

Table N1104.2 Total and continuous ventilation rates (in CFM)

	Number of Bedrooms					
	1	2	3	4	5	6 ²
Conditioned space ¹ (in sq. ft.)	Total/ Continuo us	Total/ Continuo us	Total/ Continuo us	Total/ Continuo us	Total/ Continuo us	Total/ Continuo s
1000 – 1500	60/40	75/40	90/45	105/53	120/60	135/68
1501 – 2000	70/40	85/43	100/50	115/58	130/65	145/73
2001 – 2500	80/40	95/48	110/55	125/63	140/70	155/78
2501 – 3000	90/45	105/53	120/60	135/68	150/75	165/83
3001 – 3500	100/50	115/58	130/65	145/73	160/80	175/88
3501 – 4000	110/55	125/63	140/70	155/78	170/85	185/93
4001 – 4500	120/60	135/68	150/75	165/83	180/90	195/98
4501 – 5000	130/65	145/73	160/80	175/88	190/95	205/103
5001 – 5500	140/70	155/78	170/85	185/93	200/100	215/108
5501 – 6000 ²	150/75	165/83	180/90	195/98	210/105	225/113

	ONE OR MULTIPLE POWER VENT OR DIRECT VENT APPLIANCES OR NO COMBUSTION APPLIANCES ^A	ONE OR MULTIPLE FAN-ASSISTED APPLIANCES AND POWER VENT OR DIRECT VENT APPLIANCES ^B	ONE ATMOSPHERICALLY VENTED GAS OR OIL APPLIANCE OR ONE SOLID FUEL APPLIANCE ^C	MULTIPLE APPLIANCES THAT ARE ATMOSPHERICALLY VENTED GAS OR OIL APPLIANCES OR SOLID FUEL APPLIANCES ^D
1. Use the Appropriate Column to Estimate House Infiltration				
a) pressure factor (cfm/sf)	0.15	0.09	0.06	0.03
b) conditioned floor area (sf)	—	—	—	—
(including unfinished basements)				
Estimated House Infiltration (cfm): [1a × 1b]	—	—	—	—
2. Exhaust Capacity				
a) clothes dryer	135	135	135	135
b) 80% of largest exhaust rating (cfm):	—	—	—	—
(not applicable if recirculating system or if powered <i>makeup air</i> is electrically interlocked and matched to exhaust)				
c) 80% of next largest exhaust rating (cfm):	not applicable	—	—	—
(not applicable if recirculating system or if powered <i>makeup air</i> is electrically interlocked and matched to exhaust)				
Total Exhaust Capacity (cfm): [2a+2b+2c]	—	—	—	—
3. <i>Makeup Air</i> Requirement				
a) Total Exhaust Capacity (from above)	—	—	—	—
b) Estimated House Infiltration (from above)	—	—	—	—
Makeup Air Quality (cfm): [3a - 3b]	—	—	—	—
(if value is negative, no <i>makeup air</i> is needed)				
4. For <i>Makeup Air</i> Opening Sizing, refer to Table 501.4.2.				

A. Use this column if there are other than fan-assisted or atmospherically vented gas or oil *appliances* or if there are no *combustion appliances*.

B. Use this column if there is one fan-assisted *appliance* per venting system. Other than atmospherically vented *appliances* may also be included.

C. Use this column if there is one atmospherically vented (other than fan-assisted) gas or oil *appliance* per venting system or one solid fuel *appliance*.

D. Use this column if there are multiple atmospherically vented gas or oil *appliances* using a common vent or if there are atmospherically vented gas or oil *appliances* and solid fuel *appliances*.

TABLE 501.4.2 MAKEUP AIR OPENING SIZING TABLE FOR NEW AND EXISTING DWELLING UNITS

TYPE OF OPENING OR SYSTEM	ONE OR MULTIPLE POWER VENT OR DIRECT VENT APPLIANCES OR NO COMBUSTION APPLIANCES ^A	ONE OR MULTIPLE FAN-ASSISTED APPLIANCES AND POWER VENT OR DIRECT VENT APPLIANCES ^B	ONE ATMOSPHERICALLY VENTED GAS OR OIL APPLIANCE OR ONE SOLID FUEL APPLIANCE ^C	MULTIPLE APPLIANCES THAT ARE ATMOSPHERICALLY VENTED GAS OR OIL APPLIANCES OR SOLID FUEL APPLIANCES ^D	PASSIVE MAKEUP AIR OPENING DUCT DIAMETER ^{E, F, G}
	(cfm)	(cfm)	(cfm)	(cfm)	(inches)
Passive opening	1-36	1-22	1-15	1-9	3
Passive opening	37-66	23-41	16-28	10-17	4
Passive opening	67-109	42-66	29-46	18-28	5
Passive opening	110-163	67-100	47-69	29-42	6
Passive opening	164-232	101-143	70-99	43-61	7
Passive opening	233-317	144-195	100-135	62-83	8
Passive opening with motorized damper	318-419	196-258	136-179	84-110	9
Passive opening with motorized damper	420-539	259-332	180-230	111-142	10
Passive opening with motorized damper	540-679	333-419	231-290	143-179	11
Powered makeup air ^H	> 679	> 419	> 290	> 179	Not applicable

- A. Use this column if there are other than fan-assisted or atmospherically vented gas or oil *appliances* or if there are no *combustion appliances*.
- B. Use this column if there is one fan-assisted *appliance* per venting system. Other than atmospherically vented *appliances* may also be included.
- C. Use this column if there is one atmospherically vented (other than fan-assisted) gas or oil *appliance* per venting system or one solid fuel *appliance*.
- D. Use this column if there are multiple atmospherically vented gas or oil *appliances* using a common vent or if there are atmospherically vented gas or oil *appliances* and solid fuel *appliances*.
- E. An equivalent length of 100 feet of round smooth metal duct is assumed. Subtract 40 feet for the exterior hood and ten feet for each 90-degree elbow to determine the remaining length of straight duct allowable.
- F. If flexible duct is used, increase the duct diameter by one inch. Flexible duct shall be stretched with minimal sags.
- G. Barometric dampers are prohibited in passive *makeup air* openings when any atmospherically vented *appliance* is installed.
- H. Powered *makeup air* shall be electrically interlocked with the largest exhaust system.

1346.6012 APPENDEX E, WORKSHEET E-1

(Residential Combustion air calculation method for Furnace, Boiler, and/or water heater in same space)

Step 1- Complete Vented combustion appliance information.

Furnace/ Boiler

_____ Draft Hood _____ Fan Assisted _____ Direct Vent _____ Input
(Not fan assisted) & Power vent

Water Heater

_____ Draft Hood _____ Fan Assisted _____ Direct Vent _____ Input
(Not fan assisted) & Power vent

Step 2- Calculate the *volume* of Combustion Appliance Space (CAS) containing combustion appliances. (L x W x H)

(The CAS includes all spaces connected to one another by code compliant openings) CAS Volume _____ Cu. Ft.

Step 3- Determine Air Changes Per. Hour (ACH)

Default ACH values have been incorporated into Table E-1 for use with Method B (KAIR Method)

If the Year of Construction or ACH is not known, use method 4a (Standard Method)

Step 4

4a. Standard Method.

Total Input of Combustion Appliances (Do not include direct vent appliances) Input _____ Btu/hr.

Use standard method Column in Table E-1 to find total Required Volume (TRV). TRV _____ Cu. Ft.

If CAS volume (from Step 2) **is greater than** TRV, no outdoor openings are needed.

If CAS volume (from Step 2) **is less than** TRV, then **go to step 5**

4b. Known Air Infiltration Rate (KAIR) Method

Total Input of Combustion Appliances (Do not include direct vent appliances) Input _____ Btu/hr.

Use Fan Assisted Appliances Column in Table E-1 to find Required Volume Fan Assisted (RVFA) _____

Total Btu/hr. input of all non-fan Assisted Appliances Input: _____ Btu/hr.

Use Non-Fan Assisted Appliances Column in Table E-1 to find Required Volume Non-Fan Assisted (RVNFA)

RVNFA: _____ Cu.Ft.

Total Volume required (TVR) = RVFA + RVNFA = _____ Cu. Ft.

If CAS Volume (from Step 2) **is greater than** TRV then no outdoor openings are needed.

If CAS volume (from Step 2) **is less than** TRV, then **go to step 5**

Step 5- Calculate the ratio of available interior volume to the total required volume.

$$\text{Ratio} = \text{CAS Volume (from step 2)} \text{ divided by TRV (from Step 4a or 4b)} \quad \text{Ratio} = \frac{\quad}{\quad} = \quad$$

Step 6- Calculate reduction factor

$$\text{RF} = 1 \text{ minus ratio.} \quad \text{RF} = 1 - \quad = \quad$$

Step 7- Calculate single outdoor opening as if all combustion air is from outside.

$$\text{Total Btu/hr. input of all Combustion appliances in the same CAS (Except Direct Vent) Input} \quad \text{Btu/hr.}$$

$$\text{Combustion Air opening Area (CAOA)} = \text{Total Btu/hr. divided by Btu/hr. per Sq. inch}$$

$$\text{CAOA} = \frac{\quad}{3000 \text{ Btu/hr. per Sq. Inch}}$$

Step 8- Calculate Minimum CAOA.

$$\text{Minimum CAOA} = \text{CAOA multiplied by RF.} \quad \text{Min. CAOA} = \quad \times \quad + \quad \text{Sq. Inches}$$

Step 9- Calculate Combustion Air opening Diameter (CAOD)

$$\text{CAOD} = 1.13 \text{ multiplied by Sq. root of Minimum CAOA} \quad \text{CAOD} = 1.13 \times \text{minimum CAOA} = \quad \text{Inches}$$