

The last bulletin explained how to read and interpret an Engineering Judgment (EJ). This bulletin will delve into deflection calculations and requirements, important questions to address at the start of a project, and the product limitations defined by the UL Assembly or Engineering Judgment. Gaining a clear understanding of deflection calculations will simplify the process of selecting the right UL Assembly.

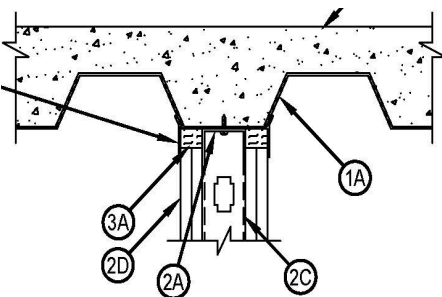
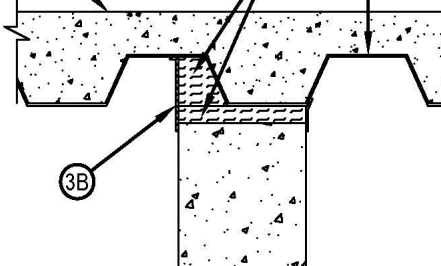
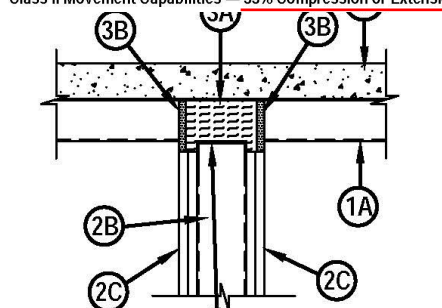
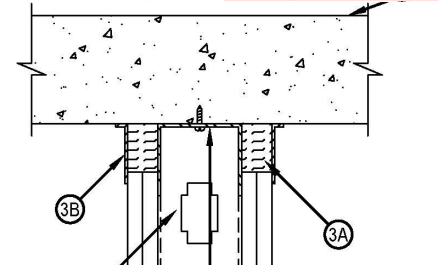
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#### Head of Wall Fire Joint Bulletins will address:

- I - What is a "Head of Wall" fire joint & why do we need it.
- II - Types of UL Assemblies.
- III - How to read a Head of Wall & what to look for – Typical Wall & Shaft Wall.
- IV - Engineering Judgments and 3<sup>rd</sup> Party Verification – How to read an EJ.
- V - Deflection calculations & Compression limitations
- VI - Mineral Wool Installation
- VII - Concerns with the different types of fire stopping materials – Spray, Sealant, Mechanical

- ❑ The cycling of a "Head of Wall" fire joint is a critical part of the design. The sealant or fire spray must be able to maintain a proper bond with the wall & floor assemblies and compress or stretch with the movement in order to maintain the proper fire protection.
- ❑ Proper bond is maintained through proper joint design, including determining the maximum compression/extension for that particular UL Assembly or Engineering Judgment (EJ) so that the material is not over stretched.
- ❑ **It is important to obtain all the "Head of Wall" fire joints for our walls as early as possible, as the system chosen will dictate the distance to hold down the drywall at the top of the wall.**
- ❑ A typical deflection amount is 1/2" to 1"...Note that a 1" deflection is sometimes problematic due to the maximum joint width of a system. Always discuss lowering the deflection if the deflection is 1" or higher (Contact the Quality Department for further detail and discussion).
- ❑ The Floor or Roof will move in both directions depending on many factors, including dead load, live load, seasonal concerns, and interment loading.
- ❑ There will typically be a "NOMINAL" value of a certain dimension identified at the top of the UL Assembly or EJ. This "Nominal" value is the **maximum separation between the bottom of the floor/roof and the top of the wall at the time of installation of the joint system.**
- ❑ **The calculation to determine the maximum joint size at the time of installation:**  
If the joint has a maximum compression capability of 50% movement, and we have a 1/2" deflection criteria from the Architect, we calculate the total joint width...1/2" divided by 50% movement = 1" gap for the drywall below the deck. This will give us the true amount to hold down the drywall with the particular "Head of Wall" fire joint...allowing for the joint movement without damaging the wall.

**The following are several examples of the calculation and how it relates to your specific UL Assembly:**

<p>System No. HW-D-0049 Assembly Ratings – 1 and 2 Hr (See Items 2 and 3B) <b>Nominal Joint Width – 1 in.</b> Class II Movement Capabilities – 50% Compression Or Extension</p>  <p><b>Using 1/2" deflection:</b> <math>1/2" / 50\% = 1" \text{ gap}</math></p> <p><i>The 1/2" deflection meets the maximum joint width for this UL Assembly.</i></p> <p><b>Using 1" deflection:</b> <math>1" / 50\% = 2" \text{ gap}</math></p> <p><i>A 1" deflection will NOT meet the maximum joint width for this UL Assembly.</i></p>	<p>System No. HW-D-0181 Assembly Rating – 2 Hr <b>Nominal Joint Width – 1 in.</b> L Rating At Ambient – Less Than 1 CFM/Lin Ft L Rating At 400°F – Less Than 1 CFM/Lin Ft Class II and III Movement Capabilities – 12.5% Compression</p>  <p><b>Using 1/2" deflection:</b> <math>1/2" / 12.5\% = 4" \text{ gap}</math></p> <p><i>A 1/2" deflection will NOT meet the maximum joint width for this UL Assembly.</i></p> <p><b>What is the Max Deflection?</b> <math>X" / 12.5\% = 1" \text{ gap}</math> Or <math>12.5\% \times 1" = 1/8" \text{ maximum deflection}</math></p>
<p>System No. HW-D-0045 Assembly Rating – 1 and 2 Hr (See Item 2) <b>Nominal Joint Width – 3/4 in.</b> Class II Movement Capabilities – 33% Compression or Extension</p>  <p><b>Using 1/2" deflection:</b> <math>1/2" / 33\% = 1 1/2" \text{ gap}</math></p> <p><i>A 1/2" deflection will NOT meet the maximum joint width for this UL Assembly.</i></p> <p><b>What is the Max Deflection?</b> <math>X" / 33\% = 3/4" \text{ gap}</math> Or <math>33\% \times 3/4" = 1/4" \text{ maximum deflection}</math></p>	<p>System No. HW-D-0106 Assembly Ratings – 1 and 2 Hr (See items 2 and 3) <b>Nominal Joint Width – 2 in.</b> L Rating At Ambient – Less Than 1 CFM/Lin Ft L Rating At 400°F – Less Than 1 CFM/Lin Ft Class II Movement Capabilities – 20% Compression or Extension</p>  <p><b>Using 1/2" deflection:</b> <math>1/2" / 20\% = 2 1/2" \text{ gap}</math></p> <p><i>A 1/2" deflection will NOT meet the maximum joint width for this UL Assembly.</i></p> <p><b>What is the Max Deflection?</b> <math>X" / 20\% = 2" \text{ gap}</math> Or <math>20\% \times 2" = 3/8" \text{ maximum deflection}</math></p>

UL assigns the following ratings for firestop joint systems:

**F-rating** for passage of flame    **T-rating** for fire & temperature    **L-rating** for amount of air/smoke leakage    **W-rating** base on water resistance