

Development Services

From Concept to Construction

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APPEAL SUMMARY

Status: Decision Rendered - Held over from ID 22052 (10/30/19) for additional information

Appeal ID: 22221	Project Address: 1750 SW Yamhill St
Hearing Date: 12/11/19	Appellant Name: Tom Jaleski
Case No.: B-020	Appellant Phone: (503) 488-5651
Appeal Type: Building	Plans Examiner/Inspector: Kathy Aulwes, Corey Stanley
Project Type: commercial	Stories: 9 Occupancy: B, A-3, M, S-2 Construction Type: I-A
Building/Business Name: Canvas at Press Blocks	Fire Sprinklers: Yes - Throughout
Appeal Involves: Reconsideration of appeal	LUR or Permit Application No.: 17-182179-CO
Plan Submitted Option: pdf [File 1] [File 2]	Proposed use: Commercial

APPEAL INFORMATION SHEET

Appeal item 1

Code Section 703.2, 703.3

Requires 703.3 Methods for determining fire resistance. The application of any of the methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E119 or UL 263. The required fire resistance of a building element, component or assembly shall be permitted to be established by any of the following methods or procedures:

Engineering analysis based on a comparison of building element, component or assemblies designs having fire-resistance ratings as determined by the test procedures set forth in ASTM E119 or UL 263.

703.2 Fire Resistance Ratings. Where materials, systems or devices that have not been tested as part of a fire-resistance-rated assembly are incorporated into the building element, component or assembly, sufficient data shall be made available to the building official to show that the required fire-resistance rating is not reduced.

Proposed Design Steel beams frame the roof system and are protected by SFRM where they are concealed from view. One- and two-hour fire ratings are required for these beams depending on whether they are primary structural framing or secondary members supporting the roof.

Reason for alternative The proposed roof framing beam assemblies have been compared to UL listed design UL S721. The proposed beam assemblies will comply with the required 1- and 2-hr fire resistance requirement if protected with the prescribed SFRM thickness. Please see attached Engineering Judgement Analysis.

Appeal item 2

Code Section	703.2, 703.3
Requires	<p>703.3 Methods for determining fire resistance. The application of any of the methods listed in this section shall be based on the fire exposure and acceptance criteria specified in ASTM E119 or UL 263. The required fire resistance of a building element, component or assembly shall be permitted to be established by any of the following methods or procedures:</p> <p>Engineering analysis based on a comparison of building element, component or assemblies designs having fire-resistance ratings as determined by the test procedures set forth in ASTM E119 or UL 263.</p> <p>703.2 Fire Resistance Ratings. Where materials, systems or devices that have not been tested as part of a fire-resistance-rated assembly are incorporated into the building element, component or assembly, sufficient data shall be made available to the building official to show that the required fire-resistance rating is not reduced.</p>
Proposed Design	Steel beams frame the roof system and are protected by intumescent coating where they are visible. One- and two-hour fire ratings are required for these beams depending on whether they are primary structural framing or secondary members supporting the roof.
Reason for alternative	The proposed roof framing beam assemblies have been compared to UL listed design UL N645 and N614. The proposed beam assemblies will comply with the required 1- and 2-hr fire resistance requirement if protected with the Intumescent thicknesses in the attached EJ letter.

APPEAL DECISION

1. Alternate 1 and 2 hour SFRM roof framing beam assemblies with engineering analysis: Granted as proposed.

2. Alternate 1 and 2 hour intumescent roof framing beam assemblies with engineering analysis: Granted as proposed.

For Item 1: The Administrative Appeal Board finds that the information submitted by the appellant demonstrates that the approved modifications or alternate methods are consistent with the intent of the code; do not lessen health, safety, accessibility, life, fire safety or structural requirements; and that special conditions unique to this project make strict application of those code sections impractical.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 90 calendar days of the date this decision is published. For information on the appeals process, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development Services Center.



Press Blocks EJ1

Engineering Judgment Report

Fire Rating of Steel Beams Protected with Intumescent Coating

Client Name: Lease Crutcher Lewis

Client Address: 550 SW 12th Avenue, Portland, OR 97205

Date: 12/10/2019

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1 PROJECT OVERVIEW

The Canvas at the Press Blocks is a new Type IA construction, nine-story, speculative office building with ground floor retail, seven levels of office space, and top floor office amenity space. It is located in Portland, Oregon. The building is protected by automatic fire sprinkler system and fire alarm system throughout. The structural roof system for the top floor consists of tongue and groove wood decking over steel wide flange beams protected with intumescent coating in areas exposed to view. Code Unlimited has been asked to provide analysis for the fire rating for the steel beams at the wood deck to ensure it will provide both 1-hour and 2-hour fire protection as required per OSSC.

2 APPLICABLE CODES, STANDARDS, AND GUIDES

2019 Oregon Structural Specialty Code (OSSC).

2019 Oregon Fire Code (OFC)

3 DISCUSSION

3.1 Approach

- The proposed beam assembly has been analyzed in accordance with 2019 OSSC §703.3 Alternative Methods for Determining Fire Resistance.
- The beam assembly is compared side-by-side to a rated assembly tested by Underwriters Laboratories (UL), Design No. N614 and N645.

4 PROPOSED DESIGN

Steel beams frame the roof system and are protected by intumescent coating where they are visible. One- and two-hour fire ratings are required for these beams depending on whether they are primary structural framing or secondary members supporting the roof. The following beams and corresponding rating requirements are proposed to frame the roof:

- W10X22 1HR
- W14X22 1HR
- W16X36 2HR

Intumescent coating will be applied to the beams in accordance with UL design thickness required to achieve a 1- or 2-hour fire-rating as required by code.

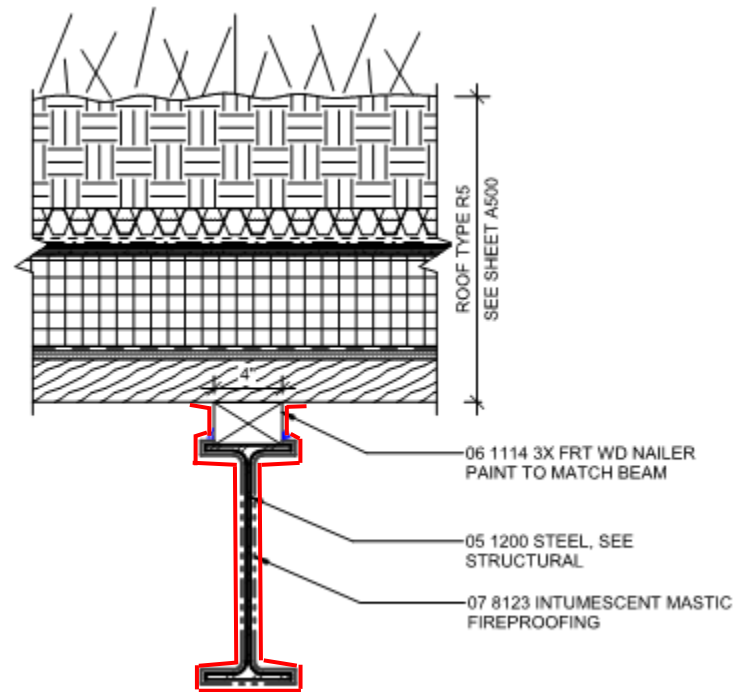


Figure 1: Proposed design (typ). Intumescent fireproofing is shown with a minimum 1/2" overlap onto the roof decking

5 ASSEMBLY ANALYSIS

Intumescent will be applied to the beams in accordance with UL N645 with the thickness required to achieve a 1- or 2-hour fire-rating. The proposed design is compared to UL N645 and N614 shown in Fig.2 and analyzed in Graph below. Limited Testing is provided for the proposed Carboline intumescent coating, while Isolatek provides tables for Beams lower W/D Ratios. The comparison table below details how the protection thicknesses are similar for Isolatek WB3 (N614) and the Carboline coating tested under UL N645. N645 is tested down to a W/D ratio of 0.67, while the project is utilizing beams with W/D ratios of 0.534 (W14x22) and 0.606 (W10x22) The W/D ratio of the thinnest member is 20% lighter than the smallest beam tested under N645. When compared to N614, the intumescent thickness for the W14x22 is 20% thicker, which falls in line with a reasonable extrapolated thickness.

Note: Primer (CarboClylic 3359-DTM) shall be continuous around the entire beam and continuing over the wood blocking and overlapping 1" onto the roof decking. Primer is also listed as a topcoat.

Press Blocks EJ1 – Intumescent – Fire Rating of Steel Beams Protected with Intumescent Coating

Design No. N645

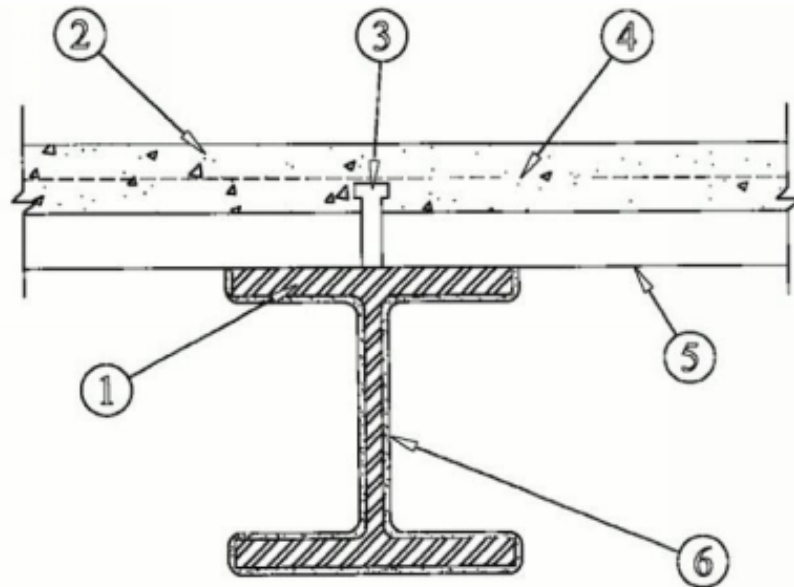
August 18, 2017

Restrained Beam Ratings — 1, 1-1/2, 2, 3 and 4 Hr (See Item 6)

Unrestrained Beam Ratings — 1, 1-1/2, 2 and 3 Hr (See Item 6)

This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide **BXUV** or **BXUV7**

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



1. **Steel Beam** — Wide flange steel beams with the minimum sizes shown in the tables below. Beams shall be free of dirt, loose scale and oil. Beams shall be primed with 0.003 in. dry film thickness of modified alkyd, epoxy, organic zinc or inorganic zinc based primer.
2. **Normal Weight or lightweight Concrete** — Compressive strength 3000 psi. For normal weight concrete either carbonate or siliceous aggregate may be used. Unit weight 148 lbs/cu ft for normal weight concrete and 110 lbs/cu ft for lightweight concrete.
3. **Shear Connector—(Optional)** — Studs, 3/4 in. diam headed type or equivalent per AISC specifications welded to the top flange of beam through the steel floor units.
4. **Welded Wire Fabric** — 6x6-10/10 SWG.
5. **Steel Floor and Form Units** — 1-1/2, 2 or 3 in. deep fluted, cellular or corrugated units welded to beam. Fluted units shall be used with the 3 hour unrestrained and 4 hour restrained ratings.
6. **Mastic and Intumescent Coating*** — Coating spray, brush or trowel applied directly from containers to desired thickness. See table below for appropriate final dry thickness. Flutes above beam to be completely filled with mineral wool insulation having a minimum density of 6 lbs/cu ft or the top flange of the beam shall be protected with the same thickness of coating as required on the beam.

Figure 2: UL N645

Press Blocks EJ1 – Intumescent – Fire Rating of Steel Beams Protected with Intumescent Coating

	Beam W/D Ratio	Fire-Resistance Rating (hours)	Material thickness (in. dft)	Fire Test ASTM E-119 (UL Design No.)
Wide Flange	0.67	1	0.053	N645
	Carboline	1.5	0.089	N645
		2	0.143	N645
	Carboline			
	1.0	1	0.053	N645
		1.5	0.089	N645
		2	0.143	N645
	Isolatek WB3			
	0.97	1	0.043	N614
		1.5	0.066	N614
		2	0.115	N614
	Isolatek WB3			
	0.60	1	0.073	N614
	W10x22	1.5	0.099	N614
		2	0.171	N614
	Isolatek WB3			
	0.53	1	0.073	N614
	W14x22	1.5	0.099	N614
		2	0.171	N614

Figure 3a: Comparison Table-UL N645 vs N614

Press Blocks EJ1 – Intumescent – Fire Rating of Steel Beams Protected with Intumescent Coating

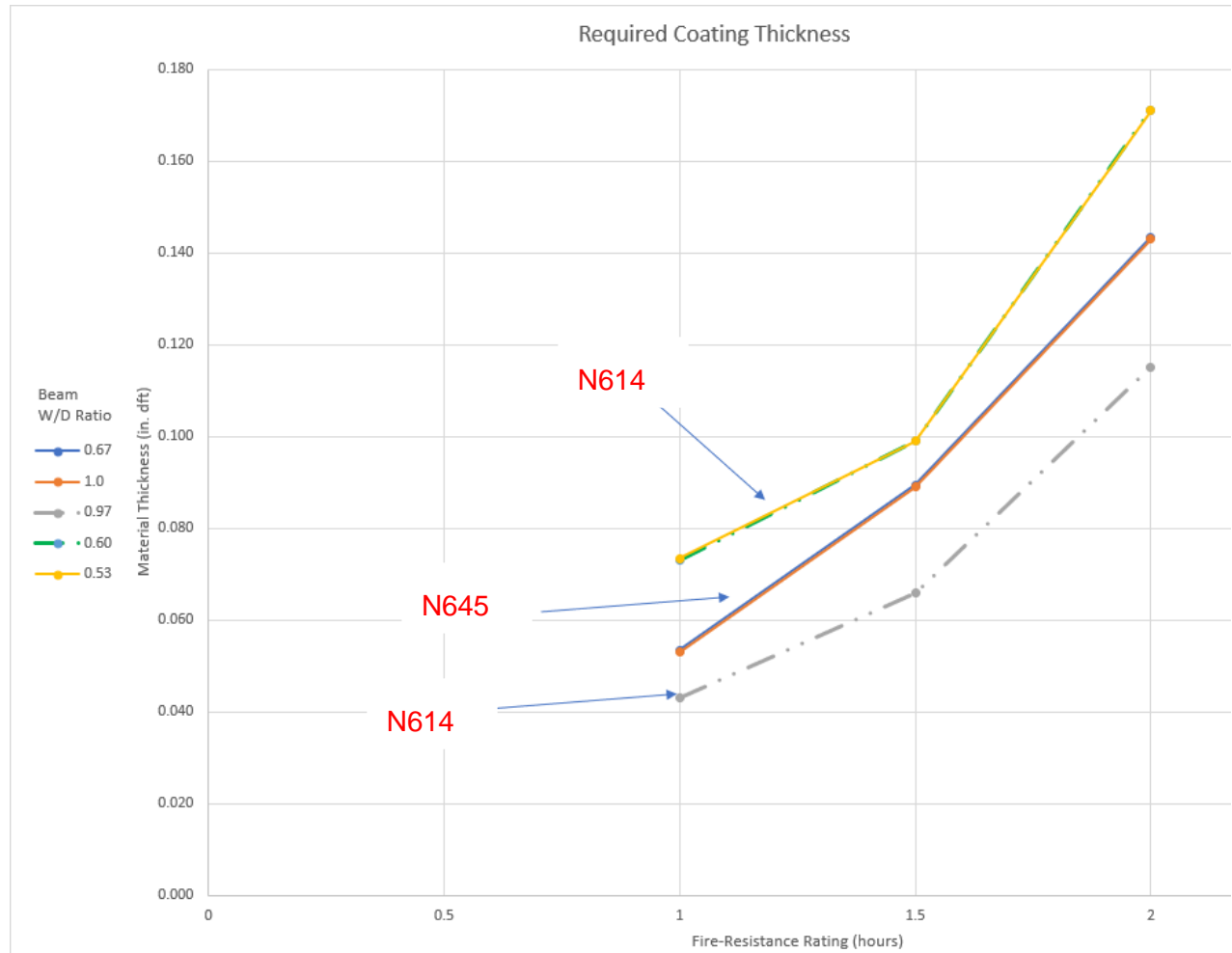


Figure 3b: Comparison Graph-UL N645 vs N614

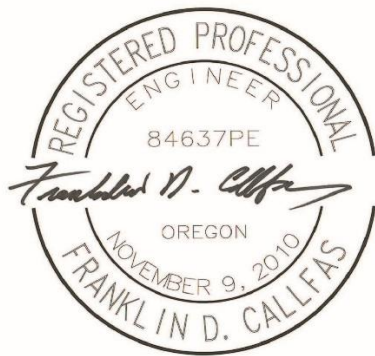
Table 1: Proposed Intumescent coating

1. W10x22 (0.606)	N614-1 Hr	73 Mils
2. W10x22 (0.606)	N614-2 Hr	99 Mils
3. W14x22 (0.534)	N614-1 Hr	73 Mils
4. W14x22 (0.534)	N614-2 Hr	99 Mils

6 CONCLUSION

The proposed roof framing beam assemblies have been compared to UL listed design UL N645 and N614. The proposed beam assemblies will comply with the required 1- and 2-hr fire resistance requirement if protected with the Intumescent thicknesses in Table 1 above. Based on the review of the tested data provided in the table and graph above, the N614 thickness can be utilized for these beams. The coating thickness shall continue over the wood blocking and onto the roof decking.

Therefore, the proposed design for the roof framing beam assembly, protected with Intumescent paint, will meet the 1- and 2-hr rating requirements prescribed by code as compared and detailed in this letter.



EXPIRES 12-31-19

Franklin Callfas

Principal/Fire Protection Engineer

Code Unlimited



Press Blocks EJ2 – SFRM

Engineering Judgment Report

Fire Rating of Steel Beams Protected with Sprayed Fire-Resistant Materials

Client Name: Lease Crutcher Lewis

Client Address: 550 SW 12th Avenue, Portland, OR 97205

Date: 12/5/2019

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1 PROJECT OVERVIEW

The Canvas at the Press Blocks is a new Type IA construction, nine-story, speculative office building with ground floor retail, seven levels of office space, and top floor office amenity space. It is located in Portland, Oregon. The building is protected by automatic fire sprinkler system and fire alarm system throughout. The structural roof system for the top floor consists of tongue and groove wood decking over steel wide flange beams protected with sprayed fire-resistant materials in areas not exposed to view. Code Unlimited has been asked to provide analysis for the fire rating for the steel beams at the wood deck to ensure it will provide both 1-hour and 2-hour fire protection as required per OSSC.

2 APPLICABLE CODES, STANDARDS, AND GUIDES

2019 Oregon Structural Specialty Code (OSSC).

2019 Oregon Fire Code (OFC)

3 DISCUSSION

3.1 Approach

- The proposed beam assembly has been analyzed in accordance with 2019 OSSC §703.3 Alternative Methods for Determining Fire Resistance.
- The beam assembly is compared side-by-side to a rated assembly tested by Underwriters Laboratories (UL), Design No. S721.

4 PROPOSED DESIGN

Steel beams frame the roof system and are protected by SFRM where they are concealed from view. One- and two-hour fire ratings are required for these beams depending on whether they are primary structural framing or secondary members supporting the roof. The following beams and corresponding rating requirements are proposed to frame the roof:

- | | |
|--------------|--------------|
| • W8X10 1HR | • W10X12 2HR |
| • W10X12 1HR | • W14X22 2HR |
| • W10X22 1HR | • W16X36 2HR |
| • W14X22 1HR | |

SFRM will be applied to the beams in accordance with UL S721 with the thickness required to achieve a 1- or 2-hour fire-rating as required by code. Figure 1 shows the details of the proposed SFRM application.

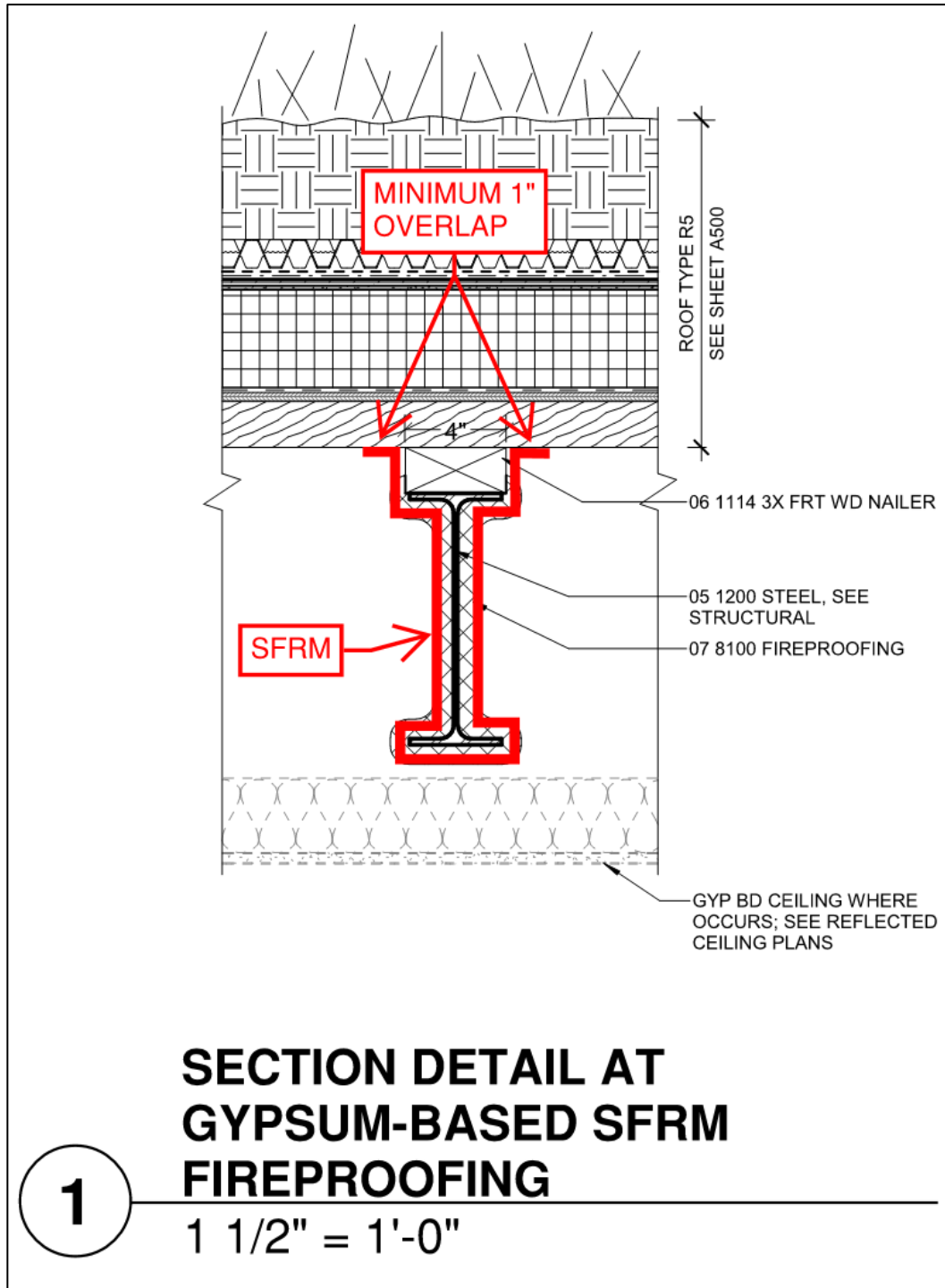


Figure 1: Proposed design (typ). SFRM fireproofing is shown with a minimum 1" overlap onto the roof assembly.

5 ASSEMBLY ANALYSIS

SFRM will be applied to the beams in accordance with UL S721 with the thickness required to achieve a 1- or 2-hour fire-rating. The proposed design is compared to UL S721 shown in Figure 2 and analyzed in Table 1 below.

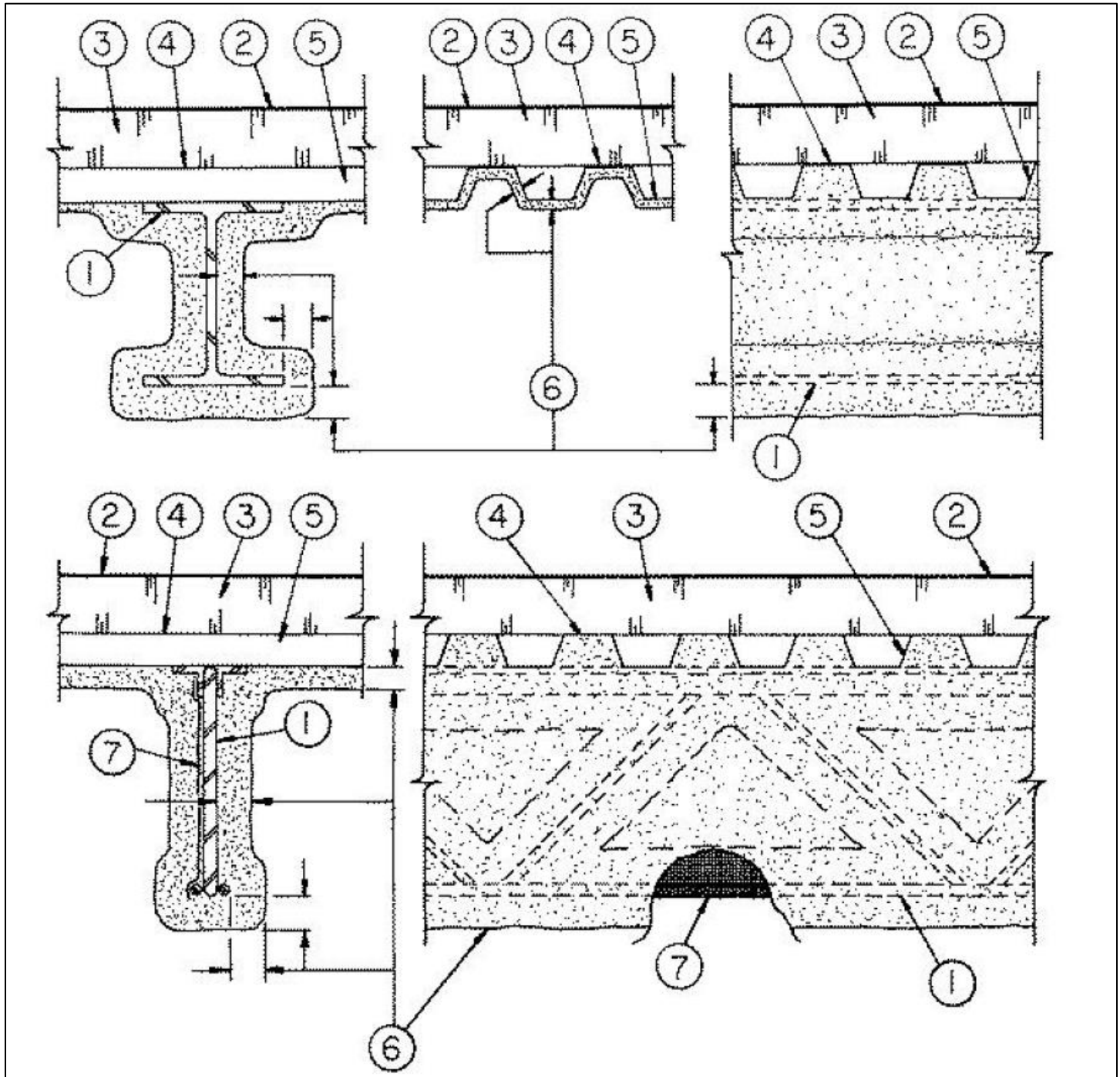


Figure 2: UL S721

Press Blocks EJ2 – SFRM – Fire Rating of Steel Beams Protected with Sprayed Fire-Resistant Materials

Table 1: UL S721 compared to the proposed assembly

Element	UL Assembly Design No. S721	Proposed Assembly
1. Steel Supports	W6x16 min size steel beam, 10K1, 12K3 or 14K1 min size steel joists. Note: When 10K1 or 12K1 joists are used, they will be limited to a max tensile stress of 26,000 psi.	1-hour steel beam minimum size is W8X10. 2-hour steel beam minimum size is W10X12 See Appendix 1 for Isolatek Unrestrained Beam Protected Roof Deck SFRM Thickness for UL S721.
2. Roof Covering	Consisting of hot mopped, cold application or single-ply materials, compatible with insulation(s) described herein which provide Class A, B or C coverings. See Roofing Materials and Systems Directory-Roof Covering Materials (TEVT).	3x dimensional tongue and groove wood car-decking over steel wide flange beams.
3. Roof Insulation	Consisting of building units, foamed plastic or mineral and fiber boards, applied in one or more layers. When multiple layers are used, end and side joints shall be offset a min of 12 in. in both directions in order to lap all joints. See category for names of companies providing Classified products — Building Units (BZXX), Foamed Plastic (CCVW) or Mineral and Fiber Boards (CERZ). Roof insulation shall be compatible with roof covering materials Class A, B or C system. See Roofing Materials and Systems Directory-Roof Covering Materials (TEVT).	Green roof system.
4. Adhesive (Optional)	May be applied to steel roof deck units or between insulation layers at a max application rate of 0.4 gal per 100 sq ft. See Adhesives (BYWR) category for names of manufacturers.	Green roof system.
5. Steel Roof Deck (Unclassified)	Fluted, No. 22 MSG min galv 1-1/2 in. deep with 3-1/2 in. wide flutes spaced 6 in. OC. Ends overlapped a min 1-1/2 in. and welded to supports, 12 in. OC max. Adjacent units button-punched, welded or fastened with No. 12 by 1/2 in. long self-drilling, self-tapping steel screws.	Wood decking. Vapor retarder. Modified bituminous membrane roofing.

Press Blocks EJ2 – SFRM – Fire Rating of Steel Beams Protected with Sprayed Fire-Resistant Materials

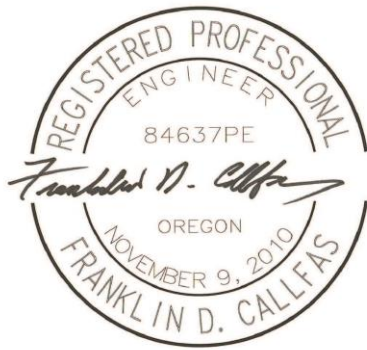
Element	UL Assembly Design No. S721	Proposed Assembly
6. Spray-Applied Fire Resistive Materials	Applied by mixing with water and spraying to the beam (or joist) and deck surfaces in one or more coats to the final min thicknesses shown below. Crest areas above the beam (or joist) shall be filled with the Spray-Applied Fire Resistive Materials. Surfaces must be clean and free of dirt, loose scale and oil. Min average and min individual density of 15 and 14 pcf, respectively, for Types 300, 300AC, 300ES, 300HS, 300N, 3000, 3000ES and SB. For Types 400AC and 400ES min average and min individual density of 22 and 19 pcf, respectively. For method of density determination see Design Information Section.	SFRM will be applied to the beams in accordance with UL S721 I with the thickness required to achieve a 1- or 2-hour fire-rating as required by code. See Appendix 1 for Isolatek Unrestrained Beam Protected Roof Deck SFRM Thickness for UL S721.
Fire-Resistance Rating	1, 1-1/2, 2, 3 or 4 Hr (See Item 6), restrained and unrestrained.	1 Hr or 2 Hr, restrained and unrestrained.

6 CONCLUSION

The proposed roof framing beam assemblies have been compared to UL listed design UL S721. The proposed beam assemblies will comply with the required 1- and 2-hr fire resistance requirement if protected with the prescribed SFRM thickness.

Therefore, it is my opinion that the proposed design for the roof framing beam assemblies, protected with SFRM, will meet the 1- and 2-hr rating requirements prescribed by code as compared and detailed in this letter with UL assembly S721.

Press Blocks EJ2 – SFRM – Fire Rating of Steel Beams Protected with Sprayed Fire-Resistant Materials



EXPIRES 12-31-19

Franklin Callfas

Principal/Fire Protection Engineer

Code Unlimited