

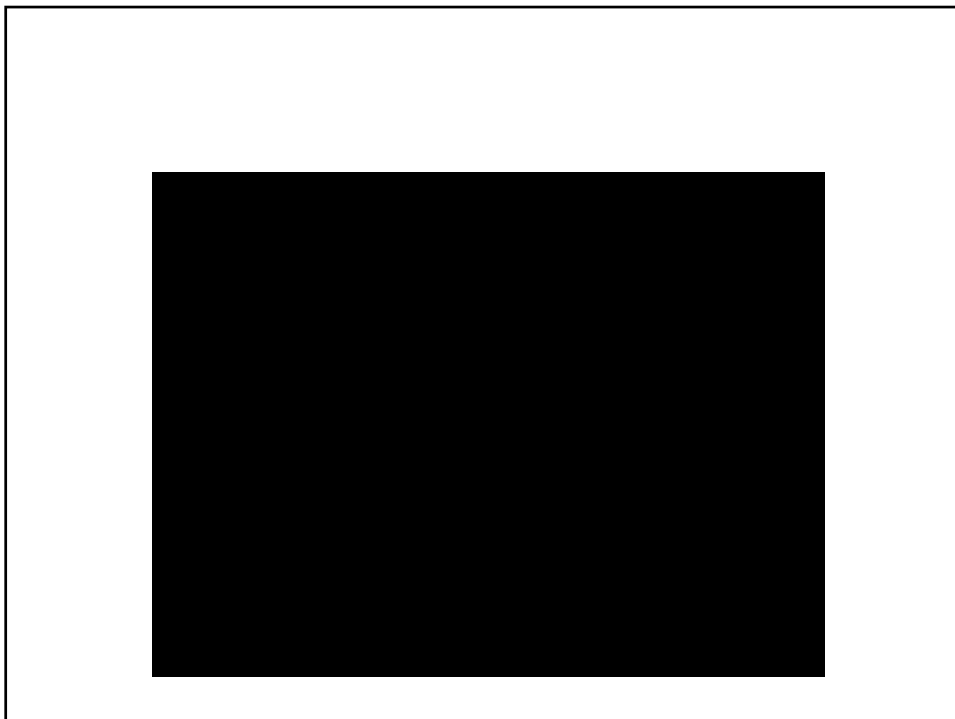
Air Tightness in New and Retrofitted US Army Buildings - Whole Building Testing Study



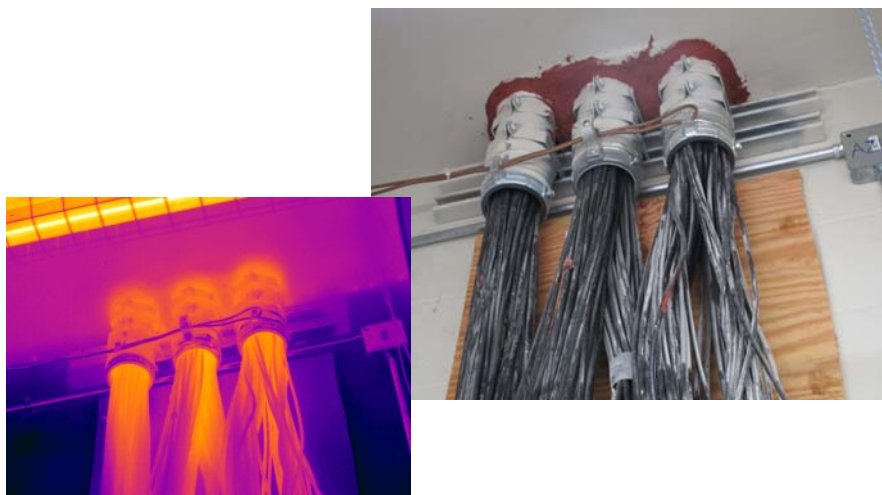
- 285 DoD buildings
- May 2009 – August 2012
- 38 DoD installations
- All climate zones in the United States
- One to nine stories
- Building envelope areas ranging from 1,122 ft² to 371,099 ft²
- All building types
- New and Renovation Construction

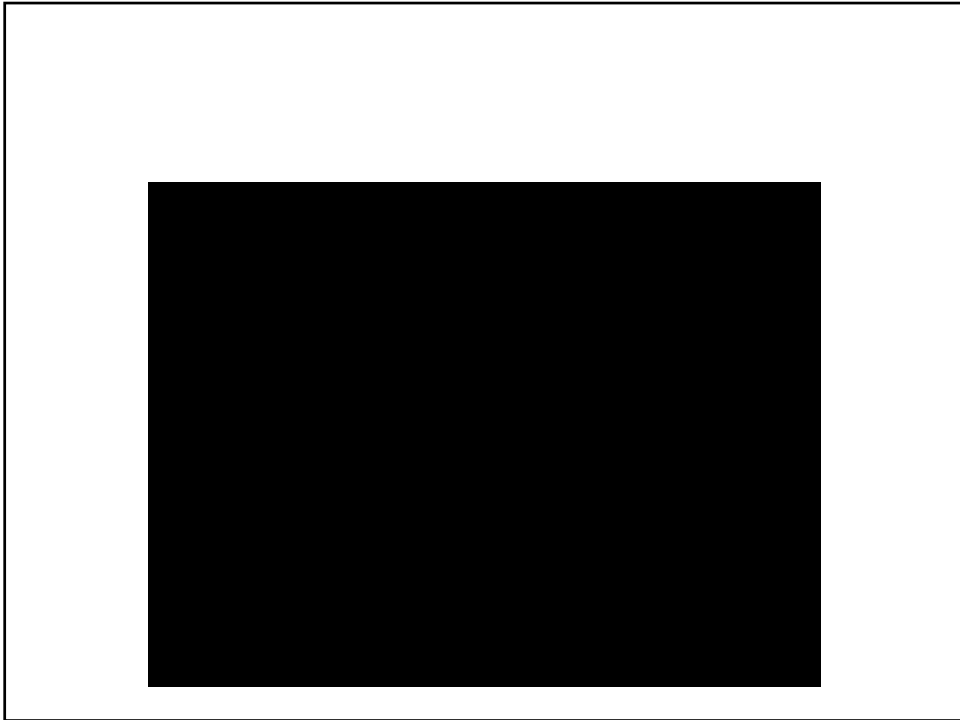
Lessons Learned Poly Vapor Barrier Air Barrier





All Trades Are Accountable





Case Study - Detroit Arsenal
Building 270



Test Set-Up



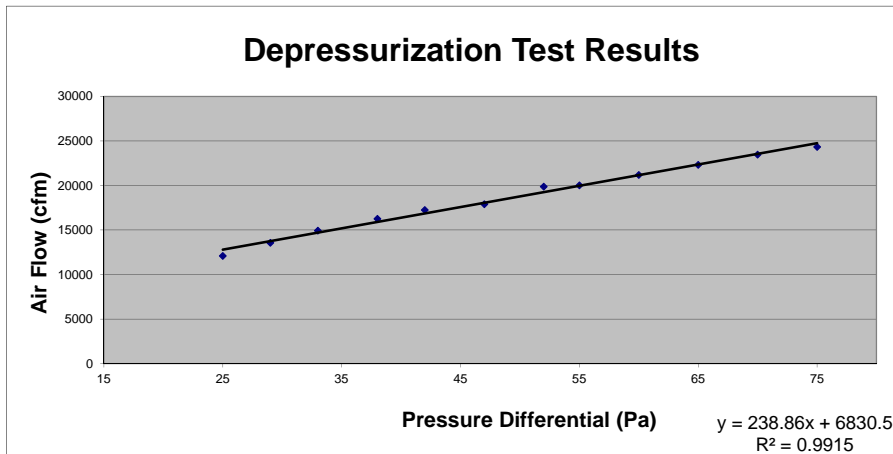
Test Set-up



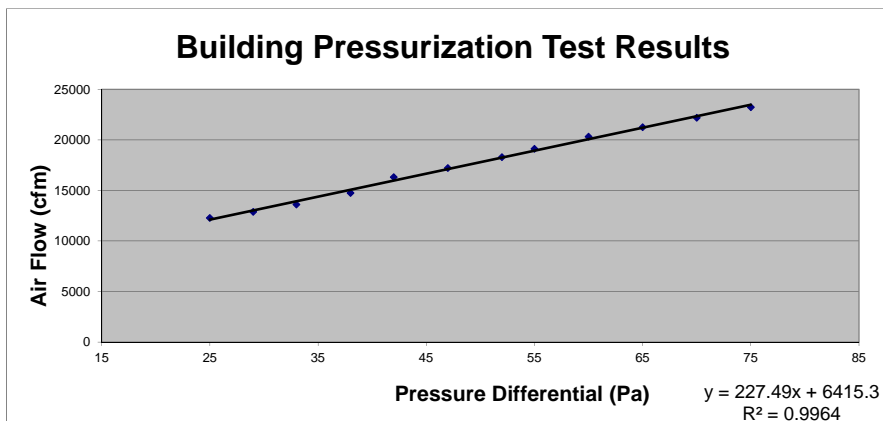
Target Air Leakage

USACE	cfm/sf@75Pa
<i>RFP Requirement</i>	<i>.25cfm/sf @75PA</i>
<i>Detroit Arsenal Bldg. 270</i>	<i>Envelope SF: 144,622</i>
<i>Allowable leakage rate</i>	<i>36155.5 cfm</i>

Data



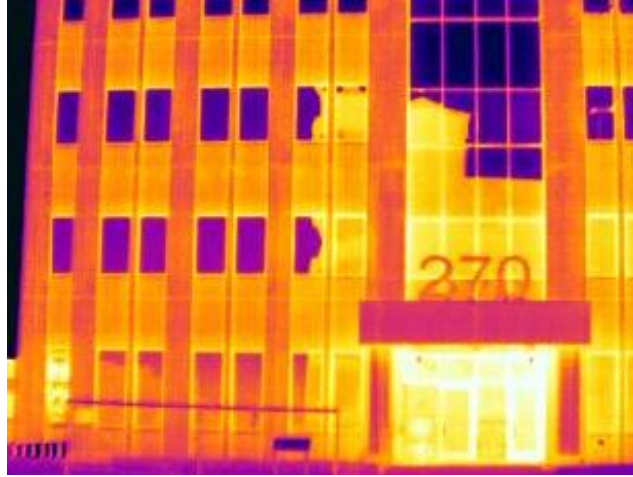
Data



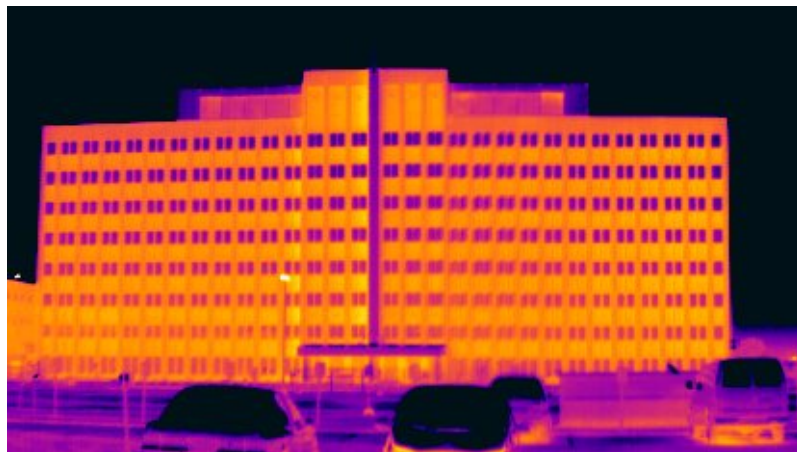
Results

Depressurize	Pressurize
0.168	0.161
24,330 cfm/75	23,235 cfm/75
Average = 0.16	
- Data correlation > 99%	

Whole Building Test



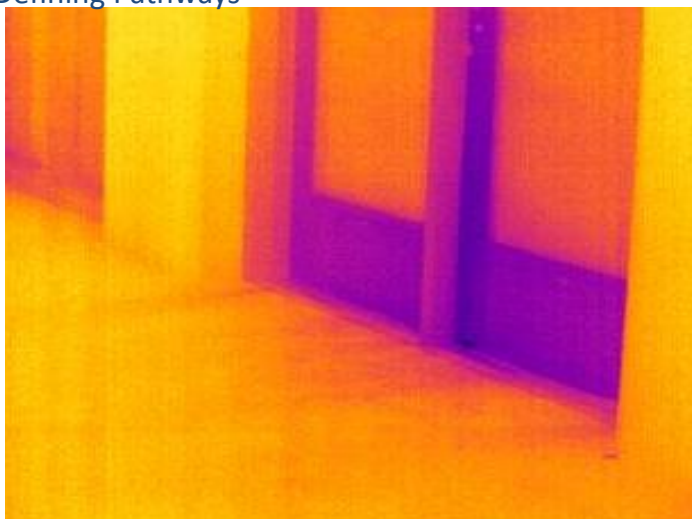
Whole Building Test



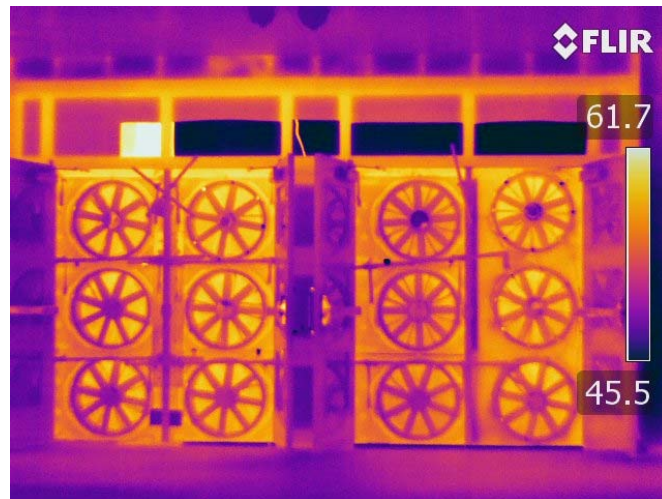
Whole Building Test



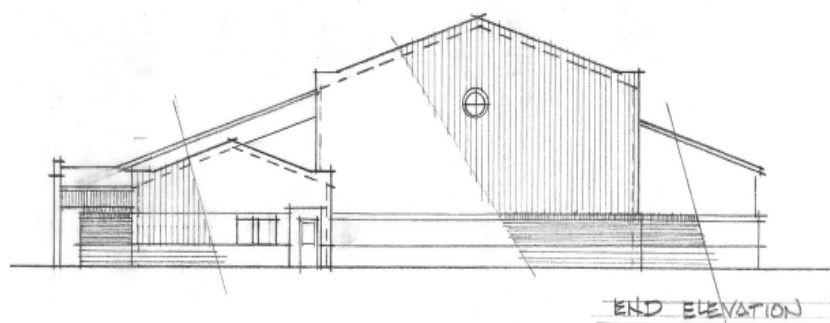
Defining Pathways

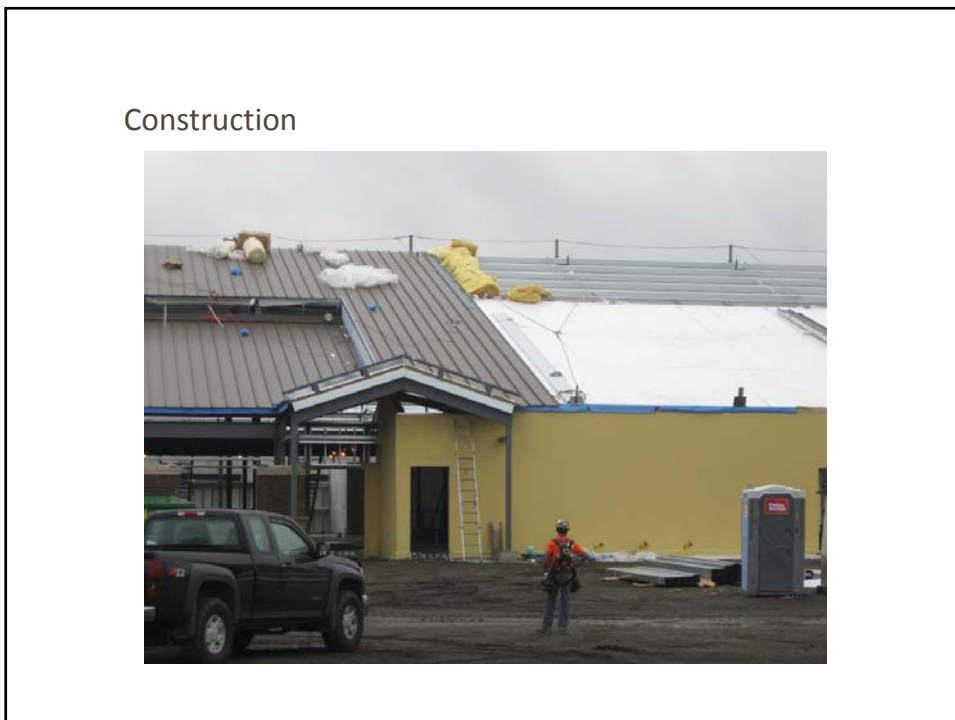
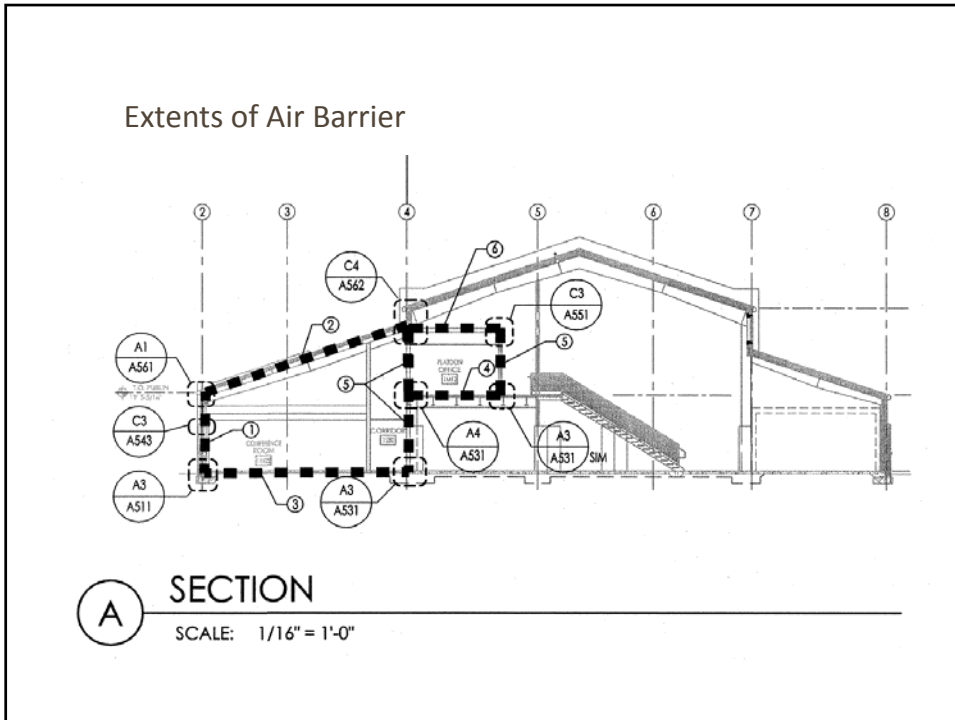


Envelope Size...



Case Study 5-5 ADA COF - Joint Base Lewis-McChord, WA





Construction



Construction



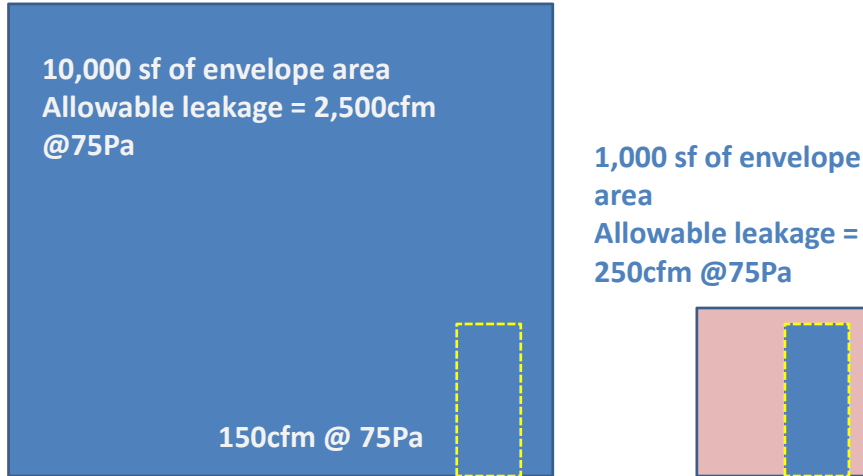
Target Air Leakage

USACE	cfm/sf@75Pa
RFP Requirement	.25cfm/sf @75PA
5-5 COF Admin Office Area	Envelope SF 51,352
Allowable leakage rate	12,838 cfm
5-5 ADA COF Mezzanine Office	Envelope SF 4,887
Allowable leakage rate	1222 cfm

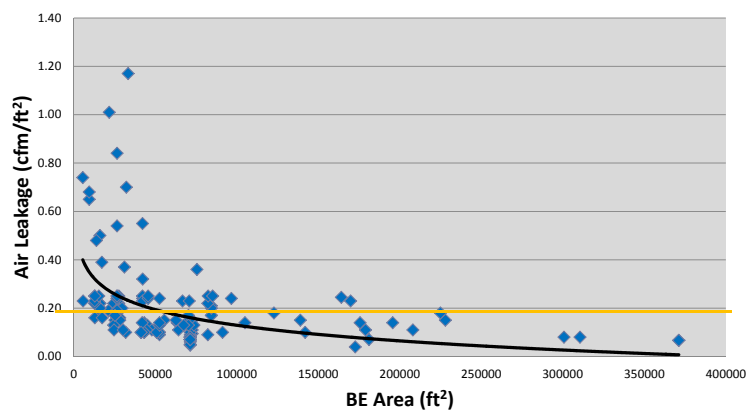
Results

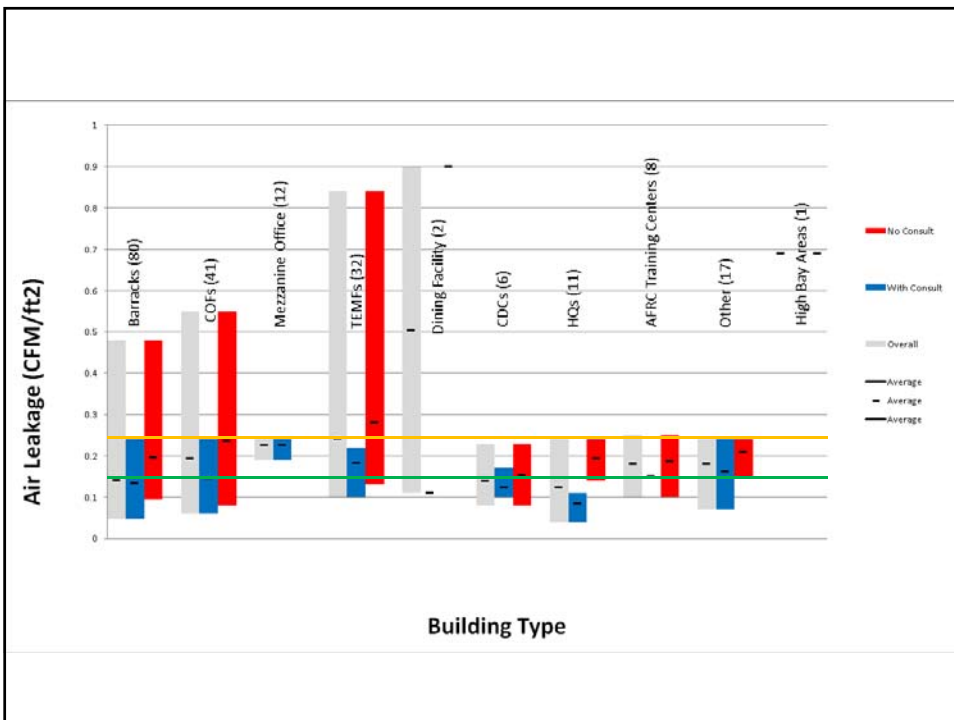
Admin Area	Mezzanine Offices
0.063	0.209
3,260 cfm/75	1,020 cfm/75

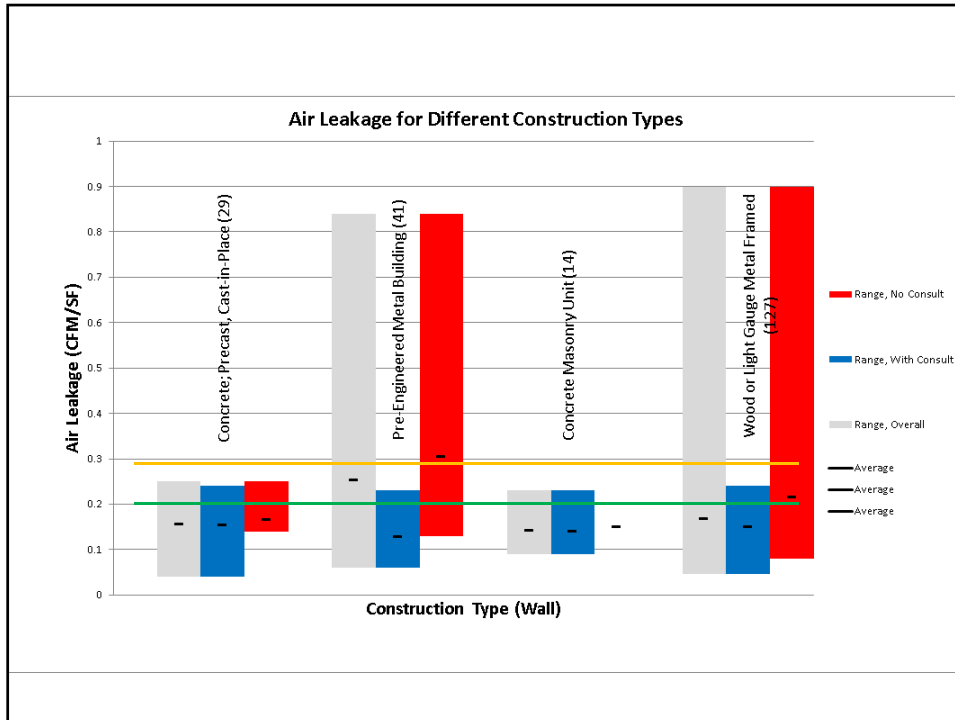
Proportion of Operational Air Leakage



Leakage Rate vs. Building Size







Success of the Air Tightness Requirement

- Achievable
- Applicable
- Does not limit construction type
- Does not limit construction materials
- Building envelope discipline



Discussion

