December 1, 2008

TO: **PARTIES INTERESTED IN EVALUATION REPORTS ON EXTERIOR WALL SHEATHING**

SUBJECT: Proposed Revisions to the Acceptance Criteria for Fiber-reinforced Magnesium-oxide-based Sheets, Subject AC386-1208-R1 (MB/YM)

Dear Madam or Sir:

A revision to the subject acceptance criteria, as presented in the enclosed criteria draft, is being posted on the ICC-ES web site to allow for public comment. The proposal is to revise Section 3.1.11 to permit a maximum flame-spread index of 25 and a maximum smoke-developed index of 450. The report applicant states the intent of the criteria, as it was originally approved, was not to establish requirements that are more restrictive than those required for interior finish materials. Staff notes that both ASTM C 1288 and ASTM C 1325, which were used as a basis for setting the physical property requirements in AC386, require flame-spread and smoke-developed indices of 0 and 5, and 10 and 5, respectively. The applicant contends that the requirements in those standards are particular to the materials for which the standards were developed and should not be applied to all materials intended for the same end use. Staff also notes that the code does not have requirements for sheet materials used as exterior sheathing, interior substrates for tile, or floor sheathing to be tested for flame spread characteristics. Further, the test requirement was included in the original criteria as it was proposed by the report applicant and because the standards on which the physical property tests were based, ASTM C 1288 and ASTM C 1325, both required the flame spread characteristics test.

You are cordially invited to submit written comments, within 30 days of the date of this letter. Please use the comment form on the web site attaching any letters to the form. An explanation of the alternate criteria process can be found on our web site at http://www.icc-es.org/Criteria_Development/alternative_criteria_process.shtml.

All comments received in the 30-day comment period will be considered. During this same 30-day period, however, the draft criteria will be balloted to the Evaluation Committee. If the public comments raise major issues, generate controversy, or require the criteria to be substantially rewritten, then ICC-ES staff may decide to reballot the criteria; or place a revised draft on the web site for further public comment; or put the criteria on the agenda for a future Evaluation Committee meeting.

Correspondence received and a memo outlining staff's resolution of the comments in the correspondence will be posted on the web site shortly after the close of the comment period.

Your cooperation is requested in forwarding to the Los Angeles business/regional office all material directed to the Evaluation Committee. Parties interested in the deliberations of the committee should refrain from communicating, whether in writing or verbally, with committee members. The committee reserves the right to refuse communications that do not comply with this request.

Newly approved acceptance criteria may involve test methods or test protocols that are not currently included in the scope of testing services offered by accredited testing laboratories. As noted in the ICC-ES Rules of Procedure for Evaluation Reports, the scope of the laboratory's accreditation must include the type of testing that is to be reported to ICC-ES. We encourage accredited laboratories to expand their scopes of accreditation to include testing under newly approved acceptance criteria. Please note that testing laboratories must be accredited by the International Accreditation Service (IAS) or by another accreditation body that is a signatory to the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement. For further information, please contact IAS at (562) 699-0541, extension 3309, or send an e-mail to pmccullen@iasonline.org.

Please submit all comments using the form on the web site. Attach any letters to the comment form. If you have any questions (not comments), please contact the undersigned at (800) 423-6587, extension 3289, or Yamil Moya, staff engineer, at extension 3257. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,

Michael Beaton

Michael Beaton, P.E.
Vice President - Whittier Operations

MB/raf

Enclosure

cc: Evaluation Committee

AC386 (MB)

DeVIT dc CONSULTING, INC

Scanned-Los Angeles 10/6/08

RECEIVED
SEP 08 2008
ICC-ES Los Angeles

September 2, 2008

ICC-ES Evaluation Services, Inc.
5360 Workman Mill Road
Whittier, CA 90601

Attn: Mr. Mike Beaton
Re: Modification to AC 386 Section

Dear Mr. Beaton:

After reviewing the criteria and preparing the submittal documents for one of the AC 386 proponents, I noticed there were some specific requirements in section 3.1.11, *FSI of 10 or less and an SDI of 5 or less*, for the E 84 test. I am not sure how this happened, but there was supposed to be a reference to a Class "A" material, *FSI of 25 or less and SDI of 450 or less*, not specific numbers. The numbers are in fact the results from one of the sponsoring clients E 84 test. I believe they were inserted by mistake and never caught. The numbers in the current document have no real correlation to anything but a specific materials test, nor do they have any apparent correlation to the code requirements.

These clients, Magnum Building Products and DragonBoard, respectfully request this be changed to reflect the initial intent of a Class "A" material, *FSI of 25 or less and SDI of 450 or less*.

Please let me know how I may help in accomplishing this.

Respectfully,

Respectfully submitted,

Ted DeVit
DeVit Consulting, Inc.
cc: File

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PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR FIBER-REINFORCED MAGNESIUM-OXIDE-BASED SHEETS

AC386

Proposed December 2008

Previously approved October 2007

PREFACE

Evaluation reports issued by ICC Evaluation Service, Inc. (ICC-ES), are based upon performance features of the International family of codes and other widely adopted code families, including the Uniform Codes, the BOCA National Codes, and the SBCCI Standard Codes. Section 104.11 of the *International Building Code*® reads as follows:

> **The provisions of this code are not intended to prevent the installation of any materials or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternative material, design or method of construction shall be approved where the building official finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.**

Similar provisions are contained in the Uniform Codes, the National Codes, and the Standard Codes.

ICC-ES may consider alternate criteria, provided the report applicant submits valid data demonstrating that the alternate criteria are at least equivalent to the criteria proposed in this document, and otherwise meet the applicable performance requirements of the codes. Notwithstanding that a product, material, or type or method of construction meets the requirements of the criteria proposed in this document, or that it can be demonstrated that valid alternate criteria are equivalent to the criteria in this document and otherwise meet the applicable performance requirements of the codes, ICC-ES retains the right to refuse to issue or renew an evaluation report, if the product, material, or type or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or malfunctioning is apt to cause unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use of the product, material, or type or method of construction.

Acceptance criteria are developed for use solely for purposes of issuing ICC-ES evaluation reports.

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PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR FIBER-REINFORCED MAGNESIUM-OXIDE-BASED SHEETS

1.0 INTRODUCTION

1.1 Purpose: The purpose of this acceptance criteria is to establish requirements for fiber-reinforced magnesium-oxide-based interior substrate sheets to be recognized in an ICC Evaluation Service, Inc. (ICC-ES), evaluation report under the 2006 *International Building Code*® (IBC), the 2006 *International Residential Code*® (IRC), and the 1997 *Uniform Building Code*™ (UBC). Bases of recognition are IBC Section 104.11, IRC Section R104.11, and UBC Section 104.2.8.

The reason for the development of this criteria is that the code does not provide guidance for qualifying fiber-reinforced magnesium-oxide-based materials that are used as sheathing, as flooring or as backer boards for adhered veneers.

1.2 Scope: This criteria is applicable to mechanically attached, fiber-reinforced, magnesium-oxide-based substrate sheets complying with the physical property requirements described in Section 3.1 of this criteria. End use of the substrate sheets is determined by testing under other acceptance criteria: the substrate sheets may be used as wall sheathing and floor underlayment when qualified in accordance with the applicable sections of the Acceptance Criteria for Reinforced Cementitious Sheets Used as Wall Sheathing and Floor Underlayment (AC376); as interior substrates, when qualified in accordance with the applicable sections of the Acceptance Criteria for Fiber-cement Interior Substrate Sheets Used in Wet and Dry Areas (AC378); and as structural floor sheathing when qualified in accordance with the applicable sections of the Acceptance Criteria for Acceptance Criteria for Fiber-cement Sheet Structural Floor Sheathing (AC367). The substrate sheets are suitable for decoration with paint, wallpaper, resilient flooring, ceramic tile, natural stone or dimensional stone veneers on floors and walls in interior dry areas. The substrate sheets are limited to use on interior surfaces as defined in IBC Section 2502 and UBC Section 2501, and may not be used in wet areas as defined in IBC Section 2509. Under the IRC, the substrate sheets may not be used in showers.

Recognition is limited to Type V construction unless the substrate sheets comply with Section 3.6 of this criteria.

1.3 Codes and Referenced Standards:

1.3.1 2006 *International Building Code*® (IBC), International Code Council.

1.3.2 2006 *International Residential Code*® (IRC), International Code Council.

1.3.3 1997 *Uniform Building Code*™ (UBC).

1.3.4 ASTM C 666-97, Test Method for Resistance of Concrete to Rapid Freezing and Thawing, ASTM International.

1.3.5 ASTM C 1185-99, Test Methods for Sampling and Testing Non-asbestos Fiber-cement Flat Sheet, Roofing and Siding Shingles, and Clapboards, ASTM International.

1.3.6 ASTM E 119-00, Test Methods for Fire Tests of Building Construction and Materials, ASTM International.

1.3.7 ASTM E 136-99$^{\epsilon 01}$, Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, ASTM International.

1.3.8 ASTM D 1037-99, Test Methods for Evaluating Properties of Wood-base Fiber and Particle Panel Materials, ASTM International.

1.3.9 ASTM D 2394-83 (1999), Methods for Simulated Service Testing of Wood and Wood-base Finish Flooring, ASTM International.

1.3.10 ANSI A 118.1-99, Standard Specifications for Dry-set Portland Cement Mortar, American National Standards Institute.

1.3.11 ANSI A 118.4-99, Standard Specifications for Latex–Portland Cement Mortar, American National Standards Institute.

1.3.12 ICC-ES Acceptance Criteria for Reinforced Cementitious Sheets Used as Wall Sheathing and Floor Underlayment (AC376).

1.3.13 ICC-ES Acceptance Criteria for Reinforced Cementitious Interior Substrate Sheets Used in Wet and Dry Areas (AC378).

1.3.14 ICC-ES Acceptance Criteria for Fiber-reinforced Cement Sheet Structural Floor Sheathing (AC367).

1.3.15 ASTM C 1325-04, Standard Specification for Non-asbestos Fiber-mat Reinforced Cement Substrate Sheets, ASTM International.

1.3.16 ASTM C 1396-02, Standard Specification for Gypsum Wallboard, ASTM International.

1.3.17 ASTM E 84-04, Test Methods for Surface Burning Characteristics of Building Materials, ASTM International.

1.4 Definitions:

1.4.1 Fiber-reinforced Magnesium-oxide-based Sheets: Fiber-reinforced magnesium-oxide-based sheets are sheet products consisting of a proprietary composition of magnesium oxychloride that is reinforced by a fibermat or fiber scrim made of organic or inorganic fibers. The sheets may contain proprietary additives and have factory-applied coatings. The sheets are manufactured in various lengths and widths, and in thicknesses from $^1/_4$ to 1 inch (6.3 to 25.4 mm).

1.4.2 Wet Areas: Shower and public toilet areas, as defined in IBC Section 2509.1.

1.4.3 Dry Areas: All areas not included in the definition under Section 1.4.2 of this criteria.

1.4.4 Fastening System: A fastening system is defined as a method to mechanically attach the sheathing or single floor grade sheets to framing.

1.4.5 Span Rating: The recommended maximum center-to-center spacing in inches (mm) of floor framing used to support the sheets for the specified end use under normal use conditions.

1.4.6 Single Floor Grade: Sheets used as a combination subfloor and underlayment installed with edge treatment, blocking or covered with one of the materials described in footnote d of IBC Table 2304.7(3), footnote j of IRC Table R503.2.1.1(1) or footnote 4 of UBC Table 23-II-E-1, as applicable.

1.4.7 Sheathing Grade: Sheets used as sheathing that require a separate underlayment installed on top of the sheets.

2.0 BASIC INFORMATION

2.1 General: The following information shall be submitted:

2.1.1 Product Description: Complete information concerning material specifications, thickness, size and the manufacturing process.

2.1.2 Installation Instructions: Installation details and limitations, fastening methods, joint treatments, and face treatments.

2.1.3 Packaging and Identification: A description of the method of packaging and field identification of the substrate sheets. Identification provisions shall include the evaluation report number and, if applicable, the name or logo of the inspection agency.

2.1.4 Field Preparation: A description of the methods of field-cutting, application and finishing.

2.2 Testing Laboratories: Testing laboratories shall comply with Section 2.0 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports.

2.3 Test Reports: Test reports shall comply with AC85.

2.4 Product Sampling: Products for testing under this criteria shall be sampled in accordance with Sections 3.1, 3.3 and 3.4 of AC85.

3.0 TEST AND PERFORMANCE REQUIREMENTS

Reports of tests shall be submitted in accordance with the following requirements:

3.1 Physical Properties:

3.1.1 Flexural Strength: Testing in accordance with ASTM C1185, with conditions of acceptance of 580 psi (4000 kPa) minimum average flexural strength, both wet and dry.

3.1.2 Freeze/Thaw Cycling: When tested in accordance with ASTM C 666, Procedure B, the test samples shall show no disintegration following 25 cycles. A minimum of 5 specimens shall be tested.

3.1.3 Dimensions and Tolerances: Testing in accordance with ASTM C1185 with conditions of acceptance as noted in Section 7 of ASTM C 1186.

3.1.4 Moisture Movement: When tested in accordance with ASTM C 1185, linear variation with change in moisture content shall be stated as the percentage change in length based on a relative humidity change from 30 to 90 percent. Sampling for tests shall be in accordance with Section 4 of ASTM C 1185.

3.1.5 Water Absorption: When tested in accordance with ASTM C 1185, the water absorption shall be reported as the percentage increase in weight of dry specimens following submersion for a period of 48 hours. Sampling for tests shall be in accordance with Section 4 of ASTM C 1185.

3.1.6 Compression Indentation: When tested in accordance with ASTM D 2394, samples shall show a value greater than 1250 psi (8620 kPa) at less than 0.05 inch (1.3 mm). A minimum of 5 specimens shall be tested.

3.1.7 Nail-head Pull Through: The substrate sheets shall have a minimum saturated nail-head pull-through resistance of 125 lbf (560 N) when tested in accordance with ASTM D 1037 utilizing a roofing nail with a 0.375-inch-diameter (10 mm) head and a shank diameter of 0.121 inch (3 mm). A minimum of 5 specimens shall be tested.

3.1.8 Falling Ball Impact: When tested in accordance with ASTM D 1037, samples shall show no damage to top or bottom surfaces at a 12-inch (305 mm) drop. A minimum of 5 specimens shall be tested.

3.1.9 Shear Bond Strength:

3.1.9.1 Dry-set Portland Cement: The substrate sheets shall be tested in accordance with ANSI A 118.1, using test specimens consisting of the substrate sheet adhered to substrate sheet, and shall demonstrate a minimum shear bond strength at seven-day curing of 50 psi (345 kPa). A minimum of 5 specimens shall be tested.

3.1.9.2 Latex-Portland Cement Mortar: The substrate sheets shall be tested in accordance with ANSI A 118.4, using test specimens consisting of the substrate sheet adhered to substrate sheet, and shall demonstrate a minimum shear bond strength at seven-day curing of 50 psi (345 kPa). A minimum of 5 specimens shall be tested.

3.1.10 Humidified Deflection: Testing in accordance with ASTM C 1396. Conditions of acceptance are as described in Section 5.1.2 of ASTM C 1396. For use as ceiling boards, the sheathing boards shall have a maximum humidified deflection of $^{5}/_{16}$ inch (7.9 mm), when used as ceiling finish (textured or painted), or 0.0639 inch (1.62 mm), when used as a base for tile.

3.1.11 Surface Burning Characteristics: The substrate sheets shall be tested in accordance with ASTM E 84 and shall have a flame-spread index of ~~10~~ 25 or less and a smoke-developed index of ~~5~~ 450 or less.

3.2 Use as Structural Floor Sheathing: For use as structural floor sheathing, testing and conditions of acceptance in accordance with Sections 3.2 through 3.6 of AC367.

3.3 Use as Wall Sheathing or Floor Underlayment: For use as wall sheathing or floor underlayment, testing and conditions of acceptance in accordance with Sections 3.6 and 3.7 of AC376.

3.4 Use as a Substrate in Interior Areas: For use as a substrate in interior areas, testing and conditions of acceptance in accordance with Sections 3.2, 3.3, 3.6 and 3.7 of AC378.

3.5 Fire-resistance-rated Construction: For use in fire-resistance-rated construction, tests shall be conducted in accordance with ASTM E 119.

3.6 Noncombustible Construction: For use in Types I, II, III and IV construction under the IBC and noncombustible construction under the UBC, tests shall be conducted in accordance with ASTM E 136.

4.0 QUALITY CONTROL

4.1 The products shall be manufactured under an approved quality control program with inspections by an inspection agency accredited by the International Accreditation Service (IAS) or otherwise acceptable to ICC-ES.

4.2 Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted.

5.0 EVALUATION REPORT RECOGNITION

5.1 The evaluation report shall include a statement that support framing shall be designed for a maximum allowable assembly deflection of L/360 under seismic or wind loads for exterior or interior walls; or live loads for ceilings supported by floor framing; or live, seismic, or wind loads for ceilings supported by roof framing.

5.2 When use is as a structural floor sheathing, the evaluation report shall include information required in Section 7.0 of AC367.

5.3 When use is as a substrate in interior wet and dry areas, the evaluation report shall include information required in Section 6.0 of AC378.

5.4 The evaluation report shall include a condition of use that the substrate sheets are limited to use on interior surfaces as defined in IBC Section 2502 and must not be used in wet areas as defined in IBC Section 2509; under the IRC, the substrate sheets must not be used in showers.■