

Development Services

From Concept to Construction

Phone: 503-823-7300 Email: bds@portlandoregon.gov 1900 SW 4th Ave, Portland, OR 97201

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APPEAL SUMMARY

Status: Decision Rendered - Held over from ID 20374 (5/8/19) for additional information

Appeal ID: 20425	Project Address: 570 NE Tomahawk Island Dr
Hearing Date: 5/22/19	Appellant Name: Jack Lyon
Case No.: B-011	Appellant Phone: 503-805-1818
Appeal Type: Building	Plans Examiner/Inspector: Brian McCall, John Cooley
Project Type: commercial	Stories: 1 Occupancy: S-1, F, B Construction Type: V-B and II-B
Building/Business Name: Sundance Marina	Fire Sprinklers: Yes - Fully
Appeal Involves: Erection of a new structure, Reconsideration of appeal	LUR or Permit Application No.: 17-199693-CO
Plan Submitted Option: pdf [File 1] [File 2]	Proposed use: Boat Storage

APPEAL INFORMATION SHEET

Appeal item 1

Code Section	Table 602
Requires	Existing building to remain (Type V-B; steel building with wood framed partial second floor) and New building (Type II-B; Steel building) will each be 6" from assumed property line. Both walls along the assumed property line are required to be 2hr rated.
Proposed Design	<p>The proposed mineral fiberboard fireproofing provides the required rating. See Fire Engineer's evaluation report attached.</p> <p>RECONSIDERATION TEXT</p> <p>Following discussion with Corey Stanley we add the following clarifications:</p> <p>The two buildings are separated by a 12" air space</p> <p>The separate 2hr rated exterior walls are connected only by flashing at the top of the shorter wall.</p> <p>Neither of the two 2hr rated walls are load bearing</p> <p>Both buildings will now be sprinkled per NFPA 13</p>
Reason for alternative	<p>The new building is a re-construction of an existing building on the original foundation. Erecting the new building 12" from the existing building leaves too little space for conventional drywall assemblies to be constructed.</p> <p>The mineral fiberboard fireproofing provides equivalent fire protection and is covered from exposure to weather by sheet metal siding above the shorter building.</p>

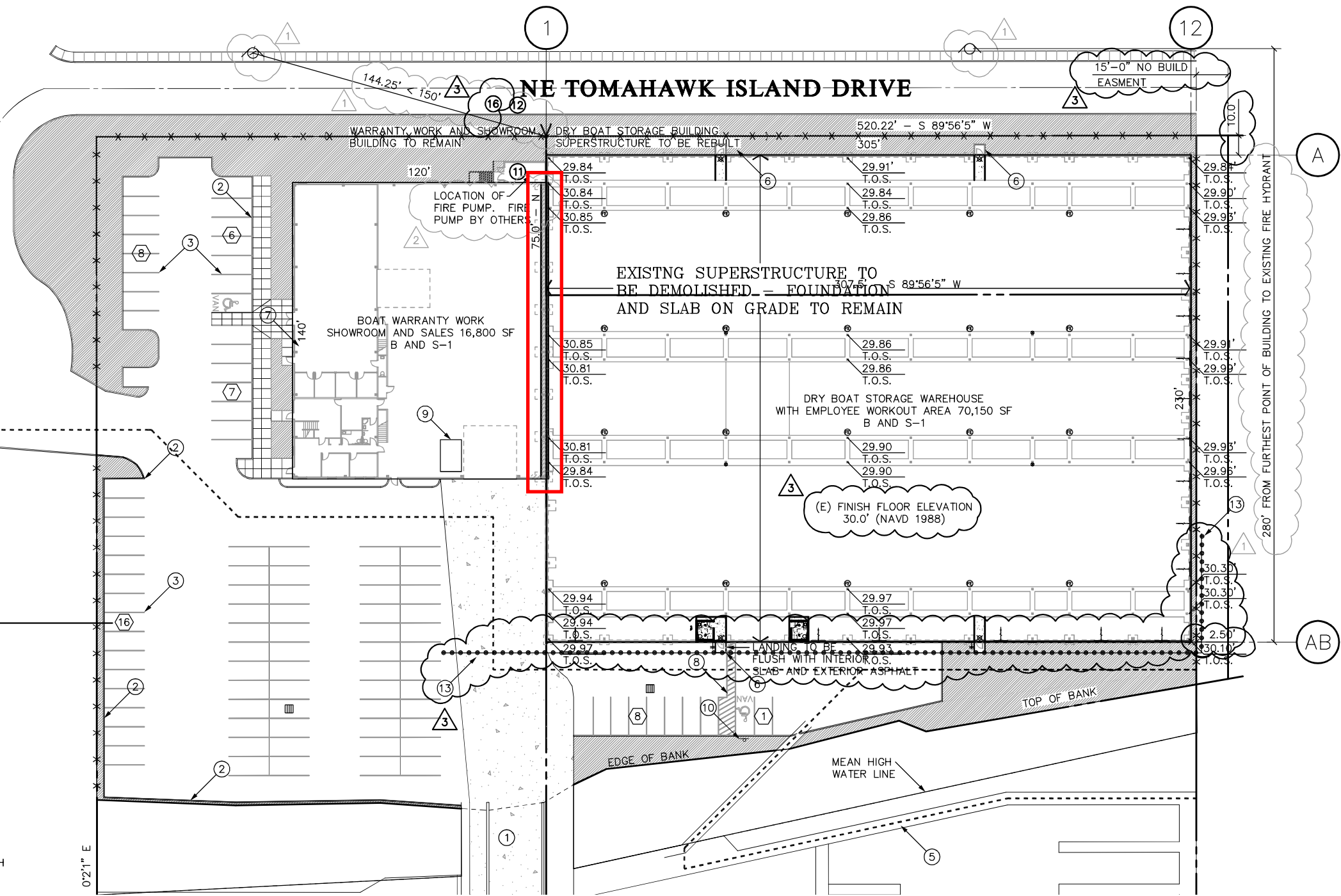
APPEAL DECISION

Alternate 2 hour exterior wall assembly with engineering analysis: Granted provided the Albi Driclad mineral fiberboard installation detail is provided on the City approved plans.

Appellant may contact John Butler (503 823-7339) with questions.

The Administrative Appeal Board finds with the conditions noted, 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 180 calendar days of the date this decision is published. For information on the appeals process and costs, including forms, appeal fee, payment methods and fee waivers, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development Services Center.





**Experienced.
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Sundance Marina

Engineering Judgement Report 2-Hour Exterior Wall

Client Name: Studio 410

Client Address: 11575 SW Pacific Hwy Suite 111, Tigard, OR 97223

Date: 5/5/2019

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1 PROJECT OVERVIEW

The Sundance Marina is an existing building being modified in Portland, Oregon. The existing building is of Type IV-B construction with occupancy groups B and F-1. A new metal building is being constructed adjacent to the existing building.

Code Unlimited has been asked to provide analysis for the fire rating of the exterior wall of the existing building to ensure 2-hour fire-resistance can be provided.

2 APPLICABLE CODES, STANDARDS, AND GUIDES

- 2014 Oregon Structural Specialty Code, including the recently adopted Appendix N.
- 2009 NFPA 221 Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls.

3 DISCUSSION

3.1 Approach

- The proposed exterior wall assembly has been analyzed in accordance with 2014 OSSC §703.3 **Alternative Methods for Determining Fire Resistance**.
- The exterior fire wall of the existing building will be modified to ensure 2-hour fire resistance is provided.
- Albi DriClad mineral fiber boards will be used to provide a 2-hour minimum fire rating on the wall through equivalency to a ASTM E119 tested wall assembly.

4 PROPOSED DESIGN

The existing building is of Type V-B construction. The modified exterior fire wall is non-load bearing with 1-5/8" Albi DriClad mineral fiberboards connected to the existing metal siding (Figure 1). The wall assembly has a 6" distance from an assumed property line. Horizontal and vertical metal flashing will protect the DriClad material from the elements.

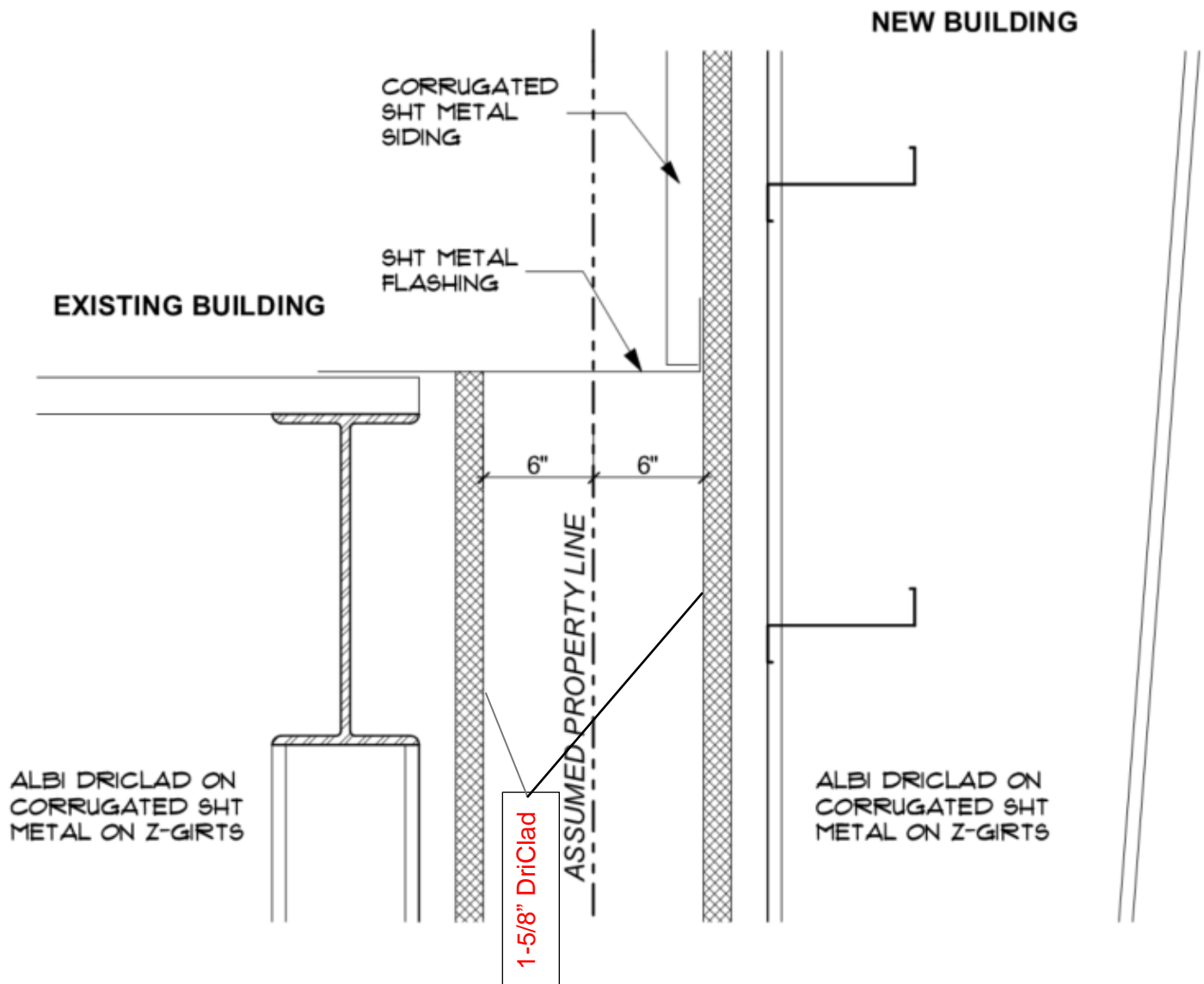


Figure 1: Proposed exterior wall assembly.

5 ASSEMBLY ANALYSIS

A 2-hour fire wall is required for the existing building near the assumed property line. The addition of DriClad mineral wool will provide the additional protection to ensure this rating can be provided.

The Albi Driclad mineral fiberboard is a UL listed material, it is a semi rigid board manufactured from molten volcanic rock spun into fine threads and impregnated with bonding resin. It is compressed to form a durable noncombustible material with superior fire-resistance. The mineral fiberboard properties are shown in Figure 2.

PROPERTY	TEST METHOD	VALUE
Dry Applied Density	—	10.5 PCF (average)
Tensile Strength	ASTM C 209	155 PSF
Compressive Strength @ 10%	ASTM C165	936 PSF
Moisture Absorption	ASTM C209	less than 0.50 % (by volume)
Moisture Adsorption	ASTM C553	less than 0.30 % (by volume)
Deflection	ASTM E 759	No Delamination
Corrosion & Fungi Resistance	ASTM C665	Non Corrosive/ No Fungi Growth
Leachable Chlorides	ASTM C871	No Leachable Chlorides
Thermal Conductivity (R Value)	ASTM C158	4.2 per inch
Sound Adsorption	ASTM C423	NRC 0.80
Fire hazard Classification	ASTM E 136	Non Combustible
Flame Spread	ASTM E84	Class A
Smoke Developed	ASTM E84	Class A

Figure 2: Albi DriClad mineral fiberboard properties.

2" thickness of Albi DriClad mineral fiberboard undergoes a linear increase in temperature under the temperature exposure of the ASTM E119 test (Figure 3). Per the linearity of temperature curve—which is due to the noncombustible composition and high heat resistant properties of the specimen—the thermal-resistance of the proposed thickness can be determined. The proposed 1-5/8" thickness of the mineral fiberboard is roughly 80% of the tested 2" thick specimen, which provides a 20% decrease in (Differential Temperature) fire-resistance due to the linear thermal resistance property of the material. It is concluded, the proposed thickness of the mineral fiberboard will provide at least 3-hours of fire-resistance.

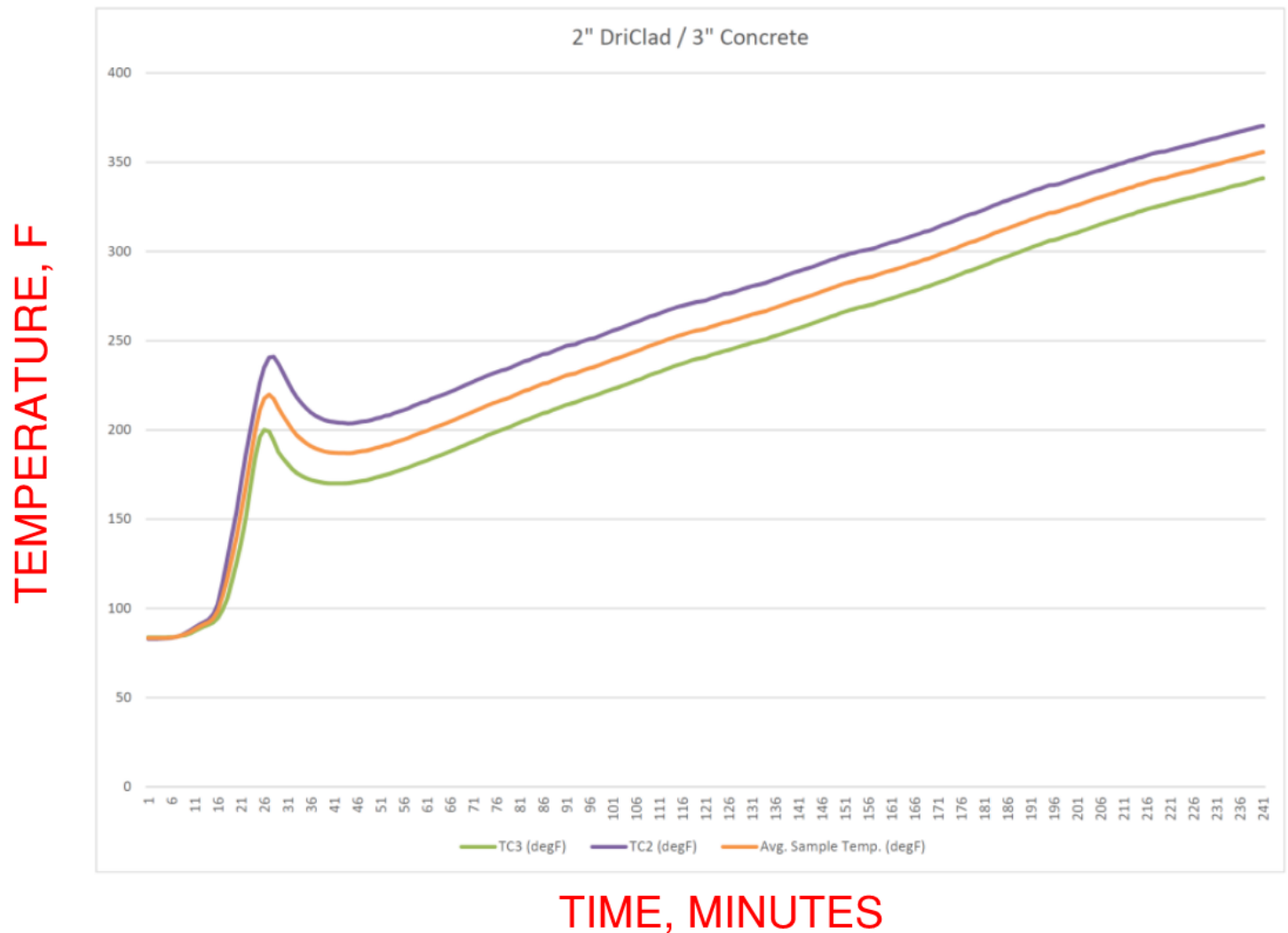


Figure 3: Time-Temperature curve of the ASTM E119 test, provided by the manufacturer.

6 SUMMARY

The manufacturer has published test data from the heating of the mineral fiberboard over a concrete block to determine material fire-resistance. Two (2) layers of 1" thick Albi DriClad mineral fiberboards were used to cover a 3" concrete block on the fire exposed side. The time-temperature profile per ASTM E119 was used for the test procedure. Two thermocouples were placed at the interface between the mineral fiberboards and the concrete. Per ASTM E119, failure of the wall specimen is reached when temperatures rise 250 °F (as measured on the unexposed face). The test results show that the mineral fiberboard was able to withstand the fire for a duration of 241 minutes (~4 hours) as shown in Figure 3 before the temperature rose by 250 degrees (ASTM E119 wall test requirement). The mineral fiberboard's noncombustible composition provides high resistance to heat and has superior thermal insulation properties. The material's innate resistance and stability under heat supports its common use in UL assemblies with higher fire duration ratings. It is assumed for this assembly; the metal siding will not provide any additional thermal resistance due to steel's high thermal conductivity.

2-Hour Exterior Wall Engineering Judgement Report

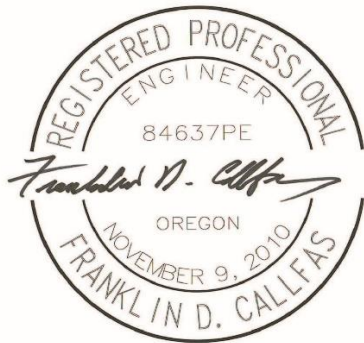
While a 2" thick mineral fiberboard provides 4 hours of fire-resistance, the proposed 1-5/8" thickness of Albi Driclad mineral fiberboard would provide at least 195 minutes (3.25 hours) of fire-resistance as estimated with linear interpolation of heat transfer through the board (Figure 3).

Since the ASTM E119 wall test also includes a hose stream test, the proposed assembly was evaluated under a post fire scenario. The metal siding will be covered in DriClad, thus protecting the steel for the full duration of 120 minutes. The mineral board does not break down under a fire conditions as gypsum materials do and will remain in place to provide an additional layer of protection during the test thereby ensuring a successful hose stream test.

7 CONCLUSION

The modified exterior wall assembly separating the existing building from the property line can be viewed as a non-loaded fire-wall assembly. As documented above, the assembly meets the minimum requirements as provided in ASTM E119, NFPA 221 and the OSSC for a non-load bearing, 2-hr equivalent wall assembly.

Although a standard ASTM E119 test has not been provided for this wall assembly, there is no reason to believe that the wall would not exceed a minimum of 2-hour fire resistance as proposed.



EXPIRES 12-31-19

Franklin Callfas
Principal/Fire Protection Engineer
Code Unlimited