7 Advanced Framing Approaches

with Fiberglass and Mineral Wool

Insulation Institute™

KNOWLEDGE. LEADERSHIP. CONFIDENCE.

7

Advanced Framing Approaches

with Fiberglass and Mineral Wool

With increasingly strict building energy codes, sky-high lumber prices, and high demand for labor seemingly here to stay, there has never been a better time to make the switch to advanced framing or to boost your existing framing techniques with better insulation products and installation practices.

Many think that advanced framing simply means switching from 16” to 24” on center framing, but the key to advanced framing success is the details for areas like corners, wall intersections, and around windows. How to frame and insulate these key details is where the real advanced framing practices occur. More insulation, coupled with reduced thermal bridging due to less framing members in walls, means more comfort and energy savings for the homebuyer.

Refer to this guide for tips on how to execute advanced framing and install proven effective fiberglass or mineral wool insulation in your projects.

01.

Insulated Corners

INSULATED CORNERS

Why:

- Eliminating framing members in exterior corners while ensuring all structural needs are met means reduced thermal bridging, more room for insulation, improved comfort, and energy efficiency.
- A two-story home will have at least eight corners and likely many more with features like bay windows, bump-outs, dormers, and architectural features. The savings and benefits can be substantial.
- Reduced framing at corners can also help achieve code compliance by lowering framing fractions and improving assembly U-factors and total building thermal envelope UA.

How:

- Three-stud corners can leave a gap that must be insulated from the exterior and can be overlooked. (Figure 1)
- An improved three-stud corner creates a space that the contractor can insulate, but batts should be cut so that they are not compressed. (Figure 2)
- A two-stud corner gives the most space for insulation and eliminates the third stud by using drywall clips or a nailing strip to hang the drywall. (Figure 3)

Figure 1: DIFFICULT TO INSULATE Three-stud corners

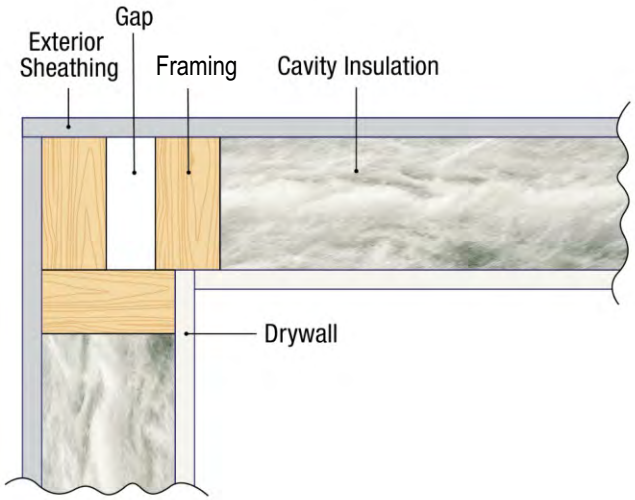


Figure 2: Improved three stud corner

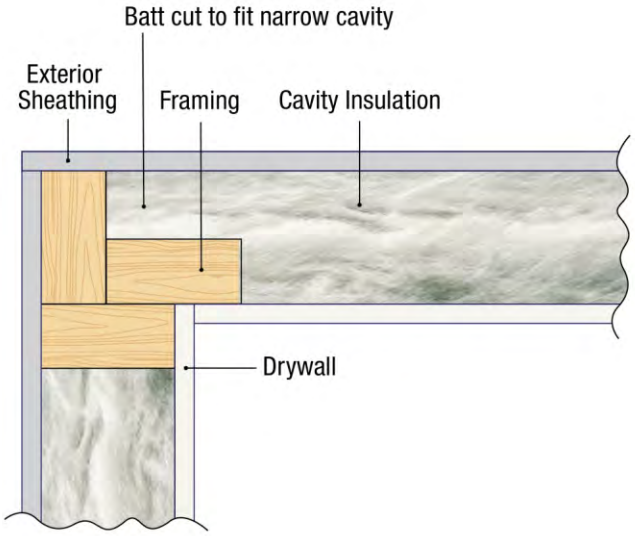
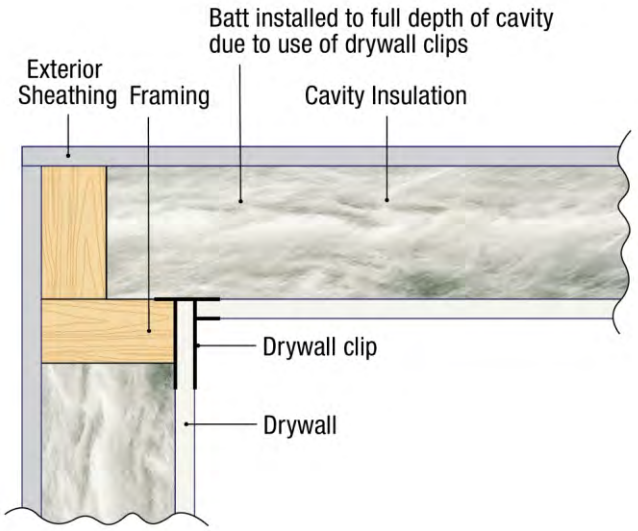


Figure 3: Improved two stud corner



02.

Ladder Construction

LADDER CONSTRUCTION AT INTERIOR/EXTERIOR WALL INTERSECTIONS

Why:

- Traditional framing at interior/exterior wall intersections can create a gap that is difficult to insulate and creates thermal bridges that run from floor to ceiling in many rooms in the house. Advanced framing techniques lead to more insulation than traditional framing, yielding greater comfort, and help achieve code compliance by lowering framing fractions and improving assembly U-factors and total building thermal envelope UA.

How:

- At each interior/exterior wall intersection, install a ladder of 2x4s between the exterior wall studs. Turn studs on their side to leave a 2” gap towards the exterior, then use batt insulation to fill the space.
- One tip is to use leftover cripple studs from framing windows to build the ladder.

Figure 4: Ladder Construction at Interior/Exterior Wall Intersections

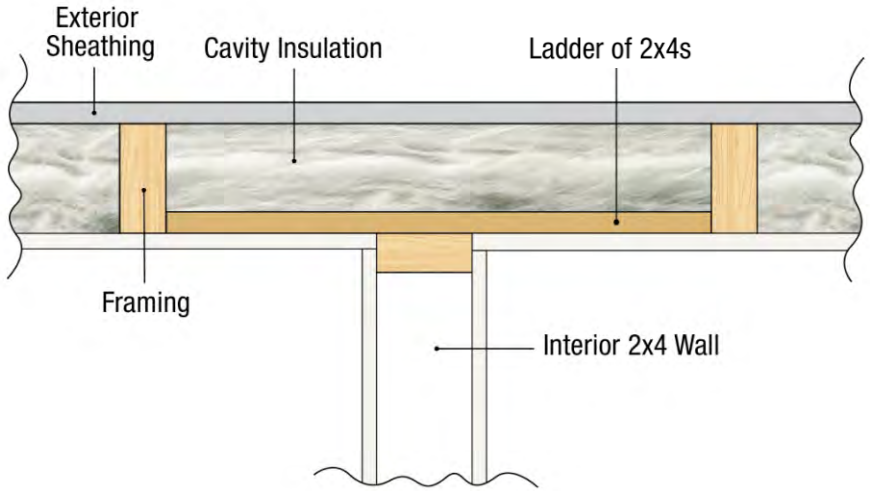
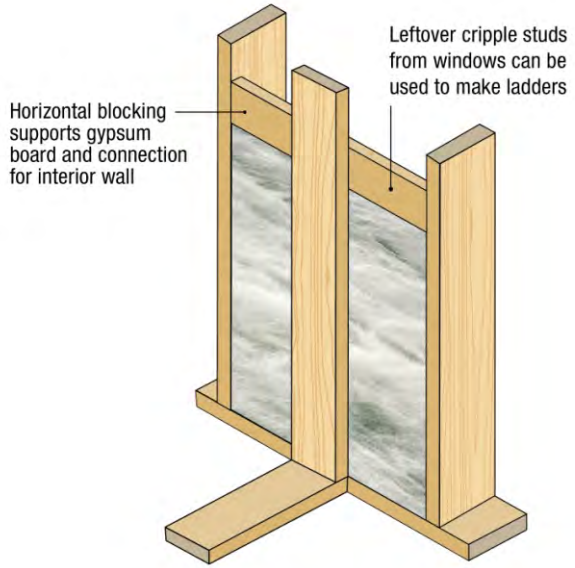


Figure 5: Ladder Construction at Interior/Exterior Wall Intersections



03.

Excessive Studs Around Windows

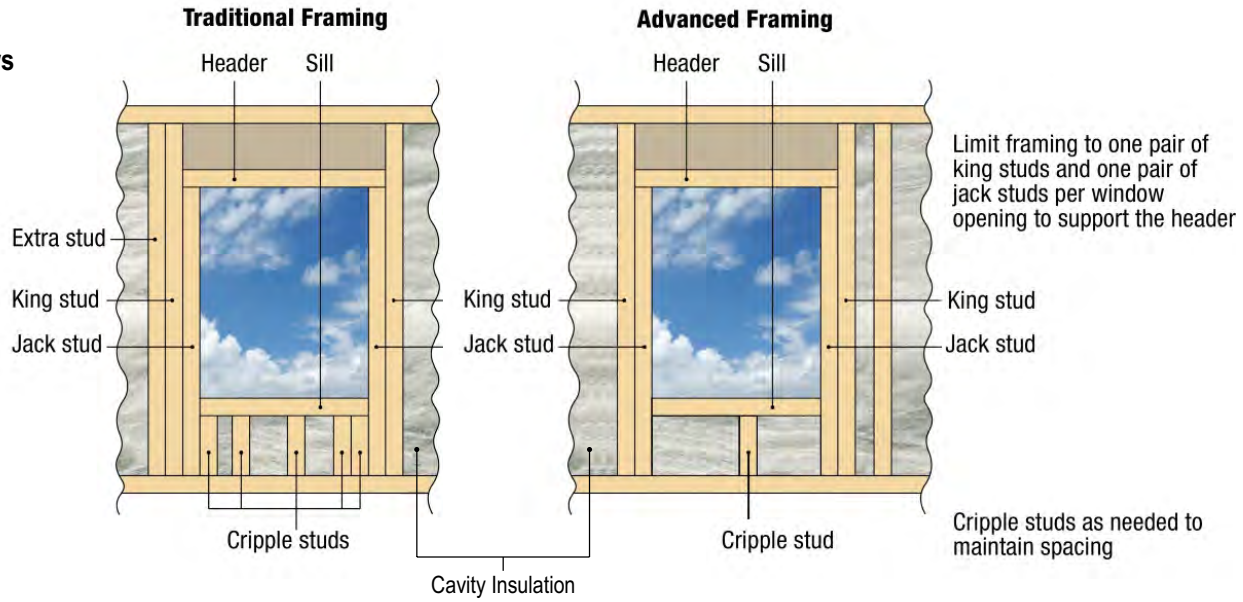
Why:

- When homeowners are uncomfortable by a window, many think it is from a draft bringing in cold air. But another potential cause is that increased framing around a window or door leads to more thermal bridging and contributes to this problem.
- Reducing framing at windows will improve comfort, efficiency, and reduce lumber costs.
- Removing excessive studs can also help achieve code compliance by lowering framing fractions and improving assembly U-factors and total building thermal envelope UA.

How:

- Ensure that the cripple studs framed under windows are constructed with spacing to eliminate the need to cut the width of insulation batts (e.g., 16-inch on center).
- Limit framing to one pair of king studs and one pair of jack studs per window opening to support the header and windowsill.
- Install additional jack studs only as needed for structural support and cripple studs only as needed to maintain the on-center spacing of studs.

Figure 6:
Excessive Studs Around Windows



04.

High-Density Batts as an Alternative to Raised Heel Truss

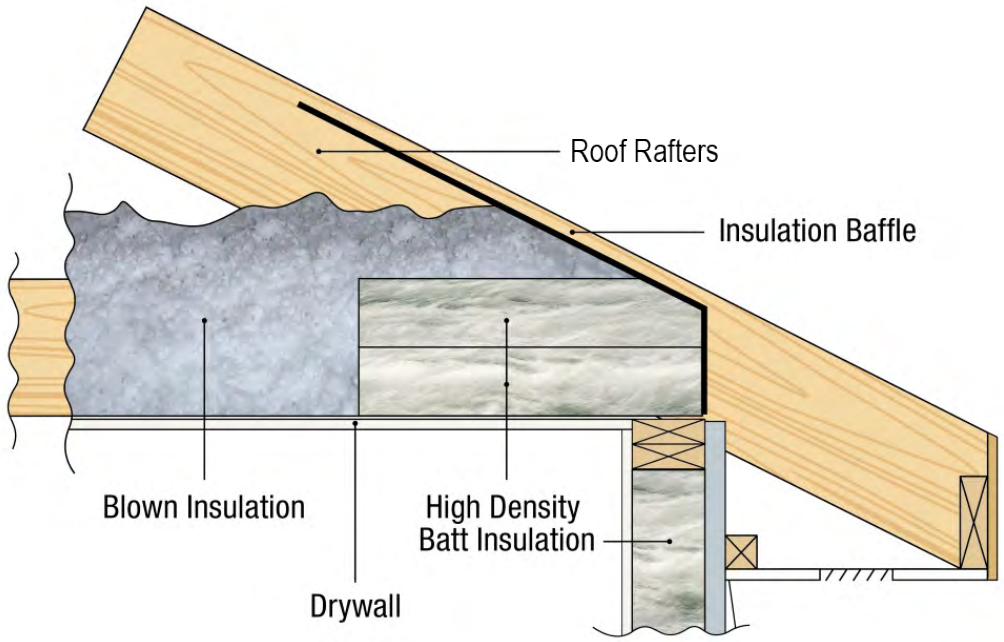
Why:

- Constructing a raised heel truss increases the amount of insulation at the attic eave but can be more expensive to build. Using high-density batts at the eave can provide cost savings and improve performance over just using blown-in insulation because of the higher R-value per inch of the high-density batt.

How:

- Install high-density batts in between ceiling joists at the eave, extending out far enough for full depth blown-in attic insulation to be achieved (e.g., 12" away from the eave). Place an additional layer of batts perpendicular to the first layer of batts in between the ceiling joists.
- Ensure that the insulation extends to cover the top plates of the exterior walls.

Figure 7:
Standard rafter and top plate with tapered insulation depth



05.

Insulating Non-Standard Floor Joist Spaces

Why:

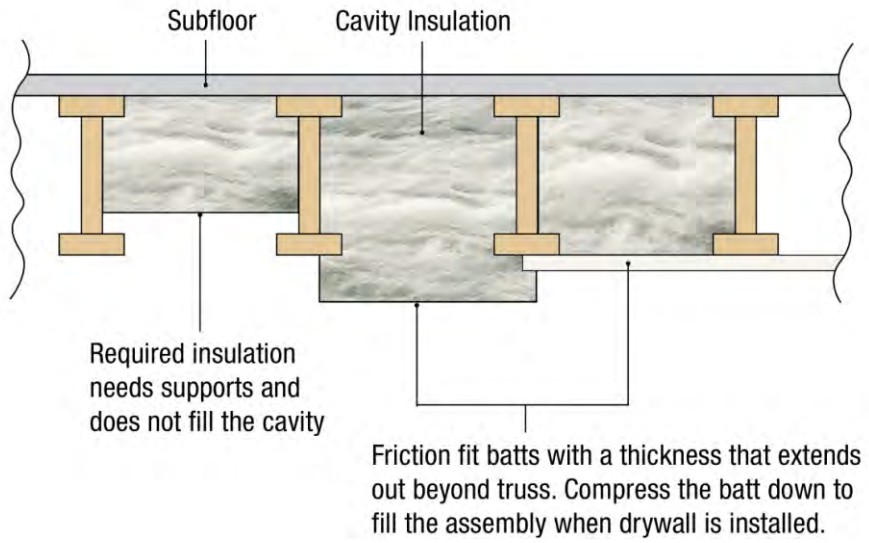
- Non-standard depth floor joists (e.g., engineered joists) can often provide more space for insulation than required by code. If just providing code-level insulation, supports would be required to hold the batts in place against the subfloor.
- Installing batts with a larger thickness can reduce labor costs. Supports will not be required because the batts will completely fill the cavity. The additional insulation will improve efficiency, comfort, and contribute to improved code compliance calculations.

How:

- At a floor above unconditioned space (e.g., at the floor joists for a bonus room over a garage), friction fit batts with a thickness that extends out beyond the truss. Compress the batt to fill the assembly when drywall is installed.
- For example, if code required R-30, but an "11 7/8" I joist is used, an R-30 batt would only partially fill the assembly, but an R-38 batt could be installed and compressed after drywall is installed to provide a full R-value without the need for installing supports.[1]

[1] For guidance on compressed R-value, see Estimated R-values for Compressed Fiber Glass Batt Insulation, https://insulationinstitute.org/wp-content/uploads/2016/08/Compressed_R_values.pdf

Figure 8:
Non-Standard Floor Joist Spaces When a Non-Standard Depth Joist (e.g., Engineered Joist) is Used



06.

Narrow Cavity Around Windows

(A 0.5-1.5-INCH GAP BETWEEN WOOD AND VINYL FRAMING)

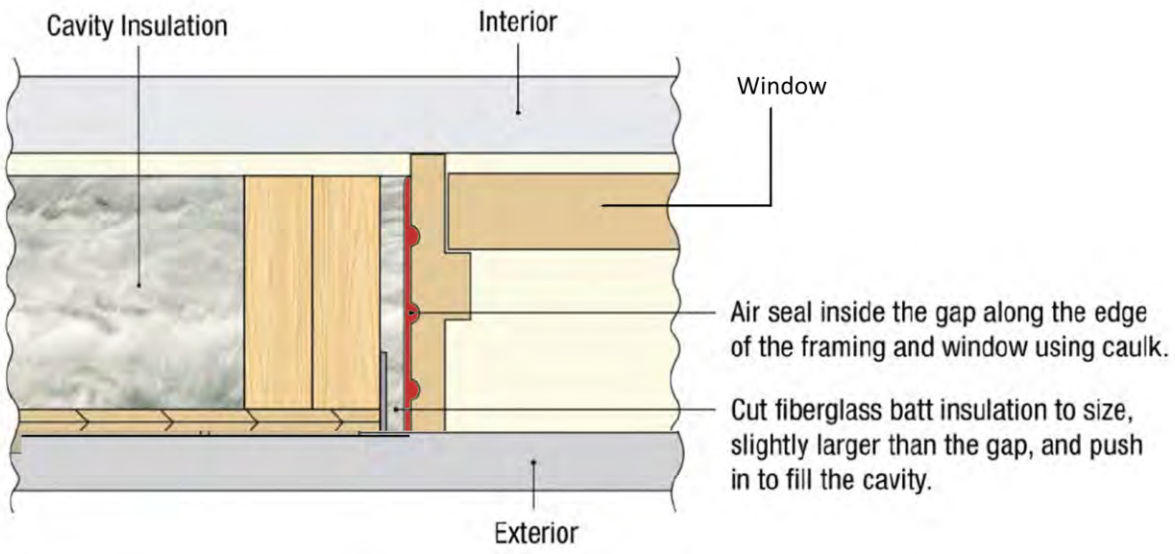
Why:

- Instead of using foam insulation, using a combination of caulk to air seal and fiberglass to insulate around the window frame avoids pressure or stress being put on the window frame from the expanding foam. This can help prevent future issues with window performance and operation.

How:

- Air seal inside the gap along the edge of the framing and window using caulk. Cut fiberglass batt insulation to size, slightly larger than the gap, and push in to fill the cavity.

Figure 9:
Narrow Cavity Around Windows (0.5” - 1.5” Gap) Between Wood and Vinyl Framing



07.

Insulated Headers

Why:

- The 2012 IECC required that headers be insulated, and a more recent version of the IECC has clarified that headers be insulated to greater than R-3 per inch.
- Insulating headers can also help achieve code compliance by lowering framing fractions and improving assembly U-factors and total building thermal envelope UA.

How:

- One approach is to use two 2-bys (e.g., 2x8, 2x10, etc) on either the interior or exterior surface so that the extra space can be insulated using rigid foam board.
- Another approach is to create a header using a piece of rigid foam between two pieces of plywood. This can be purchased prefabricated or constructed on site.

Figure 10: Insulated Headers

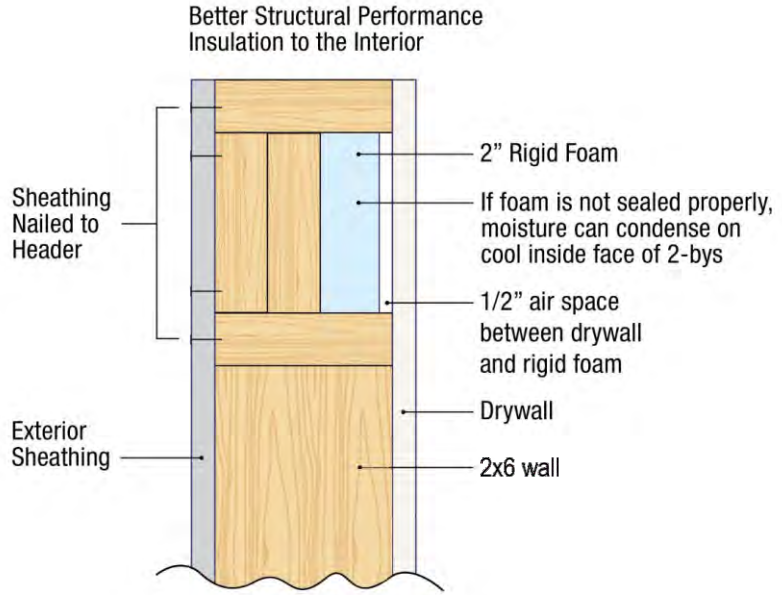
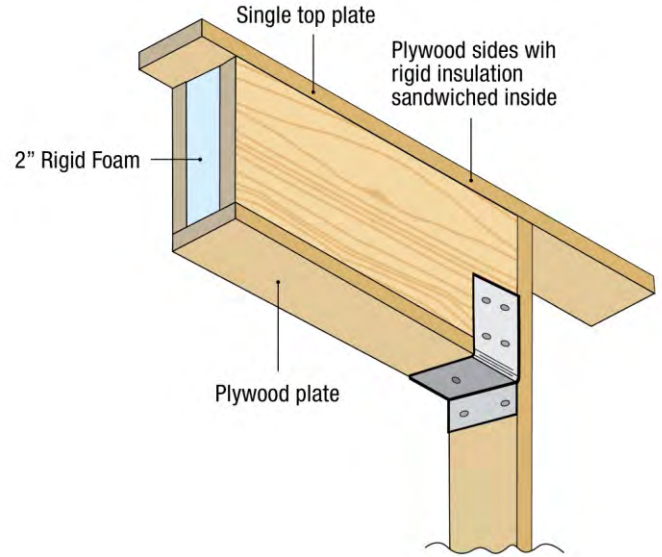


Figure 11: Insulated Headers



In some instances, advanced framing techniques may not be used due to structural requirements (e.g., load-bearing requirements, wind speed). This summary is offered for informational purposes only. It does not purport to be an exhaustive analysis of code requirements or provide advice that will ensure guaranteed compliance with any energy code provision. Please consult with local authorities before finalizing your installation plans.

Insulation Institute™
KNOWLEDGE. LEADERSHIP. CONFIDENCE.

The photographs and illustrations set forth herein are the property of NAIMA and NAIMA's member companies. Each of these images is subject to copyright. All rights to these images are reserved, and the images may not be reproduced without written permission.

Insulation Institute™

KNOWLEDGE. LEADERSHIP. CONFIDENCE.

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials.

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. Our mission is to enable a more comfortable, energy efficient and sustainable future through insulation – and we are constantly working with building professionals, homeowners, government agencies, and public interest, energy and environmental groups to realize that vision.

NAIMA
2013 OLDE REGENT WAY, SUITE 150, BOX 120 | LELAND, NC 28451 | P: 703-684-0084

PUB. NO. N154 8/22

insulationinstitute.org | ©NAIMA. All Rights Reserved