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DIFFERENTIAL AIR PRESSURE CALCULATION - ADMINISTRATION BUILDING

NOTES:

2013 ASHRAE Handbook - HVAC Application Chapter 53

$$Q = 776CA \sqrt{\frac{2\Delta P}{\rho}}$$

Q = Volumetric Flow Rate (CFM)
 C = Flow Coefficient, 0.65
 A = Leakage Area (ft²)
 ΔP = Differential Pressure (in. W.G.)
 ρ = Gas Density, 0.0765 (lb/ft³)

Equation 11 taken from 2013 ASHRAE Handbook - HVAC Application Chapter 53

Flow/Leakage Area Calculations:

Table 1

Structural Component	Quantity	Door Height (ft)	Door Length (ft)	Door Gap (in)	Door Gap (ft)	Door Leakage Area (ft ²)	Total Leakage Area (ft ²)
West Door	1	7	3	0.0625	0.0052	0.104	0.10
South Door	1	7.5	3	0.0625	0.0052	0.109	0.11
						Total =	0.21

Area Ratio values taken from: 2013 ASHRAE Handbook - HVAC Application Chapter 53

Structural Component	Quantity	Height (ft)	Length (ft)	Depth (ft)	Area (ft ²)	Area Ratio A/A _w	Total Leakage Area (ft ²)
North Wall	1	9	46.5	-	419	0.00017	0.07
South Wall	1	9	46.5	-	396	0.00017	0.07
East Wall	1	9	37.5	-	338	0.00017	0.06
Ceiling	1	-	46.5	37.5	1744	0.000052	0.09
Floor	1	-	46.5	37.5	1744	0.000052	0.09
						Total =	0.38

Height refers to ceiling elevation per Architectural drawings

Height, Width, Depth dimensions noted in the table above are based on Architectural drawings

Total Flow Area:

Coefficient: C = 0.65

(Summed from Table 1) A = 0.59 ft²

Pressure Difference: ΔP = 0.05 In. W.G. (Environmental Conditions Specification 01 11 80 - 3)

Gas Density ρ = 0.0765 lb/ft³

Volumetric Flow Rate: Q = 341 CFM

Q = 341 CFM Use 350 CFM

A difference of 350 CFM is required between Outside Air and Exhaust Air to develop a positive differential pressure of 0.05 In. W. G.

Exhaust Air in Administration Building is calculated at 570 CFM.

Total Outside Air to Administration Building = 570 CFM + 350 CFM = 920 CFM