

**INTERNATIONAL ASSOCIATION OF PLUMBING  
AND MECHANICAL OFFICIALS, EVALUATION SERVICES**

**EVALUATION CRITERIA  
FOR**

**WOOD STRUCTURAL PANELS WITH  
FACTORY-APPLIED FIRE-RETARDANT COATINGS**

**EC 005-2010**

**1.0 INTRODUCTION**

- 1.1 Purpose:** This criteria establishes the requirements for recognition by IAPMO Evaluation Service (IAPMO-ES) of wood structural panels with a factory-applied fire-retardant coating (Manufactured Product) under the 2006 *International Building Code*<sup>®</sup> (IBC) Section 104.11 and the 2006 *International Residential Code*<sup>®</sup> (IRC) Section R104.11. Applicable code criteria are listed in Section 1.2.

This criterion prescribes the evaluation guidelines for a Manufactured Product for the following items or uses described in Section 1.2. as the IBC, IRC and associated documents do not specify testing methodology and acceptance conditions for such products.

- 1.2 Scope:** The Manufactured Product may be used in accordance with sections 1.2.1 thru 1.2.6 provided the product complies with Test and Performance Requirements of section 5.0 of this criteria.
- 1.2.1** The product may be used as a fire-retardant-treated roof sheathing on buildings of Type III, IV and V construction where vertical continuity of fire walls is provided for without a parapet in accordance with IBC Section 705.6, and IRC Section R317.2.2 2 (E)].
- 1.2.2** The product may be used as a fire-retardant-treated roof sheathing on building of Type I and II construction where the vertical distance from the upper floor to the roof is greater than 20 feet (6096 mm), as described in IBC Section 603.1.1.1.3 (E).
- 1.2.3** The product may be used in exterior walls on buildings of Type I and II construction, as described in IBC Section 603.1.1.1.2.
- 1.2.4** The product may be used as a Class A interior finish material for walls and ceilings of Type V construction (IBC Section 803 and IRC Section R702 & R315).
- 1.2.5** The product may be used as a thermal barrier for separating foam plastic insulation in walls from the interior of a building (IBC Section 2603.4 & IRC Section R314.4).
- 1.2.6** The product may be used as a component of fire-resistant rated construction (IBC

Copyright © 2010 by International Association of Plumbing and Mechanical Officials. All rights reserved. Printed in the United States of America. No part of this publication may be reproduced, stored in an electronic retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

Section 703).

- 1.2.7 The product may be used as a component of roof covering classified assemblies (IBC Section 1505).

## 2.0 REFERENCE STANDARDS

- 2.1 Standards referenced in this criteria shall be applied consistently with the specific code(s) complied.

2006 IBC	<i>International Building Code</i> <sup>®</sup>
2006 IRC	<i>International Residential Code</i> <sup>®</sup>
ASTM E 84-04	Standard Test Method for Surface Burning Characteristics of Building Materials
ASTM E 108-04	Standard Test Methods for Fire Tests of Roof Coverings
ASTM E 119-00a	Standard Test Methods for Fire Tests of Building Construction and Materials
ASTM D 968-05 <sup>ε01</sup>	Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
ASTM D 3359-08	Standard Test Methods for Measuring Adhesion by Tape Test
ASTM D 5516-03	Standard Test Method for Evaluating the Flexural Properties of Fire-Retardant-Treated Softwood Plywood Exposed to Elevated Temperatures.
ASTM D 6305-02 <sup>ε01</sup>	Practice for Calculating Bending Strength Design Adjustment Factors for Fire-retardant-treated Plywood Roof Sheathing
AWPA E 12-08	Standard Method of Determining Corrosion of Metal in Contact with Treated Wood
UL 790-98 (2006 IBC)	Standard Test for Fire Resistance of Roof Covering Materials-with Revisions through July 1998, Underwriters Laboratories, Inc.
UL 790-04 (2006 IRC)	Standard Test for Fire Resistance of Roof Covering Materials, Underwriters Laboratories, Inc.
UL 1715-97	Fire Test of Interior Finish Material-with Revisions through March 2004

## 3.0 DEFINITIONS

- 3.1 **Wood Structural Panel with a Factory-Applied Fire-Retardant Coating (Manufactured Product):** A wood based structural panel complying with Section 2303.1.4 of the IBC or Section R604 of the IRC with a proprietary, inert, intumescent coating bonded to one side or both sides of the panel during the manufacturing process. The substantiating test coating thicknesses shall be the basis of the thickness specified in the Evaluation Report.

## 4. BASIC INFORMATION

**4.1 General:** Each submittal shall include the following information for an evaluation report:

**4.1.1 Description:** The Manufactured Product shall be described by dimensions, material specifications, temperature that triggers the intumescent reaction, number of sides required to be coated and their respective panel applications per section 1.2, and compliance with applicable standards or approved criteria.

**4.1.2 Installation Instructions:** Installation details, limitations including building materials that are deleterious to the coating, approved fastener materials, and installation manual.

**4.1.3 Identification:** Description of the method of identification of the Manufactured Product. Each panel shall bear a mark which clearly identifies the manufacturer or a registered trademark. Packaging shall include the IAPMO evaluation service report number. The manufacturer shall establish a means of identifying the coated surfaces and it shall be specified in the evaluation report.

**4.1.3.1** The mark shall be in accordance with Section 2303.2.1 of the IBC and shall include the following additional information:

1. IAPMO-ES evaluation report number
2. ASTM E84 test indices (flame-spread and smoke developed), and a statement indicating no evidence of significant progressive combustion when the test is extended to 30 minutes
3. Span rating of the Manufactured Product, grade, and mill identification of the base panel
4. Name of the accredited inspection agency

**4.1.4** After the panels are coated with a factory-applied fire-retardant documentation shall be submitted to show conformance to the requirements of IBC section 2303.1.4 and sections R604.1 and R803.2 of the IRC.

**4.2 Testing Laboratories:** Testing laboratories shall be recognized by IAPMO-Evaluation Services.

**4.3** Prior to any test procedures being performed, a qualifying document must be presented to IAPMO ES, indicating the target thickness of the fire-retardant coating on the tested material and how the thickness will be measured for the test and for the manufacturing process. The qualifying document shall require third party auditing of all test samples to conclusion of test. The test plan shall be a complete document including test method description, sampling methodology, application type, rates, and any other pertinent information.

**4.4** The third party auditor shall confirm the fire-retardant coating thickness when measured in accordance with section 4.3 and document all sample fire-retardant coating thickness in the test reports. The maximum tested sample measured thickness shall be specified in the Evaluation Report as the minimum required thickness for manufacturing.

## 5.0 TESTING AND PERFORMANCE REQUIREMENTS

### 5.1 Surface-burning Characteristics:

- 5.1.1 Prior to complying with section 5.1.2 all sample test panels shall be subjected to elevated temperatures and humidity tests in accordance to ASTM D 5516 section 7.1.2 with an exposure period greater than 42 days.
- 5.1.2 Documentation of the performance of the Manufactured Product to be in compliance with Section 2303.2 of the IBC or Section R604 of the IRC using test method(s) in Section 6.1 of this evaluation criteria.

### 5.2 Durability

- 5.2.1 **Structural Flexural Performance When Exposed to Elevated Temperatures and Humidity:** Documentation of the Manufactured Product as exposed to elevated temperatures and humidity to be in compliance with Section 6.2.1 of this evaluation criteria.
- 5.2.2 **Material Degradation:** Documentation of the Manufactured Product tests to be in compliance with Sections 6.2.2 and 6.2.3 of this evaluation criteria.
- 5.3 **Fire Classified Roof Covering Assemblies:** Documentation of Manufactured Product when used in a fire classified roof covering assembly, the panels shall be fire tested to be in compliance with Section 6.3 of this evaluation criteria.
- 5.4 **Thermal Barrier:** Documentation of the Manufactured Product tested to be in compliance with Section 6.4 of this acceptance criteria.
- 5.5 **Fire-resistance-rated Assemblies:** Documentation of Manufactured Product when used in a fire-resistance-rated assembly, the panels shall be fire tested to be in compliance with Section 6.5 of this evaluation criteria.
- 5.6 **Substrates:** Documentation of the wood structural panels used in the Manufactured Product to be in compliance with Section 2303.1.4 of the IBC or Section R604 of the IRC.

## 6. TEST METHODS

- 6.1 **Surface-burning Characteristics:** Document the surface-burning characteristics of the Manufactured Product according to ASTM E 84 test protocol. Construct test samples with a joint, minimum of 0.125 running the length of the tunnel. Fasteners used to simulate attaching roofing materials are to be driven through the coated panels with the nail points protruding through the coating and exposed in the tunnel. Hot dipped galvanized roofing nails spaced a minimum of 8 inches (203 mm) on center along the length of the tunnel with one row of nails on each side of the joint shall fasten the test sample to the test assembly. Each type of wood structural panel (OSB or plywood) for which recognition is sought shall have its own surface burning testing that shall apply to all products of that respective type. Each test assembly shall continue for 30-minutes. Installation details, species/type, and combination of materials used in the test shall be

Copyright © 2010 by International Association of Plumbing and Mechanical Officials. All rights reserved. Printed in the United States of America. No part of this publication may be reproduced, stored in an electronic retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

documented in the report.

**Conditions of Acceptance:** The Manufactured Product shall not have a flame-spread index exceeding 25 and the smoke-developed rating not exceeding 450. Flame front progress shall not be more than 10.5 feet (3200 mm) beyond the centerline of the burners when the test is extended for a 30-minute total duration and shall show no evidence of significant progressive combustion.

## 6.2 Durability

**6.2.1 Structural Flexural Performance When Exposed to Elevated Temperatures and Humidity:** Test specimens with and without the factory applied fire-retardant coating for flexural properties after exposure to elevated temperatures and humidity in accordance with procedures of ASTM D 5516.

**Conditions of Evaluation:** Design values of the coated samples exposed to elevated temperatures and humidity shall be comparable to those of the control samples determined by ASTM D6305 procedures. At the end of the test at least 90% of the surface area of the coating must remain adhered. Submit an engineering analysis evaluating the test data.

**6.2.2 Adhesion Testing:** Document adhesion in accordance with Method A of ASTM D 3359.

**Conditions of Evaluation:** A classification of 3A or better shall be obtained.

**6.2.3 Abrasion Testing:** Document abrasion resistance in accordance with ASTM D 968, Method A.

**Conditions of Evaluation:** The minimum mean abrasion resistance shall be 2.5 liters of sand per mil of dry coating thickness.

**6.3 Fire Classified Roof Covering Assembly:** Test the Manufactured Product as a fire classified roof covering assembly using ASTM E108 (UL 790) on each type of wood structural panel for which recognition is sought. The test assembly report shall completely describe the orientation of the coating along with the corresponding fire classification (Class A, B or C). Code compliant roof coverings and the test laboratory shall deem relevant the lower range of physical or mechanical properties. Two assemblies shall be tested.

**Conditions of Evaluation:** The assemblies tested shall comply with Section 12, Conditions of Classification, of ASTM E 108, or Section 12, Conditions of Acceptance, of UL 790. The assemblies shall be described in the published evaluation report.

**6.4 Thermal Barrier:** Test the Manufactured Product in accordance with the 2006 IBC section 2603.4 and the 2006 IRC section R314.4.

**Conditions of Evaluation:** The assemblies tested shall comply with the Conditions of Acceptance of the 2006 IBC section 2603.4 and the 2006 IRC section R314.4. .

**6.5 Fire-Resistance-Rated Assembly:** Test the Manufactured Product as a fire-resistance-rated assembly ASTM E119 on each type of wood structural panel for which recognition is sought. Completely describe the test assembly including the orientation of the coating in the test report.

**Conditions of Evaluation:** A minimum fire-resistance rating of one hour for the wall, floor-ceiling or roof-ceiling assembly shall apply to only the specific assembly tested.

**6.6 Corrosion Testing:** Test the Manufactured Product in accordance with AWPA E12, with a minimum of 10 replicates per metal.

**Conditions of Evaluation:** Document the types of fasteners, coatings and metals to be specified by the report applicant for each test.

## 7.0 QUALITY CONTROL

7.1 Manufactures Quality Assurance System shall comply with the IAPMO-ES Minimum Requirements for Listee's Quality Assurance System (IAPMO ES-010).

7.2 The test method for determining the coating thickness of the samples shall be the same that is specified in the quality control documentation.

7.3 Treated panels shall be tested to verify performance levels as noted in section 2303.1.4 of the IBC and section R604.1 and R803.2 of the IRC.

## 8.0 EVALUATION REPORT RECOGNITION

8.1 Include the manufacturer's name and address and the Evaluation Report number as required by IAPMO on the product identification label. The product identification label shall be visible on the product.

8.2 The panels' structural design shall be in accordance with the *International Building Code*<sup>®</sup> (IBC) or the *International Residential Code*<sup>®</sup> (IRC).

8.3 Avoid exposure to precipitation during storage or installation. If material becomes wet it shall be replaced or permitted to dry to a maximum moisture content of 15 percent, prior to covering or enclosure within the structure.

8.4 Field-repaired panels and for panels exposed to conditions described in Section 8.3 of this criteria requires special inspection. Special inspector shall be approved by the manufacturer.

8.5 The Evaluation Report shall include the requirements of section 4.1 of this Evaluation Criterion.

8.6 The Evaluation Report shall publish allowable maximum loads and spans for service as floor and roof sheathing for its treatment. The use of adjustment factors are permitted to be used in conjunction with IBC or IRC published load or span tables.

8.7 Roof material installed above the temperature the coating intumesces is outside the scope of this report.

**Adopted: May 2010**