Air Sealing Modular Home Marriage Joints

Last Updated: 08/15/2013

Scope

Marriage joints between modular home modules at all exterior boundary conditions fully sealed with gasket and foam.

A. Install a gasket along the entire seam of the exterior boundary where modules are attached together.

B. When modules are in place, seal the edge of the gasket to the module.

See the Compliance Tab for related codes and standards requirements, and criteria to meet national programs such as DOE's Zero Energy Ready Home program, ENERGY STAR Certified Homes, and Indoor airPLUS.
Description

In modular or manufactured homes that are delivered to the site in two (or three) sections, the joint where the sections of the structure are joined together is called a marriage joint. (It is sometimes also referred to as a marriage line or mating joint.) Marriage joints can be significant sources of air leakage. They should be properly gasketed and sealed to avoid leakage and maintain indoor air quality. Air leakage leads to heat loss in the winter and cooling losses in the summer.

Double-section modular homes are transported to the site as two separate sections. The marriage joints, beam joists, and walls are aligned and connected at the site. The roof, walls, and floor along the marriage line must be properly aligned, sealed, and supported.

Modular home manufacturers offer two options for delivery of manufactured homes to the home site: turn-key or rough set. With the “turn-key” option the manufacturer constructs the foundation, delivers the home, sets the home on the foundation, seals the marriage joints, and performs all finishing work. With the “rough-set” option, the home is delivered to the site by the manufacturer and placed on a foundation built by a third party (Steven Winter Associates 2001). The third-party contractor is responsible for ensuring the marriage joints are properly gasketed and air sealed.

How to Air Seal the Modular Home Marriage Joint

1. Install a gasket along the entire seam of the marriage joint. If the manufacturer has already installed the gasket, ensure that each step below was performed.
   a. Install the gasket to the ceiling, walls, and floor prior to joining the sections together.
   b. Fold the gasket in half and fasten along the mating surface with nails or staples. Fasten at intervals of 6 inches on center (NFPA 2003).

2. After the sections have been put in place and attached, air seal the entire perimeter of the gasket to the section walls, floor, and ceiling. Use an appropriate sealant such as caulk, foam, or silicon.
Ensuring Success

Marriage joints between portions of modular homes should be visually checked to ensure that a gasket is installed along the entire seam of the modules and the outside portion of the gasket is fully air sealed. An experienced technician can also check for air leaks with a smoke pencil or by feeling with the back of the hand. Air barrier effectiveness is measured at the whole-house level by blower door testing, which may help indicate whether marriage joints have been successfully sealed. To ensure indoor air quality and code compliance, air sealing strategies must be accompanied by whole-house ventilation systems and local mechanical exhaust.
Climate

No climate specific information applies.
Training

Right and Wrong Images

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Compliance

The Compliance tab contains both program and code information. Code language is excerpted and summarized below. For exact code language, refer to the applicable code, which may require purchase from the publisher. While we continually update our database, links may have changed since posting. Please contact our [webmaster](mailto:webmaster@webmaster.com) if you find broken links.

**ENERGY STAR Certified Homes, Version 3/3.1 (Rev. 09)**

Rater Field Checklist

Thermal Enclosure System.

4. Air Sealing (Unless otherwise noted below, “sealed” indicates the use of caulk, foam, or equivalent material).

4.1 Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed, with blocking / flashing as needed.

4.8 In multifamily buildings, the gap between the common wall (e.g. the drywall shaft wall) and the structural framing between units sealed at all exterior boundaries.

Please see the [ENERGY STAR Certified Homes Implementation Timeline](https://www.energystar.gov/) for the program version and revision currently applicable in your state.

**DOE Zero Energy Ready Home (Revision 07)**

Exhibit 1 Mandatory Requirements.

Exhibit 1, Item 1) Certified under the ENERGY STAR Qualified Homes Program or the ENERGY STAR Multifamily New Construction Program.

**2009 IECC**

The 2009 IECC does not specifically address sealing the marriage joints between modular home modules. Table 402.4.2 Air Barrier and Insulation Inspection Component Criteria, Walls: Corners, headers, narrow framing cavities, and rim joists are insulated.

**2012, 2015, and 2018 IECC**

The IECC does not specifically address sealing the marriage joints between modular home modules. Table R402.4.1.1 Air Barrier and Insulation Installation, Walls: Junction of foundation and wall sill plates, wall top plate and top of wall, sill plate and rim-band, and rim band and subfloor are sealed. Corners, headers, and rim joists making up the thermal envelope are insulated.


Section R101.4.3 (Section R501.1.1 in 2015 and 2018 IECC). Additions, alterations, renovations, or repairs shall conform to the provisions of this code, without requiring the unaltered portions of the existing building to comply with this code. (See code for additional requirements and exceptions.)

**2009 IRC**

The IRC does not specifically address sealing the marriage joints between modular home modules. Table N1102.4.2 Air Barrier and Insulation Inspection, Walls: Corners, headers, narrow framing cavities, and rim joists are insulated.

**2012, 2015, and 2018 IRC**

The 2012 IRC does not specifically address sealing the marriage joints between modular home modules. Table N1102.4.1.1 Air Barrier and Insulation Installation, Walls: Junction of foundation and wall sill plates, wall top plate and top of wall, sill plate and rim-band, and rim band and subfloor are sealed. Corners, headers, and rim joists making up the thermal envelope are insulated.


Section N1101.3 (Section N1107.1.1 in 2015 and 2018 IRC). Additions, alterations, renovations, or repairs shall conform to the provisions of this code, without requiring the unaltered portions of the existing building to comply with this code. (See code for additional requirements and exceptions.)

Appendix J regulates the repair, renovation, alteration, and reconstruction of existing buildings and is intended to encourage their continued safe use.
Reference and Resources*

1. **2009 IECC - International Energy Conservation Code**
   - **Author(s):** International Code Council
   - **Organization(s):** ICC
   - **Publication Date:** January, 2009
   - Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems and service water heating systems in homes and commercial businesses.

2. **2009 IRC - International Residential Code for One and Two Family Dwellings**
   - **Author(s):** International Code Council
   - **Organization(s):** ICC
   - **Publication Date:** January, 2009
   - Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.

   - **Author(s):** International Code Council
   - **Organization(s):** ICC
   - **Publication Date:** January, 2012
   - Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems and service water heating systems in homes and commercial businesses.

4. **2012 IRC - International Residential Code for One and Two Family Dwellings**
   - **Author(s):** International Code Council
   - **Organization(s):** ICC
   - **Publication Date:** January, 2012
   - Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.

5. **2015 IECC - International Energy Conservation Code**
   - **Author(s):** International Code Council
   - **Organization(s):** ICC
   - **Publication Date:** May, 2014
   - Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems and service water heating systems in homes and commercial businesses.

6. **2015 IRC - International Residential Code for One and Two Family Dwellings**
   - **Author(s):** International Code Council
   - **Organization(s):** ICC
   - **Publication Date:** May, 2014
   - Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.
2018 IECC - International Energy Conservation Code
Author(s): International Code Council
Organization(s): ICC
Publication Date: November, 2017
Code establishing a baseline for energy efficiency by setting performance standards for the building envelope (defined as the boundary that separates heated/cooled air from unconditioned, outside air), mechanical systems, lighting systems, and service water heating systems in homes and commercial businesses.

8. 2018 IRC - International Residential Code for One and Two Family Dwellings
Author(s): International Code Council
Organization(s): ICC
Publication Date: August, 2017
Code for residential buildings that creates minimum regulations for one- and two-family dwellings of three stories or less. It brings together all building, plumbing, mechanical, fuel gas, energy and electrical provisions for one- and two-family residences.

Author(s): Steven Winter Associates
Organization(s): Steven Winter Associates, SWA
Publication Date: September, 2001
Document describing advancement in factory built housing innovations.

10. DOE Zero Energy Ready Home National Program Requirements (Rev. 07)
Author(s): U.S. Department of Energy
Organization(s): DOE
Publication Date: May, 2019
Standard requirements for DOE’s Zero Energy Ready Home national program certification.

11. ENERGY STAR Certified Homes, Version 3 (Rev. 07) Inspection Checklists for National Program Requirements
Author(s): U.S. Environmental Protection Agency
Organization(s): EPA
Publication Date: June, 2013
Standard document containing the rater checklists and national program requirements for ENERGY STAR Certified Homes, Version 3 (Rev. 7).

12. NFPA 225: Model Manufactured Home Installation Standard
Author(s): National Fire Protection Association
Organization(s): National Fire Protection Association
Publication Date: January, 2013
Standard for installing manufactured homes, including specifications and procedures, for installation of utility connections of a manufactured home.

13. Protecting Manufactured Homes from Floods and other Hazards: A Multi-Hazard Foundation and Installation Guide
Author(s): FEMA
Organization(s): FEMA
Publication Date: November, 2009
Report that addresses flood, wind and seismic hazards and recommends several multi-hazard resistant foundation designs of manufactured homes.

14. Thermal Enclosure System Rater Checklist Guidebook
Author(s): U.S. Environmental Protection Agency
Organization(s): EPA
Publication Date: October, 2011
Guide describing details that serve as a visual reference for each of the line items in the Thermal Enclosure System Rater Checklist.

*Publication dates are shown for formal documents. Dates are not shown for non-dated media. Access dates for referenced, non-dated media, such as web sites, are shown in the measure guide text.

Contributors to this Guide
The following authors and organizations contributed to the content in this Guide.

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