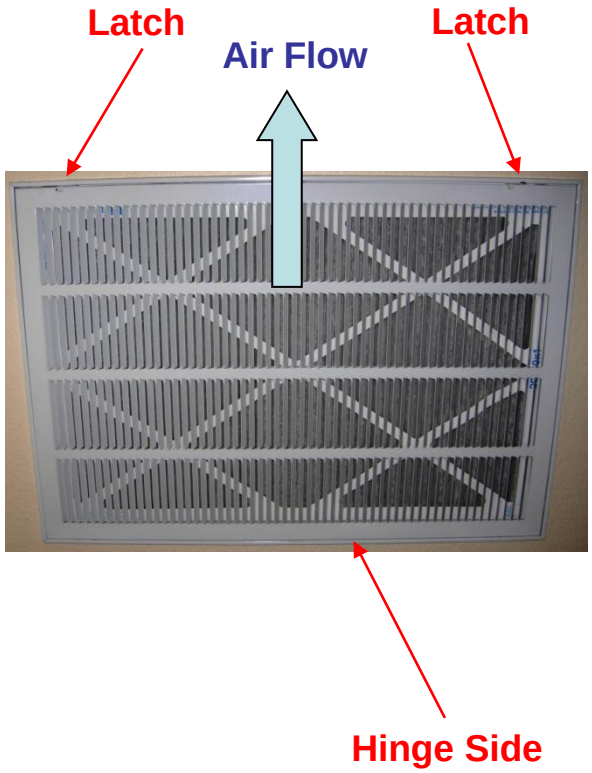
Air Filter Replacement

Once you have obtained a replacement filter(s), simply remove the old filter and replace with a new one.

Note that there is usually an air flow direction marked on the filter. Air flows from the room into the air handler, so make sure to orient the filter accordingly.

To access a closet filter, there will be a cover to remove or a door to open.

For ceiling/wall filters, there is usually a hinged grate over the filter. Simply unlatch the grating and lower it to remove the filter.



Air Conditioner Maintenance

Evaporator Drain Cleaning

One of the most overlooked maintenance areas of a central air conditioning system is to keep the evaporator condensate drain line clean.

Left unattended, biological gunk always builds up in the primary drain line. The pipe eventually clogs up so that the secondary drain goes into action. **If the secondary is ignored, the backup pan may rust through and cause extensive water damage in your home.**

The more humid your climate is, the more important this maintenance item becomes, since the volume of evaporator condensate is proportional to humidity.

The evaporator coil is where all the cooling action takes place. This is located in the air handler after the air filter. A beneficial side effect of the cooling that takes place due to refrigerant expansion is that it captures moisture from the air. Picture a glass of ice water sitting on the counter. The outside of the glass gets a lot of moisture stuck on it, right? The same thing happens in air conditioning where the cold evaporator coils attract moisture from the air passing across it.

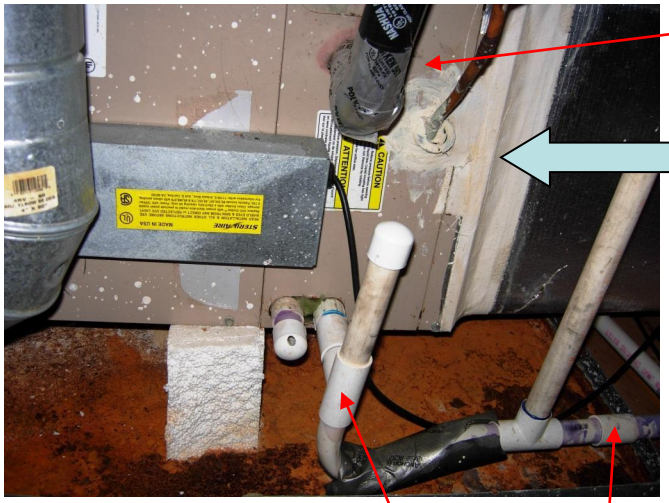
Air Conditioner Maintenance

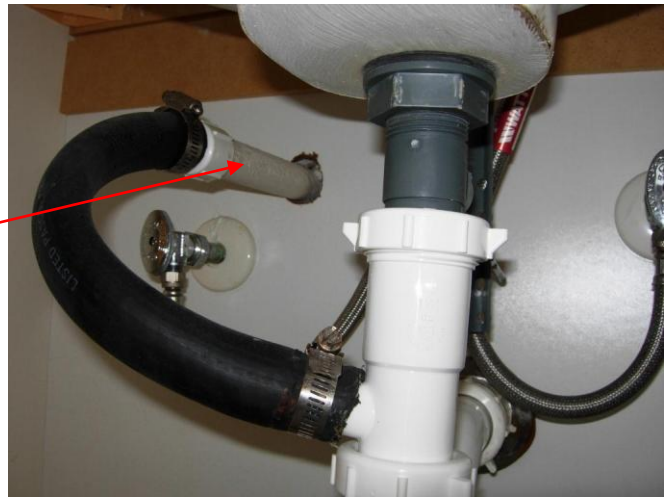
Evaporator Drain Cleaning

This moisture has to go somewhere, so it is collected in a pan just below the evaporator coil and out to a drain pipe.

This primary evaporator drain pipe often goes to a fixed drain in your home, typically to a bathroom sink drain.

Sometimes the primary line will drain to the outside where you will see a trickle of water while the AC unit is running.





Bathroom Sink Drain

Air Conditioner Maintenance

Evaporator Drain Cleaning

A catch pan is installed below the AC evaporator compartment to catch water in case the primary drain does not flow. A secondary drain pipe is connected to allow the water to flow out of the pan. This secondary drain is always routed to a highly visible area such as over windows, into bathtubs or onto porches. The idea is that if you see water dripping from these pipes, something needs attention. You should never have water in the catch pan; if there is, the primary drain is clogged or blocked.

Air Conditioner Maintenance

Evaporator Drain Cleaning

Cleaning involves pouring a liquid which removes biological growth down the primary drain pipe . One or two standpipes are normally provided for this purpose in the drain line. A chemical cleaning keeps evaporator condensate flowing smoothly to the primary drain.

Bleach was recommended in the past but it can harm the innards of newer evaporators. Vinegar, hydrogen peroxide or special AC line cleaners are now recommended.

Do not use sewer-type drain cleaning chemicals which can be very corrosive.

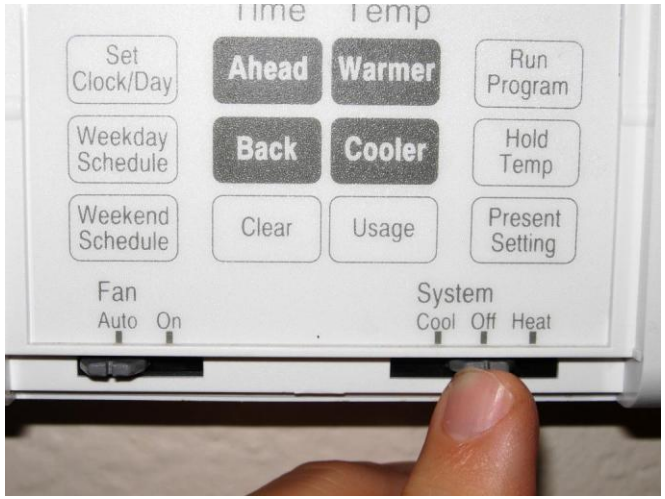
A step-by-step procedure follows.

Note: A horizontal attic air handler is shown for example. Your system may be different, but the same principles apply.

Air Conditioner Maintenance

Evaporator Drain Cleaning

1. Begin by turning your system off at the thermostat. This prevents blower air from pushing the chemical back at you.



2. The primary drain standpipe closest to the air handler should be capped with an end fitting. This cap should not be glued on, so remove it.

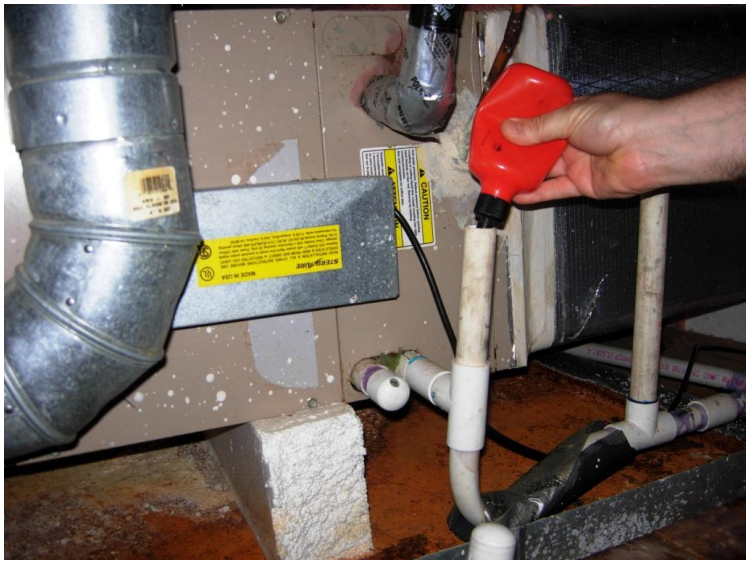
Remove Standpipe Cap

Evaporator Drain Cleaning

3. Pour about 1 cup of cleaner down the standpipe. A funnel is useful to minimize spills; a squirt bottle is a helpful alternative. Mild chemical cleaners break up most biological clogs over time and this is essential to keep the drain clean. As mentioned, do not use bleach or harsh chemicals.

Do this to treat a clog, or at least once a season as preventive maintenance, or more frequently as necessary.

4. Replace the standpipe cap and switch your thermostat back on when done.



Don't forget to treat both drain lines if you have two AC systems.

Air Conditioner Maintenance

Evaporator Drain Cleaning

The secondary drain normally needs no cleaning since it should not have water in it to promote gunk.

However, in such cases where the secondary line has been flowing for some time, it can also build up a clog. The same cleaning procedures apply.

If a slow primary drain is not cured by chemical cleaning, you may need some mechanical help.

A shop vacuum applied to the far end of the drain may help pull the clog out.

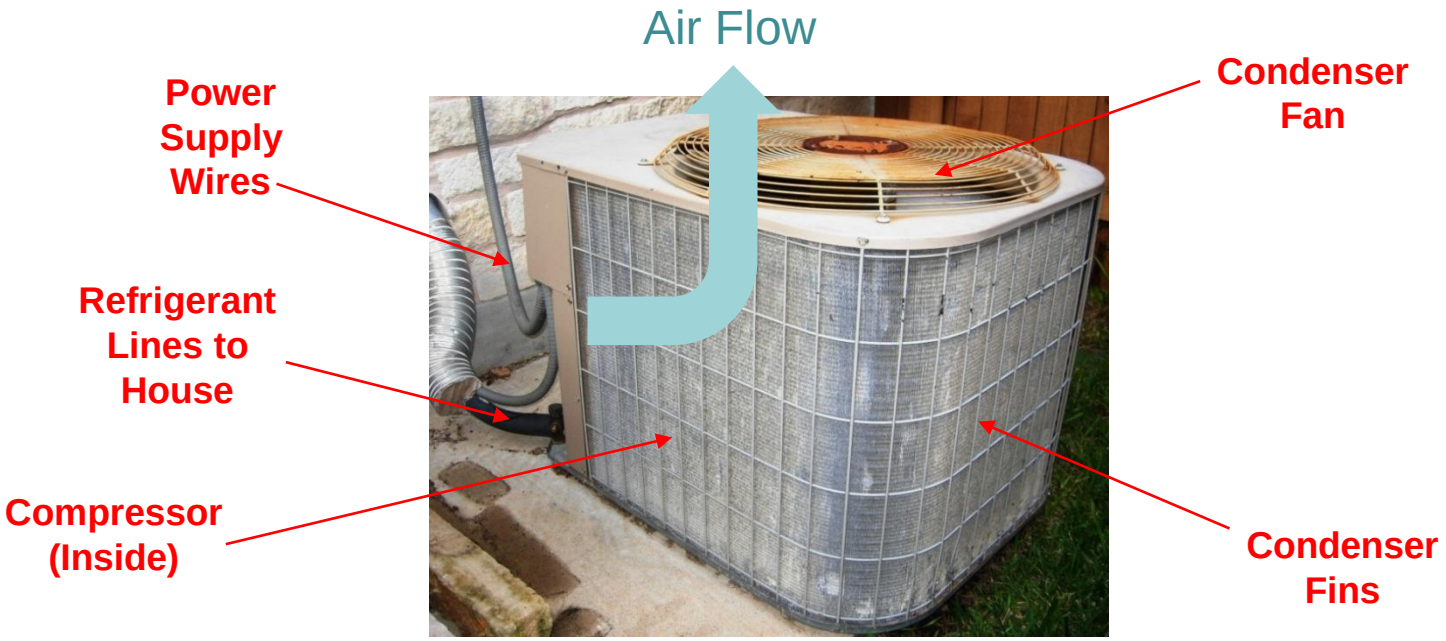
If not, try using an electrician's fish tape. This is smaller and more flexible than a plumber's snake which is likely too large to work on these small pipes.

Air pressure can be applied to the standpipe to help blow the clog out. This requires special equipment such as a "Drain Dog" with small gas cylinder or another device known as a "Gallo Gun" which has a special fitting attached to a CO_2 cartridge.

Air Conditioner Maintenance

Condenser Cleaning

The big, noisy part of the air conditioning system located outside your home is called the condenser unit. Its function is to condense and then compress the refrigerant and push it back up to the evaporator coil inside the dwelling. An important part of condensing is to transfer the heat exchanged up in the evaporator to the outside air. This is accomplished by having loops of refrigerant tubing exposed to lots of surface area and then pushing volumes of air past the cooling fins.



Typical Compressor/Condenser Unit

Condenser Cleaning

Efficiency of this heat transfer depends on unobstructed air flow. Unfortunately, the big fan on top pulls air into the condenser fins, which attracts all the grass, dirt, pet hair and general debris that tends to be present in our yards.

When the condenser fins become blocked by dirt and debris, air flow is restricted and heat exchange is diminished. This means the unit runs longer to achieve the desired level of cooling, which costs you more money.

This is why cleaning of the outside unit is so important. It should be done at least once a season, and more often if you have high levels of dirt or other debris in the area.

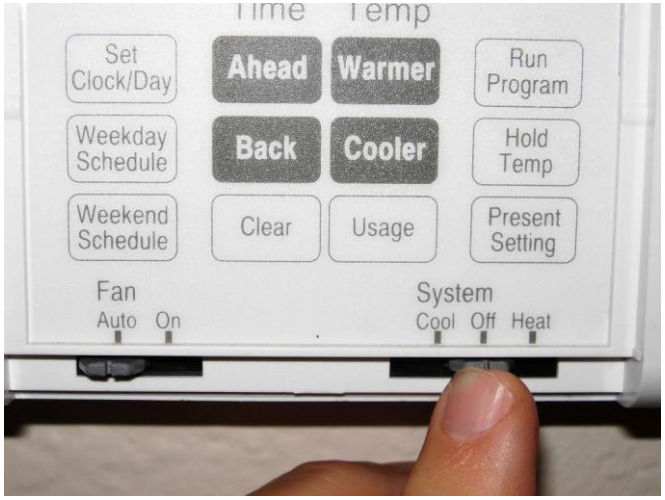
In addition to cleaning the unit, make sure that there are no objects stored up against any side of the condenser. Anything that obstructs air flow has the same effect as dirty or clogged condenser fins.

A step-by-step procedure follows.

Air Conditioner Maintenance

Condenser Cleaning

1. Begin by turning your system off at the thermostat. This shuts down the condenser unit and prevents it from trying to turn on later.



2. Wait until the condenser unit shuts down (fan and compressor are off). Then switch off the circuit breaker and pull the service disconnect plug to kill all power to the unit.

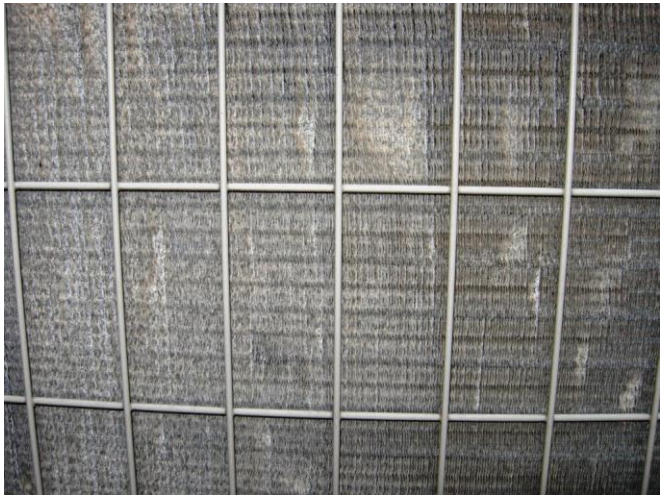
Air Conditioner Maintenance

Condenser Cleaning

3. Remove grass or other debris from condenser fins by hand. Then use a shop vac to clean out surface debris. Do this on all sides where fins are present.

Be careful not to move or damage the fins when cleaning.

4. Follow dry cleaning with a hose wash (not a power washer) with clean water. Use a fairly forceful spray over every part of the condenser fins. Direct the stream perpendicular to the fins all around for maximum cleaning. This pushes all the dirt and small debris inside the unit where it can wash out the bottom.



When finished, all condenser fin surface area should be clean.

Condenser Cleaning

5. When done washing the condenser, you can plug the service disconnect back in and switch the power back on. Don't forget to set the thermostat back to the cool position.

While you are cleaning the condenser fins, note areas of fin damage where air flow won't pass through easily. Hail and physical abuse will often bend the fins to obstruct free air flow. If the damaged portion exceeds 20% of the fin area, you should consider getting the fins combed straight by a professional.

Air Conditioner Maintenance

Professional Service

What we have presented is the most AC maintenance a homeowner should practically attempt. Beyond this, a professional service person should be consulted.

They can check refrigerant charge, straighten bend condenser fins, clean the evaporator coil and other such advanced topics.

Basic diagnosis of air conditioning problems can be found in the AC Troubleshooting topic on the HandyHomeowner site. It is useful because some AC problems are easily remedied without professional help.