From: Michael Gardner [mailto:mgardner@gypsum.org]
Sent: Friday, January 15, 2010 6:57 AM
To: Peter Bahlo
Subject: AC259 Comment

Dear Peter:

Since AC259 does involve gypsum, a couple of comments in the spirit of assisting the process. I think you may have already heard some of this from one of my member companies.

When I read the scope, it appears linguistically reversed. Don't you want it to address an exterior application and say "installed on the exterior" rather than "installed in" in Section 1.2.? It reads as if it is intended to apply to an interior use.

Three reasons:

1. The traditional use of power-driven pins with gypsum board materials is with exterior gypsum sheathing products. I'm not aware that they are used much, if at all, with interior applications.
2. Section 1.2.1. discusses transverse loads, typically an exterior application issue.
3. Appears that you are trying to reference an exterior product standard via C 79 in Section 1.3.

I would suggest that you eliminate the reference to the ASTM C 79 standard as the standard has been withdrawn from circulation by ASTM and is no longer being distributed. It also likely will come out of the 2012 codes. We submitted a change to have it removed as it has been replaced by the universal C 1396 standard. (We thought ASTM was going to do that for the 2009 codes. We got our signals crossed. It did not get accomplished.)

<u>Assuming that the actual intention of the proposed AC is to address an exterior gypsum sheathing application only</u>, I might suggest the following:

1. Eliminate the reference to ASTM C 79 from section 1.3 of AC 259.
2. Retain the reference to ASTM C 1396 in Section 1.3 of AC 259.
3. Change any references to ASTM C 79 in the body of the AC to ASTM C 1396.
4. Modify section 1.4.7 to read as follows: "Gypsum sheathing board as defined in ASTM C 1396 or in a current ICC-ES evaluation report."

I believe you have discussed the need to incorporate the proper references for proprietary non-paper face sheathing products with some of our member companies. You may need to modify what I have suggested based on those discussions. One problem you will encounter if you keep the C 79 reference is that no manufacturer labels paper-face gypsum sheathing with the C 79 identifier anymore. It is all labeled as C 1396 material under the universal standard.

Please contact me to discuss our input as necessary. I will leave it to your discretion as to whether you want to post it as a comment.

Michael A. Gardner

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January 18, 2010

To Whom It May Concern:

RE: Proposed revisions to AC259

The purpose of this letter is to comment on the proposed changes to AC259 – Acceptance Criteria for Power Driven Pins for Attaching Gypsum Board to Cold Formed Steel Framing. In the letter dated December 29, 2009, some of the proposed revisions appear to be acceptable and require no further comments. The sections below are areas that Ramset believes require additional discussion and submit the following comments:

In proposal number 2, references to the earlier I-codes are proposed to be deleted. While it is assumed that the 2009 codes provide a greater level of protection, there are some building officials around the country that may believe if the evaluation report does not reference their particular locally approved I-Code, the evaluation report is not valid. Perhaps language in the evaluation report should be developed explaining the greater level of protection.

Proposal number 7 revises the requirements within section 2.1 concerning the details of the power driven pins. We are agreeable to the proposal here, however many of the attributes of the fastener could be considered as proprietary. The details of the fastener can be provided to the ES staff as part of the data submitted. We are opposed to much of the data being published within the evaluation report other than a very general description of the fastener.

Proposal number 10 would require test data on the gypsum board core end and hardness data. We disagree with this proposal. Adding this requirement would be an added expense of testing. While a test lab may be able to determine these characteristics of the board, the gypsum board specifications are not likely to be revealed. The board manufacturer may consider these attributes proprietary. At the time of testing the specification range of the board would be unknown. As an alternative, the test laboratory should be able to submit an affidavit that the board is sampled from representative manufactured stock.

Proposal number 11 greatly changes the test methods and requirements. Ramset is deeply opposed to many of the changes within section 3.2 of the acceptance criteria. These changes have no basis and require testing that does little to prove equivalency to the comparable screw that would normally be used to make this type of fastening. It should be noted that in many cases these nail or pin type fasteners are modeled after the screws they are designed to replace. Many of the proposed changes appear to reflect staff concern regarding the performance of the gypsum board and not the fastener. The scope clearly states the fastener is being tested here and not the gypsum board. The contrary appears in these proposals. If there is concern over the performance of the board, little will change whether a screw or nail type fastener is used. Perhaps there should be some further collaboration with the ES staff, the board manufacturers, and the fastener manufacturers.

Section 3.2.1.1 and 3.2.2 would require pullout testing of the fastener installed in the grade and thickness of each cold formed steel structural member where recognition is sought. This proposal would appear unnecessary. If it can be shown in a full scale ASTM E330 test that the failure mode is the board pulling over the head of the fastener, what is gained by performing fastener pullout testing when the board is the limiting factor? Perhaps the criteria should be revised to add pullout testing as a requirement where failure mode in an E330 test is the fastener.

Section 3.2.1.2 adds the proposed requirement of testing pull through capacity of the fastener through the gypsum board. This proposal does little to test the actual fastener and appears that its sole purpose is to test the gypsum board. This testing would not appear to have much value because it essentially duplicates the E330 test on a smaller scale.

Section 3.2.1.3 requests to establish edge and spacing requirements. We have to keep in mind the actual application. When board is placed onto a cold formed stud at best there is normally 1-1/2 inches where the fastener can be placed, worst case with a butt joint there is half of that. This edge distance would be that same as the screw the pin/nail would replace. We have a question as to the need and what value does this testing provide? Fastener spacing is a little different. In an E330 test, increased panel performance can be seen with tighter fastener spacing. Is there an issue with recognition being granted for the fastener spacing tested? An option can be written into the criteria to investigate spacing for additional recognition.

Section 3.2.4 significantly changes the way an E330 test is run with proposed requirements of 24-inches on center stud spacing and a full length vertical but joint. While 24 inch stud spacing might be conservative, it does not represent current building practices of 16 inch stud spacing. Perhaps both should be allowed and appropriately noted within the evaluation report.

The requirement in section 3.2.4.3 of a full scale butt joint does nothing to test the ability of the fastener and only tests edge strength of the board itself. If we refer back to the scope of the acceptance criteria is it not the fastener we are testing and evaluating here? If a screw were used in this type of testing how would testing differ from the nail or pin.

We feel many of the requirements proposed to be added to AC259 do not add value to the test and only increase the expense in the cost of testing. While a screw is essentially written into the building code for this type of application, the criteria should be designed around tests where the nail/pin may differ greatly from the screw. While the screw does a great job in making the attachment of gypsum board to cold formed steel, is its performance overkill for the application especially when the gypsum board is normally the limitation? To add value to the criteria perhaps some consideration should be given to a fastener driving test. Essentially this would test the fasteners ability to penetrate through the gypsum board and cold formed steel while leaving the head of the fastener flush. This would find the material thickness where the fastener can no longer be driven flush with the manufacturers recommended tool. It may also find the low end where the cold formed steel is too thin to properly hold the fastener. Another area where improvements can be made is adding a requirement to the evaluation report that the end user perform field test fastenings. This would properly adjust the tool and see if the fastener can accomplish what it was designed to do in that particular application. The test would look for the ability to drive the fastener flush without being overdriven into the gypsum board.

Best regards,

Dave Jablonski
Product Validation Manager

STANLEY
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January 18, 2010

Mr. Peter Bahlo
ICC – Evaluation Service
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RE: AC259-0210R1

Dear Mr. Bahlo;

For many years, gypsum boards were attached to wood-frame construction only with nails. Even though, the I-codes reference ASTM C954 tapping screws for the attachment of gypsum boards to cold-formed steel (CFS) framing, it should not be a revelation that gypsum boards can be attached to CFS framing with power-driven pins. The use of pneumatic and cordless gas tools with driven pins for fastening gypsum boards to CFS is a highly productive construction method. While building officials and engineers are most familiar with screws for this fastening, power-driven pins are an alternate fastener with performance that meets or exceeds tapping screws for CFS framing recognized by the I-codes.

Tapping screws cut a hole and tap the hole surface as they pass through the CFS framing member. Power-driven pins forcefully penetrate the framing member producing a dimple by pushing the entry surface through the exit surface. The dimple causes the pin to perform as though driven into a thicker base material. The shank deformations either cut the penetration surface much like the threads on a tapping screw and/or act to tightly wedge the fastener in the penetration opening. Power-driven pins used for attachment of gypsum boards to CFS framing have under-head geometry and head diameter similar to screws in compliance with ASTM C954, and the pins are collated (in plastic or on wire) for use in a driver tool. Typical pneumatic tools that drive pins into CFS framing in the range of thickness 0.068 to 0.033 in. (14 to 20 ga.) operate at 100 to 120 psi; although, there are some high pressure tools that operate as high as 400 psi. The driver tools have mechanical depth control so that the head of the pin is driven into the plane of the board surface without tearing the surface at the head perimeter; the head of the pin is driven to the same depth as a properly placed screw. As a result of the drive depth control and the head geometry, the power-driven pins have pull-over capacities that meet those of screws, and negative pressure testing has shown that pull-over property, not the pull-out property, controls negative pressure performance for both power-driven pins and C954 screws.

Power-driven pins are somewhat different from nearly every other construction fastener because there is not an ASTM standard that is used as the basis for compliance. A consensus standard has not been developed because there is a limited number of manufacturers, and at the same time there is a range of wire properties, processes, and geometries that when combined can provide performance that meets or exceeds the performance offered by C954 tapping screws. Hence, the acceptance criteria and the evaluation reports based on them are important to the pin manufacturers, the engineering design community, and building code officials.

The proposed revision to AC259 (Section 3.2.2 and Section 3.2.3) requires single fastener performance that has not previously been part of the evaluation report. The data are important information that should be part of the data set. Section 3.2.2 addresses the pull-out test, which provides a sense for where the pull-out property lies for the pin in different base metal thickness relative to the pull-over property for various sheathing products. Section 3.2.3 directs to establish the pull-over property using ASTM C473 as the basis for the test and S100-2007 as the basis for calculation. While the test gives a sense for likely performance, it is noted that ASTM C473, section 13.2 cautions “the degree of correlation between these test methods and service performance have not been determined.” At the same time, there is no other more satisfactory method to establish the pull-over property and the method parallels that used for other products.

Section 3.2.4.2 describes required assembly testing and requires that the CFS framing is selected so that pull-out is not a failure mode and to minimize framing deformation during test. This requirement mutes the purpose of assembly testing because the CFS framing thickness should be selected based on the materials to be recognized in the evaluation report. Pull-out will be a low probability failure mode for the thicknesses of steel that are required in the codes (0.068 to 0.033 in.) because it is greater than the pull-over property for gypsum board products. Various fastener spacing could be demonstrated using 0.033, 0.054, and 0.098-in. thick steels and the values for 0.043 and 0.068-in. steels can be adequately estimated by interpolation. Testing every fastener spacing and gypsum board on all steel thicknesses is counter productive because the pull-over property of the sheathing controls.

Section 3.2.4.3 requires that the pins be placed at the maximum spacing and using the minimum edge distance to be sought in the evaluation report. The construction of the test assembly acts as the limits to the evaluation report. The proponent should be allowed to demonstrate a range of assembly configurations as needed and with the knowledge that the performance of the widest spacing and minimum edge distance named in the report are to be demonstrated by assembly test.

The ASTM E330, Method B requires deflection measurement, but the deflection measurement data is not used in the acceptance criteria or the calculation of the engineering properties. Further, Section 3.2.4.5 requires that the specimen is stiffened to prevent deflection greater than allowed by the applicable code. By stiffening the test specimen, the deflection measurements required by E330, Method B are even less valuable and more difficult to interpret. Further, stiffening the framing may cause some unrealized consequences in that the three-dimensional surface topology of the sheathing could be changed from that of a non stiffened frame, thus affecting the fastener capacity. Is there a need to measure deflection per E330, Method B for the purposes of this test? Should the specimen always be stiffened? Some bracing may be required with heavier sheathings and closer fastener spacing, or both, because these conditions may cause the controlling mechanism to be bending strength of the gypsum board or the lateral-torsional bending capacity of the framing. What negative pressure value is to be assigned in those cases where component performance other than the fasteners controls the ultimate load?

Please accept my expression of appreciation for your considerable work in the revision of this acceptance criteria. I look forward to the approval and assignment of an immediate implementation date.

Sincerely,

STANLEY FASTENING SYSTEMS, L.P.

[electronic]

Robert J. Leichti
Compliance Manager, Fasteners