SCOPE OF WORK
NFPA 285 TESTING ON EXTERIOR NON-LOAD-BEARING WALL ASSEMBLY CONTAINING TREMCO® EXOAIR® 230 FLUID-APPLIED, 4 IN. THICK KINGSPAN® GREenguARD® TYPE IV 25 PSI EXTRUDED POLYSTYRENE (XPS) INSULATION BOARD, 10MM KEENE BUILDING PRODUCTS DRIWALL™ RAISCREEN, 1/2 IN. PERMABASE® CEMENT BOARD, LATICRETE® MVIS THIN BRICK MORTAR AND 1/2 IN. THICK GLEN-GERY THIN VENEER BRICK WITH GLEN-GERY COLOR MORTAR BLEND BETWEEN BRICK

REFERENCE PROJECT NUMBER
I8508.01-121-24-R2

TEST DATE
12/10/18

LETTER OF RESULTS ISSUE DATE
01/30/20

RECORD RETENTION END DATE
12/10/22

PAGES
11

DOCUMENT CONTROL NUMBER
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LETTER OF RESULTS BRICK INDUSTRY ASSOCIATION
Issue Date: 01/30/20
Reference Project No.: I8508.01-121-24-R2

LETTER OF RESULTS ISSUED TO
Brick Industry Association
12007 Sunrise Valley Drive
Suite 430
Reston, Virginia 20191

SECTION 1
SCOPE

Intertek Building & Construction (B&C) was contracted by Brick Industry Association, 12007 Sunrise Valley Drive Suite 430 Reston, Virginia 20191 to evaluate the flame propagation characteristics of an exterior, non-load-bearing wall assembly containing Tremco® ExoAir® 230 fluid-applied, synthetic air & vapor permeable membrane, 4 in. thick Kingspan® GreenGuard® Type IV 25 psi Extruded Polystyrene (XPS) Insulation Board, 10mm Keene Building Products Driwall™ Rainscreen, 1/2 in. thick PermaBase® cement board, Laticrete® MVIS Thin Brick Mortar polymer modified mortar, 1/2 in. thick Glen-Gery Thin Veneer Brick with Glen-Gery Color Mortar Blend between brick. Testing was conducted at the Intertek B&C test facility in York, Pennsylvania. Results obtained are tested values and were secured by using the designated test method(s). A comprehensive summary of test construction is within this document. This report does not constitute a complete test report, certification of this product, nor an opinion or endorsement by this laboratory. For full details of the project, reference Intertek-ATI test report number I8508.01-121-24-R2.

SECTION 2
SUMMARY OF TEST RESULTS

NFPA 285 Test Results
The assembly summarized and referenced in this document did meet the Conditions of Acceptance of NFPA 285. Construction of the tested assembly is summarized in Section 5 of this document.

For INTERTEK B&C:

<table>
<thead>
<tr>
<th>COMPLETED BY:</th>
<th>REVIEWED BY:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Gingrich</td>
<td>Ethan Grove</td>
</tr>
<tr>
<td>Technician Team Lead – Fire Testing</td>
<td>Manager – Fire Testing</td>
</tr>
<tr>
<td>SIGNATURE:</td>
<td>SIGNATURE:</td>
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<tr>
<td>[Signature]</td>
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</tr>
<tr>
<td>DATE: 01/30/20</td>
<td>DATE: 01/30/20</td>
</tr>
</tbody>
</table>

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SECTION 3
TEST METHOD

The assembly was evaluated in accordance with the following:


SECTION 4
TEST PROCEDURE

For complete test procedure, conditions, and calibration values, reference Intertek-ATI Test Report #I8508.01-121-24-R2.

SECTION 5
TEST ASSEMBLY DESCRIPTION

Interior Cladding
The full interior surface of the wall assembly was clad with one (1) layer 5/8 in. thick National Gypsum Gold Bond® Fire-Shield® gypsum board meeting the requirements of ASTM C1396. The gypsum board was fastened to the wall framing with #6 x 1-1/4 in. long, bugle head, self-drilling screws with a nominal spacing of 8 in. around the board perimeter and 12 in. in the field. Drywall orientation on the burn floor consisted of four pieces of gypsum board fastened to the core wall, with the run edge running parallel with the framing and the cut edge perpendicular to the framing. Drywall orientation on the second floor consisted of vertically oriented boards with the run edge running parallel with the framing and the cut edge perpendicular to the framing. Drywall orientation for the areas above the top support angle and below the bottom support angle consisted of boards that were oriented with the run edge perpendicular with the framing. All joints were taped with USG Sheetrock® Brand paper joint tape and spackled with USG Sheetrock® Brand joint compound. All fastener heads were spackled with USG Sheetrock® Brand joint compound.
SECTION 5 (Continued)

TEST ASSEMBLY DESCRIPTION

Framing
The core wall consisted of 18 ft. long, 3-5/8 in. deep, 18 gauge galvanized steel studs (33 ksi steel) fastened to 14 ft. length, 3-5/8 in. deep, 18 gauge galvanized steel track every 24 inches on center. The studs were connected to the track with one #6 x 1/2 in. long self-drilling, pan head fastener per stud flange. Two additional 18 ft. long, 3-5/8 in. deep, 18 gauge studs were used as king studs for the window opening jambs. Mineral wool fiber safing pieces with a nominal density of 4.0 lb. /cu. ft. were installed per the manufacturer’s installation instructions to fit into each stud cavity placed at the second story floor line. The safing length dimensions were no less than the apparatus floor slab thickness of 8 in.

Framing Insulation
Johns-Manville R11 unfaced fiberglass batt insulation meeting the requirements of ASTM C665 Type I was friction fit into the stud cavity prior to the interior gypsum installation.

Exterior Sheathing
One (1) layer 1/2 in. thick National Gypsum Gold Bond® eXP® Extended Exposure Gypsum Sheathing with glass mat facing, meeting the requirements of ASTM C1177, was placed horizontally across the full exterior surface of the assembly. A vertical joint offset of 24 in. was utilized during installation. The gypsum sheathing was fastened to the wall framing with #6 x 1-1/4 in. long, bugle head, self-drilling screws with a nominal spacing of 8 in. around the board perimeter and 12 in. in the field.

Water-Resistive Barrier / Air Barrier
Tremco® Dymonic® 100 high performance, high movement single-component, polyurethane sealant was placed on all the screw heads used to secure the exterior gypsum. After the Dymonic® 100 was cured, application of the Tremco® ExoAir® 230 fluid-applied, synthetic air & vapor permeable membrane began. Using a 3/4 in. nap roller, the ExoAir® 230 was applied to achieve a thickness of 0.048 in. (48 wet mils) across the entire surface of the assembly including inside the perimeter of the window rough opening. The application was allowed to cure for a minimum of 72 hours before additional components were added to the assembly.
SECTION 5 (Continued)
TEST ASSEMBLY DESCRIPTION

Window Opening
A 81 in. wide x 33 in. tall window opening was made from 18 gauge galvanized steel track. The opening was centered on the vertical centerline of the wall assembly such that the finished sill was located 30 in. above the first story floor line. The steel track sections were mechanically fastened with #6 x 1/2 in. long self-drilling, pan head fasteners at each corner. Upon the completion of the exterior sheathing Tremco ExoAir® was applied on the rough opening with a 3/4 in. nap roller to 48 wet mils. Three pieces of nominal 1/2 in. thick plywood pieces not treated with fire retardant and measuring 8-1/4 in. wide were stacked and secured to the perimeter of the window opening framing. A 26 gauge sheet metal flashing drip edge was added to the top of the window opening header. Self-adhered flashing tape was lapped over the horizontal leg of the metal flashing with the vertical rise of +/- 3 in.

Exterior Insulation
4 in. thick Kingspan® Type IV 25 psi GreenGuard® Extruded Polystyrene (XPS) Insulation Board, meeting the requirements of ASTM C578 Type IV was used as the exterior insulation. The insulation was placed horizontally and adhered to the exterior gypsum using Loctite® Power Grab® ultimate construction adhesive. This adhesive was applied vertically to the back of the insulation board on 24 inch intervals with a 1/4-inch bead thickness. At the horizontal plane of the window opening header, the long dimension of the board was placed perpendicular to the assembly’s studs. A full board, measuring 48 in. wide x 96 in. long was used in conjunction with a cut board measuring 48 in. wide x 72 in. long to complete the row. The next row above started with the cut board and then the full-size board. This installation provided staggered vertical joints in the insulation. The staggering was utilized to complete the remaining uncovered area until the assembly was fully covered with the insulation. Pieces were then measured and cut to install beside and below the window opening.
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SECTION 5 (Continued)
TEST ASSEMBLY DESCRIPTION

Exterior Cladding
The installation began with 10mm Keene Building Products Driwall™ Rainscreen drainage mat. This was secured with #10 x 6 in. long scorpion drill point drywall fasteners and 1-1/4 in. diameter metal washers placed at 24 in. centers into each vertical stud. The 1/2 in. thick PermaBase® cement board, meeting the requirements of ASTM C1325, Type A, was secured to the assembly using #10 x 6 in. long scorpion drill point drywall fasteners placed on 8 in. centers into each vertical stud and horizontal track. The cement board was staggered in the same manner as the exterior insulation making sure to not have vertical and horizontal cement board joints that overlapped with the insulation vertical and horizontal joints. The cement board joint was taped with PermaBase® cement board fiberglass tape. A thin coat of Laticrete® MVIS Thin Brick Mortar polymer modified mortar meeting ANSI A118.15 and ANSI A118.4 was used to cover the tape and joints of the cement board. The same mortar was applied to the full exterior surface of the PermaBase® cement board in accordance with ANSI A108.5 used to adhere the Glen-Gery Thin Veneer Brick meeting ASTM C1088, Type TBS to the assembly. As the brick courses were installed, Glen-Gery Color Mortar Blend Portland cement-lime mortar conforming to ASTM C270, Type N was utilized in a grout bag to fill the space between each brick. A concave jointer tool was used to strike the mortar when firm to finish the install.

SECTION 6
DRAWINGS

Test specimen construction was verified by Intertek B&C per the drawings included in this report. For a complete drawing set including drawings showing thermocouple locations for the test, reference Intertek-ATI Test Report #I8508.01-121-24-R2.
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SECTION AT HEAD

1. Gypsum board (interior side) - One layer 5/8 in. thick National Gypsum Gold Bond® Fire-Shield® gypsum board
2. Cold-formed metal framing - 3-5/8 in. wide No. 18 (43 mil) gauge galvanized cold formed metal studs and track
3. Batt insulation - R-11 Johns-Manville unfaced fiberglass batt insulation
4. Exterior gypsum sheathing (interior side) - One layer 1/2 in. thick National Gypsum Gold Bond® eXtended Exposure Gypsum Sheathing with glass mat facing
5. Water-resistant barrier / air barrier - Therm® ExoAir® B 210 fluid-applied, synthetic air & vapor permeable membrane applied to a thickness of 0.048 in. (48 wet mils)
6. Exterior insulation - 4 in. thick Kingspan® GreenGuard® Type IV 25 psi Extruded Polystyrene (XPS) Insulation Board
7. Drainage mat - Keene Building Products Driwell® Rainscreen 10 mm
8. Cement board - 1/2 in. thick Permalad® Cement Board
9. Mortar bed - Laticrete® MVS® Thin brick Mortar polymer modified mortar
10. Clay thin brick - 1/2 in. thick Glen-Grey clay thin brick
11. Mortar joints - Glen-Grey Color Mortar Blend
12. Wood Duck - three layers 1/2 in. thick plywood nailing back
13. Flashing tape - Self-adhered flashing tape
14. Flashing - 20 gauge sheet metal flashing

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1. Gypsum board (interior side) - One layer 5/8 in. thick National Gypsum Gold Bond ® Fire-Shield ® gypsum board
2. Cold-formed metal framing - 3-5/8 in. wide No. 18 (43 mil) gauge galvanized cold-formed metal studs and track
3. Batt insulation - R-11 Johns-Manville unfaced fiberglass batt insulation
4. Exterior gypsum sheathing (interior side) - One layer 1/2 in. thick National Gypsum Gold Bond ® xXP ® Extended Exposure Gypsum Sheathing with glass mat facing
5. Water-resistive barrier (air barrier) - Tremco ® Evisor ® 350 fluid-applied, synthetic air & vapor permeable membrane applied to a thickness of 0.048 in. (48 wet mils)
6. Exterior insulation - 4 in. thick Kingspan ® GreenGuard ® Type IV 250 sco Extruded Polystyrene (XPS) Insulation Board
7. Drainage mat - Keene Building Products Driwall ® Rainscreen 10 mm
8. Cement board - 1/2 in. thick PermaBase ® Cement Board
9. Mortar bed - Laticrete ® MVS ® Thin Brick Mortar polymer modified mortar
10. Clay thin brick - 1/2 in. thick Owen-Gary clay thin brick
11. Mortar joints - Owen-Gary Color Mortar Blend
12. Wood jamb - three layers 1/2 in. thick plywood nailing buck

SECTION AT JAMB

Report #: I8508.01-121-24
Date: 03/29/19
Verified by: [Signature]

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1. Gypsum board (interior side) - One layer 5/8 in. thick National Gypsum Gold Bond® Fire-Shield® gypsum board
2. Cold-formed metal framing - 3-69 in. wide No. 18 (43 mil) gauge galvanized cold-formed metal studs and track
3. Batt insulation - R-11 Johns Manville unfaced fiberglass batt insulation
4. Exterior gypsum sheathing (interior side) - One layer 1/2 in. thick National Gypsum Gold Bond® eXP® Extended Exposure Gypsum Sheathing with glass mat facing
5. Water-resistive barrier / air barrier - ThermCo® ExoAir® 210 fluid-applied, synthetic air & vapor permeable membrane applied to a thickness of 0.048 in. (48 wet mils)
6. Exterior Insulation - 4 in. thick Kingspan® GreenGuard® Type IV 25 psi Extruded Polystyrene (XPS) Insulation Board
7. Drainage mat - Keene Building Products Driwell® Rainscreen 10 mm
8. Cement board - 1/2 in. thick PermaDew® Cement Board
9. Mortar bed - Latcrete® MV50™ Thin brick Mortar polymer modified mortar
10. Clay thin brick - 1/2 in. thick Glen-Grey clay thin brick
11. Mortar joints - Glen-Grey Color Mortar Blend
12. Wood back - three layers 1/2 in. thick plywood nailing back

SECTION AT SILL

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SECTION 7
TEST OBSERVATIONS & RESULTS

<table>
<thead>
<tr>
<th>TIME (Min:Sec)</th>
<th>OBSERVATIONS</th>
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<tbody>
<tr>
<td>00:00</td>
<td>Ignition of room burner.</td>
</tr>
<tr>
<td>02:08</td>
<td>Interior gypsum ignition.</td>
</tr>
<tr>
<td>05:00</td>
<td>Ignition of window opening burner.</td>
</tr>
<tr>
<td>06:30</td>
<td>Window frame ignition.</td>
</tr>
<tr>
<td>16:44</td>
<td>Window header fallout and reignition.</td>
</tr>
<tr>
<td>30:00</td>
<td>Burners Extinguished. Post-test 10-minute observation period begins.</td>
</tr>
<tr>
<td>40:00</td>
<td>Post-test 10-minute observation period ends; test concluded.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEST REQUIREMENTS</th>
<th>TEST RESULTS</th>
<th>PASS/FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flames did not reach 10 ft. above the window opening header.</td>
<td>Flames did not reach 10 ft. above the window opening header.</td>
<td>PASS</td>
</tr>
<tr>
<td>Flames did not reach a lateral distance of 5 ft. from the vertical centerline.</td>
<td>Flames did not reach a lateral distance of 5 ft. from the vertical centerline.</td>
<td>PASS</td>
</tr>
<tr>
<td>Flames did not propagate beyond the limits of the first story test room.</td>
<td>Flames did not propagate beyond the limits of the first story test room.</td>
<td>PASS</td>
</tr>
<tr>
<td>No visible flaming in the second story test room.</td>
<td>No visible flaming in the second story test room.</td>
<td>PASS</td>
</tr>
<tr>
<td>TC’s 11 and 14-17 (1000°F limit)</td>
<td>TC’s 11 and 14-17 did not exceed their 1000°F limit.</td>
<td>PASS</td>
</tr>
<tr>
<td>TC’s 18-19, 28, and 31-40 (1000°F limit)</td>
<td>TC’s 18-19, 28, and 31-40 did not exceed their 1000°F limit.</td>
<td>PASS</td>
</tr>
<tr>
<td>TC’s 49-54 (500°F above ambient)</td>
<td>TC’s 49-54 did not exceed 500°F above their ambient temperatures.</td>
<td>PASS</td>
</tr>
<tr>
<td>TC’s 55-67 (750°F above ambient)</td>
<td>TC’s 55-67 did not exceed 750°F above their ambient temperatures.</td>
<td>PASS</td>
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</tbody>
</table>

For complete test observations and specific acceptance criteria, reference Intertek-ATI Test Report #I8508.01-121-24-R2.