Rim board products are integral structural components of wood I-joist floor and roof assemblies. They perform multiple critical functions in the structure and must meet stringent requirements for dimensional stability, durability, and structural capacity. As such, not all wood products are suitable for use in these applications. Materials that are not dimensionally compatible, are expected to shrink to non-compatible dimensions after the time of manufacture or have not been evaluated for the structural demands of rim board applications should not be used to replace rim board products in wood I-joist assemblies.

The International Building Code (IBC) and International Residential Code (IRC) require rim board products to meet the requirements of either ASTM D7672 *Standard Specification for Evaluating Structural Capacities of Rim Board Products and Assemblies* or ANSI/APA PRR 410 *Standard for Performance-Rated Engineered Wood Rim Boards*. These standards specify minimum requirements that must be met for rim board products, including requirements for performance testing and for dimensional compatibility with I-joists throughout the life of the structure. In addition, both standards require a minimum thickness of 1 in. for rim board products. Products that do not meet these requirements or have not been evaluated specifically for use in rim board applications should not be used with wood I-joist assemblies.

Rim Board Functions

Rim board products do much more than simply provide closure to the ends of the joist bays; they are primary structural members in the floor or roof system. Rim board products perform several critical structural roles, including transfer of vertical and lateral loads around I-joist framing, support of deck ledgers, lateral bracing of joists, and spanning over openings. Rim board products are also commonly used as blocking between joists to transfer vertical and lateral loads.

Vertical Load Transfer

Wood I-joists are highly efficient for supporting bending and shear loads applied to the joist. They are also dimensionally stable in most applications and do not typically shrink after the time of manufacture. However, their thin webs are not well-suited for transferring concentrated vertical loads from bearing walls above the floor to bearing walls, beams, or foundations below the floor. Rim board products, installed as rim board or blocking, are typically used at locations of bearing to transfer vertical loads and prevent crushing or buckling of the I-joists. To perform this function, the rim board product must be equal in height or slightly taller than the I-joists throughout the life of the structure. Consequently, products that are not of the proper height at time of installation or are expected to substantially shrink vertically in service (**Figure 1**) are not suitable for this application.

ASTM D7672 and ANSI/APA PRR 410 require engineering calculations and tests of rim board products to establish design capacities for both concentrated and uniform vertical loads. For prescriptive residential construction, rim board products must be tested and qualified to support minimum vertical loads prescribed in the testing standards. Manufacturers may also publish vertical load capacities for use with engineered construction.

Lateral Load Transfer

Rim board products are used to transfer lateral loads from roof and floor diaphragms and shear walls above a floor into shear walls or foundations below. These loads are typically transferred by nails from the sheathing and wall plates into the top edge of the rim board product. This results in high nail congestion in the top edge of the rim board product. The rim board product must be able to accept all of these nails without splitting and transfer the required loads. A rim board product that splits easily will not transfer the required loads. A rim board product that is not full height will create a gap (**Figure 1**) that will

significantly reduce the lateral load that could be achieved. Consequently, materials that are not of the proper height at time of installation or are expected to shrink vertically in service (**Figure 1**) are not suitable for this application.

ASTM D7672 and ANSI/APA PRR 410 require tests for lateral load capacity for rectangular wood-based rim board products both before and after accelerated weathering. All rim board products must be tested and qualified for minimum lateral design loads as prescribed in the test standards. Manufacturers may also publish lateral load capacities for use with engineered construction.

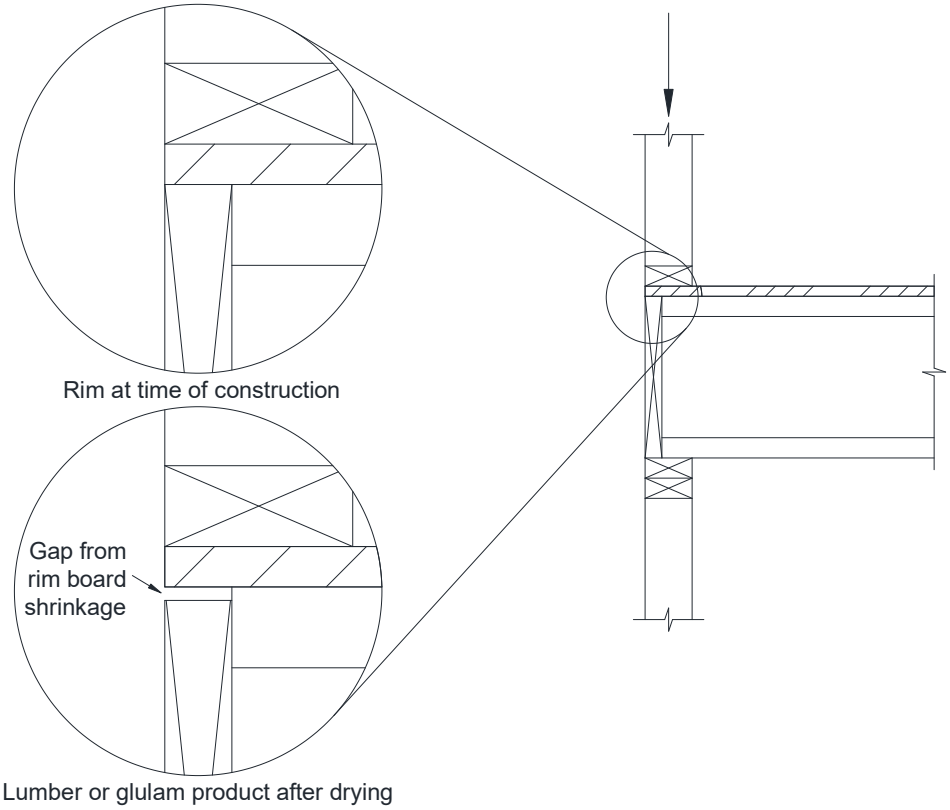

Figure 1. Gap caused by shrinkage of lumber or glulam product can compromise vertical load capacity leading to crushing or buckling of the I-joists and can compromise lateral load transfer capacity.

Support of Deck Ledgers

Rim board is commonly used as the attachment point for deck ledgers. This is a critical connection in the structure of a deck and can result in catastrophic failure if not properly designed and constructed. Both the ASTM D7672 and ANSI/APA PRR 410 standards require rim board products to be tested as deck-ledger supports to ensure that they can safely be used in this application. Fastening requirements for this application are included in the IRC for prescriptive design and load capacities may be available from manufacturers for engineered design.

Lateral Bracing of Joists

Floor and roof joists are inherently unstable unless they are properly braced against rotation. Rim board and blocking prevent rotation and lateral displacement of the joists, providing stability to the structure. The testing requirements in ASTM D7672 and ANSI/APA PRR 410 ensure that rim board products provide sufficient support.

Spanning over Openings

Rim board products can be designed to span across openings, acting as beams to support the roofs, floors, or walls above. As such, the PRR 410 and ANSI/APA ASTM D7672 standards require testing for corresponding design properties if rim board products are used to span over openings.

Suitable and Unsuitable Rim Board Products for Use with Wood I-joists

Table 1 lists wood products that are suitable for use in rim board applications with wood I-joists.
Table 2 lists wood products that are not suitable for use with wood I-joists.

Table 1. Suitable Rim Board Products for Use with Wood I-joists

Product	Identification
OSB or Plywood Rim	Marked with third-party quality mark and either an evaluation report[1] number from an accredited agency or "ANSI/APA PRR 410."
SCL Rim	Marked with third-party quality mark and either an evaluation report[1] number from an accredited agency or "ANSI/APA PRR 410."
I-joist[2]	Marked with third-party quality mark and an evaluation report[1] number from an accredited agency.
Glulam[3] Rim	Marked with third-party quality mark and "ANSI/APA PRR 410"

[1] Evaluation report must provide design information for use of product as a rim board.
[2] I-joist rim boards are typically not permitted for deck ledger support.
[3] For use as rim board, glulam must be specially manufactured and evaluated as rim board per ANSI/APA PRR 410.

Table 2. Unsuitable Products for Use in Rim Board Applications with Wood I-joists

Product	Primary Reason(s) Product is Unsuitable
Green Lumber	Dimensionally incompatible and typical 3-6% shrinkage[3] in service.
Kiln-dried Lumber	Dimensionally incompatible and typical 1.5-3% shrinkage[3] in service.
Ripped OSB or Plywood Panels	Not suitable for edge nailing, required loads, or thickness.
Standard Glulam[1]	Dimensionally incompatible and typical 1% shrinkage[3] in service.
SCL or I-joist not qualified[2] as rim board	May not meet rim board dimensional tolerances. May not meet performance requirements. Requires evaluation.

[1] Glulam certified to ANSI A190.1 typically does not meet size tolerances or dimensional stability requirements for rim board products and is not evaluated for the loading conditions typical of rim board applications.
[2] Not all SCL and I-joists meet requirements for rim board. Contact manufacturer to verify compliance with ANSI/APA PRR 410 or ASTM D7672.
[3] Lumber shrinkage values were calculated assuming 4-8% shrinkage for a 30% change in moisture content (6th edition AITC Timber Construction Manual, p. 51). Glulam shrinkage value was calculated assuming a 1% change in dimension for 5% change in moisture content (6th edition AITC Timber Construction Manual, p. 52). Calculations assumed as-manufactured moisture contents of 30%, 19%, and 12% for green lumber, kiln-dried lumber, and glulam, respectively and in-service equilibrium moisture content of 7%. Values are rounded to the nearest 0.5%.

This document is not intended to preclude the use of materials or systems that can be demonstrated by engineering analysis or testing to meet both the dimensional and capacity requirements for the intended application. Any such evaluation should be conducted by a competent design professional after careful consideration of project-specific circumstances and the required rim board functions discussed herein.