



June 2, 2008

TO: PARTIES INTERESTED IN EVALUATION REPORTS ON EXTERIOR WALL COVERINGS OF STEEL- BACKED VENEER PANELS ATTACHED TO WALLS WITH STEEL FRAMING AND BRACKETS

SUBJECT: Proposed New Acceptance Criteria for Exterior Wall Coverings of Steel-backed Veneer Panels Attached to Walls With Steel Framing and Brackets, Subject AC359-0608-R1 (RK/BG)

Dear Madam or Sir:

A new acceptance criteria, as presented in the attached criteria draft, is an initial, incomplete proposal being posted on the ICC-ES web site to allow public comment.

The acceptance criteria under development has been substantially based on information provided by an applicant for a new evaluation report on wall covering panels consisting of various veneer types factory-attached to steel backer panels, with the panels installed onto a steel framing system over the exterior side of exterior walls. The veneer types addressed by the criteria are described in Section 1.2 of the criteria draft. The criteria is intended to be applicable to systems where the weight of the veneer is transferred to the supporting wall by the framing system and associated attachment brackets.

Other than noting omissions in the attached criteria draft, the following is a partial list of the staff's general comments on the draft of the criteria:

1. ASCE 7-05 Section 7-05, referenced by IBC Section 1613.1, contains requirements for the seismic design of nonstructural components of structures, including wall veneer. As a result, Section 1.2 of the attached criteria draft, as prepared, intends to limit the criteria to specific Seismic Design Categories. However, the intent of the evaluation report applicant is for the Seismic Design Categories to not be limited in the criteria. As a result, the procedures necessary to qualify a veneer system for higher Seismic Design Categories than noted in the attached criteria draft will need to be developed. Sections 3.8.3 and 4.2 are initial proposals submitted by the evaluation report applicant that need additional review.
2. If the Seismic Design Categories are not limited as noted in comment 1, staff questions whether the criteria also needs to include provisions for evaluating the veneer to remain in place on structures at the allowable story draft limits specified in Table 12.12-1 of ASCE 7-05.

3. The evaluation report applicant's intent for the stucco substrate veneer panels is that the exterior plaster metal plaster base is to be attached to the steel backer panel, instead of being attached to the wall framing of the structure. As a result, revisions to the criteria are needed to include a means to justify the attachment of the metal plaster base to the steel backer panel.
4. ASTM C 1528, referenced by Section 3.2.1.3 of the criteria draft as the required specifications, does not actually contain specifications. As a result, revisions are needed to the criteria for the criteria to include minimum specification requirements for the natural stone veneer. Also, question is raised as to whether the criteria should be limited to specific natural stone types.
5. Since the panels consist of a veneer factory-attached to a steel backer panel, it is questionable whether the test procedures in Sections 3.6.4 and 3.7.2 are appropriate to test the wind load resistance of the attachment of the veneer units to the steel backer panel.
6. The conditions of acceptance in Sections 3.2.2.1.1 of the criteria draft need to be related to end use of the product.
7. Since the effects of freeze-thaw exposure on the bond of the mortar is to be determined in accordance with Section 3.2.2.4.1, and Section 3.2.2.5.1 requires bond strength tests on each veneer type, consideration needs to be given to requiring the freeze-thaw tests to be conducted with each veneer that is factory attached to the steel backer panel with the proprietary mortar.
8. A weight loss limitation may need to be added as a condition of acceptance of the freeze-thaw tests of Section 3.2.24.1.
9. The strength of the veneer unit to mortar connection may not be the same for natural stone within each type of natural stone, due to differences in the characteristics of stone from different quarries or other locations within the same quarry. As a result, it appears pertinent for the criteria to be revised to require the evaluation report to require bond tests of the particular natural stone selected for each building project, with the test results and analysis submitted to the code official for approval.
10. The tests in Section 3.2.2.5.1 are tests of a singular veneer unit. However, since adjacent veneer units are attached to the steel backer panel with mortar in a common mortar joint, revisions to the criteria are needed.
11. In regard to Section 3.2.2.5.1, since the bond strength of the mortar used to attach the veneer units to the steel backer panels may be adversely affected by aging conditions, the effects of aging on the bond strength needs to be evaluated and revisions to the criteria are needed.

12. Section 3.6.2 is preliminary and is subject to revision.

You are cordially invited to submit written comments, within 30 days of the date of this letter. 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 in preparing a proposed criteria that may be considered at a future Evaluation Committee meeting. Comments received 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.

If you have any questions, please contact the undersigned at (800) 423-6587, extension 3275, or Brian Gerber, Principal Structural Engineer, at extension 3260. You may also reach us by e-mail at es@icc-es.org.

Yours very truly,


Russ Krivchuk
Senior Staff Engineer

RK/cm:raf

Enclosure

cc: Evaluation Committee



PROPOSED ACCEPTANCE CRITERIA FOR EXTERIOR WALL COVERINGS OF STEEL-BACKED VENEER PANELS ATTACHED TO WALLS UTILIZING STEEL FRAMING AND BRACKETS

AC359

Proposed June 2008

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.

**PROPOSED ACCEPTANCE CRITERIA FOR EXTERIOR
WALL COVERINGS OF STEEL-BACKED VENEER PANELS ATTACHED TO
WALLS UTILIZING STEEL FRAMING AND BRACKETS**

1 **1.0 INTRODUCTION**

2 **1.1 Purpose:** The purpose of this acceptance criteria is to establish
3 requirements for exterior wall coverings of steel-backed veneer panels attached to walls
4 utilizing steel framing and brackets to be recognized in an ICC Evaluation Service, Inc.
5 (ICC-ES), evaluation report under the 2006 *International Building Code*[®] (IBC) and the
6 2006 *International Residential Code*[®] (IRC). Bases of recognition are IBC Section
7 104.11 and IRC Section R104.11.

8 The reason for development of this criteria is that the IBC and IRC do not contain
9 sufficient provisions for evaluation of this product.

10 **1.2 Scope:** This criteria is applicable to exterior wall covering systems
11 consisting of steel-backed veneer panels, cold-formed steel framing members, and
12 cold-formed steel attachment brackets.

13 The following types of veneer panels are addressed in this acceptance criteria:

- 14 • Thin clay brick veneer panels. Systems with this veneer panel type also
15 consist of a proprietary mortar for jobsite application to joints between the
16 veneer units of adjacent veneer panels The veneer panels consist of
17 veneer units of thin clay bricks or natural stone, factory attached to a
18 proprietary cold-formed steel backer panel using a proprietary mortar,

19 applied only at the veneer unit joints. The steel backer panels of this type
20 of veneer panel are formed with integral punchouts to allow the factory
21 applied mortar to key into the steel backer panel.

22 • Natural stone veneer panels. Systems with this veneer panel type also
23 consist of a proprietary mortar for jobsite application to joints between the
24 veneer units of adjacent veneer panels. The veneer panels have maximum
25 nominal dimensions of 24 inches by 48 inches (610 by 1219 mm) and
26 consist of veneer units of natural stone, factory attached to a proprietary
27 cold-formed steel backer panel with either a proprietary mortar applied
28 only at the veneer unit joints, or factory attached to the steel backer
29 panels with mechanical anchors installed into kerfs cut into the edges of
30 the stone veneer. The steel backer panels of this type of veneer panel are
31 formed with integral punchouts to allow the factory applied mortar to key
32 into the steel backer panel.

33 • Metal veneer panels with a pressed steel veneer factory attached to the
34 proprietary cold-formed steel backer panel with corrosion resistant screws.
35 The metal veneer panels have maximum nominal dimensions of 24
36 inches by 48 inches (610 by 1219 mm).

37 • Artificial cast stone veneer panels with artificial stone factory cast onto the
38 steel backer panel. Systems with artificial cast stone veneer panels also
39 consist of a proprietary mortar for jobsite application to joints between
40 veneer units of adjacent veneer panels. The steel backer panels of this

41 type of veneer panel are a maximum of 48 by 24 inches (1219 by 610
42 mm) and are formed with integral punchouts to allow the artificial cast
43 stone veneer to key into the steel backer panel.

44 • Stucco substrate veneer panels consisting of a $\frac{1}{4}$ -inch-thick cement
45 backerboard factory attached to the steel backer panel with mechanical
46 fasteners (screws). These veneer panels are for use as a substrate for
47 jobsite application of exterior cement plaster (stucco), applied over the
48 veneer panels. The stucco is to be applied in accordance with the
49 applicable code with a code complying metal plaster base (woven or
50 welded wire lath, or expanded metal lath) installed over the veneer panel
51 and attached to the wall framing of the structure in accordance with the
52 applicable code, with the exterior cement plaster also applied to the metal
53 plaster base in accordance with the applicable code. The steel backer
54 panels of this type of veneer panels have maximum nominal dimensions
55 of 24 inches by 48 inches (610 by 1219 mm).

56
57 All of the steel backer panels also have punchouts to allow the veneer panels to be
58 hung on the horizontal steel framing members of the system. In addition to being hung
59 on the horizontal steel framing members, each veneer panel is to be mechanically
60 attached at the jobsite with rivets installed through holes, pre-drilled in the steel backer
61 panels, and into the horizontal steel framing members. The horizontal framing
62 members are jobsite attached to the vertical steel framing members of the system, that

63 are jobsite attached to the supporting wall with attachment brackets. The steel-to-steel
64 connections between the horizontal and vertical framing members, and between the
65 vertical framing members and the attachment brackets are proprietary bolted
66 connections with elongated threaded slots.

67 This criteria is applicable to installations of the wall covering system to concrete,
68 masonry, wood-framed or cold-formed steel framed, load-bearing or nonload bearing
69 supporting walls in Seismic Design Categories A and B.

70 **1.3 Codes and Referenced Standards:** Where standards are referenced in
71 this criteria, the standards shall be applied consistently with the code (IBC or IRC) upon
72 which compliance of the wall covering system is based.

73 **1.3.1 ICC-ES Acceptance Criteria for Cold-Formed Steel Framing**
74 **Members (AC46).**

75 **1.3.2 2001 North American Specification for the Design of Cold-Formed**
76 **Steel Structural Members with 2004 Supplement (AISI-NAS), American Iron and Steel**
77 **Institute.**

78 **1.3.3 2004 AISI Standard for Cold-formed Steel Framing—General**
79 **Provisions (AISI-General), American Iron and Steel Institute.**

80 **1.3.4 ASTM International:**

81 **1.3.4.1** ASTM A 370-07a, Standard Test Methods and
82 Definitions for Mechanical Testing of Steel Products.

83 **1.3.4.2** ASTM A 653-04a, Standard Specification for Steel
84 Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip

85 Process.

86 **1.3.4.3** ASTM A 755-03, Standard Specification for Steel
87 Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating
88 Process for Exterior Exposed Building Products.

89 **1.3.4.4** ASTM C 109-05, Standard Test Method for
90 Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube
91 Specimens).

92 **1.3.4.5** ASTM C 270-07, Standard Test Method for Mortar for
93 Unit Masonry.

94 **1.3.4.6** ASTM C 307-03, Standard Test Method for Tensile
95 Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.

96 **1.3.4.7** ASTM C 348-02, Standard Test Method for Flexural
97 Strength of Hydraulic-Cement Mortars.

98 **1.3.4.8** ASTM C 426-06, Standard Test Method for Linear
99 Drying Shrinkage of Concrete Masonry Units.

100 **1.3.4.9** ASTM C 567–81(Reapproved 1996), Test Method for
101 Unit Weight of Structural Lightweight Concrete.

102 **1.3.4.10** ASTM C 473-05, Standard Test Methods for Physical
103 Testing of Gypsum Panel Products.

104 **1.3.4.11** ASTM C 666-?????, Standard Test Method for
105 Resistance of Concrete to Rapid Freezing and Thawing.

106 **1.3.4.12** ASTM C947-03, Standard Test Method for Flexural

- 107 Properties of Thin-Section Glass-Fiber-Reinforced Concrete (Using Simple Beam With
108 Third-Point Loading).
- 109 **1.3.4.13** ASTM C 1088-02, Specification for Thin Veneer Brick
110 Units Made from Clay or Shale.
- 111 **1.3.4.14** ASTM C 1185-??, xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx.
- 112 **1.3.4.15** ASTM C 1194-03, Standard Test Method for
113 Compressive Strength of Architectural Cast Stone.
- 114 **1.3.4.16** ASTM C 1195-03, Standard Test Method for
115 Absorption of Architectural Cast Stone.
- 116 **1.3.4.17** ASTM C 1201-91 (Reapproved 1996), Structural
117 Performance of Exterior Dimension Stone Cladding Systems by Uniform Static Air
118 Pressure Difference.
- 119 **1.3.4.18** ASTM C 1262-05a, Standard Test Method for
120 Evaluating the Freeze-Thaw Durability of Manufactured Concrete Masonry Units and
121 Related Concrete Units.
- 122 **1.3.4.19** ASTM C 1325-04, Standard Specification for Non-
123 Asbestos Fiber-Mat Reinforced Cement Substrate Sheets.
- 124 **1.3.4.20** ASTM C 1354-96 (Reapproved 2004), Standard Test
125 Method for Strength of Individual Stone Anchorages in Dimension Stone.
- 126 **1.3.4.21** ASTM C 1364-06, Standard Specification for
127 Architectural Cast Stone.
- 128 **1.3.4.22** ASTM C 1439-99^{e1}, Standard Test Method for

- 129 Polymer-Modified Mortar and Concrete.
- 130 **1.3.4.23** ASTM C 1528-02, Standard Guide for Selection of
- 131 Dimension Stone for Exterior Use.
- 132 **1.3.4.24** ASTM C 1531-02, Standard Test Method for in Situ
- 133 Measurement of Masonry Mortar Joint Shear Strength Index.
- 134 **1.3.4.25** ASTM D 1037-99, Standard Test Methods for
- 135 Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
- 136 **1.3.4.26** ASTM D 2394-83 (Reapproved 1999), Standard Test
- 137 Methods for Simulated Service Testing of Wood and Wood-Base Finish Flooring.
- 138 **1.3.4.27** ASTM E 72-02, Standard Test Methods of
- 139 Conducting Strength Tests of Panels for Building Construction.
- 140 **1.3.4.28** ASTM E 330-02, Standard Test Method for Structural
- 141 Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air
- 142 Pressure Difference.
- 143 **1.3.4.29** ASTM E 575-99, Standard Practice for Reporting
- 144 Data from Structural Tests of Building Constructions, Elements, Connections, and
- 145 Assemblies.
- 146 **1.3.4.30** ASTM E 1592-05, Standard Test Method for
- 147 Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air
- 148 Pressure Difference.
- 149 **1.3.4.31** ASTM G 21-96 (Reapproved 2002), Standard
- 150 Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

195 proprietary joint mortar applied between veneer units at the factory and applied at
196 veneer panel joints at the jobsite shall include the product designation, material
197 specifications for the constituents and mix design and applicable national standard.

198 **2.1.1.1.3 Steel Backer Panel:** The description of the
199 steel backer panel shall include dimensions and material specifications. The material
200 specifications shall include the applicable national standard, specified yield strength,
201 specified tensile strength, elongation properties, base-metal thickness and coating. The
202 dimensions shall be illustrated on a production drawing with all dimensions and
203 tolerances specified on the drawing. The drawings shall include details of all punchouts,
204 deformations and perforations.

205 **2.1.1.1.4 Veneer Panel Fasteners:** The description of
206 the screws used to factory attach the metal veneer and cement backerboard to the
207 steel backer panels shall include the fastener material, type, size (length and diameter),
208 screw head shape and diameter, corrosion resistant coating description and applicable
209 national standard. The quantity and location of the fasteners, factory installed in each
210 veneer panel, shall also be included.

211 **2.1.1.1.5 Veneer Panel Manufacture:** The standard
212 procedure for manufacturing the veneer panels shall be specified.

213 **2.1.1.2 Steel Framing Members and Attachment Brackets:**
214 The description of the steel framing members and attachment brackets shall include
215 dimensions and material specifications, including the dimensions of the elongated,
216 threaded holes, slots and perforations used to facilitate the attachment of the horizontal

217 steel framing members to the vertical framing members and to facilitate the attachment
218 of the vertical framing members to the attachment brackets. A description of the size,
219 shape and location of holes in the horizontal framing members to facilitate drainage of
220 water shall be included in the description of the horizontal framing members. The
221 material specifications shall include the applicable national standard, the grade, class,
222 specified yield strength, specified tensile strength, elongation properties, base-metal
223 thickness and coating.

224 **2.1.1.3 Fasteners:**

225 **2.1.1.3.1 Bolts:** The description of the bolts used to
226 connect the steel framing members together and to connect the attachment brackets to
227 the steel framing members of the system shall include dimensions, applicable national
228 standard, grade, material type and corrosion protective coatings.

229 **2.1.1.3.2 Rivets:** The description of the rivets used to
230 fasten the steel backer panels of the veneer panels to the horizontal steel framing
231 members shall include fastener material, type, size (length and diameter), corrosion
232 resistant coating description and applicable national standard. The quantity and location
233 of the fasteners, to be used at the jobsite to attach each veneer panel, shall also be
234 included.

235 **2.1.1.4 Flashing:** Details illustrating the installation of
236 flashing at the locations described in Section 1405 of the IBC shall be provided for
237 inclusion in the evaluation report.

238 **2.1.1.5 Expansion Joints:** Evidence of the expansion joint

239 material's compliance with Section 2.5B of ACI 530.1-05/ASCE 6-05/TMS 602-05 shall
240 be submitted. Details illustrating the installation of expansion joints and the maximum
241 spacing permitted between joints shall be provided.

242 **2.1.1.6 Joint Treatment:** The method of treating the joints
243 between panels shall be specified.

244 **2.1.2 Installation Instructions:** Published installation instructions for the
245 wall covering system bearing the date of publication. The installation instructions shall
246 comply with IBC Sections 1403.2 and 2512.1 and Sections 6.1.5 and 6.2.2.7 of ACI
247 530/ASCE 5/TMS 402.

248 The instructions shall address installation of each veneer panel type on
249 each type of supporting wall, and the structural support system intended in all locations.
250 As a minimum, instructions shall include:

- 251 a. Preparation of supporting wall.
- 252 b. Application of water-resistive barrier and flashing.
- 253 c. Installation of vertical and horizontal framing members of the
254 wall covering system to the wall, including methods on
255 assuring that the horizontal framing members are properly
256 located to assure that the veneer panels are provided with
257 consistent support at each horizontal framing member. The
258 spacing of horizontal and vertical framing members shall be
259 included in the instructions.
- 260 d. The method of installing the veneer panels onto the

- 261 horizontal framing members and a description of the
262 mechanical attachment of each panel to the horizontal
263 framing member with rivets.
- 264 e. Method of interconnecting the veneer panels.
- 265 f. Jobsite mortar preparation, application, thickness and curing
266 instructions, for veneer panels installed with mortar at joints
267 between veneer panels.
- 268 g. Ambient temperatures for jobsite application of mortar, when
269 used in the system.
- 270 h. Width and depth of mortar/grout joints, when used in the
271 system.
- 272 i. Installation of metal plaster base and exterior plaster over
273 the stucco substrate veneer panels with the metal plaster
274 base attached to steel backer panel of the stucco substrate
275 veneer panel as prescribed in the code for application of
276 metal plaster bases to cold-formed steel wall framing.

277 In addition, the following information shall be submitted to explain the
278 installation of the product:

279 **2.1.2.1 Illustrated Details:** As a minimum, illustrations shall
280 be submitted of the following:

- 281 a. Details at the head, sill and jambs of windows and
282 doors showing flashing, sealing and support requirements.

- 283 b. Closures and flashing at other veneer terminations,
284 such as eaves and sills, and where abutting dissimilar exterior wall coverings.
- 285 c. Typical conditions within the field of the veneer,
286 showing substrates, drainage media, water-resistive barriers, and control joints.
- 287 d. Detail at the bottom of the wall illustrating the means
288 for drainage of water from behind the veneer panels.
- 289 e. Details of attachment of supporting steel brackets to
290 framing and/or foundation.
- 291 f. Connection of attachment bracket to vertical framing
292 member of the system.
- 293 g. Connection of vertical framing member to horizontal
294 framing member.
- 295 h. Connection of veneer panel to horizontal framing
296 member.

297 **2.1.2.2 Limitations:** Limitations on usage, such as veneer
298 panel height, wind and/or seismic loading, and minimum and maximum angle of
299 installation, if applicable, shall be specified. For recognition under the IRC, the total
300 thickness of the veneer system shall not exceed 5 inches (127 mm).

301 **2.1.2.3 Joints:** Required locations and details of masonry
302 joints used to control cracking, if applicable.

303 **2.1.2.4 Field Preparation:** Method of field cutting, trimming
304 or forming, and treatment of cut edges and cut ends of the veneer panels and steel

305 framing members.

306 **2.1.3 Packaging and Identification:** The method of packaging and
307 identification of the wall covering system components assembled and applied at the
308 jobsite. Identification provisions shall include the evaluation report number, product
309 name and company name of the wall covering system manufacturer. The labels for the
310 veneer panels shall also include the name or logo of the inspection agency. In addition,
311 the steel framing members shall have a legible label, stamp or embossment, at a
312 maximum of 48 inches (1219 mm) on center, indicating the manufacturer's name, logo
313 or initials; the evaluation report number (ICC-ES ESR-XXXX); material minimum base-
314 metal thickness (uncoated) in decimal thickness or mils; minimum specified yield
315 strength [if greater than 33 ksi (228 MPa)]; and coating grade [if G60 or greater].

316 **2.2 Testing Laboratories:** Testing laboratories shall comply with Section 2.0
317 of the ICC-ES Acceptance Criteria for Test Reports (AC85) and Section 4.2 of the ICC-
318 ES Rules of Procedure for Evaluation Reports.

319 **2.3 Test Reports:** Test reports required by this acceptance criteria shall
320 comply with AC85 and also include the following:

321 1. Documentation of the test laboratory witnessing the manufacturing
322 of the veneer panels, and fabrication and installation of the assembly test specimens.

323 2. Documentation of the test laboratory witnessing the preparation of
324 component test specimens (such as the mortar strength or durability test specimens,
325 bolted connection test specimens), including a complete description of the component
326 specimens, density, mix proportions and curing.

- 327 3. Description of test procedures, along with details.
- 328 4. Test observations, including description of test specimen before
329 and after testing. Description shall be supported by photographs.
- 330 6. Descriptions of sampled veneer panels.
- 331 7. Age of specimens at time of testing. Tests must be conducted
332 within 45 days of specimen preparation.
- 333 8. Curing, storage, handling and conditioning procedures of test
334 specimens.

335 **2.4 Product Sampling:** For the tests specified under this criteria, the
336 components of the test specimens must be representative of normal manufacture and
337 sampled in accordance with Section 3.2 of AC85, except the veneer panels must be
338 sampled in accordance with Sections 3.1 of AC85. The testing laboratory shall witness
339 assembly of the test specimens reflecting field assembly procedures (see also Section
340 2.3).

341 **3.0 TEST AND PERFORMANCE REQUIREMENTS**

342 **3.1 Water-resistive Barrier:** A water-resistive barrier is required under the
343 wall covering system prior to installation of the attachment brackets for the vertical
344 framing members of the system. For installation under the IBC, the water-resistive
345 barrier shall comply with IBC Section 1404.2. For installations under the IRC, the
346 water-resistive barrier shall be a weather-resistive sheathing paper complying with IRC
347 Section R703.2.

348 **3.2 Veneer Panels:**

349 **3.2.1 Veneer Units:**

350 **3.2.1.1 Thin Clay Bricks:** The specifications for the thin clay
351 bricks shall be ASTM C1088, grade exterior.

352 **3.2.1.2 Artificial Cast Stone Veneer:**

353 **3.2.1.2.1 Thickness:** The thickness of the artificial cast
354 stone veneer shall be a minimum of 2 inches (51mm) and a maximum of 2.625 inches
355 (67mm).

356 **3.2.1.2.2 Physical Properties:** The compressive
357 strength, cold-water water absorption, boiling-water water absorption and linear drying
358 shrinkage of the artificial cast stone veneer shall be demonstrated to comply with the
359 requirements of ASTM C1364 Sections 5.1, 5.2, 5.3 and 5.7, respectively, with tests
360 conducted in accordance with ASTM C1194, ASTM C1195, ASTM C1195 and ASTM
361 C426, respectively. The specimens shall be cut from artificial cast stone veneer panels,
362 removing the steel backer panel from the test specimens prior to testing.

363 **3.2.1.2.3 Weight:** The average saturated weight of the
364 artificial cast stone veneer per unit area of wall shall not exceed 15 psf based on the
365 equilibrium density, increased by the percentage of cold-water water absorption
366 determined under Section 3.2.1.2.1. The equilibrium density shall be determined in
367 accordance with ASTM C567.

368 **3.2.1.2.4 Durability:**

369 **3.2.1.2.4.1 Durability of the Artificial Cast Stone:**

370 The freeze-thaw resistance of the artificial cast stone veneer shall be demonstrated to

371 comply with the requirements of Section 5.4 of ASTM C1364 , with tests conducted in
372 accordance with ASTM C666, as specified in ASTM C1364. The specimens shall be cut
373 from artificial cast stone veneer panels, removing the steel backer panel from the test
374 specimens prior to testing.

375 **3.2.1.2.4.2 Durability of the Bond of the Artificial**

376 **Cast Stone to the Steel Backer Panel:** Based on the average of three specimens, the
377 shear bond strength of the artificial cast stone to the steel backer panel of both control
378 specimens and specimens subjected to freeze-thaw conditions shall be a minimum of
379 50 psi. The test method used in the shear bond tests shall be ????? The freeze-thaw
380 specimens shall be subjected to ??????? prior to the shear bond tests.

381 **3.2.1.3 Natural Stone:** The specifications for the natural
382 stone shall be ASTM C1528. The maximum dimensions of the natural stone must be
383 limited to 2 feet by 4 feet by 2-inches.

384 **3.2.1.4 Cement Backerboard:** The specifications for the
385 cement backerboard, of the stucco substrate veneer panels shall require the cement
386 backerboard to have a minimum $\frac{1}{4}$ -inch thickness and be a Type A non-asbestos fiber-
387 mat reinforced cement substrate sheet complying with ASTM C1325, including the
388 requirements in the Supplementary Requirements section of ASTM C1325. These
389 requirements specify required testing of the cement-backerboard in accordance with
390 ASTM C473, ASTM C666, ASTM C947, ASTM C 1185, ASTM D1037, ASTM D1037,
391 ASTM D2394, ASTM G21, and ASTM G22. Reports of tests demonstrating that the
392 cement backerboard complies with these requirements needs to be submitted.

393 **3.2.1.5 Metal:** The specifications for the metal veneer shall
394 require the metal veneer to be steel with a minimum galvanization coating weight of
395 G90 and a minimum base-metal thickness complying with IBC Section 1405.10.

396 **3.2.2 Mortar:**

397 **3.2.2.1 Physical Properties:** The compressive strength,
398 bond strength, and indication of chloride ion penetration of the mortar shall be
399 determined in accordance with ASTM C1439, except that the compressive strength of
400 the mortar shall be determined by tests in accordance with ASTM C109, as modified by
401 ASTM C1439, at mortar specimen ages of 48 hours and 28 days. The freshly mixed
402 mortar tests specified in ASTM C1439 shall be conducted on the mortar used in the
403 compressive strength, bond strength, and indication of chloride ion penetration tests,
404 and the results of the freshly mixed mortar tests recorded in the test report. The tests of
405 a reference mortar, as noted in ASTM C1439, are not required under this criteria. The
406 conditions of acceptance of the hardened mortar tests are as follows:

407 **3.2.2.1.1 Compressive Strength:** Based on an average
408 of three specimens, the minimum compressive strength of the mortar at 48 hours and
409 28 days shall be 1500 and 3000 psi, respectively.

410 **3.2.2.1.2 Bond Strength:** ????????

411 **3.2.2.1.3 Indication of Chloride Ion Penetration:** ????

412 **3.2.2.2 Flexural Strength:** The flexural strength of the mortar
413 shall be determined in accordance with ASTM C348 on specimens prepared and cured
414 in accordance with ASTM C1439 and ASTM C348. The conditions of acceptance are

415 ????

416 **3.2.2.3 Tensile Strength:** The tensile strength of the mortar
417 shall be determined in accordance with ASTM C307 on specimens prepared and cured
418 in accordance with ASTM C1439 and ASTM C307. The conditions of acceptance are
419 ?????.

420 **3.2.2.4 Durability:**

421 **3.2.2.4.1 Freeze-thaw Resistance:** The durability of the
422 bond of the mortar used to factory attach the veneer units to the steel backer panel
423 when subjected to freeze-thaw conditions shall be tested in accordance with ASTM
424 C1262, except as amended by this criteria. Two sets of specimens are required, since
425 one specimen set shall be tested with a test solution of water and the second set of
426 specimens shall be tested with a test solution of 3 percent saline solution. Each
427 specimen set shall consist of five veneer panel sections, each having minimum height
428 and width dimensions of 24 and 12 inches, respectively, but of sufficient size such that
429 the specimen contains representative factory installed mortar head and bed joints of the
430 veneer units. The specimens shall be cured and maintained for a minimum of 28 days
431 at 50 percent relative humidity and 70°F. ($\pm 3^\circ\text{F}$.). If the panels are cut using water, the
432 specimens shall be returned to these conditions for a minimum of 48 hours prior to
433 commencement of the freeze-thaw exposure. After curing, the specimens shall be
434 placed with the steel backer panel side down in the container and submerged so that
435 approximately 50 percent of the mortar thickness is under the water. Each specimen
436 shall be subjected to 50 freeze-thaw cycles. The conditions of acceptance are that the

437 veneer, mortar and steel backer panel must not crack or degrade, nor shall debonding
438 occur between the components of the test specimens. In addition, a minimum of ????

439 freeze-thaw specimens shall be subjected to the mortar bond tests in Sections
440 3.2.2.5.1, and additional ??????? freeze-thaw specimens shall be subjected to the
441 mortar bond tests in Section 3.2.2.5.2. The average bond strength of each set of
442 specimens shall be equal or greater than the corresponding result of tests conducted in
443 accordance with Sections 3.2.2.5.1 and 3.2.2.5.2

444 **3.2.2.4.2 Ultraviolet Light Resistance: ??????**

445 **3.2.2.4.3 Wet/Dry Cyclic Resistance: ??????**

446 **3.2.2.4.4 Heating/Cooling Cyclic Resistance: ??????**

447 **3.2.2.5 Veneer Unit to Steel Backer Panel Mortar**

448 **Connection Strength:** This criteria section is applicable to both the thin brick veneer
449 panels and natural stone veneer panels which have the veneer units factory attached to
450 the steel backer panels with mortar.

451 **3.2.2.5.1 Forces Due to Outward Wind Pressure:** The
452 strength of the mortared connection of the each veneer unit type to the steel backer
453 panel for outward wind pressures shall be evaluated by testing in accordance with the
454 concentrated load test procedure of Section 13 of ASTM E72 with the concentrated
455 load applied to the back of the veneer units with the load apparatus inserted through
456 the punchouts provided in the steel backer panels. The test load shall be applied at a
457 uniform rate of ???? to veneer panel specimens that are representative of standard
458 manufacture that have been cured and maintained for a minimum of 28 days at 50

459 percent relative humidity and 70°F ($\pm 3^\circ\text{F}$). If the panels are cut using water, the
460 specimens shall be returned to these conditions for a minimum of 48 hours prior to
461 commencement of the load test. The test specimen shall be supported on the veneer
462 units adjacent to the load tested veneer unit. The load at failure of a minimum of **????**
463 shall be analyzed in general conformance with Method B of ASTM C1531 using the
464 gross area of the surrounding mortar joints as the value of A_j to calculate the shear
465 strength of the mortar-to-veneer unit bond. The allowable mortar-to-veneer unit shear
466 strength must be based on a minimum safety factor of **????**, applied to the average of
467 these test results. The allowable wind loads based on the allowable mortar-to-veneer
468 unit shear strength shall exceed the allowable outward wind pressures derived under
469 Section 3.5.2 of this criteria.

470 **3.2.2.5.2 Forces Due to Veneer Unit Gravity Loads:**

471 The strength of the mortar to transfer the veneer unit gravity load from the veneer unit
472 to the steel backer panel shall be evaluated by testing in accordance with **?????**

473 **3.2.3 Screws:** The screws used to factory-attach the veneer to the steel
474 backer panel of the metal veneer panels shall be steel screws complying with **?????**

475 **3.2.4 Steel Backer Panels:** The steel backer panels shall be cold-
476 formed from galvanized steel with a minimum G90 coating weight complying with ASTM
477 A653. The steel shall be one of the types and grades of steel listed in Section A2 of
478 AISI-NAS.

479 **3.3 Rivets:** The specifications for the rivets used to fasten the steel backer
480 panels to the horizontal framing members shall be steel rivets complying with **?????**with

481 a minimum corrosion resistant coating of ??????.

482 **3.4 Steel Framing Members and Attachment Brackets:** The steel framing
483 members and attachment brackets shall be galvanized with a minimum G90 (0.90
484 ounces of zinc per square foot) coating weight complying with ASTM A653.

485 **3.5 Proprietary Bolted Connections of the Wall Covering Systems**

486 **Framing System:**

487 **3.5.1 General:** The shear and tension capacity of the steel-to-steel
488 bolted connections of the horizontal steel framing members to the vertical steel framing
489 members shall be determined in accordance with the bolted connection testing and
490 data analysis requirements of Sections 3.5.2 through 3.5.4, respectively.

491 The actual yield strength, tensile strength, base-metal thickness
492 and elongation properties of the steel framing members and attachment brackets of the
493 load test specimens shall be determined in accordance with Section 3.5.5 of this
494 criteria.

495 **3.5.2 Connection Load Tests:** Tension and shear tests of the steel-to-
496 steel bolted connections shall be conducted in accordance with AISI TS-5-02 on test
497 specimens assembled in accordance with the installation instructions of the veneer wall
498 covering system evaluation report applicant. For steel-to-steel bolted connections of
499 bolts installed through elongated holes, the shear load tests must be conducted with the
500 length of the elongated holes parallel to the load direction. The minimum quantity of test
501 specimens for each specific connection condition shall comply with Section 3.5.3.2.

502 **3.5.3 Analysis of Bolted Connection Test Results:**

524 R = Average value of all test results.

525 Ω = Factor of safety to be computed as follows:

526
$$\Omega = \frac{1.6}{\phi} \geq 3.75$$

527 where:

528
$$\phi = 1.67e^{-3.5\sqrt{0.0766 + C_p V_p^2}}$$

529 where:

530 e = Natural logarithmic base (2.718...).

531 C_p = Correction factor = $\frac{\left(1 + \frac{1}{n}\right) m}{(m - 2)}$, for $n \geq 4$, and 5.7

532 for $n = 3$.

533 n = Number of tests performed.

534 m = Degrees of freedom = $n - 1$.

535 V_p = Coefficient of variation of the test results, but
536 not less than 6.5 percent.

537 **3.5.4 Connection Strength Adjustments:**

538 **3.5.4.1 Steel Sheet Physical Properties:** If the actual yield
539 strength of the steel sheets of the bolted connection load test specimens determined in
540 accordance with Section 3.5.5 of this criteria exceeds the specified yield strength for the
541 steel sheets, the results of the bolted connection load tests shall be adjusted down to

542 the steel's specified yield strength by multiplying the average maximum strength of the
543 connection by the ratio of F_y (specified) / F_y (actual). Connection test results shall not be
544 increased if the actual yield strength of the steel sheets is less than the specified yield
545 strength.

546 Where the actual tensile strength of the steel sheets of the tested
547 connections exceeds the specified tensile strength for the steel sheets, the results of the
548 connection load tests shall be adjusted downward based on the steel sheet's tensile
549 strength, instead of the steel sheet's yield strength.

550 **3.5.4.2 Steel Sheet Thickness:** Downward adjustment of the
551 connection load test results shall be made when a variation or difference exists between
552 the design base-metal thickness of the steel sheets and the base-metal thickness of the
553 steel sheets of the bolted connection load test specimens.

554 **3.5.5 Steel Sheet Physical Properties and Thickness:** The actual yield
555 strength, tensile strength, elongation and base-metal thickness of the steel sheets of the
556 bolted connection load test specimens tested under Section 3.5 of this criteria shall be
557 determined by conducting tension tests of coupons in accordance with ASTM A 370.
558 The tension test coupons shall be taken from a flat undamaged area of the steel sheet.
559 When the steel sheet is profiled, the length of the tension test coupons shall be oriented
560 parallel to the profiles. Where the number of steel coupon specimens is not specified in
561 the specific standard, a minimum of three, single, sheet-type coupon specimens shall be
562 tested to demonstrate compliance with the applicable standard for the steel sheet and to
563 determine the base-metal thickness of the steel sheets, excluding all coatings such as

564 zinc galvanization. Three identical coupon specimens shall be tested provided the
565 deviation of each individual test result from the average value obtained from all tests
566 does not exceed 15 percent. If deviation from the average value exceeds 15 percent,
567 more coupon tests shall be performed until the deviation of each individual test result
568 from the average value obtained from all tests does not exceed 15 percent, or until at
569 least three additional tests have been performed. All tests shall be considered, unless
570 there is a rationale for exclusion of individual test results, such as a test equipment
571 malfunction. The actual yield strength, tensile strength, elongation and base-metal
572 thickness is the average of the tested values.

573 **3.6 Natural Stone Veneer Units Mechanically Attached to the Steel Backer**
574 **Panel:**

575 **3.6.1 General:** This criteria section addresses the natural stone veneer
576 panel with natural stone veneer units mechanically attached to the steel backer panels
577 consistent with ASTM C1242.

578 **3.6.2 Fastener to Stone Veneer:** The connection of the fastener to the
579 stone veneer shall be tested in accordance with ASTM C1354.

580 **3.6.3 Fastener to Steel Backer Panel: ?????**

581 **3.6.4 Stone Veneer to Steel Backer Panel Wind Load Resistance:**

582 Each configuration of veneer unit to steel backer panel attachment, including the
583 placement and quantity of kerf fasteners, is to be evaluated under this criteria section.
584 The panels with the stone veneer units attached to the steel backer panels shall be
585 tested in accordance with ASTM C1201?????. The allowable wind load shall be the

586 average of the maximum test load of a minimum of five specimens for each tested
587 configuration divided by a safety factor of ????.

588 **3.6.5 Stone Veneer to Steel Backer Panel Gravity Load Resistance:**

589 See Sections 3.7.1 and 3.7.2.

590 **3.7 Metal Veneer Units Mechanically Attached to the Steel Backer Panel:**

591 **3.7.1 General:** This criteria section addresses the metal veneer panel
592 with metal veneer units mechanically attached to the steel backer panels

593 **3.7.2 Metal Veneer to Steel Backer Panel Attachment:** The metal
594 veneer shall be attached to the steel backer panel in compliance with IBC Section
595 1405.10.1. The attachment of the metal veneer units to the steel backer panels shall be
596 tested in accordance with ASTM E 1592 ????. The allowable wind load shall be the
597 average of the maximum test load of a minimum of five specimens for each tested
598 configuration divided by a safety factor of ????.

599 **3.8 Veneer Panel and Steel Framing Members Structural Assembly**

600 **Performance:**

601 **3.8.1 General:** The test specimens under this section of this criteria shall
602 represent the critical conditions of installation. This includes the maximum horizontal and
603 vertical steel framing member spacing, maximum attachment bracket spacing, minimum
604 base-metal thickness of the steel backer panel and any other conditions that affect the
605 structural performance of the system. The test assembly shall not include mortar in the
606 panel joints that represents jobsite installed mortar.

607 **3.8.2 Gravity Loads:**

608 **3.8.2.1 General:** Gravity load tests in accordance with Section
609 4.1 are required to evaluate the veneer wall covering system to transfer the weight of the
610 veneer to the supporting structure.

611 **3.8.2.2 Conditions of Acceptance:** The maximum weight of
612 the veneer panels shall be equal to the average of the maximum loads from tests in
613 accordance with Section 4.1, divided by a minimum factor of safety of 3, provided the
614 following provisions are satisfied:

615 **3.8.2.2.1** No single test result varies by more than 15
616 percent from the average of three tests. Variations exceeding this limit require larger
617 safety factors.

618 **3.8.2.2.2** The allowable gravity load does not exceed the
619 allowable veneer weight based on the allowable strength of the mortar attaching the
620 veneer units to the steel backer panel.

621 **3.8.2.2.3** The allowable gravity load does not exceed the
622 allowable shear strength of the steel-to-steel connections, as applicable, determined in
623 accordance with Section 3.5 of this criteria. The analysis of the connections shall
624 consider load eccentricities.

625 **3.8.3 In-plane Seismic Shear Loads: ?????**

626 **3.8.3.1 General:** In-plane shear tests in accordance with
627 Section 4.2 are required to evaluate the veneer wall covering system to transfer the in-
628 plane, horizontal seismic force due to the weight of the veneer to the supporting

629 structure.

630 **3.8.3.2 Conditions of Acceptance:** The maximum weight of
631 the veneer panels shall be equal to the average of the maximum loads of the tests
632 conducted in accordance with Section 4.2, divided by a minimum factor of safety of 3,
633 provided the following provisions are satisfied:

634 **3.8.3.2.1** No single test result varies by more than 15
635 percent from the average of three tests. Variations exceeding this limit requires larger
636 safety factors.

637 **3.8.3.2.2** The allowable gravity load does not exceed the
638 allowable veneer weight based on the allowable strength of the mortar attaching the
639 veneer units to the steel backer panel.

640 **3.8.3.2.3** The allowable gravity load does not exceed the
641 allowable shear strength of the steel-to-steel connections, as applicable, determined in
642 accordance with Section 3.4 of this criteria.

643 **3.8.4 Transverse Wind Loads:**

644 **3.8.4.1 General:** Transverse load tests in accordance with
645 Section 4.3 are required to determine allowable inward and outward wind pressures for
646 the veneer wall covering system.

647 **3.8.4.2 Conditions of Acceptance:** The allowable inward and
648 outward pressures shall be based on a minimum factor of safety of three applied to the
649 average maximum load if the following three provisions are satisfied:

650 **3.8.4.2.1** No single test result varies by more than 15

651 percent from the average of three tests. Variations exceeding this limit requires larger
652 safety factors.

653 **3.8.4.2.2** Allowable outward wind pressure does not
654 exceed the allowable pressure based on the allowable strength of the mortar attaching
655 the veneer units to the steel backer panel.

656 **3.8.4.2.3** Allowable inward and outward wind pressures
657 do not exceed the allowable tension or shear strength of the steel-to-steel connections,
658 as applicable, determined in accordance with Section 3.5 of this criteria.

659 **3.9 Attachment to Walls:** For installation over concrete or masonry walls, the
660 attachment brackets of the veneer wall covering system shall be attached to the wall
661 with fasteners. For installations over wood or steel frame walls, the horizontal steel
662 framing members or attachment brackets of the veneer wall covering system shall be
663 attached to the wall framing members with fasteners. The fasteners shall be any
664 fastener designated by the report applicant, provided the fasteners are not the failure
665 mode in the tests and the evaluation report states that the fastener shall be designed to
666 the satisfaction of the code official for the gravity load of the veneer wall covering system
667 and design wind loads. The analysis of the connections to the supporting wall shall
668 consider load eccentricities.

669 **3.10 Noncombustible Construction:** When the wall covering system is to be
670 evaluated for use in Types I, II, III and/or IV construction, the veneer shall be fabricated
671 from a code recognized noncombustible material or testing shall be submitted
672 establishing compliance with either IBC Section 703.4 or 1406.

673 **4.0 TEST METHODS**

674 **4.1 Gravity Load Tests:**

675 **4.1.1 Test Procedure:** The gravity load tests as required by Section 3.6.2
676 shall be conducted in accordance with ASTM C1354 with the loads applied parallel to
677 the surface of the veneer, and parallel to the length of the vertical framing of the system.
678 Loading shall be applied in a vertical orientation. A minimum of three assemblies shall
679 be tested.

680 **4.1.2 Test Specimens:** Each specimen shall be an assembly of multiple
681 veneer panels with the intended framing members and connections, with each specimen
682 of sufficient size to represent the end use installation conditions, reflecting the tributary
683 gravity loads that the system components and connections are required to support. The
684 horizontal and vertical steel framing members shall be located at the maximum spacing
685 for which recognition is sought. The components and configuration of the test specimens
686 shall be based on minimum conditions, since test specimens establish the basis of
687 acceptance. The base-metal thickness and physical properties of the steel of the
688 framing members, attachment brackets and veneer backer panel also establish the
689 minimum basis of acceptance.

690 **4.2 In-plane Seismic Shear Tests: ????**

691 **4.2.1 Test Procedure:** The in-plane seismic shear load tests shall be
692 conducted in accordance with ASTM C1354 with the loads applied parallel to the surface
693 of the veneer, perpendicular to the length of the vertical framing of the system.
694 Specimens shall be mounted in a vertical orientation. A minimum of three assemblies

695 shall be tested.

696 **4.2.2 Test Specimens:** Each specimen shall be an assembly of multiple
697 veneer panels with the intended framing members and connections, with each specimen
698 of sufficient size to represent the end use installation conditions, reflecting the tributary
699 seismic loads that the system components and connections are required to support. The
700 horizontal and vertical steel framing members shall be located at the maximum spacing
701 for which recognition is sought. The components and configuration of the test specimens
702 shall be based on minimum conditions, since test specimens establish the basis of
703 acceptance. The base-metal thickness and physical properties of the steel of the
704 framing members, attachment brackets and veneer backer panel used in the test
705 specimens also established the minimum requirements.

706 **4.3 Transverse Load Structural Tests:**

707 **4.3.1 Test Procedure:** The transverse load structural tests of the wall
708 covering system shall be in accordance with ASTM E 330, Procedure B. Application of
709 load to ultimate shall consist of at least six increments, with a 60-second load duration
710 for each increment. Specimens shall be mounted in accordance with ASTM E 330 in a
711 vertical orientation to prevent disconnection of the veneer from the steel framing. At
712 least three positive and three negative load tests must be conducted, for each veneer
713 and/or method of attachment.

714 **4.3.2 Test Specimens:** The specimens shall be an assembly of the
715 veneer panels with framing members and shall have a width that is a minimum of twice
716 the maximum spacing of the vertical steel framing members of the wall covering system

717 or twice the veneer panel width, whichever is greater, and not less than 4 feet (1219
718 mm) (This will ensure a minimum of three vertical framing members on the test
719 assembly). The height of the specimen shall be a minimum of three times the veneer
720 panel height but not less than 4 feet (1219 mm) to ensure the test assembly includes at
721 least three full height veneer panels. The horizontal steel framing members shall be
722 located at the maximum spacing for which recognition is sought. The components and
723 configuration of the test specimens shall be based on minimum conditions since test
724 specimens establish the basis of acceptance. The base-metal thickness and physical
725 properties of the steel framing members, attachment brackets and veneer backer panel
726 used in the test specimens also established the minimum basis of acceptance.

727 **5.0 QUALITY CONTROL**

728 **5.1** The veneer panels shall be manufactured under an approved quality
729 control program with inspections by an inspection agency accredited by the International
730 Accreditation Service (IAS) or as otherwise acceptable to ICC-ES.

731 **5.2** Third-party follow-up inspections are not required under this criteria for
732 mortar or steel components of the wall covering system or the bolts used at connections
733 under this criteria.

734 **5.3** Quality documentation complying with the ICC-ES Acceptance Criteria for
735 Quality Documentation (AC10) shall be submitted for the manufacture of the mortar
736 components and steel components, and for fabrication of the veneer panels.

737 In addition, the quality documentation for the steel framing members, brackets
738 and steel backing panels shall also include sufficient detail to verify that each type of

739 steel complies with the specifications and complies with the requirements specified in
740 Sections 6.2 through 6.7 of AC46.

741 **6.0 EVALUATION REPORT RECOGNITION**

742 The evaluation report shall include the following information:

743 **6.1** Product description, installation instructions, and packaging and
744 identification information for the veneer panels, jobsite installed mortar, steel framing
745 members and brackets, and rivets and other fasteners based on the information
746 submitted in Section 2.0 of this criteria. The installed weight of the system is to be
747 included.

748 **6.2** Allowable inward and outward wind pressures based on requirements in
749 Section 3.7.4 of this criteria.

750 **6.3** Statements regarding the attachment of the system to the supporting walls,
751 consistent with Section 3.8 of this criteria.

752 **6.4** Statements that the need for, and locations of, expansion and control joints
753 shall be determined and specified by the registered design professional; where a
754 registered design professional is not involved, the designer or fabricator shall be
755 responsible.

756 **6.5** A statement as to the types of construction on which the product is
757 recognized for use.

758 **6.6** A statement included in the installation section of the evaluation report that
759 requires the installation to be performed only by qualified installers approved by the
760 evaluation report applicant.

761 **6.7** Statements that when regulated by the IBC, a water-resistive barrier must
762 be installed in accordance with IBC Section 1404.2 and that when regulated by the IRC,
763 a weather-resistive sheathing paper must be installed in accordance with IRC Sections
764 R703.1 and R703.2.

765 **6.8** A statement that for installation of the wall covering system under the IRC,
766 the installation shall be in accordance with the requirements of IRC Section R703.7.

767 **6.9** A statement that for installation of the wall covering system under the IBC,
768 the installation is limited to 30 feet (9144 mm) in height above a noncombustible
769 foundation. Installations above 30 feet (9144 mm) under the IBC are outside the scope
770 of the report.

771 **6.10** A statement that the wall covering system is limited to use on structures in
772 Seismic Design Categories A and B.

773 **6.11** A statement that when the wall covering system is installed on an existing
774 building, calculations by a registered design professional must be submitted to the code
775 official establishing the ability of the existing structure to support the additional weight
776 and applied loads of the system.

777 **6.10** Each box of fasteners provided by the wall covering system evaluation
778 report applicant shall contain a label or be stamped with the evaluation report applicant's
779 company name.

780 **6.11** A statement that the metal veneer panels must be grounded as required by
781 IBC Section 1405.10.4.

782 **6.12** For evaluation reports on steel-backed veneer panels with natural stone

783 veneer units, the evaluation report shall specify the general natural stone types that
784 have been qualified, and include requirements that data analysis and reports of tests
785 regarding the bond strength of the mortar to the natural stone selected for each building
786 project, satisfactory to the code official, are to be submitted to the code official. The tests
787 are to be tests in accordance with Section 3.2.2.5.1. The evaluation report is to include
788 minimum conditions of acceptance of the tests that are based on the results of the
789 qualification tests conducted in accordance with Section 3.2.2.5.1.

790 **7.0 SPECIAL INSPECTION**

791 When the wall covering system is attached to concrete or masonry walls, special
792 inspection shall be provided for the installation of the fasteners to the concrete or
793 masonry, as specified in the respective fastener evaluation report. ■