

June 11, 2021

Ramesh Sarna
President
Megha Holdings Inc.
401 Coventry Road
Ottawa, ON K1K 2C5

Dear Ramesh,

**Re: Engineering Judgment for Head of Wall Joint for Steel Demising Wall
832 B Burton Road, Vars, Ontario**

Morrison Hershfield Limited (MH) provided an Engineering Judgment dated May 18, 2021 for the fire resistance rating of mineral fibre and steel demising wall for the building at 832 B Burton Road. The demising wall is to be constructed between adjacent tenants and is to provide a fire separation with a 2 hour fire resistance rating. MH was requested to evaluate the corresponding head of wall firestop system for this demising wall.

Background

The continuity of demising wall fire separation shall be maintained where it abuts the roof assembly per OBC Division B Sentence 3.1.8.3.(4). The related appendix note elaborates and advises to fill “all gaps at the juncture of the assemblies with a material that will maintain the integrity of the fire separation”.

It is important to note that the OBC does not require the head of wall firestopping to pass a specific fire test, although firestops systems that match or closely match listings tested to ULC-S115 “Fire Tests of Firestop Systems” are often used as a means of demonstrating the required performance will be provided. An Engineering Judgment is provided for this head of wall firestopping since a specific system tested with the wall type is not available.

The structural engineer has confirmed:

- Demising wall will have fixed connections to the structural columns on either end.
- Intermediate connections to the roof will have vertical-slip connections. These vertical-slip connections to roof framing will ensure that no vertical load will be transferred from the roof to the proposed wall-partition framing.
- The metal siding will terminate 1” below the roof deck to allow for roof deflection. The roof assembly will have a maximum $\frac{3}{4}$ ” deflection.

Head of Wall Detail

The proposed continuity of the demising wall fire separation and head of wall firestopping consists of the following key features, see also attached Head of Wall Firestopping Detail:

- Compressed mineral wool stuffed in voids between roof deck and the U- track.
- Continuous 20 gauge U-track/deflection track attached to the underside of the roof deck.
- Mineral wool installed within wall assembly to meet underside of U-track.
- Metal components of wall assembly constructed to the underside of the roof deck with allowance for roof assembly deflection.

Analysis

The proposed firestop system has been reviewed relative to fire protection principles and a sample head of wall firestopping cUL System No. HW-D-0264 (attached).

The 2 hour rating of the demising wall is primarily achieved with the 8 inch thickness of mineral wool, held in place by the steel siding and girts. The ½ inch fire blanket provides a thermal break to reduce heat transfer via conduction from the steel on the fire exposed side of the wall via the girts to the steel on the unexposed side.

The same two key features (mineral wool and fire blanket under siding) will provide continuity of the 2 hour fire resistance rating at the head of wall joint, since all components of the wall will extend to the U-track mounted on the steel deck, with the exception of the siding that will be up to 1 inch shy of the roof deck in order to accommodate deflection of the roof assembly under snow loads. The continuous 20 gauge U-track (0.9 mm thickness which exceeds the steel siding 0.61 mm thickness) is the backup to the siding when the roof is not deflected.

The compressed mineral wool insulation above the U-track will function in a manner similar to the listed head of wall firestopping in cUL System No. HW-D-0264 to reduce the risk of premature fire spread over top of the demising wall. The steel deck orientation parallel to the demising wall is beneficial since the voids will not span the demising wall. A fire separation is required to act as a barrier to control smoke spread, however it is important to note that the OBC prescribes specific locations for smoke-tight joints in Sentence 3.1.8.3.(2) and (3), and the head of wall joint for walls between suites is not a specified location for a smoke-tight joint.

Conclusion

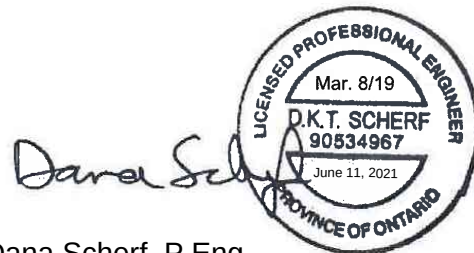
In our opinion the attached head of wall detail (compressed mineral wool in roof deck voids, continuous 20 gauge U-track/deflection track, and mineral wool inside wall extending up to the U-track) meets the requirements of OBC Sentence 3.1.8.3.(4) and provides the required continuity of the 2 hour rated fire separation at the juncture of the two assemblies.

Please contact the undersigned if there are any questions.

Sincerely,
Morrison Hershfield Limited



Alma Rahmani, OAA
Code Consultant



Dana Scherf, P.Eng.
Principal, Senior Code Consultant

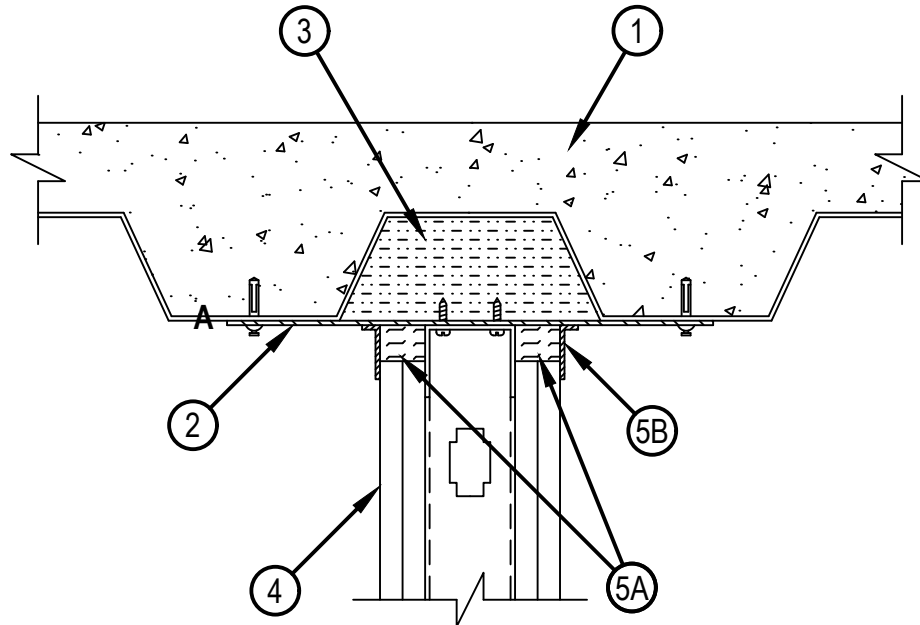


Classified by
Underwriters Laboratories, Inc.
to UL 2079 and CAN/ULC-S115

System No. HW-D-0264

HW-D-0264

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 4)	F Ratings — 1 and 2 Hr (See Item 4)
Nominal Joint Width - 1-1/2 In.	FT Ratings — 1 and 2 Hr (See Item 4)
Class II Movement Capabilities — 50% Compression or Extension	FH Ratings — 1 and 2 Hr (See Item 4)
L Rating At Ambient — Less Than 1 CFM/lin ft	FTH Ratings — 1 and 2 Hr (See Item 4)
L Rating At 400 F — Less Than 1 CFM/lin ft	Nominal Joint Width - 1-1/2 In.
	Class II Movement Capabilities — 50% Compression or Extension
	L Rating At Ambient — Less Than 1 CFM/lin ft
	L Rating At 400 F — Less Than 1 CFM/lin ft



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the Fire Resistance Directory and shall include the following construction features:
- A. Steel Floor and Form Units* — Max 3 in. (76 mm) deep galv steel fluted floor units.
 - B. Concrete — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
 - C. Spray-Applied Fire Resistive Material* — (Optional. Not Shown) - After installation of the steel straps (Item 2), the steel floor units may be sprayed with the min thickness of material specified in the individual D700 Series Design.

ISOLATEK INTERNATIONAL — Type 300

GCP APPLIED TECHNOLOGIES INC — Types MK-6/HY or MK-10HB



Hilti Firestop Systems

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September 26, 2019

1A. Roof Assembly — (Not Shown) - As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof shall be constructed of the materials and in the manner described in the individual P700 or P900 Series Roof-Ceiling designs in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

- A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
- B. Roof Insulation — Roof insulation to consist of min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the roof deck.
- C. Spray-Applied Fire Resistive Material* — (Optional. Not Shown) - After installation of the steel straps (Item 2), all surfaces of the steel deck may be sprayed with the thickness of material as specified in the individual P700 Series Floor-Ceiling Design. The flutes of the steel deck above the steel straps and wall may be filled with material as an alternate to the Forming Material (Item 3).

ISOLATEK INTERNATIONAL — Type 300

GCP APPLIED TECHNOLOGIES INC — Types MK-6/HY or MK-10HB

2. Steel Straps — Min. 2 in. (51 mm) wide 16 MSG galv steel straps cut to a length to span the flute and overlap the adjacent valleys of fluted floor units or roof deck by 1-1/2 in. (38 mm). Straps spaced max 24 in. (610 mm) OC and fastened to floor or roof assembly with 1/4 in. (6 mm) diam by 1-1/2 in. (38 mm) long steel concrete anchors. As an alternate, min 1 in. (25 mm) long Hilti X-DNI 27 P8 S15 or Hilti X-U 27 P8 S15 powder actuated floor pins with integral min 9/16 in. (14 mm) diam washer may be used to secure steel straps to floor or roof assembly.

3. Forming Material* - Plugs — Preformed mineral wool plugs, formed to the shape of the fluted floor units or roof deck, friction fit to completely fill the flutes above the steel straps. Adjacent lengths of plugs to be tightly butted with butted seams spaced min 24 in. (610 mm) apart along the length of the plugs.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs

3A. Forming Material* — As an alternate to Item 3, min 4 pcf (64 kg/m³) mineral wool batt insulation forming material cut to the shape of the fluted floor units or roof deck and friction fit to completely fill the flutes above the steel straps. Adjacent lengths of batts to be tightly butted with butted seams spaced min 24 in. (610 mm) apart along the length of the flutes.

INDUSTRIAL INSULATION GROUP L L C — MinWool-1200 Safing

JOHNS MANVILLE — Safing

ROCK WOOL MANUFACTURING CO — Delta Board

ROCKWOOL — SAFE

THERMAFIBER INC — Type SAF

4. Wall Assembly — The 1 hr or 2 h fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. Steel Floor and Ceiling Runners — Floor and ceiling runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner to be 3/4 in. (19 mm) greater than extended joint width. Ceiling runner installed parallel to direction of fluted steel floor units, directly beneath steel straps, and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap.

- A1. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 4A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Items 4B). Ceiling runner installed parallel to direction of fluted steel floor deck, directly beneath steel straps, and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.

BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK, SLPTRK325

CALIFORNIA EXPANDED METAL PRODUCTS CO — CST

CLARKDIETRICH BUILDING SYSTEMS — Types SLT, SLT-H

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT

METAL-LITE INC — The System

RAM SALES L L C — RAM Slotted Track



A2. Light Gauge Framing* - Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A1, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors spaced max 24 in. (610 mm) OC.

OLMAR SUPPLY INC — Type SCR

A3. Light Gauge Framing* — Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 4A through 4A2, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 4B). Flange height of slotted ceiling runner shall be 3-1/4 in. (83 mm) with 2 in. (51 mm) deep slots. Slotted ceiling runner installed parallel to direction of fluted steel floor deck, directly beneath steel straps, and secured to straps with two No. 8 self-drilling, self-tapping steel screws per strap.

SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track-Type SDLT

B. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. Studs cut 3/4 in. (19 mm) to 1 in. (25 mm) less in length than assembly height with bottom nesting in and resting on the floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 4A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC. When slotted ceiling runner (Item 4A3) is used, steel studs cut in lengths 3/4 to 1-3/4 in. (19 to 44 mm) less than floor to ceiling height and secured to slotted ceiling runner with No. 8 by 1/2 (13 mm) long wafer head steel screws at +/- 3/16 in. (5 mm) of the mid-height of slot on each side of wall.

C. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board as specified in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board are specified in the individual Wall and Partition Design. For both hourly ratings, a nominal 1-1/2 in. (38 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the steel floor units and the top row of screws shall be installed into the studs 3 in. (76 mm) below the valleys of the steel floor units.

The hourly ratings of the joint system are dependent on the hourly rating of the wall.

5. Joint System — Max separation between bottom of floor and top of wall is 1-1/2 in. (38 mm). The joint system is designed to accommodate a max 50percent compression or extension from its installed width. The joint system consists of a forming material and a fill material between the top of the gypsum board and the bottom of the floor, as follows:

A. Forming Material* — Min 4 pcf (64 kg/m³) density mineral wool batt insulation cut shall be cut into strips to fill the gap between the top of gypsum board and bottom of the floor units. The width of the strips shall be equal to the total thickness of the gypsum board. The strips of mineral wool are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the mineral wool plug or steel floor units.

INDUSTRIAL INSULATION GROUP L L C — MinWool-1200 Safing

JOHNS MANVILLE — Safing

ROCK WOOL MANUFACTURING CO — Delta Board

ROCKWOOL — SAFE

THERMAFIBER INC — Type SAF

A1. Forming Material* - Strips — (Optional) - Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide precut mineral wool strips for 1 hr and 2 hr rated assemblies respectively. The strips are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall.

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips

B. Fill, Void or Cavity Material* - Sealant — Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.6 mm dry thickness) of fill material sprayed or troweled on each side of the wall to completely cover the mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board, steel floor units or roof deck and steel straps on both sides of the wall and min 2 in. (51 mm) onto spray-applied fire resistive material (Item 1C).

HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-SP WB Firestop Joint Spray

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.



Hilti Firestop Systems

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Siding to remain 1" below the roof deck as the max deflection is to be 3/4"

Fasten siding into the flutes of the expansion track

20 gauge continuous 8" deflection track.

Steel siding per wall assembly

3/16" x 8" gert supported to structure

The steel deck is P3606 Steel Deck From Canam. The depth is 1.5" or 38mm

1.5" (38mm)

MH: Compressed mineral wool in voids above U track

MH: Mineral wool in wall assembly to be installed so there are no gaps between mineral wool and the U- track

1/2" fire blanket insulation

4" dense roxul insulation times two

Note: any penetrations through the siding are packed with Roxul insulation and then caulked with fire caulking. also each sheet of siding is sealed to the next sheet with a rated sealant.

Head of Wall Detail

(Detail drawn by others, modified by MH for clarity of key features, see MH Engineering Judgment Jun 11, 2021)