WESTERN FIRE CENTER, INC.
2204 Parrott Way, Kelso, Washington 98626
Phone: 360-423-1400 | Fax: 360-423-5003

December 29, 2015

Moffette Tharpe
Easi-Set Worldwide
5119 Catlett Rd
Midland, VA 22728

Subject: Assembly calculation letter dated May 3, 2002

Moffette,

WFCi's letter dated May 3, 2002 to Chip Huffman by Jim White regarding the fire resistance rating of the Slenderwall system is still valid provided that the built/installed assembly is identical to the one detailed in the letter. If you have any questions, please let me know.

Sincerely,

Brent M. Pickett, Ph.D.

WFCi **Western Fire Center, Inc.**
2204 Parrott Way • Kelso, Washington 98626
Telephone: (360) 423-1400 • Fax: (360) 423-5003 • Toll Free 1-800-423-1474

May 03, 2002

Chip Huffman
Smith-Midland Corporation
5119 Catlett Road
Midland, VA 22728

Subject: Fire Resistance Rating of SLENDERWALL®

Dear Mr. Huffman:

You sent me a package of information about your SLENDERWALL exterior wall system for review and asked me to evaluate its fire resistance. This wall system is shown in the attached Figures 1 and 2 excerpted from the literature you sent.

The wall fire resistance rating is determined by the American Society of Testing and Materials (ASTM) Standard E119, Fire Tests of Building Construction and Materials. This large-scale test method, also closely described by UBC 7-1, UL 263, and NFPA 251, uses a vertical exposure furnace to subject specimens to a standard time-temperature curve as specified in ASTM E119.

I am a principal of the Western Fire Center, Inc. of Kelso, WA and we presently operate an ICBO approved and accredited UBC 7-1 full scale facility. I have conducted and witnessed many of these tests

In lieu of conducting a large scale test on some assemblies, an engineering evaluation procedure called the component additive method (CAM) is frequently used on assemblies utilizing materials or systems for which there already exists E119 data. The CAM will be applied to the SLENDERWALL system.

The following sections are excerpted from the 1997 Uniform Building Code (UBC), which is presently in effect. Other model building codes (BOCA, SBCCI and the new International Building Code) have similar sections. This gives guidance we need for our determination. Section 7-1 says that the assembly needs to be qualified by test UBC 7-1. Section 703.3 indicates that tables and calculation methods for the fire resistance of some assemblies and components of assemblies are shown in Section 7 - 7.

"SECTION 703 - FIRE-RESISTIVE MATERIALS AND SYSTEMS

703.1 General. *Materials and systems used for fire-resistive purposes shall be limited to those specified in this chapter, unless accepted under the procedure given in Section 703.2 or 703.3.*

The materials and details of construction for the fire-resistive systems described in this chapter shall be in accordance with all other provisions of this code except as modified herein.

For the purpose of determining the degree of fire resistance afforded, the materials of construction listed in this chapter shall be assumed to have the fire-resistance rating indicated in Table 7-A, 7-B or 7-C.

As an alternate to Table 7-A, 7-B or 7-C, fire-resistive construction may be approved by the building official on the basis of evidence submitted showing that the construction meets the required fire-resistive classification.

703.2 Qualification by Testing. *Material or assembly of materials of construction tested in accordance with the requirements set forth in UBC Standard 7-1 shall be rated for fire resistance in accordance with the results and conditions of such tests.*

EXCEPTION: *The acceptance criteria of UBC Standard 7-1 for exterior-bearing walls shall not be required to be greater with respect to heat transmission and passage of flame or hot gases than would be required of a nonbearing wall in the same building with the same distance to the property line. The fire exposure time period, water pressure and duration of application for the hose stream test shall be based on the fire-resistive rating determined by this exception.*

Fire-resistive assemblies tested under UBC Standard 7-1 shall not be considered to be restrained unless evidence satisfactory to the building official is furnished by the person responsible for the structural design showing that the construction qualifies for a restrained classification in accordance with UBC Standard 7-1. Restrained construction shall be identified on the plans.

TABLE 7-7-C-A—MINIMUM EQUIVALENT THICKNESS, INCHES, OF CAST-IN-PLACE OR PRECAST CONCRETE WALLS, LOAD BEARING OR NONLOAD BEARING

CONCRETE TYPE	MINIMUM WALL THICKNESS (INCHES) FOR FIRE-RESISTANCE RATING OF				
	×25.4 for mm				
	1 Hr.	1½ Hr.	2 Hr.	3 Hr.	4 Hr.
Siliceous[1]	3.5	4.3	5.0	6.2	7.0
Carbonate	3.2	4.0	4.6	5.7	6.6
Sand-lightweight	2.7	3.3	3.8	4.6	5.4
Lightweight concrete	2.5	3.1	3.6	4.4	5.1

[1]The equivalent thickness may include the thickness of portland cement plaster or 1.5 times the thickness of gypsum plaster applied in accordance with the requirements of Chapter 25.

From the table above, we see that, depending on the concrete used, between 2.5 and 3.5" of concrete is necessary to provide a 1-hour wall. Taking the worse case scenario of 3.5", then a minimum of 1.75" of concrete would be necessary to provide one half the endurance time. In the same section of the UBC, a wall consisting of 5/8" type X gypsum wallboard applied to both side of wood or steel studs is assigned a one hour rating. A single layer of 5/8" Type X is given a rating 20 minutes. The "air cavity" is assigned 20 minutes so that by the CAM two sheets of 5/8" Type X gypsum equals 40 minutes and the 3.5" air spacing between the gypsum furnishes the remaining 20 minutes to get the assembly up to 1 hour.

In the SLENDERWALL system the CAM procedure would yield:

Item	**Fire Resistance Time (minutes)**
2" concrete	34
Air cavity (minimum 3.5 ")	20
5/8" Type X gypsum	20
Total Fire Resistance	**74 minutes**

The above analysis indicates that a SLENDERWALL assembly with 5/8" Type X Gypsum wallboard or equivalent containing no insulation in the cavity would easily meet a one-hour fire resistance requirement.

The 1/2-inch air space between the concrete and the metal frame should be fire stopped with mineral wool or the equivalent to prevent fire gases from traveling vertically. If no insulation is used in the cavity space, then a suitable fire barrier must be provided between floor levels. This is done by affixing mineral wool insulation (or its equivalent) in the gap between the horizontal joints.

Sincerely,

James A. White
Sr. Fire Scientist
Western Fire Center, Inc.

ICBO Evaluation Service, Inc.

Certificate of Accreditation

This is to signify that

WESTERN FIRE CENTER, INC.
2204 PARROTT WAY
KELSO, WASHINGTON 98626

Testing Laboratory 180

has demonstrated compliance with the ICBO Evaluation Service, Inc., Acceptance Criteria for Laboratory Accreditation (encompassing the requirements of ISO/IEC Guide 25 and relevant requirements of the ISO 9000 series of standards), and has been accredited, commencing December 1, 2001, for the test methods listed below:

Fire testing under 1997 UBC Standards 7-1, 7-2, 7-3, 7-4, 7-5, 15-2, 26-2, 26-3; ASTM Standards E 119, E 152, and E 814; UL Standard 263; and NFPA Standard 251.

Amended rain testing under Section 3.2 of the ICBO ES Acceptance Criteria for Fire-retardant-treated Wood Roof Systems (AC107).

Patrick V. McCullen
Manager, Field Services Group

C. P. Ramani, P.E.
Vice-President

This accreditation certificate supersedes any ICBO ES accreditation certificate bearing an earlier date. The certificate becomes invalid upon suspension, cancellation, revocation, or expiration of accreditation. See the ICBO ES *Index of Evaluation Reports* (printed version, or on the web at www.icboes.org) for current accreditation information, or contact ICBO ES directly at (562) 699-0543. 12/20/2001