Combustion air

Homes need fresh air for combustion in furnaces, fireplaces, wood stoves, gas water heaters and clothes dryers. Homes that have been tightened to prevent heat loss can become starved for air.

This is especially true when you're using exhaust fans and vented appliances, which draw air from inside your house. Air from outside can be pulled into your home, and possibly down the furnace vent or fireplace chimney. This is called backdrafting and it can cause carbon monoxide (CO) to form.

To prevent homes from becoming starved for air, and to prevent dangerous levels of carbon monoxide from forming, the Minnesota Uniform Mechanical Code requires all new homes be built with a special duct that brings outside air directly to the heating system. All furnace and boiler installations in existing homes are also required to have a combustion air duct.

To learn more about the causes, symptoms and prevention of carbon monoxide buildup, ask for our brochure, *The Inside Story on Carbon Monoxide*.

Do a fresh air check

To see if your home is receiving enough fresh air: *(See figure 1)*

1. Close all doors and windows.
2. If you have a fireplace, build a fire.
3. Turn on all exhausting devices, such as kitchen and bathroom exhaust fans, gas or electric dryers, and attic fans.
4. Turn on all vented gas appliances, such as heating equipment and water heaters. Then wait 10 minutes for drafts to stabilize.
5. Hold a lit match below each heating system draft hood air intake as shown below.

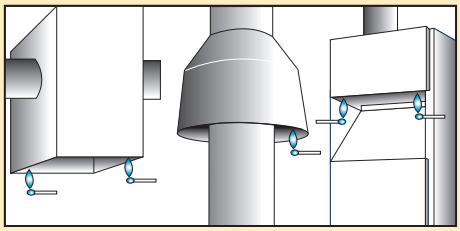

Fig.1. *Draft hoods*

Results of your fresh air check:

6. If the match remains lit and the match flame pulls toward the draft hood, it indicates sufficient fresh air. Check draft hoods on all other equipment such as gas space heaters, water heaters and additional heating systems. Then, return appliances and exhausting devices to their original condition.
7. If the flame/smoke blows down or if the match goes out, the vent may be plugged and/or your home's air supply may be inadequate.

If you suspect inadequate air supply:

1. Check for plugged vent connectors and chimneys. Repair stoppage and test again.
2. If the match goes out even when the vent is clear, additional air for combustion must be brought from outside by adding a vent or fresh air intake directly to the furnace area. To avoid backdrafting, limit use of your clothes dryer, fireplace, furnace and mechanical exhaust fan until the new vent or fresh air intake is installed.

   See the Minnesota Uniform Mechanical Code or call a qualified heating contractor or local gas utility service department for installation instructions.

Installing fresh air ducts

The following are examples of places fresh air ducts can be installed to increase your home's combustion air. **Always be sure to check the Minnesota Uniform Mechanical Code before you begin** or contact your local building codes office for size and materials. Flexible ducting is not recommended because ridges create turbulence and reduce air flow.

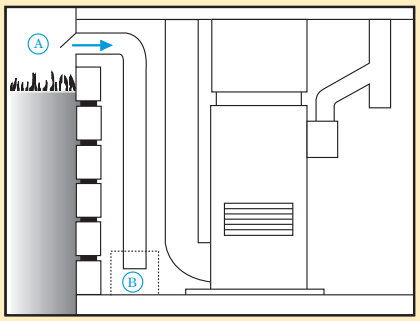

Fig.2. Furnace in confined area with vents in door/wall.

To supply outside air to floor in furnace area: *(See figure 2)*

1. Place outside air intake duct (A) at least 1' above grade level.

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2. Cover air intake with 1/4" mesh screen and weather hood.
3. The duct must discharge the fresh air at a level no more than 1' off the floor (B).

To help keep cold air from spreading across your basement floor, build a closed-bottom box out of sheet metal or use a five-gallon bucket that allows air to flow freely in and out. Drop the combustion air supply duct into the containment box and permanently attach the duct to it. **To avoid restricting airflow, the box or bucket cannot be more than 1' high.**

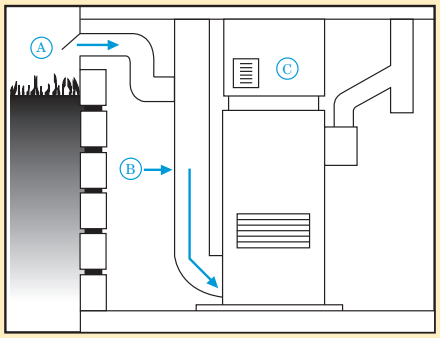

Fig. 3. A ventilation air outlet grill in a wall or door, at a level higher (C) than the draft hood opening. The grill area must provide one square inch for every 2,000 Btus per hour of natural gas input to the gas equipment in the area.

To supply outside air into cold air return: *(See figure 3)*

Note: This method is permitted by code but has been known to shorten equipment life, reduce performance in unusually cold temperatures and void warranties. To install:

1. Place air intake duct (A) at least 1' above grade level.
2. Cover air intake duct with 1/4" mesh screen and weather hood.
3. Install duct in return side of heating system (B).
4. A register without a damper (C) must be installed in the plenum of the furnace. Its free area size must be at least one-half the free area of the common vent.

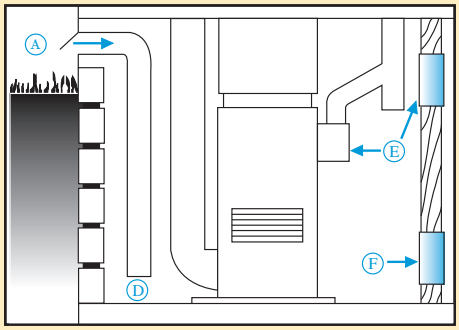

Fig. 4. A ventilation air inlet grill located in the wall or door, level with or below (D) the combustion air inlet to the lowest burner. The area of the grill must provide one square inch for every 2,000 Btus per hour of natural gas input to gas equipment in the area.

To supply outside air to a furnace in a confined area: *(See figure 4)*

1. Place air intake duct (A) at least 1' above grade level.
2. Cover air intake with 1/4" mesh screen and weather hood.
3. Duct must discharge fresh air at a level no more than 1' off the floor (D).
4. Ventilation air must be supplied to the furnace area through two openings to the main house area located as shown in figure 4 (E and F).
5. To size the ventilation air vents, calculate the size as 1.5 square inch of opening per 2,000 Btus of furnace input rating.

For example: A furnace has a Btu input rating of 80,000. (80,000 / 2,000) X 1.5 = 60 (square inches of vent opening). A vent grill that measures 10” x 6” = 60 square inches. However, since only the free area of the grill is counted (not the slats), the actual opening size is only 30 square inches. Therefore, two grills (E and F in figure 4) each measuring 10” x 6” are needed.

Proper maintenance and periodic care of your home heating system will help ensure safety, extend the system’s operating life, save energy and increase efficiency. Follow manufacturer’s recommendations. Conduct a yearly check-up and change filters regularly.

If your heating system is not working properly, contact a qualified heating contractor or local utility service department.

Never block the fresh air intakes. Keep them clear of snow, leaves or other debris.

For more information on how you can create a healthy indoor air environment, request our *Humidity and the indoor environment* and *Indoor air quality* fact sheets by calling 612-372-4727 (1-800-245-2377) or at CenterPoint Energy.com

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CenterPointEnergy.com

CenterPoint Energy
Customer Relations
PO Box 59038
Minneapolis, MN 55459-0038