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Space Conditioning Systems – You Can Do It
Michigan State University Cooperative Extension Service
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Space Conditioning Systems

All heating systems should be checked periodically by a professional. Consult the installation manual for maintenance frequency, or ask the dealer who installed the system how often professional inspections are recommended. Generally, oil burning units and heat pumps should be inspected annually; gas fired units and electric furnaces every 2 to 3 years.

Burners

□ Have oil burners inspected, cleaned, lubricated, and adjusted by a heating and cooling professional (annually). This will insure soot- and odor-free operation as well as maximum combustion efficiency (see Figure 2).

- Check to see that the draft regulator on the oil burner is functioning, i.e., that the small damper on the exhaust stack is movable (annually, see Figure 2).
- Have the exhaust gases on an oil burner analyzed by a professional to determine if the system is functioning at maximum efficiency (annually).
- Inspect the underside of interior oil storage tanks for oil leakage by running your hand along the bottom section (semiannually). Roughness or a film of oil on the hand indicates leaks and will require replacing the oil tank. (Note: Repairs can be difficult and dangerous and may not last.)

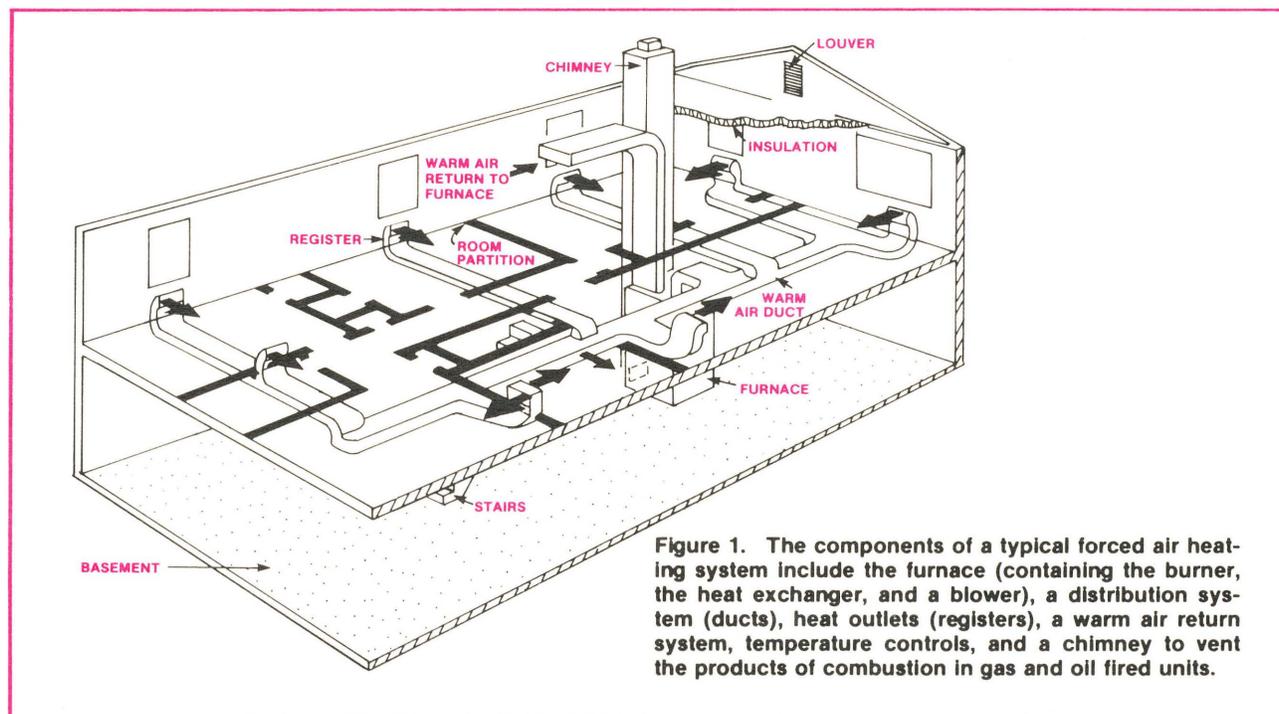


Figure 1. The components of a typical forced air heating system include the furnace (containing the burner, the heat exchanger, and a blower), a distribution system (ducts), heat outlets (registers), a warm air return system, temperature controls, and a chimney to vent the products of combustion in gas and oil fired units.

- Inspect the flame color in gas fired units (annually). The flame should be primarily bluish in color. If it is yellow or if flames are lifting off the burners, call a professional to adjust the system.

Furnaces/Boilers

- Inspect the walls of the heat exchanger for deterioration, corrosion, debris, soot, mineral deposits, or cracks (annually, see Figure 3). If any damage is evident, consult a professional to clean or replace the unit, depending upon severity. If the area only needs cleaning, you can perform this task. Ask the heating and cooling contractor to show you how during his/her next visit, or consult the installation manual.

- Clean mineral deposits from humidifiers attached to the furnace (3 times during the heating season, see Figure 3). Consult the operating manual for directions.
- In boilers, if the firebox is accessible, inspect it to see if water leakage or dripping is evident (annually, see Figure 4). If so, have the problem checked by a professional.
- Check water pressure in the boiler (throughout the heating season, see Figure 4).
- Check the pressure relief valve on the boiler by opening it and allowing a small quantity of water to flow (annually, see Figure 4). Ask a profes-

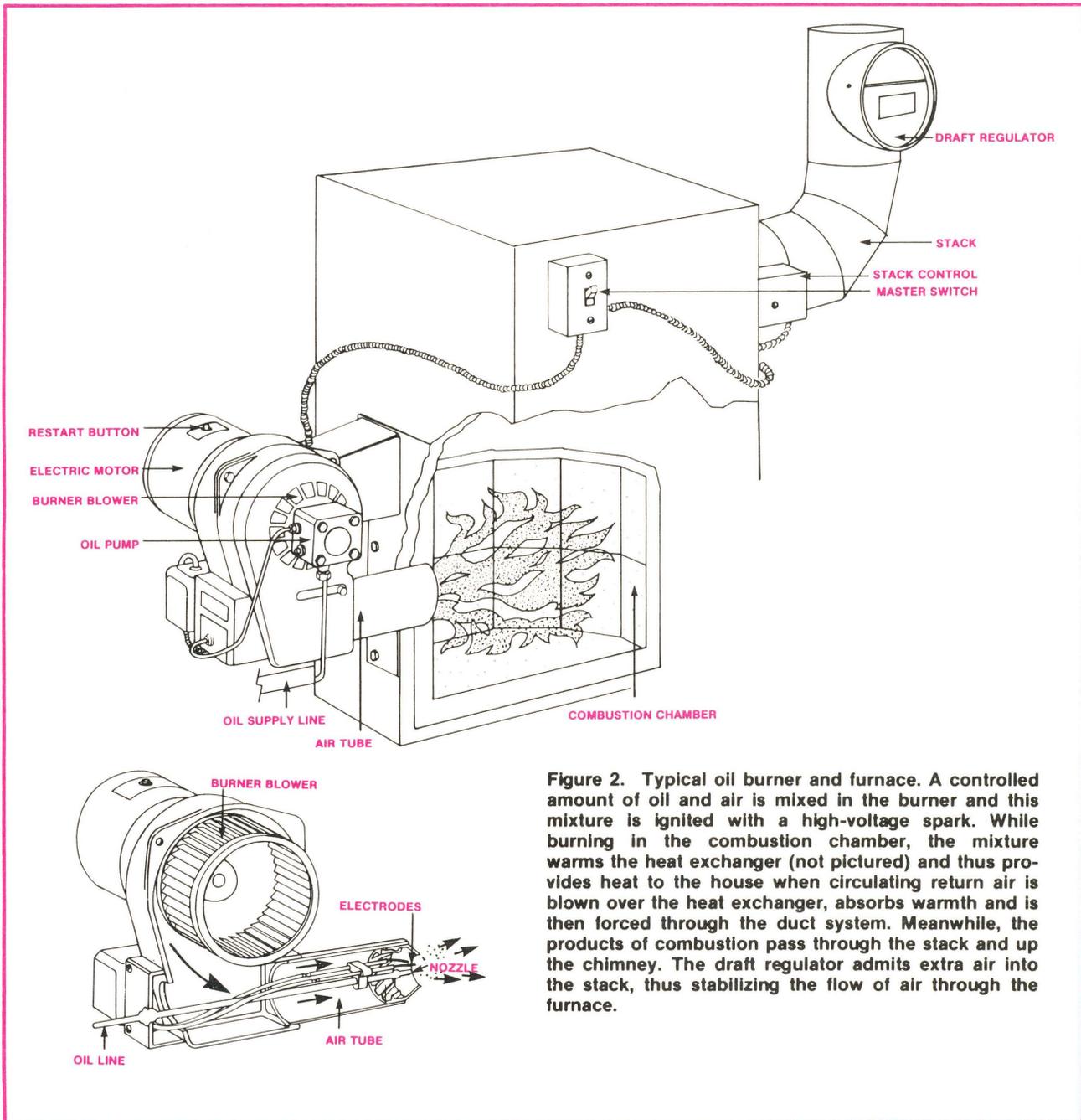


Figure 2. Typical oil burner and furnace. A controlled amount of oil and air is mixed in the burner and this mixture is ignited with a high-voltage spark. While burning in the combustion chamber, the mixture warms the heat exchanger (not pictured) and thus provides heat to the house when circulating return air is blown over the heat exchanger, absorbs warmth and is then forced through the duct system. Meanwhile, the products of combustion pass through the stack and up the chimney. The draft regulator admits extra air into the stack, thus stabilizing the flow of air through the furnace.

sional to demonstrate this procedure. If the relief valve does not operate, have it replaced. The valve may not reseat properly after the test because of mineral deposit buildup. If this occurs, have it replaced.

Distribution Systems

(Ducts for forced air systems; pipes for water and steam systems.)

- Oil the motor and fan in your forced air heating system (at the beginning and during the heating season, see Figure 3). The heating contractor

can show you how, or consult the furnace installation manual.

- Oil the motor of the circulating pump in your hot water heating system (at the beginning of the heating season, see Figure 4). The heating contractor can illustrate the procedure, or consult the boiler operating manual.
- Clean or replace the air filter in a forced air heating system (check the filter monthly during the winter, see Figure 3). Consult the installation manual for directions and recommended replacement frequency.

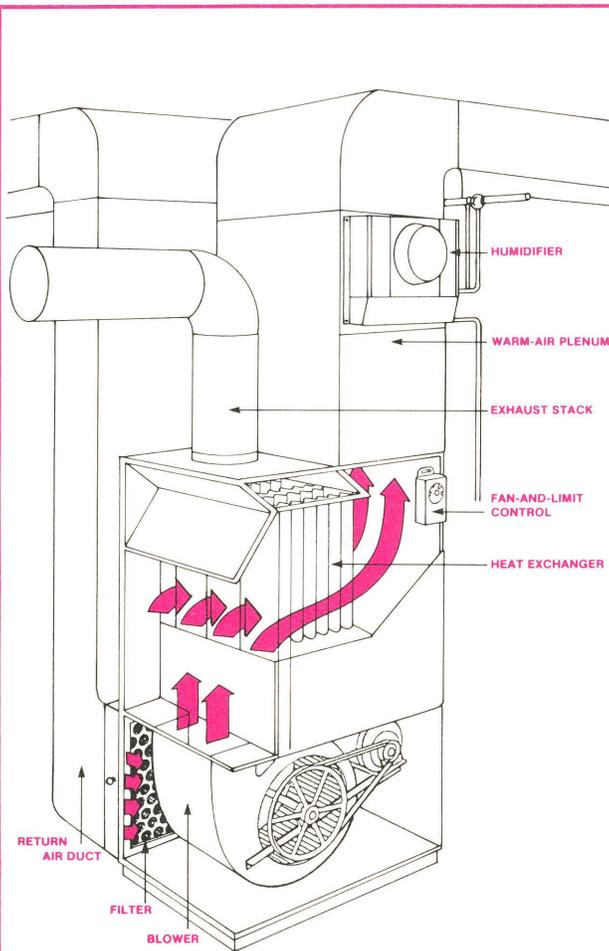


Figure 3. Typical forced air furnace. Cool air is returned from the house by passing it through a filter to trap dirt. A blower then passes the air through the heat exchanger, which contains metal passageways heated to high temperatures by combustion gases rising inside of them (the house air and combustion gases do not mix). The then warm house air is next forced into the warm air plenum and on to the heating ducts to warm the house interior. The combustion gases enter the stack and exit the home through the chimney. Humidifiers are often attached to forced air furnaces to provide additional comfort by adding moisture to the warm air.

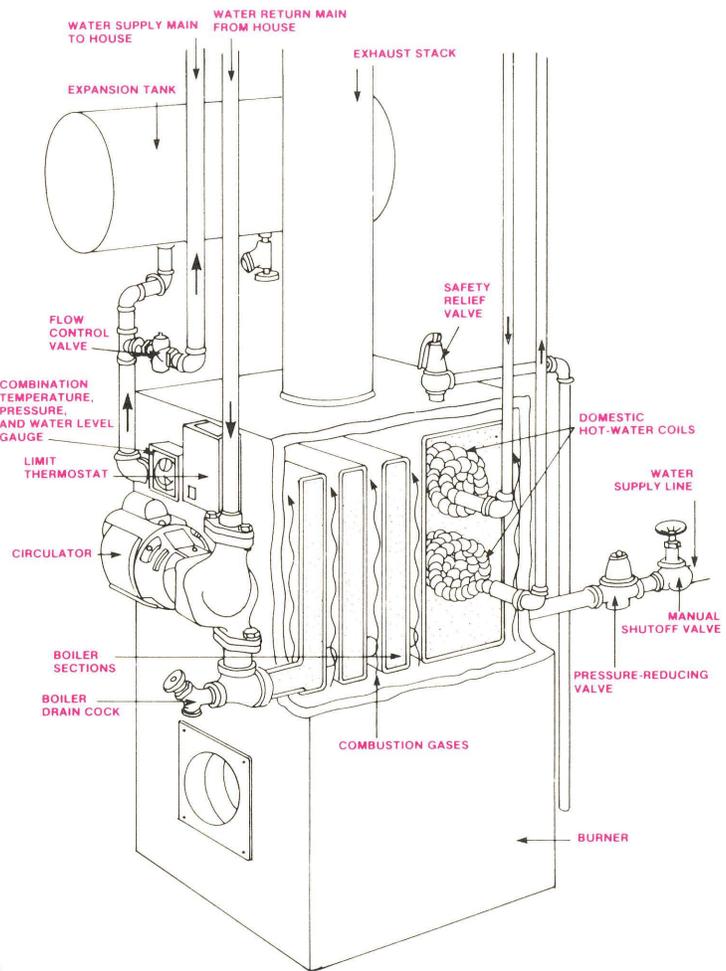


Figure 4. Typical hot water/steam boiler. Cool water flows into the boiler and is heated by combustion gases given off by a burner. The combustion gases then flow on to the stack and out the chimney, while the now hot water flows through a piping/radiator/convactor system to heat individual rooms in the house. The hot water and gases never come in contact in a well-functioning system. The circulator controls the flow-control valve, and thus the circulation of heat throughout the home. These systems are also able to heat water for home use.

- Inspect insulation on heating supply ducts/pipes to insure that it is secure (annually). Refasten any loose insulation.
- Inspect exposed distribution piping/ducts in the basement, crawl space, or attic for leaky joints (annually). If joints are loose or broken, reseal.
- Inspect the floor area under radiators or convectors for signs of leaks (annually). If stains are present, seal the leak or replace leaking valves.

Heat Outlets

- Remove register grills, and vacuum the grill and duct area in each room to remove dirt and dust balls (quarterly, see Figure 1). (Note: Removing dust buildup will help warm air circulate more freely.)
- Remove the return air grill and vacuum the grill and duct work (quarterly). (Note: Cleaning the return air grill will help the air flow back to the furnace for reheating more easily.)
- Check each room in the home for the level of heat output, especially rooms farthest from the furnace/boiler (annually). Uneven heat distribution indicates the system is out of balance. Consult a heating contractor.

Safety/Temperature Controls

- Inspect and clean the thermostat (annually). Use a soft brush to remove dust and lint. Use soft white paper to clean the contacts. Ask the heating contractor to demonstrate the procedure.
- Check to see that the master shutoff switch to the heating system is operational (annually). If it does not shut off the system, consult a professional.
- Inspect bricks and mortar joints of bricks lining the fireplace firebox (annually). Cracked and chipped bricks or broken mortar joints should be repaired as they present a potential fire hazard. Consult a professional.
- Remove soot and creosote from the fireplace chimney (annually) and from the wood burning stovepipe and chimney (fall). Check the wood stovepipe and chimney monthly for creosote buildup during the heating season.
- Inspect stovepipe to insure it is in good condition and free of corrosion or small holes (annually). Old, weak stovepipe should be replaced before another fire is built in the stove box.
- Check wood burning appliances for rust, cracks, or other excessive wear (annually). Consult with a professional to determine how to make repairs.

Air Conditioning

- Have the air conditioning system checked periodically by a professional heating and cooling contractor (consult the installation manual for frequency).
- If central air conditioner lines are equipped with a sight glass, check the refrigerant level to see that it is adequate, i.e., no bubbles present (periodically during the cooling season). If a sight glass is not present, check the low pressure refrigerant line for frost. Ask the cooling contractor to show you how. If the refrigerant is low, have it replaced; then try to locate the leak and have it sealed.
- Clean the central air conditioner condensing unit (the part located outside the house) of insects, dirt, and leaves (spring). Most can simply be hosed out. Consult the installation manual for instructions.
- Oil the blower motor and fan on both the condensing and the evaporation units (annually). Consult the operating manual to determine where, how, and the oil type.
- Check the tension on the fan belts of the condensing and evaporation unit blowers (at the beginning of the cooling season). If the belts give more than $\frac{3}{4}$ to 1 inch, adjust. Consult the installation manual to determine how.
- Inspect the ducts carrying cooled air for leaks or openings in the joints and for insulation slippage (annually). Rejoin leaking ducts with duct tape. Reposition insulation.
- Clean or replace air filters in both window and central air conditioning units (every 3 months during the cooling season for central units, monthly for window units).
- Clean window air conditioning units, particularly the evaporation coil; oil the blower motor and the fan, and clean the fan blades (at the beginning of the cooling season). Consult the installation manual. Follow the manufacturer's instructions regarding winter storage.
- Check the joint between the window frame and the unit to be sure it is properly caulked and weather-stripped (annually).

Other Publications in the "You Can Do It, Too" Home Maintenance Checklist Series:

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- E-2091 Exterior Structural Items
- E-2092 Interior Structural Items and Outside Areas
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