

Technical Tip

AdvanTech Nail Withdrawal vs. Plywood and OSB

Allowable design withdrawal values can be calculated in accordance with chapter 11 in the National Design Specification (NDS) for Wood Construction. Please take notice that these are allowable values and not **ultimate** design values. Ultimate values are values that are measured at the point of failure. In this case, ultimate value is the amount of pulling force being exerted on a fastener as it first begins to withdraw from the panel. It does not include any adjustment or safety factors. Ultimate values should not be used as design values. The allowable design withdrawal value (W') for a common nail in pounds per inch of thickness for AdvanTech being used in a floor application can be determined by the following equation:

$$W' = 1380 \times G^{5/2} \times D \times C_D \times C_M$$

G, Specific Gravity = 0.44 for 23/32 AdvanTech (See ESR-1785, Table 4) and 0.40 for 23/32" APA plywood and OSB (See APA TT-039C, Table 1)

D, Diameter of Fastener = 0.131" for 8d common nail

C_D , Load Duration Factor = 1.0 for normal duration of loads.

C_M , Wet Service Factor = 1.0 for In-Service moisture content less than 19% for AdvanTech

For AdvanTech subflooring panels:

$W' = 1380 \times 0.44^{5/2} \times 0.131 \times 1.0$ (assume normal load duration) $\times 1.0 = 23$ pounds per inch of thickness

For APA plywood and OSB subflooring:

$$W' = 1380 \times 0.40^{5/2} \times 0.131 \times 1.0 \times 1.0 = 18 \text{ pounds per inch of thickness}$$

The allowable withdrawal design values for a specific thickness of panel are calculated by multiplying W' by the panel thickness; $W' \times t$. For 23/32 thick AdvanTech, the allowable withdrawal design value is 23 #/in. \times 23/32 in. = 16 pounds. For 23/32 APA plywood and OSB, the allowable withdrawal design value is 18#/in. \times 23/32 in. = 13 pounds.

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