

Considerations & Limitations of Tracks and Cavity Requirements

Considerations when using J-Shaped or J-Runner track profiles in dynamic Head of Wall (**HOW**) deflection assemblies. Determining proper J-Runner track profiles to accommodate structural deflection, requires knowledge of engineered structural deflection to prevent catastrophic failure of shaft wall assemblies.

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:

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

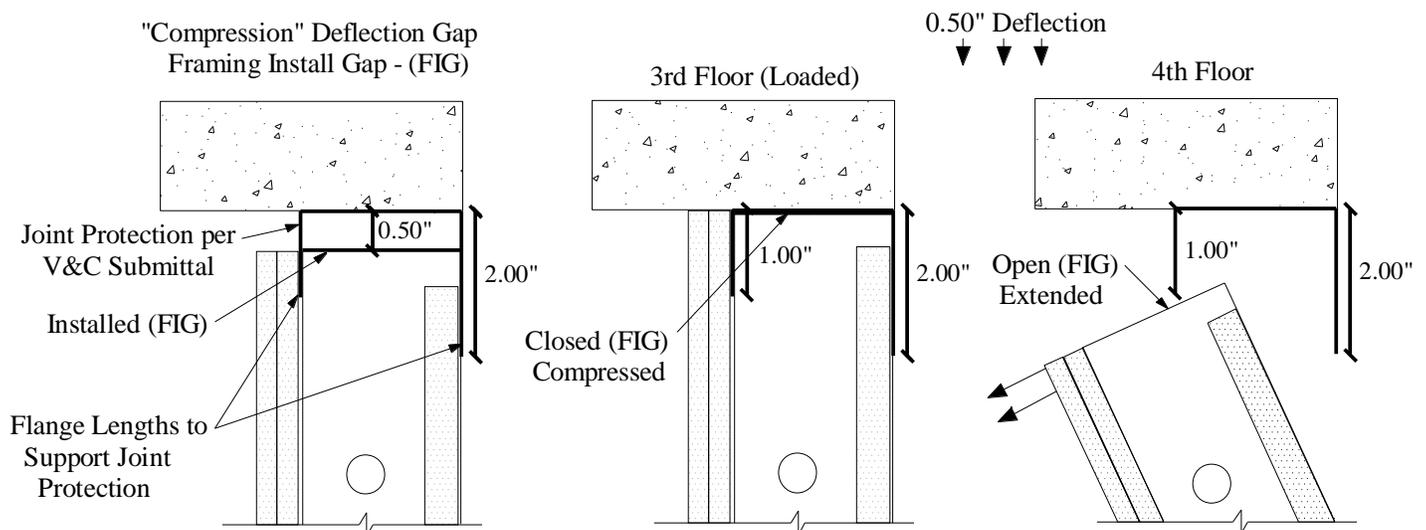
**Example:** 20ft x 12in  $\div$  L/240 = 1.00” (one way compression)

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

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

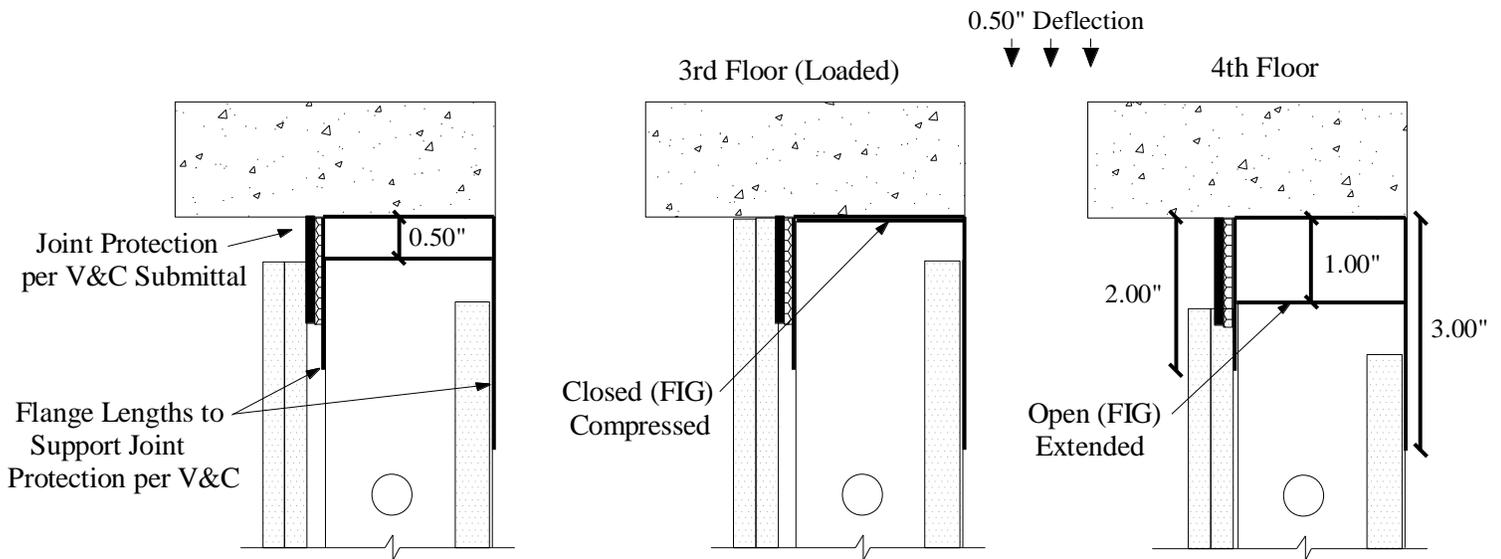
To avoid failure of wall framing/assemblies and joint protection, structural deflection distance should be clearly specified and detailed with “installed gap between stud and overhead” or Framing Install Gap (**FIG**). Plan set details should note a “slip or slide” connection allowing independent movement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

To avoid failure of shaft wall assemblies from being crushed, dislodging, or falling over, structural deflection should be clearly detailed with “installed gap between stud and overhead” or Framing Install Gap (**FIG**). *Note:* industry typical J-Runner with opposing 1.00” and 2.00” flanges are not optimal to address HOW deflection but work well for use in Static conditions (bottom and vertical wall to wall conditions). An illustration shows use of “typical” j-runner failure upon a **FIG** of 0.50” and deflection of 0.50” with “loaded” floor **HOW** joint opening up the same 0.50” distance:



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To avoid failure and increase lateral support in dynamic shaft wall conditions (i.e., min. 0.50" deflection or 1.00" total joint protection), there should be a clear specification requiring a Verification and Compliance (V&C) submittal of Certified Joint Protection chosen. A V&C submittal provides required Drywall Install Gap (**DIG**) and assists in determining if at least 2.00" and 3.00" flange lengths are needed to support minimum Joint Protection Required (engineered deflection x 2) at the HOW:



Standard shapes of Shaft Wall studs (CT, CH, or I) and 1.00" thick liner panel on shaft side in wall cavity "lock" studs into place preventing stud rotation as would happen in non-composite assembly. The opposite side of shaft studs are braced via attachment of the finish layers of gypsum.

J-Runner profiles with flanges long enough to support assembly in most severe "open" position should be used and allow for an ergonomic "set and flop" of the liner panel. The "static" bottom and side (wall to wall) joints can be accomplished with any j-runner or standard u-shaped tracks.

Considerations of using a slotted track profile at Shaft **HOW** Conditions, include exposure and water intrusion through slotted punch outs (solid leg shields against water) during construction. In addition, air leakage or pressurization after cycling may be affected as joint treatment required above the Liner Panel inside the track cavity shrinks or dislodges during life cycle and gaps open where slots exist.

Both the finished side and wall cavity (**DIG**) are typically limited to a max 1.00" (**MIG**) and need to be addressed with joint protection that will accommodate deflection requirements (up/down total movement). Requiring a Verify and Comply submittal for intended joint protection will aid in selection of proper framing required and code compliant install.

## Know H.O.W. (Head-of-Wall) - Vol. 4 – Shaft Wall

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For all UL certified dynamic or “deflecting” Shaft Wall **HOW** joints, the Wall Cavity Drywall Install Gap (**DIG**) above the gypsum shaft liner panel located on the shaft side, always needs to be protected with mineral wool or sealant to prevent heat, flame, and air leakage. There are currently **NO** UL certified dynamic shaft wall systems that allow for an open gap above the liner panel in the wall cavity with an exposed “shaft side” track flange.

Specifying code compliant assemblies are similar to standard wall certifications, when using “**Encumbering**” Caulk, Stuff/Spray, foam rod/sleeves, and backers, understanding the limit to overall joint protection is the lowest certified % of movement requiring possibly a larger (**DIG**) on non-shaft side than the (**FIG**) of the Shaft Wall Studs. In Shaft Wall conditions verify the approved (**MIG**) of both the gypsum “liner panel” in wall cavity and the “finished side” gypsum as one or both of these may further limit protection capabilities.

Use of “Unencumbered” systems or materials will allow for 100% movement and narrower (**DIG's**) on both finished and cavity sides of assembly.

