



August 5, 2023

TO: IAS – INSPECTION PROGRAMS FOR MANUFACTURERS OF METAL BUILDING SYSTEMS AND OTHER INTERESTED PARTIES.

SUBJECT: Proposed Revisions to the Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems, AC472 202310-R0 (SM)

Hearing Information:

IAS Accreditation Committee

Wednesday, October 4, 2023

8:30 am (Pacific Time Zone)

WebEx Meeting – Refer to IAS website for details.

Dear Madam or Sir:

Proposed Revisions to the Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems, (AC472) has been placed on the agenda for committee consideration at the above-noted meeting.

Proposed changes include:

Lines 473-477: Added an alternate to what types of facilities work can be subcontracted and require that the subcontracting facility's CWI is responsible for 100% of the welds.

You are cordially invited to submit written comments, or to attend the WebEx committee hearing and present verbal comments. Written comments will be forwarded to the committee, **prior to the hearing**, if received by September 4, 2023. For your convenience, a comment form is provided. The link can be found on the Accreditation Committee meeting page on the IAS website, www.iasonline.org. Comments must be emailed to iasinfo@iasonline.org.

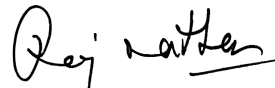
Parties interested in proposed revised criteria may deliver written communications and submissions regarding such proposed criteria to IAS within approximately 30 days of posting of the public notice on the IAS website. The committee shall be informed of all pertinent written communications received by IAS. Any relevant communication and changes to a criteria arising from the written communication/submission shall be posted to the IAS website prior to the meeting.

Participants at the accreditation committee meetings shall have the opportunity to speak on the proposed criteria to provide information to the committee. Committee meetings are generally held by electronic means. Participants are responsible to ensure access to appropriate computer equipment, software, and internet connectivity to ensure effective participation during the meeting.

Your cooperation is requested in forwarding to IAS, as noted above, all material directed to the committee. Prior to the hearing, parties interested in the deliberations of the committee should refrain from communicating, whether in writing or verbally, with committee members regarding agenda items. The committee reserves the right to refuse communications that do not comply with this request.

If you have any questions, please contact IAS at 562-364-8201. You may also reach us by e-mail at iasinfo@iasonline.org.

Yours very truly,

A handwritten signature in black ink that reads "Raj Nathan". The signature is written in a cursive style with a horizontal line under the name.

Raj Nathan
President

Enclosures: Proposed Revised AC478

cc: Accreditation Committee



1 **PROPOSED REVISIONS TO THE ACCREDITATION CRITERIA FOR**
2 **INSPECTION PROGRAMS FOR MANUFACTURERS OF METAL BUILDING**
3 **SYSTEMS**

4
5 **AC472**

6
7
8 **Proposed October 4, 2023**

9
10
11 **PREFACE**

12
13
14 The attached accreditation criteria have been proposed to provide all interested parties with an
15 opportunity to comment. These criteria may be further revised as needed. The criteria are
16 developed and adopted following public hearings conducted by the International Accreditation
17 Service, Inc. (IAS), Accreditation Committee and are effective on the first of the month following
18 approval by the Accreditation Committee, but no earlier than 30 days following the approval.

19 **PROPOSED REVISIONS TO THE ACCREDITATION CRITERIA FOR INSPECTION PROGRAMS FOR**
20 **MANUFACTURERS OF METAL BUILDING SYSTEMS**

21
22 **1. INTRODUCTION**

23 1.1. **Scope:** These criteria set forth the requirements for obtaining and maintaining International
24 Accreditation Service, Inc. (IAS), Inspection Programs for Manufacturers of Metal Building
25 Systems accreditation. The criteria supplement the IAS Rules of Procedure for Inspection
26 Programs for Manufacturers of Metal Building Systems.

27
28 1.2. **Overview:** Accredited entities complying with these criteria will have demonstrated that they
29 have the personnel, organization, experience, knowledge, quality procedures and commitment to
30 fabricate in accordance with specified requirements. IAS-accredited inspection programs for
31 manufacturers of metal building systems operate under a documented management system
32 developed in concert with an IAS-accredited inspection agency which conducts unannounced
33 inspections to verify continued compliance with these criteria. The management system includes
34 the manufacturer's written fabrication procedures and quality control manuals which provide a
35 basis for control of materials and workmanship, with periodic inspections of fabrication and
36 quality control practices by an IAS-accredited inspection agency. Although accredited entities
37 are evaluated on their performance measures to consistently produce products of the required
38 quality mandated by specified requirements, these criteria do not cover the products or the
39 design or performance characteristics of the products.

40
41 1.3. **Normative and Reference Documents:** Publications listed below refer to current editions
42 (unless otherwise stated).

43 1.3.1. American Welding Society: D1.1, D1.3, Structural Welding Code.

44 1.3.2. ISO 9606-1, Qualification testing of welders – Fusion welding – Part 1: Steels.

45 1.3.3. ISO/IEC 17000, Conformity assessment - Vocabulary and general principles.

46 1.3.4. International Accreditation Service, Inc. (IAS), Accreditation Criteria for Inspection
47 Programs for Manufacturers of Cold-formed Steel Structural and Nonstructural
48 Components Not Requiring Welding accreditation (AC473).

49 1.3.5. IAS Rules of Procedure for Accreditation of Inspection Programs for Manufacturers of
50 Metal Building Systems.

51 1.3.6. International Building Code®, published by the International Code Council.

52 1.3.7. American Welding Society: A2.4, Standard Symbols for Welding, Brazing, and
53 Nondestructive Examination.

54 1.3.8. American Welding Society: A3.0, Standard Welding Terms and Definitions; Including
55 Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal
56 Spraying.

- 57 1.3.9. American Welding Society: QC1, Standard for AWS Certification of Welding Inspectors.
58 1.3.10. Canadian Standards Association: W178.2, Certification of welding inspectors.
59 1.3.11. The American Society for Nondestructive Testing (ASNT): SNT-TC-1A Personnel
60 Qualification and Certification in Nondestructive Testing.
61 1.3.12. American Institute of Steel Construction (AISC), ANSI/AISC 360 Specification for
62 Structural Steel Buildings.
63 1.3.13. American Iron and Steel Institute: AISI S100: North American Specification for the
64 Design of Cold-Formed Steel Structural.
65 1.3.14. MBMA Manuals:
66 1.3.14.1. Metal Building Systems Manual
67 1.3.14.2. Metal Roofing Systems Design Manual
68 1.3.14.3. Fire Resistance Design Guide for Metal Building Systems
69 1.3.14.4. Guide for Inspecting Metal Building Systems
70 1.3.14.5. MBMA Model Written Practice-UT Certification
71

72 2. DEFINITIONS

73 For the purposes of these accreditation criteria, the definitions given in ISO/IEC 17000, and the
74 definitions that follow, apply.

- 75 2.1. **Approved Fabricator:** An established and qualified person, firm or corporation approved by the
76 building official pursuant to the approved fabricator designation in Section 1702 of the
77 *International Building Code*[®].
78 2.2. **Cold-formed Products:** Products such as cold-formed Z- or C-shaped structural members or
79 roll-formed sheeting or deck designed to resist vertical and/or lateral loads.
80 2.3. **Contract Documents:** Documents that describe the metal building system to be supplied in its
81 entirety for a given project. These documents include work orders, drawings, specifications, and
82 buyer sketches.
83 2.4. **Corrective Action:** Implemented action necessary to eliminate or reduce the root cause of an
84 identified problem.
85 2.5. **General Manager:** The person occupying the highest position of authority within a facility's
86 organization.
87 2.6. **Letter of Certification:** A project document that certifies the design of the metal building system
88 as required by AC472 Section 4.6.3.2.3.
89 2.7. **Management System:** A set of interrelated or interacting elements that organizations use to
90 direct, control and coordinate how policies are implemented and objectives are achieved.
91 Previously, this was referred to as Quality Management System.
92 2.8. **Metal Building Systems Manufacturer:** An entity that may be a company, division, subsidiary
93 or similar organization that designs and manufactures a metal building system which consists of

- 94 an integrated set of components and assemblies, including but not limited to frames that are
95 primary structural steel members, secondary members that are cold-formed steel and steel
96 joists, and roof and wall cladding components, specifically designed to support and transfer
97 loads and provide a complete or partial building shell.
- 98 2.9. **Nonconformance:** An action employed that renders a design, member, or component
99 unacceptable for the intended use as specified in contract documents or these criteria.
- 100 2.10. **Nondestructive Testing (NDT):** The process of inspecting, testing, or evaluating materials,
101 components or assemblies for discontinuities, or differences in characteristics without
102 destroying the serviceability of the part or system.
- 103 2.11. **PQR:** Procedure Qualification Record in accordance with AWS Standards, as applicable.
- 104 2.12. **Procedure:** An implemented and written document that describes who does what, when,
105 where, why and how.
- 106 2.13. **Product:** Result of activities or processes.
- 107 2.14. **Production Engineer:** An engineer who performs final designs on projects so that project
108 documents and shop documents can be made.
- 109 2.15. **Project:** A process consisting of a set of coordinated and controlled activities undertaken to
110 achieve customer requirements.
- 111 2.16. **Project Documents:** Documents produced for the buyer's use to support the implementation
112 of the project. These documents include permit and erection drawings, installation manuals and
113 letters of certification.
- 114 2.17. **Quality Assurance:** Measurable systematic actions to assure confidence that the
115 implementation of planned activities result in meeting objectives, goals and contract
116 documents.
- 117 2.18. **Quality Control:** The act of examination, testing or measurement that verifies processes and
118 services, or that documents conform to specified criteria.
- 119 2.19. **Quality Manager:** A quality professional, designated by management who has demonstrated
120 competence in establishing, maintaining and implementing a management system with
121 consistent results. The quality manager shall have direct access to the highest executive level
122 and shall report on the performance of the quality system to the organization's management for
123 use as a basis for improvement of the management system.
- 124 2.20. **Quality Plan:** A written document that describes the procedures and policies implemented to
125 assure product quality meets requirements of specific contract documents. As a minimum,
126 quality plans must meet the requirements of Sections 4.7.1.1 and 4.7.1.2 or 4.7.4.1 and 4.7.4.2
127 of these criteria.
- 128 2.21. **Repair:** Action taken to render a member or component acceptable for the intended use.

- 129 2.22. **Shop Documents:** Documents produced that describe the individual parts and pieces of a
130 metal building system to be fabricated in the fabrication facility. These documents include shop
131 details, bills of material, manifests, bills of lading, etc.
- 132 2.23. **Specification:** A document that states the obligatory requirements to which the product must
133 conform.
- 134 2.24. **Structural Weldments:** Structural framing involving welding, coping, cutting, and drilling of
135 built-up I-shaped sections, rolled shapes, or cold-formed sections.
- 136 2.25. **Subcontractor:** An entity that provides goods or services per stipulated project or shop
137 documents. A subcontractor is hired to perform specific tasks. An example of a subcontractor is
138 a structural steel fabricator.
- 139 2.26. **Vendor:** An entity that provides inventorable, proprietary buy-out items that are available for
140 sale. These items are typically chosen from a catalogue or list and are finite in terms of
141 available options and quantity. Examples of vendors are bolt manufacturers and steel mills.
- 142 2.27. **WPS:** Welding Procedure Specification in accordance with ANSI/AWS D1.1 or AWS D1.3, as
143 applicable.

144

145 3. ELIGIBILITY

146 The metal building systems manufacturer must have, at a minimum, in-house capabilities for Parts A
147 and C. Part B components can be manufactured in-house or outsourced under the quality assurance
148 requirements under Part B. Entities that outsource any cold-form secondary and sheeting products to
149 facilities that are not IAS-accredited facilities must ensure annually that the manufacturer effectively
150 implements a quality management system that is compliant with Part B of these criteria.

151

152 4. REQUIRED BASIC INFORMATION

153 4.1. Fabricator inspection programs for manufacturers of metal building systems must demonstrate
154 compliance with the following requirements:

155 4.1.1. The requirements of these accreditation criteria;

156 4.1.2. IAS Rules of Procedure for Accreditation of Inspection Programs for Manufacturers of
157 Metal Building Systems.

158

159 4.2. General Requirements

160 4.2.1. Quality System

161 4.2.1.1. Entities accredited under these criteria shall establish and implement a quality
162 system that is fully documented. This documented management system must
163 describe the procedures and quality activities for ensuring that fabricated products
164 meet the specified requirements.

- 165 4.2.1.2. A documented management system shall be prepared and submitted to IAS. The
166 documentation shall include a cross-reference matrix prepared in concert with an
167 IAS-accredited inspection agency ensuring that the general requirements in Section
168 4.2, personnel requirements in Section 4.3, data in Section 4.4, the statements in
169 Section 4.5, and the written procedures noted in Section 4.6 of these accreditation
170 criteria have been included.
- 171 4.2.1.3. The submitted management system must be signed and dated by the highest level of
172 authority within the organization.
- 173 4.2.1.4. The submitted quality assurance document must be signed and dated by an
174 authorized representative of an IAS-accredited inspection agency, attesting that the
175 inspection agency has reviewed the documented quality system and that it is
176 sufficient to allow scheduling of an onsite joint assessment with IAS.
- 177 4.2.2. The submitted documentation must be reviewed at least annually.
- 178 4.2.3. The program consists of three parts:
- 179 4.2.3.1. **Part A:** Fabrication of structural weldments and cold-formed products requiring
180 welding.
- 181 4.2.3.2. **Part B:** Fabrication of cold-formed products not requiring welding.
- 182 4.2.3.3. **Part C:** Design of metal building systems.

184 4.3. Personnel

185 4.3.1. Part A

- 186 4.3.1.1. **Quality Manager:** Entities accredited under these criteria shall designate a quality
187 manager who has the necessary training and experience to complete the tasks listed
188 in Sections 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to
189 the highest level of authority within the organization. The quality manager shall have
190 the following responsibilities:
- 191 4.3.1.1.1. Maintaining the documented management system in accordance with these
192 criteria.
- 193 4.3.1.1.2. Monitoring the effective implementation of the documented quality system.
- 194 4.3.1.1.3. Assuring that periodic internal audits are conducted and documented, and
195 that corrective actions are implemented.
- 196 4.3.1.1.4. Assuring that annual management reviews are conducted and documented
197 to assure the adequacy and effectiveness of the management system.
198 Annual management reviews must produce a summary and a documented
199 plan of action for improvement. Documents to be considered during the
200 annual management review must include, but are not limited to, customer
201 complaints, back charges, internal audit results and corrective actions.

- 202 4.3.1.1.5. Developing quality plans that meet contract documents, and having
203 knowledge of and access to the appropriate documents to meet this
204 requirement.
- 205 4.3.1.2. **In-house Quality Control (QC) Inspector:** Entities accredited under these criteria
206 shall designate an in-house quality control inspector who, as a minimum, must meet
207 the following requirements:
- 208 4.3.1.2.1. Be a Certified Welding Inspector (CWI) in accordance with the provisions of
209 AWS QC1 or the equivalent requirements of the Canadian Standards
210 Association (CSA) Standard W178.2 or for an ICC Structural Welding Special
211 Inspector (S2).
- 212 4.3.1.2.2. Be familiar with and demonstrate knowledge of codes and specifications, as
213 appropriate, for the scope of work specified in the contract documents.
- 214 4.3.1.2.3. Be responsible for assuring that only qualified and certified welders are used,
215 as specified by contract documents for the welding process and procedures
216 permitted for use.
- 217 4.3.1.2.4. Be responsible for assuring continuity of the welders' qualifications as
218 required by American Welding Society AWS D1.1 or D1.3, as appropriate.
- 219 4.3.1.2.5. Qualified personnel must be responsible for overall workmanship and for
220 ensuring all structural members and weldments are 100 percent visually
221 inspected. Although inspections may be delegated to qualified personnel
222 during the receipt and in-process stages of assembly, it is the responsibility
223 of the in-house quality control inspector to ensure that inspections are
224 performed and documented and that the product meets project requirements.
225 Qualified personnel must meet the requirements of Section 4.3.1.2.1 of these
226 criteria or demonstrate competence to perform inspections by appropriate
227 training and/or experience in metals fabrication, inspection and testing. The
228 basis for designating qualified personnel shall be documented by the in-
229 house quality control inspector as noted in AC472 Section 4.6.1.5.3.
- 230 4.3.1.2.6. Be responsible for ensuring that incoming raw materials are properly
231 identified and inspected for compliance with quality plans and specifications.
- 232 4.3.1.2.7. Be responsible for ensuring and documenting that the final assembly can be
233 traced back to the incoming materials, the quality assurance records and the
234 individual welder.
- 235 4.3.1.2.8. Be responsible for reviewing all Welding Procedure Specifications (WPSs)
236 and Procedure Qualification Records (PQRs) before these are used in
237 production welding operations.

238 4.3.1.2.9. Be responsible for ensuring that fabrication of weldments and cold-formed
239 products meet the fabrication tolerances outlined in Table 4.1 or Table 4.2.

240 4.3.1.3. **Welding Personnel:** Entities accredited under this criteria shall ensure that the
241 following conditions are met:

242 4.3.1.3.1. All welding personnel shall be qualified by the test as described in
243 ANSI/AWS D1.1 or D1.3, or other accepted country-specific test standard, as
244 appropriate, by a qualified independent third-party agency. Third-party
245 qualification shall be by certification as an AWS Certified Welding Inspector
246 (CWI) in accordance with the provisions of AWS QC1, *Standard Guide for*
247 *Qualification and Certification of Welding Inspectors*; or current qualification
248 by the Canadian Welding Bureau (CWB) to the requirements of the Canadian
249 Standards Association Standard W178.2, *Certification of Welding Inspectors*;
250 or current qualification by approved third-party agencies, such as those
251 accredited by an accreditation body that is an IAS Mutual Recognition
252 Arrangement (MRA) partner, per ISO 9606-1; or by the International Code
253 Council as an ICC Structural Welding Special Inspector (S2). The in-house
254 CWI, CWB, or ICC structural welding special inspector (S2) may administer
255 the welding tests; however, the qualification coupon shall be evaluated by the
256 third party CWI, CWB or ICC Structural Welding Special Inspector. If tensile
257 testing is required for qualification of welding personnel, the test, or test
258 sample, must be sent to an IAS-accredited testing laboratory for examination.
259 Such laboratories must be accredited by IAS or by an accreditation body that
260 is a partner with IAS in an MRA.

261 4.3.1.3.2. All welding personnel shall have and use an identifying number, letter or
262 symbol for the purpose of traceability.

263 4.3.1.4. **Nondestructive Testing:** Procedures shall be developed as required by the
264 applicable building code and in the project documents.

265
266 If metal building manufacturers include nondestructive testing as an in-house
267 practice, they will receive recognition on the certificate of accreditation. As a
268 minimum, there must be in-house staff certified in accordance with SNT-TC-1A.

269 4.3.2. **Part B**

270 4.3.2.1. **Quality Manager:** Entities accredited under these criteria shall designate a quality
271 manager who has the necessary training and experience to complete the tasks listed
272 in Sections 4.3.2.1.1 through 4.3.2.1.5. The quality manager shall report directly to
273 the highest level of authority within the organization. The quality manager shall have
274 the following responsibilities:

- 275 4.3.2.1.1. Maintaining the documented management system in accordance with these
276 criteria.
- 277 4.3.2.1.2. Monitoring the effective implementation of the documented management
278 system.
- 279 4.3.2.1.3. Assuring that periodic internal audits are conducted and documented, and
280 that corrective actions are implemented.
- 281 4.3.2.1.4. Assuring that annual management reviews are conducted and documented
282 to assure the adequacy and effectiveness of the management system.
283 Annual management reviews must produce a summary and a documented
284 plan of action for improvement. Documents to be considered during the
285 annual management review must include, but are not limited to, customer
286 complaints, back charges, internal audit results and corrective actions.
- 287 4.3.2.1.5. Developing quality plans that meet contract documents, and having
288 knowledge of and access to the appropriate documents to meet this
289 requirement.
- 290 4.3.2.2. **In-house Quality Control (QC) Inspector:** Entities accredited under this criteria
291 shall designate an in-house quality control inspector who, as a minimum, must meet
292 the following requirements:
- 293 4.3.2.2.1. Be familiar with and demonstrate knowledge of codes and specifications, as
294 appropriate, for the scope of work specified in the contract documents.
- 295 4.3.2.2.2. Be responsible for ensuring that incoming raw materials are properly
296 identified and inspected for compliance with quality plans and specifications.
- 297 4.3.2.2.3. Be responsible for ensuring and documenting that the final fabrication
298 assembly can be traced back to the incoming materials and the quality
299 assurance records.
- 300 4.3.2.2.4. Be responsible for ensuring that fabrication of cold-formed products meets
301 the fabrication tolerances outlined in Table 4.1.
- 302 4.3.3. **Part C**
- 303 **Engineer in Responsible Charge:** Entities accredited under these criteria shall
304 designate an Engineer in Responsible Charge who, as a minimum, must meet the
305 following requirements:
- 306 4.3.3.1. Be a professional engineer registered or licensed in the United States to practice
307 engineering or an engineer duly registered or licensed in the country in which the
308 facility is located, who has experience with the building code and the design of metal
309 building systems.
- 310 4.3.3.2. Have full authority for the control of engineering performed at the facility as related to
311 technical decision making. This person need not be the highest level of authority

312 within the organization of the facility as long as appropriate technical authority has
313 been granted to him/her.

314 4.3.3.3. Assuring that annual management reviews are conducted to assure the adequacy
315 and effectiveness of the quality system. Annual management reviews must produce a
316 documented summary and a documented plan of action for improvement. Documents
317 to be considered during the annual management review must include, but are not
318 limited to, customer complaints, back charges, internal audit results and corrective
319 actions.

320

321 4.4. Required Data

322 4.4.1. Part A

323 4.4.1.1. The name of the facility, the physical street address, mailing address (if different),
324 information on the person serving as the IAS contact (including the telephone
325 number and e-mail address), and the telephone number of the facility.

326 4.4.1.2. A floor plan of the fabrication facility. The floor plan need not be to scale.

327 4.4.1.3. A list of major production equipment, including welding, burning, lifting and inspection
328 equipment.

329 4.4.1.4. A list of typical items fabricated (e.g., beams, trusses, girders, bracing members,
330 etc.).

331 4.4.1.5. A copy of all WPSs for production welding. The WPSs shall be written to include
332 essential and nonessential variables, in accordance with AWS D1.1 or D1.3, as
333 appropriate for the type of fabrication performed at the facility.

334 4.4.1.6. A copy of all PQRs for WPSs qualified by testing, when required.

335 4.4.1.7. A list of qualified welding personnel, including their approved welding process,
336 limitations on their qualifications and their identification marks.

337 4.4.1.8. Evidence that welding personnel are qualified by an independent, third-party CWI,
338 CWB, or ICC Structural Welding Special Inspector in accordance with Section
339 4.3.1.3.1 of these criteria.

340 4.4.1.9. The name and certification number of the CWI, CWB, or ICC Structural Welding
341 Special Inspector acting as the in-house quality control inspector.

342 4.4.1.10. The name of the deputy in-house QC inspector who assumes the position in the
343 absence of the primary in-house QC person.

344 4.4.1.11. An organizational chart including the names of the responsible quality managers.
345 This chart must show the relationships among the CEO, the Engineer In
346 Responsible Charge, general manager, quality manager, in-house quality control
347 inspector, deputy in-house inspector, production manager and welding personnel.

348 4.4.1.12. A list of approved vendors, including any testing agencies employed to verify a
349 WPS.

350 4.4.1.13. A list of test and measuring equipment.

351 Test and measuring equipment must be calibrated and traceable to a national
352 standard. The equipment list must include sufficient testing instruments to assure
353 quality compliance as appropriate for the items being fabricated.

354 **4.4.2. Part B**

355 4.4.2.1. The name of the facility, the physical street address, mailing address (if different),
356 information on the person serving as the IAS contact (including the telephone
357 number and e-mail address), and the telephone number of the facility.

358 4.4.2.2. A floor plan of the fabrication facility. The floor plan need not be to scale.

359 4.4.2.3. A list of major production equipment, including burning, lifting and inspection
360 equipment.

361 4.4.2.4. A list of typical items fabricated (e.g., cold formed sections, roof and wall panels,
362 etc.).

363 4.4.2.5. The name of the deputy in-house QC inspector who assumes the position in the
364 absence of the primary in-house QC person.

365 4.4.2.6. An organizational chart including the names of the responsible quality managers.
366 This chart must show the relationships among the CEO, general manager, quality
367 manager, in-house quality control inspector, deputy in-house inspector and
368 production manager.

369 4.4.2.7. A list of approved vendors.

370 4.4.2.8. A list of test and measuring equipment.

371 Test and measuring equipment must be calibrated and traceable to a national
372 standard. The equipment list must include sufficient testing instruments to assure
373 quality compliance as appropriate for the items being fabricated.

374 **4.4.3. Part C**

375 4.4.3.1. The name of the facility, the physical street address, mailing address (if different),
376 information on the person serving as the IAS contact (including the telephone
377 number and e-mail address), and the telephone number of the facility.

378 4.4.3.2. An organizational chart showing the relationships among the CEO, general manager,
379 Engineer in Responsible Charge, and production engineers.

380 4.4.3.3. A listing of all engineers performing production engineering, along with their years of
381 experience in designing metal building systems.

382

383 **4.5. Required Statements**

384 **4.5.1. Part A**

385 The following statements shall be provided in the quality system submittal:
386 4.5.1.1. A quality policy statement that includes the following elements:
387 4.5.1.1.1. All activities of the organization shall be directed in such a manner as to
388 ensure that the quality requirements of AC472 will be met.
389 4.5.1.1.2. The elements of the quality assurance program will be disseminated to all
390 personnel assigned activities that affect the quality of the product.
391 4.5.1.2. IAS will be notified, in writing prior to any cancellation of the inspection agreement
392 with the accredited inspection agency.
393 4.5.1.3. Copies of reports of inspections conducted by the inspection agency, if they note
394 major quality control variations, will be forwarded to IAS within 10 days of the major
395 deficiency having been reported.
396 4.5.1.4. Entities accredited under these criteria will notify the inspection agency when the
397 facility is to be closed for extended time periods other than for normally scheduled
398 periods for maintenance or vacations, or for two or more weeks regardless of the
399 circumstances of the closure. IAS and the inspection agency will be notified 10 days
400 prior to resumption of operations.
401 4.5.1.5. IAS will be notified in writing by the accredited entity and the inspection agency if
402 unannounced, follow-up inspections have not been conducted by the inspection
403 agency.
404 4.5.1.6. IAS and the accredited inspection agency must be notified within 30 days of any
405 changes in management personnel. As a minimum, this would include the president,
406 general manager, purchasing manager, production manager or quality manager.
407 4.5.2. **Part B**
408 The following statements shall be provided in the quality system submittal:
409 4.5.2.1. A quality policy statement that includes the following elements:
410 4.5.2.1.1. All activities of the organization shall be directed in such a manner as to
411 ensure that the quality requirements of AC472 will be met.
412 4.5.2.1.2. The elements of the quality assurance program will be disseminated to all
413 personnel assigned activities that affect the quality of the product.
414 4.5.2.2. IAS will be notified, in writing, prior to any cancellation of the inspection agreement
415 with the accredited inspection agency.
416 4.5.2.3. Copies of reports of inspections conducted by the inspection agency, if they note
417 major quality control variations, will be forwarded to IAS within 10 days of the major
418 deficiency being reported.
419 4.5.2.4. Entities accredited under these criteria will notify the inspection agency when the
420 facility is to be closed for extended time periods other than for normally scheduled
421 periods for maintenance or vacations, or for two or more weeks regardless of the

422 circumstances of the closure. IAS and the inspection agency will be notified 10 days
423 prior to resumption of operations.

424 4.5.2.5. IAS will be notified in writing by the accredited entity and the inspection agency if
425 unannounced, follow-up inspections have not been conducted by the inspection
426 agency.

427 4.5.2.6. IAS and the accredited inspection agency must be notified within 30 days of any
428 changes in management personnel. As a minimum, this would include the president,
429 general manager, purchasing manager, production manager, or quality manager.

430 **4.5.3. Part C**

431 4.5.3.1. A quality policy statement that includes the following elements:

432 4.5.3.1.1. All activities of the organization shall be directed in such a manner as to
433 ensure that the quality requirements of AC472 will be met.

434 4.5.3.1.2. The elements of the quality assurance program will be disseminated to all
435 engineering personnel performing production engineering.

436 4.5.3.2. IAS will be notified, in writing, prior to any cancellation of the inspection agreement
437 with the accredited inspection agency.

438 4.5.3.3. Copies of reports of inspections conducted by the inspection agency, if they note
439 major quality control variations, will be forwarded by the accredited entity to IAS
440 within 10 days of the major deficiency being reported.

441 4.5.3.4. Entities accredited under these criteria will notify the inspection agency when the
442 facility is to be closed for extended time periods other than for normally scheduled
443 periods for maintenance or vacations, or for two or more weeks regardless of the
444 circumstances of the closure. IAS and the inspection agency will be notified 10 days
445 prior to resumption of operations.

446 4.5.3.5. IAS will be notified in writing by the accredited entity and the inspection agency if
447 unannounced, follow-up inspections have not been conducted by the inspection
448 agency.

449 4.5.3.6. IAS and the accredited inspection agency must be notified within 30 days of any
450 changes in management personnel. As a minimum, this would include the president,
451 general manager, or Engineer in Responsible Charge.

452 4.5.3.7. A Letter of Certification will be issued for all projects per the procedure required in
453 Section 4.6.3.2.3.

454

455 **4.6. Required Written Procedures**

456 Entities accredited under these criteria shall submit written procedures for the following:

457 **4.6.1. Part A**

458 4.6.1.1. **Document Control:** Control of documents and data relating to the quality functions
459 must be provided. This control shall include the following:

460 4.6.1.1.1. A document approval procedure.

461 4.6.1.1.2. A procedure to ensure that only current, approved documents are used.

462 4.6.1.1.3. A procedure to ensure that documents are available at all locations where
463 necessary for the proper functioning of the management system.

464 4.6.1.2. **Purchasing**

465 4.6.1.2.1. Determining that purchased products will conform to specified requirements.
466 The procedure must include a requirement that the type and grade of
467 material be documented on the purchase order agreement.

468 4.6.1.2.2. Evaluation of subcontractors for their ability to meet subcontract
469 requirements. Evaluations may contain summaries or logs, but must include
470 a means of quantifying and measuring the ability of the subcontractor or
471 supplier to provide quality products or services consistent with the required
472 shop documents. For projects requiring IAS accreditation, fabrication may be
473 subcontracted only to fabrication facilities that are currently IAS-accredited to
474 [AC472 or AC172 or for primary frames a fabrication facility that is AISC](#)
475 [Certified. The organization that elects to subcontract work must ensure their](#)
476 [in-house CWI is responsible for 100% of all welding regardless if the welding](#)
477 [was performed in-house or subcontracted.](#)

478 4.6.1.3. **Product Traceability:** The traceability procedure must describe the method used to
479 ensure items are traceable as specified in the contract documents. Items that
480 typically require traceability are materials and consumables that are incorporated into
481 the final product. The project documents will determine if full materials traceability is
482 required; however, the accredited entity must have a procedure to meet the project
483 needs for the type of fabrication performed. In addition to project requirement needs,
484 the accredited entity, as a minimum, must have in their control traceability of the
485 finished product to incoming materials, certified welders, inspectors, plans and
486 specifications. The procedure must make provision for documentation of this
487 traceability on inspection forms or on a controlled copy of the detail drawing.

488
489 Material traceability to heat number, unless otherwise required by contract
490 documents, is limited to main members and does not include items such as
491 stiffeners, clips, and bolted end plates. As a minimum, all steel used and incorporated
492 into the final product must be traceable to the type and grade of material.

493 4.6.1.4. **Process Control:** There must be a procedure that identifies how process control is
494 communicated to appropriate personnel. Process control includes procedures such

495 as cutting or saw operations, fitting and welding of the material, cambering and
496 coating. Examples of forms used in the process control procedure are cut lists,
497 standard drawings or detail drawings. The procedure must describe the accredited
498 entity's method of communicating and establishing priorities of such operations.

499 **4.6.1.5. Inspection and Testing:** The inspection procedure shall include provisions for
500 receipt, in-process and final inspections as appropriate to provide a level of
501 assurance that products are fabricated in accordance with contract documents by
502 qualified personnel. Final inspections shall include a record of the results and
503 resolution of nonconformances identified by subsequent inspections. As a minimum,
504 inspection procedures shall include the following:

505 4.6.1.5.1. Receiving inspection of incoming materials to the required specification,
506 including review of mill test reports and certificates of conformance to ensure
507 compliance with contract documents.

508 4.6.1.5.2. In-process inspection for workmanship that can affect subsequent
509 operations. (Examples of in-process inspections are nondestructive testing of
510 welds that will be hidden or out of reach during the final inspection; visual
511 examination of fit-up tolerances that will not be visible after welding; areas
512 requiring coatings that will not be accessible during final inspection;
513 monitoring of welding operations as appropriate; fabrication tolerances per
514 Table 4.1; and monitoring of roll-forming operations for shape tolerances per
515 Figure 4.1.) Welding process inspections on multiple pass welds must ensure
516 that proper preheat and interpass temperatures are maintained and that the
517 finished welds meet the tolerances specified in the contract documents and
518 are of the required size, without rejectable indications such as cracks,
519 undercuts, inclusions or porosity. In the event in-process weld inspections
520 are delegated by the in-house Certified Welding Inspector (CWI), there must
521 be documentation ensuring personnel performing assigned inspections have
522 been trained on the specific tasks that are delegated.

523 4.6.1.5.3. All final welds are to be accepted under the direction of the in-house CWI,
524 CWB, or ICC Structural Welding Special Inspector. There must be a record
525 of the final inspection ensuring that receiving, in-process and final
526 inspections have been performed.

527 **Note:** All inspectors or assistant inspectors who accept or reject welds must
528 have a current eye exam in accordance with AWS D1.1.

529 **4.6.1.6. Control of Inspection, Measuring and Test Equipment:** There must be a
530 maintenance schedule, including calibration procedures for testing equipment.
531 Wherever possible, calibration services shall be provided by a calibration laboratory

532 accredited by IAS or by an accreditation body that is a partner with IAS in a mutual
533 recognition arrangement.

534
535 It is recognized there may not be nationally recognized standards available for
536 unique testing equipment. When such instances exist, calibration procedures must be
537 in compliance with manufacturer's recommendations to the extent that such testing
538 equipment is calibrated to ensure consistency with the required measuring
539 capabilities. It is the accredited entity's responsibility to ensure that such testing
540 equipment is approved prior to use.

541 4.6.1.7. **Control of Nonconforming Workmanship:** Procedures shall be established for
542 identifying, documenting and assigning the disposition of nonconforming items.

543 4.6.1.8. **Corrective Action:** The procedure for corrective action shall include investigating,
544 documenting and correcting nonconformances. The procedure must include a
545 provision to preclude repetition.

546 4.6.1.9. Handling, storage and delivery procedures shall include identifying and storing of
547 incoming materials and finished products as appropriate to minimize damage and
548 deterioration.

549 4.6.1.10. **Internal Audits:** Entities accredited under these criteria shall identify the
550 frequency, method of documentation and the content of internal audits to determine
551 the effectiveness of the quality system. Audits shall include a summary that
552 compares the most recent audit to the previous audit, and shall include the
553 elements of AC472.

554 4.6.1.11. **Control of Quality Records:** Entities accredited under these criteria must
555 determine methods for storing, maintaining and accessing quality records for a
556 minimum of two years. Quality records must include the following:

557 4.6.1.11.1. Completed in-house quality inspection reports, forms, and checklists.

558 4.6.1.11.2. Manufacturer test reports and certificates of compliance from vendors, for
559 incoming materials and consumables.

560 4.6.1.11.3. Copies of inspection reports by the inspection agency.

561 4.6.1.11.4. Records of internal audits.

562 4.6.1.11.5. Training records.

563 4.6.1.11.6. Evaluations of vendors and subcontractors.

564 4.6.1.12. **Training:** There must be a procedure for the training of personnel who have an
565 effect on the quality of the finished product. The procedure must include provision
566 for maintaining current personnel qualifications. As a minimum, there must be
567 training requirements established for inspectors, assistant inspectors, machine
568 operators, welders, and fitters.

569
570
571
572
573
574
575
576
577
578
579
580
581
582
583
584
585
586
587
588
589
590
591
592
593
594
595
596
597
598
599
600
601
602
603
604
605

4.6.2. **Part B**

4.6.2.1. **Document Control:** Control of documents and data relating to the quality functions must be provided. This control shall include the following:

- 4.6.2.1.1. A document approval procedure.
- 4.6.2.1.2. A procedure to ensure that only current, approved documents are used.
- 4.6.2.1.3. A procedure to ensure that documents are available at all locations where necessary for the proper functioning of the management system.

4.6.2.2. **Purchasing**

4.6.2.2.1. Determining that purchased products will conform to specified requirements. The procedure must include a requirement that the type and grade of material be documented on the purchase order agreement.

4.6.2.2.2. Evaluation of subcontractors for their ability to meet subcontract requirements. Evaluations may contain summaries or logs, but must include a means of quantifying and measuring the ability of the subcontractor or supplier to provide quality products or services consistent with the required shop documents.

Note: While IAS understands some organizations use the term “subcontractor” synonymously with “supplier,” there is a difference, and both suppliers and subcontractors are required to be evaluated on an annual basis.

4.6.2.3. **Product Traceability:** The traceability procedure must describe the method used to ensure items are traceable as specified in the contract documents. Items that typically require traceability are materials and consumables that are incorporated into the final product. The project documents will determine if full materials traceability is required; however, the accredited entity must have a procedure to meet the project needs for the type of fabrication performed. In addition to project requirement needs, the accredited entity, as a minimum, must have in their control traceability of the finished product to incoming materials, inspectors, plans and specifications. The procedure must make provision for documentation of this traceability on inspection forms or on a controlled copy of the detail drawing. Material traceability to a heat number, unless otherwise required by contract documents, is limited to main members and does not include items such as clips. However, as a minimum, all steel used and incorporated into the final product must be traceable to the type and grade of material.

4.6.2.4. **Process Control:** There must be a procedure that identifies how process control is communicated to appropriate personnel. Process control includes procedures such as cutting or saw operations and coating. Examples of forms used in the process

606 control procedure are cut lists, standard drawings or detail drawings. The procedure
607 must describe the method of communicating and establishing priorities of such
608 operations.

609 **Note:** Manufacturers shall have a written procedure for implementing the Steel
610 Coalition Lubricant Task Group Final Report dated May 14, 2002, and show evidence
611 that roll formed roof panels and decking are in conformance with the manufacturer's
612 written standards with regards to lubricants and labeling.

613 4.6.2.5. **Inspection and Testing:** The inspection procedure shall include provisions for
614 receipt, in-process and final inspections as appropriate to provide a level of
615 assurance that products are fabricated in accordance with contract documents by
616 qualified personnel. Final inspections shall include a record of the results and
617 resolution of nonconformances identified by subsequent inspections. As a minimum,
618 inspection procedures include the following:

619 4.6.2.5.1. Receiving inspection of incoming materials to the required specification,
620 including review of mill test reports and certificates of conformance to ensure
621 compliance with contract documents.

622 4.6.2.5.2. In-process inspection for workmanship that can affect subsequent
623 operations. (Examples of in-process inspections are areas requiring coatings
624 that will not be accessible during final inspection, fabrication tolerances per
625 Table 4.1 or Table 4.2, and monitoring of roll-forming operations for shape
626 tolerances per Figure 4.1.)

627 4.6.2.5.3. Final inspection includes documented acceptance of all workmanship
628 performed, including materials and coatings.

629 4.6.2.6. **Control of Inspection, Measuring and Test Equipment:** There must be a
630 maintenance schedule, including calibration procedures for testing equipment.
631 Wherever possible, calibration services shall be provided by a calibration laboratory
632 accredited by IAS or by an accreditation body that is a partner with IAS in a mutual
633 recognition arrangement.

634
635 It is recognized there may not be nationally recognized standards available for
636 unique testing equipment. When such instances exist, calibration procedures must be
637 in compliance with manufacturer's recommendations to the extent that such testing
638 equipment is calibrated to ensure consistency with the required measuring
639 capabilities. It is the accredited entity's responsibility to ensure that such testing
640 equipment is approved prior to use.

641 4.6.2.7. **Control of Nonconforming Workmanship:** Procedures shall be established for
642 identifying, documenting and assigning the disposition of nonconforming items.

643 4.6.2.8. **Corrective Action:** The procedure for corrective action shall include investigating,
644 documenting and correcting nonconformances. The procedure must include a
645 provision to preclude repetition.

646 4.6.2.9. Handling, storage and delivery procedure shall include identifying and storing of
647 incoming materials and finished products as appropriate to minimize damage and
648 deterioration.

649 4.6.2.10. **Internal Audits:** Entities accredited under these criteria shall identify the
650 frequency, method of documentation and the content of internal audits to determine
651 the effectiveness of the quality system. Audits shall include a summary that
652 compares the most recent audit to the previous audit, and shall include the
653 elements of AC472.

654 4.6.2.11. **Control of Quality Records:** Entities accredited under these criteria must
655 determine methods for storing, maintaining and accessing quality records for a
656 minimum of two years. Quality records must include the following:

657 4.6.2.11.1. Completed in-house quality inspection reports, forms, and checklists.
658 4.6.2.11.2. Manufacturer test reports and certificates of compliance from vendors, for
659 incoming materials and consumables.

660 4.6.2.11.3. Copies of inspection reports by the inspection agency.
661 4.6.2.11.4. Records of internal audits.
662 4.6.2.11.5. Training records.
663 4.6.2.11.6. Evaluations of vendors and subcontractors.

664 4.6.2.12. **Training:** There must be a procedure for the training of personnel who have an
665 effect on the quality of the finished product. The procedure must include provision
666 for maintaining current personnel qualifications. As a minimum, there must be
667 training requirements established for inspectors and machine operators.

668 4.6.3. **Part C**

669 4.6.3.1. **Contract Review:** Review of contract documents to ensure that the needed
670 resources exist to fulfill the contract requirements. The contract review procedure
671 must include provisions that assure the review is appropriate, and that the product
672 and service will meet the specifications. Procedures must include a provision for the
673 approval of exceptions or change requests. Reviews shall be performed by personnel
674 who have access to the appropriate information and have adequate knowledge of the
675 contract requirements. Reviews must be approved by the Engineer in Responsible
676 Charge.

677 4.6.3.2. **Engineering:** Entities accredited under these criteria shall have written procedures
678 for production engineering that shall include, at a minimum, requirements covering
679 the information in Sections 4.6.3.2.1 through 4.6.3.2.4.

- 680 4.6.3.2.1. Information on how incoming contract documents are to be evaluated and
681 provided to the design engineer.
- 682 4.6.3.2.2. Information for the preparation and checking of design calculations and
683 erection drawings. Design calculations are to be in conformance with the
684 specified codes and standards.
- 685 4.6.3.2.3. A procedure for the creation of a Letter of Certification. All information
686 pertinent to the structural design that is required to be indicated on the
687 construction documents, as noted in Section 1603 of the applicable edition of
688 the *International Building Code*[®], is to be included. The Letter of Certification
689 shall be sealed in accordance with the engineering laws of the appropriate
690 jurisdiction. As a minimum, the letter of certification shall be in accordance
691 with the requirements of the appropriate jurisdiction.
- 692 4.6.3.2.4. Information on how detail drawings are prepared and how revisions to project
693 or shop documents and change orders are approved.
- 694 4.6.3.3. **Control of Quality Records:** Entities accredited under these criteria must determine
695 methods for storing, maintaining and accessing quality records for a minimum of two
696 years. Quality records must include the following:
- 697 4.6.3.3.1. Order documents
- 698 4.6.3.3.2. Contract review documents
- 699 4.6.3.3.3. Design calculations and drawings
- 700 4.6.3.3.4. Certificate of design conformance
- 701 4.6.3.3.5. Training records
- 702 4.6.3.3.6. Evaluations of subcontract engineers and detailers.
- 703 4.6.3.4. **Training:** There must be a procedure for the training of personnel who have an
704 effect on the quality of the finished product. The procedure must include provision for
705 maintaining current personnel qualifications. As a minimum, there must be training
706 requirements established for project managers, engineers and detailers.
- 707 4.6.3.5. **Corrective Action:** The procedure for corrective action shall include investigating,
708 documenting and correcting nonconformances. The procedure must include a
709 provision to preclude repetition.
- 710 4.6.3.6. **Internal Audits:** Entities accredited under these criteria shall identify the frequency,
711 method of documentation and the content of internal audits to determine the
712 effectiveness of the quality system. Audits shall include a summary that compares
713 the most recent audit to the previous audit, and shall include the elements of AC472.

714

715 4.7. Control of Required Procedures

716

4.7.1. Part A

717 **Contract Review:** The quality manager must ensure that contract quality requirements
718 are met. The quality manager will be responsible for reviewing any instructions and/or
719 procedures relative to activities affecting quality to determine if they are properly
720 understood and implemented.

721
722 As a minimum, the following elements must be documented to ensure that contract
723 reviews are managed, controlled, and successfully implemented and communicated to
724 appropriate personnel:

725 4.7.1.1. Quality plans to ensure that fabrication conforms to the most recent project
726 specifications. Quality plans shall include proprietary buy-out items and subcontract
727 fabrication. Project specifications include design drawings, detail drawings, and other
728 related documents.

729 4.7.1.2. As a minimum, quality plans shall address the following:

730 4.7.1.2.1. **Material:** ASTM Grade and Type, AWS filler metal classification.

731 4.7.1.2.1.1. Origin of materials

732 4.7.1.2.1.2. Substitution requirements

733 4.7.1.2.1.3. Material test report requirements

734 4.7.1.2.2. **Workmanship**

735 4.7.1.2.2.1. Cutting of components

736 4.7.1.2.2.1.1. Drilling or punching of holes

737 4.7.1.2.2.1.1.1. Edge distance

738 4.7.1.2.2.1.1.2. Repair of miss-located holes

739 4.7.1.2.2.1.2. Welding requirements

740 4.7.1.2.2.1.2.1. Welding procedure specifications

741 4.7.1.2.2.1.2.2. Control consumables

742 4.7.1.2.2.1.2.3. Cambering, bending, straightening

743 4.7.1.2.2.1.2.4. Dimensional tolerances (See Table 4.2 for built-up section
744 tolerances)

745 4.7.1.2.3. **Coating/Painting/Galvanizing**

746 4.7.1.2.3.1. Surface preparation

747 4.7.1.2.3.2. Manufacture and type of coating

748 4.7.1.2.3.3. Application of coating

749 4.7.1.2.4. Required inspections and sequence of inspections to verify conformance of
750 an item or activity to specified requirements. Procedures needed:

751 4.7.1.2.4.1. Receiving

752 4.7.1.2.4.2. In-process

753 4.7.1.2.4.3. Final

754 4.7.1.2.4.4. Records and reports
755 4.7.1.2.4.5. Nondestructive testing requirements
756 4.7.1.2.5. Acceptance criteria for inspections required in the contract documents for the
757 scope of the project.
758 4.7.1.2.6. Shipping, packaging, and handling requirements.
759 4.7.2. **Part B**
760 **Contract Review:** The quality manager must ensure that contract quality requirements
761 are met. The quality manager will be responsible for reviewing any instructions and/or
762 procedures relative to activities affecting quality to determine if they are properly
763 understood and implemented.
764
765 As a minimum, the following elements must be documented to ensure that contract
766 reviews are managed, controlled, and successfully implemented and communicated to
767 appropriate personnel:
768 4.7.2.1. Quality plans to ensure that fabrication conforms to the most recent project
769 specifications. Quality plans shall include proprietary buy-out items and subcontract
770 fabrication. Project specifications include design drawings, detail drawings, and other
771 related documents.
772 4.7.2.2. As a minimum, quality plans shall address the following:
773 4.7.2.2.1. **Material:** ASTM Grade and Type:
774 4.7.2.2.1.1. Origin of materials
775 4.7.2.2.1.2. Substitution requirements
776 4.7.2.2.1.3. Material test report requirements
777 4.7.2.2.2. **Workmanship**
778 4.7.2.2.2.1. Cutting of components
779 4.7.2.2.2.2. Drilling or punching of holes
780 4.7.2.2.2.3. Edge distance
781 4.7.2.2.2.4. Cambering, bending, straightening
782 4.7.2.2.2.5. Dimensional tolerances (See Tables 4.1 and 4.2 for section tolerances)
783 4.7.2.2.3. **Coating/Painting/Galvanizing**
784 4.7.2.2.3.1. Surface preparation
785 4.7.2.2.3.2. Manufacture and type of coating
786 4.7.2.2.3.3. Application of coating
787 4.7.2.2.3.4. Protection of coating
788 4.7.2.2.4. Required inspections and sequence of inspections to verify conformance of
789 an item or activity to specified requirements. Procedures needed:
790 4.7.2.2.4.1. Receiving

- 791 4.7.2.2.4.2. In-process
- 792 4.7.2.2.4.3. Final
- 793 4.7.2.2.4.4. Records and reports
- 794 4.7.2.2.5. Acceptance criteria for inspections required in the contract documents for the
- 795 scope of the project.
- 796 4.7.2.2.6. Shipping, packaging and handling requirements.

797 **4.7.3. Part C**

798 4.7.3.1. **Contract Review:** The Engineer in Responsible Charge must ensure that contract

799 requirements are met. The Engineer in Responsible Charge will be responsible for

800 reviewing the contract documents relative to requirements affecting engineering to

801 determine if they are properly understood and implemented.

802 4.7.3.2. **Design Review:** The Engineer in Responsible Charge will be responsible for

803 ensuring that the production engineer reviews the design documents and the shop

804 documents to verify that the contract requirements are met.

805

806 **4.8. Fabrication Tolerances**

807 4.8.1. **Cold-formed Structural Members:** The fabrication tolerances indicated in Figure 4.1

808 for cold-formed structural members are defined in Table 4.1.

809 4.8.2. **Built-up Structural Members:** The fabrication tolerances indicated in Figures 4.2(a)

810 and 4.2(b) for built-up structural members are defined in Table 4.2.

811

812 **5. ADDITIONAL INFORMATION (AS APPLICABLE)**

813 5.1. AWS Welding Quality Assurance Guideline for Fabricators.

814 5.2. SSPC, The Society for Protective Coatings.

815 5.2.1. Steel Structures Painting Manual, Volume I, Good Painting Practice.

816 5.2.2. Steel Structures Painting Manual, Volume II, Systems and Specifications.

817 5.3. Steel Joist Institute(SJI) Specifications.

818 5.4. SJI K-I.1 Standard Specification for Open Web Steel Joists, K-Series.

819 5.5. SJI LH/DLH-I.1 Standard Specification for Longspan Steel Joists, LH Series and Deep

820 Longspan Steel Joists, DLH Series.

821 5.6. Steel Coalition Lubricant Task Group Final Report, May14, 2002.

822

823 **6. LINKS TO ADDITIONAL REFERENCES**

824 6.1. IAS – www.iasonline.org

825 6.2. International Code Council – www.iccsafe.org

826 6.3. MBMA – www.mbma.com

827
828
829
830

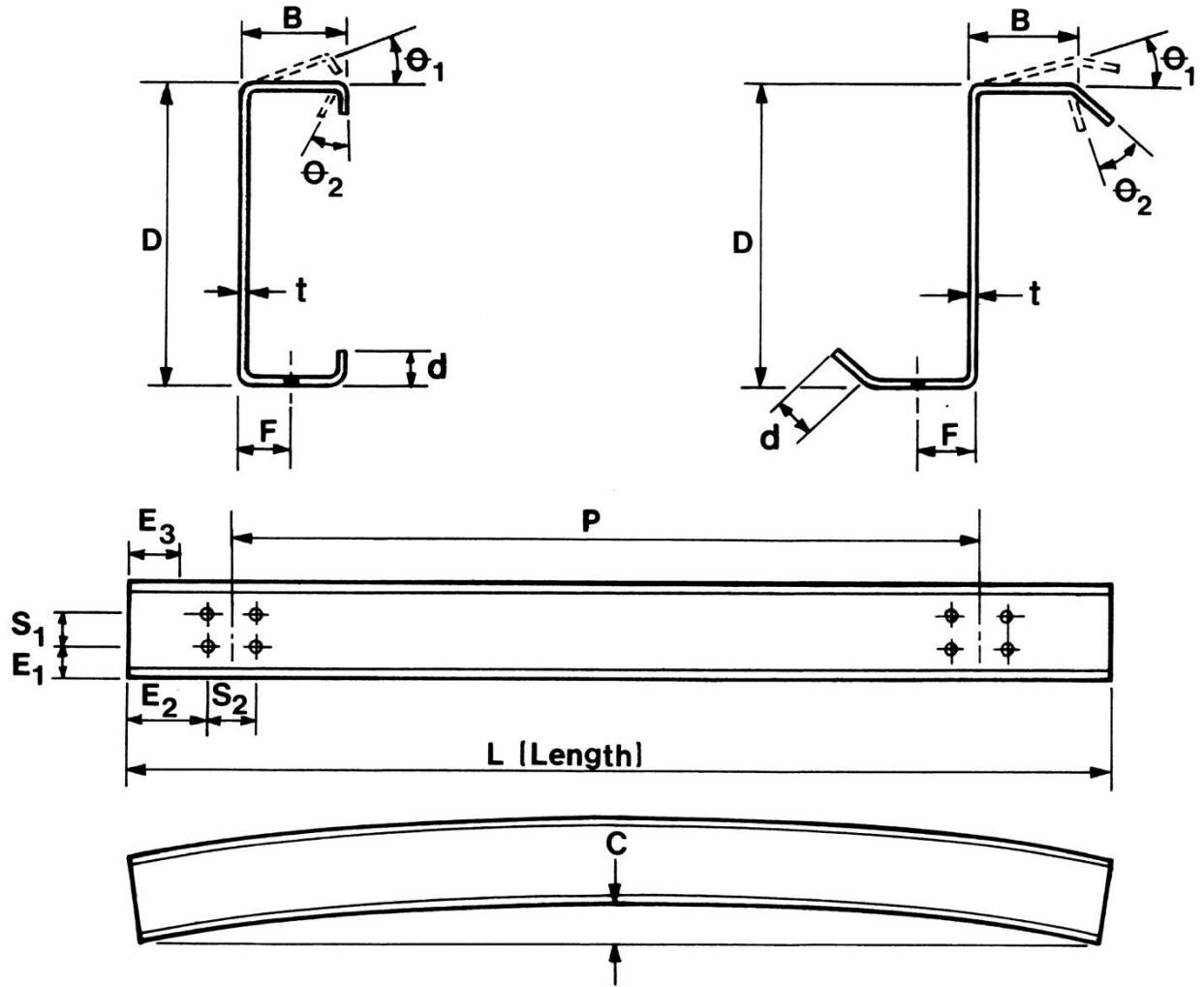
Table 4.1
Cold-formed Structural Members

Formed Structural Members			
	Dimension	Tolerances	
		+	-
Geometry	D	3/16"	3/16"
	B	3/16"	3/16"
	d	3/8"	1/8"
	θ_1	3°	3°
	θ_2	5°	5°
Hole Location	E ₁	1/8"	1/8"
	E ₂	1/8"	1/8"
	E ₃	1/8"	1/8"
	S ₁	1/16"	1/16"
	S ₂	1/16"	1/16"
	F	1/8"	1/8"
	P	1/8"	1/8"
Length (L)		1/8"	1/8"
Camber (C)		1/4" x L (ft)/ 10	
Minimum Thickness (t)		0.95 (Design t)	

831

832
833
834
835
836
837
838
839
840
841
842
843
844
845
846

Figure 4.1
Cold-formed Structural Members



847
848
849
850
851
852

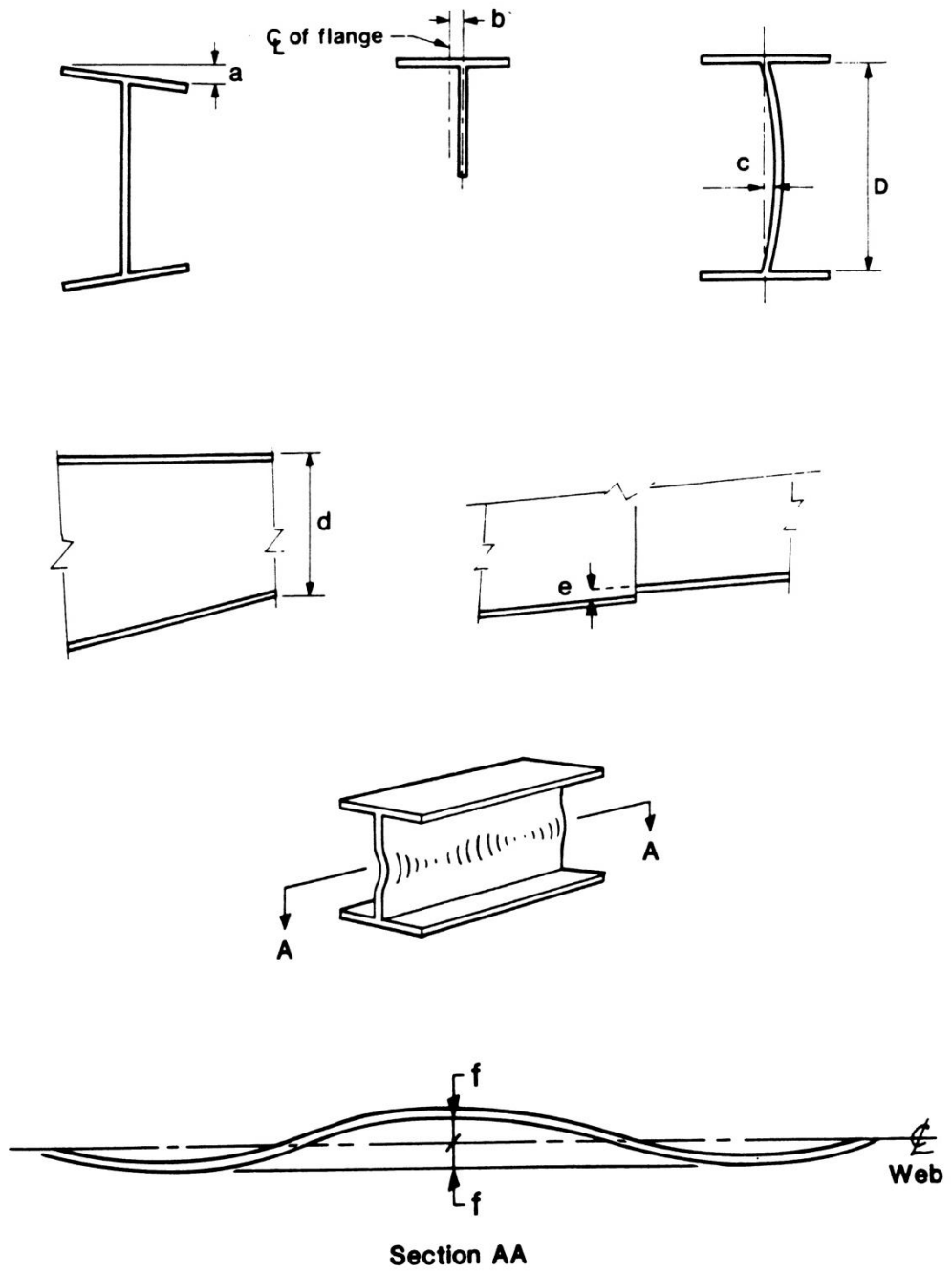
Table 4.2
Built-up Structural Members

Built-up Structural Members				
	Dimension	Tolerances		
		+	-	
	a	3°- 1/4" Max	3°- 1/4" Max	
	b	1/4"	1/4"	
	d	3/16"	3/16"	
	e	1/8"	1/8"	
	c	D/72"		
	f	D/72"		
	E1	1/8"	1/8"	
	E2	1/8"	1/8"	
	E3	1/8"	1/8"	
	S1	1/16"	1/16"	
	S2	1/16"	1/16"	
	F	1/8"	1/8"	
Length (L)		1/4"	1/4"	
Sweep (S)		Runway Beams 1/8" x L(ft)/ 10		
		All Other members 1/4" x L(ft)/ 10		
Camber (C)		1/4" x L(ft)/ 10		
Splice Plates	N ₁	1/8"	1/8"	
	N ₂	3/16"	3/16"	
	G ₁	1/16"	1/16"	
	G ₂	1/16"	1/16"	
	H	Up to 24"	1/8"	1/8"
		24" to 48"	3/16"	3/16"
		Over 48"	1/4"	1/4"
	J		1/4"	1/4"

853

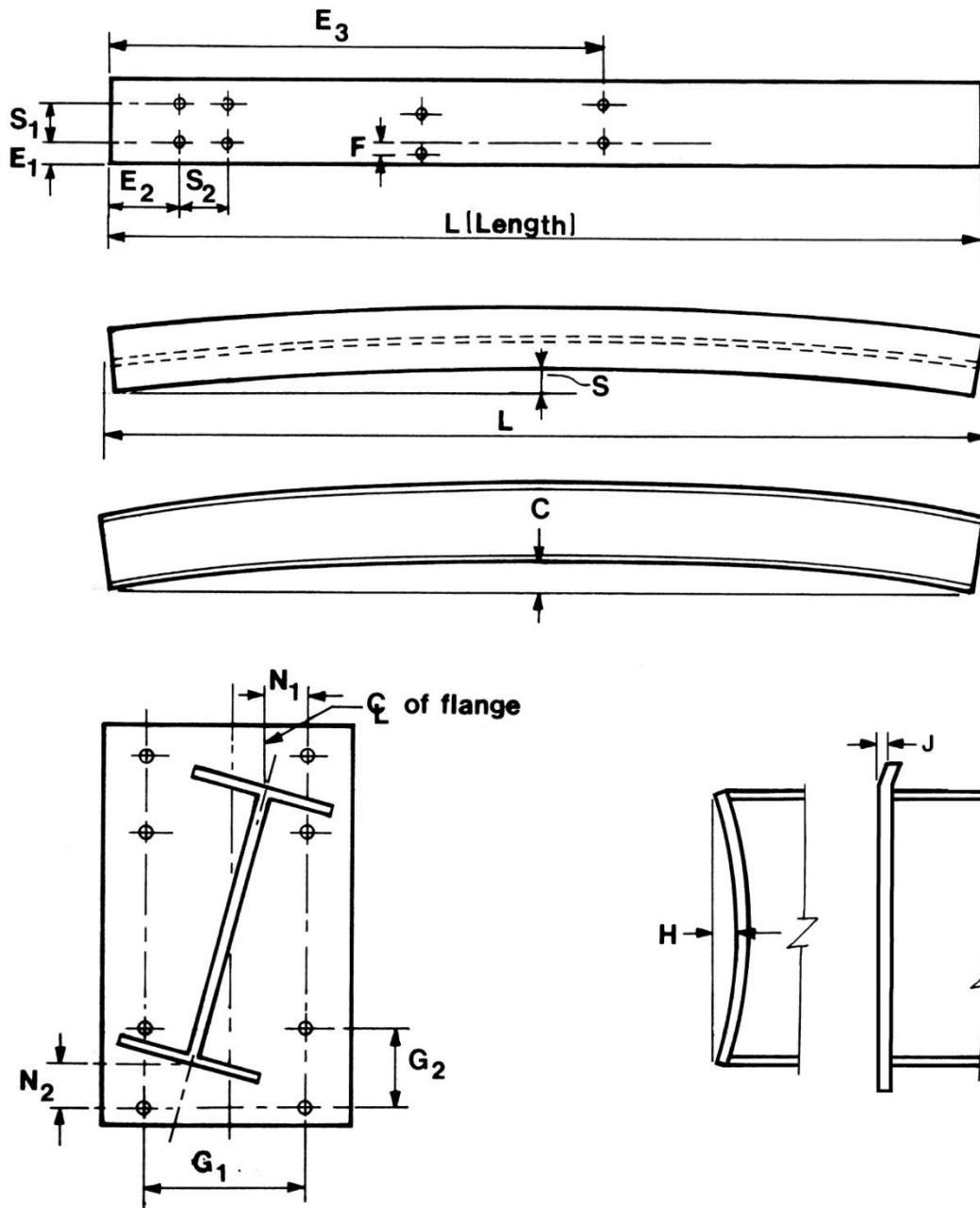
854
855
856
857
858
859
860
861
862
863
864
865
866
867
868
869
870
871
872
873
874
875
876
877
878
879
880
881
882
883
884
885
886
887
888
889

Figure 4.2(a)
Built-up Structural Member



890
891
892

Figure 4.2(b)
Built-up Structural Member



893
894
895
896
897
898

These criteria were previously issued April 2008, September 2008, May 2010, April 2011, August 2012, September 2013, February 2015, April 2017, and June 2017, September 27, 2018 and Editorially revised January 22, 2019.