PERFORMANCE SYSTEMS
DEVELOPMENT

RESNET Rater Combustion Safety

Online Training

www.psdconsulting.com/academy

Presenters

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The Requirements

- All Raters pass 2 tests
  - 25 question written test (online)
  - Simulation test (online)
- Non-BPI current Rater take field training
  - For those raters not currently BPI certified,
  - *At least* 2 hours of field training
- Required for all existing Raters by January 1st 2015

The Justification

Our Course

Course Description

All Raters **must** pass the Combustion Safety and Work scope written exam and simulation prior to December 31st 2014 to maintain their Rater Certification! Raters who are not BPI analyst certified will need an additional 2 hours of field training by the end of 2014 to comply with RESNET standards. This 7 hour online training is conveniently spaced over just 1 week.

- August 5-8th, 2014 (Online)
- November 4-7th, 2014 (Online)
- Dec 3-5th, 2014 (Online)

Course Outline

- **Targeting Health and Safety**
- Ambient Carbon Monoxide per RESNET standards
- Measurement and protocols
- Carbon Monoxide in unvented combustion appliances (ovens and ranges)
- Combustible gas leakage testing
- Interaction of combustion appliances and makeup air
- Controlled and uncontrolled makeup air
- Venting configurations and interaction with the building envelope
- Depressurization, flame rollout, and backdraft
- Configuring the home for Worst Case Depressurization testing
- Measuring and documenting spillage
- Carbon Monoxide in the venting flue
  - Variations in venting configuration and testing locations (venting & fuel types)
- Predicting and adjusting for combustion safety problems
  - Correcting depressurization problems per RESNET protocols
  - Workscope recommendations based on CO and spillage testing results
- Introduction to the RESCAZ training simulator
- Differences between the BPI and RESNET testing protocols

All online sessions will be recorded for later viewing for our participants convenience

Do you live or work in NY?

PERFORMANCE SYSTEMS DEVELOPMENT

Day 1

- Simulation Check-in, Q&A
- Health and Safety
- Introduction to Chapter 8/Interim Guidelines
- Gas Leakage Detection
- Carbon Monoxide
  - Ambient
  - Oven testing

Day 2

- Defining the CAZ
- Worst-Case Depressurization
  - Setup
  - Testing
- Combustion Appliance Testing
- Makeup/Combustion Air
- Relevant Thresholds and Action Items

Day 3

- Combustion Appliance Testing
- Makeup/Combustion Air
- Relevant Thresholds and Action Items
- Work Scope

Order of operations

Outside the house

- Health and Safety Equipment
- Zero gauges
- CO Monitor Worn
- Check Gas Lines

Inside the House

- Ambient CO
- Check Gas Lines
- Identify the CAZ or CAZs
- Ready the house for Worst Case
- Simulate Exhaust if necessary

Inside the CAZ

- Find/Determine Worst Case
- Test Appliances (smallest first) for CO and Draft
- Record results
- If Failures, test under natural conditions

Performance Testing

- Gas leak detector
  - Move it along incoming gas lines to test for minor leaks
  - Zero it outside to assess ambient combustible gases upon entry to home

Carbon Monoxide

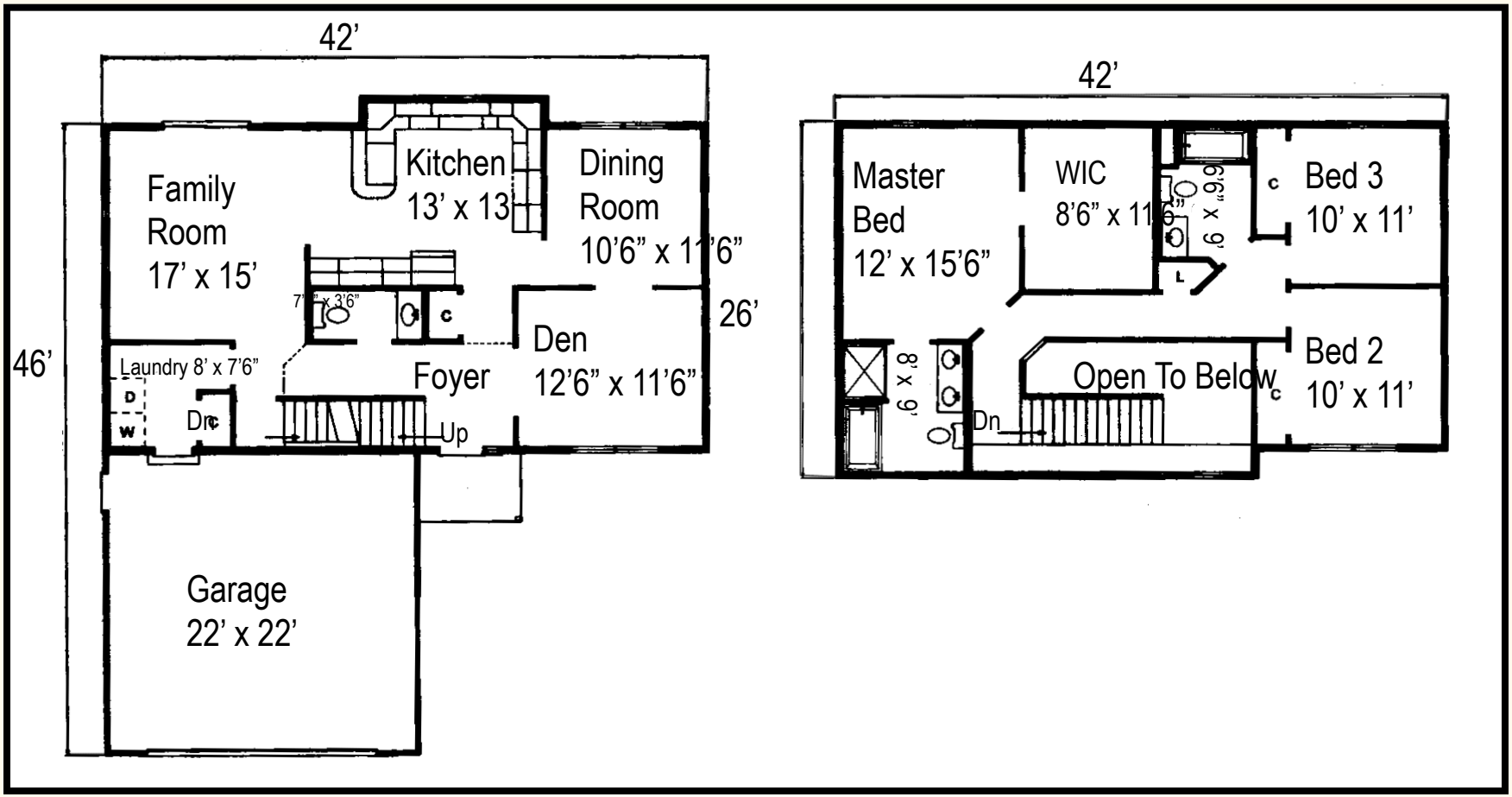
RESNET Action Level Standards

- Short term ambient levels 35 PPM
- Measured vent levels exceeding 100 PPM
- Measured oven vent levels exceeding 200 PPM

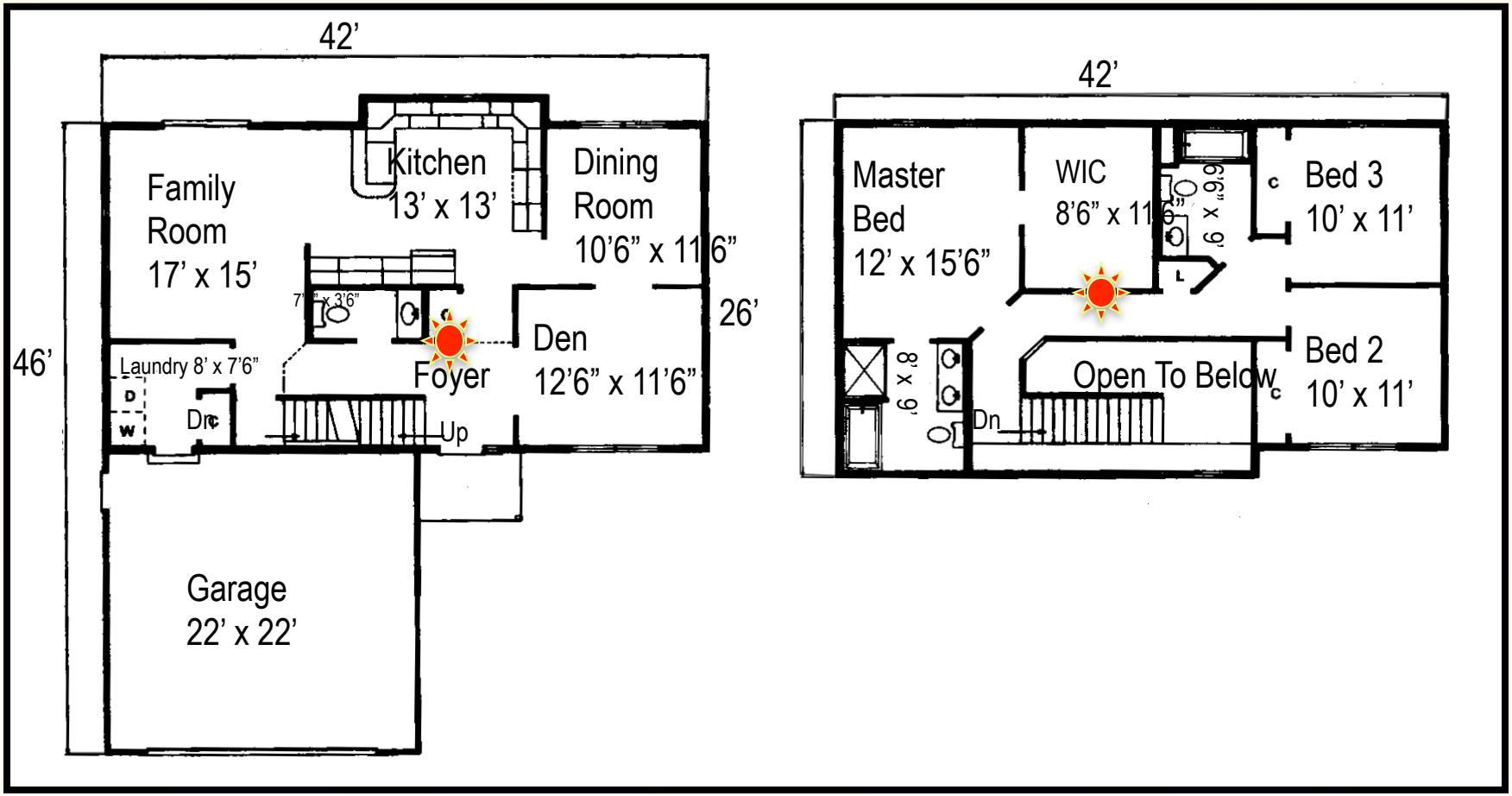
Action Levels

- Ambient exceeds 35 ppm at any time during test.
- Ovens exceed 200 ppm in the vent after 5 –10 minutes of operation
- Vented combustion appliances exceed 100 ppm in the flue.

Exercise: Where should carbon monoxide detectors be located in this floor plan?



Carbon Monoxide Detector Placement

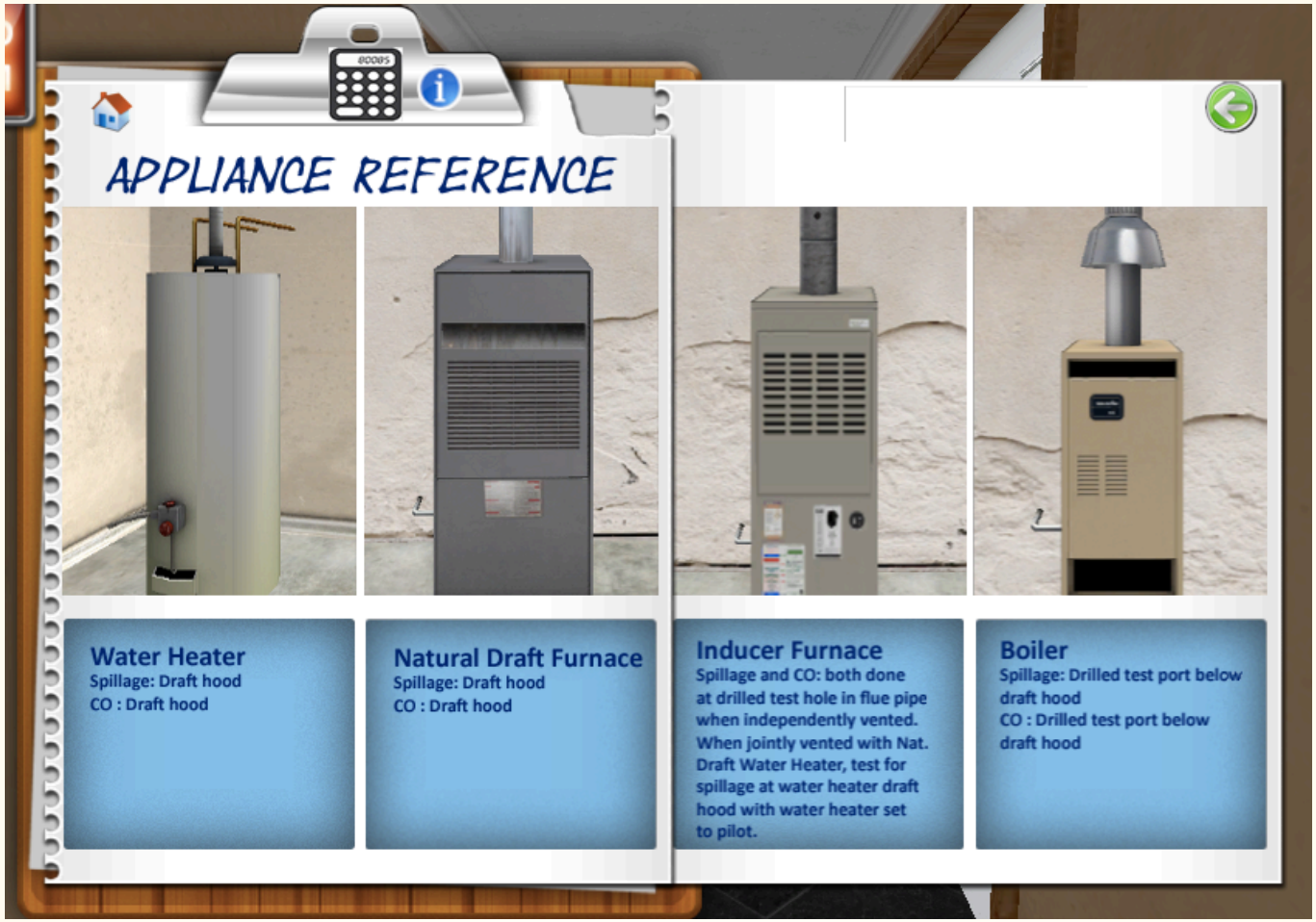


Combustion Appliance Categories

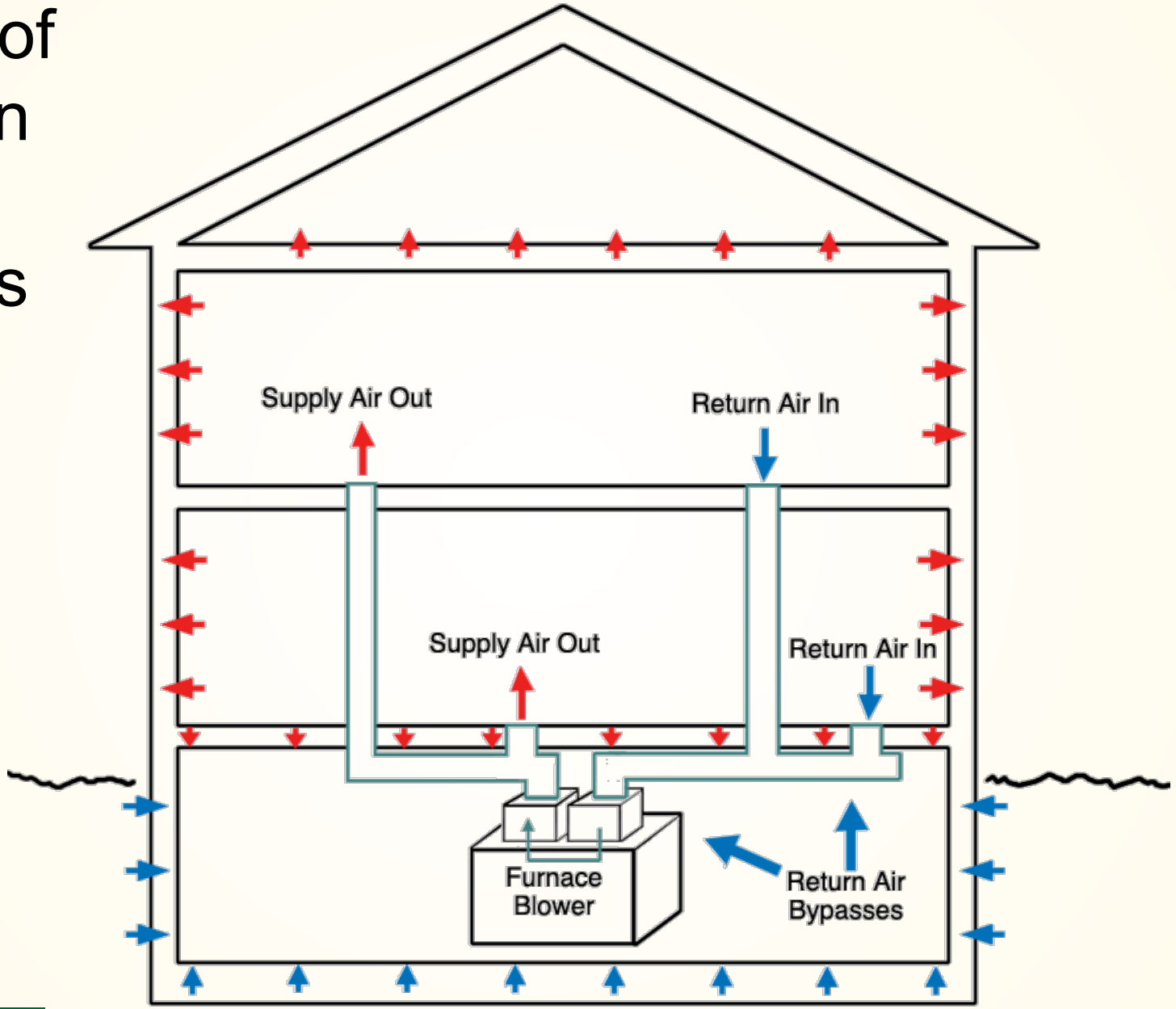
- **Category 1** – Negative pressure vent with flue gas well above the condensing temperature (very common: most atmospheric furnaces, boilers and water heaters)
- **Category 2** – Negative pressure vent with condensing flue gas (less common)
- **Category 3** – Positive pressure vent with flue gas well above condensing temperature (somewhat common)
- **Category 4** – Positive pressure vent with condensing flue gas (becoming more popular)

What to Inspect?

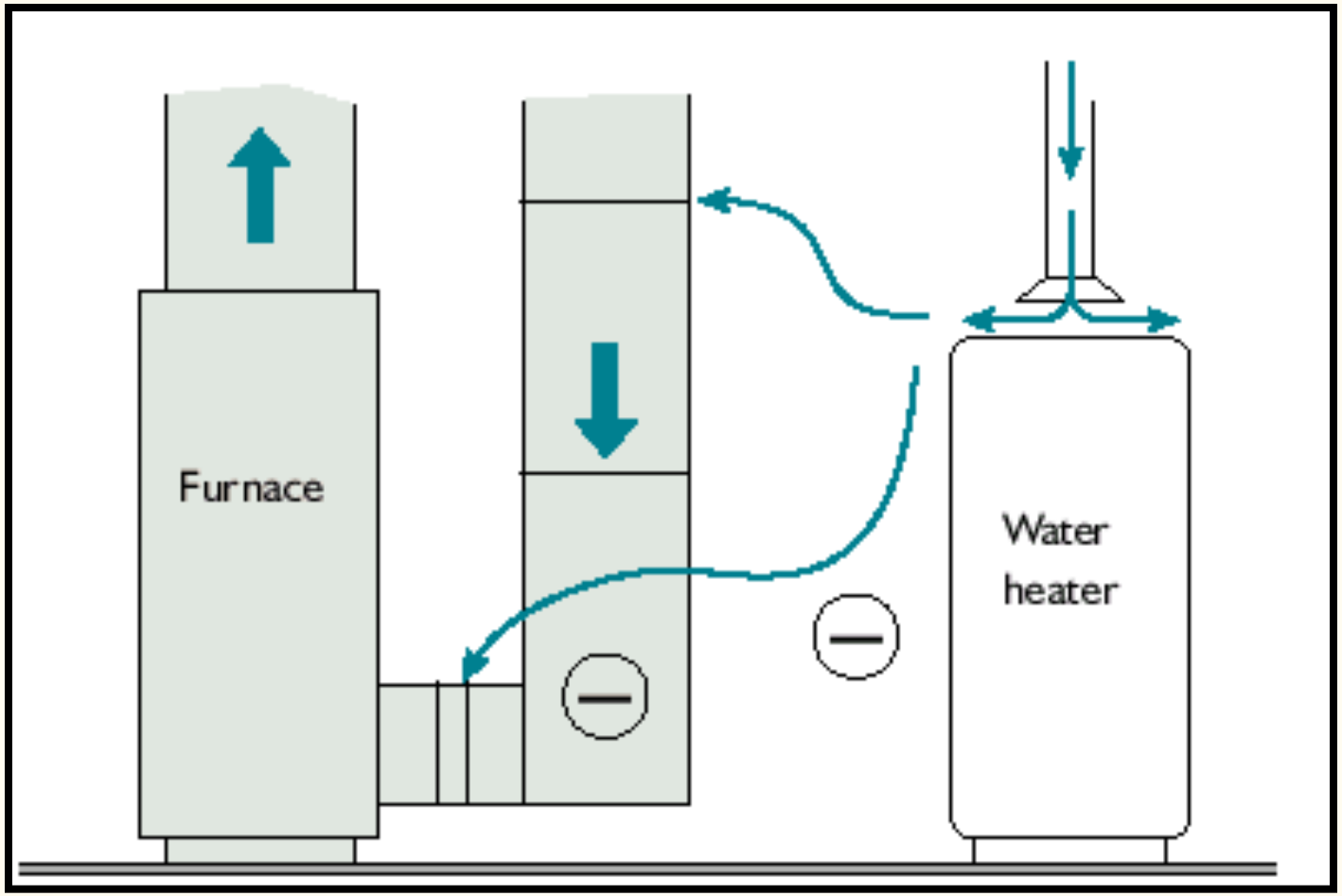
Simulation Appliance Reference



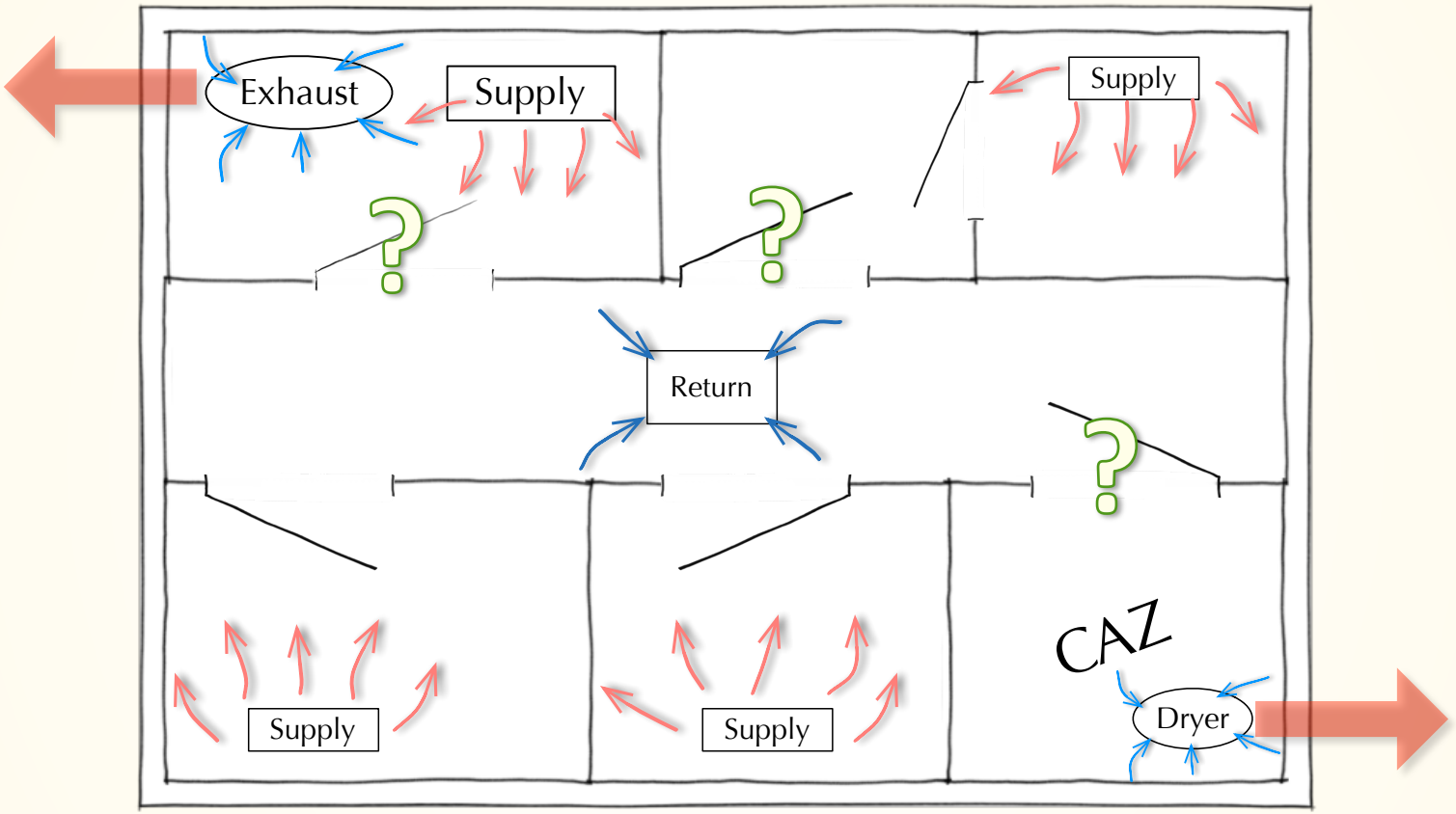
Effect of Return Duct Leaks



Depressurization and Backdrafting



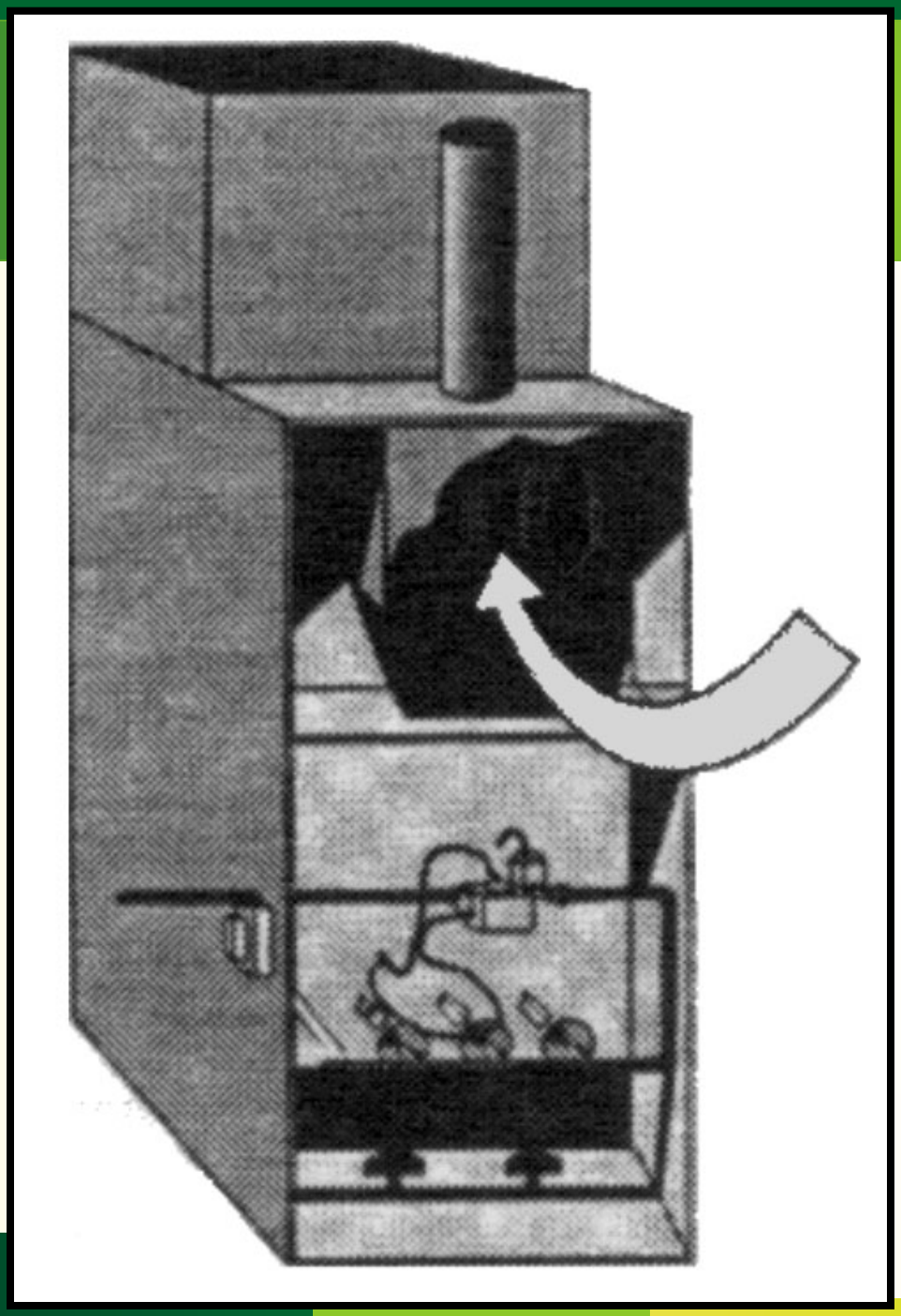
Add Negatives and Subtract Positives



Some pathways will be obvious to close off from -- or keep connected to -- the CAZ.
Best practice is to check all doorways for their contribution to depressurization

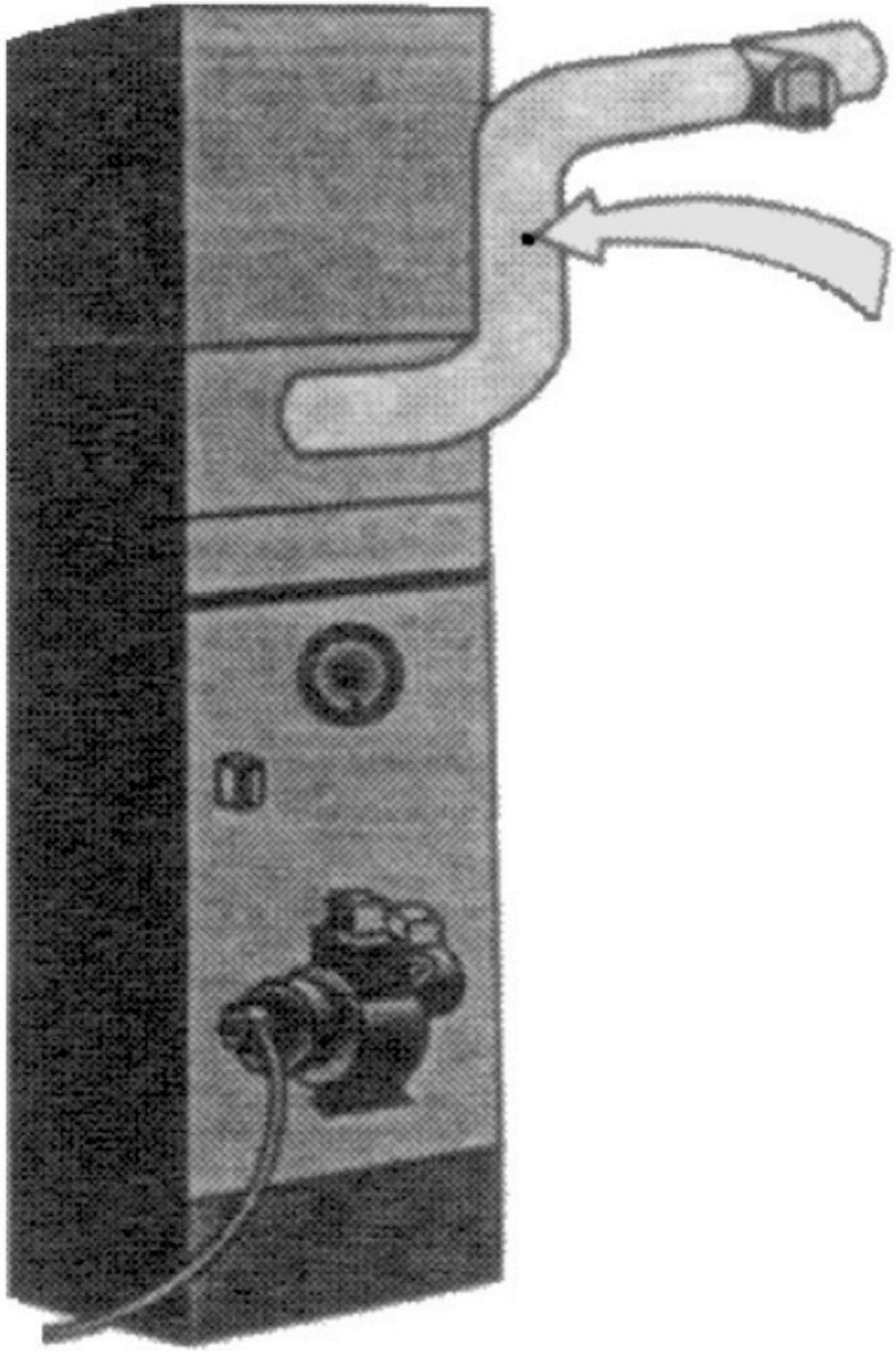
Testing for Draft and Carbon Monoxide in Worst-Case and/or Natural Conditions

TESTING COMBUSTION APPLIANCES



Atmospheric Furnace

- Proper probe placement for flue gas sampling (O2, CO, temperature)
- inside the heat exchanger (before gases are diluted)

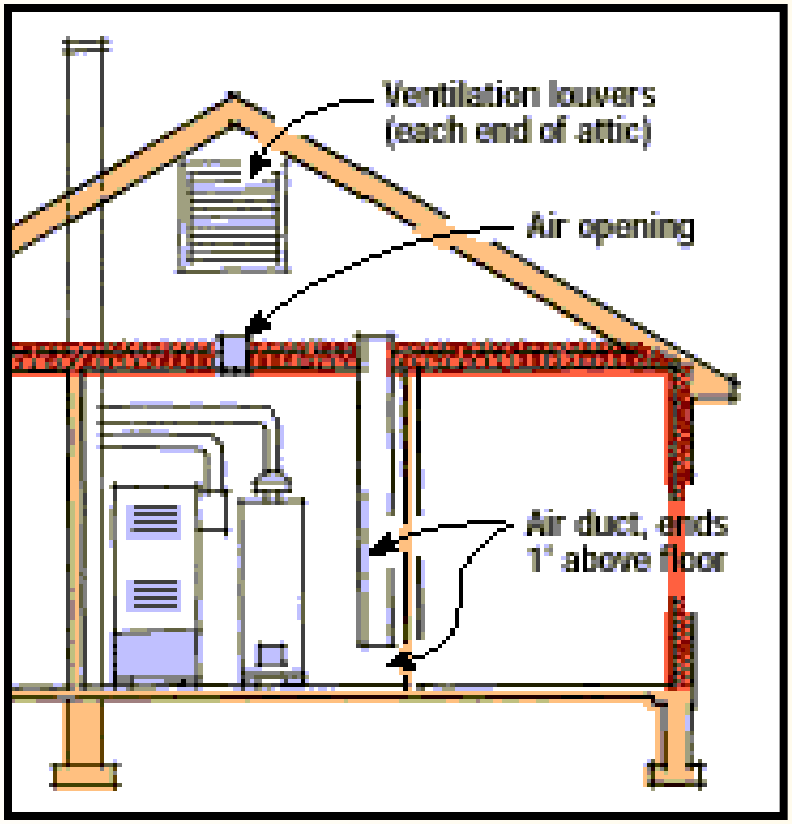


Fuel Oil Furnace

Proper probe placement for SSE and carbon monoxide testing

Makeup Air Options In A Confined Space: From A Ventilated Attic

The space where the appliances are located must include 2 permanent openings communicating with the attic, each with a free area of 1 inch² per 4000 Btu/h of the total Btu/h input. One opening must be located within 12" of the ceiling, and one must be located within 12" of the floor.



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