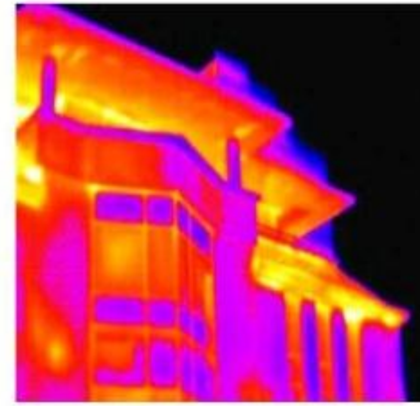


Practical experience of common ventilation problems – Getting it right

5-3-2013



Presented by

Alan Gilbert

BSRIA

BUILDING REGULATION COMPLIANCE TESTING

Part E: Sound Insulation

Part F: Ventilation

Part L: Air Tightness

BSRIA Compliance

Airtightness – Part L1
– key statistics

- 2012 – BSRIA tested approximately 10,000 properties of which **1500** were to 2010 version of the Building Regulations
- 2013 – BSRIA will test approximately 13,500 properties of which **4000** will be to the 2010 version of the Building Regulations



Ventilation – Part F
– key statistics

- In 2012 approximately **<u>500</u>** dwellings were tested for airflow performance (completed systems and are post commissioning i.e. completed)
- In 2013 approximately **<u>1000</u>** dwellings will be tested for airflow performance *(but could be more !)*

Passivhaus properties
– key statistics

- End of 2013 will see approximately 500 Passivhaus properties completed in the UK
- All properties are likely to have MVHR systems claimed to be installed, commissioned and tested correctly. But …..

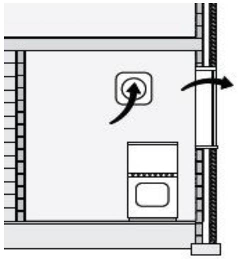


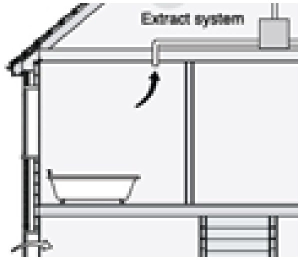
Ventilation – Part F
– key statistic

In 2011 **95%** of all dwellings when initially tested **FAILED** to meet the requirements contained in the Building Regulations. In 2012 this high % improved *but only a little !*

Ventilation – Part F
– key failure modes

- Installations had ductwork incorrectly fitted (kinked / bent / poor joints / blocked)
- Under sized fans or fans were incorrectly commissioned for air volume flow rate
- Insufficient number of fans or grilles
- No boost function
- No local fan control
- Missing ductwork
- Long ductwork runs





Ventilation – Part F
– key failure modes

Poorly installed ductwork is without question one of the largest causes of systems not performing properly.

Ventilation – Part F
– key failure modes

Table 5.1a **Extract ventilation rates**			
Room	**Intermittent extract**	**Continuous extract**	
	Minimum rate	**Minimum high rate**	**Minimum low rate**
Kitchen	30 l/s adjacent to hob; or 60 l/s elsewhere	13 l/s	Total extract rate should be at least the ***whole dwelling ventilation*** rate given in Table 5.1b
Utility room	30 l/s	8 l/s	
Bathroom	15 l/s	8 l/s	
Sanitary accommodation	6 l/s	6 l/s	

Table 5.1b **Whole dwelling ventilation rates**					
	Number of bedrooms in dwelling				
	1	**2**	**3**	**4**	**5**
Whole dwelling ventilation rate [a, b] (l/s)	13	17	21	25	29

Notes:

a. In addition, the minimum ventilation rate should be not less than 0.3 l/s per m^2 of internal floor area. (This includes all floors, e.g. for a two-storey building add the ground and first floor areas.)

b. This is based on two occupants in the main bedroom and a single occupant in all other bedrooms. This should be used as the default value. If a greater level of occupancy is expected add 4 l/s per occupant.

Ventilation – Passivhaus

- Often designed around 30m^3/h/person, and speed settings based on “likely” occupancy…… this can lead to wrong ventilation rates + conflicts with Part F.

Speed 1 - lowest likely occupancy (1 person)

Speed 2 - standard (based on Passivhaus design sheet)

Speed 3 - maximum occupancy (not on demand)

Or

Speed 1 - Maximum occupancy

Speed 2 - Boost (from Part F)

Speed 3 – Not less than 1 or 2

Case study
Small development

System 4 – Continuous mechanical supply with heat recovery (MVHR)

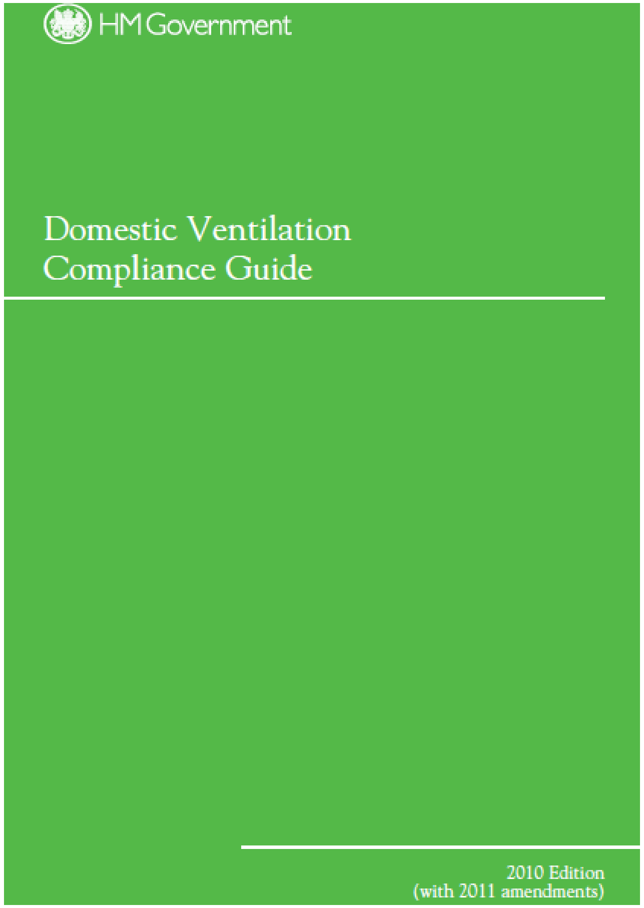
Visit 1. Systems all failed. Single speed controller for all rooms in a cupboard / no local boost control.

Visit 2. Systems all failed. Local speed controllers fitted. But…..
Position 3 = boost, Position 2 = trickle, Position 1 = no flow (turned off. Commissioning data also suspect as conducted with a 35mm diameter vane anemometer ~ All incorrect !

Visit 3. Commissioned correctly. All passed.

Documents


HM Government
The Building Regulations 2000
Ventilation
F
APPROVED DOCUMENT
F1 Means of ventilation
Coming into effect 1 October 2010
2010 edition
ONLINE VERSION


HM Government
Domestic Ventilation
Compliance Guide
2010 Edition
(with 2011 amendments)

What next ?


HM Government
The Building Regulations 2000
Ventilation
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APPROVED DOCUMENT
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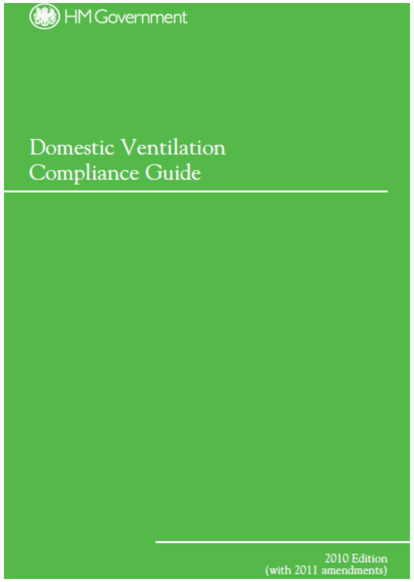
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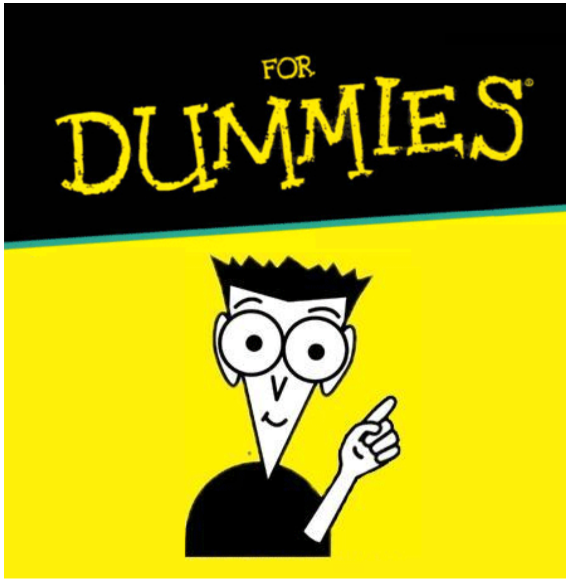
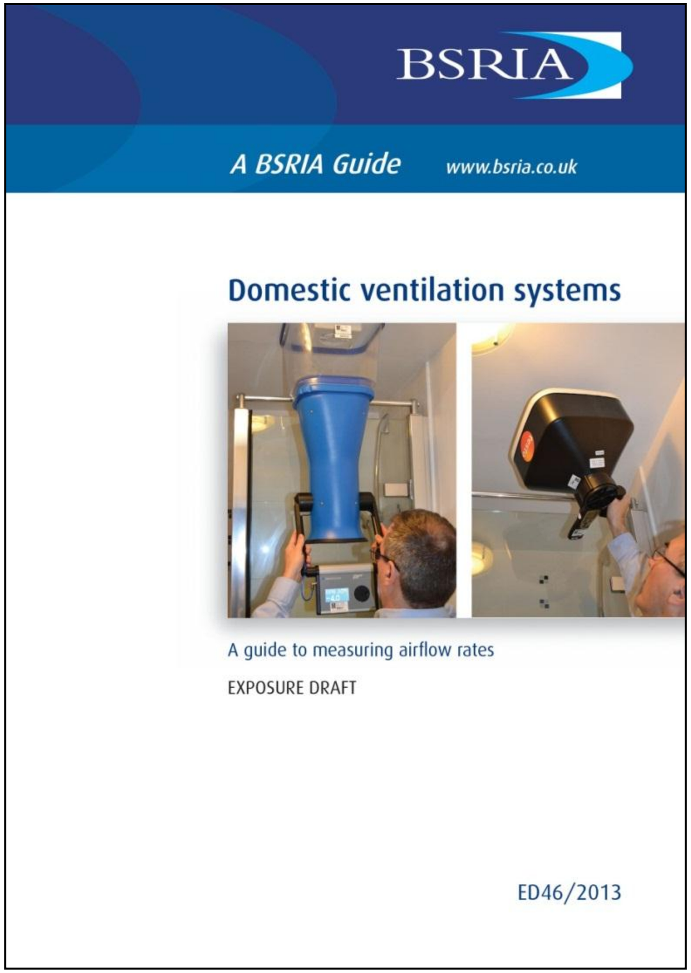

FOR
DUMMIES



The aim of the guide is to improve the standard of domestic ventilation installations. In particular, it focuses on making sure that the methods used for measuring airflow rates are fit for purpose.

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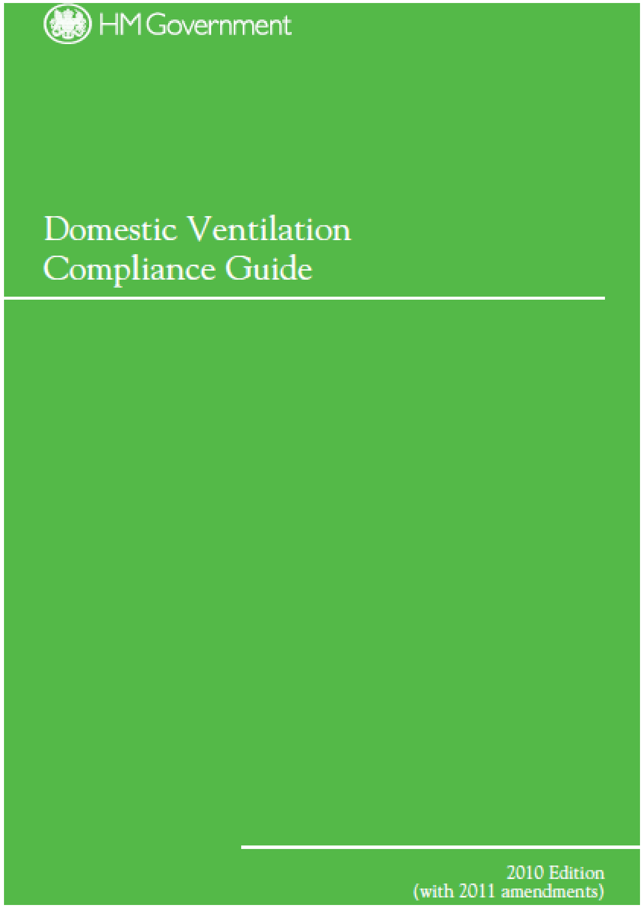
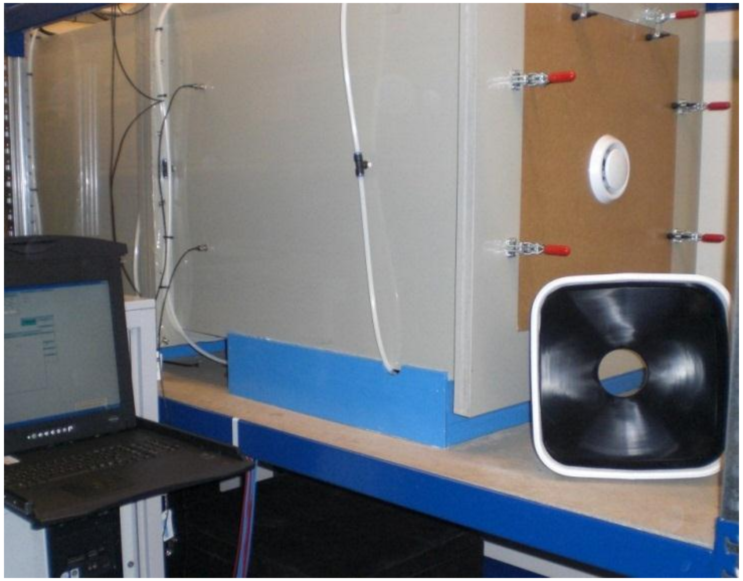
Why ?

The Domestic Ventilation Compliance Guide Section 5.2 states “Measurement of air flows should be performed using equipment that has been calibrated at a UKAS accredited calibration centre”.

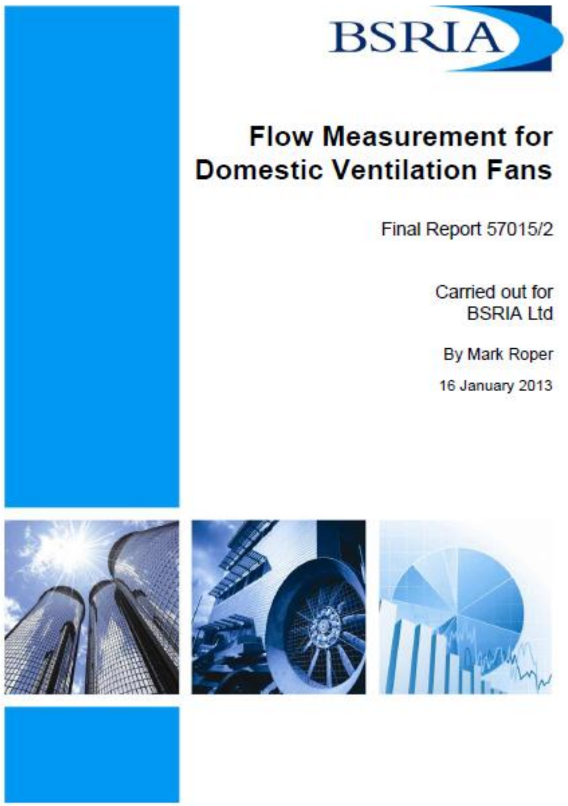


Step 1



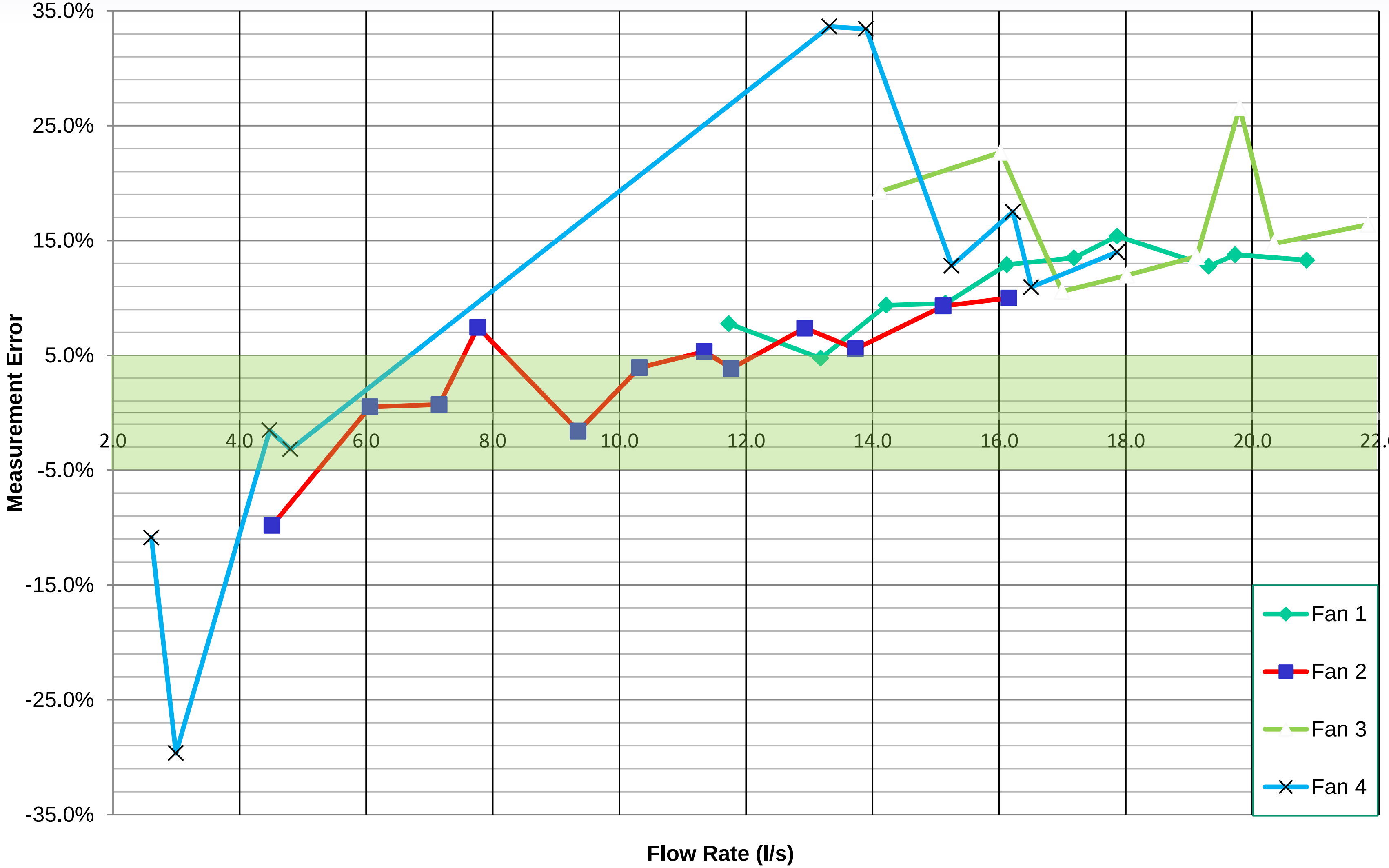
Laboratory investigation into the market leading vane anemometer & hood assembly measurement accuracies

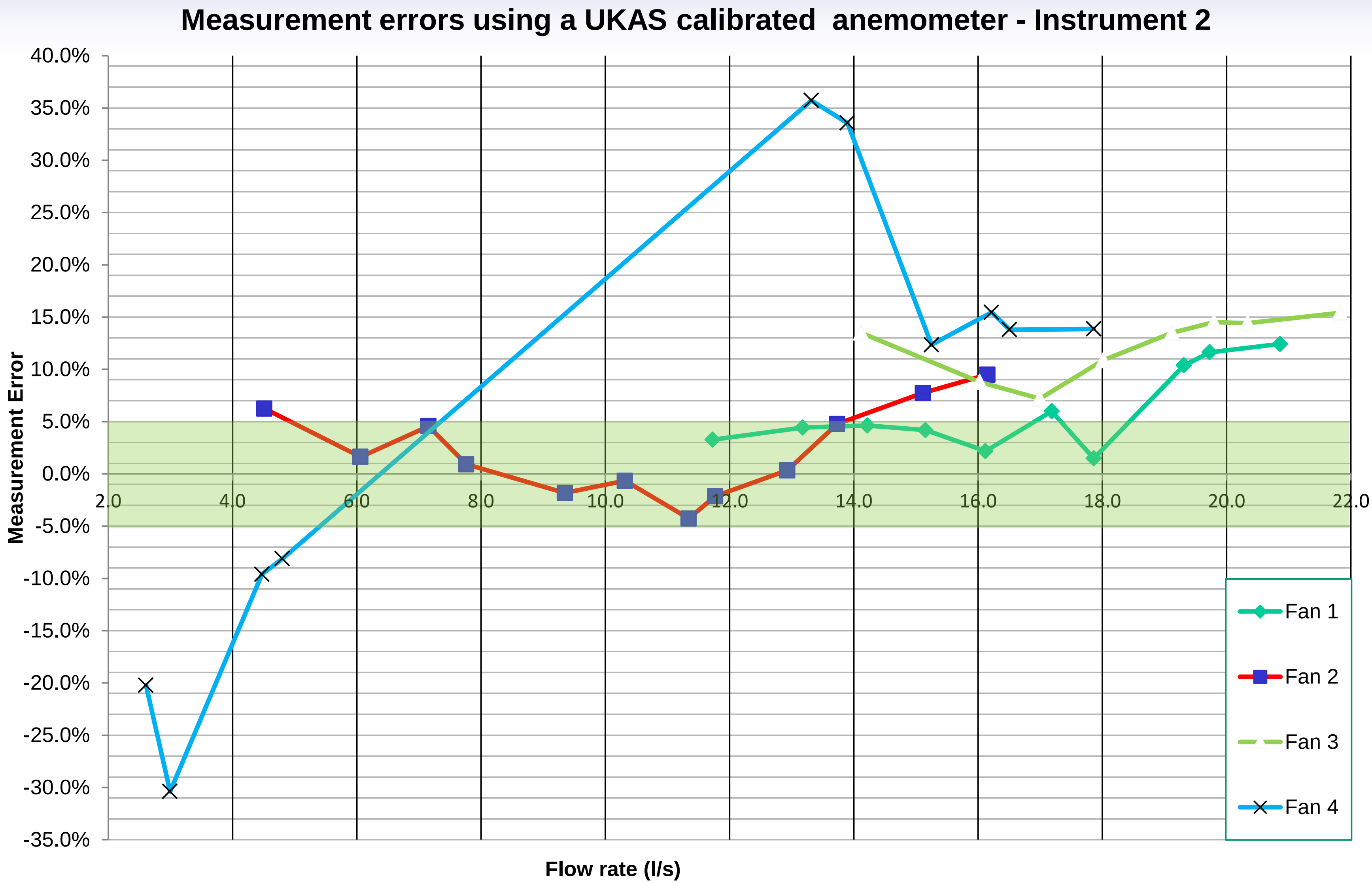
Step 2



Laboratory investigation into various instruments and how they influenced the performance of typical fans in the marketplace

Measurement errors using a UKAS calibrated anemometer - Instrument 1





Measurement errors using a UKAS calibrated anemometer - Instrument 2
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
-5.0%
-10.0%
-15.0%
-20.0%
-25.0%
-30.0%
-35.0%
Measurement Error
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
Flow rate (l/s)
Fan 1
Fan 2
Fan 3
Fan 4

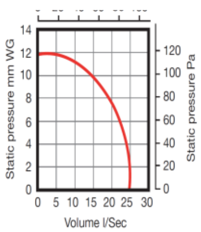
The unconditional method
- The preferred method -

- Free from site-specific conditions such as fan type and model, airflow direction and instrumentation characteristics
- Uses a powered hood assembly to eliminate back pressure and turbulent flow effects
- Devices based on a zero-pressure method

The conditional method

<u>Must take into account</u> specific site conditions such as fan performance characteristics, the resistance to airflow created by the measuring device, correction and conversion factors depending on the instrument used. This information is currently not available !!!!!

The conditional method



True air volume

=

corrections for the anemometer + hood + fan system

=

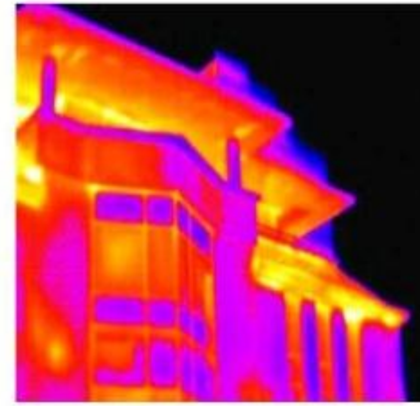
Lots of unknowns especially in centralised fan systems with multiple grilles

Demonstration

Ventilation – a future key statistic ?

In 2014 **95%** of all dwellings when initially tested **PASSED** meet the requirements contained in the Building Regulations.



alan.gilbert@bsria.co.uk



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