Examples

Furnace 80,000 BTU + Water Heater 40,000 BTU = 120,000 BTU Total

Minimum Indoor Air Communicating with the Appliances:

The minimum required volume shall be 50 cubic feet per 1,000 Btu/h of the appliance input rating.
((Total BTU Input of all Appliances / 1,000) x 50 = Volume Required)

(120,000 BTU / 1,000) x 50 ft^3 = 6,000 ft^3

Combustion Air Supplied From Same Story:

The minimum free area of 1 square inch per 1,000 Btu/h of the total input rating of all appliances in the enclosure.
(Total BTU Input of all Appliances / 1,000 = Free Area of Each Opening Required)

(120,000 BTU / 1,000) x 1 in^2 = 120 in^2 minimum free area for each of the required (2) openings

Utilizing metal louvers requires (120 in^2/.75 = 160 in^2) to obtain 120 in^2 of free area.
Confirmation: 75% of 160 in^2 = .75 x 160 in^2 = 120 in^2

One opening 160 in^2 within 12 inches of the top and one opening 160 in^2 within 12 inches of the bottom of the enclosure would meet the minimum requirements.

Note: the appliances must be communicating with a minimum of 6,000 ft^3 of space as calculated above.

Combustion Air Supplied From Different Story:

The minimum free area of 2 square inches per 1,000 Btu/h of total input rating of all appliances in the enclosure.
(Total BTU Input of all Appliances / 1,000 x 2 = Total Free Area Required)

(120,000 BTU / 1,000) x 2 in^2 = 240 in^2 minimum free utilizing one or more openings

Utilizing metal louvers requires (240 in^2/.75 = 320 in^2) to obtain 240 in^2 of free area.
Confirmation: 75% of 320 in^2 = .75 x 320 in^2 = 240 in^2

One or more openings in doors or floors 320 in^2 communicating with a different story would meet the minimum requirements.

Minimum Outdoor Air Communicating with the Appliances:

Two-permanent-openings method:

__Vertical Ducts:__

The minimum free area of each opening shall have a minimum free area of 1 square inch per 4,000 Btu/h of total input rating of all appliances in the enclosure.
(Total BTU Input of all Appliances / 4,000 = Total Free Area Required)

(120,000 BTU / 4,000) x 1 in^2 = 30 in^2 minimum free area for each of the required (2) openings

Assume duct is communicating with the attic space and louvers are not utilized.

One opening 30 in^2 within 12 inches of the top and one opening 30 in^2 within 12 inches of the bottom of the enclosure would meet the minimum requirements.

__Horizontal Ducts:__

The minimum free area of each opening shall have a minimum free area of 1 square inch per 2,000 Btu/h of total input rating of all appliances in the enclosure.
(Total BTU Input of all Appliances / 2,000 = Total Free Area Required)

(120,000 BTU / 2,000) x 1 in^2 = 60 in^2 minimum free area for each of the required (2) openings

Utilizing metal louvers requires (60 in^2/.75 = 80 in^2) to obtain 60 in^2 of free area.
Confirmation: 75% of 80 in^2 = .75 x 80 in^2 = 60 in^2

One opening 80 in^2 within 12 inches of the top and one opening 80 in^2 within 12 inches of the bottom of the enclosure would meet the minimum requirements.

One-permanent-opening method:

The minimum <u>free area</u> of 1 square inches per 3,000 Btu/h of total input rating of all appliances in the enclosure.
(Total BTU Input of all Appliances / 3,000 = Total Free Area Required).

(120,000 BTU / 3,000) x 1 in^2 = 40 in^2 minimum free utilizing one or more openings

Utilizing metal louvers requires (40 in^2/.75 = 53.3 in^2) to obtain 53.3 in^2 of free area.
Confirmation: 75% of 53.3 in^2 = .75 x 53.3 in^2 = 40 in^2

One opening 53.3 in^2 within 12 inches of the top of the enclosure would meet the minimum requirements.

Combination Indoor & Outdoor Combustion Air:

For example we have 3,000 ft^3 of indoor combustion air available from the same story
As calculated above we will need one opening 160 in^2 within 12 inches of the top and one opening 160 in^2 within 12 inches of the bottom of the enclosure to meet part of the combustion air requirements.

Without the indoor air, utilizing only the one-permanent-opening method as shown above we would need one opening 53.3 in^2, however, we can reduce this because we are utilizing some indoor air for combustion.

The reduction factor equals the calculated total free area based on the outdoor combustion air section x (1 - available volume/required volume).

$53.3\ in^2 \times (1 - (3{,}000ft^3/6{,}000ft^3)) = 26.65in^2$

Therefore, we need the two 160in^2 openings communicating with the indoor air and one opening 26.65 in^2 within 12 inches of the top of the enclosure in order to meet the minimum requirements.