



# Head of Wall Fire Joint

Engineering Judgments and 3rd Party Verification—How to Read an EJ.

## Part 4 of 7

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The previous bulletin explained how to interpret a standard UL Assembly system, breaking down the components and details of the report. However, there may be situations where a tested UL Assembly is not available for the specific conditions of a project. In such cases, an alternative solution known as an Engineering Judgment (EJ) is required. An EJ is a fire protection design approach that relies on actual test data and sound fire engineering principles to predict the performance of a fire joint condition that differs from the original UL Assembly system.

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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 building code makes allowance for Engineering Judgments in Section 7.3. IBC — Section 703.3 Alternative methods for determining fire resistance. The application of any of the alternative methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E 119 or UL 263.
- ❑ If a tested UL Assembly does not accurately reflect the tested assembly, even if one component of the system differs from the actual construction in-place, an EJ must be produced.
- ❑ The EJ should be designed with the manufacturer and a registered engineer.
- ❑ Your EJ might need to be reviewed by an independent 3rd party...Typically, State Health Departments, Architect's & City's will require this evaluation.
- ❑ The entity that produces or reviews the EJ, should have the following information clearly identified in the EJ report (based on the by the International Firestop Council's (IFC) Guidelines for evaluating EJ's):
  1. Only accept an EJ when an Approved UL Tested Assembly is not available.
  2. Based upon previously tested systems that are sufficiently similar in nature in which the judgment is being developed.
  3. Based on similar rated tested systems...if your wall rating is 2-hours, the system(s) that are guiding this EJ also needs to be rated 2-hours.
  4. Based on similar joint size and joint movement ability.
  5. Only good for one specific project...a new EJ must be written for other projects, even if the EJ is the same.

The following example is one specific EJ for a partition. (your project will vary):

**ENGINEERING JUDGMENT FIRESTOP DETAIL**

PROJECT : CARLE HEART & VASCULAR INSTITUTE  
CONTRACTOR : CARTER CONSTRUCTION SERVICES, INC.

F-RATING = 1-HR. OR 2-HR.

1. LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR (MINIMUM 2-1/2" THICK) OVER METAL DECKING (2-HR. FIRE-RATING).
2. HILTI CP 777 SPEED PLUGS FRICTION FITTED TO COMPLETELY FILL FLUTES. ADJACENT LENGTHS OF SPEED PLUGS TO BE TIGHTLY BUTTED WITH SEAMS SPACED MINIMUM 24" APART ALONG LENGTH OF THE PLUGS.
3. MINIMUM 2" WIDE, 16 GA., STEEL STRAPS CUT TO A LENGTH TO SPAN THE FLUTE AND OVERLAP THE ADJACENT VALLEYS BY 1-1/2". STEEL STRAPS SPACED MAXIMUM 24" ON CENTER AND FASTENED TO FLOOR ASSEMBLY WITH APPROPRIATE HILTI ANCHORS (1/4" DIAMETER x 1-1/2" LONG) OR 1" LONG HILTI X-DNI 27 P8S16 POWDER ACTUATED FASTENERS WITH 9/16" DIAMETER STEEL WASHERS.
4. GYPSUM WALL ASSEMBLY (UL/CUL CLASSIFIED U400 SERIES) (1-HR. OR 2-HR. FIRE-RATING).
5. CEILING RUNNER (MIN. 25 GA. WITH 2" FLANGES) INSTALLED PARALLEL TO DIRECTION OF STEEL FLOOR UNITS AND SECURED TO STEEL STRAPS WITH TWO NO. 8 SELF-DRILLING, SELF-TAPPING STEEL SCREWS PER STRAP.
6. STEEL STUDS (MIN. 2-1/2" WIDE), CUT 1/2" TO 3/4" LESS IN LENGTH THAN ASSEMBLY HEIGHT, NESTING IN CEILING RUNNER WITHOUT ATTACHMENT.
7. HILTI CP 767 SPEED STRIPS OR MINERAL WOOL (MIN. 4 PCF DENSITY) COMPRESSED 50% AND INSERTED INTO JOINT, FLUSH WITH BOTH SIDES OF WALL.
8. MINIMUM 1/8" (WET) THICKNESS HILTI CFS-SP WB FIRESTOP JOINT SPRAY TO COMPLETELY COVER MINERAL WOOL AND TO OVERLAP A MINIMUM 1/2" ONTO GYPSUM, STEEL STRAPS, AND METAL DECK.

**NOTES:**

1. AS AN ALTERNATE TO CEILING RUNNER IN ITEM NO. 5, CEILING RUNNERS, MANUFACTURED BY SLIPTRACK SYSTEMS, CEMCO, METAL-LITE, OR DENMAR STEEL, MAY BE USED, WHEN ALTERNATE CEILING TRACKS ARE USED, CONSULT THE UL FIRE RESISTANCE DIRECTORY FOR INSTALLATION INSTRUCTIONS.
2. T-RATING MAY NOT EQUAL F-RATING IN ACCORDANCE WITH UL 2079.
3. THIS SYSTEM IS DESIGNED TO ACCOMMODATE 50% COMPRESSION OR EXTENSION.
4. THE LIGHT GAUGE PLATE ARE DIRECTLY FASTENED TO THE STRUCTURE AND WILL MOVE WITH STRUCTURE PER : ANDREA SILER PROJECT MANAGER WITH CLARK DIETRICH ENGINEERING SERVICES.

THIS ENGINEERING JUDGMENT REPRESENTS A FIRESTOP SYSTEM THAT WOULD BE EXPECTED TO PASS THE STATED RATINGS IF TESTED.  
(REFERENCE : UL/CUL SYSTEM NO. HW-D-0264 & HW-D-0042)

<b>HILTI</b> Hilti Firestop Systems	HILTI, Inc. Tulsa, Oklahoma USA (800) 879-8000	Sheet 2 of 2	Drawing No.
	Designed by <i>Uly A. Henzley</i>	Scale	153745c
Saving Lives through Innovation and Education		Date Sep. 26, 2012	

*SYSTEM RATING*

*NAME OF Specific Project & Contractor*

*CLEAR DIRECTION OF INSTALLATION REQUIREMENTS*

*NON-STANDARD ITEMS IDENTIFIED IN NOTES*

*SPECIFIC ACCOMMODATION TO MOVEMENT IDENTIFIED*

*REFERENCED TESTED UL ASSEMBLIES... WE SHOULD ALWAYS REVIEW & VERIFY THAT THEY DO MEET THE SAME REQUIREMENTS...*

*(IF ONE OF THESE IDENTIFIED SYSTEMS HAS A MOVEMENT OF 12%, RATHER THAN THE 50% IDENTIFIED IN THE EJ → THIS EJ SHOULD BE QUESTIONED AND MOST LIKELY REJECTED)*

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

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