MEMBER FIELD GUIDE EXTERIOR FOUNDATION INSULATION INTEGRATION





Exterior Foundation Insulation Integration Guide

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FORWARD

Several resources were used to develop this guide and BAM wishes to extend sincere gratitude for the production of these guides for BAM's membership:

Illustrations were generously donated by BAM Member George Cundy, Terrace Development and Design.

Engineering services provided by Craig Oswell, Oswell Engineering & Consulting

Production work was provided by Ed Von Thoma, Building Knowledge Inc.



Exterior Foundation Insulation Integration

INTRODUCTION

The 2015 Minnesota Residential Energy Code Section 402.2.8 requires R-15 insulation for basement walls, with a minimum of R-10 insulation on the exterior of the wall. This minimum R-10 exterior foundation insulation requirement has impacted the strategies many builders have traditionally used for key interface details, among those affected are:

- Exterior wall covering
- Brick ledges
- Garage slabs
- Concrete stoops

The challenge is to develop integrated solutions that address all key considerations without unnecessarily complicating construction or increasing the cost. There is no one set of perfect solutions. Recommended practices or details often represent compromises and trade-offs. No particular approach is considered superior in all cases. The purpose of this paper is to show and describe a variety of reasonable code compliant alternatives. Individual circumstances will dictate final design choices.

EXTERIOR WALL COVERING

The exterior wall covering strategy many builders have used at lookout/walkout side walls is to align the exterior framed wall edge with the exterior foundation insulation to create a single plane for the wall siding to continue down over the foundation insulation.

In order to align the exterior wall edge with the exterior foundation insulation some builders have chosen to cantilever the sill plate over the foundation wall and insulation. Since the practice of cantilevered plates is not specifically addressed in the code, many Building Code Officials have been requiring the builders to provide engineered drawings to demonstrate code compliance. Many of these builders have had their floor truss/joist suppliers provide the required engineered drawings, however these drawing details typically focus only on the floor system requirements and do not address the sill plate torsion, anchoring requirements, or bearing point loads.

It is our recommendation that cantilevering sill plates, in order to address what is essentially an aesthetic exterior wall covering issue, is not a recommended practice and to that end we have created alternate details and recommendations for builders.

Code Requirements

Here are the relevant code requirements builders should consider when developing solutions to integrate the exterior foundation insulation into their details.

R402.2.8 Basement walls. Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet (3048 mm) below grade or to the top of the footing, whichever is less. Foundation insulation shall be installed according to the manufacturer's installation instructions. Walls associated with unconditioned basements shall meet the requirements of this section unless the floor





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These photos (courtesy of Oswell Engineering and Consulting, LLC) show what can happen when the sill plate is cantilevered:





Water Table

Over a hundred years ago builders would install a "water table" at the connection of the wall framing and foundation in order to divert water from the foundation. We can adopt this proven detail toward integrating the exterior foundation insulation without resorting to questionable structural practices.



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Siding over foundation insulation

This strategy uses a trim board to accentuate the transition from the wall/floor framing to the foundation and insulation while minimizing the perceived depth of the foundation insulation. Builders have also used this strategy without the trim board using metal flashing matching the siding color. Of course, additional detailing may be added for an enhanced architectural effect.

"Proud" foundation insulation

This strategy from a builder in Ottawa, Ontario emphasizes the use of exterior foundation insulation, featuring a tapered slope at the top to facilitate drainage and an elastomeric coating finish. The primary benefit of this strategy is that it easily accommodates the thickness for R15 insulation at the exterior of the foundation wall.





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Cantilevered Floor

If the above techniques do not meet your needs and you must have a single plane from your exterior wall to the foundation you may cantilever the floor system to align with the exterior edge of the foundation insulation. This strategy will still require engineered drawings to prove compliance with the code, but avoids issues associated with the cantilevered sill.

BRICK LEDGES

R402.2.11 Masonry veneer. Insulation shall not be required on the horizontal portion of the foundation that supports a masonry veneer.

Maintaining R-10 exterior insulation to the top of the foundation wall would result in a 2" air space between the masonry and the exterior surface of the wall.





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BRICK LEDGES (cont.)

An alternate approach would be to eliminate the step down ledge.





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GARAGE SLAB

R402.2.11 Masonry veneer. Insulation shall not be required on the horizontal portion of the foundation that supports a masonry veneer.

Although not explicitly noted in the code for the purposes of other supporting horizontal foundation details we will assume this exemption will also apply as shown for garage slabs.





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CONCRETE STOOP

R402.2.11 Masonry veneer. Insulation shall not be required on the horizontal portion of the foundation that supports a masonry veneer.

Although not explicitly noted in the code for the purposes of other supporting horizontal foundation details we will assume this exemption will also apply as shown for concrete stoops.





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COMMENT

The intent of this paper is to show and describe a variety of alternatives to details that have come to our attention. It is not intended to be a comprehensive analysis of all applicable code provisions for the provided details.

STILL HAVE QUESTIONS?

Send your detailed energy code questions to BAM at info@bamn.org.

BAM will post the most commonly asked questions on BAM's Code Q & A website page.

See www.bamn.org/regulation for more information.

RESOURCES

2015 Minnesota Residential Code NDS for Wood Construction, 2012 Edition Architectural Drafting, by Abraham Benton Greenburg, Charles Burton Howe Cyclopedia Of Architecture, Carpentry, And Building Vol 1-3 Urbandale's Proud Foundations