BUILD TEST SOLUTIONS

The Real Value of Airtightness Testing:

More Than Just Compliance

Luke Smith

BTS Webinar Series #3

Build Test Solutions: Who We Are

- Building performance measurement **experts**
- Pioneering, **practical** measurement technologies
- Accurate, **actionable** insight

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Today We'll Cover

- Why airtightness is important
- Market drivers and use cases
- Embedding airtightness testing into practice

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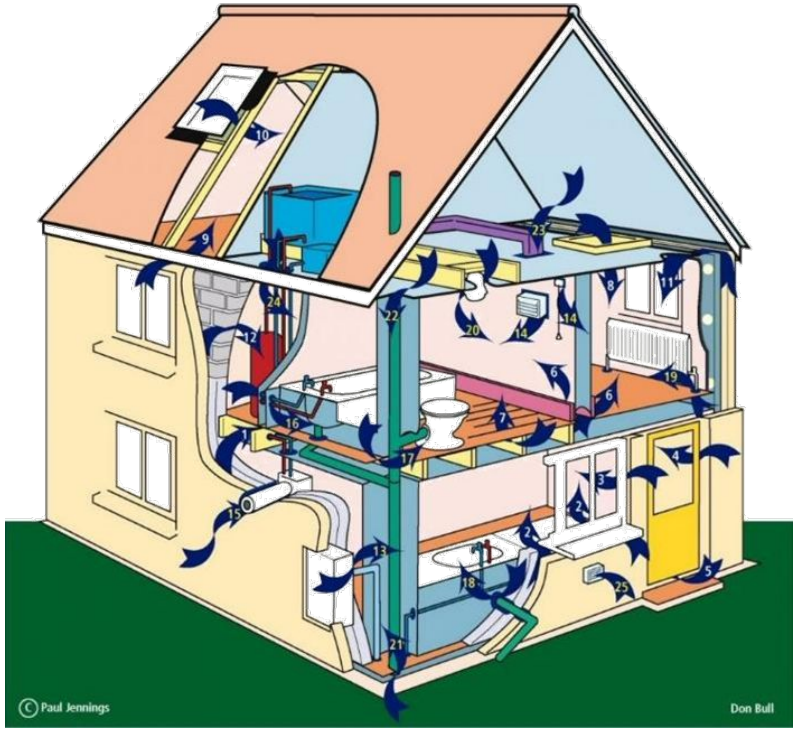
What is airtightness?

- Airtightness focuses on the elimination of all unintended air leakage into and out of a building.
- Air leakage can occur in a building due to its construction, poor workmanship or as a result of general fabric degradation.
- Uncontrolled air leakage can typically account for 10-30% of total heat loss.
- Improving airtightness reduces heat loss, reduces running costs and creates a more comfortable living environment.



Source: Paul Jennings, Aldas Ltd

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Why is airtightness important?

- **Energy efficiency**: Reducing heat loss in winter. True low hanging fruit!
- **Comfort**: airtight buildings are better at maintaining stable temperatures.
- **Building durability**: reduce excessive moisture build-up and damage to homes. Airtightness generally a great indicator for quality of workmanship.
- **Indoor air quality**: Regain control over the ingress and egress of internal and external pollutants. BUILD TIGHT, VENTILATE RIGHT

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Pulse and Leak Checker

- Pulse invented at University of Nottingham 2000s
- BTS created to commercialise 2015
- Dynamic method
- Results at low pressure (4Pa)
- Hardware & browser UI
- Accepted in BRs 2022 (CIBSE TM23)
- Leak Checker = complementary diagnostics tool

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Airtightness and new build

- In the UK, all new developments require an airtightness test on completion (Part L1a and L2a, since 2013) (some non-domestic exceptions)
- Testers must be suitably trained and registered with a competent persons scheme (ATTMA or Elmhurst)
- Must follow CIBSE TM23 - this describes both the blower door and pulse method
- Maximum permitted air permeability 8.0 $m^3/(h.m^2)$ @ 50Pa. Most developers readily build to an air permeability of 5 $m^3/(h.m^2)$ @ 50Pa or better.

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Airtightness and new build

- In a 2010 update, Building Regulations AD F made the explicit link between airtightness and ventilation system choice:
  - Highly airtight dwellings (Design AP50 of 5 or as-built of 3 $m^3/(h.m^2)$ @ 50Pa)
  - Less airtight dwellings (As-built AP50 of greater than 3 $m^3/(h.m^2)$ @ 50Pa)
- **There's an airtightness and ventilation risk that developers must actively manage**
- **More ambitious airtightness targets tend to drive a culture of intermediate testing and checking + more conscious consideration of ventilation**

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Airtightness and retrofit

- As per new build in relation to competency and procedures i.e. CIBSE TM23
- **PAS2035:2023** requires *every property* to have an airtightness and air leakage testing strategy (8.2.35 and 8.2.36).
- **Part F section 3** - ADF requirements triggered when replacing or modifying the existing ventilation system or installing energy efficiency measures
    - **3.7** = assessment of ventilation needs by means of expert advice and air permeability testing
    - **4.9** = ventilation system air flow rate testing
- RdSAP 10 permits the input of **airtightness into EPCs**. Full SAP and SBEM also permits this.
- Airtightness tests can also be used in MCS 12831 heat loss calculations for **heat pump sizing**.
- PAS2035:2023 Annex C IAA **Background ventilation testing**

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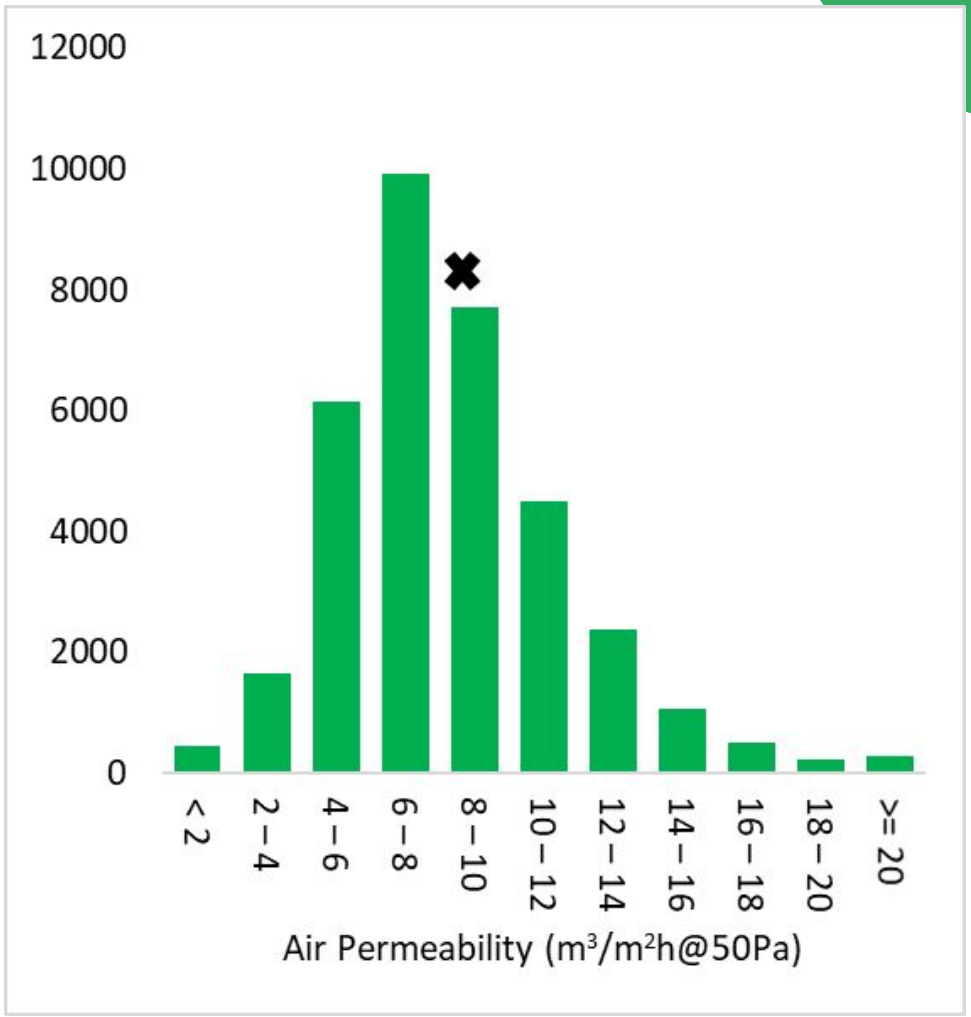
Airtightness and retrofit

- Most Pulse tests uploaded to a central database
- First significant sample of existing UK buildings
- Mean 8.3m^3/m^2h@50Pa
- Standard deviation 3.6
- Coefficient of variation **43%**



Profile based on 35,000 whole building Pulse airtightness tests

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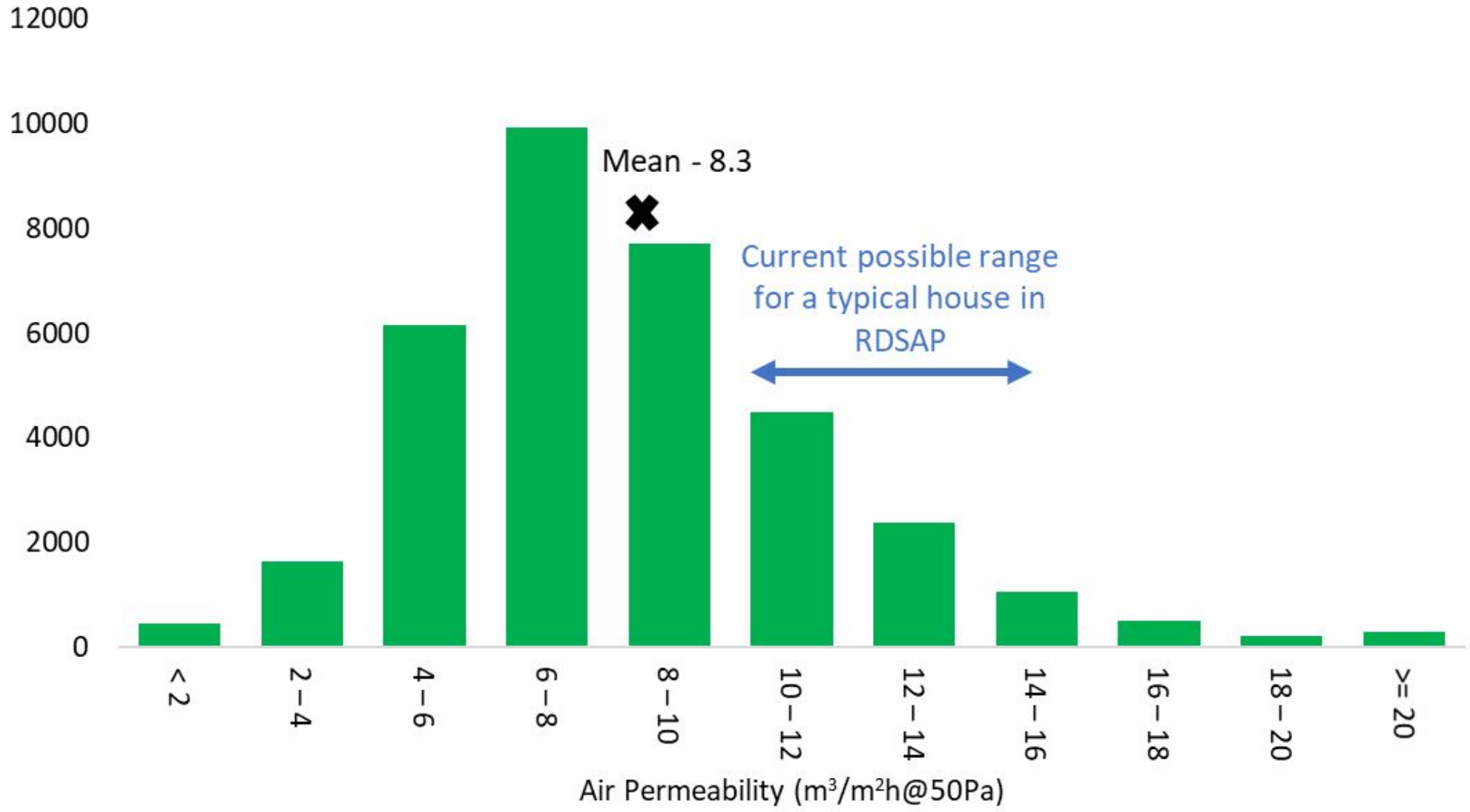
Airtightness & RDSAP



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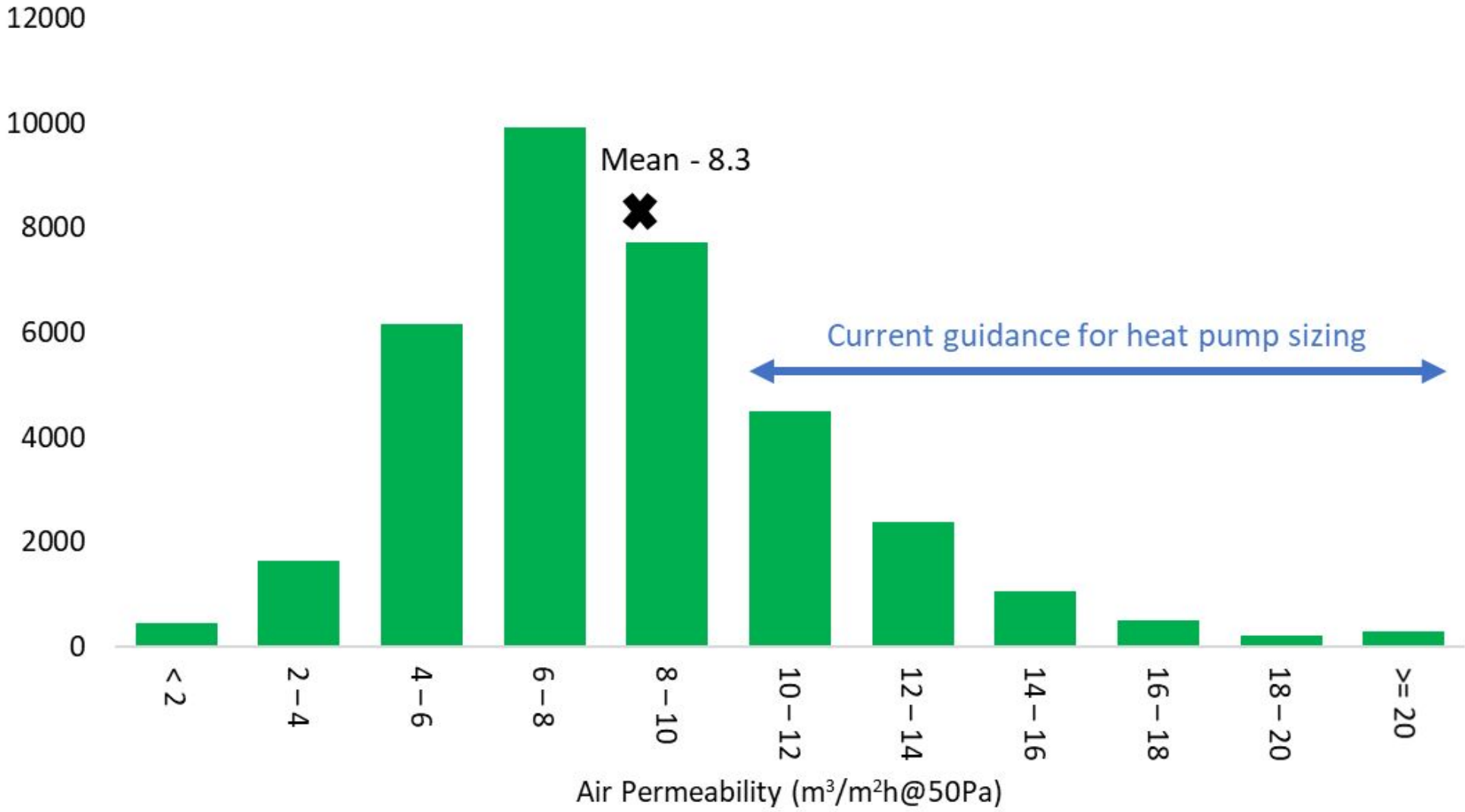
Airtightness & Heat Pump Sizing



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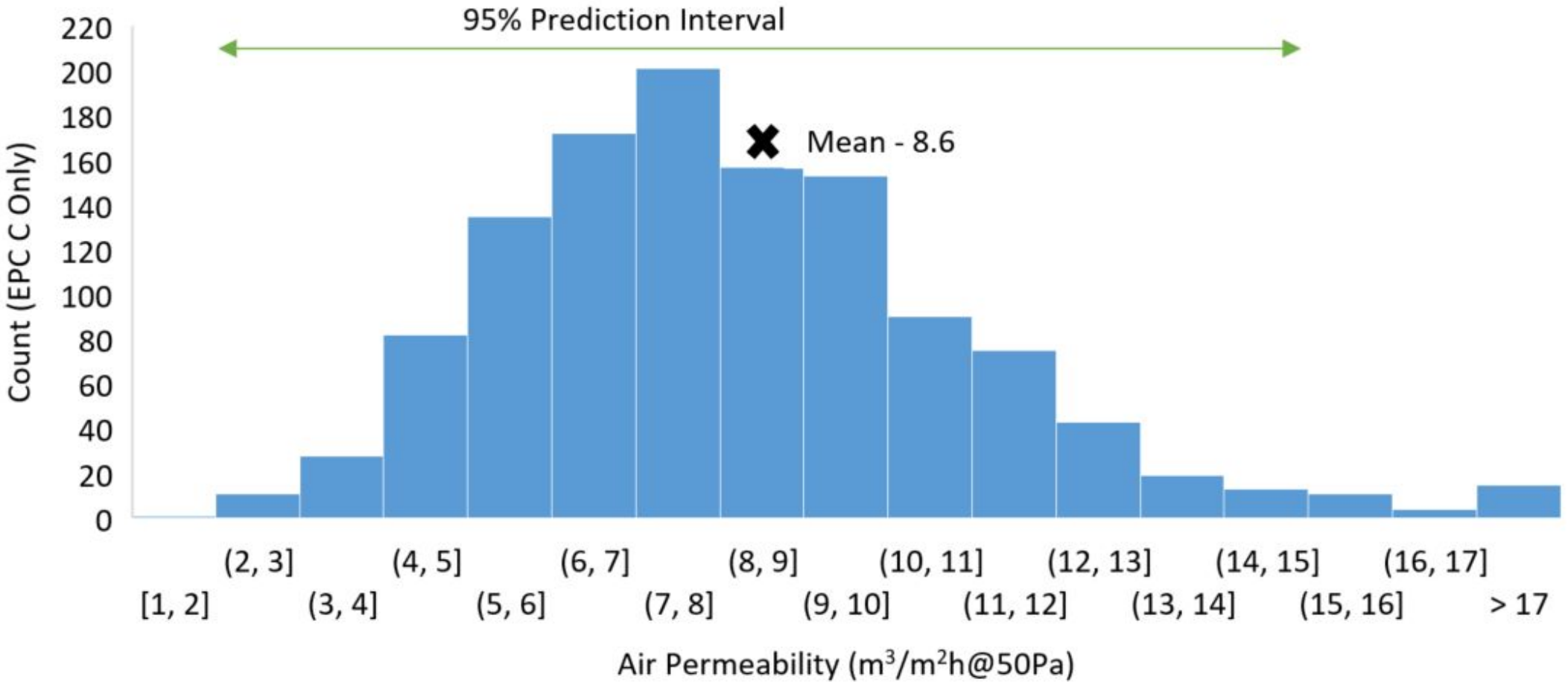
Can we use db to better estimate airtightness?



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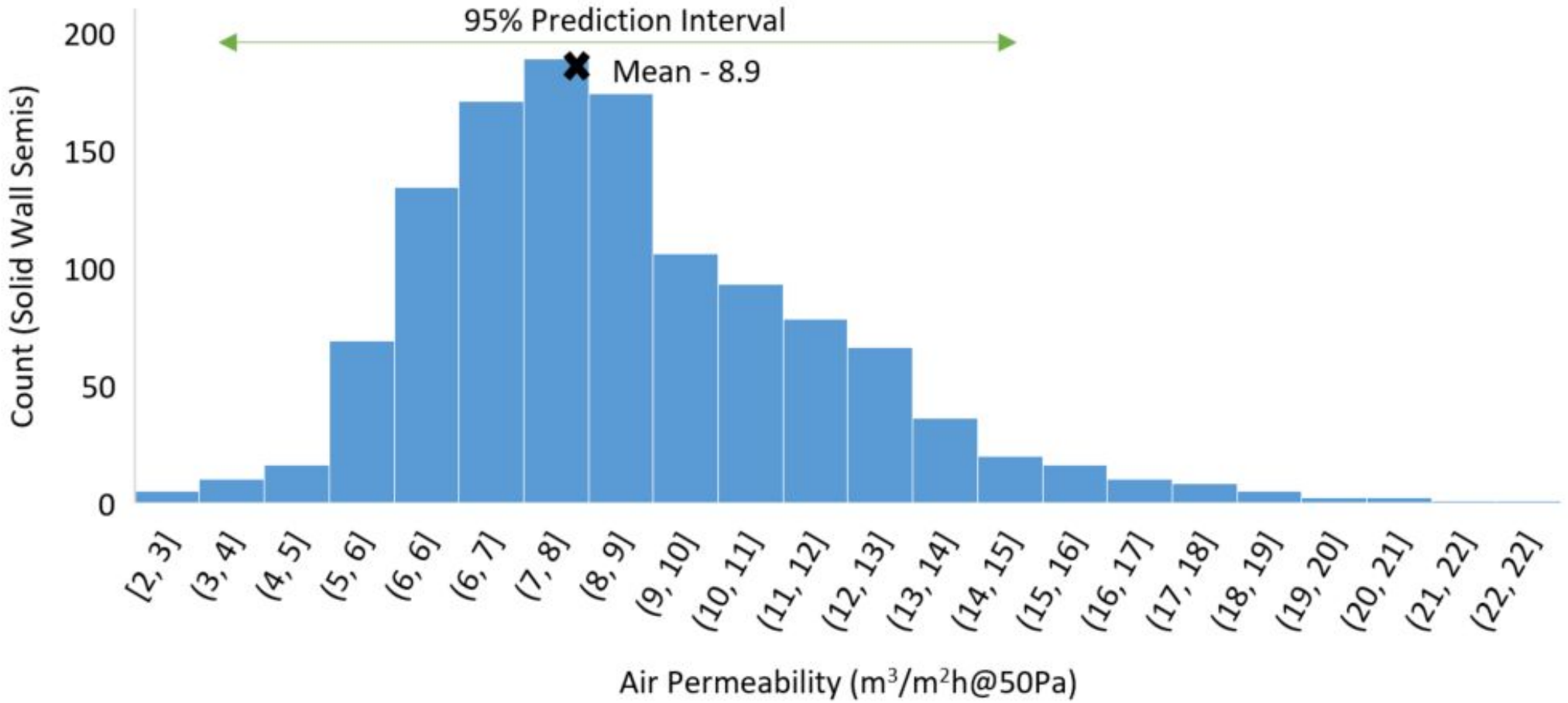

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Guess the Performance

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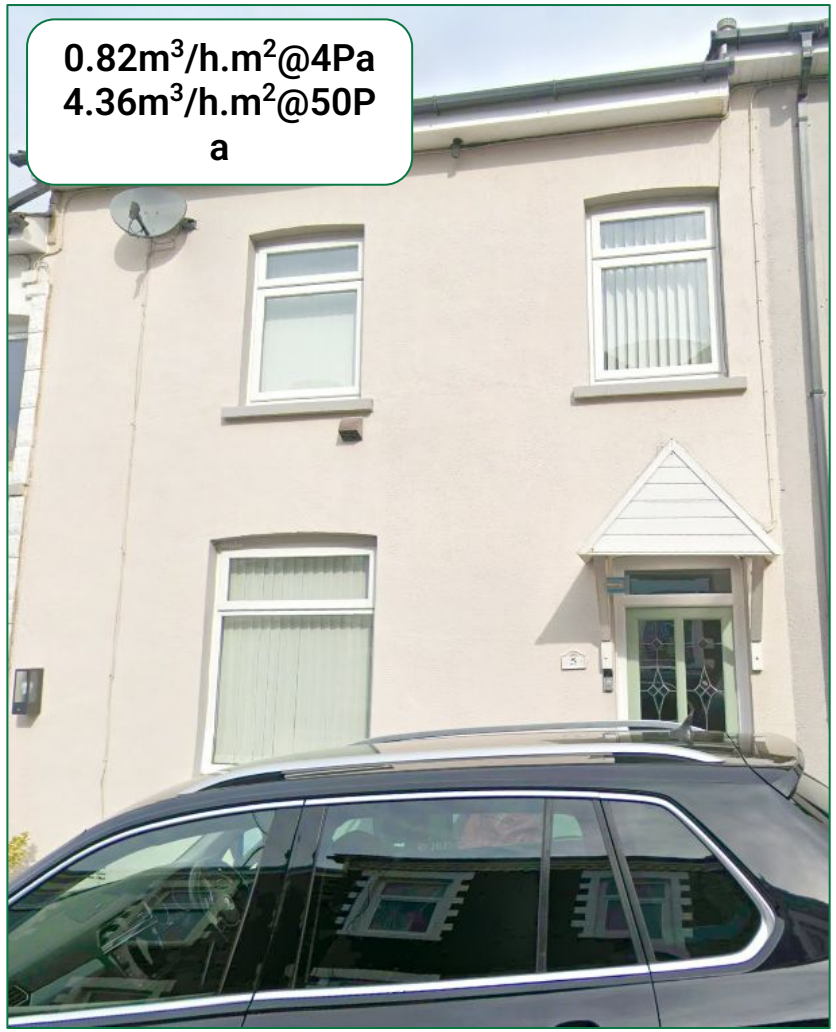

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Guess the Performance

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In Practice: SURVEYORS/ASSESSORS

- **Training and equipment** - regardless of market, you must be qualified and competent. What service are you to provide and what kit do you need?
- **Compliance testing** - new build and retrofit
- **Airtightness and ventilation critical friend** - property risk assessments (e.g. Awaabs law), testing strategy, action plans
- **Super Assessor** - RA, EPC, airtightness, BVT, ventilation, condition reporting, advice reports - bundled packages
- **Beyond the measurement** - EPCs, EPRs, Heat Loss Calculations
- **Specialise** - primary market segment, proposition and USP

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In Practice: LANDLORDS

- **Beyond compliance -** far from just a tick box exercise, unlock real value from the tests in your EPCs, stock condition and energy efficiency reporting, inform your response to mould and condensation complaints, feed the values into ventilation assessments and heat loss calculations
- **Sample test at your peril!** No two buildings are ever the same!!
- **Procurement** - prescribe the protocol (e.g. CIBSE TM23), expected building preparation and tester competency
- **Measure, act, learn** - use airtightness to help make better informed decisions, learn what works and inform future projects.

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In Practice: INSTALLERS/DEVELOPERS

- **Beyond compliance -** EPC and EPR uplift, ventilation strategy, more accurately sized heat pumps
- **Manage risk** - provide a clear evidence trail and deliver right first time ventilation
- **In-house or work with partners** - nature of your work and business model
- **Better informed decision making** - identify and address root causes, better informed investment

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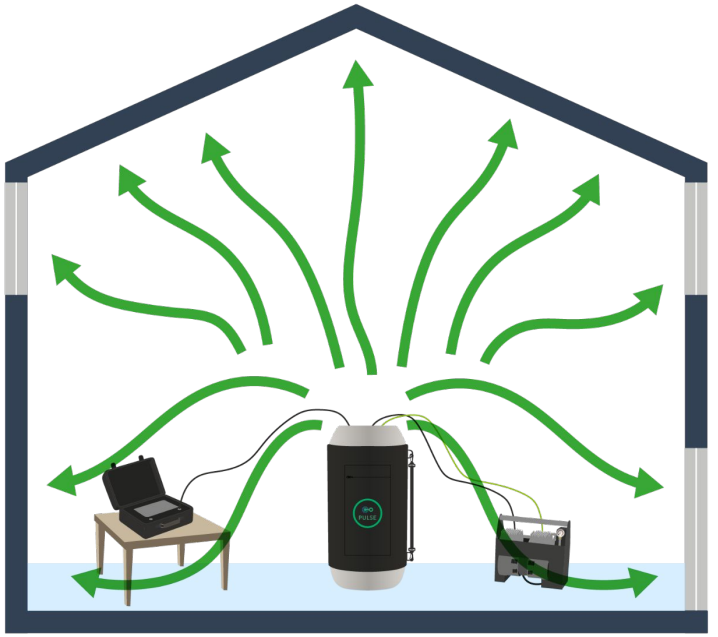
Conclusions

What on the face of it is a simple test, there is an awful lot of value behind the number.

No two buildings are the same and airtightness testing is in essence all about risk management and gaining more accurate understanding of our buildings and their ventilation needs.



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Next Webinar

Assessing Thermal Performance in Heritage Buildings:

Challenges & Solutions

Thursday 23rd October

Midday

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BTS “Measure Up” Conference

- 9th October 2025, Loughborough University
- Bigger and better than ever!
- Speakers from BTS users, Government & academics
- Product demos
- The world’s #1 BPE-fest

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Level 1 Airtightness Testing Training

- First date: 21st - 23rd October 2025 (2 days online, 1 day practical @ BTS office)
- Allows you to competently test simple buildings up to the size of 4,000m3.
- Part L new build compliance testing
- PAS2035 or if you are using results in an EPC for an existing dwelling

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Future Diary Dates

Next Webinar:

- 23rd October 2025 @ 12pm
- Assessing Thermal Performance in Heritage Buildings: Challenges & Solutions

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- Product demos, Q&A panels & networking

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