COMBUSTION AIR REQUIREMENTS

Total BTU's of all fuel-burning equipment *(except direct vent sealed combustion with outside combustion air intake) shall not be more than btu's listed on chart for room square footage & height for equipment located in unconfined spaces. If total BTU's are higher than listed, then combustion air is to be provided as equipment is considered to be located in a confined space.

*all fuel burning equipment: heating equipment - furnaces, boilers, ,(including heat producing fireplaces), water heaters, cooking appliances(gas), refrigerators(gas) and clothes dryers(gas).

Note: Connecting rooms may be used to provide inside combustion air provided doorways do not have a door or two openings may be provided one within 1 foot of the ceiling and one within 1 foot of the floor.

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Combustion air from inside the dwelling
(allowed only with discontinuous vapor barrier)
Room Volume = BTU of furnace + BTU of other fuel burning appliances* x 50 divided by 1,000 = min. cubic feet

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EXAMPLE

Furnace btu's + Water heater btu's + dryer btu's = Total btu's
80,000 + 35,000 + 27,000 = 142,000 btu's
142,000 BTU x 50 / 1,000 = 7,100 cubic feet required
Room size of: 1000 SF x 6.5 feet high = 6,500 cubic feet ---insufficient combustion air.
(Either draw combustion air from entire basement or outside air.)

Entire basement area

Whole basement size 1200 SF x 6.5 feet high = 7800 CF. Air may be provided from adjacent room via a doorway with no door or provide two openings, one high & one low. One square inch per 1000 input BTU's, but not less than 100 total square inches.

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Combustion air from outside the dwelling

1) Direct opening to outside requires one square inch per 4000 BTU's (no duct).
2) Opening via horizontal duct requires one square inch per 2000 BTU's.
3) Opening via vertical duct requires one square inch per 4000 BTU's.

Note: Two openings required – one within 12 inches of floor and one within 12 inches of the ceiling .
(If all appliances are gas, then only one opening required within 1 foot of ceiling & one square inch per 3000BTU's but not less than the combined cross sectional areas of the appliance flue collars or draft hoods.

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Approved Options

Comm 23.06 'Combustion-Air The code offers several methods to supply adequate combustion air. Below is a highlighted listing of the options. Also see the optional Makeup and Combustion Air Worksheet at the end of this chapter.

Method 1. Inside Air (Discontinuous Vapor Retarder) (23.06(3)): Allows combustion air to be drawn from an inside space if the building has a discontinuous vapor barrier, as is permitted at boxsills by s. 22.22. The space shall provide a room volume of at least 50 cubic feet per 1,000 btu/hr combined input rating of all open combustion appliances in that space. An inside space may include several rooms if connected with high and low openings, with each opening providing one square inch of clear opening per 1000 btu/hr input rating, but not less than 100 square inches each.

Method 2. Inside & Outdoor Air (Continuous Vapor Retarder) (23.06(4)(d)): If a building has a continuous vapor barrier, and therefore cannot use the method of 23.06(b) of taking all air from inside, but does have a room volume of at least 50 cubic feet per 1,000 btu/hr combined input rating of all open combustion appliances in that space, then it can use a method of supplementing the inside air with outside air. It shall be via a single, direct or ducted, exterior, high opening, sized at one square inch per 5,000 btu/hr combined input rating.

Method 3. Single Outdoor Opening (Gas Appliances Only) (23.06(4)(c)): If serving only gas appliances, then from outdoors via a single, direct or ducted, exterior, high opening sized at one square inch per 3,000 btu/hr combined input rating, but not less than the combined cross sectional areas of the appliance flue collars or draft hood outlets in that space.

Method 4. Prorated Inside Air Credit Plus Outdoor Air (23.06(2)(d): For method 1, per current national standards (1999 NFPA 54-5.3.3(c)), we will also allow a combination of drawing inside and outside combustion air, unless prohibited by the appliance manufacturer. This is done by taking a pro-rated credit for an inside space that partially meets method 1, and then making up the difference by pro-rating the outside combustion air otherwise required by Method 5 (23.06(4) (c)). Example: If the inside space provides only 25 cubic feet Per 1,000 btus, or half of the size required by method 1, then the additional direct or ducted outside combustion air, as calculated by method 5 can be reduced by one half.

Method 5. Two Outdoor Openings (23.06(4)(b)): From outdoors via high and low direct or vertically ducted exterior openings, each sized at one inch Per 4,000 btu/hr combined input rating or via horizontally ducted openings, each sized at one inch per 2,000 btu/hr combined input rating.
Free area of openings with louvers. 1. Manufacturer specified free opening for duct cover.
2. Duct area x .75 = free opening (metal louvers)
(2001 UDC Commentary) 3. Duct area x .25 = free opening (wood louvers)

Question? Why are combustion air openings into an enclosure required both high and low?

Answer. The lower opening is for combustion air and the upper opening is to allow for venting of excess heat or leaked gases and to provide air to draft hood and barometric dampers. (1999 UDC code commentary -23.045)
Comm 23.045 Solid fuel burning appliances. (see comm. 23045)
<u>Consideration should also be given for wood burning appliances, as these also require combustion air.</u>