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MEMO

To: ICC-ES Evaluation Committee
From: Peter Bahlo, P.E., Senior Staff Engineer
Date: January 28, 2010
Subject: Proposed Revisions to the ICC-ES Acceptance Criteria for Pneumatic- or Gas-power-driven Pin Fasteners Used to Attach Gypsum Panels to Cold-formed Steel Framing; Subject AC259-1210-R1 (PB/PL)

Proposed new title:
Acceptance Criteria for Power-driven Pins for Attaching Gypsum Board to Cold-formed Steel Framing;
Subject AC259-1210-R1 (PB/PL)

In response to the request for public comments as noted in the December 29, 2009, staff letter on the subject, the following correspondence was received:

1. E-mail correspondence from Michael Gardner, CEO, Gypsum Association; dated January 15, 2010.
2. Letter from Dave Jablonski, Product Validation Manager, ITW Ramset, a Division of Illinois Tool Works; dated January 18, 2010.
3. Letter from Robert J. Leichti, Ph.D., Compliance Manager, Fasteners, Stanley Fastening Systems; dated January 18, 2010.
4. Letter from José Manuel Estrada, Architectural Systems & Code Affairs, United States Gypsum Company; dated January 20, 2010.

Staff greatly appreciates the correspondence providing critique of the proposed revisions to AC259, an acceptance criteria with very limited scope, that is, a document that sets forth test requirements for proprietary power-driven pins used to attach gypsum board to exterior walls and establishing the pins' capacity to hold the gypsum board in place when subject to transverse wind loads.

The following proposed revisions to the AC259-0210-R1 currently posted on the ICC-ES website are submitted by staff for consideration by members of the Evaluation Committee during their deliberation on February 3, 2010:

1. Staff proposes to further revise the proposed new title as follows: “Acceptance Criteria for Power-driven Pins for Attaching Gypsum Board to Exterior Wall Cold-formed Steel Framing.” Additionally, revise Section 1.2 to clarify that the intent of the criteria has not changed with respect to exterior wall applications resisting transverse wind loads only:

1.2 Scope: This criteria applies to power-driven pins used to attach gypsum board to cold-formed steel (CFS) framing members for exterior wall applications that designed and installed to resist transverse (wind) loading on structures of combustible (Type V) and noncombustible (Types I, II, III, and IV) construction. Exterior wall assemblies incorporating the pneumatic- or gas- with power-driven pins used to attach gypsum board to CFS framing are limited:

2. Staff is grateful for the information submitted by Mr. Gardner (Gypsum Association) and Mr. Estrada (United States Gypsum Company), and finds that it should be incorporated into AC259-0210-R1:

- Eliminate the reference to ASTM C 79 from Section 1.3.9 of AC259-0210-R1. Although IBC Table 2506.2 mandates that gypsum sheathing comply with ASTM C 79, this standard has been withdrawn from circulation by ASTM because it has been replaced by industry with ASTM C 1396, and all gypsum sheathing available in the marketplace bears a label identifying only ASTM C 1396. Gypsum sheathing with an ASTM C 79 identifier is no longer available.
- Retain the reference to ASTM C 1396 in Section 1.3 of AC259-0210-R1.
- In Section 1.3, include ASTM C 1177-08, *Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing*; and ASTM C 1278-07a, *Standard Specification for Fiber-Reinforced Gypsum Panel*.
- Revise Section 1.4.7 to read as follows:

1.4.7 Gypsum Board: Gypsum Sheathing board compliant with ASTM C 1396, or gypsum-based sheathings compliant with ASTM C 1177 or ASTM C 1278, or a with a current ICC-ES evaluation report.

3. Mr. Jablonski, Product Validation Manager, ITW Ramset, expresses an objection to the revised Section 3.1.3, which requests the evaluation report applicant to submit test data verifying the core, edge and end hardness of gypsum boards used in test protocols for the power-driven pins. Mr. Jablonski further suggests that it should be sufficient for the test laboratory to submit an affidavit certifying that the sheathing products tested are from representative manufactured stock. Although Mr. Jablonski’s objection and suggested remedy seem reasonable, staff recommends

that the current version of Section 3.1.3 of AC259 (dated June 2004) be reread closely because it mandates submittal of test reports on verification of gypsum board compliance with its applicable standard:

“Gypsum panels shall comply with the applicable standard(s) and Verification of compliance, in the form of test reports, shall be provided.”

The reason staff proposed changes to Section 3.1.3 was to lessen the burden currently imposed upon an evaluation report applicant to submit test reports verifying compliance with gypsum sheathing standardized performance requirements, such as flexural strength, humidified deflection, fastener pull-through resistance, surface water absorption, water resistance of treated cores, and core hardness. From staff's perspective, it seems reasonable to test only one physical property of the gypsum board that probably has the most influence on fastener head pull-through capacity. The requirement, as currently set forth in Section 3.1.3 of the 2004 edition of AC259, seems too onerous and provides little useful information with respect to evaluating the pull-through capacity of a fastener.

Staff concurs that the scope of AC259 is power-driven pins and their ability to attach gypsum sheathing to steel studs, which requires qualification testing of the interaction between the pin and the gypsum board. Some physical properties of the materials used in testing need to be quantified, such as the properties of the steel studs and the gypsum board. Consequently, staff proposes to further revise Section 3.1.3 by requesting that only the gypsum board core hardness be tested and reported to verify compliance with industry standards. This further revision deletes from Section 3.1.3 the requirement to test the board's end and edge hardness. Staff has a concern that if a gypsum board material is noncompliant with its own standard but is used in qualification testing of the power-driven pin's pull-through capacity, it probably would detrimentally affect the fastener's rated performance.

4. Mr. Jablonski, Product Validation Manager, ITW Ramset, expresses considerable concern about, and firm opposition to, the proposed changes to Section 3.2 (Test Method) of the current version of AC259 (June 2004). Whereas, Dr. Leichti, Compliance Manager, Fasteners, Stanley Fastening Systems, is generally supportive, he also expresses reservations about the proposed revisions to the assembly testing described in Section 3.2.4. Staff has considered these concerns and reviewed test data on file that had been submitted for several existing evaluation reports for power-driven pins used to attach several proprietary gypsum board products to steel studs. Staff concludes that although the proposed changes to AC259 that investigate by small-scale testing the limit states of pin pull-out and pin pull-over capacities, the full-scale test data on file implies that failure loads for an assembly may not be accurately calculated with sufficient confidence if data are only available based on small-scale testing that intentionally induces specific failure modes. Staff is not prepared to suggest all the necessary changes in this memo,

which has a strict deadline for posting on the ICC-ES website. Consequently, staff requests the assistance of Messrs. Jablonski and Leichti, and any other interested parties, to revise AC259 to permit small-scale testing that is needed to induce specific types of failures on a sample size that has statistical significance, as well as include large-scale testing to investigate a systems effect that is apparent when evaluating the existing data.

Staff requests that all interested parties contact the author of this memo at ext. 3306 or by e-mail pbahlo@icc-es.org with any comments or further concerns.