

ANSI/RESNET/ICC 380 Blower Door Test Correction Calculations¹

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Required pre-spreadsheet tool calculations:

Prior to entering data into the 380 Temperature and Altitude Correction Spreadsheet tool, the blower door test airflow must be adjusted to airflow at measurement conditions using manufacturer's instructions.

Spreadsheet calculations consist of the following steps:

Step 1: Convert blower door airflow (Q) to envelope air flow (Q_{env})

For a multi-point test:

For depressurization: $Q_{env} = Q * (\rho_{in} / \rho_{out})$

For pressurization: $Q_{env} = Q * (\rho_{out} / \rho_{in})$

where:

ρ_{in} = air density at indoor conditions

ρ_{out} = air density at outdoor conditions

For a single-point test (see ANSI/RESNET/ICC 380-2016 for CFM50 adjustment where tests pressure differences are unable to reach 50 Pa):

For depressurization: $Q_{env} = cfm50 * (\rho_{in} / \rho_{out})$

For pressurization: $Q_{env} = cfm50 * (\rho_{out} / \rho_{in})$

where:

ρ_{in} = air density at indoor conditions

ρ_{out} = air density at outdoor conditions

Step 2: Determine the envelope air flow coefficient and pressure exponent using an unweighted log-linearized linear regression technique using the following equation

For multi-point test:

$$Q_{env} = C * (\Delta P)^n$$

where:

C = envelope air flow coefficient

ΔP = indoor to outdoor pressure difference

n = pressure exponent

and where ΔP is adjusted by addition/subtraction for the baseline building pressure difference when blower door fan is sealed

Step 3: Convert to standard conditions (68°F and sea level)

For multi-point tests:

¹ See E779-2010, Appendix X1 for appropriate equations for the calculation of air density (ρ) and viscosity (μ) as a function of temperature and elevation above sea level.

$$C_0 = C * (\mu / \mu_0)^{(2n-1)} * (\rho / \rho_0)^{(1-n)}$$

where:

C = envelope air flow coefficient from Step 2

C₀ = envelope air flow coefficient at standard conditions

μ = air viscosity at test conditions

μ₀ = air viscosity at standard conditions

ρ = air density at test conditions

ρ₀ = air density at standard conditions

and where un-subscripted quantities refer to the values under the conditions of the test (indoor air for pressurization and outdoor air for depressurization), and the subscripted quantities refer to the values under the standard reference conditions

For single-point tests:

$$Q_0 = Q_{env} * (\mu / \mu_0)^{(0.3)} * (\rho / \rho_0)^{(0.35)}$$

where:

Q₀ = corrected cfm50 envelope air flow at standard conditions

μ = air viscosity at test conditions

μ₀ = air viscosity at standard conditions

ρ = air density at test conditions

ρ₀ = air density at standard conditions

and where un-subscripted quantities refer to the values under the conditions of the test (indoor air for pressurization and outdoor air for depressurization), and the subscripted quantities refer to the values under the standard reference conditions

Step 4: Calculate corrected envelope leakage parameters

For multipoint tests:

$$ELA \text{ (in}^2\text{)} = C_0 * 0.567 * 4^{(n-0.5)}$$

$$\text{corrected cfm50} = C_0 * 50^n$$

$$\text{corrected ach50} = C_0 * 50^n * 60 / \text{InfVol}$$

where:

C₀ = corrected envelop air flow coefficient value from Step 3

n = pressure exponent from Step 2

InfVol = Infiltration volume of building

For single point tests:

$$ELA \text{ (in}^2\text{)} = Q_0 / 18.2$$

$$\text{corrected cfm50} = Q_0$$

$$\text{corrected ach50} = Q_0 * 60 / \text{InfVol}$$

where:

Q₀ = corrected cfm50 envelope air flow from Step 3

InfVol = Infiltration volume of building