# Five Priority Air Sealing Locations

## *For New Homes*


**RESNET 2019**

Presented by:
Charlie Haack, NAIMA

# Who is NAIMA

- NAIMA (North American Insulation Manufacturers Association) is the recognized voice of the insulation industry, bringing together North American manufacturers of fiberglass and mineral wool insulation products.

- Through the Insulation Institute, we leverage the collective insulation expertise of our organization and our members to empower homeowners and professionals to make informed insulation choices.

# Agenda

1. Need for this information
2. Background studies
3. Priority air sealing locations
4. Links & resources

# 1. Need for this Information

## Five Priority Air Sealing Locations

## Need for this Information

# New Codes and Standards

- Updated codes and standards include more stringent air sealing requirements and targets.

## Need for this Information

# Uptake in High Performance Homes

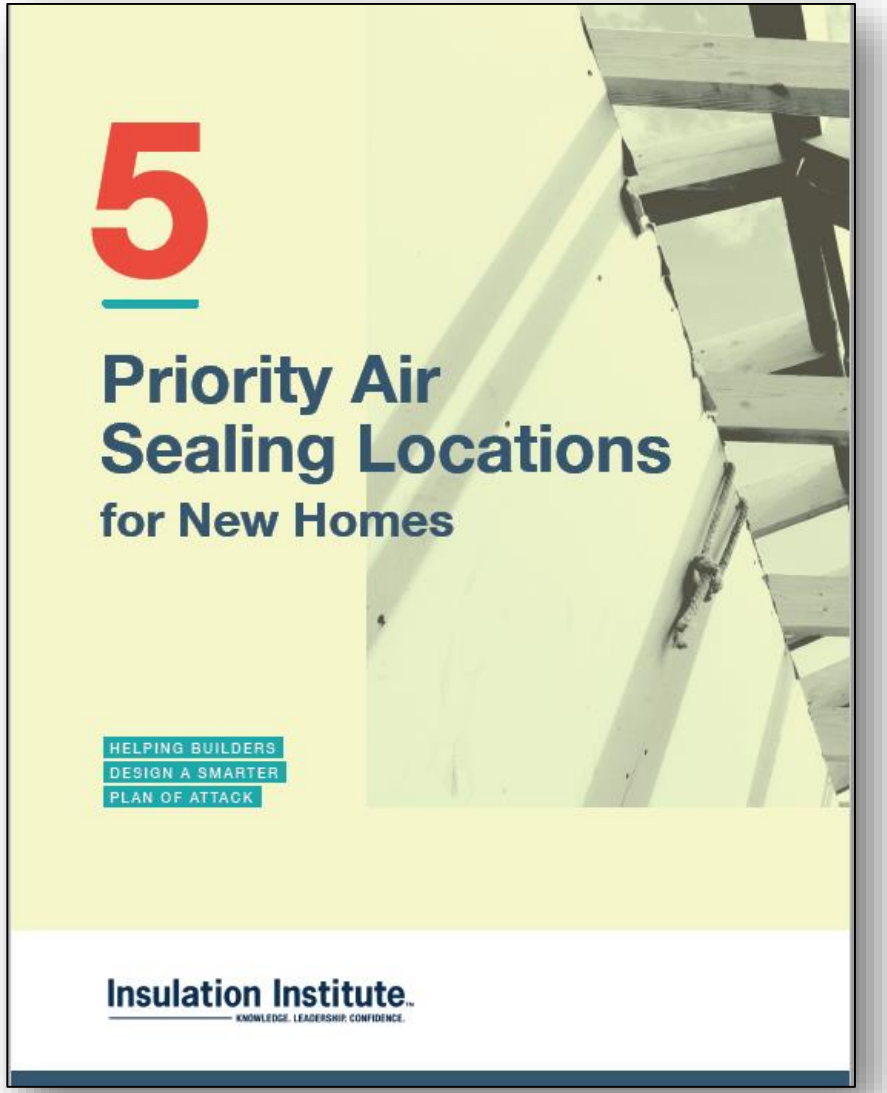
- Growing demand for higher performance homes
  - Lower Energy Rating Indexes
  - ENERGY STAR
  - Zero Energy Ready Home
  - Passive House

# 2. Background Studies

## Five Priority Air Sealing Locations

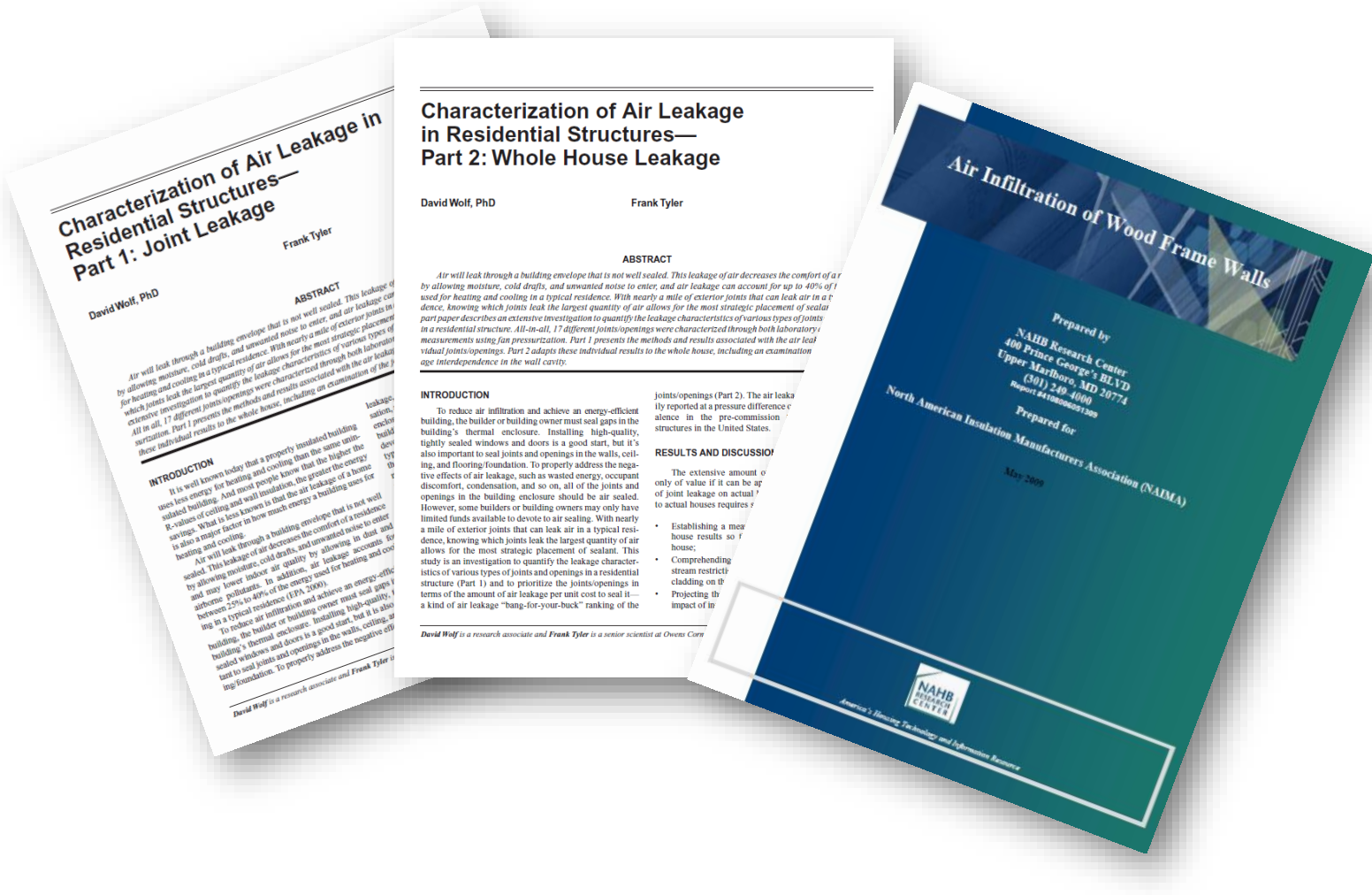
# Insulation Institute Guide

- Outlines the top five air sealing locations for new homes
- Released in 2018



# Studies Cited

- *Characterization of Air Leakage in Residential Structures - Part 1: Joint Leakage*
- *Characterization of Air Leakage in Residential Structures - Part 2: Whole House Leakage*
- *Air Infiltration of Wood Frame Walls*



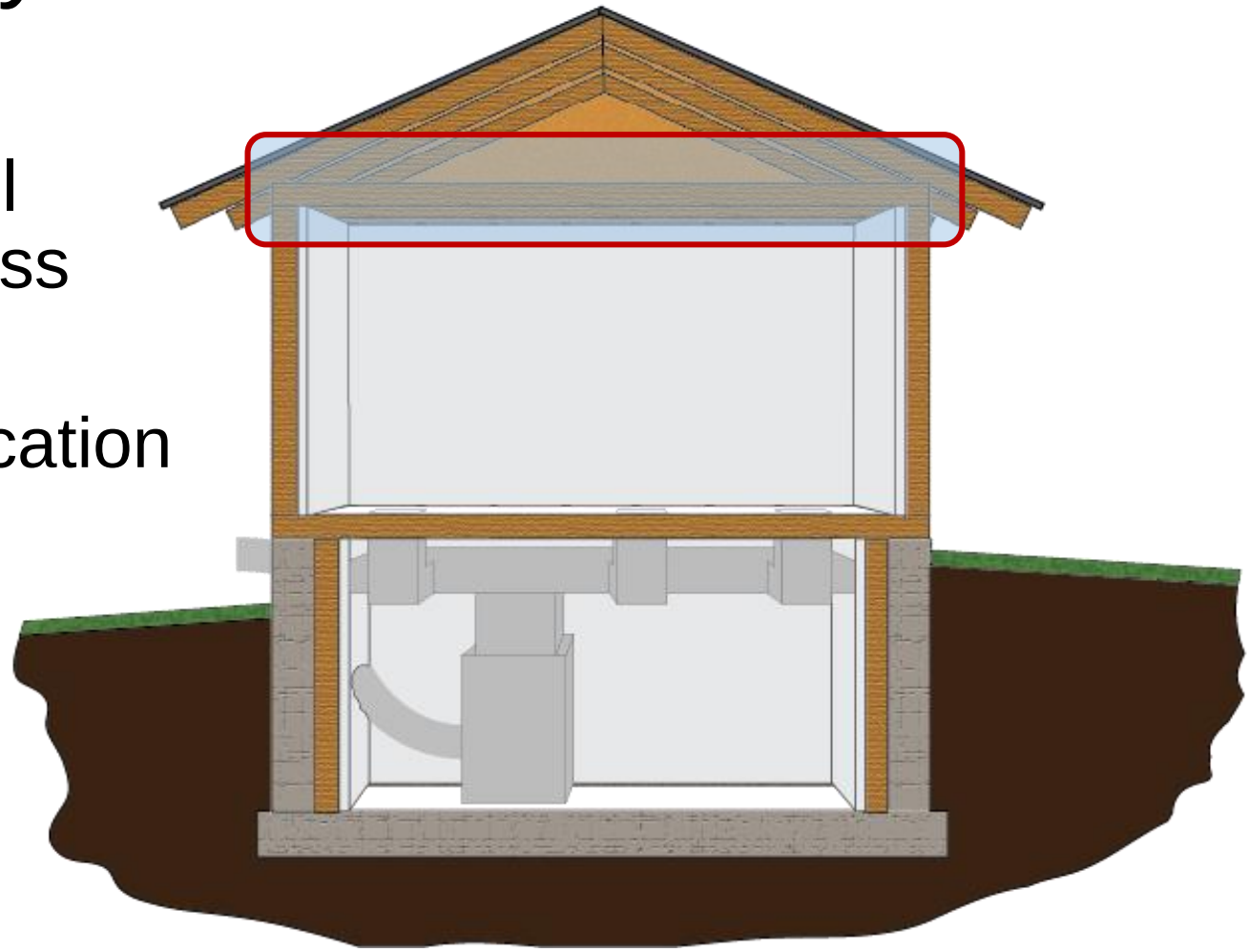
# 3. Top Air Sealing Locations

## Five Priority Air Sealing Locations

## Top Air Sealing Locations

# 1. Top Plate to Attic Drywall

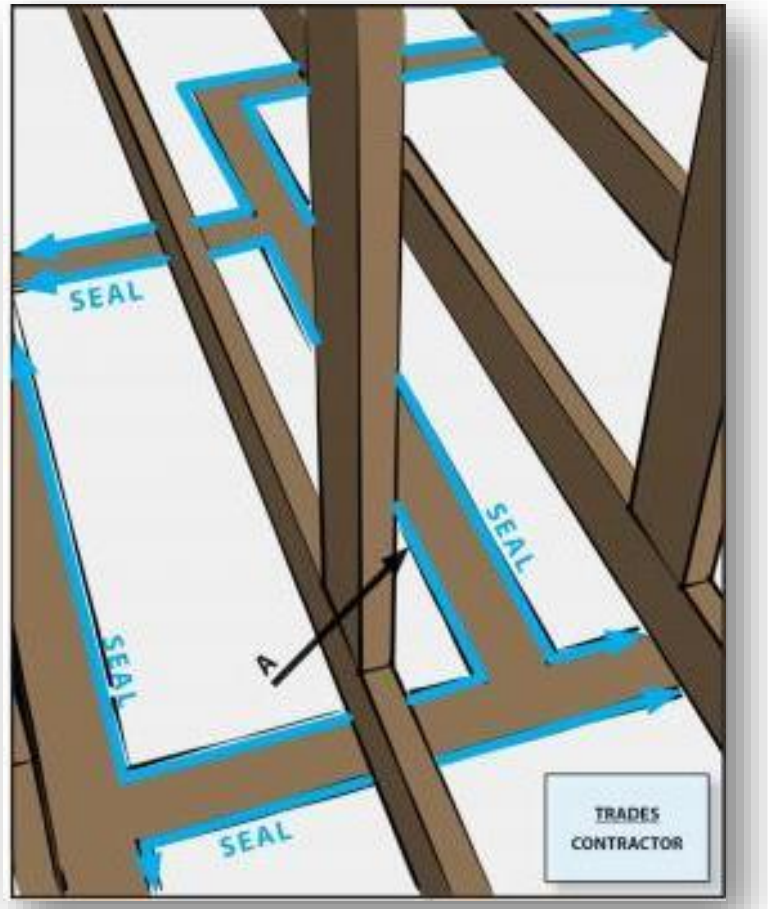
- Homes with vented attics
- Small cracks where the drywall meets top plate that goes across the top of the wall.
- Over 300 ft of cracks at this location in a typical single family home



## Top Air Sealing Locations

# 1. Top Plate to Attic Drywall

- Two approaches available:
  - Seal cracks from attic space above
  - Seal before drywall goes up



## Top Air Sealing Locations

# 1. Top Plate to Attic Drywall

- Seal from attic above:

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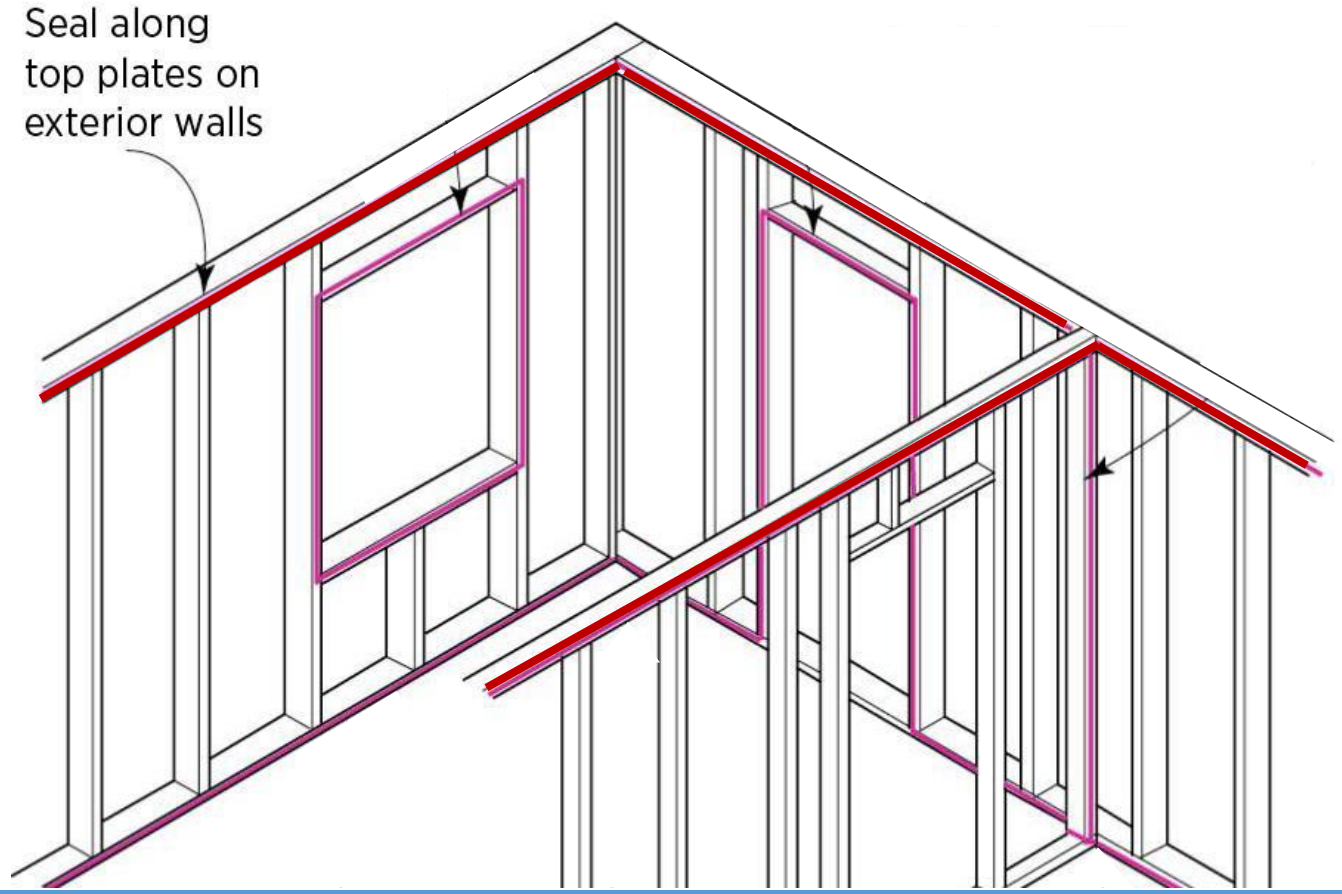
## Top Air Sealing Locations

# 1. Top Plate to Attic Drywall

- Add seal before drywall goes up:



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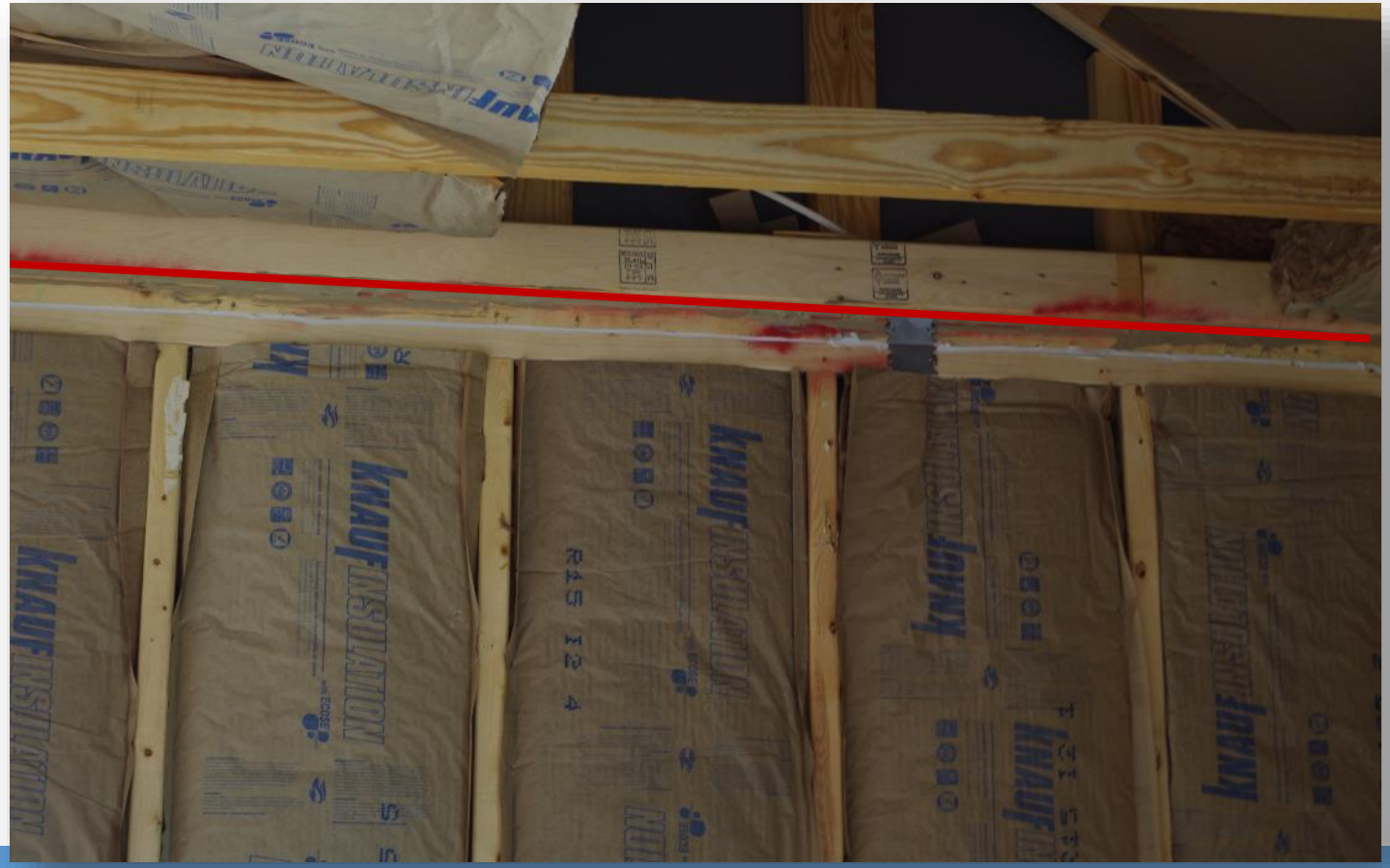


## Top Air Sealing Locations

# 1. Top Plate to Attic Drywall

- Add seal before drywall goes up:

## Top Air Sealing Locations

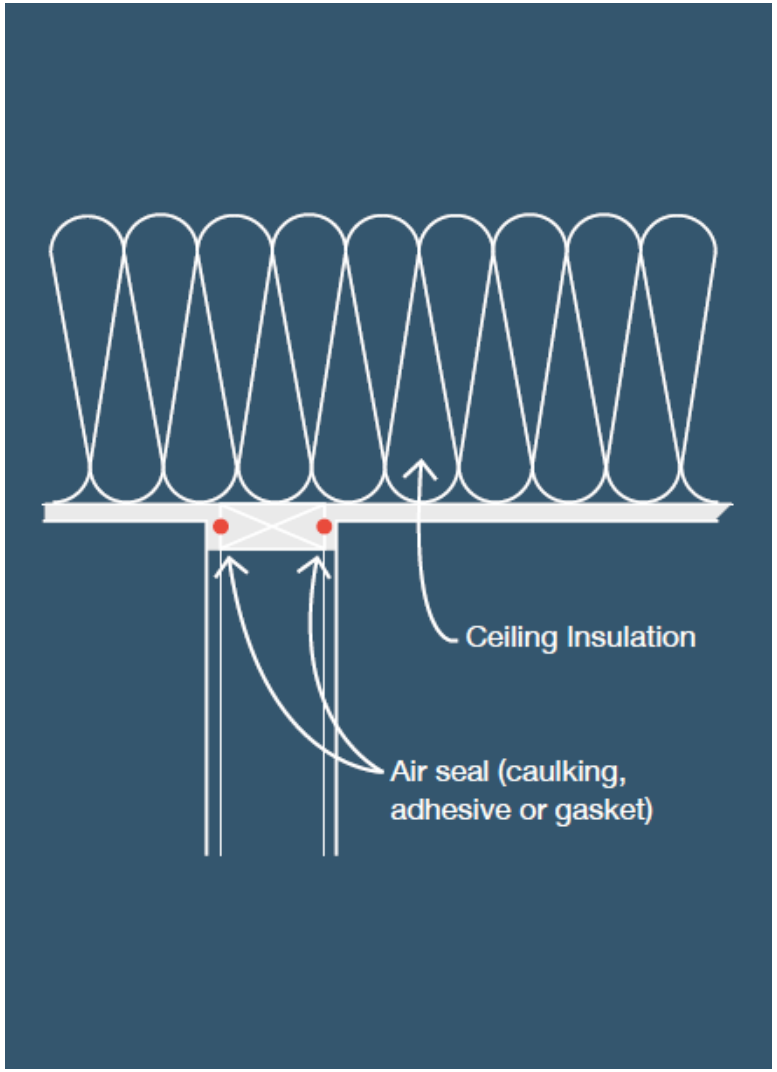
# 1. Top Plate to Attic Drywall

- In shafts where drywall is not going to be installed – block from above

# 1. Top Plate to Attic Drywall

- Summary Recap
  - Over 300 ft of cracks to be sealed
  - Highly effective as it reduces stack effect
  - Two options at this location:
    - Air seal from the attic above after drywall is installed
    - Add seal before drywall is in place

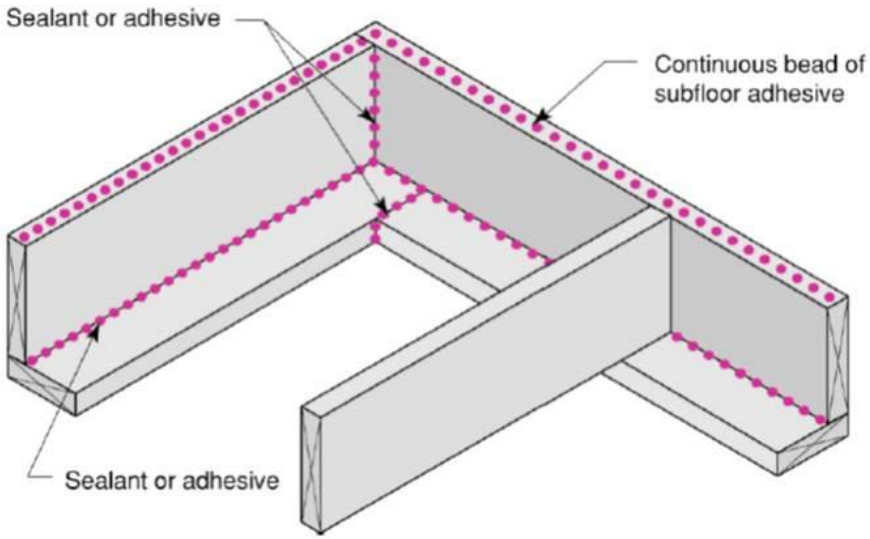
- Effect on reaching ACH50 targets
  - Reduction in infiltration of up to 1.6 ACH50



## Top Air Sealing Locations

# 2. Band Joist

- Low point above foundation wall contributes to stack effect
- Applicable to homes with either conditioned or unconditioned basements and crawlspaces
- Up to 200 ft of cracks to seal



## Top Air Sealing Locations

# 2. Band Joist

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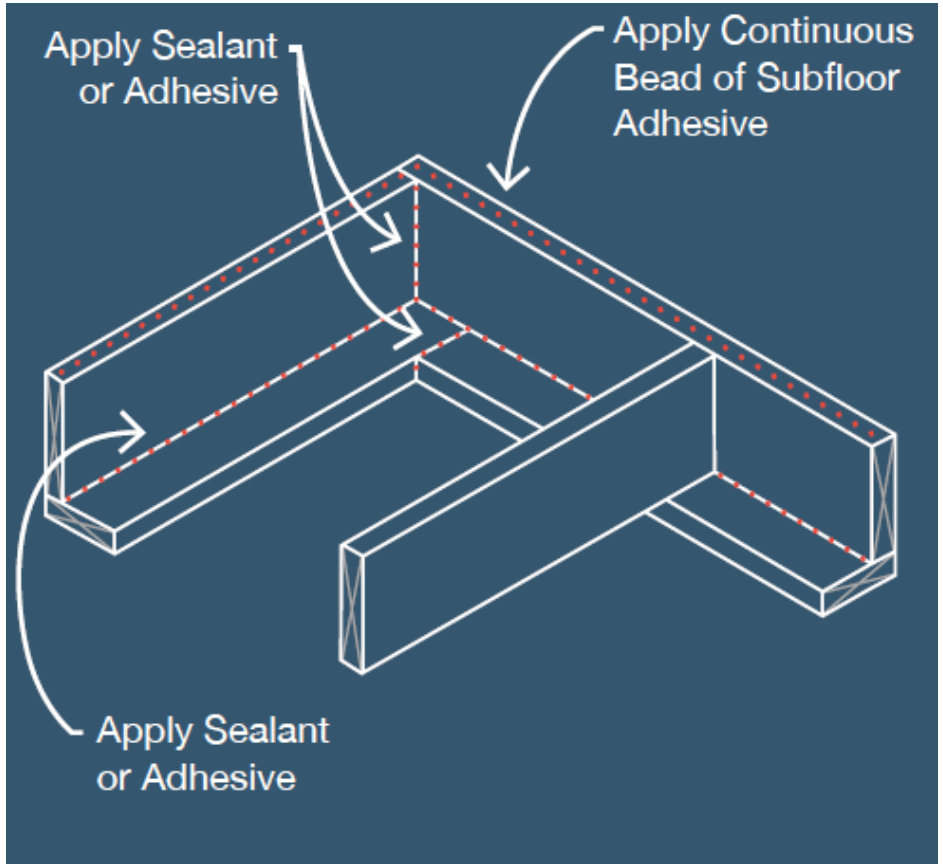
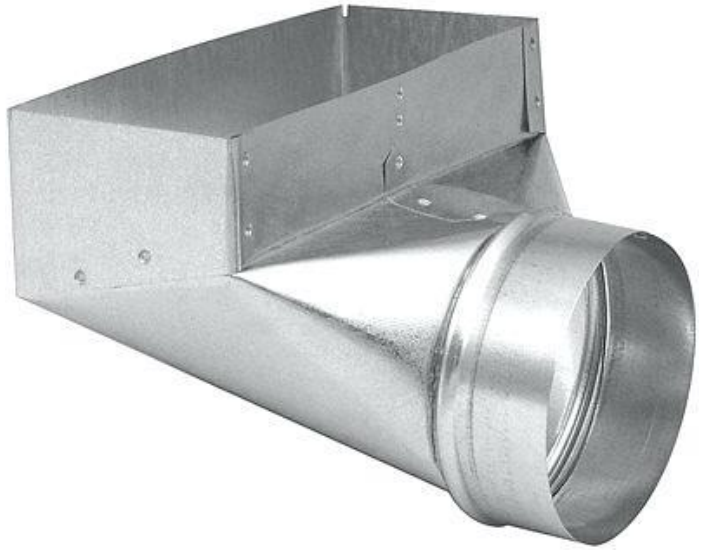
- Summary Recap
  - Up to 200 ft to be sealed
  - Can be sealed from the interior or exterior

- Effect on reaching ACH50 targets
  - Reduction in infiltration of up to 0.4 ACH50



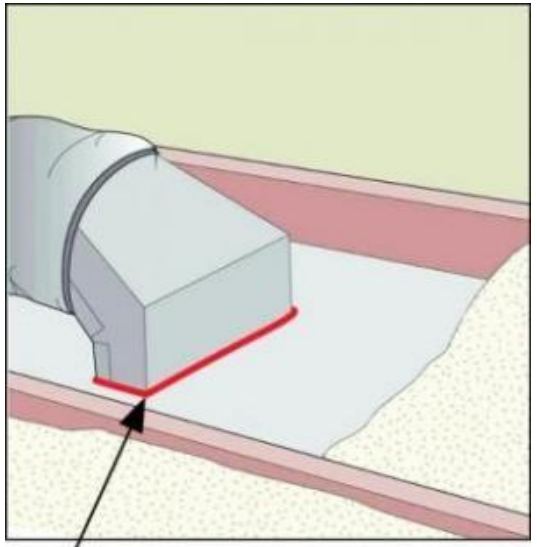
# 3. Duct Boot to Finished Surface

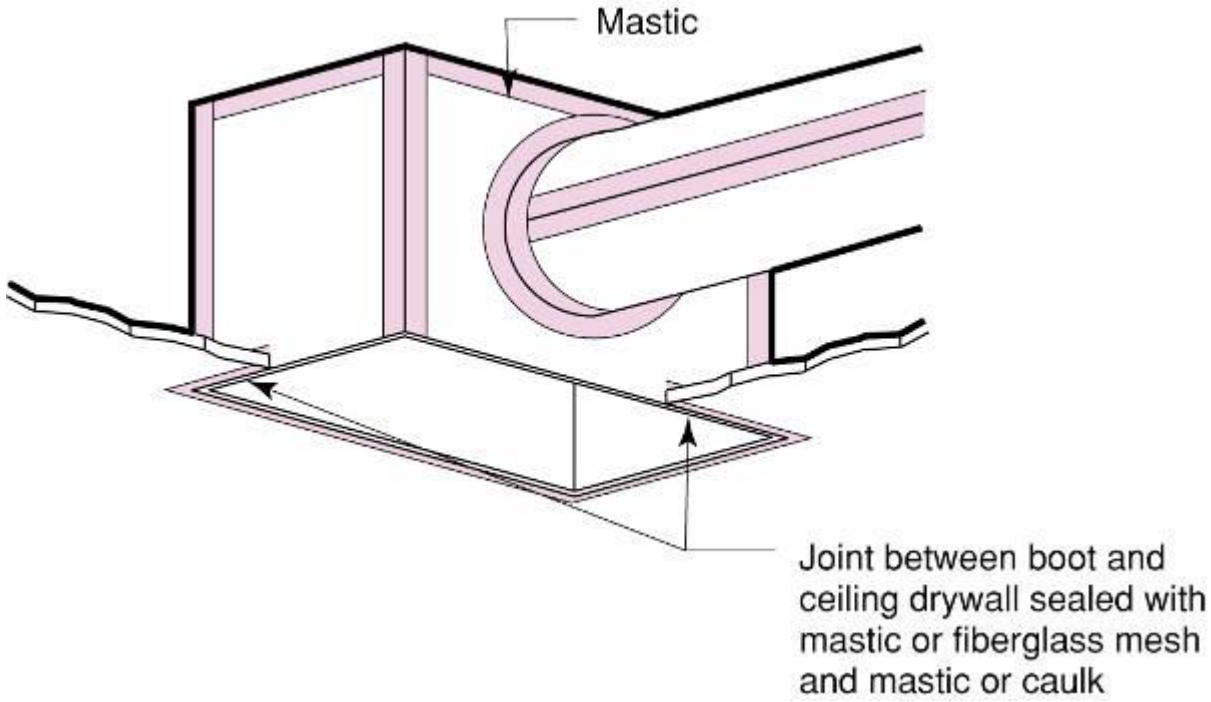
- Homes with unconditioned attics and unconditioned basements/crawlspaces
- Typically 10 in x 6 in duct boots
- Up to 8+ per home



# 3. Duct Boot to Finished Surface

- Ceilings



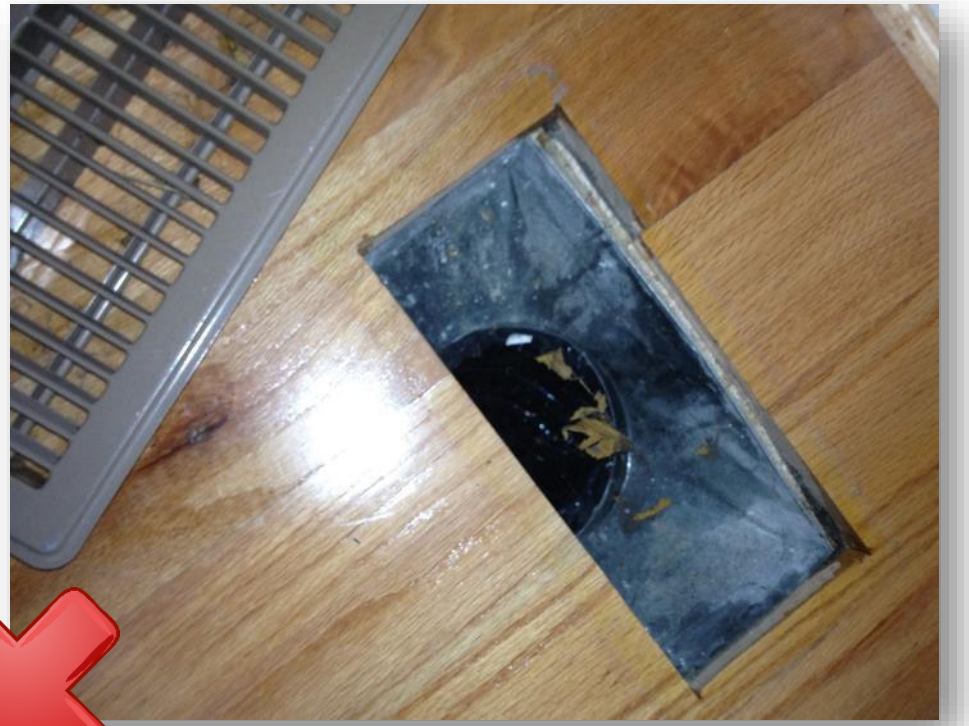
## Top Air Sealing Locations

# 3. Duct Boot to Finished Surface

- Ceilings

# 3. Duct Boot to Finished Surface

- Floors



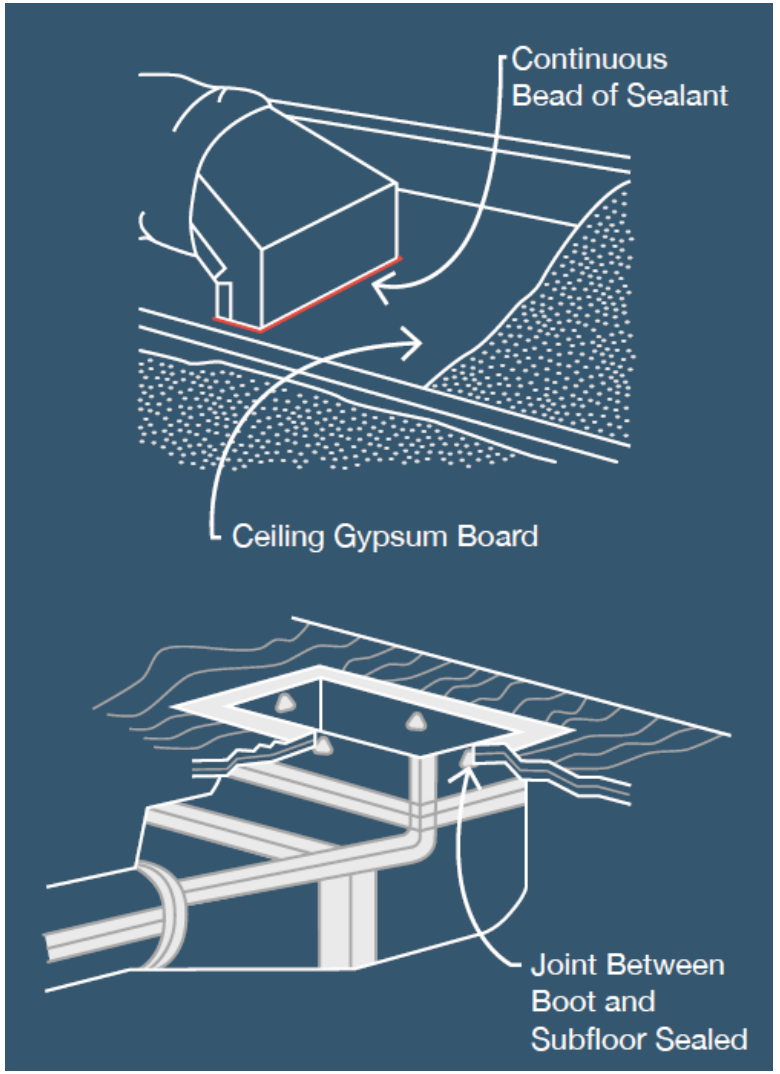
# 3. Duct Boot to Finished Surface

- Floors

# 3. Duct Boot to Finished Surface

- Summary Recap
  - Sealing these high and low locations reduces the stack effect
  - Up to 8+ boots to be sealed in a typical home

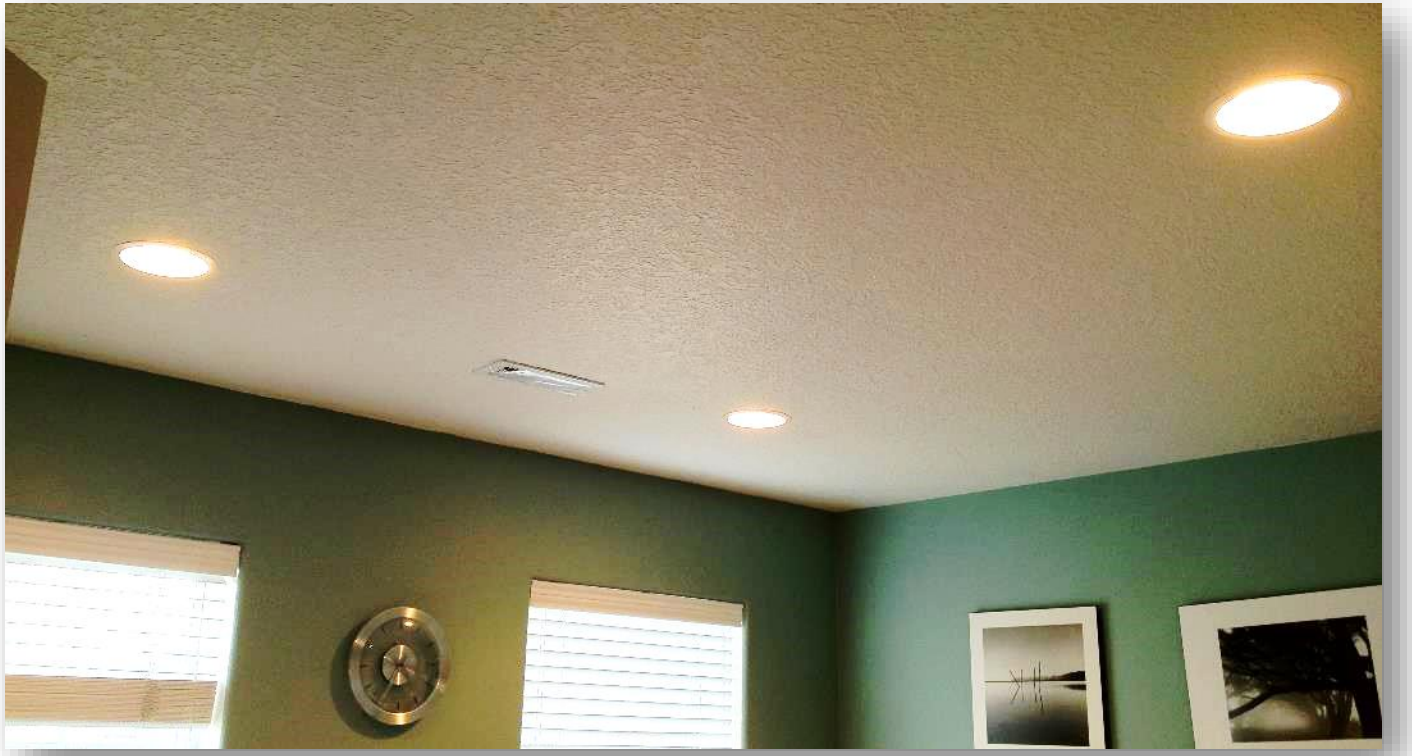
- Effect on reaching ACH50 targets
  - Reduction in infiltration of up to 0.2+ ACH50



## Top Air Sealing Locations

# 4. Recessed Lighting

- Homes with vented attics
- Typically 10 per home



# 4. Recessed Lighting

- Air tight recessed can light & seal at base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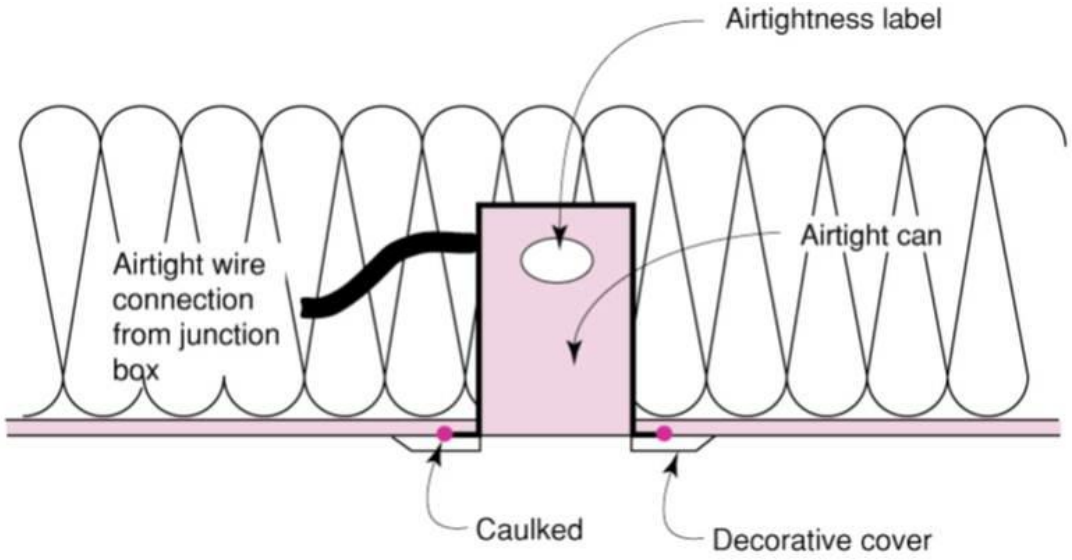
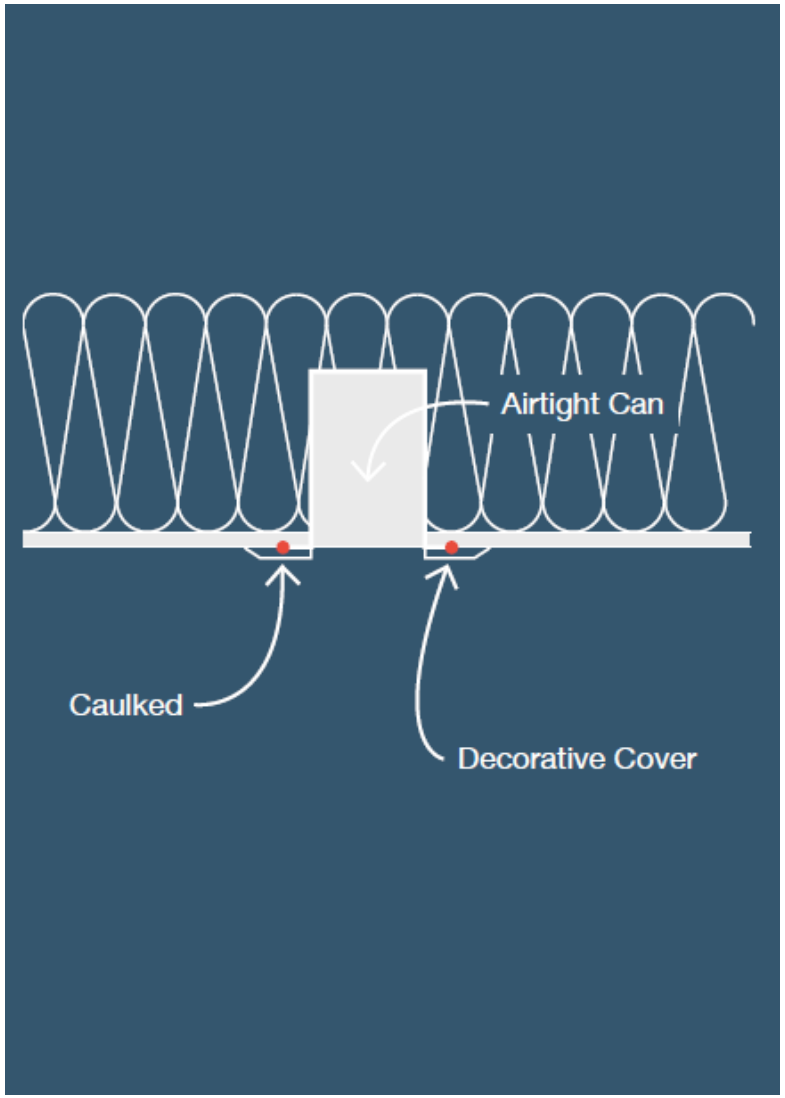


# 4. Recessed Lighting

- Summary Recap
  - Up to 10 lights to be sealed
  - Highly effective as it reduces stack effect

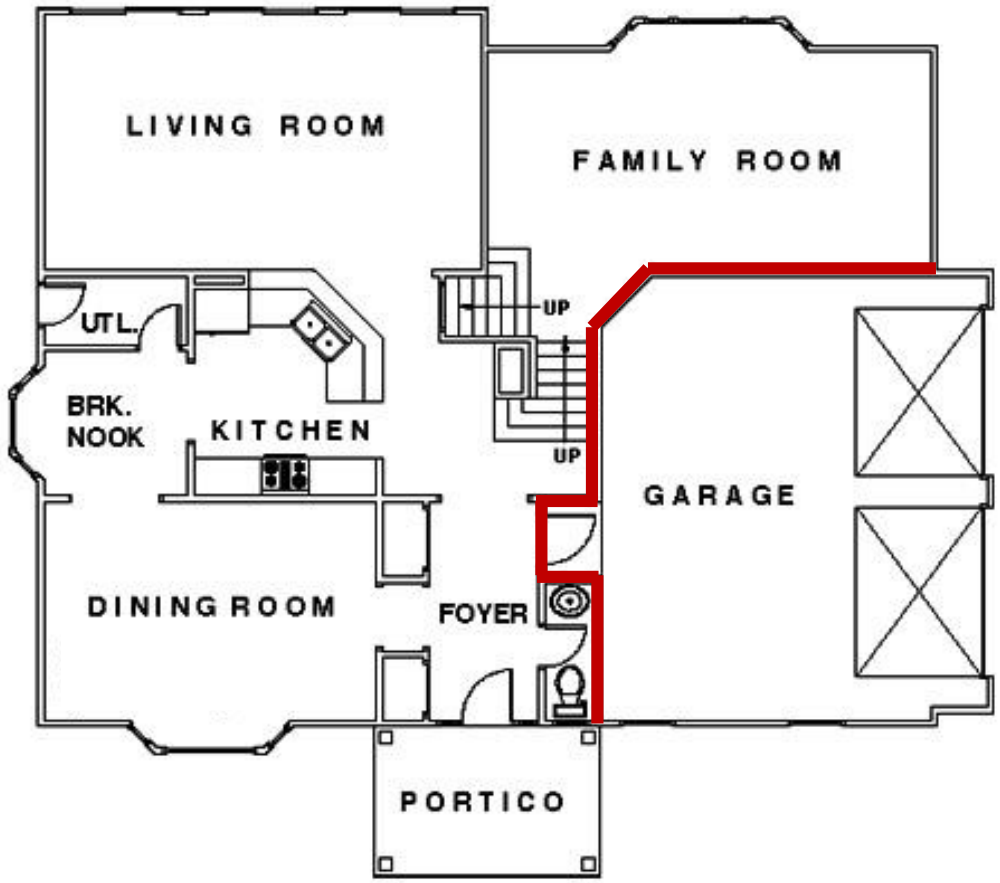
- Effect on reaching ACH50 targets
  - Reduction in infiltration of up to 0.2+ ACH50



## Top Air Sealing Locations

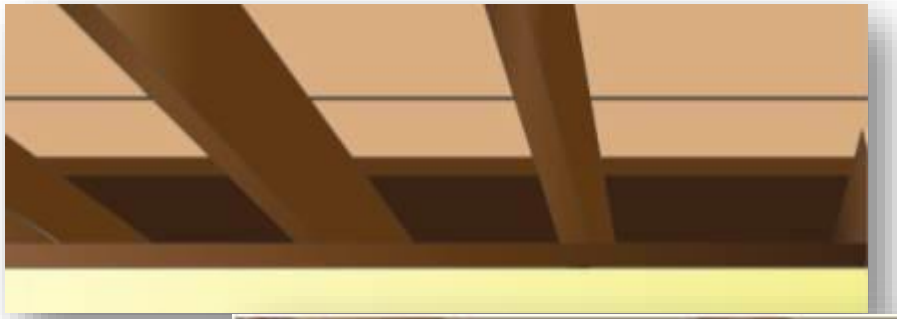
# 5. Garage-House Common Wall

- Homes with attached garages
- Includes sealing walls and doors
- Most overlooked area is the flooring system above garage that connects with the conditioned space in the house



## Top Air Sealing Locations

# 5. Garage-House Common Wall

## Top Air Sealing Locations

# 5. Garage-House Common Wall

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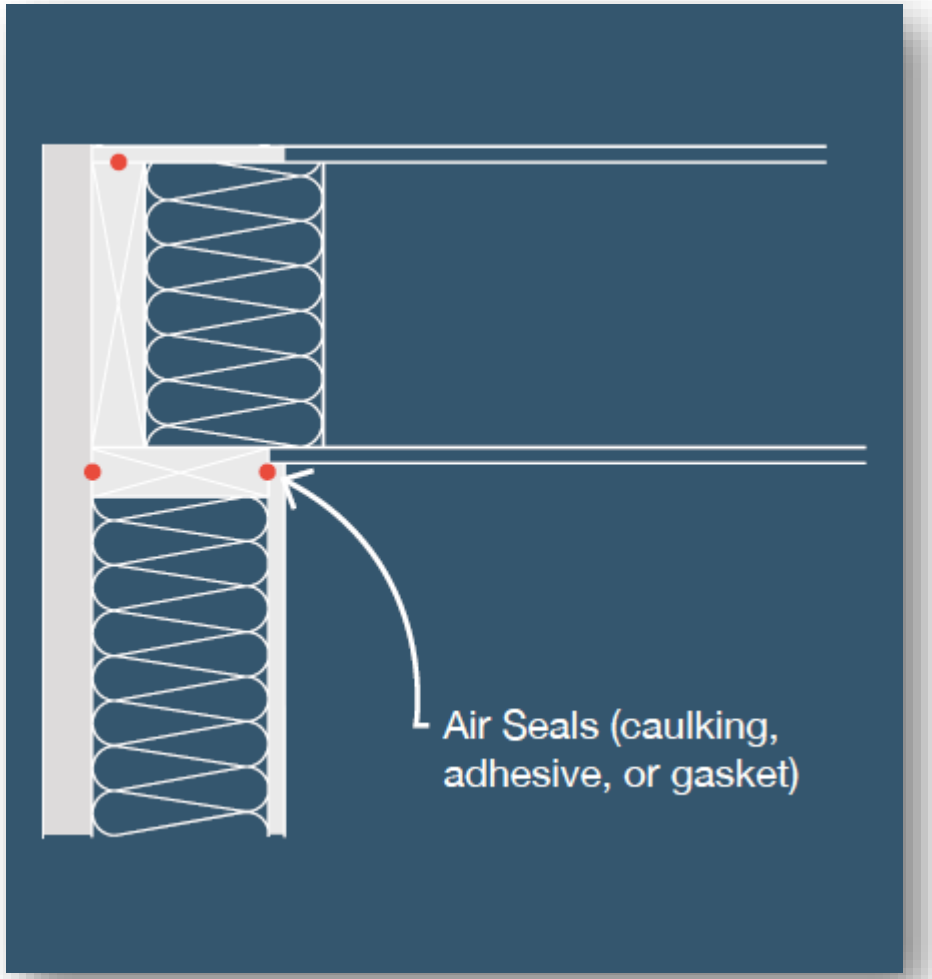
- Summary Recap
  - Up to 6+ bays to be blocked & sealed

- Effect on reaching ACH50 targets
  - Reduction in infiltration of up to 0.2+ ACH50



## Top Air Sealing Locations

# Summary

| | Location | ACH50 Reduction |
|---|---|---|
| 1. | Attic Top Plate to Drywall | 1.6+ |
| 2. | Band Joist | 0.4+ |
| 3. | Duct Boot to Finished Surface | 0.2+ |
| 4. | Recessed Lighting | 0.2+ |
| 5. | Garage-House Common Wall | 0.2+ |

# Summary

- Energy Rating Index impact for improving infiltration rates
- Typical single family home
  - 2,400 sq.ft.
  - 2 stories

| Climate Zone | 7 ACH50 | 5 ACH50 | 3 ACH50 |
|---|---|---|---|
| 1 | 71 | (1) | (1) |
| 2 | 74 | (1) | (2) |
| 3 | 70 | (2) | (4) |
| 4 | 78 | (3) | (4) |
| 5 | 83 | (4) | (7) |
| 6 | 80 | (4) | (8) |
| 7 | 72 | (4) | (8) |

# 4. Links and Resources

## Five Priority Air Sealing Locations

# Links and Resources

- Insulation Institute: www.insulationinstitute.org
- ENERGY STAR National Rater Field Checklist: www.energystar.gov/NewHomesRequirements
- Referenced Studies:
  - *Characterization of Air Leakage in Residential Structures - Part 1: Joint Leakage*
  - *https://web.ornl.gov/sci/buildings/conf-archive/2013%20B12%20papers/097-P1_Wolf.pdf*
  - *Characterization of Air Leakage in Residential Structures - Part 2: Whole House Leakage*
  - *https://web.ornl.gov/sci/buildings/conf-archive/2013%20B12%20papers/097_P2%20Wolf.pdf*

## Top Air Sealing Locations

# Video Available

# Thank You & Questions

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