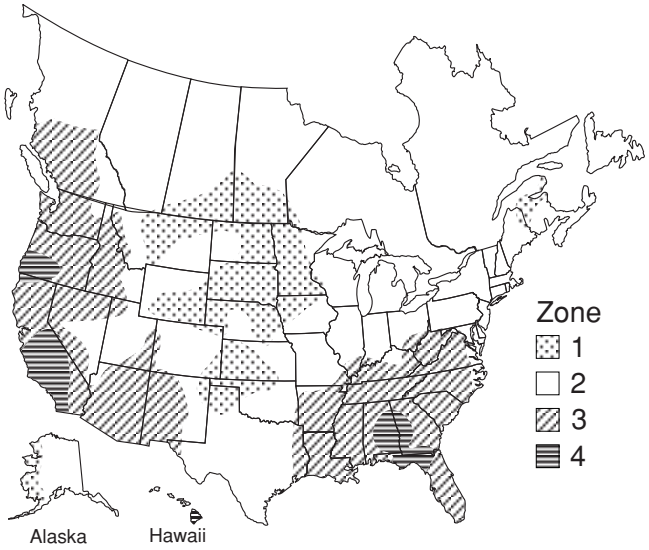
A-11 Building Tightness Limits

In the mid 1980s, researchers at Lawrence Berkeley Laboratory (LBL) developed a procedure for estimating natural air-leakage from measured blower-door readings. The number 20 had previously been used to convert 50-pascal blower-door airflows to natural airflows. The procedure outlined below gives a more accurate conversion factor "n". The formulas provided below the instructions describe how n is used. The last formula is the Building Tightness Limit (BTL) and is based on each occupant of a building needing 15 cfm of natural air exchange. This method was developed by George Tsongas using original methodology from LBL. See also "Building tightness limits (BTL)" on page 79.



Step 1: Find your climate zone on the map.
Step 2: Match that zone number with the same zone number on the table.
Step 3: Identify your site as well-shielded, normal, or exposed.
Step 4: Identify the column for your building's number of stories.
Step 5: Follow that column down to where it meets the row corresponding to your climate zone and shielding to find n.
Step 6: Use n to convert 50-pascal airflows to natural or vice versa.
Step 7: Find the building tightness limit (BTL), using the formula listed below, or other protocol.

n-Factor Table

Zone ↓	# of stories →	1	1.5	2	3
1	Well-shielded	18.6	16.7	14.9	13.0
	Normal	15.5	14.0	12.4	10.9
	Exposed	14.0	12.6	11.2	9.8
2	Well-shielded	22.2	20.0	17.8	15.5
	Normal	18.5	16.7	14.8	13.0
	Exposed	16.7	15.0	13.3	11.7
3	Well-shielded	25.8	23.2	20.6	18.1
	Normal	21.5	19.4	17.2	15.1
	Exposed	19.4	17.4	15.5	13.5
4	Well-shielded	29.4	26.5	23.5	20.6
	Normal	24.5	22.1	19.6	17.2
	Exposed	22.1	19.8	17.6	15.4

$$ACH_n = \frac{ACH_{50}}{n}$$

$$ACH_{50} = ACH_n \times n$$

$$CFM_n = \frac{CFM_{50}}{n}$$

$$CFM_{50} = CFM_n \times n$$

$BTL(CFM_{50}) = 15CFM_n$ X # of occupants X n

Example BTL calculation

BTL = 15 CFM_n X 7 occupants X 15.5 = 1630 CFM_{50}