

Multifamily Blower Door Testing



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The Energy Conservatory

MN Building Performance Association

In accordance with the Department of Labor and Industry's statute 326.0981, Subd. 11,

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Agenda

- Commonly used airtightness standards
- Programs requiring testing
- Total leakage vs leakage to outside
- Preparing for the test
- Software

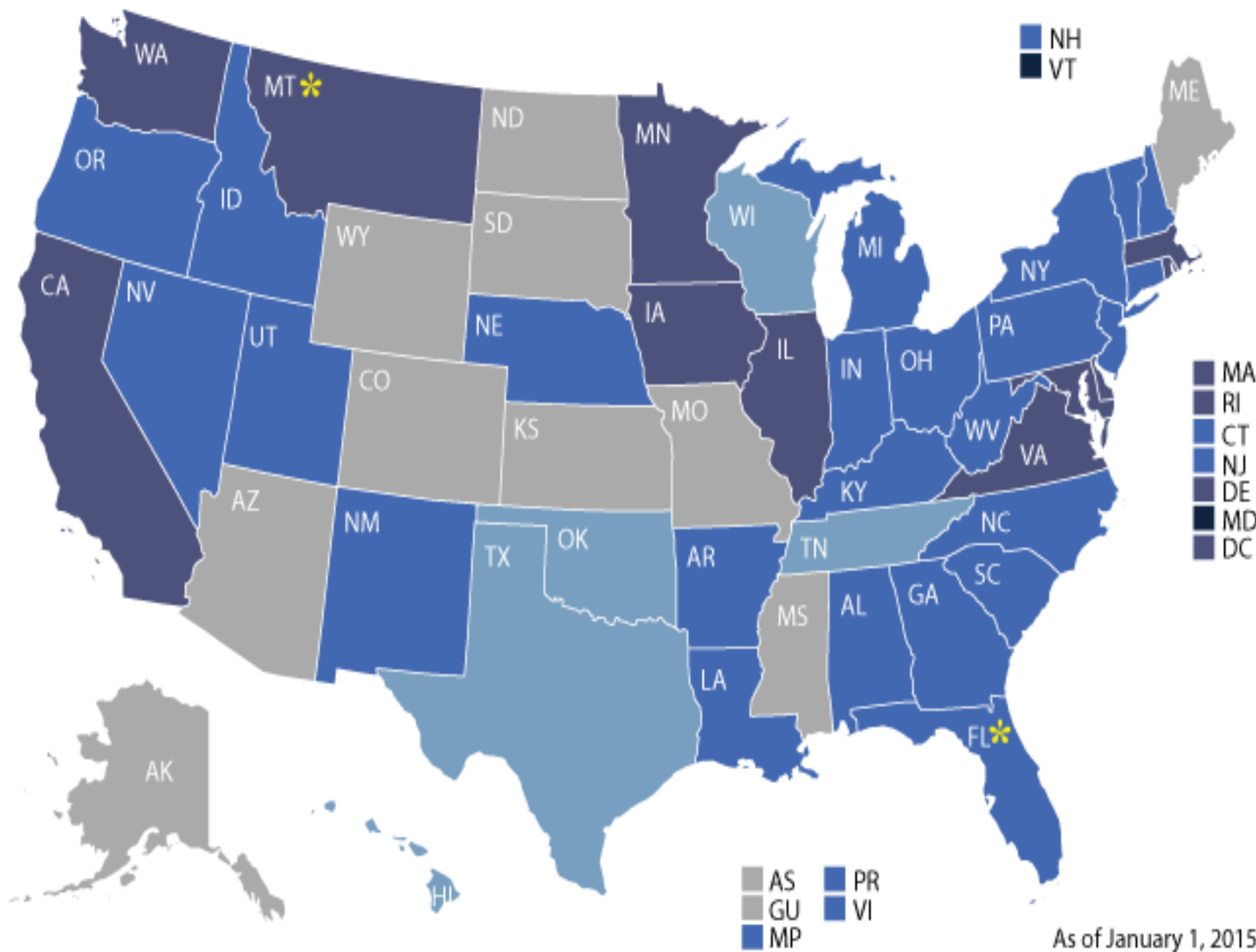
Commonly Used Airtightness Standards

- ASTM E1827
- ASTM E779
- CGSB-149
- RESNET Chapter 8

Programs Requiring Testing

2012 IECC (Residential less than 3 stories)

- CA, DC, DE, IA, IL, MA, MD, MT, RI, VA, WA
- All residential buildings must be tested for airtightness and meet the following levels:
 - 5 ACH50 Climate zones 1-2
 - 3 ACH50 Climate Zones 3-8



As of January 1, 2015

Programs Requiring Testing

- **Army Corp of Engineers**
- 0.25 CFM75 / ft² enclosure area (.19 CFM50)
- What is achievable with proper design? 0.11
- Refers to ASTM E779 -10

Programs Requiring Testing

- **EnergyStar for Highrise**
- 0.3 CFM50 / ft² enclosure – adjacent units open
- Blower door test must be conducted (E779-10 or E1827)
- Sampling protocol may be used
- Requires preliminary and final testing
 - Inspect air sealing details during construction
 - Test at least 2 units as soon as they are ready

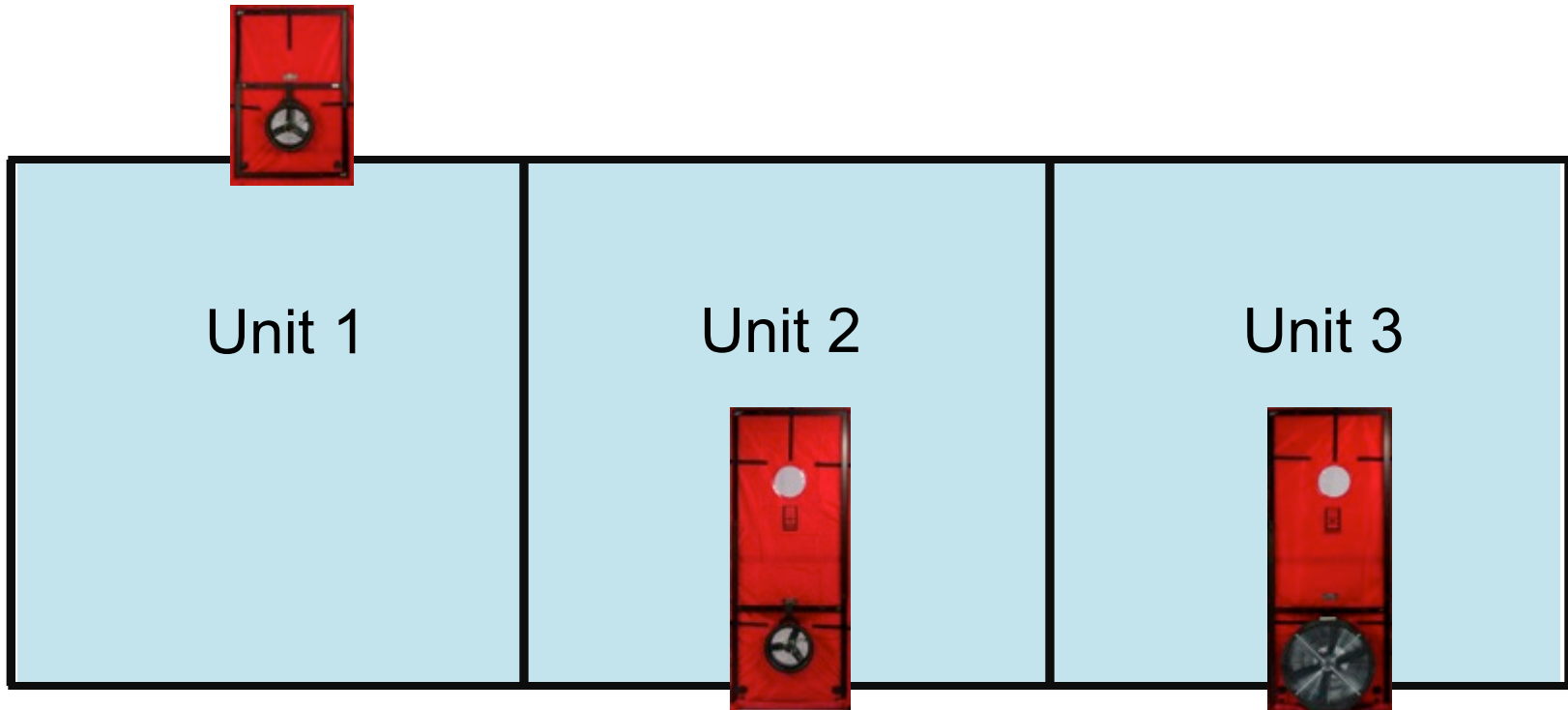
Programs Requiring Testing

- **LEED Multifamily IEQ PR 2012 - ETS**
- 1.25 in² leakage area/ 100 ft² enclosure area (6 sides)
- 0.23 CFM50/ ft² enclosure
- A sampling protocol may be used
- Setup?

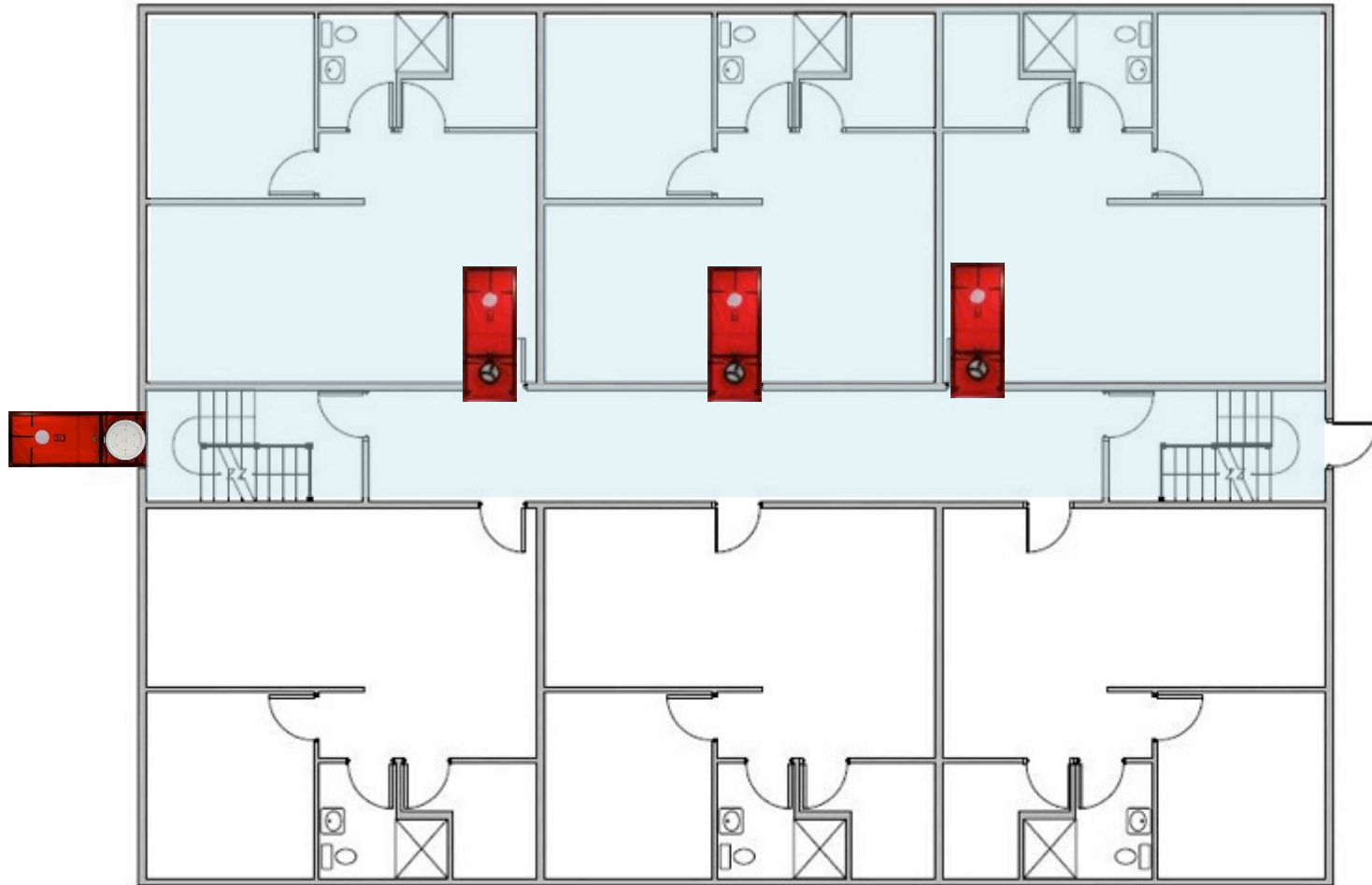
Programs Requiring Testing

- WA State – all buildings > 3 stories
- HERS Rating – multifamily units
- State or Utility multifamily programs
- Other multifamily programs?

Town House Test Options



Apartment Building Test Options



RESNET Guidelines for Multifamily Energy Ratings

*These Guidelines were developed by the
Residential Energy Services Network (RESNET)
and adopted by the
RESNET Board of Directors on
August 29, 2014*

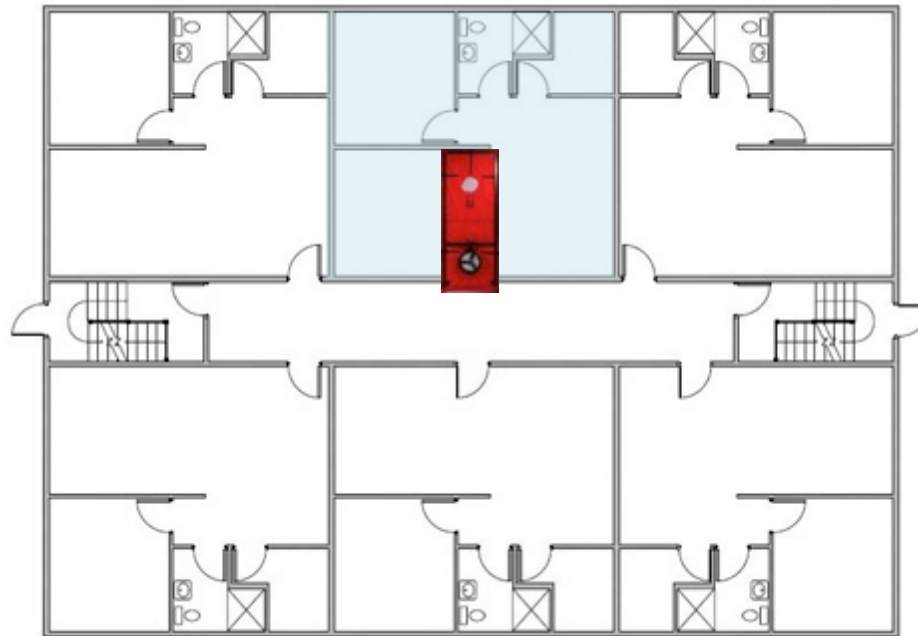
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Four Separate Protocols

1. An unguarded *dwelling unit*-level blower door test – “*Compartmentalization*” test

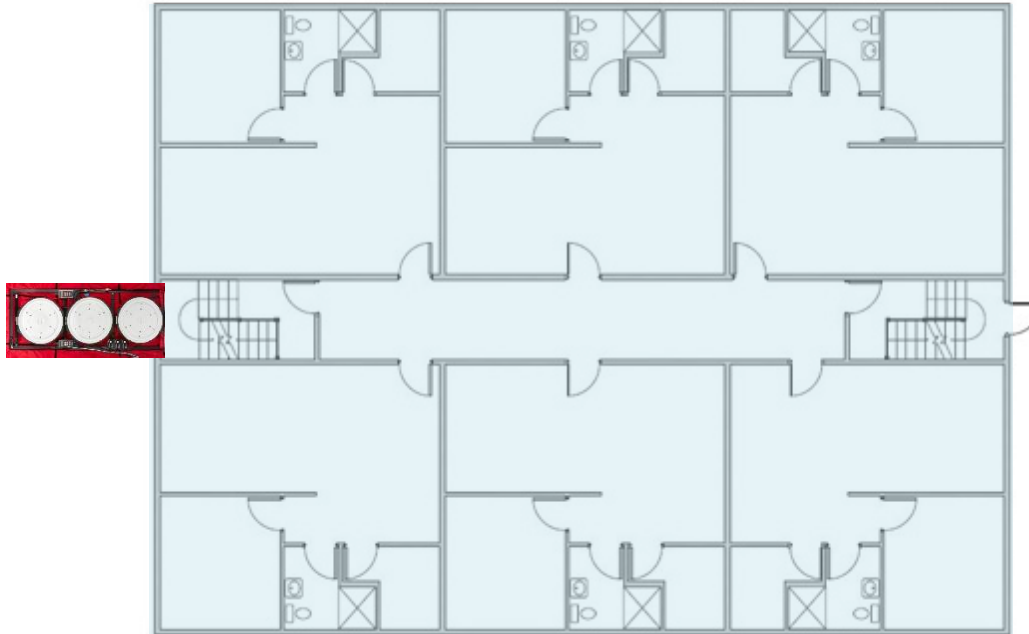


Advantages to Compartmentalizing Units

- Reduces sound transfer
- Reduces odor / pollutant transfer (ETS)
- Reduces wind effect
- Reduces stack effect
- Better able to control mechanical ventilation
- New construction
 - Seal plate to floor
 - Seal sheetrock at edges
 - Flanged / gasketed electrical boxes

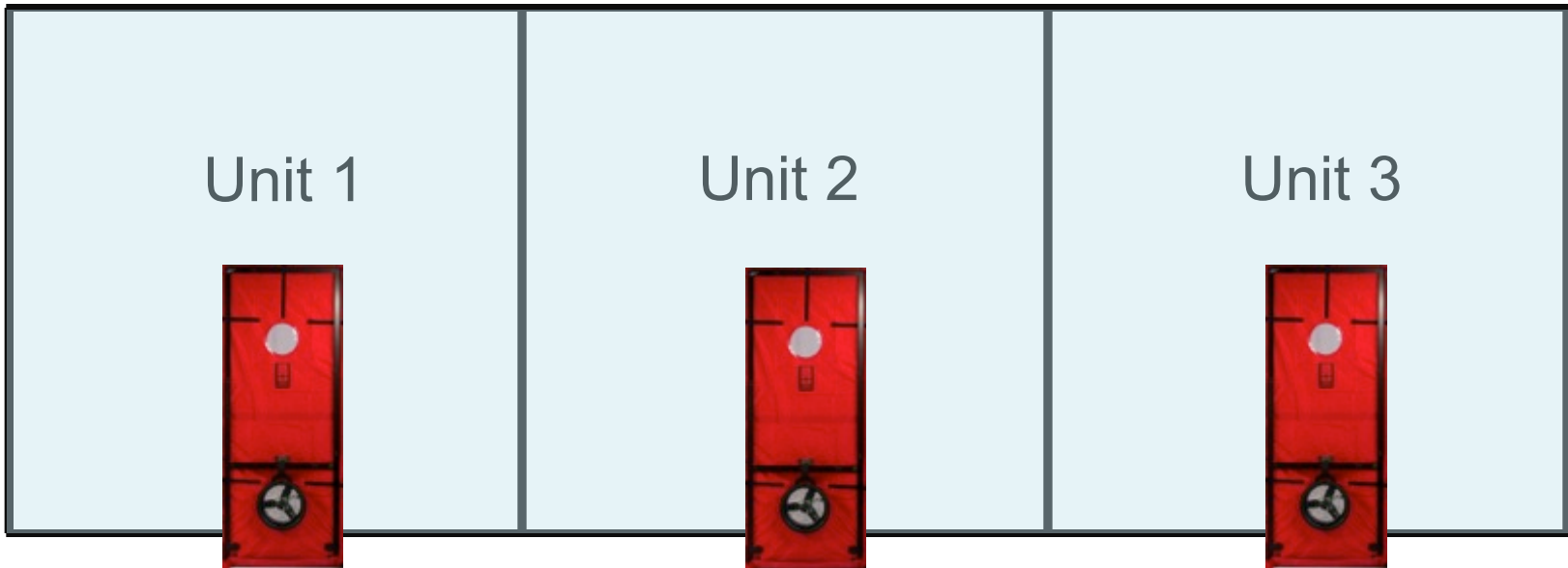
Four Separate Protocols

2. A full building single zone blower door test



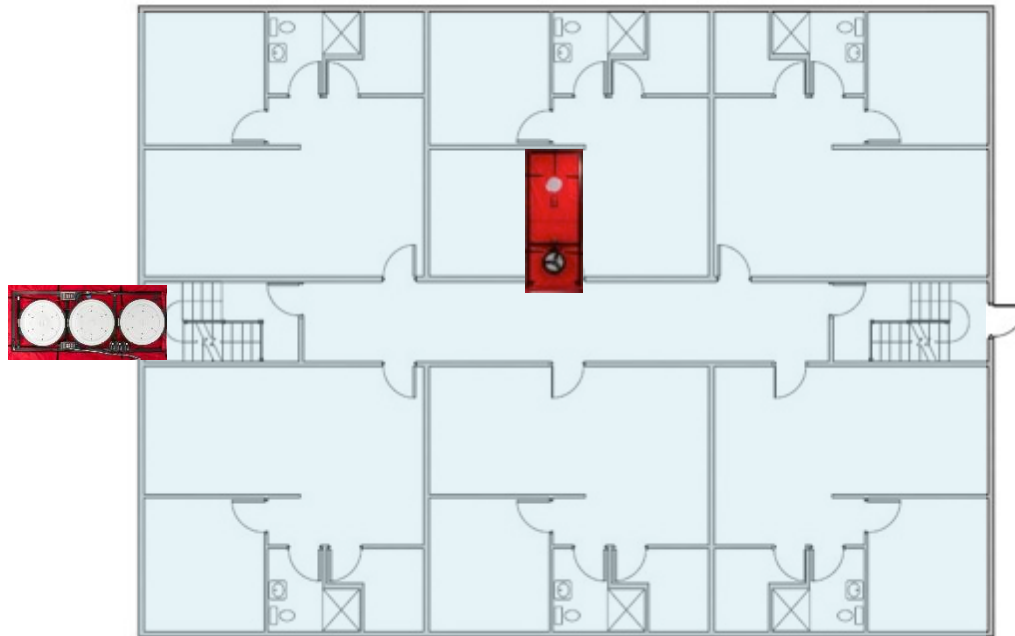
Four Separate Protocols

3. A full building multi zone blower door test

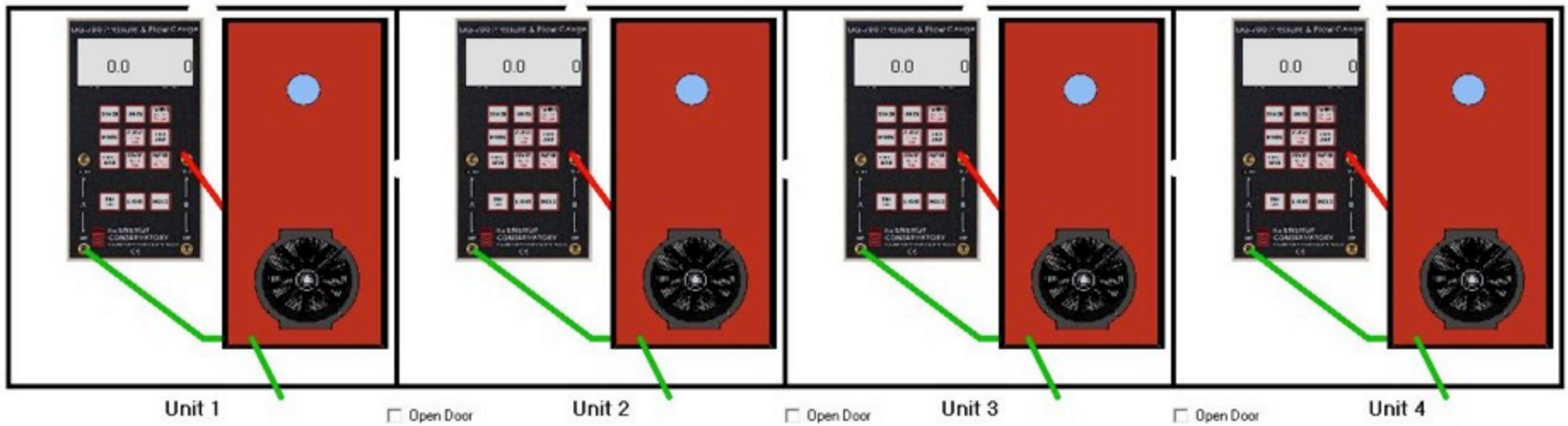


Four Separate Protocols

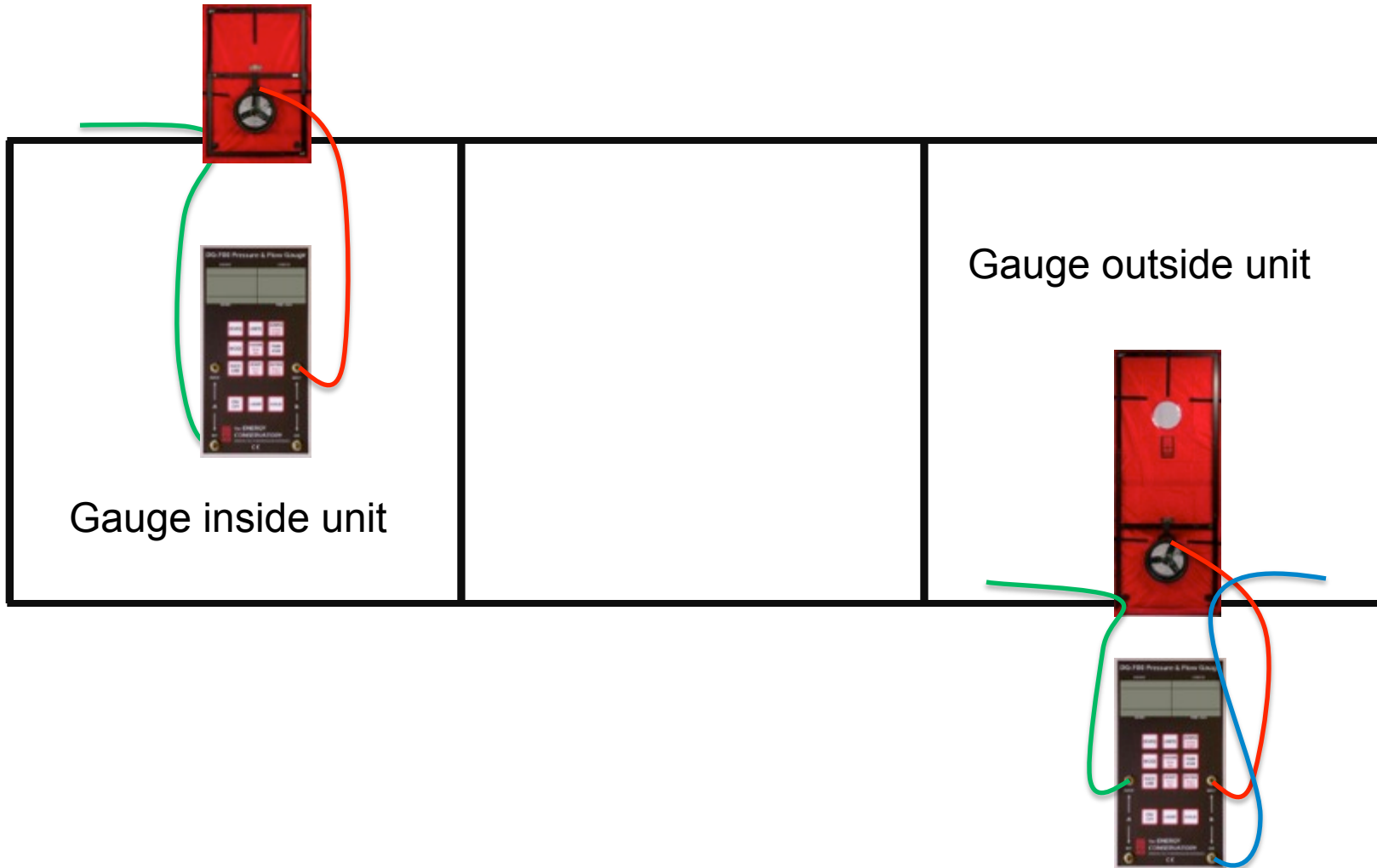
4. A full building blower door test simultaneously with a target *dwelling unit* test

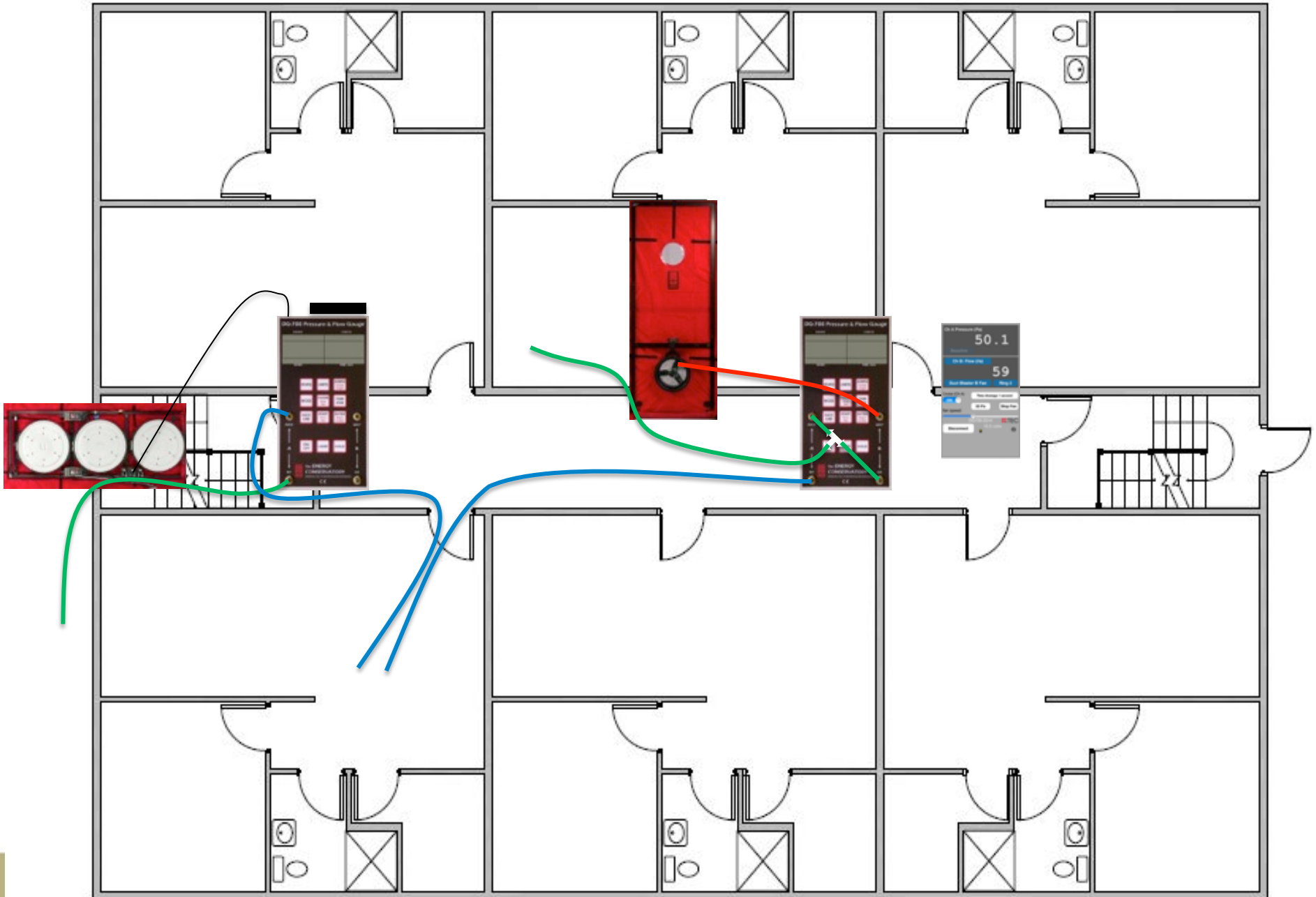


Single Unit vs Leakage to Outside

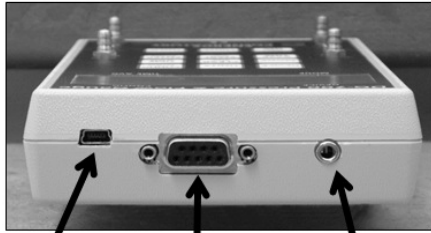


Tubing Connections – Testing a Single Unit





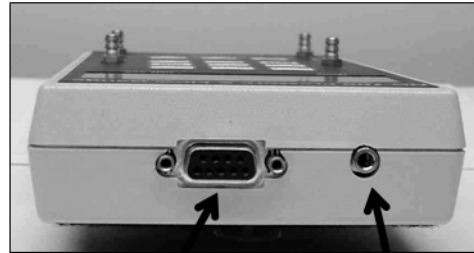
Using Software



USB
Communication
Port

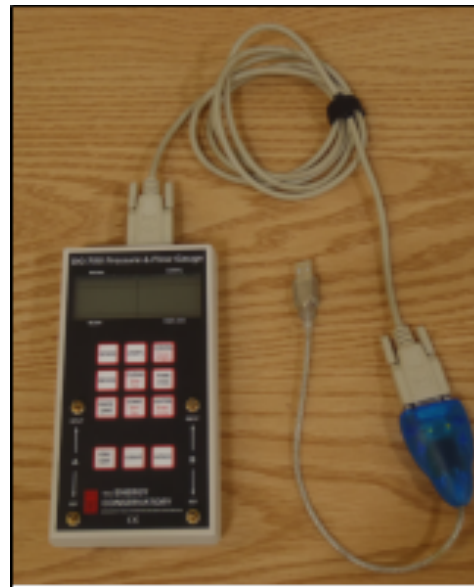
Serial
Communication
Port

Fan Control
Output Jack



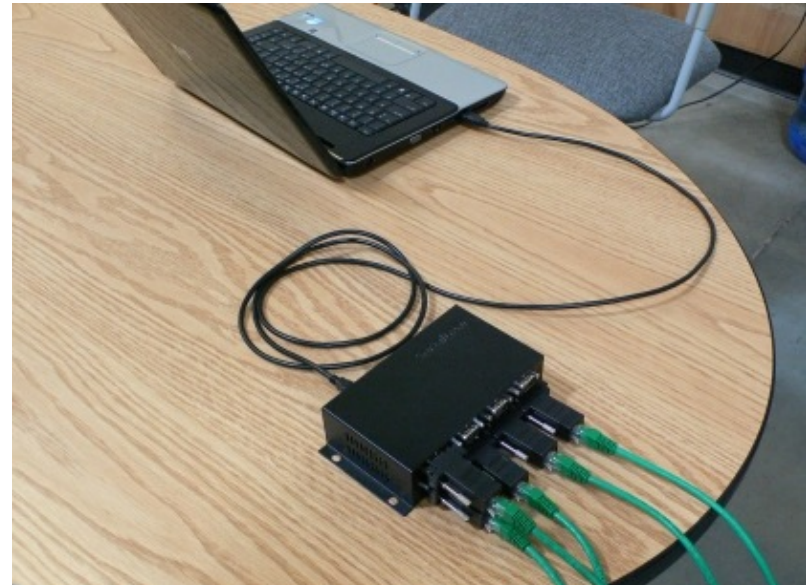
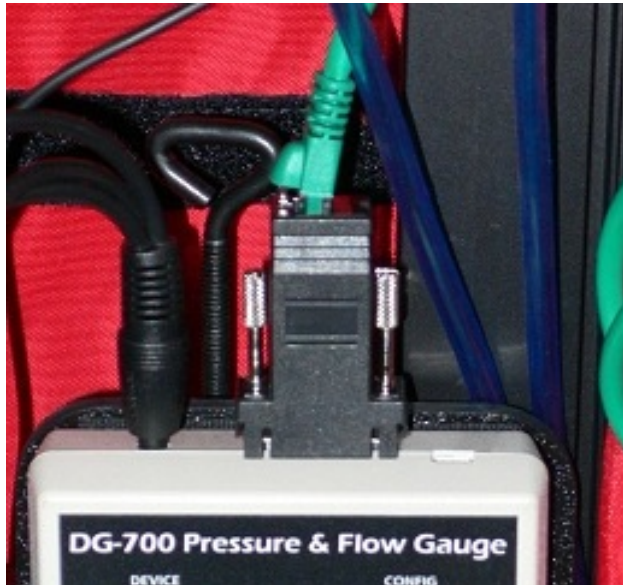
Serial Communication
Port

Fan Control
Output Jack



Connecting to a Computer with Multiple DG-700s

- Wired connection – 9 pin serial to USB Hub



Connecting to a computer with Multiple DG-700s

- Wireless connection – router required



Connecting to a computer

Multiple DG-700s

- Multiple Routers

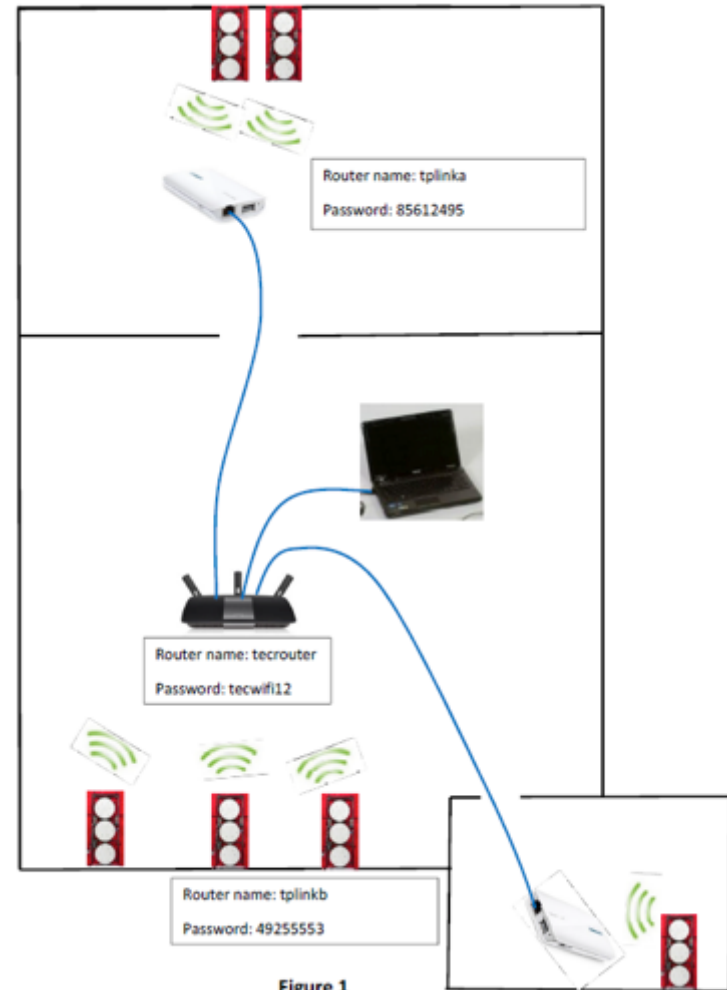


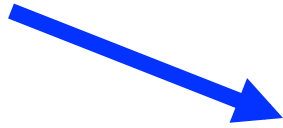
Figure 1

Setup the Fans



Two Gauges and Three Fans

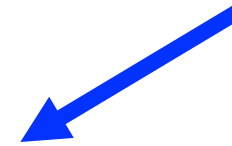
Gauge 1
A: Envelope Press.
B: Bottom Fan



3 Controllers



Gauge 2
A: Middle Fan
B: Top Fan

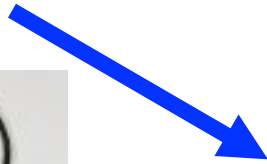


No open taps on
gauges

Fans plugged
into separate
circuits

Two Gauges and Three Fans

3 way
Fan Control Splitter



3 Controller
Board

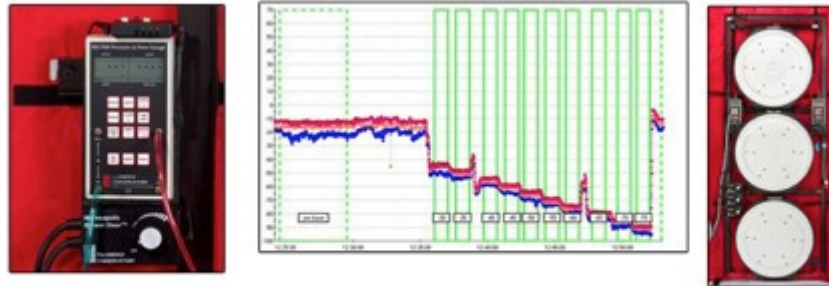


CAT5 Splitter



Kill-O-Watt
Meter

Single fan TECLOG3 Demo

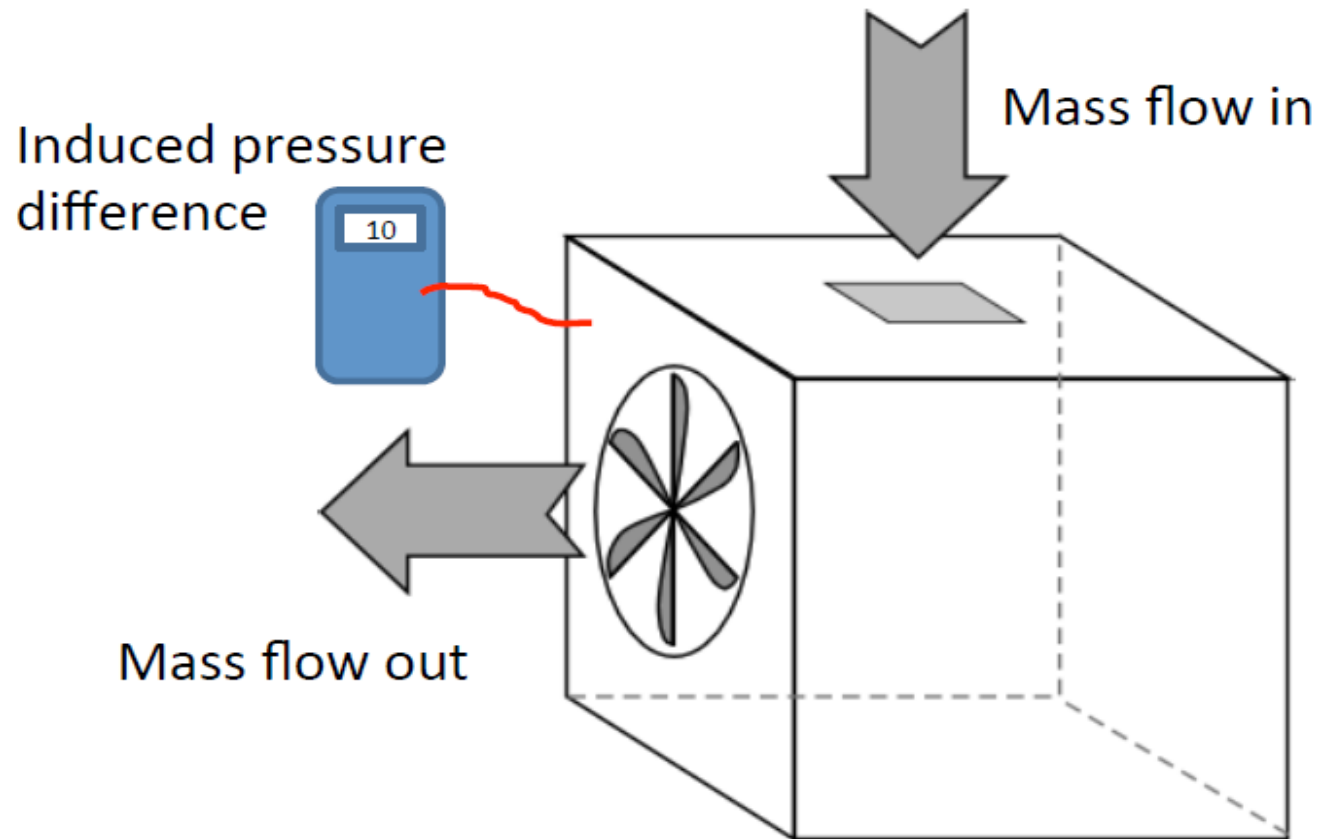


TECLOG 3

The Energy Conservatory



Fan Pressurization Airtightness Test



Configuration Worksheet

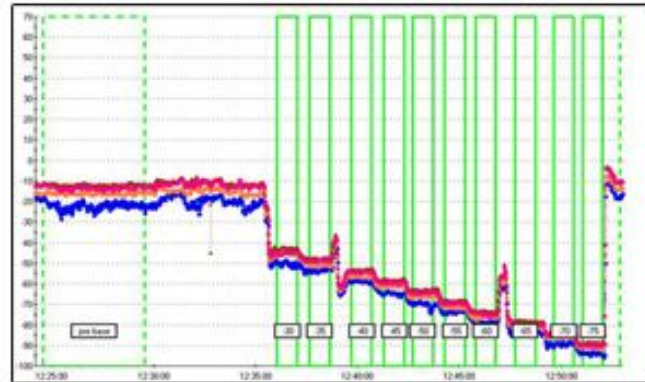
TECLOG3 Device Configuration Worksheet

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Serial _____ Chan A _____	Label _____ Chan B _____	Serial _____ Chan A _____	Label _____ Chan B _____
Serial _____ Chan A _____	Label _____ Chan B _____	Serial _____ Chan A _____	Label _____ Chan B _____
Serial _____ Chan A _____	Label _____ Chan B _____	Serial _____ Chan A _____	Label _____ Chan B _____
Serial _____ Chan A _____	Label _____ Chan B _____	Serial _____ Chan A _____	Label _____ Chan B _____
Serial _____ Chan A _____	Label _____ Chan B _____	Serial _____ Chan A _____	Label _____ Chan B _____
Serial _____ Chan A _____	Label _____ Chan B _____	Serial _____ Chan A _____	Label _____ Chan B _____
Serial _____ Chan A _____	Label _____ Chan B _____	Serial _____ Chan A _____	Label _____ Chan B _____
Serial _____ Chan A _____	Label _____ Chan B _____	Serial _____ Chan A _____	Label _____ Chan B _____

Serial _____	Label _____
Chan A _____	Chan B _____

TECLOG3 Demo



TECLOG 3



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Questions?

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