

# Special Design Provision

4D+ Embedment Reduction Factor for ASSY Screws Loaded in Withdrawal



July 15, 2018

**Subject: 4D+ embedment reduction factor for ASSY screws loaded in withdrawal**

To Whom It May Concern;

Reference withdrawal design values in ICC ESR-3178 (SWG ASSY VG PLUS WOOD DRILLING SCREWS) and ICC ESR-3179 (SWG ASSY 3.0 WOOD SCREWS) are applicable to thread penetration lengths ( $p_t$ ) greater than or equal to 8D (8 times the nominal diameter, not including the tip).

For applications where effective thread penetration lengths are less than 8D, a reduction factor can be applied to ICC-certified reference withdrawal design values.

Designers may apply a reduction factor of **0.8** to reference withdrawal design values for 1/4" (6mm) screws for thread penetration lengths between 4D and 8D. This reduction factor is based on an analysis of over 500 proprietary product withdrawal tests at a thread penetration length of 4D. Reference withdrawal design values multiplied by the suggested reduction factor of 0.8 achieve the standard factor of safety that is applied to axially loaded threaded fasteners in the NDS.

For screw diameters  $\geq 5/16$ ", no reduction factor is required.

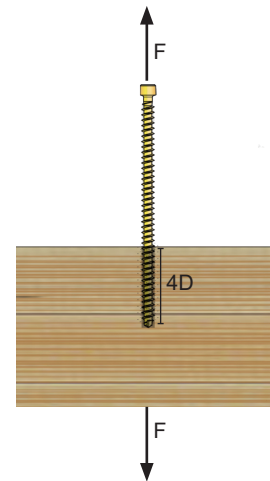
## Example:

*Reference withdrawal design value for 1/4" VG screw in DFir (SG= 0.49) according to ICC ESR-3178:*

$$W_{90} = 202 \text{ lbf/in}$$

*Suggested reference withdrawal design value for 1/4" VG screw in DFir for  $4D \leq p_t < 8D$ :*

$$W_{90} = 0.8 * 202 \text{ lbf/in} = \mathbf{161.6 \text{ lbf/in}}$$



Sincerely,  
MTC Solutions