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.
Five Priority Air Sealing Locations

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
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
Background Studies

Insulation Institute Guide

• Outlines the top five air sealing locations for new homes

• Released in 2018
Background Studies

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:
Top Air Sealing Locations

1. Top Plate to Attic Drywall

• Seal from attic above:
Top Air Sealing Locations

1. Top Plate to Attic Drywall

• Seal from attic above:
Top Air Sealing Locations

1. Top Plate to Attic Drywall

• Add seal before drywall goes up:

Seal along top plates on exterior walls
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

- 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
Top Air Sealing Locations

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
Top Air Sealing Locations

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Top Air Sealing Locations

2. Band Joist
Top Air Sealing Locations

2. Band Joist

• 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
Top Air Sealing Locations

3. Duct Boot to Finished Surface

- Ceilings

Caulk with a continuous bead of sealant

Joint between boot and ceiling drywall sealed with mastic or fiberglass mesh and mastic or caulk.
Top Air Sealing Locations

3. Duct Boot to Finished Surface

• Ceilings
Top Air Sealing Locations

3. Duct Boot to Finished Surface

- Floors
Top Air Sealing Locations

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
Top Air Sealing Locations

4. Recessed Lighting

• Air tight recessed can light & seal at base
4. Recessed Lighting

- Air tight recessed can light & seal at base
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

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Top Air Sealing Locations

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Top Air Sealing Locations

5. Garage-House Common Wall

• 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

<table>
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<tr>
<th>Location</th>
<th>ACH50 Reduction</th>
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<tr>
<td>1. Attic Top Plate to Drywall</td>
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<td>2. Band Joist</td>
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<tr>
<td>3. Duct Boot to Finished Surface</td>
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<tr>
<td>4. Recessed Lighting</td>
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<td>5. Garage-House Common Wall</td>
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Top Air Sealing Locations

Summary

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

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<th>Climate Zone</th>
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4. Links and Resources

Five Priority Air Sealing Locations
Top 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*
  • *Characterization of Air Leakage in Residential Structures - Part 2: Whole House Leakage*
Top Air Sealing Locations

Video Available
Top Air Sealing Locations

Thank You & Questions

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