



Know your steep-slope roof decks

Following plywood and OSB installation guidelines can help ensure a successful roof system performance

by Mark S. Graham

Plywood or oriented strand board structural panel sheathing are integral components of many steep-slope roof assemblies, and proper use of these products can help ensure successfully performing assemblies. If you use or encounter plywood and/or OSB structural panel sheathing roof decks, it is important to be knowledgeable of the applicable code requirements and APA—The Engineered Wood Association and NRCA guidelines applicable to them.

IRC 2018

The International Residential Code® provides specific requirements applicable to plywood and OSB structural panel sheathing used as roof decks for one- and two-family dwellings. In IRC's 2018 edition, specific requirements are provided in Section R803-Roof Sheathing.

IRC 2018 requires wood structural panels conform to the Department of Commerce's PS 1, "Structural Plywood," or PS 2, "Performance Standard for Wood-based Structural-Use Panels," or CSA Group™'s O325, "Construction Sheathing," or O437, "Standards on OSB and Waferboard." PS 1 and O325 generally are recognized to apply to plywood, and PS 2 and O437 apply to OSB.



Structural panels are required to bear a grade mark or certificate of inspection issued by a code official-approved agency.

The maximum allowable spans for wood structural panel roof sheathing must not exceed the values in IRC 2018's Table R503.2.1.1(1) or APA—The Engineered Wood Association's *Engineered Wood Construction Guide*, Form E30. Nominal roof sheathing thicknesses as thin as $\frac{3}{8}$ of an inch thick are permissible for specific span, total and live load, and edge support conditions.

Roof sheathing attachment into wood roof framing is

required to comply with IRC 2018's Table 602.3(1) Rows 30 through 32 or Form E30. For roof sheathing $\frac{3}{8}$ of an inch to 1 inch thick, the use of $2\frac{1}{2}$ -inch-long 8d common nails installed 6 inches on center at supported panel edges and 12 inches on center at intermediate supports is a minimum requirement. IRC 2018 also permits the use of $2\frac{3}{8}$ -inch-long roof sheathing ring shank nails complying with ASTM F1667, "Standard Specification for Driven Fasteners: Nails, Spikes, and Staples."

Increased nail attachment schedules may be necessary in high-wind regions or where the roof deck is engineered to perform as a diaphragm (providing lateral support).

APA guidelines

Form E30 is the APA—The Engineered Wood Association's guide to engineered wood

products. This 102-page publication (the latest edition was published in December 2019) provides separate sections addressing panel, glulam and cross-laminated timber selection and specification; floor, wall and roof construction; and additional considerations for fire protection and building systems.

The association also makes available roofing-specific excerpts from Form E30 titled "Roof Construction."

APA Data File T325D, "Roof Sheathing Fastening Schedules for Wind Uplift," dated March 2006, provides additional guidance about roof sheathing attachment for high-wind regions, including enhanced attachment for roof area perimeters and corners. This document is indicated to be based on ASCE 7-02, "Minimum Design Loads for Buildings and Other Structures," enclosed buildings and Exposure B; this may not comply with current code requirements.

APA Data File A410, "Retrofitting a Roof for High Wind Uplift," provides guidance for roof sheathing re-nailing during reroofing and roof sheathing retrofit without reroofing, which involves applying construction adhesives to the bottom of roof sheathing at framing members.

All APA—The Engineered Wood Association documents can be accessed from apawood.org.

NRCA guidelines

NRCA recommends structural panel roof sheathing for steep-slope roof assemblies comply with PS 1, PS 2 or APA PRP-108, "Performance Standards and Qualification Policy for Wood Structural Panels."

NRCA has concerns about the long-term performance of OSB panels, including those addressed by PS 2 and PRP-108. Although NRCA acknowledges the widespread use of OSB panels for constructing roof deck substrates, experience has shown OSB panels are subject to dimensional changes, ridging and fastener backout resulting from changing moisture conditions. If given a choice between an OSB panel roof deck substrate or a plywood roof deck substrate, NRCA prefers roof deck substrates constructed of plywood panels complying with PS 1.

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Panel thickness should be the minimum required to comply with code requirements for span and loading. Furthermore, NRCA recommends specific minimum thicknesses based on roof system type. For example, NRCA recommends a minimum thickness of $\frac{1}{2}$ -inch-thick (actual thickness of $\frac{15}{32}$ of an inch) plywood or OSB for 16-inch rafter spacing and four-ply, nominal thickness of $\frac{5}{8}$ -inch-thick (actual thickness of $\frac{19}{32}$ of an inch) plywood or OSB for 24-inch rafter spacings. These minimum thicknesses are intended to provide adequate support for asphalt shingle roof systems and adequate pull-out resistance for asphalt shingle fasteners.

For new construction, NRCA does not provide specific guidance regarding roof sheathing attachment. This should be determined and clearly specified by a building's designer.

For reroofing, NRCA encourages consideration be given to providing roof sheathing attachment according to current code requirements or guidelines. Because existing deck attachments cannot readily be determined before removing an existing roof system, this additional deck attachment can be provided for either on a unit-cost or time-and-materials basis.

Additional information about structural panel sheathing roof decks for steep-slope roof assemblies is provided in *The NRCA Roofing Manual: Steep-slope Roof Systems—2017*. 📖🔗

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