



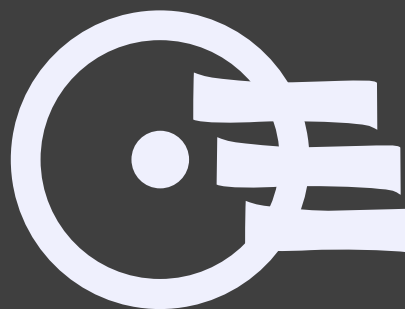
Airtightness: Building Enclosure Commissioning 101

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Women in Building Science

Jessica Allen, Climasure – ATTMA Level 2 tester



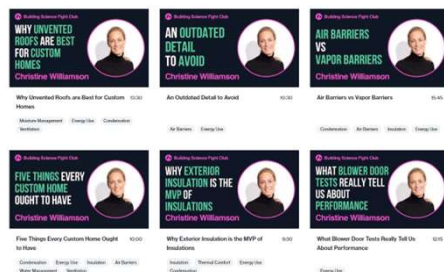
ATTMA Level 2 Registered Air Tightness Tester

<https://www.bcta.group/attma/members/air-tightness-testers/australia/>

Christine Williamson

<https://www.instagram.com/buildingsciencefightclub/>

<https://acelabusa.com/courses>



POLL

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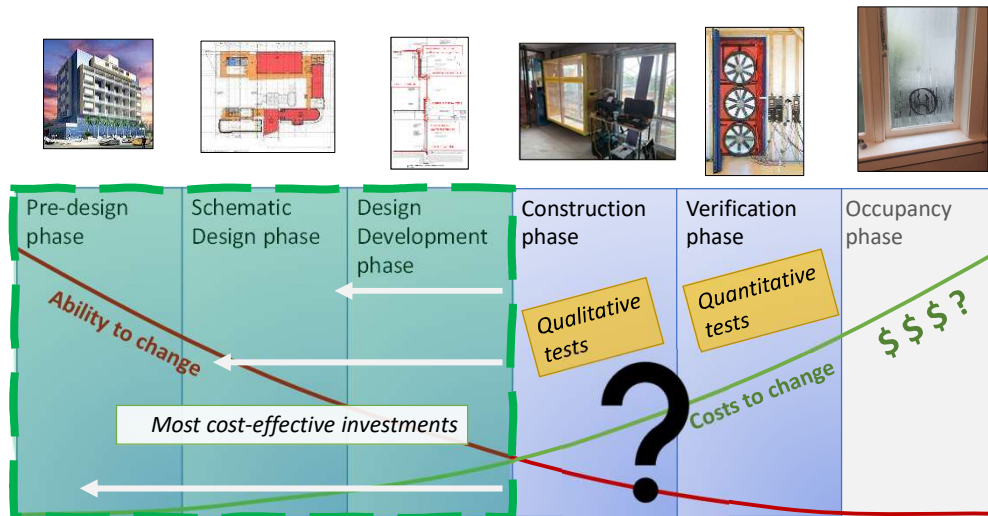
What is Great? What is Good?

Research / Standard / Code	Minimum	Normal Practice	Best Practice
Passive House for large buildings	-		0.6 m ³ /h/m ²
NCC 2022 (optional) - Commercial (certain climate zones and classes)	5 m ³ /h/m ²		
NCC 2022 (optional) - Residential	10 m ³ /h/m ²		
CSIRO study, 2015 – Residential	-	~15 m ³ /h/m ²	-
UK	-	10 m ³ /h/m ²	1 – 5 m ³ /h/m ²
US Building Code (IECC 2021)	5.6 m ³ /h/m ²		
United States Air Force, Navy specification	3.5 m ³ /h/m ²		
Australian Dept of Defence – Offices	-	5 m ³ /h/m ²	2 m ³ /h/m ²
Green Star Design and As-Built v1.2/v1.3	20 m ³ /h/m ²	7 m ³ /h/m ²	2 m ³ /h/m ²
Green Star Buildings	No target - focus on building <i>commissioning</i>		
All results expressed as permeability at 50 Pascals			

All end result specifications. How to reach them?



Building Enclosure Commissioning (BECx) process



Cx ≠ Not just tweaks to systems or measurements at the end

The essence of commissioning

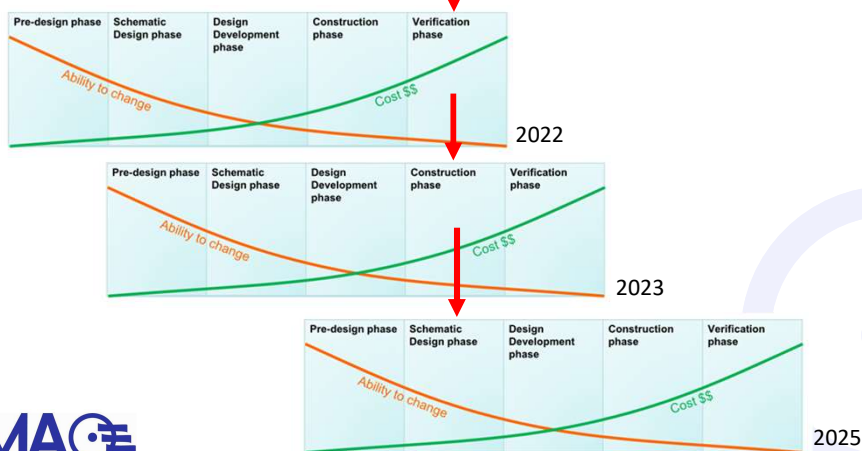
- Setting expectations
- Checking as you go
- Feedback loops
- Learning and improving



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Apply lessons learned



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Basics of testing

- Qualitative testing
- Quantitative testing
- Limits of each approach



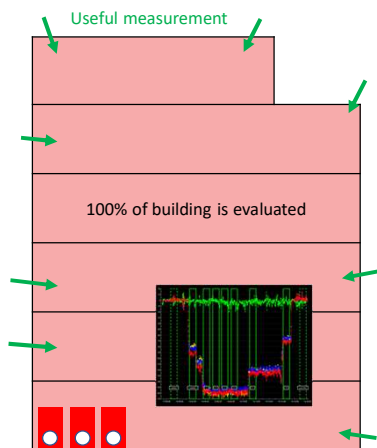
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Test methodologies

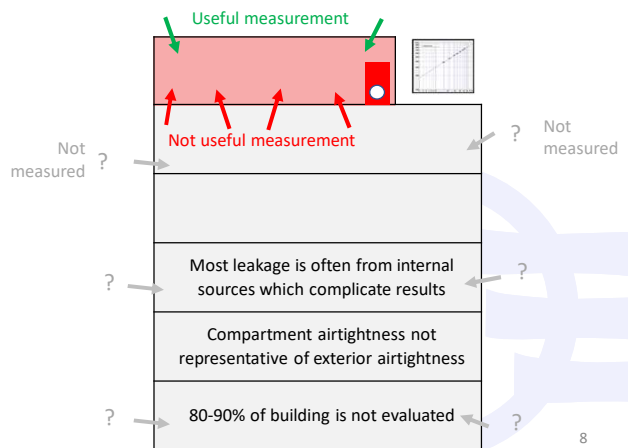
Not *quantitative* means not helpful to compare the *numbers* of this test to another test, or to a standard

Simple example: can this number be used for NCC? No.

Quantitative



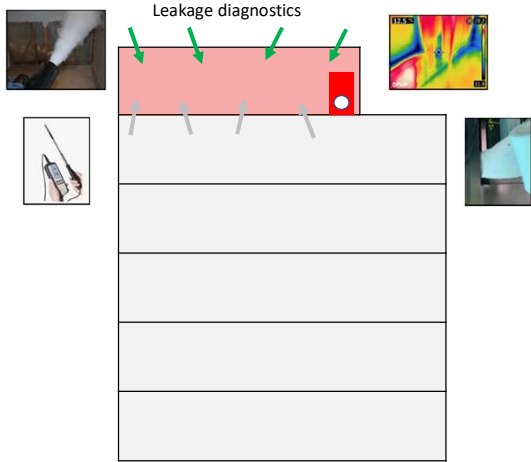
Not quantitative



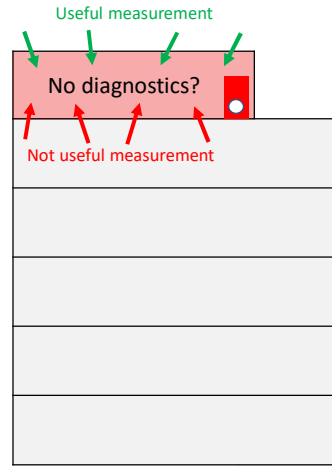
Test methodologies

Not qualitative means no evaluation of the causes of the problems

Qualitative

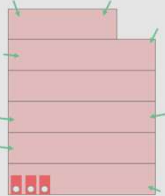


Not qualitative

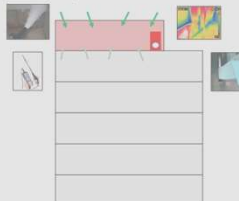


Commonly specified tests

Quantitative

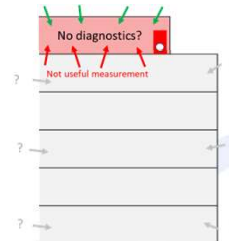


Qualitative



Not quantitative

Not qualitative



Valuable tests will be quantitative and/or qualitative

Examples of negative outcomes...

Example Building 1

If finding and documenting defects is not required



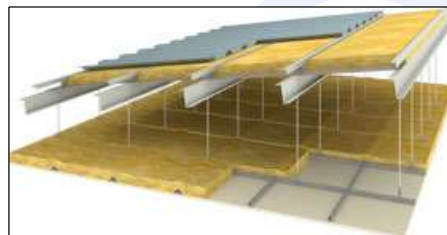
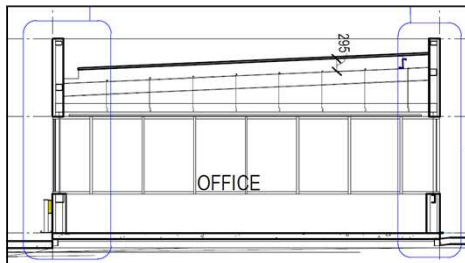
Result just under arbitrary target of 20 m³/hr.m², but no one required to look for leaks...¹¹

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Feedback loop? No change to future designs encouraged

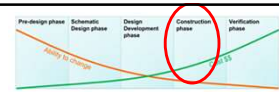
- THE most common roof assembly in commercial construction in Australia
- Unless feedback is given, designs won't change.



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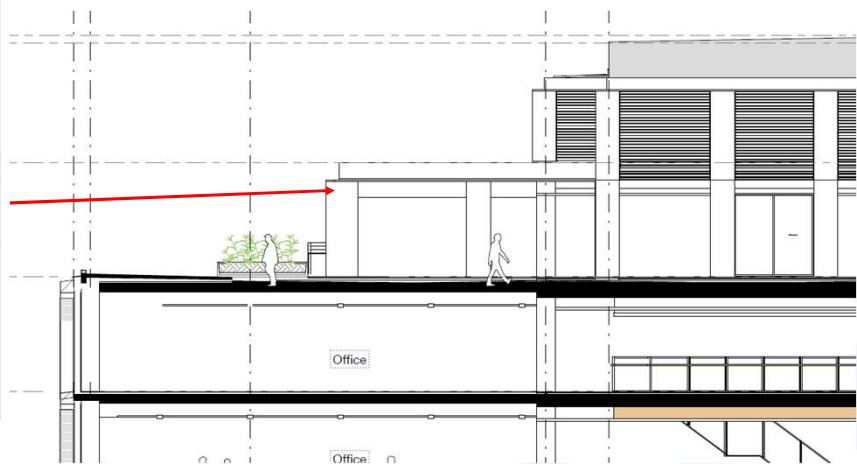
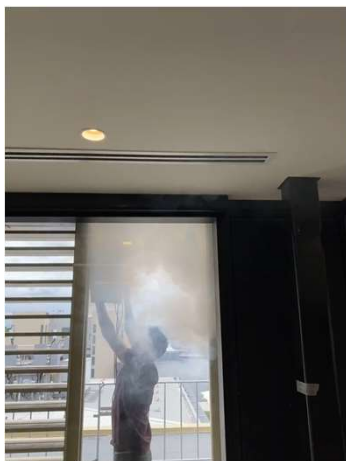
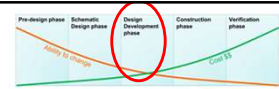
Example Building 2



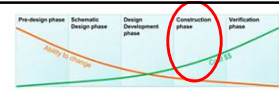
Testing at the end won't fix the problems



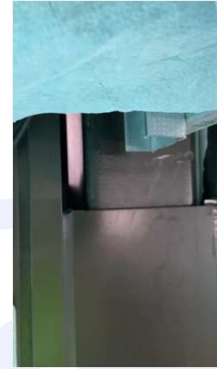
Especially if you're not asked to look for them



Example Building 3



Poor performance has **real consequences**.
Fire system can't operate without pressure.



Example of bogus quantitative test completed.
Qualitative diagnostic test needed to find and fix leaks.



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Green Star Buildings: encouraging better BECx

ATMA Commissioning for Airtightness
Milestone Guide – beta due spring 2022



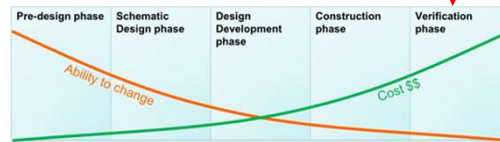
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Top things to adopt

- Specify whole-building test
- If you specify small-scale tests, also
 - Require documentation of leaks
 - Require retrospective design review
- Use ATTMA Commissioning Milestone Guides to facilitate discussion

Whole-building test is a step above standard practice.
Green Star Buildings incentive?



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Watch for upcoming
workshops on
Commissioning for
Airtightness

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