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April 1, 2024

TO: **PARTIES INTERESTED IN PROPRIETARY DESIGNS AND ALTERNATE CONFIGURATIONS OF SHEET METAL TIES FOR ANCHORED MASONRY VENEER CONSTRUCTION**

SUBJECT: Proposed New Acceptance Criteria for Proprietary Designs and Alternate Configurations of Sheet Metal Ties for Anchored Masonry Veneer Construction (AC568) Subject AC568-0424-R1 (DW/MC)

Dear Colleague:

We are seeking your comments on the enclosed proposal for a new acceptance criteria for Proprietary Designs and Alternate Configurations of Sheet Metal Ties for Anchored Masonry Veneer Construction, which is being posted for 30 days of public comment on the ICC-ES web site.

1. New proposed acceptance criteria is based on AC13 requirements for the evaluation of proprietary and alternate configurations of sheet metal ties for anchored masonry veneer as alternatives to corrugated sheet metal ties and AC13 Annex 2. AC13 has been revised and posted on the ICC-ES website, to remove all references and requirements for the Proprietary Designs and Alternate Configurations of Sheet Metal Ties for Anchored Masonry Veneer Construction.

Should the Evaluation Committee approve the proposed new acceptance criteria, no mandatory compliance date will be required.

While the Evaluation Committee will be voting on the criteria during the 30-day comment period, we will seriously consider all comments from the public and will pull the criteria back for reconsideration and revisions if public comments raise major issues. In that case, we would seek a new committee vote; revise the draft and post it for further public comments; or put the criteria on the agenda for a future Evaluation Committee hearing.

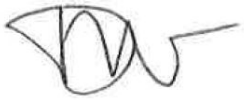
If it is of interest, please review the draft criteria and send us your comments at the earliest opportunity.

To submit your comments, please use the form on the web site and attach any letters or other materials. If you would like an explanation of the “alternate criteria process,” under which we are soliciting comments, this too is available on the ICC-ES web site.

Please do not try to communicate directly with any Evaluation Committee member about a criteria under consideration, as committee members cannot accept such communications.

Thank you for your interest and your contributions. If you have any questions, please contact me at (800) 423-6587, extension 3272, or Manuel Chan, P.E., S.E. Principal Structural Engineer, at extension 3288. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,



Danny Wong, P.E., P.Eng.
Senior Staff Engineer

dw/mc/ls

Encl.

cc: Evaluation Committee

ICC EVALUATION SERVICE®

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PROPOSED ACCEPTANCE CRITERIA ACCEPTANCE CRITERIA FOR PROPRIETARY DESIGNS AND ALTERNATE CONFIGURATIONS OF SHEET METAL TIES FOR ANCHORED MASONRY VENEER CONSTRUCTION

AC568

Proposed April 2024

PREFACE

Evaluation reports issued by ICC Evaluation Service, LLC (ICC-ES), are based upon performance features of the International family of codes, and may include other codes, as applicable. For alternative materials design and methods of construction and equipment, see Section 104.2.3 of the 2024 International Building Code® (IBC), Section 104.11 of the 2021 IBC and earlier editions, and Section R104.11 of the 2021 IRC and earlier editions.

ICC-ES may consider alternate criteria for report approval, provided the report applicant submits data demonstrating that the alternate criteria are at least equivalent to the criteria set forth in this document, and otherwise demonstrate compliance with the performance features of the codes. ICC-ES retains the right to refuse to issue or renew any evaluation report, if the applicable product, material, or method of construction is such that either unusual care with its installation or use must be exercised for satisfactory performance, or if malfunctioning is apt to cause injury or unreasonable damage.

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

PROPOSED ACCEPTANCE CRITERIA FOR PROPRIETARY DESIGNS AND ALTERNATE CONFIGURATIONS OF SHEET METAL TIES FOR ANCHORED MASONRY VENEER CONSTRUCTION (AC568)

1.0 INTRODUCTION

1.1 Purpose: The purpose of this criteria is to establish requirements for ICC Evaluation Service, LLC (ICC-ES), evaluation of proprietary and alternate configurations of sheet metal ties, for anchored masonry veneer, as alternatives to the corrugated sheet metal ties in Section 1404.7 the 2021, 2018 and 2015 *International Building Code*® (IBC) and Section R703.8.4 the 2021, 2018 and 2015 *International Residential Code*® (IRC).

The reason for the development of this criteria is to provide a guideline for the evaluation of proprietary or alternate configurations of sheet metal anchors for masonry veneer, since the IBC and IRC and associated reference standards do not specify installation and quality requirements for these products.

1.2 Scope: Sheet metal ties for anchored masonry veneer in this criteria are used to attach anchored masonry veneer to wood framing members.

Sheet metal ties for anchored masonry veneer transfer out-of-plane lateral (horizontal) loads from masonry veneer construction to supporting wall framing.

The IBC (through reference to TMS 402) and the IRC provide prescriptive physical characteristics and construction requirements for sheet metal ties for anchored masonry veneer construction. The airspace for such ties is limited to 1 inch. The purpose of this criteria is to provide test requirements and evaluation criteria for sheet metal ties for anchored masonry veneer construction for the following non-prescriptive cases:

1.2.1 Sheet metal ties for anchored masonry veneer construction that comply with the code-specified physical characteristics of TMS 402 Section 12.2.2.5.1.1 or IRC R703.8.4.1 [0.03-inch thick (0.8 mm thick)] but are utilized with greater airspace than prescribed by the IBC and IRC.

1.2.2 Sheet metal ties for anchored masonry veneer construction that comply with the code-specified physical characteristics of TMS 402 Section 12.2.2.5.2.1 [0.06-inch thick (1.5 mm thick)].

1.2.3 Sheet metal ties for anchored masonry veneer construction that are of a proprietary physical design and intended for use with greater airspace than prescribed by the IBC and IRC.

1.3 Codes and Referenced Standards:

1.3.1 2021, 2018 and 2015 *International Building Code*® (IBC), International Code Council.

1.3.2 2021, 2018 and 2015 *International Residential Code*® (IRC), International Code Council.

1.3.3 AISI S100-16(2020) with S2-20 for the 2021 IBC; -16 for the 2018 IBC and IRC; and -12 for the 2015 IBC and IRC. North American Specification for the Design of Cold-formed Steel Structural Members, American Iron and Steel Institute.

1.3.4 ASTM E754-80 (2022) Standard Test Method for Pullout Resistance of Ties and Anchors Embedded in Masonry Mortar Joints.

1.3.5 ASTM D7147-11(2018) for the 2021 IBC and IRC;-11 for the 2018 IBC and IRC; and -05 for the 2015 IBC and IRC. Standard Specification for Testing and Establishing Allowable Loads of Joist Hangers, ASTM International.

1.3.6 ISO 21930-2017 Sustainability in Buildings and Civil Engineering Works - Core Rules for Environmental Product Declarations of Construction Products and Services, International Organization for Standardization (ISO).

1.3.7 TMS 402-16 for the 2021 and 2018 IBC and IRC; and -13 for the 2015 IBC. Building Code Requirements and Specifications for Masonry Structures, The Masonry Society.

2.0 BASIC INFORMATION AND TEST REPORTS

2.1 General: The following information shall be submitted:

2.2 Device Description: Complete information pertaining to components, material specifications, and manufacturing processes. Materials shall comply with an appropriate recognized national standard(s).

2.3 Fastener Description: Complete information pertaining to fastener. type, size, diameter, dimensions, material specifications, and minimum specified bending yield strength of fasteners, as applicable.

2.4 Installation Instructions: Installation details and drawings, noting installation requirements and/or limitations.

2.5 Identification: Description of the method of identifying the product. Each device shall bear an imprint which clearly identifies the manufacturer. A registered trademark may serve as such identity. Labeling shall also be in accordance with the product identification provisions of the ICC-ES Rules of Procedure for Evaluation Reports.

2.6 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.

2.7 Test Reports: Test reports shall comply with AC85. All test reports shall be prepared by an independent testing laboratory in accordance with Section 4.2 of the ICC-ES Rules of Procedure for Evaluation Reports. Test reports shall include a complete description of devices tested; the dimensions of the specimens; the number, size, type, and method of installing fastenings; type of failure; and such other data as may be pertinent.

2.8 Sampling: Test specimens shall be sampled in accordance with Section 3.1 of AC85.

2.9 Qualification Test Plan: A qualification test plan shall be submitted to and approved by ICC-ES staff prior to any testing being conducted.

3.0 TEST REQUIREMENTS

3.1 Corrugated Sheet Metal Ties for Airspace Greater than 1 inch: Corrugated sheet metal ties conforming to the requirements of TMS 402 Section

12.2.2.5.1.1 [$^{7}/_{8}$ in. x 0.03 in. (22 mm x 0.8 mm)] for installations with airspace greater than 1 inch (alternate configurations) shall be tested to determine capacities in the compressive and tensile direction as follows:

3.1.1 The compression and tension capacities of the tie shall be determined using the test setup similar to that shown in Figure 1 below.

3.1.2 Where a tie is of a design that is not adaptable to Figure 1, necessary test set-up departures shall be permitted provided the test setup departures are approved by ICC-ES.

3.1.3 Ties shall be tested in configurations consistent with end-use installation conditions with attention to, but not limited to, the following details:

3.1.3.1 The sheet metal tie shall be fastened to the horizontal wood member, which simulates the wall stud, with the fastener specified by the manufacturer. The tie shall be connected to the vertical member of the test fixture, representing the masonry veneer, by any method suitable to ensure load transfer and hold the end of the tie in a vertical position. The connection shall be located a maximum of $1^{1}/_{2}$ inches (38.1 mm) from the end of the tie, representing the minimum required embedment into the masonry veneer.

3.1.3.2 Reference specific gravities for the horizontal wood test member shall be stated in the test report and shall be the basis of determining applicable species for wood framing member in the evaluation report.

3.1.3.3 The vertical test member shall be restrained from rotation. Other means of ensuring only vertical movement during testing shall be permitted provided they are approved by ICC-ES. The horizontal member shall be restrained to the test bed.

3.1.3.4 The tie shall be installed with the manufacturer-specified fastener and airspace value for which recognition is sought.

3.1.3.5 The airspace in the test shall be considered to be the vertical distance from the horizontal wood member and the bottom of the vertical member of the test fixture to which the tie is attached.

3.1.4 A minimum of three tests shall be performed for each combination of the tie and airspace configuration to be recognized.

3.1.5 The ultimate load and the load at 0.05-inch (1.2 mm) vertical movement of the vertical member shall be recorded for each test.

3.2 Sheet Metal Ties for Airspace Greater than 1 inch: Sheet metal ties for anchored masonry veneer conforming to TMS 402 Section 12.2.2.5.2.1 [$^{7}/_{8}$-inch x 0.06-inch (22.2 mm x 1.5 mm)] shall be tested in accordance with the following:

3.2.1 Compression and tension testing in accordance with Sections 3.1.1 through 3.1.5 above, and

3.2.2 Pull-out testing of ties from the mortar joint shall be tested in accordance with ASTM E754.

3.2.3 Push-through testing of ties into the mortar joint shall be tested in by means acceptable to and agreed upon by ICC-ES.

3.3 Proprietary Sheet Metal Ties for Airspace Greater than 1 inch: Proprietary sheet metal ties for anchored masonry veneer shall be tested in accordance with the following:

3.3.1 Compression testing in accordance with Sections 3.1.1 through 3.1.5 above.

3.3.2 Pull-out testing of ties from the mortar joint shall be tested in accordance with ASTM E754.

3.3.3 Push-through testing of ties into the mortar joint shall be tested in by means acceptable to and agreed upon by ICC-ES.

3.3.4 Tensile capacity of the tie shall be determined in accordance with AISI S100.

3.3.5 The tensile capacity of the tie and tie-to-wood member connection shall be tested in general accordance with Section 3.1 above and Figure 1, except that the vertical member shall be displaced in the upward (tension) direction.

4.0 ANALYSIS DETAILS

4.1 Adjustment factor, R_{MT}: An adjustment factor, R_{MT}, for the allowable wall area supported by each tie or proposed configuration shall be determined from the testing required by Sections 3.1, 3.2.1, 3.3.1 and 3.3.5 of this criteria as follows:

4.1.1 The adjustment factor, R_{MT}, determined as the lesser of the two following ratios:

R_{MTUC} = U_C/125 lb (56.7 kg)

R_{MT05C} = D_C/50 lb (22.7 kg)

where:

U_C is the adjusted tested ultimate load (compression or tension) on the proprietary tie or alternate installation, in pounds.

D_C is the average load at 0.05 inches (1.27 mm) displacement of the tie (relative displacement between the horizontal and vertical test members in Figure 1), in pounds.

4.1.1.1 Where three specimens are tested, the ultimate load shall be the lowest of the three ultimate loads measured.

4.1.1.2 Where six specimens are tested, the average of the ultimate loads shall be used.

4.1.2 Where the tie is tested in both compression and tension, the lesser adjustment factor of the two test directions shall be used.

4.1.3 R_{MT} shall not exceed 1.0.

4.1.4 Spacing of ties around openings as required by IRC R703.8.4.1.1 and TMS 402 Section 12.2.2.5.6.4 shall be multiplied by the of the adjustment factor determined in Section 4.1.1 and shall be included in the evaluation report.

4.2 Tie and Mortar Joint Pull-out and Push-through Strength: The strength of tie pull-out or push-through of the mortar joint as required by Sections 3.2.2, 3.2.3, 3.3.2 and 3.3.3 shall be analyzed by either of the following:

4.2.1 The average adjusted ultimate pull-out or push-through strength shall not be less than 220 lb. (99.7 kg) with 5% accuracy and 75% confidence, or

4.2.2 The average adjusted pull-out or push-through strength shall not be less than the average ultimate strength of a comparative test using the same number of specimens of ties conforming to TMS 402 Section 12.2.2.5.1.1, in similar masonry construction, with 5% accuracy and 75% confidence.

4.3 Tie tensile capacity: The proprietary tie nominal tensile strength, required by Section 3.3.4, shall not be less than 220 lb. (99.7 kg).

4.4 Fastener to Wood: The fastener used for the wood connection shall be 8d common wire nail [0.131-inch diameter x 2 1/2 inches long (3.3 mm diameter x 63.5 mm long)] or other fastener with recognized withdrawal capacity equal to or exceeding that of the 8d common wire nail installed in the wood species (assigned specific gravity) for the evaluation report. For ties in which the nail hole size exceeds the fastener diameter by more than 1/32-inch (0.79 mm), nail-head pullover testing shall be conducted by means acceptable to and agreed upon by ICC-ES.

4.5 Adjustments to Test-based Values: Test-based values shall be adjusted in accordance with ASTM D7147 Section 13.5, as applicable.

5.0 QUALITY CONTROL

5.1 Quality documentation complying with the ICC-ES Acceptance Criteria for Quality Documentation (AC10) shall be submitted for each facility manufacturing or labeling products that are recognized in the ICC-ES evaluation report.

5.2 A qualifying inspection and corresponding periodic inspections shall be conducted at each manufacturing facility in accordance with the requirements of the ICC-ES Acceptance Criteria for Inspections and Inspection Agencies (AC304).

6.0 EVALUATION REPORT REQUIREMENTS

6.1 The following information shall be included in the evaluation report:

6.1.1 The airspace used in the test shall be used to establish the maximum airspace permitted for the tie. Where multiple airspaces are evaluated, interpolations shall not be permitted.

6.1.2 The evaluation report shall provide the maximum airspace and corresponding adjustment factor R_{MT} (or allowable supported area) for each tie or tie configuration.

6.1.3 The code-specified maximum horizontal and vertical tie spacing shall not be exceeded and need not be adjusted.

6.1.4 The tie and wood fastener shall be corrosion resistant.

6.1.5 Vertical support of the anchored masonry veneer is not addressed by this criteria and must be in accordance with the applicable code.

6.1.6 Air space values evaluated under this criteria may not exceed 4 5/8 inches (117.5 mm).

7.0 ENVIRONMENTAL PRODUCT DECLARATION (Optional):

Environmental impacts shall be assessed via an Environmental Product Declaration (EPD) based on a Life Cycle Assessment (LCA). The LCA and EPD shall be conducted in accordance with ISO 21930 and the appropriate Product Category Rule(s) for the product type.■

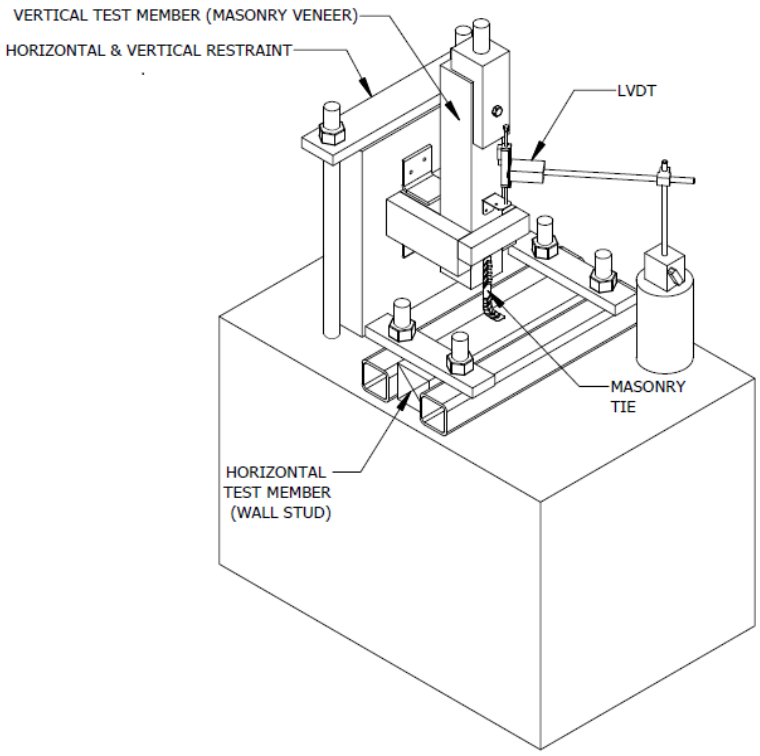

Figure 1 - Test Setup for Testing of Anchored Masonry Veneer Ties