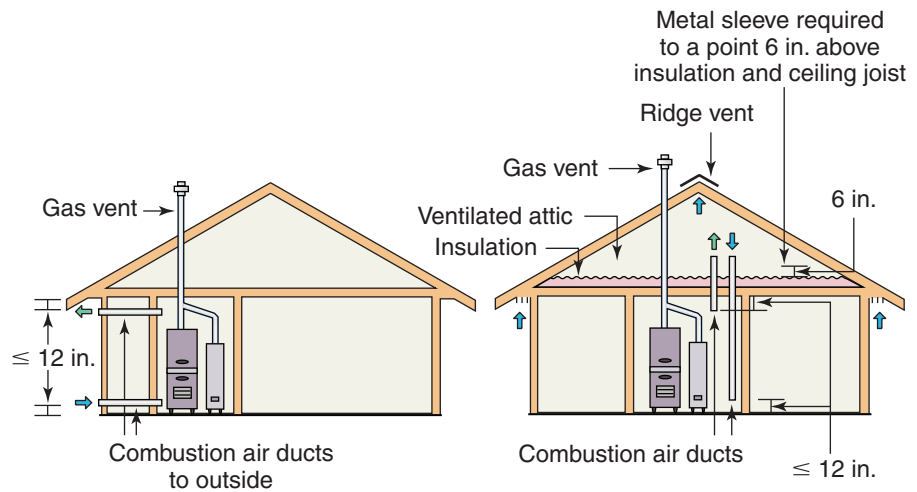


## Combustion air from outdoors

For gas-fired appliances, the IRC prescribes two methods for obtaining combustion air from the outdoors or from a space freely communicating with the outdoors, such as a ventilated attic. [\[Ref. G2407.6\]](#)

### **Outdoor combustion air obtained through two openings or ducts**

In the first method for obtaining outdoor combustion air, two openings or ducts are required, one within 12 inches of the ceiling and one within 12 inches of the floor. Each vertical duct or direct opening to the outdoors requires a free area of at least 1 square inch per 4000 Btu/h of total input rating. Horizontal ducts require a larger cross-sectional free area of at least 1 square inch per 2000 Btu/h of total input rating.



Horizontal combustion air ducts  
minimum free area of 1 sq. in. per  
2,000 Btu/h for each opening

Example: Calculate size  
of each opening  
Total appliance input rating  
is 135,000 Btu/h

$$\frac{135,000}{2,000} = 67.5 \text{ sq. in. free area per opening}$$

Vertical combustion air ducts  
minimum free area of 1 sq. in. per  
4,000 Btu/h for each opening

Example: Calculate size  
of each opening  
Total appliance input rating  
is 135,000 Btu/h

$$\frac{135,000}{4,000} = 33.75 \text{ sq. in. free area per opening}$$

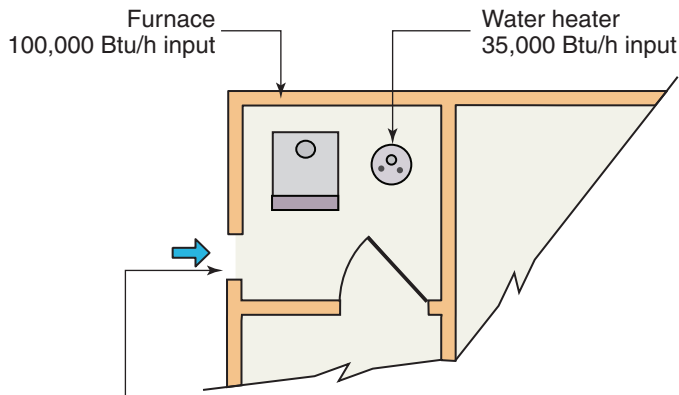
**FIGURE 12-12** Combustion air from outdoors through two openings

For combustion air ducts that terminate in an attic, the IRC requires the termination point to be not less than 6 inches above the top of the ceiling joists and insulation, and does not permit screens on the termination inlet (Figure 12-12). [\[Ref. G2407.6.1\]](#)

### **Outdoor combustion air obtained through single opening or duct**

The IRC also permits combustion air for gas-fired appliances to be obtained through a single opening located within 12 inches of the ceiling when the size is increased to meet three criteria. The free area of the opening must be at least 1 square inch per 3000 Btu/h of the total appliance input rating and must be at least the sum of the areas of all vent connectors in the space. The code also prescribes minimum clearances around the appliances for free circulation of air (Figure 12-13).

[\[Ref. G2407.6.2\]](#)



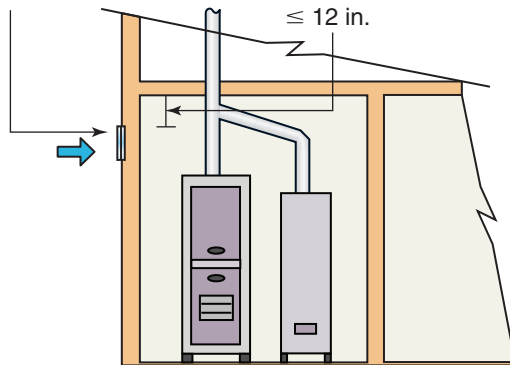
Air circulation:

Minimum 1 in. clearance at sides  
and back of appliances

Minimum 6 in. clearance in front  
of appliances

Single opening requires 1 sq in. per 3000 Btu/h  
of total appliance input rating **and** not less than  
sum of areas of connectors

Single combustion  
air opening directly  
to outdoors



Example: Calculate opening free area based on  
total appliance input of 135,000 Btu/h and one 7 in.  
diameter connector and one 4 in. diameter connector

7 in. diameter = 38.5 sq in. cross-sectional area

4 in. diameter = 12.5 sq in. cross-sectional area

Total: 51.0 sq in. free area

$$\frac{135,000}{3,000} = 45 \text{ sq in. free area}$$

51 sq in. free area is required for single opening

**FIGURE 12-13** Outdoor combustion air through single opening or duct