

Considerations & Limitations of Slotted Track Profiles

Considerations when using slotted track profiles in Head of Wall (**HOW**) assemblies based on deflection and orientation. Determining and selecting proper slotted track profiles to accommodate structural deflection and aid in holding studs in place until gypsum drywall is attached to stud framing require knowledge of engineered and specified structural deflection.

Deflection in design terms is “degree to which a part of a structural element is displaced under a load (because it deforms)”. In dynamic Head of Wall **HOW** conditions this means a horizontal floor/roof frame, beam, or truss bends downward as forces are applied. These forces can be Dead (structure), Live (load/unload people, machines, furniture, etc...), or Gravity Loads (concrete creep over time) which the Engineer of Record uses to determine “total structural deflection”. A simple check to ensure or determine possible deflection:

$$\text{Span} \times 12\text{in} \div \text{Load Limit} = \text{Deflection}$$

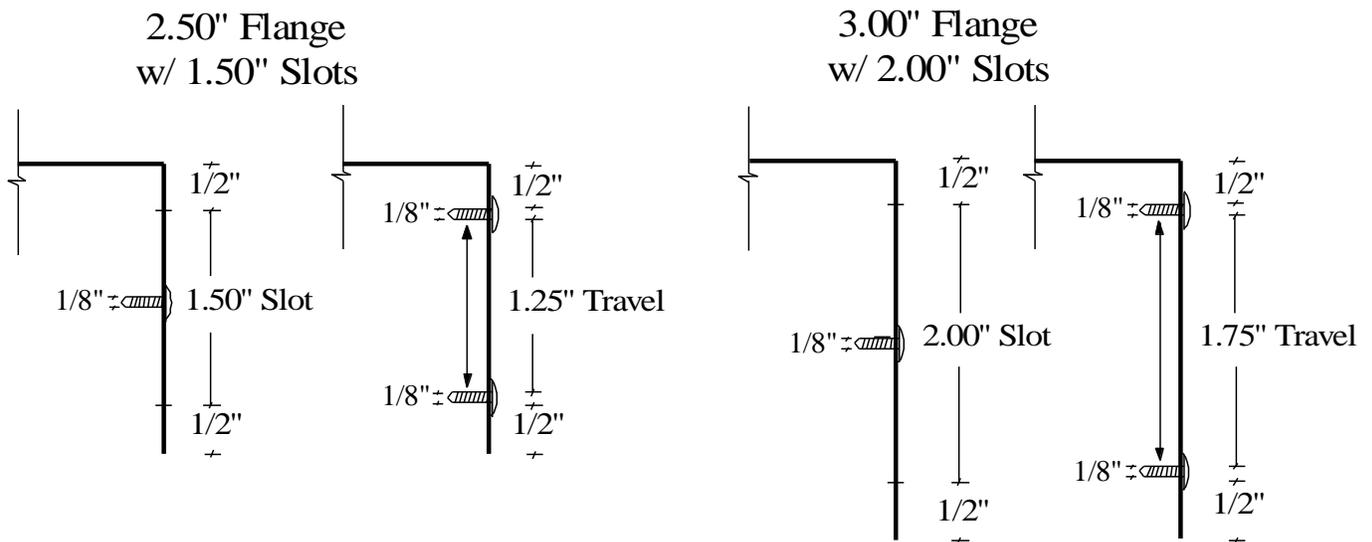
Example: 20ft x 12in \div L/240 = 1.00” (one way compression)

Required Framing (Stud) Deflection Gap (FIG) = 1.00”

Required Multi-Story (Up/Down) Total Joint Protection = 2.00”

To avoid failure of wall framing/assemblies and joint protection, structural deflection distance should be clearly specified and detailed with “installed gap between stud and overhead” or Framing Install Gap (**FIG**). Plan set details should note a “slip or slide” connection allowing independent movement at **HOW**.

The length, location, and orientation of “punched slots” in slotted **HOW** deflection tracks are designed to provide a “positive” attachment to aid in holding studs in place before drywall application. Consideration of fastener thicknesses and effect on the amount of travel (**Screw Fastener Encumbrance**) aids in determining length of slots needed to meet specified deflection or structural movement:



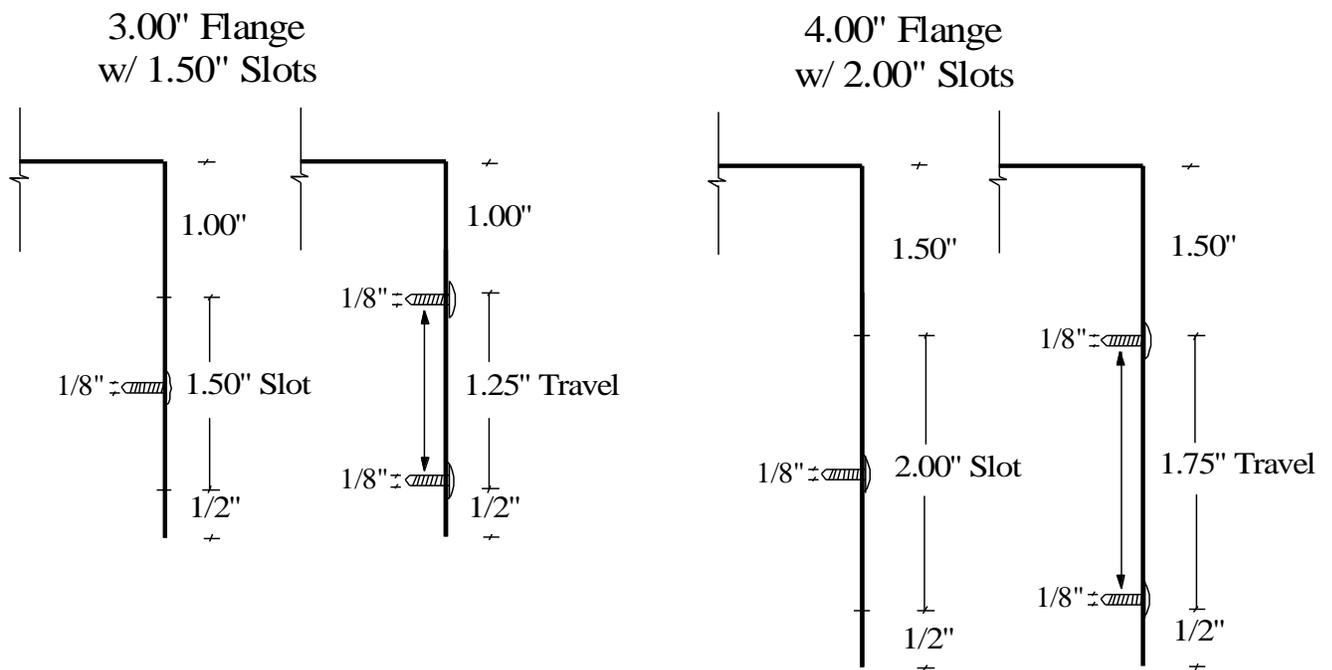
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For a **FIG** that is larger than 0.50" (1.00" overall up/down deflection), manufacturers offer longer 2.00" slotted punch outs to accommodate 3/4" (FIG's) or 1 1/2" total deflection. The **fastener encumbrance of 0.25"** remains the same with any increase in length of punched out slots, so an increase in slot length is still reduced by 0.25" in allowed amount of travel should one use slots longer than 2.00".

Considerations regarding STC and Air/Smoke leakage that can occur due to slotted openings should be factored in specification decision. Standard slotted tracks locate slots 1/2" from track web which results in exposed slots where gypsum is installed with a **(DIG)** to accommodate any type of certified **Encumbered** deflection. Filling a "deflection joint" and covering slots with foam backer rods, sleeves, and or sealants may result in Air/Smoke or STC issues as sealants shrink (curing process – consider product shrinkage %) and can like foam rods or sleeves be dislodged due to deflection or building movement. Any "post" application shrinkage or dislodging that exposes slots then creates "pass-through" leakage resulting in sound and air/smoke leakage.

Additional considerations of "open cell" foams such as backer rods and sleeves, are they provide little resistance to air/sound travel and if underlying slotted track flanges are used there is a potential for lower STC and higher air/smoke leakage ratings.

One approach to ensure "continuous solid backing" when specifying slotted tracks is to require longer track flanges with slots "moved down" from the web. This allows for solid flange "seal" where deflection joint occurs and mastic or open cell systems can fail with adhesive, cohesive, or substrate failures leaving gaps, cracks, or "mouse holes" that negatively affect the joint protection.



Know H.O.W. - Vol. 3 - (Slotted Deflection Track)

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Common “standard” or custom “pitch” and “slope” slotted tracks are supplied with slots located 1.00” O/C and typically with a 1.50” slot than can address deflection limited to a 1/2” **FIG** or 1.00” overall movement/cycle (considers a .025” variance in fastener install being centered in slot). Manufactures may provide longer slots for these types of profiles, check with your local supplier.

Considerations for slotted “pitched” track formed to the pitch of a substrate, are angles created by the pitch and additional material required to locate slots on “long leg side” at the same level as “short leg side”. The **FIG** is based on where lower flange/web intersecting angle exists and stud will contact first upon compression, so required flange height to accommodate deflection should be calculated from this point.

Using slotted in a sloped orientation requires providing degree of slope of overhead to manufacturer so they can punch requested slots at the correct degree to allow for vertical movement of the fasteners. The **FIG** is measured from the “lowest point” of the sloped track web where a stud would first contact the web upon deflection compression.

