

## Air Replacement Time

The time to replace air inside a structure (or vehicle) is not a linear function of air exchange. A house with an air exchange of 1acph will not have 100% replacement of air in 1 hour. This is due to interior mixing of the air. Another way to say this is a house with an air exchange of 1 acph in a toxic plume for 1 hour will not have the same concentration as the outside air. Some of the toxic materials that enter the house will also exit the house. Some basic rules of thumb on replacement relationships are shown in Table 1, which is based on calculations made by Fletcher and Saunders (1994). The table shows the length of time to replace 63% and 95% of the air in structures with different air exchange rates. A house with 0.5 acph will take about 6 hours to exchange 95% of the inside air with outside air. At 32 acph, 95% of the air inside a moving automobile would be replaced in 8 minutes.

Replacement %	acph			
	.25	.5	1.0	2.0
63%	4 h	2 h	1 h	0.5 h
95%	12 h	6 h	3 h	1.5 h

Fletcher B. and C. J. Saunders. 1994. "Air change rates in stationary and moving vehicles," *Journal of Hazardous Materials* 38: 243-246.