



Western Fire Center, Inc.

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**Testing in Accordance with SFM
Standard 12-7A-1:
*Fire Resistive Standard for
Exterior Wall Siding and Sheathing***

LP[®] FlameBlock[™] Fire-Rated OSB Sheathing (7/16" Minimum Nominal Thickness) with Various Claddings:

- SmartSide[™] Lap and Panel Siding (Precision Series - strand substrate)
- 1/2" Cedar Shingles

**PN# 10023
Report No. 10023.1**

Rendered to:

LP CORPORATION

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TABLE OF CONTENTS

INTRODUCTION.....	3
SUMMARY OF THE TEST METHOD	4
SAMPLE DESCRIPTION.....	5
TEST RESULTS	7
CONCLUSION AND EXTENTION OF RESULTS.....	8
SIGNATURES	9
REVISION SUMMARY	10
APPENDIX A: SAMPLING REPORT	11
APPENDIX B: TEST PICTURES (from representative tests)	13

INTRODUCTION

This report documents the CSFM 12-7A-1 testing of representative exterior wall assemblies constructed with LP® FlameBlock™ fire-rated OSB sheathing and two types of wall claddings: ½” cedar sidewall shingles and LP Precision Series Lap siding. The testing of the LP FlameBlock with Precision Series lap siding was originally reported under WFCi Report No. 10023, dated April xx, 2010.

The purpose of this testing was to evaluate the SFM 12-7A-1 fire test performance characteristics of representative wall assemblies constructed with the client’s LP FlameBlock fire-rated OSB sheathing as a base component in order to demonstrate conformity with Paragraph 704A.3.1 the California Building Code, Chapter 7A, Section 704A requirements.

Two test series were performed:

1. **Test Series No. 1** was originally reported under WFCi Report No. 10023, and covered the testing of a wall assembly incorporating LP FlameBlock fire-rated OSB sheathing and LP Precision Series Lap Siding (strand based). The lap siding selected for this testing was considered to define a ‘worst-case’ condition for wall assemblies clad with Precision Series strand-based siding. The testing was also deemed to represent the expected fire test performance of LP Precision Series panel siding installed over FlameBlock.
2. **Test Series No. 2** covers what is deemed to be an example of a ‘severe-case’ wall assembly condition employing the use of cedar sidewall shingles having a ½” butt thickness as exterior cladding over the LP FlameBlock OSB sheathing product. The ½” butt thickness (referred to as 4/2 by the cedar shingle industry) was selected as representative of the ‘heaviest’ shingle thickness in order to develop a ‘worst-case’ testing scenario for cedar sidewall shingle installations over FlameBlock sheathing. This testing is intended to cover cedar shingle siding applications with a shingle butt thickness of ½” or less, as well as ‘plain bevel’ cedar siding of unlimited widths. Cedar shakes are not covered.

SUMMARY OF THE TEST METHOD

The CSFM 12-7A-1 test methodology incorporates a protocol utilizing a 4" wide x 39" long diffusion burner positioned at the base of a 4' wide by 8' high wall construction with the fire exposure conducted at 150 kW for a period of 10 minutes. After fire exposure, the wall specimens are observed for a 60-minute post-exposure period for signs of progressive combustion and/or flame penetration through to the unexposed side of the assembly. Signs of flame penetration at any time during the test, or presence of glowing combustion at the end of the 60-minute post exposure period constitute a failure to meet the conditions of acceptance. Tests are conducted in triplicate for conformity with the California Building Code, Chapter 7A requirements.

Excerpted from CSFM 12-7A-1: *Fire Resistive Standards for Exterior Wall Siding and Sheathing:*

(a) Application. *The minimum design, construction and performance standards set forth herein for exterior wall siding and sheathing are those deemed necessary to establish conformance to the provisions of these regulations. Materials and assemblies that meet the performance criteria of this standard are acceptable for use in Very High Fire Hazard Zones as defined in California Building Code, Chapter 7A.*

(b) Scope. *This standard determines the performance of exterior walls of structures when exposed to direct flames.*

(i) Conduct of Tests.

1. **Airflow.** *The wall test shall be conducted under conditions of ambient airflow.*
2. **Number of tests.** *Conduct the tests on three replicate wall assemblies.*
3. **Burner output verification.** *Without the wall assembly in place, adjust the burner for 150 ± 8 kW output.*
4. **Burner configuration.** *Center the burner relative to the width of the cladding-wall assembly and 0.75 in. (20 mm) from the wall. The distance from the floor to the top of the burner shall be 12 in. (300 mm).*
5. **Procedure**
 - i) *Ignite the burner, controlling for constant 150 ± 8 kW output.*
 - ii) *Continue the exposure until flame penetration of the cladding-wall assembly occurs, or for a 10-min period.*
 - iii) *If penetration does not occur, continue the test for an additional 60 min or until all combustion has ceased. An infrared thermometer has been found to be useful to detect the increase of temperature on the back side of the sheathing and an aid to identify the areas of potential combustion.*

Conditions of Acceptance:

1. *Absence of flame penetration through the wall assembly at any time.*
2. *Absence of evidence of glowing combustion on the interior surface of the assembly at the end of the 70-min test.*

SAMPLE DESCRIPTION

The wall assemblies were constructed by WFCi personnel, and were prepared in accordance with the 12-7A-1 test standard. Assembly and fastening details of the FlameBlock™ sheathing and indicated cladding types were consistent with the manufacturer's installation instructions.

Test Series No. 1

- **Sheathing: LP FlameBlock™ 4'x8' Fire-Rated OSB sheathing, 7/16" minimum nominal thickness (reference ICC ESR-1365)**
 - Minimum Pyrotite thickness of 0.06" applied to fiberglass mat
 - Pyrotite laminate applied to one face of OSB sheathing [exposed (fire) side]
- **Cladding: SmartSide™ Precision Series Lap siding (limited to strand substrate)**

Test Series No. 2

- **Sheathing: LP FlameBlock™ Fire-Rated OSB sheathing, 7/16" minimum nominal thickness (reference ICC ESR-1365)**
 - Minimum Pyrotite thickness of 0.06" applied by direct process to OSB sheathing
 - Pyrotite applied to one face of OSB sheathing [exposed (fire) side]
- **Cladding: Cedar Sidewall Shingles, 1/2" butt end thickness (installed in accordance with industry standard/manufacturer's instructions)**

Manufacturing of the LP FlameBlock sheathing was witnessed by Progressive Engineering, Incorporated (PEI), as attested to in the PEI Product Sampling Report included in Appendix A. The test material was received at the laboratory carrying the marking of the inspection agency.

Conditioning: Prior to assembly, the FlameBlock sheathing, lap siding and cedar sidewall shingles were conditioned to equilibrium moisture content at 70±5°F and 50±5% relative humidity. The test assemblies were tested shortly after construction.



Test Series No. 1: Construction Photographs – Lap Siding (note butt joints every other course)



Test Series No. 1: Completed test assembly – Lap Siding



Test Series No. 2: Completed Wall Assembly

TEST RESULTS

Test 1

Testing of the FlameBlock with Lap Siding was completed on March 3, 2010, with the results summarized in Table 1 below. Individual tests from a series of three successful consecutive test runs are reported as Trial A, B and C (with actual project test id's in parentheses). The moisture content of the FlameBlock™ sheathing and the SmartSide Lap siding was determined to be 8.5% and 5.5%, respectively, using the ASTM D 4442 'oven-dry' method. The moisture content of the 2x4 studs comprising the base wall structure was 9-10%. An IR imaging camera was employed to assess panel temperature changes on the unexposed side during each burn. Pretest weathering was not conducted. The test burner was calibrated to 150kW prior to testing. Photographs from a representative test are included in Appendix B.

Table 1

Trial	Result	Notes
A (Test 5)	Pass- no signs of flame-through or glow on unexposed side	Cladding ignited at 50 s with vigorous flaming, flames out at 16 min, glowing combustion at various locations on sample surface until test terminated at 70 minutes - IR imaging shows diminishing temps on unexposed side at test termination
B (Test 7)	Pass- no signs of flame-through or glow on unexposed side	Cladding ignited at 45 s with vigorous flaming, all flame out prior to 20 min, glowing combustion at various locations on sample surface until test terminated at 70 minutes - IR imaging shows diminishing temps on unexposed side at test termination
C (Test 8)	Pass- no signs of flame-through or glow on unexposed side	Cladding ignited at 49 s with vigorous flaming, glowing combustion at various locations on sample surface until test terminated at 70 minutes - IR imaging shows diminishing temps on unexposed side at test termination

Test 2

Testing of the FlameBlock with cedar sidewall shingle cladding was completed on May 4, 2010, with the results summarized in Table 2 below. Individual tests from a series of three successful consecutive test runs are reported as Trial A, B and C (with actual project test id's in parentheses). The moisture content of the FlameBlock™ sheathing and the shingle siding was determined to be 8.5% and nominally 8%, respectively, using the ASTM D 4442 'oven-dry' method. The moisture content of the 2x4 studs comprising the base wall structure was 9-10%. An IR imaging camera was employed to assess panel temperature changes on the unexposed side during each burn. Pretest weathering was not conducted. The test burner was calibrated to 150kW prior to testing.

Table 2

Trial	Result	Notes
A (Test 10)	Pass- no signs of flame-through or glow on unexposed side	Shingles ignited at 28 s with vigorous flaming, flames out at 23 min, glowing combustion at various locations on sample surface until test terminated at 70 minutes - IR imaging shows diminishing temps on unexposed side at test termination
B (Test 11)	Pass- no signs of flame-through or glow on unexposed side	Cladding ignited at 28 s with vigorous flaming, all flame out at 27 min, glowing combustion at various locations on sample surface until test terminated at 70 minutes - IR imaging shows diminishing temps on unexposed side at test termination
C (Test 12)	Pass- no signs of flame-through or glow on unexposed side	Cladding ignited at 23 s with vigorous flaming, glowing combustion at various locations on sample surface until test terminated at 70 minutes - IR imaging shows diminishing temps on unexposed side at test termination

CONCLUSION AND EXTENTION OF RESULTS

The wall assemblies comprised of LP® FlameBlock™ sheathing with SmartSide™ Precision Series Lap siding (strand substrate) and ½” butt cedar shingles as tested and described in this report are deemed to meet the CSFM 12-7A-1 test requirements of California Building Code Chapter 7A.

The test program was design to assess the effect of two ‘severe-case’ exterior cladding applications over minimum nominal 7/16” FlameBlock Fire-Rated OSB sheathing. These siding applications included LP Smartside Precision Series Lap Siding (strand based) and ½” cedar sidewall shingles. Based on a review of the LP SmartSide Precision Series strand-based product line, the Lap siding is deemed to represent a ‘worst case’ condition for this product line. Furthermore, based on previous laboratory testing experience with solid wood siding products, the ½” (4/2) cedar sidewall shingles were selected as representative of a ‘worst case’ for cedar shingle siding, owing to the fact that the heaviest (in terms of butt thickness) available shingle was tested.

The test results reported in Tables 1 and 2 are judged to apply to the following range of siding products installed over FlameBlock sheathing:

- SmartSide™ Precision Series lap and panel siding
- Cedar shingles of ½” (4/2) butt thickness and less
- Plain Bevel solid wood siding (cedar and other species, various widths)

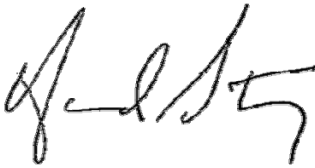
SIGNATURES

Testing supervised by:



Mike White
Laboratory Manager

Reviewed and approved,



Howard Stacy
Director, Testing Services

**WESTERN FIRE CENTER AUTHORIZES THE CLIENT NAMED HEREIN TO
REPRODUCE THIS REPORT ONLY IF REPRODUCED IN ITS ENTIRETY**

**The test specimen identification is as provided by the client and WFCi
accepts no responsibilities for any inaccuracies therein. WFCi did not select
the specimen and has not verified the composition, manufacturing
techniques or quality assurance procedures.**

REVISION SUMMARY

DATE	PAGE(S)	SUMMARY
May 28, 2010	None	Original issue

APPENDIX A: SAMPLING REPORT



Progressive Engineering Inc.

IAS Accredited Testing Laboratory & Q.C. Agency

Product Sampling for Materials to be Tested at PEI

Arrival Time: 8:15am on 2/11/2010

Departure Time: 5:05 on 2/11/2010

Manufacturing Facility & Location

Company Name	Barrier Technology
Address	510 4th Street North Watkins, MN 55389
Telephone	800-638-4570
Contact Person	Mike Huddy

Product Sampled

Name	BlazeGuard / LP FlameBlock Sheathing
Quantity	65 pieces w/Matt Fiberglass-65 pieces w/chopped Fiberglass-8 double sided w/Rated Sheathing-11 Single sided on Rated Sheathing
Inspector's Markings	One corner of each sheet was sprayed with light green paint

Sampling Date: 2/11/2010

Pei Witness : Greg Weeden

Director of Testing & Listing Services

Contact Person: Mike Huddy

The BlazeGuard / LP FlameBlock Sheathing that was manufactured and witnessed on 2/11/2010 was manufactured as stated in there approved Quality Control Program as approved by there PEI Listing Program and shown on Product Evaluation Report # 06013.

APPENDIX B: TEST PICTURES (from representative tests)

Test Series No. 1 – Lap Siding/FlameBlock



Test time = 1 minute



Midway through burner exposure



Prior to burner termination



Immediately after termination of burner



Exposed face at test termination



Unexposed side at test termination

Test Series No. 2, Cedar Shingles/FlameBlock



Prior to test



T = 7.5 minutes



Termination of burner exposure



Exposed face at T = 41 minutes



Unexposed face at test termination