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ENGINEERING JUDGMENT

March 24, 2017

Project: Webster University – Interdisciplinary Science Building
Contractor: NGG Ltd, Inc.
Application: UL 2079 Fire Rated Expansion Joint System
Assembly #1: Non-UL 2079 Wall Assembly
Assembly #2: UL 2079 2 Hour Concrete Slab
Requested Rating: UL 2079 2 Hour Rating
Product: Willseal FireStop FR-2H 3" x 4" +/-50% & Willseal Fire Stop FR-2H 4" x 4" +/-50%
Quantity: TBD
Special Condition: No rated systems are listed

Application Details:

Based on this engineering judgment the safing system incorporated of a UL 2079 2 Hour Concrete slab, Curtain wall system and Willseal FireStop FR-2H 3" x 4" or Willseal Fire Stop FR-2H 4" x 4" will suffice the applicable rating requirements for the Webster University - Interdisciplinary Science Building.

This system as designed can be utilized in applications where 3/4" dynamic vertical movement is anticipated.

Note: This engineering judgment only addresses the application in the corresponding detail and does not address any other application on the project.

Note: Willseal or its' representatives are not responsible for damage to the expansion joint or rated assemblies over the life and use of the building. The joint design does not address the structural integrity of the rated assemblies nor any consequential damage to the joint or assemblies in a fire scenario.

Based on: UL Rating FF-D-1175

This engineering judgment (EJ) is based exclusively on data obtained in testing at Underwriters Laboratory in accordance with UL 2079 and must be applied as described as above. Modifications of any of the parameters of this EJ shall render this judgment null and void.

All renderings within this EJ are ultimately subject to the approval of the local Authorities having jurisdiction in fire-rating requirements and must be consulted before installation to ensure specific substrates and rated assemblies are detailed and constructed to local requirements and codes.

Engineering Judgment Prepared by:

Date: 03/24/2017

Brian J. Iske
President



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February 29, 2017

RE: Willseal Firestop 2H & 3H (25% & 50%) – LEED™ Product Information

Willseal LLC, located in Hudson, NH is committed to quality, customer service and manufacturing products that meet the highest industry standards.

If your project is within a 500 mile radius of our manufacturing facility, the products are considered to be locally produced material and can contribute to MR Credit 5.1.

No single extracted material is used to produce the majority of this product. All raw materials are sourced from multiple manufacturers to prevent out of stock situations and single source force majeure. Therefore, point source for raw materials cannot be determined.

The recycled content weight is as follows:
None

Willseal Firestop 2H & 3H (25% & 50%) contains 0g/L volatile organic content (VOC) and as a result satisfies the LEED™ criteria for Indoor Environmental Quality.

Should you have any questions or require additional information, please do not hesitate to call.

Best regards,

A handwritten signature in black ink, appearing to read "Derek Iske", written over a light gray background.

Derek Iske
Willseal, LLC

SPECIFICATION
Sections 07 90 00 / 07 95 00

Willseal FR-2H / Willseal FR-3H by WILLSEAL

Pre-Compressed, Self-Expanding, Tensionless, UL2079 FR Sealant System with Silicone Coated Surface, Watertight, Traffic Rated, 2 or 3 Hour Rated, +/-25% or 50% Expansion, Primary Seal for Horizontal Expansion Joints

****NOTE to specifier: Select FR-2H for two-hour applications and FR-3H for three-hour applications and delete the other. If using both systems, make reference to respective locations in the spec and on the drawings. Select FR-2H +25 for joints rated (+/-25%) or FR-2H +50 for joints rated (+/-50%) ****

PART 1 – GENERAL

1.01 Work Included

- A. The work shall consist of furnishing and installing waterproof, fire rated expansion joints in accordance with the details shown on the plans and the requirements of the specifications. Preformed sealant shall be silicone pre-coated, preformed, pre-compressed, self-expanding, tensionless, FR sealant system.
- B. Related Work
 - Division 3 - Cast-in-Place Concrete
 - Division 7 - Thermal & Moisture Protection
 - Division 7 - Sealants, Caulking and Waterproofing
 - Division 7 - Joint Firestopping

1.02 Submittals

- A. General – Submit the following according to Division 1 Specification Section.
- B. Standard Submittal Package – Submit typical expansion joint drawing(s) indicating pertinent dimensions, general construction, expansion joint opening dimensions and product information.
- C. Sample of material is required at time of submittal.
- D. Life Safety/Quality Control: Manufacturer shall be ISO-9001:2008, certified and shall provide written confirmation that a formal Quality management System and Quality Processes have been adopted in the areas of, (but not limited to) Manufacturing, Quality Control and Customer Service for all processes, products and their components. Alternate manufacturers will be considered provided they submit written proof that they are ISO 9001:2008, certified prior to the project bid date.
- E. All products must be identified by a UL listing number and must be listed in the UL and ULC Online Certification Directories as proof that they have been tested according to UL 2079 and manufactured under UL's "Follow Up" service.
- F. Submit UL-issued Certificate of Compliance as proof product has been tested by UL and passed ANSI/UL 2079.
- G. All products must be certified by independent laboratory tests that they are not comprised of un-bonded vertical laminations and do not rely on a water based intumescent surface coating as part of the FR sealant system. Manufacturer must have proof that the FR expansion joint will perform as UL Listed even if the surface bellows are vandalized or damaged.

- H. All products shall be certified in writing to be: a) capable of being expanded from the mean joint size at 40°F to the stated maximum dimension without exerting any tension on the attached substrate; and b) capable of withstanding 150°F (65°C) for 3 hours while compressed down to the minimum of movement capability dimension of the basis of design product (-25% or -50% of nominal material size) then extended to the stated extension (+25% or +50%) without evidence of foam delamination or sealant face debonding from the material; and that the same material after the heat stability test and after first being cooled to room temperature will subsequently self-expand to the maximum of movement capability dimension of the basis-of-design product (+25% or +50% of nominal material size) within 24 hours at room temperature 68°F (20°C).

1.03 Product Delivery, Storage and Handling

- A. Deliver products to site in Manufacturer's original, intact, labeled containers. All materials must have the WILLSEAL logo and the corresponding UL classification logo. Handle and protect as necessary to prevent damage or deterioration during shipment, handling and storage. Store in accordance with manufacturer's installation instructions.

1.04 Basis-of-Design

- A. All joints shall be designed to meet the specified performance criteria of the project as manufactured by: Willseal LLC, 34 Executive Drive, Hudson, NH 03051, 800-274-2813. Willseal.com, custserv@willseal.com.
- B. Alternate manufacturers must demonstrate that their products meet or exceed the design criteria and must submit certified performance test reports performed by nationally recognized independent laboratories as called for in section 1.02 Submittals. Submittal of alternates must be made three weeks prior to bid opening to allow proper evaluation time.

1.05 Quality Assurance

- A. The General Contractor will conduct a pre-construction meeting with all parties and trades involved in the treatment of work at and around expansion joints including, but not limited to, concrete, mechanical, electrical, HVAC, landscaping, masonry, curtain wall, waterproofing, fire-stopping, caulking, flooring and other finish trade subcontractors. All superintendents and foremen with responsibility for oversight and setting of the joint gap must attend this meeting. The General Contractor is responsible to coordinate and schedule all trades and ensure that all subcontractors understand their responsibilities in relation to expansion joints and that their work cannot impede anticipated structural movement at the expansion joints, or compromise the achievement of watertightness or life safety at expansion joints in any way.
- B. Warranty – Manufacturer's standard warranty shall apply.
- C. LEED Building Performance Requirements: The VOC of the silicone must not exceed 50 grams/liter. Additional credits may be available for projects within 500 miles of Hudson, NH.

PART 2 – PRODUCT

2.01 General

- A. Provide traffic durable, watertight, 2 or 3 hour fire rated, expansion joint rated for +/-25% or +/-50% for isolation joints and expansion joints in decks and floors. Typical locations include, but are not limited to the following: subject to review, joints over occupied space,

below-grade, stair tower perimeters, elevator perimeters, stadium tread and risers, parking deck joints, treatment plant perimeters and covers, and structural expansion joints. System shall perform waterproofing, fire-rating, traffic bearing, sound proofing as well as accommodate movement functions as the result of a single installation not requiring invasive anchoring and without the addition of fire blankets, fire barriers, or mineral wool. Cover plates may be used in conjunction with the FR expansion joint as part of the overall design. This is particularly important in wide joints or those exposed to extreme traffic patterns or conditions.

- B. Provide Willseal FR-2H / Willseal FR-3H as manufactured by WILLSEAL and as indicated on drawings for horizontal-plane expansion joint locations.
- C. Sealant system shall be comprised of the following components: 1) fire-retardant-impregnated foam proven not to vertically delaminate and will fully extend without putting tension on the substrate, 2) pre-coated on the traffic surface with highway-grade, fuel resistant silicone proven not to de-bond or separate if exposed to thermal shock cycling, 3) field-applied epoxy or UL listed adhesive, 4) Silicone fillet beads may be used where appropriate to prove a uniform seal with the substrate. Impregnated foam material must be proven not to take a compression set over time and the FR joint sealant must not rely on "injected sealant bands" along the substrate for its sealing properties.
- D. Material shall be capable of movements of -25%, +25% (50% total) or -50%, +50% (100% total) of nominal material size depending on the anticipated movement of the joint design. Standard sizes from 1/2" (25mm) to 4-1/2" (112mm). Depth of seal is 3" (76.2 mm) or 4" (100 mm) depending on UL listing.
- E. Silicone coating to be highway-traffic grade, low-modulus, jet-fuel resistant silicone factory-applied to the foam while it is partially pre-compressed to a width greater than maximum joint extension and cured before final compression. When compressed to final supplied dimension, a bellow(s) to handle movement must be created in the silicone coating such that the joint is never under tension within its rated movement range.
- F. Willseal FR-2H / Willseal FR-3H to be installed into manufacturer's standard field-applied epoxy or UL approved adhesive. The Willseal FR-2H / Willseal FR-3H is to be installed slightly recessed from the surface, such that when the bead of silicone is installed between the substrates and the foam-and-silicone-bellow(s), the system will be essentially flush with the substrate surface.
- G. Select the sealant system model appropriate to the movement (+/-25% or +/-50%) and design requirements at each joint location that meet the project specification or as defined by the structural engineer of record.
- H. Manufacturer's Checklist must be completed by expansion joint subcontractor and returned to manufacturer at time of ordering material.

2.02 Fabrication

- A. Willseal FR-2H / Willseal FR-3H by WILLSEAL must be supplied pre-compressed to less than the joint size, packaged in shrink-wrapped lengths (sticks). If stick lengths are required in lengths other than 6.56LF (2M) add at least 10 working days to the lead time.
- B. Directional changes and terminations into horizontal plane surfaces can be provided by factory supplied 90-degree angles containing minimum 12-inch long leg and 6-inch long leg, or custom leg on each side of the direction change, or through field fabrication in strict accordance with published installation instructions. In most cases field conditions are such that the restrictive nature of the factory supplied corners do not conform with as

built conditions and may outweigh the benefits. Consult manufacturer for proven field transition methods.

PART 3 – EXECUTION

3.01 Installation

A. Preparation of the Work Area

1. The contractor shall provide properly formed and prepared expansion joint openings constructed to the exact dimensions and elevations shown on manufacturer's standard system drawings or as shown on the contract drawings. Deviations from these dimensions will not be allowed without the written consent of the engineer of record.
2. The contractor shall clean the joint opening of all contaminants immediately prior to installation of expansion joint system. Repair spalled, irregular or unsound joint surfaces using accepted industry practices for repair of the substrates in question. Remove protruding roughness to ensure joint sides are smooth. Ensure that there is sufficient depth to receive the full depth (typically 4") of the size of the Willseal FR-2H / Willseal FR-3H being installed. Refer to Manufacturer's Installation Guide for detailed step-by-step instructions.
3. No drilling, or screwing, or fasteners of any type are permitted to anchor the sealant system into the substrate.
4. System to be installed by qualified sub-contractors only according to detailed published installation procedures and/or in accordance with job-specific installation instructions of manufacturer's field technician.

3.02 Clean and Protect

- ##### A.
- Protect the system and its components during construction. Subsequent damage to the expansion joint system will be repaired at the general contractor's expense. After work is complete, clean exposed surfaces with a suitable cleaner that will not harm or attack the finish.

END OF SECTION

SUBMITTAL IDENTIFICATION SHEET

To be completed by Contractor/CM

WEBSTER UNIVERSITY ISB	
PROJECT NAME	
8274 BIG BEND BLVD	
ADDRESS	
NUMBER	
WEBSTER UNIVERSITY	
OWNER	
CANNON DESIGN	
ARCHITECT / ENGINEER	
Devin Gates	
SUBMITTED BY	
0784460-004	
CONTRACTOR / CM SUBMITTAL NO.	CANNON DESIGN SUBMITTAL NO.
	0784460
DRAWING / DETAIL REFERENCE	SPECIFICATION SECTION / PARAGRAPH
MANUFACTURER / SUPPLIER	ITEM / PRODUCT ID
REQUIRED DATE	PRIORITY
	CRITICAL

ITEM BEING SUBMITTED (check only one)

- | | | |
|--|--|--|
| ☒ Shop Drawings | ☐ Certification / | ☐ Coordination Drawing |
| ☐ Samples | ☐ Qualifications | ☐ Calculations |
| (_____ copies) | ☐ Record Documents | ☐ Schedules |
| ☐ LEED Submittal | ☐ Product Data | ☐ O&M Manuals |
| ☐ Other _____ | | |

ITEM BEING SUBMITTED FOR (check only one)

- ☒ Action ☐ Information Only ☐ Record

REMARKS OR DEVIATIONS

Product data and engineering judgement for firesafing at dynamic conditions only.

CONTRACTOR / CM CERTIFICATION (SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)



PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

By:

Devin D. Gates

To be completed by Reviewer

07 8446-004
CANNON DESIGN SUBMITTAL NUMBER
3/30/17
RECEIVED DATE

- ☐ A. No Exceptions Taken
No further review of submittal is required.
- ☐ B. Make Corrections Noted
Incorporate corrections in work; resubmission is not required.
- ☐ C. Revise and Resubmit
Revise as noted, and resubmit for review.
- ☐ D. Rejected
Submittal is not in compliance with Contract Documents; provide new submittal.
- ☒ E. For Record / Information Only
Submittal was reviewed for Record / Information purposes only.
- ☐ F. Not Required for Review
Submittal is not required by Contract Documents and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be affected thereby. This review is null and void if submittal deviates from contract documents and does not indicate or note deviations.

A/E COMMENTS

☐ See attached sheet(s) for additional comments

SEE ATTACHED COMMENTS.

Devin Gates	3/30/17
REVIEWED BY	DATE

Kelvin Patel	04/03/17
REVIEWED BY	DATE

Digitally signed by Kelvin Patel
DN: C=US, E=kpatel@cannondesign.com, O=Cannon Design,
OU=Architect, CN=Kelvin Patel
Date: 2017.04.03 13:33:17 -0500

A/E COMMENTS:

This engineering judgment (EJ) does not appear to include the back-pan and insulation mounted to and protecting the curtain wall spandrel. The fire resistive joint system EJ must be comprehensive including both the connection to the slab and the fire protection at the spandrel. The engineering judgment should be signed by a fire protection engineer, the one submitted does not appear to be signed by a fire protection engineer.

Additionally, the fire protection engineer should be considering the continuity of the fire resistive joint as it terminates and transitions to joints beyond this application area. Compatibility with adjacent systems and products will need to be verified by the construction management team as well as transition details should be provided as part of the engineering judgment.

Finally, as referenced in the engineering judgment itself, the final engineering judgment documents shall be approved by the local Authorities Having Jurisdiction (AHJ) and a record of this approval must be submitted for record as part of the submittal process.

We believe the AHJ may have issues approving the provided engineering judgment for reasons (not limited to) those listed below;

- 1.The EJ should be written and signed by a fire protection engineer.
- 2.The EJ should address the continuity of the protection between the EJ designated system and the adjacent systems.
- 3.The compatibility of components or products in EJ system and adjacent systems is addressed at transitions.
- 4.The EJ should address transition details between designated system it transitions.
- 5.The submitted EJ indicates it does not address the structural integrity of the joint in a fire. We believe this is a key performance requirement of interest to an AHJ.....that the joint will perform in a fire.



System No. FF-D-1175 XHBN.FF-D-1175 Joint Systems

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Design / System / Construction / Assembly Usage Disclaimer

- Authorities Having Jurisdiction should be consulted in all cases as to the particular requirements covering the installation and use of UL Certified products, equipment, system, devices, and materials.
- Authorities Having Jurisdiction should be consulted before construction.
- Fire resistance assemblies and products are developed by the design submitter and have been investigated by UL for compliance with applicable requirements. The published information cannot always address every construction nuance encountered in the field.
- When field issues arise, it is recommended the first contact for assistance be the technical service staff provided by the product manufacturer noted for the design. Users of fire resistance assemblies are advised to consult the general Guide Information for each product category and each group of assemblies. The Guide Information includes specifics concerning alternate materials and alternate methods of construction.
- Only products which bear UL's Mark are considered Certified.

XHBN - Joint Systems

XHBN7 - Joint Systems Certified for Canada

[See General Information for Joint Systems](#)
[See General Information for Joint Systems Certified for Canada](#)

System No. FF-D-1175

July 12, 2016

ANSI / UL2079	CAN / ULC S115
Assembly Rating — 2 Hr	F Rating — 2 Hr
Nominal Joint Width — 5 in.	FT Rating — 2 Hr
Class II and III Movement Capabilities — 50 % Compression or Extension	FH Rating — 2 Hr
	FTH Rating — 2 Hr
	Nominal Joint Width — 127 mm
	Class II and III Movement Capabilities — 50 % Compression or Extension