

CALCULATION WORKSHEET: AIR CHANGES PER HOUR

Step 1:

- Enter the building parameters in the spaces to the right.

Calculation parameters:

No. of stories: _____

Area of living space: _____

Ceiling height: _____

Interior design temperature: _____

Coldest 1-week outdoor temperature: _____

Step 2:

- Determine the effective air leakage rate, A_L , by entering the number, area, or length construction features in Table 1.
- Multiply by the factors in Table 1 and add to find the total A_L .

Table 1 Effective Air Leakage Area

Area	Component	Description	Size/No.	A_L /Unit	A_L
Ceiling		General		0.026 in. ² /ft ²	
Walls		Cont. air inflt. barrier		0.0022 in. ² /ft ²	
Joints	Top plate	Band joist		0.005 in. ² /ftc	
	Sole plate	Caulked		0.04 in. ² /ftc	
Windows	Exterior	Double hung with pressurized		0.023 in. ² /ftc	
	Framing	Wood, caulked		0.004 in. ² /ft ²	
Doors	Front exterior	Double		0.12 in. ² /ft ²	
	Patio	Sliding		0.079 in. ² /ft ²	
	Framing	Doors, wood		0.004 in. ² /ft ²	
	Attic	Fold down		3.4 in. ² ea.	
Fireplace		With damper closed		0.62 in. ² /ft ²	
Exhaust vents	Kitchen	With damper closed		0.8 in. ² ea.	
	Bathroom	With damper closed		1.6 in. ² ea.	
	Dryer	With damper		0.46 in. ² ea.	
Penetrations	Plumbing	Vent stacks		0.3 in. ² ea.	
	Vent	Furnace/water heater		3.1 in. ² ea.	
	Wiring	Caulked or gasketed		0.3 in. ² ea.	
	Electrical	Interior outlets on outside walls		0.023 in. ² ea.	
	Ceiling lights	Surface mounted		0.13 in. ² ea.	
				$A_L =$	

Step 3:

- Calculate the air changes per hour (ACH).
- Calculate the house volume. The 0.8 reduction factor corrects for interior spaces not available for combustion (i.e., closets, wall spaces, cabinets).
- Determine values for C_S and C_W (from Tables S3.2, S3.3, or S3.4 as appropriate), and U .

House volume = Area × ceiling height × 0.8 =

 $C_S =$ (from Table S3.2)

 $C_W =$ (from Tables S3.3 and S3.4)

 $U =$
Step 4:

- Calculate the air flow through the house, Q .
- Calculate the air changes per hour, I .

$$Q = A_L / C_S \Delta t + C_W U^2$$

$$= \text{_____}$$

$$= \text{_____ cfm}$$

$$I = Q \times 60 \text{ min/hr/V}$$

$$= \text{_____}$$

$$= \text{_____ ACH}$$

Job: _____ **Prepared by:** _____ **Date:** _____