



BRIAN TAYLOR
STATE FIRE MARSHAL

August 5, 2025

Mr. Ted Richard Brown, AIA
Ted Richard Brown, PLLC
2520 Sardis Road North Suite 215
Charlotte, NC 28227

RE: Fire Protection of Steel Column within 3-Hour Firewall (UL V438) and Compliance with 2018 North Carolina Building Code (NCBC) Table 721.1(1), Item #1-7.3

Dear Mr. Brown:

This letter responds to your request for a formal interpretation from the Office of State Fire Marshal (OSFM) dated March 10, 2025 and received by OSFM the same day. Your request seeks clarification on two questions, as follows:

1. Does a 3-hour firewall designed per UL V438 meet the prescriptive requirements of 2018 NCBC Table 721.1(1), Item #1-7.3?
2. Does a concealed steel column within this firewall (UL V438) require additional or alternative fire protection under the 2018 NCBC?

Remarks:

Code sections cited in this letter refer to the 2018 edition of the North Carolina Building Code (NCBC) unless otherwise noted.

Attachment A, a copy of your request for formal interpretation dated March 10, 2025, is attached to this letter for reference.

Attachment B, supporting documents, includes your letter dated March 10, 2025, providing additional explanation; a firewall plan submitted by you, detailing the UL V438 assembly; and a web interpretation from the OSFM dated September 1, 2011, providing historical context. Attachment B is attached for reference.

Code Analysis:

2018 NCBC Section 704.2 – Column protection states:

704.2 Column protection. Where columns are required to have protection to achieve a *fire-resistance rating*, the entire column shall be provided individual encasement protection by protecting it on all sides for the full column height, including connections to other structural members, with materials having the required *fire-resistance rating*. Where the column extends



through a ceiling, the encasement protection shall be continuous from the top of the foundation or floor/ceiling assembly below through the ceiling space to the top of the column.

Comment: This section requires individual encasement (e.g., gypsum board, concrete, or spray-applied fire-resistive materials [SFRM]) to achieve the specified fire-resistance rating for primary structural columns, ensuring protection is applied on all sides for the full column height, including connections to other structural members.

2018 NCBC Section 704.4.1 – Light-frame construction states:

704.4.1 Light-frame construction. Studs and boundary elements that are integral elements in load-bearing walls of light-frame construction shall be permitted to have required fire-resistance ratings provided by the membrane protection provided for the load-bearing wall.

Comment: This section provides an exception limited to light-frame construction (e.g., wood or light-gauge steel framing). For structural steel columns in other construction types, individual encasement is required unless an alternative method is approved.

2018 NCBC Table 721.1(1) – Prescriptive fire resistance states:

Table 721.1(1) – Item #1-7.3: Table 721.1(1), Item #1-7.3, prescribes a 3-hour fire-resistance rating for a structural steel column protected by three layers of 5/8-inch Type X gypsum wallboard, each layer screw-attached to 1-5/8-inch steel studs (0.018-inch thick, No. 25 carbon sheet steel gauge) at each corner of the column. The middle layer is also secured with 0.049-inch (No. 18 B.W. gauge) double-strand steel wire ties, 24 inches on center. Screws are No. 6 by 1 inch spaced 24 inches on center for the inner layer, No. 6 by 1-5/8 inches spaced 12 inches on center for the middle layer, and No. 8 by 2-1/4 inches spaced 12 inches on center for the outer layer.

Comment: This prescriptive design is specifically for column encasement and is not equivalent to a proprietary tested wall assembly like UL V438, which is optimized for wall performance with variable configurations (e.g., stud size, number of drywall layers, and insulation) that achieve 1- to 4-hour fire ratings.

Conclusions:

1. The 3-hour firewall designed per UL V438 does not meet the prescriptive requirements of NCBC Table 721.1(1), Item #1-7.3, which specifies a steel column encased with three layers of 5/8-inch Type X gypsum wallboard, attached to 1-5/8-inch steel studs (No. 25 gauge) with specific screw sizes and spacing, and secured with wire ties for the middle layer. UL V438, as a proprietary tested wall assembly, uses a different configuration (e.g., variable stud sizes, number of drywall layers, and insulation) optimized for wall performance and is not listed in Table 721.1(1). Modifications to UL V438's framing, drywall, or connections are not permitted unless supported by an engineering judgment approved by code enforcement officials. The determination of fire resistance for UL V438, as a proprietary design, requires strict adherence to the tested assembly's specifications (e.g., stud size, number of drywall layers, insulation, and connections) as detailed in its UL listing. UL V438 complies with NCBC Section 703.3 as a tested assembly, providing a 3-hour fire-resistance rating for the wall when configured accordingly.



2. A concealed steel column within a UL V438 3-hour firewall requires individual fire protection (e.g., per Item #1-7.3 or other approved methods) on all sides for the full column height, including connections to other structural members, unless the building uses light-frame construction and the column is located entirely between the top and bottom plates of the wall assembly, as per NCBC Section 704.4.1, allowing the assembly's membrane protection, strictly adhering to UL V438's proprietary design (e.g., specified stud size, drywall layers, insulation, and connections), to provide the required 3-hour fire-resistance rating. In all other construction types, individual encasement on all sides for the full column height is required because UL V438 is a proprietary design for wall protection, not column protection.

Please contact our office if you have further questions or comments.

Sincerely,

Pak Keung Yip, PE
Chief Code Consultant
North Carolina Office of State Fire Marshal

cc: File
Nathan Childs, NCDOJ, counsel for NC Building Code Council, nchilds@ncdoj.gov
David Rittlinger, NCOSFM, Division Chief - Code and Interpretations, david.rittlinger@ncdoi.gov



APPENDIX E
APPEALS
NORTH CAROLINA

BUILDING CODE COUNCIL

1429 Rock Quarry Road, Suite 105

Raleigh, North Carolina 27610

(919) 647-0008

david.rittlinger@ncdoi.gov

ATTACHMENT A

GS 153A-374, GS 160A-434 ☒ Formal Interpretation by NCDOI ☐ Appeal of Local Decision to NCDOI
Hearing Date ____/____/____
GS 143-140, GS 143-141
☐ Appeal of Local Decision to NCBCC
☐ Appeal of NCDOI Decision to NCBCC

APPELLANT TED RICHARD BROWN PHONE (704) 330-1111 x ____
REPRESENTING TED RICHARD BROWN, PLLC ARCHITECT
ADDRESS 2520 SARDIS ROAD NORTH SUITE 215
CITY CHARLOTTE STATE NC ZIP 28227
E-MAIL TEDBROWN@TRBARCHITECT.COM FAX (____) ____-____

North Carolina State Building Code, Volume 2018 - Section 721.1 (1), ITEM # 1-7.3

REQUEST ONE: ☒ Formal Interpretation by NCDOI ☐ Appeal of Local Decision to NCBCC
☐ Appeal of Local Decision to NCDOI ☐ Appeal of NCDOI Decision to NCBCC

Type or print. Include all background information as required by the referenced General Statutes and the attached policies. Attach additional supporting information.

ATTACHED IN PDF ARE FOUR DOCUMENTS:
1- LETTER FROM ARCHITECT DATED MARCH 10, 2025
2- FLOOR PLAN DATED MARCH 10, 2025
3- RATED SHAFT ENCLOSURE DATED SEPTEMBER 1, 2011
4- FORMAL INTERPRETATION FORM DATED MARCH 10, 2025

REASON:

OUR QUESTION FOR INTERPRETATION IS THE 3 HOUR FIREWALL WITH UL V430 MEETS PRESCRIPTIVE TABLE 721.1 (1) ITEM # 1-7.3. DOES THE CONCEALED STEEL FRAME REQUIRE ADDITIONAL AND/OR ALTERNATIVE PROTECTION?

Signature Ted Richard Brown
ARCHITECT

APPEAL TO NCDOI/NCBCC
DATE: 3/10/2025 FORM 3/14/17

Ted Richard Brown, PLLC

ATTACHMENT B

Architectural Services

2520 Sardis Road North, Suite 215, Charlotte, North Carolina 282

Telephone: 704-330-1111 / Fax: 704-330-112

March 10, 2025

Office of State Fire Marshall
1429 Rock Quarry Road Suite 105
Raleigh, N.C. 27610

Attention: David Rittlinger, PE

David,

I hope you are doing fine. I am the Architect for a new one story storage occupancy building. It is type 2-B construction and is not sprinkled. The total square footage is 25,948 and is a PEMB. The design is based on the 2018 NC Building Code.

On the interior is one 3 hour fire barrier and two one hour rated each tenant walls.

This floor plan has a three hour fire wall equal to UL V438 with (3) layers of 5/8" type x gypsum board each side of 8" metal studs at 24" oc up tight to the metal roof panels and tight to the metal exterior wall panels with a free standing conventional steel frame centered in the wall. This wall is not load bearing and designed by our structural engineer to allow collapse of the structure on either side without collapse of the wall under fire conditions. Refer to the attached floor plan in PDF for reference.

Our question for your interpretation is does the three layers of 5/8" gypsum board specified in V438 and totaling 1-7/8" total thickness protect the concealed structural steel frame inside the wall in accordance with the prescriptive requirements in Table 721.1 (1), Item #1-7.3 or does the steel frame require additional and/or alternative protective measures?

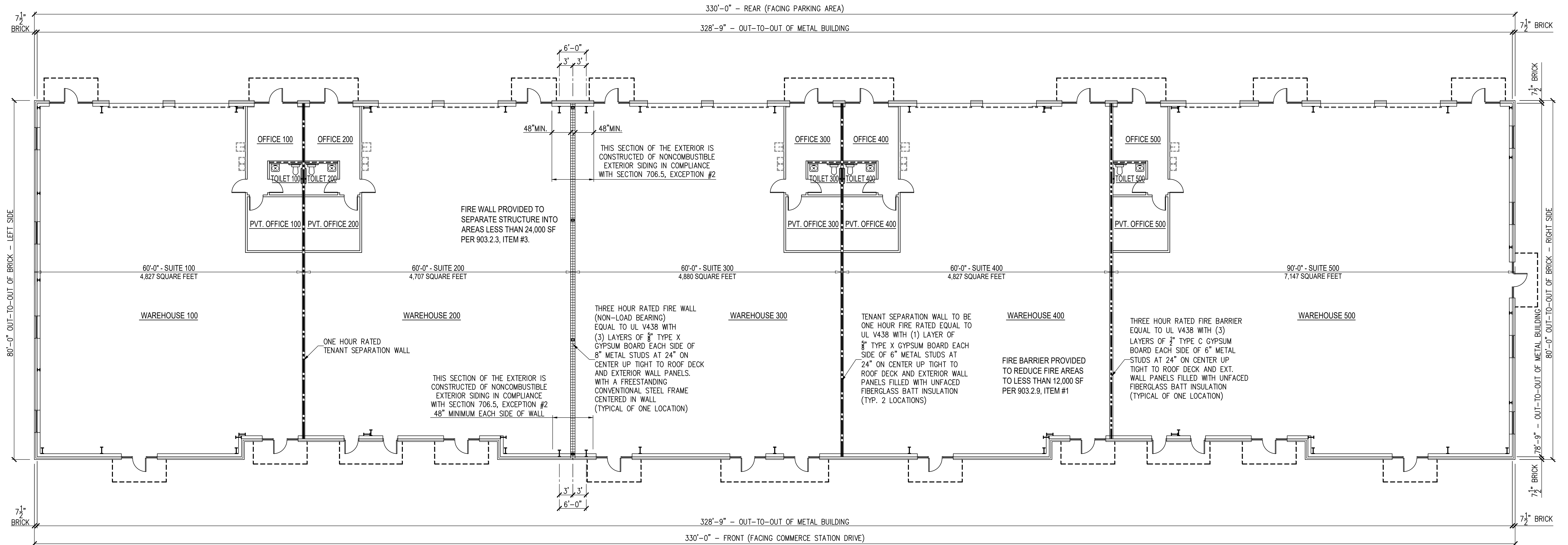
I looked in my past DOI files for this answer and only found the attached PDF from September 1, 2011 concerning rated shaft enclosure structural continuity and it did not appear to mention a rated firewall.

Therefore, I am requesting a formal interpretation response letter from you on whether the concealed steel frame inside the 3 hour firewall required additional protection.

Sincerely,



Ted Richard Brown
Architect



FLOOR PLAN

TOTAL BUILDING AREA - 25,948 SQUARE FEET

MARCH 10, 2025

**NC Department of Insurance
Office of the State Fire Marshal - Engineering Division
1202 Mail Service Center, Raleigh, NC 27699-1202
919-661-5880**

Rated Shaft Enclosure Structural Continuity

Code: 2012 Building Code
Section: 708.5, 712.4

Date: September 1, 2011

All of these questions are related to unprotected (0-hour rated) type structures.

Question #1:

If a structural beam runs parallel to and inside of a rated shaft wall and supports the wall is the beam required to be rated to the column that supports the beam, and is the column and/or other structure supporting the beam required to be rated?

Answer #1:

Yes. The beam is required to be rated all the way to the column that supports it and the column and/or other structure that supports the beam must be rated all the way to the foundation.

Question #2:

If a structural beam runs parallel to a rated shaft wall and supports the floor slab that in turn supports a rated shaft wall is the beam required to be rated to the column that supports the beam, and is the column required to be rated?

Answer #2:

Yes. The beam or girder that immediately supports the slab is required to be rated. The girders and columns that provide the direct load path to the ground are also required to be rated. The concrete slab floor that extends into the rated shaft enclosure and supports the shaft wall provides sufficient rating to consider the shaft rating continuous.

Question #3:

If a rated shaft wall is stabilized by tying it to a floor slab or structural beam is the beam (including the beam that supports the floor slab) required to be rated to the column that supports the beam, and is the column required to be rated?

Answer #3:

No. The beam is not required to be rated. The structure supporting the beam does not, of course, require rating either.

Keywords:

Elevator, stair, stairway, vertical, egress, exit