ICC EVALUATION SERVICE

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December 29, 2009

TO: **PARTIES INTERESTED IN EVALUATION REPORTS ON COLD-FORMED STEEL FRAMING MEMBERS–INTERIOR NONLOAD-BEARING WALL ASSEMBLIES**

SUBJECT: Proposed Revisions to the Acceptance Criteria for Cold-Formed Steel Framing Members–Interior Nonload-Bearing Wall Assemblies, Subject AC86-0210-R1 (WM/DM)

Hearing Information:
Wednesday, February 3, 2010
8:00 a.m.
Sheraton Gateway Hotel Los Angeles
6101 West Century Boulevard
Los Angeles, California 90045
(888) 627-7104

Dear Madam or Sir:

Proposed revisions to the subject criteria are on the agenda for the Evaluation Committee hearing noted above. ICC-ES is requesting changes to AC86 as follows:

1. Update AC86 to include the 2009 *International Building Code*® (IBC) and the 2009 *International Residential Code*® (IRC). These changes involve updating the edition of codes and standards referenced in Section 1.3 of AC86. The only other technical change in AC86 as result of changes in the code, is an increase in the transverse load, found in Section 3.1.2, from 5 psf to 10 psf. This is a result of a change in the definition of "non-structural member" found in the North American Standard for Cold-Formed Steel Framing–General Provisions (S200). The effect of this definition change is to allow steel classified as non-structural to be used in nonload-bearing walls subject to transverse loads up to and including 10 psf. The differences between structural and non-structural steel are that the galvanization coating is less (G40 vs. G60) for the non-structural steel, and there are yield strength requirements but no tensile strength and elongation requirements for the non-structural steel. Staff believes the changes between the 2006 IBC/IRC and the 2009 IBC/IRC and their referenced standards have no effect on the use of AC86, and that AC86 with the proposed revisions can be used for both the 2006 and the 2009 IBC/IRC.

2. Delete provisions for the legacy codes. Industry has indicated they believe there is no need to continue with provisions in AC86 for the legacy codes.

3. A proposed change to Section 6.1.3 involves formatting of entries within wall height tables.

4. There are editorial changes to clarify sections of AC86.

You are cordially invited to submit written comments on agenda items, or to attend the Evaluation Committee hearing and present verbal comments. If you wish to contribute to the hearing, please note the following:

1. Written comments that are received by the Los Angeles business/regional office by **January 19, 2009,** will be forwarded to the committee prior to the hearing, and will be posted on the ICC-ES web site shortly after the comment deadline.

2. Written comments received up to ten days before the meeting, and staff memos responding to comments, will be posted to the web site on **January 28, 2009**.

3. ICC-ES is no longer providing printed copies at the meeting of proposed acceptance criteria, staff memos or public comments. These documents will be available on a limited number of CDs at the meeting, for uploading to computers; and ICC-ES will make arrangements with the hotel business center to have hard copies available for photocopying.

4. Written comments that miss the deadline noted in item (1), above, will only be available at the meeting if you provide 35 copies, collated, stapled, and three-hole punched, either at the meeting itself or to the Los Angeles business/regional office by **January 28, 2009**.

5. If you plan to speak for more than 15 minutes, or offer a visual presentation lasting longer, you should notify ICC-ES staff as far as possible in advance. There will be a computer, projector, and screen available at the meeting for anyone wishing to make a visual presentation, and presentations in most cases will need to be in PowerPoint format. Also, ICC-ES will need to be provided with your presentation at least a half-hour before the start of the relevant meeting session (morning or afternoon) on either a CD or a flash card.

6. If you have any special needs related to a presentation, you should contact ICC-ES staff well in advance of the meeting.

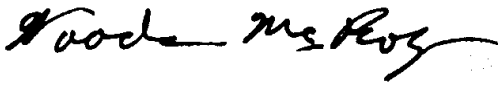
7. Any visual aids for viewing at committee meetings (charts, overhead transparencies, slides, videos, electronic presentations, etc.) will be permitted only if a copy is provided to ICC-ES, before the presentation, in a medium that can be retained with other records of the meeting.

8. Any materials submitted for committee consideration are considered nonconfidential and available for public discussion, as noted in Section 2.7 of the ICC-ES Rules of Procedure for the Evaluation Committee.

9. Prior to the meeting, you should refrain from trying to communicate directly with committee members about agenda items, either verbally or in writing. Committee members reserve the right to refuse such communications.

Your cooperation with these guidelines is much appreciated, as is your interest in the deliberations of the Evaluation Committee. If you have any questions, please contact the undersigned at (800) 423-6587, extension 5686, or David Musselwhite, P.E., Senior Staff Engineer, at extension 5681. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,



Woods McRoy, P.E.
Senior Staff Engineer

WFM/raf

Enclosures

cc: Evaluation Committee

ICC EVALUATION SERVICE, INC.,
RULES OF PROCEDURE FOR THE EVALUATION COMMITTEE

1.0 PURPOSE

The purpose of the Evaluation Committee is to monitor the work of ICC-ES, in issuing evaluation reports; to evaluate and approve acceptance criteria on which evaluation reports may be based; and to sponsor related changes in the applicable codes.

2.0 MEETINGS

2.1 The Evaluation Committee shall schedule meetings that are open to the public in discharging its duties under Section 1, subject to Section 3.

2.2 All scheduled meetings shall be publicly announced.

2.3 Two-thirds ($^2/_3$) of the voting Evaluation Committee members shall constitute a quorum. A majority vote of members present is required on any action.

2.4 In the absence of the nonvoting chairman-moderator, Evaluation Committee members present shall elect an alternate chairman from the committee for that meeting. The alternate chairman shall be counted as a voting committee member for purposes of maintaining a committee quorum and to cast a tie-breaking vote of the committee.

2.5 Minutes of the meetings shall be kept.

2.6 An electronic audio record of meetings shall be made by ICC-ES; no other audio, video, electronic or stenographic recordings of the meetings will be permitted. Visual aids (including, but not limited to, charts, overhead transparencies, slides, videos, or presentation software) viewed at meetings shall be permitted only if the presenter provides ICC-ES before presentation with a copy of the visual aid in a medium which can be retained by ICC-ES with its record of the meeting and which can also be provided to interested parties requesting a copy. A copy of the ICC-ES recording of the meeting and such visual aids, if any, will be available to interested parties upon written request made to ICC-ES together with a payment as required by ICC-ES to cover costs of preparation and duplication of the copy. These materials will be available beginning five days after the conclusion of the meeting but will no longer be available after one year from the conclusion of the meeting.

2.7 Parties interested in the deliberations of the committee should refrain from communicating, whether in writing or verbally, with committee members regarding agenda items. All written communications and submissions regarding agenda items should be delivered to ICC-ES. All such written communications and submissions shall be considered nonconfidential and available for discussion in open session of an Evaluation Committee meeting, and shall be delivered at least ten days before the scheduled Evaluation Committee meeting if they are to be forwarded to the committee. Materials delivered to ICC-ES at least ten days before the scheduled meeting will be posted on the ICC-ES web site (www.icc-es.org) prior to the meeting. After this time, parties wishing to submit materials for consideration by the Evaluation Committee must deliver a sufficient number of copies as directed by ICC-ES. Consideration of materials not received by ICC-ES at least ten days before the meeting is at the discretion of the Evaluation Committee. Following the meeting, ICC-ES will make all materials considered by the Evaluation Committee available on the web site for a maximum period of one year following the meeting. The committee reserves the right to refuse recognition of communications which do not comply with the provisions of this section.

3.0 CLOSED SESSIONS

Evaluation Committee meetings shall be open except that the chairman may call for a closed session to seek advice of counsel.

4.0 ACCEPTANCE CRITERIA

4.1 Acceptance criteria are established by the committee to provide a basis for issuing ICC-ES evaluation reports on products and systems under codes referenced in Section 2.0 of the Rules of Procedure for Evaluation Reports. They also clarify conditions of acceptance for products and systems specifically regulated by the codes.

Acceptance criteria may involve a product, material, method of construction, or service. Consideration of any acceptance criteria must be in conjunction with a current and valid application for an ICC-ES evaluation report, an existing ICC-ES evaluation report, or as otherwise determined by the Evaluation Committee.

4.2 Procedure:

4.2.1 Proposed acceptance criteria shall be developed by the ICC-ES staff and discussed in open session with the Evaluation Committee during a scheduled meeting, except as permitted in Section 5.0 of these rules.

4.2.2 Proposed acceptance criteria shall be available to interested parties at least 30 days before discussion at the committee meeting.

4.2.3 The committee shall be informed of all pertinent written communications received by ICC-ES.

4.2.4 Attendees at Evaluation Committee meetings shall have the opportunity to speak on acceptance criteria listed on the meeting agenda, to provide information to committee members.

4.3 Approval of acceptance criteria shall be as specified in Section 2.3 of these rules.

4.4 Actions of the Evaluation Committee may be

appealed in accordance with the ICC-ES Rules of Procedure for Appeal of Acceptance Criteria or the ICC-ES Rules of Procedure for Appeals of Evaluation Committee Technical Decisions.

5.0 COMMITTEE BALLOTING FOR ACCEPTANCE CRITERIA

5.1 Acceptance criteria may be issued without a public hearing following a 30-day public comment period and a majority vote for approval by the Evaluation Committee when, in the opinion of ICC-ES staff, one or more of the following conditions have been met:

1. The subject is nonstructural, does not involve life safety, and is addressed in nationally recognized standards or generally accepted industry standards.

2. The subject is a revision to an existing acceptance criteria that requires a formal action by the Evaluation Committee, and public comments raised were resolved by staff with commenters fully informed.

3. Other acceptance criteria and/or the code provide precedence for the revised criteria.

5.2 Negative votes must be based upon one or more of the following, for the ballots to be considered valid and require resolution:

a. *Lack of clarity*: There is insufficient explanation of the scope of the acceptance criteria or insufficient description of the intended use of the product or system; or the acceptance criteria is so unclear as to be unacceptable. (The areas where greater clarity is required must be specifically identified.)

b. *Insufficiency*: The criteria is insufficient for proper evaluation of the product or system. (The provisions of the criteria that are in question must be specifically identified.)

c. *The subject of the acceptance criteria is not within the scope of the applicable codes*: A report issued by ICC-ES is intended to provide a basis for approval under the codes. If the subject of the acceptance criteria is not regulated by the codes, there is no basis for issuing a report, or a criteria. (Specifics must be provided concerning the inapplicability of the code.)

d. *The subject of the acceptance criteria needs to be discussed in a public hearings*. The committee member requests additional input from other committee members, staff or industry.

5.3 An Evaluation Committee member, in voting on an acceptance criteria, may only cast the following ballots:

- Approved
- Approved with Comments
- Negative: Do Not Proceed

6.0 COMMITTEE COMMUNICATION

Direct communication between committee members, and between committee members and an applicant or concerned party, with regard to the processing of a particular acceptance criteria or evaluation report shall take place only in a public hearing of the Evaluation Committee. Accordingly:

6.1 Committee members receiving an electronic ballot should respond only to the sender (staff). Committee members who wish to discuss a particular matter with other committee members, before reaching a decision, should ballot accordingly and bring the matter to the attention of ICC-ES staff, so the issue can be placed on the agenda of a future committee meeting.

6.2 Committee members who are contacted by an applicant or concerned party on a particular matter that will be brought to the committee will refrain from private communication and will encourage the applicant or concerned party to forward their concerns through the ICC-ES staff in writing, and/or make their concerns known by addressing the committee at a public hearing, so that their concerns can receive the attention of all committee members.■

Effective March 18, 2008

ICC EVALUATION SERVICE

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PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR COLD-FORMED STEEL FRAMING MEMBERS—INTERIOR NONLOAD-BEARING WALL ASSEMBLIES

AC86

Proposed December 2009

Previously approved February 2008, June 2007, July 1995

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 by ICC-ES for purposes of issuing ICC-ES evaluation reports.

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR COLD-FORMED STEEL FRAMING MEMBERS—INTERIOR NONLOAD-BEARING WALL ASSEMBLIES

1.0 INTRODUCTION

1.1 Purpose: This criteria covers a procedure for testing and evaluating the structural performance of cold-formed steel vertical framing members (studs) used in interior, nonload-bearing wall assemblies, and establishing limiting wall heights for recognition in ICC Evaluation Service, Inc., (ICC-ES) evaluation reports under the 2006 and 2009 *International Building Code*® (IBC), and the 2006 and 2009 *International Residential Code*® (IRC)~~, the BOCA® *National Building Code*/1999 (BNBC), the 1999 *Standard Building Code*© (SBC), and the 1997 *Uniform Building Code*™ (UBC)~~. Bases of recognition are IBC Section 104.11, and IRC Section R104.11~~, BNBC Section 106.4, SBC Section 103.7, and UBC Section 104.2.8~~.

The reason for the development of this criteria is to establish an empirical method of determining limiting wall heights based on stiffness and strength characteristics of interior nonload-bearing wall assemblies, consisting of cold-formed steel studs and gypsum panel products installed on one or both sides of the wall such that the wall responds to transverse loading as an assembly. This empirical approach is an alternative to the sheathing-braced design referenced in the building codes for cold-formed steel stud wall assemblies resisting transverse loads.

1.2 Scope: The information obtained by the provisions of this criteria is applicable to the design of field-fabricated interior nonload-bearing walls when using the Allowable Stress Design (ASD) method where the transverse design loads are limited to 5, $7^1/_2$, 10, and 15 psf (240, 360, 480, and 720 Pa) and where the superimposed axial design load is zero pounds.

1.3 Codes and Referenced Standards:

1.3.1 2009 *International Building Code*® (IBC), International Code Council.

1.3.2 2009 *International Residential Code*® (IRC), International Code Council.

1.3.3 2006 *International Building Code*® (IBC), International Code Council.

1.3.4 2006 *International Residential Code*® (IRC), International Code Council.

~~**1.3.5** BOCA® *National Building Code*/1999 (BNBC).~~

~~**1.3.6** 1999 *Standard Building Code*© (SBC).~~

~~**1.3.7** 1997 *Uniform Building Code*™ (UBC).~~

1.3.5 AISI ~~NAS-01~~ S100-07, North American Specification for the Design of Cold-formed Steel ~~Framing~~ Structural Members, ~~including 2004 Supplement~~, American Iron and Steel Institute.

1.3.6 AISI ~~General-04~~ S200-07, Standard for Cold-formed Steel Framing—General Provisions, American Iron and Steel Institute.

1.3.7 AISI ~~WSD-04~~ S211-07, Standard for Cold-formed Steel Framing—Wall Stud Design, American Iron and Steel Institute.

1.3.8 ASTM A 370-~~05~~ 09ae1, Standard Test Methods and Definitions for Mechanical Testing of Steel Products, ASTM International.

1.3.9 ASTM C 473-~~03~~ 06a, Standard Test Methods for Physical Testing of Gypsum Panel Products, ASTM International.

1.3.10 ASTM C 1178~~-04~~ 06, Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel, ASTM International.

1.3.11 ASTM C 1278~~-03~~ 06, Standard Specification for Fiber-Reinforced Gypsum Panel, ASTM International.

1.3.12 ASTM C 1396-~~02~~ 06a, Standard Specification for Gypsum Board, ASTM International.

1.3.13 ASTM E 72-~~02~~ 05, Standard Test Methods of Conducting Strength Tests of Panels for Building Construction, ASTM International.

1.4 Definitions:

1.4.1 Interior Nonload-bearing Wall Assembly: A field-fabricated wall assembly consisting of cold-formed steel vertical framing members (studs) spaced a maximum of 24 inches (610 mm) on center and gypsum panel products sheathed on one or both sides of the wall assembly. Installation of the wall assemblies in a structure shall be limited to interior applications where the superimposed axial load is zero pounds.

1.4.2 Stud: A cold-formed steel vertical framing member in a wall assembly.

1.4.3 Gypsum Panel Products: The general name for a family of sheet products consisting essentially of gypsum.

1.4.4 Set Deflection: The deflection reading obtained five minutes after the application or release of test loads.

1.4.5 Test Specimen: A single assembly being tested.

1.4.6 Test Assembly: A set of three or more identical test specimens.

2.0 BASIC INFORMATION

2.1 General:

2.1.1 Description: Each component of the wall assembly shall be described with respect to material specifications, dimensions, and compliance with applicable standards or ICC-ES acceptance criteria.

2.1.1.1 Cold-formed steel framing members shall conform to the field identification and quality control requirements of the ICC-ES Acceptance Criteria for Cold-formed Steel Framing Members (AC46). Sheet steel materials used in the steel wall stud construction shall comply with the requirements in Section 2210.4 of the IBC.

2.1.1.2 Gypsum panel products shall comply with ASTM C 1396, C 1278, or C 1178, as applicable.

2.1.1.3 Fasteners shall comply with applicable standards, specifications, or ICC-ES acceptance criteria.

2.1.2 Installation Instructions: Installation instructions shall be submitted, and include information on type and thickness of the gypsum panel product, attachment of gypsum panel products to the steel studs (orientation of panel products, location of panel joints, type and size of panel fasteners, fastening schedule, and joint and face treatments) and attachment of steel studs to tracks.

2.1.3 Identification: A description of the method of field identification of the components of the interior nonload-bearing wall assembly qualified in accordance with this acceptance criteria shall be provided. Products shall be marked, as applicable, in accordance with the relevant acceptance criteria or ASTM specification, or both.

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 and include:

2.3.1 A description of the test ~~specimens~~ assemblies, including installation details and specifications of the gypsum panel products, cold-formed steel framing members, fastener type and size, and fastener schedule. The description of studs and gypsum panel products shall also be supplemented by test data on the yield and tensile strength of the cold-formed studs, bare-metal thickness of the steel studs, and the flexural strength of the gypsum panel products, when required. The description of the test ~~specimens~~ assemblies shall also include the orientation of panel products and location of panel joints.

2.3.2 A description of the gypsum panel product type and product name, including the manufacturer's name, when required. (Refer to Section 3.1.3.)

2.3.3 A description of the test procedures, test results, deflection and load measurements, observations, calculations deriving limiting wall heights based on stiffness and strength test data of tested assemblies, and photographs of typical ~~wall assembly~~ test specimens and typical failures.

2.4 Product Sampling and Preparation of Test Assemblies: Sampling of the components of interior nonload-bearing walls for tests under this criteria shall comply with Section 3.2 of AC85. Preparation of test assemblies shall be witnessed by the testing laboratory in accordance with Section 3.3 of AC85.

3.0 TEST AND PERFORMANCE REQUIREMENTS

3.1 General: The allowable height of an interior nonload-bearing wall assembly shall be the lesser of the limiting height based on wall assembly stiffness in accordance with Section 3.2 or the limiting height based on wall assembly strength in accordance with Section 3.3.

3.1.1 Test specimens shall be representative of the wall construction for which recognition in an evaluation report is desired, as to materials, workmanship, and details such as orientation of gypsum panel products and location of panel joints, except that joints and fasteners shall not be treated.

3.1.2 One representative steel sample shall be obtained from each tested wall assembly to verify steel thickness both before and after removal of the galvanized coating. When the manufacturing processes that cold forms steel to a shape make taking thickness measurements impossible, a minimum of ten samples cut from flat sheets taken from the same coil of steel used to cold form the steel studs, shall be obtained. Additionally, yield strength, tensile strength, and elongation shall be verified using ASTM A 370 test procedures. When the maximum allowable transverse load specified in the evaluation report for the interior nonload-bearing wall assembly is limited to ~~5~~ 10 psf (~~240~~ 480 Pa), only the yield strength need be verified.

3.1.3 The type, thickness, and product name of gypsum panel product shall be identified. The type and product name of the gypsum panel product do not need to be reported in the evaluation report when the flexural strength of the gypsum panel products used in the tests does not exceed the minimum values set forth in the applicable ASTM standard by more than 15 percent. The gypsum panel product shall be evaluated independently in accordance with ASTM C 473, except none of the single test values shall be discarded, and the test data shall be included in the test report for the wall assemblies. At least three panels from each shipment received by the test agency shall be selected for physical property testing, provided they constitute a representative sample for the purpose of wall assembly tests.

3.1.4 Unsymmetrical wall systems shall be tested in the weakest and most flexible direction.

3.2 Limiting Heights Based on Wall Assembly Stiffness: Testing shall be in accordance with Section 4.1 of this criteria and the analysis of test data shall be in accordance with Sections 3.2.1 through 3.2.5.

3.2.1 ~~Wall~~ Test assembly bending stiffness, *EI*, shall be based on the equation for midspan deflection of a simply supported beam with uniformly distributed loading over its entire span. An *EI* value for each midspan deflection target shall be calculated based on the incremental deflection from previous set deflection after release of load to the current set deflection after application of load.

3.2.1.1 Average *EI* values for each deflection target shall be determined from the test results for each test assembly ~~height~~. For a ~~specific~~ test specimen, the arithmetical average of the *EI* values derived for each deflection target shall be used when the deviation of any individual deflection target *EI* value does not exceed ±15 percent of the test specimen's average *EI* value. The overall averaged *EI* values shall be used to calculate the limiting heights for the test assembly.

3.2.1.2 If ~~such a deviation from the average value~~ the variation of any deflection target *EI* value for a test specimen exceeds the test specimen's average *EI* by more than 15 percent ~~for any test assembly~~, ~~then the *EI* values for each~~ the specific deflection target *EI* values for ~~of~~ all test specimens of that test assembly shall be considered separately ~~averaged~~. The averaged deflection-

target-specific *EI* values shall be used to calculate the limiting heights for that test assembly ~~height~~.

3.2.1.3 If a deflection target is not attained by all test specimens of a test assembly, then that deflection target specific *EI* shall not be derived for that test assembly. The averaged available deflection-target-specific *EI* values derived for that test assembly shall be used to calculate the deflection target specific limiting heights for the test assembly.

3.2.2 The ~~wall~~ test assembly's controlling *EI* value derived in accordance with Section 3.2.1 shall be used to calculate limiting wall heights for deflection target values L/360, L/240 and L/120 (if a L/120 deflection level cannot be obtained, it shall be permitted to use *EI* values determined for the deflection target value of L/180 ~~in place of~~ as a direct substitute for L/120); and transverse design loads of 5, $7^1/_2$, 10, and 15 psf (240, 360, 480, and 720 Pa), provided:

3.2.2.1 The measured uncoated steel thickness of the studs in each test ~~assembly~~ specimen does not vary from the specified (design) thickness by ±5 percent when steel samples are obtained from each tested wall assembly to verify steel thickness.

3.2.2.2 The measured uncoated steel thickness of samples cut from flat sheets taken from coil steel does not vary from the coil steel thickness specified in the quality documentation by ±5 percent when it is not possible to measure steel thickness of studs in each test ~~assembly~~ specimen because the manufacturing processes that cold forms steel to a shape makes taking measurements impossible.

3.2.2.3 The unloaded set deflection is less than 20 percent of the loaded set deflection.

3.2.3 Limiting wall heights may be derived by linear interpolation between the derived limiting height value (H_1) from one test ~~span~~ assembly and the derived limiting height value (H_2) from the next taller test ~~span~~ assembly:

$$L_{LH} = \frac{(L_1 \times H_2) - (L_2 \times H_1)}{H_2 - H_1 - L_2 + L_1}$$

where:

L_{LH} = Interpolated limiting wall height, ft (m).

L_1 = Actual span of short test assembly, ft (m).

L_2 = Actual span of tall test assembly, ft (m).

H_1 = Derived limiting height for a specific deflection target and design load based on the controlling *EI* value from short-span wall test data, ft (m).

H_2 = Derived limiting height for a specific deflection target and design load based on the controlling *EI* value from long-span wall test data, ft (m).

3.2.3.1 If the calculated limiting heights derived from the shorter test assemblies are greater than twice the height of the taller test assemblies, then the calculated limiting height based on the taller test assemblies shall be used rather than an interpolated value.

3.2.3.2 If for any specific design load and deflection target combination a calculated limiting wall height ~~based on the shorter test assemblies~~ is less than the ~~actual~~ shorter test ~~span~~ assembly, the calculated limiting height value obtained from consideration of both the shorter and taller test assemblies shall be discarded ~~and the wall assembly shall not be permitted to resist that specific design load and deflection target~~.

3.2.3.3 In no case shall the interpolated value, L_{LH}, be greater than the mean value between calculated values H_1 and H_2.

3.2.4 Linear extrapolation of the controlling *EI* value may be used to determine limiting wall heights greater than ~~the~~ those tested, up to twice the height of the test assembly ~~ies~~.

3.2.5 ~~A controlling~~ An *EI* value for a test assembly shall only be used to calculate limiting wall heights for target deflection values that are included in the derivation of ~~the controlling~~ that *EI* value ~~for the test wall assembly~~.

3.3 Limiting Heights Based on Wall Assembly Strength: The design of cold-formed steel studs for interior nonload-bearing wall assemblies shall be in accordance with AISI ~~WSD~~ S211. When the wall assembly construction deviates from the AISI ~~WSD~~ S211 provisions, limiting wall heights based on strength characteristics of the wall assembly may be derived in accordance with the provisions of this section. Flexural and end-reaction testing shall be in accordance with Sections 4.1 and 4.2, respectively, and the analysis of test data shall be in accordance with Sections 3.3.1 and 3.3.2, respectively.

3.3.1 Wall assembly limiting height based on flexural strength shall be derived using the following formula:

$$L_f = \sqrt{\frac{R_s P L_t^2}{\Omega W}}$$

where:

L_f = Limiting height based on flexural strength, ft (m).

R_s = Adjustment factor (refer to Section 3.3.1.1).

P = Controlling peak test load (refer to Section 3.3.1.2), psf (Pa).

L_t = Span of test assembly, ft (m).

Ω = Safety factor (refer to Section 3.3.1.3).

W = Design load (refer to Section 3.3.1.4), psf (Pa)

3.3.1.1 If the yield point of the steel from which the studs are formed is larger than the specified minimum value, or the thickness of the steel is greater than the specified (design) thickness, or both, the controlling test peak load shall be scaled by an adjustment factor, R_s:

$$R_s = \left(\frac{F_{y-specified}}{F_{y-tested}}\right) \times \left(\frac{t_{specified}}{t_{tested}}\right) \leq 1.0$$

where:

$F_{y\text{-}specified}$ = Specified yield stress of the steel, psi (MPa).

$F_{y\text{-}tested}$ = Measured yield stress of the steel, psi (MPa).

$t_{specified}$ = Design steel thickness specified in the evaluation report or the coil steel thickness specified in the quality documentation, as applicable, inch (mm).

t_{tested} = Measured steel thickness, inch (mm)

3.3.1.2 The controlling peak test load of a ~~set of wall assemblies of the same height~~ test assembly shall be in accordance with Section 4.1.

3.3.1.3 Safety factor, S, shall be in accordance with Section F1.2 of AISI ~~NAS~~ S100. The following variables for theresistance factor equation in Chapter F of AISI ~~NAS~~ S100 (Eq. F1.1-2) shall be used, unless data justifying other variables are submitted:

β_o = Target reliability index = 2.5

M_m = Mean value of the material factor = 1.0

V_M = COV of the material factor = 0.10

V_F = COV of the fabrication factor = 0.15

3.3.1.4 The transverse design loads, *W*, shall be limited to 5, $7^1/_2$, 10, and 15 psf (240, 360, 480, and 720 Pa) and shall not be multiplied by 0.75 or any other factor associated with short-term loading. ~~For compliance with the UBC, transverse design loads, *W*, may be multiplied by 0.75, or the allowable flexural resistance of the assembly determined in accordance with Section 3.3.1 may be increased by one-third, but not both.~~

3.3.1.5 Linear interpolation between the multiple test heights is permitted to derive limiting heights based on flexural strength between ~~sets of wall~~ test assemblies having different heights.

3.3.1.6 Linear extrapolation of flexural strength data may be used to derive limiting wall heights greater than those tested, up to twice the height of the tested assemblies.

3.3.2 Wall assembly limiting height based on end reaction strength shall be derived using the following formula:

$$L_r = \frac{R_s B L_t}{\Omega W}$$

where:

L_r = Limiting height based on end reaction, ft (m).

R_s = Adjustment factor (refer to Section 3.3.1.1).

B = Controlling peak test load, psf (Pa), in accordance with Section 4.2 of this criteria.

L_t = Actual span of the nominal 4-foot test assembly, ft (m).

Ω = Safety factor in accordance with Section F1.2 of AISI ~~NAS~~ S100.

W = Transverse design load (refer to Section 3.3.1.4), psf (Pa).

4.0 TEST METHODS

4.1 Transverse Load Testing:

4.1.1 ~~Wall~~ Test assemblies at two different heights shall be tested. The taller ~~set of wall~~ test assembly ~~ies~~ can be one-half the maximum allowable height of the wall assembly sought for recognition in an ICC-ES evaluation report.

4.1.2 A ~~set of wall~~ test assembly ~~test specimens~~ shall define each combination of variables that affects the performance of the wall assembly, such as stud depth, uncoated minimum steel thickness, and minimum and maximum stud spacing, where the maximum spacing shall be 24 inches (610 mm) on center; type and thickness of gypsum panel products, panel orientation, and location of panel joints; and type and size of fasteners and fastener schedule. If it can be shown that the test data for walls with minimum spaced studs is within 15 percent of the test data for walls with maximum spaced studs, then only walls with maximum spaced studs need to be tested.

4.1.3 A ~~set of wall~~ test assembly ~~test specimens~~, consisting of not fewer than three identical test specimens, shall be tested provided deviation of any individual test result from the average value does not exceed ±15 percent. If such a deviation from the average value exceeds ±15 percent, more tests of the same kind shall be conducted until the deviation of any individual test result from the average value obtained from all the tests does not exceed ±15 percent, or until at least three additional tests have been conducted.

4.1.4 Transverse load testing shall comply with ASTM E 72, using uniform air pressure loading on minimum 4-foot-wide (1220 mm) ~~wall assembly~~ test specimens placed in a vertical position as described in Section 12 of ASTM E 72, and Sections 4.1.4.1 through 4.1.4.7 of this criteria.

4.1.4.1 An initial load, or preload, is permitted to be applied to seat the assembly. This preload shall not exceed 10 percent of the average load associated with the L/120 deflection target value.

4.1.4.2 To reduce rotational restraint, cylindrical roller supports shall be used at both ends of the assembly, as shown in the vertical test setup in Figure 3 of ASTM E 72 and as described in Section 12.3 of ASTM E 72. The top and bottom tracks of the ~~wall~~ test specimen shall not be attached or fastened to supports.

4.1.4.3 The gypsum panel products shall be cantilevered at the edges of the ~~wall assembly~~ test specimen a distance representative of the tributary load area for the steel studs. To prevent premature failure of the cantilevered edges of the gypsum panel products in the test ~~assemblies~~ specimen, maximum 4-inch-long (102 mm) steel tracks or wood blocks, having the same depth and width as the ~~wall assembly's~~ test specimen's steel studs, shall be placed at the unsupported edges of the gypsum panel products. These supports shall be located 12 inches (305 mm) from the ends of the ~~wall assembly~~

test specimen and spaced 24 inches (610 mm) on center, and may be attached with a screw on one side of the assembly, provided the method of attachment does not increase the ~~wall assembly's~~ test specimen's stiffness.

4.1.4.4 The chamber method of loading shall be used with an airtight frame surrounding the specimen. A polyethylene sheet or equivalent shall cover the specimen, overlap the frame, and be sealed to the wall of the test facility so that it is reasonably airtight. The polyethylene sheet or equivalent shall be applied loosely, such that it does not contribute to the stiffness of the assembly. A vacuum pump shall be used to reduce air pressure within the chamber behind the assembly. The difference between the chamber pressure and the ambient pressure shall be recorded.

4.1.4.5 Mid-height lateral deflections shall be measured using dial gages or electronic instruments that are aligned with at least two steel studs in the wall assembly and are mounted on a reference frame. The arithmetical average of the deflection readings shall be used to determine the mid-height deflection of the test assembly at each loading increment. As an alternate, a single deflection gage is permitted at the center of the test assembly, provided it is aligned midway between the steel studs.

4.1.4.6 Successive incremental loadings shall be applied for five minutes at each designated deflection target of L/360, L/240 and L/120. Deflections shall be measured at the initial application of each load increment, after five minutes of set, after release of the load increment, and after five minutes of set. Additional deflection targets or alternative deflection targets may be considered based on the specific assembly response characteristics, provided at least three target levels are investigated, and ICC-ES is consulted prior to testing.

4.1.4.7 Test ~~assemblies~~ specimen shall be loaded to failure following the incremental loadings, where failure is defined as when the maximum pressure cannot be sustained without the sudden or continuous movement of the test assembly. After the conclusion of each test, the ~~assembly~~ test specimen shall be visually inspected for buckling or permanent deformation of the steel studs, fastener pullout or pullthrough, and gypsum panel failure. The mode of failure and the measured load at failure shall be reported for each test ~~assembly~~ specimen.

4.2 Wall End Reaction Load Testing:

4.2.1 As a minimum, a series of three identical tests shall be performed for each combination of variables that affect the performance of the assembly, provided deviation of any individual test result from the average value does not exceed ±15 percent. If such a deviation from the average value exceeds ±15 percent, more tests of the same kind shall be conducted until the deviation of any individual test result from the average value obtained from all the tests does not exceed ±15 percent, or until at least three additional tests have been conducted. Variables affecting performance include stud depth, spacing, and uncoated minimum base metal thickness; track configuration and uncoated minimum base metal thickness; type and thickness of gypsum panel products; fastener type, size, and schedule used to construct the assemblies; and fasteners used to attach the track to the supporting construction. If various wall configurations are sought for evaluation, the worst case configuration may be tested. If higher ratings are sought for stronger configurations, the additional configurations shall be tested.

4.2.2 Transverse load testing shall comply with ASTM E 72, using uniform air pressure loading on nominally 4-foot-tall-by-4-foot-wide (1220 mm by 1220 mm) wall assemblies placed in a horizontal or vertical position, as described in Section 11 or Section 12 of ASTM E 72, respectively; and Sections 4.2.2.1 through 4.2.2.5 of this criteria.

4.2.2.1 An initial load, or preload, is permitted to be applied to seat the assembly. This preload shall not exceed 10 percent of the peak load.

4.2.2.2 Cold-formed steel studs shall be spaced as intended for actual construction, except the maximum spacing shall be 24 inches (1220 mm) on center. Track sections shall be placed at the ends of the studs, and the wall assembly shall be sheathed with gypsum panel products in the same manner that simulates actual top and bottom wall construction. The minimum end distance of web holes of studs shall be considered in the test specimen wall construction.

4.2.2.3 One end of the wall assembly may bear against a cylindrical roller, and the other end shall be attached to a wood or steel cleat in such a manner that is representative of actual construction. The cleat shall be set against a rigid support of the test fixture.

4.2.2.4 The gypsum panel products shall be cantilevered at the edges of the wall assembly a distance representative of the tributary load area for the steel studs. To prevent premature failure of the cantilevered edges of the gypsum panel products in the test assemblies, maximum 4-inch-long (102 mm) steel tracks or wood blocks, having the same depth and width as the wall assembly's steel studs, shall be placed at the unsupported edges of the gypsum panel products. These supports shall be located 12 inches (305 mm) from the ends of the wall assembly.

4.2.2.5 Test assemblies shall be loaded to failure, where failure is defined as when the maximum pressure cannot be sustained without the sudden or continuous movement of the test assembly. Each test assembly shall be visually inspected for buckling or permanent deformation of the steel studs or track, fastener pullout or pullthrough, or gypsum panel failure. The mode of failure and the measured load at failure shall be reported for each test assembly.

5.0 QUALITY CONTROL

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

5.2 Third-party follow-up inspections are not required under this acceptance criteria.

6.0 EVALUATION REPORT RECOGNITION

6.1 The evaluation report for interior nonload-bearing walls that comply with this acceptance criteria shall include:

PROPOSED REVISIONS TO THE ACCEPTANCE CRITERIA FOR COLD-FORMED STEEL FRAMING MEMBERS—INTERIOR NONLOAD-BEARING WALL ASSEMBLIES

6.1.1 Material specifications for all wall assembly components, description of the wall assembly, and applicable fastener type and fastener schedule for interconnection of framing members and attachment of gypsum panel to cold-formed steel framing members.

6.1.2 Product name and manufacturer's name of proprietary components.

6.1.3 Tabulated limiting wall heights for wall assemblies resisting transverse design loads limited to 5, $7^1/_2$, 10, and 15 psf (240, 360, 480, and 720 Pa) at deflection limits of L/360, L/240, and either L/180 or L/120 (see Section 3.2.2 ~~revision~~). ~~Tabulated limiting wall heights governed by wall assembly strength shall be so identified.~~ Tabulated wall heights in evaluation reports shall be rounded to the nearest 3-inch (76 mm) increment.

6.1.4 A condition of use shall state the following: "The interior nonload-bearing wall assemblies shall be limited to interior installations where the superimposed axial load is zero pounds." ■