

# Know H.O.W. (Head of Wall) - Vol. 2 - (No Fly Zones)

## Life Safety Head of Wall – MEP Penetration Considerations

Trades affected via wall construction such as Carpenter, Mechanical, Electrical, Plumbing, and Joint Protection have some exposure and are affected by designs used for joint protection at Head of Wall (**HOW**) fire, smoke, and sound life safety conditions.

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)

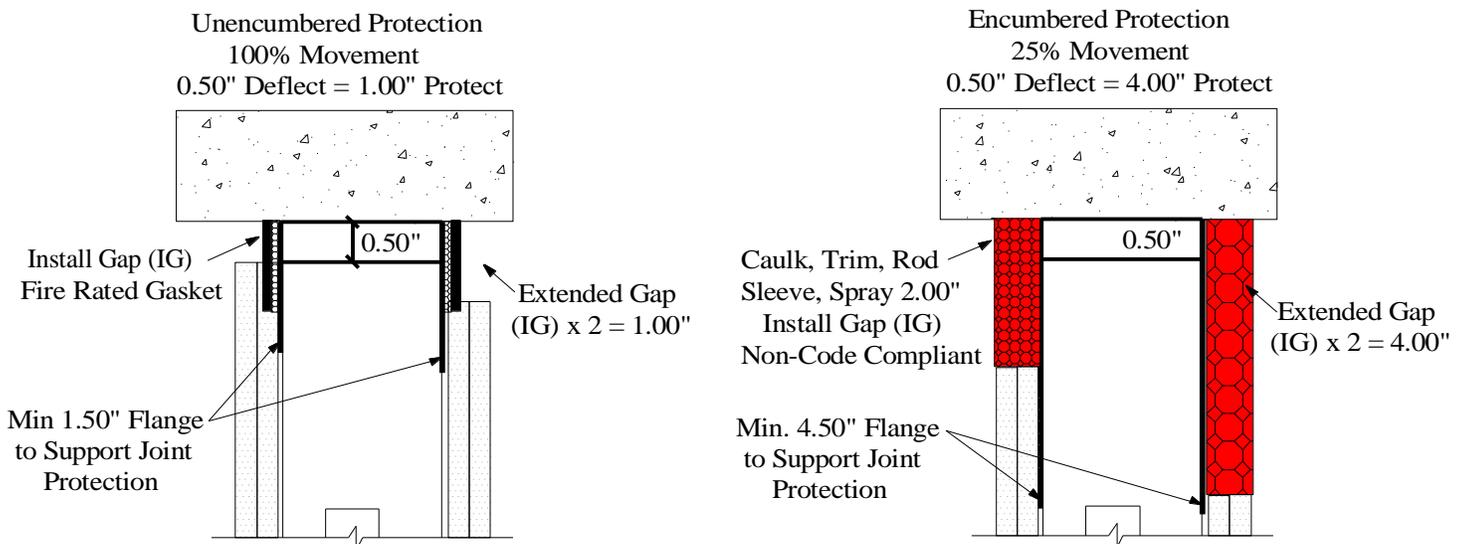
*Required Framing (Stud) Deflection Gap (FIG) = **1.00”***

*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**.

Construction considerations of assembly penetrations around HOW deflection, joint design, and method to provide continuous fire, smoke, sound, and thermal protection are:

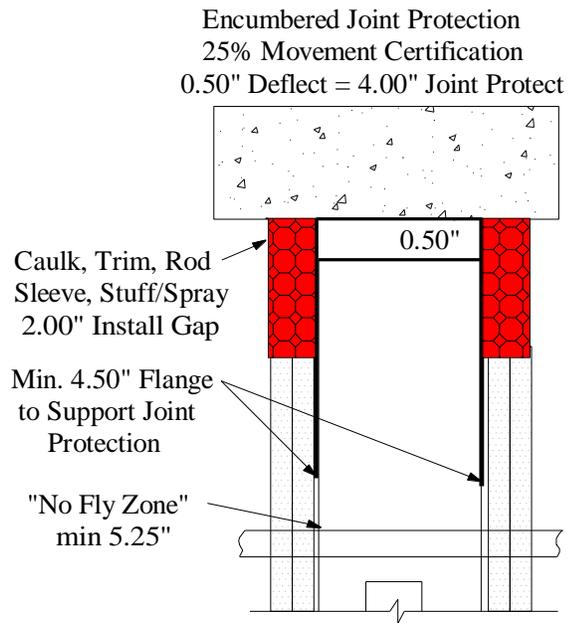
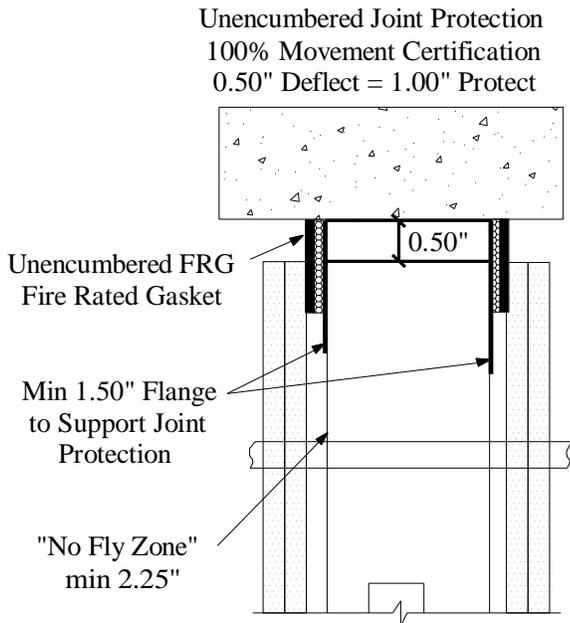
**Track Flanges** – Required continuous HOW track flanges and length to support joint protection in most severe “open” position is typically required to be 1/2” longer than “extended” joint protection



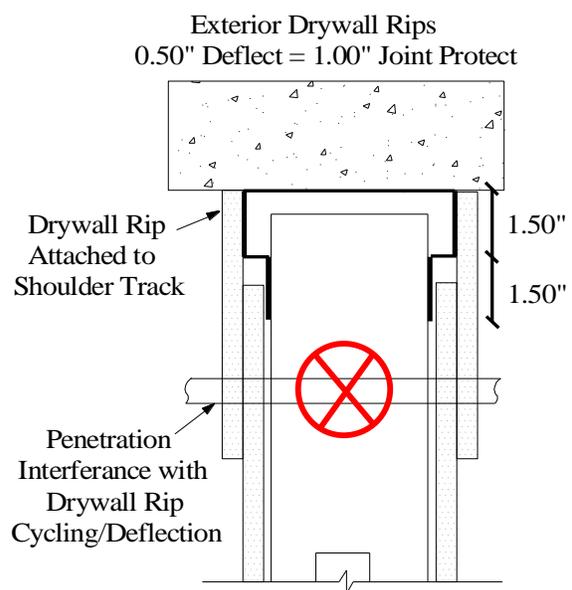
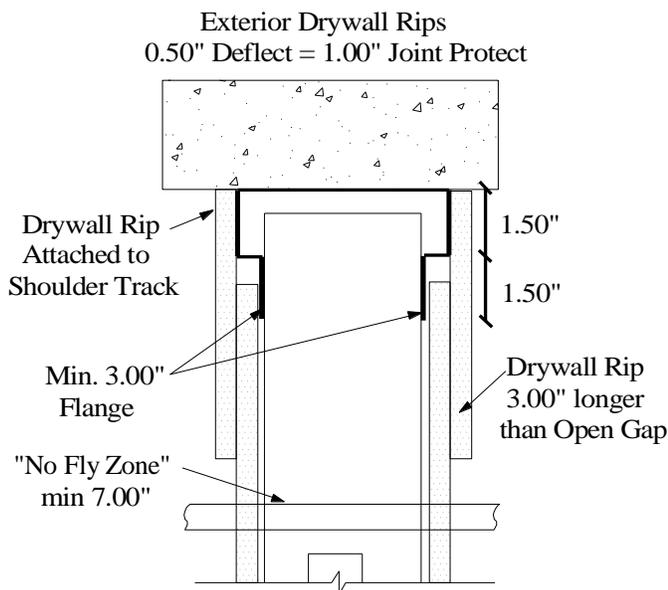
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**“No Fly” Zone (Wall Framing)** – area created by track flange/deflection cycling, where penetrations such as “static” pipes, wires, ducts, and cables (not affixed to move with structure) shouldn’t be located. Installation of “static” penetrations in “No Fly” Zone interferes with “cycling” resulting in damaged penetrations, framing, or failure of protection.



**“No Fly” Zone (Joint Protection)** – areas created by joint protection such as overlapping drywall ribs/deflection cycling, where penetrations such as pipes, wires, ducts, and cables (not affixed to move with structure) shouldn’t be located. Installation of “static” penetrations in a “No Fly” Zone interferes with “cycling” drywall ribs resulting in damaged penetrations or failure.



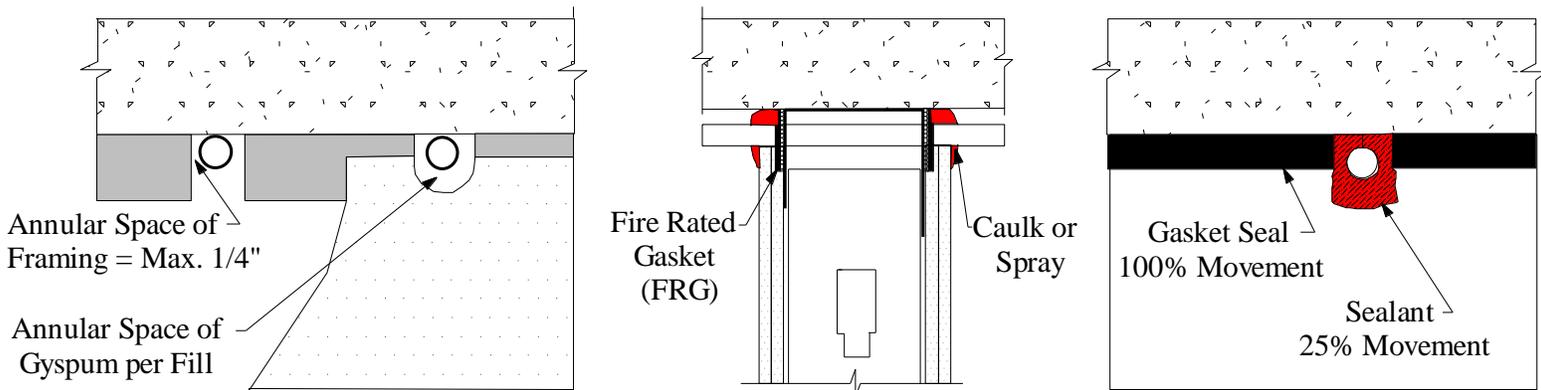
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**“Deflection Zone” (Joint Protection)** – areas where dynamic cycling/deflection occurs, and a “continuation” of the gypsum protection is provided by a “joint seal”. Wall penetrations such as pipes, wires, ducts, and cables affixed direct to overhead substrate, that “deflect” with the structure, and are located within the “Deflection Zone” need to be sealed in a manner to avoid damage and seal failure. Wall framing can be cut out, modified, or not installed in penetrant area to allow for the penetration to pass through. To support joint protection, framing flanges need to be installed as close as possible or within sealant certified “annular space” limitations around penetrant on both sides to accommodate limitation of joint protection.

The wall sheathing or gypsum needs to be modified (contour cut with appropriate “annular space” based on void fill material) to also accommodate deflection of penetrant without damage. It is the “annular space fill” that then limits the deflection based on its movement capabilities or design.



Allowing penetrations in the “Deflection Zone” one must consider the deflection limitation or appropriate system to allow the specified deflection to happen at any penetrations. Based on the type and location of assembly penetration, the trades affected need to coordinate not only type, size, and material but also how the wall framing, gypsum, and seal around the penetration will be chosen and installed.

If the penetration is located out of the “No Fly” zone, then a static joint seal can be used. For any lateral drift issues consult the manufacturer of penetration sealant.

No matter the size or shape of penetrations located within the “Deflection Zone”, they need to be protected with a solution and annular space large enough that will allow the structure to deflect without damage to surrounding wall sheathing assembly or gypsum envelope.