Technical Tip

Allowable Shear Capacity for ZIP System® Sheathing Panels

ZIP System® sheathing is code recognized in ICC-ES ESR-1474 by the International Building and Residential Codes as a combination wood structural panel, water-resistive barrier and air barrier. The OSB wood structural panel substrate is readily available in 7/16", 1/2", and 5/8" thicknesses with 24/16, 32/16, or 40/20 span ratings, respectively. Also note that the ½" and 5/8" thick ZIP System sheathing panels carry the Structural 1 panel grade. Additionally, 7/16" thick, long-length (4'x9', 4'x10') ZIP System sheathing panels are stamped with a Structural 1 panel grade. 7/16" (4'x8') ZIP System sheathing panels may be available as Structural 1 by special order.

ZIP System sheathing complies with the requirements of PS2-10, *Performance Standard for Wood-Based Structural-Use Panels,* therefore satisfying IBC Section 2303.1.4 for wood structural panels. Please refer to Section 4.3 of the 2008 American Forest and Paper Association (AF&PA), *Special Design Provisions for Wind and Seismic (SDPWS)* for nominal shear values for wall sheathing when designing shear walls using ZIP System sheathing. Nominal values do not include any adjustment or safety factors and must be reduced to allowable values in order to be used in designing shear walls. Allowable shear can be calculated in accordance with section 4.3.3 in the SPDWS. For direct allowable shear values, please refer to 2006 IBC Table 2306.4.1 and 2009 IBC Table 2306.3 with addendum. Please notice that the standard does not make any distinction between plywood and OSB. Allowable design shear values are based on panel thickness, panel grade and fastener type, size and spacing. Therefore, typical plywood, OSB and ZIP System sheathing, assuming they are the same thickness and panel grade, resist the same amount of allowable shear in accordance with Section 4.3 of the SDPWS and Chapter 23 of the IBC. Fasteners may be any code-recognized fastener. The spacing may vary upon load requirements of each individual building.

Both the 2008 SDPWS and 2006 and 2009 IBC can be used to calculate the allowable shear capacity for wood structural panels. The 2012 IBC refers to the SDPWS exclusively in Section 2306.3. Both calculation methods result in the same allowable shear capacity. See the two examples below comparing the two methods.

> **SDPWS Design Example**[1] (See SDPWS Table 4.3A): 7/16" ZIP System sheathing, OSB or plywoodfastened using 8d nails with 6" oc edge nailing can resist 480 plf (seismic) and 670 plf (wind) of nominal unit shear. In order to convert nominal unit shear to an allowable design value it must be divided by the ASD reduction factor of 2.0, in accordance with section 4.3.3 in the SDPWS. For this example the allowable shear is:

480 plf / 2.0 = 240 plf (seismic controlled design)
670 plf / 2.0 = 335 plf (wind controlled design)

The IBC allows for a 40% increase in allowable shear for shear wall designs controlled by wind. The SDPWS conveniently lists values for seismic and wind separately so the designer does not have to make that 40% increase calculation. Notice in the example above that 480 plf x 1.40 = 670 plf.

2006 and 2009 IBC Design Example[1] (See 2006 IBC Table 2306.4.1 or 2009 IBC Table 2306.3 with addendum): 7/16" ZIP System sheathing, OSB or plywood fastened using 8d nails with 6" oc edge nailing can resist 240 plf of allowable shear. If wind, not seismic, controls the shear wall design then the allowable value can be increased be 40% in accordance with Section 2306.3. Therefore, in this example the allowable shear is:

240 plf (seismic controlled design)
240 x 1.40 = 335 plf (wind controlled design)

1. The design values shown in these examples have not been adjusted based on framing type, panel thickness, stud spacing, panel orientation or moisture content.

Walls that are designed to resist lateral shear forces and sheathed with wood structural panels typically require solid framing behind all panel edges. Blocking requirements are typically the same for all shear walls constructed with structural OSB or plywood and are not specific to ZIP System products. It is the responsibility of the contractor to verify fastener and blocking requirements in accordance with the requirements of the structural engineer or the authority having jurisdiction.

If there are any questions about how to determine the allowable shear value of any ZIP System sheathing used in the construction of shear walls, please contact our Technical Services department at 1-800-933-9220 ext. 2716.

.