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ACCREDITATION CRITERIA FOR INSPECTION PROGRAMS FOR MANUFACTURERS OF METAL BUILDING SYSTEMS AC472

September 2018 Effective January 1, 2019

PREFACE

13 14 The attached accreditation criteria have been issued to provide all interested parties with guidelines on implementing performance features of the applicable standards referenced herein. 15 The criteria were developed and adopted following public hearings conducted by the 16 17 International Accreditation Service, Inc. (IAS), Accreditation Committee and are effective on the 18 date shown above. All accreditations issued or reissued on or after the effective date must 19 comply with these criteria. If the criteria are an updated version from a previous edition, solid 20 vertical lines ()) in the outer margin within the criteria indicate a technical change or addition 21 from the previous edition. Deletion indicators (\rightarrow) are provided in the outer margins where a 22 paragraph or item has been deleted if the deletion resulted from a technical change. These

- 23 criteria may be further revised as the need dictates.
- IAS may consider alternate criteria provided the proponent submits substantiating data
 demonstrating that the alternate criteria are at least equivalent to the attached criteria and
 otherwise meet applicable accreditation requirements.
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ACCREDITATION CRITERIA FOR INSPECTION PROGRAMS FOR MANUFACTURERS OF METAL BUILDING SYSTEMS

35 **1. INTRODUCTION**

- 1.1. Scope: These criteria set forth the requirements for obtaining and maintaining International Accreditation Service, Inc. (IAS), Inspection Programs for Manufacturers of Metal Building Systems accreditation. The criteria supplement the IAS Rules of Procedure for Inspection Programs for Manufacturers of Metal Building Systems.
- 41 1.2. **Overview:** Accredited entities complying with these criteria will have demonstrated that they 42 have the personnel, organization, experience, knowledge, guality procedures and commitment to 43 fabricate in accordance with specified requirements. IAS-accredited inspection programs for 44 manufacturers of metal building systems operate under a documented management system 45 developed in concert with an IAS-accredited inspection agency which conducts unannounced 46 inspections to verify continued compliance with these criteria. The management system includes 47 the manufacturer's written fabrication procedures and quality control manuals which provide a 48 basis for control of materials and workmanship, with periodic inspections of fabrication and 49 quality control practices by an IAS-accredited inspection agency. Although accredited entities 50 are evaluated on their performance measures to consistently produce products of the required 51 quality mandated by specified requirements, these criteria do not cover the products or the 52 design or performance characteristics of the products.
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1.3. **Normative and Reference Documents**: Publications listed below refer to current editions (unless otherwise stated).

- 1.3.1. American Welding Society: D1.1, D1.3, Structural Welding Code.
- 1.3.2. ISO 9606-1, Qualification testing of welders Fusion welding Part 1: Steels.
- 1.3.3. ISO/IEC 17000, Conformity assessment Vocabulary and general principles.
- 1.3.4. International Accreditation Service, Inc. (IAS), Accreditation Criteria for Inspection Programs for Manufacturers of Cold-formed Steel Structural and Nonstructural Components Not Requiring Welding accreditation (AC473).
- 1.3.5. IAS Rules of Procedure for Accreditation of Inspection Programs for Manufacturers of Metal Building Systems.
- 1.3.6. International Building Code[®], published by the International Code Council.
- 1.3.7. American Welding Society: A2.4, Standard Symbols for Welding, Brazing, and Nondestructive Examination.
- 67 1.3.8. American Welding Society: A3.0, Standard Welding Terms and Definitions; Including
 68 Terms for Adhesive Bonding, Brazing, Soldering, Thermal Cutting, and Thermal
 69 Spraying.

70		1.3.9.	American Welding Society: QC1, Standard for AWS Certification of Welding Inspectors.
71		1.3.10.	Canadian Standards Association: W178.2, Certification of welding inspectors.
72		1.3.11.	The American Society for Nondestructive Testing (ASNT): SNT-TC-1A Personnel
73			Qualification and Certification in Nondestructive Testing.
74		1.3.12.	American Institute of Steel Construction (AISC), ANSI/AISC 360 Specification for
75			Structural Steel Buildings.
76		1.3.13.	American Iron and Steel Institute: AISI S100: North American Specification for the
77			Design of Cold-Formed Steel Structural.
78		1.3.14.	MBMA Manuals:
79		1.3.1	4.1. Metal Building Systems Manual
80		1.3.1	4.2. Metal Roofing Systems Design Manual
81		1.3.1	4.3. Fire Resistance Design Guide for Metal Building Systems
82		1.3.1	4.4. Guide for Inspecting Metal Building Systems
83		1.3.1	4.5. MBMA Model Written Practice-UT Certification
84			
85	2.	DEFINITION	S
86		For the purpo	ses of these accreditation criteria, the definitions given in ISO/IEC 17000, and the
87		definitions that	at follow, apply.
88		2.1. Approve	ed Fabricator: An established and qualified person, firm or corporation approved by the
89		building	official pursuant to the approved fabricator designation in Section 1702 of the
90		Internati	onal Building Code [®] .
91		2.2. Cold-for	rmed Products: Products such as cold-formed Z- or C-shaped structural members or
92		roll-form	ed sheeting or deck designed to resist vertical and/or lateral loads.
93		2.3. Contrac	t Documents: Documents that describe the metal building system to be supplied in its
94		entirety f	for a given project. These documents include work orders, drawings, specifications, and
95		buyer sk	etches.
96		2.4. Correcti	ve Action: Implemented action necessary to eliminate or reduce the root cause of an
97		identified	d problem.
98		2.5. General	Manager: The person occupying the highest position of authority within a facility's
99		organiza	ition.
100		2.6. Letter of	f Certification: A project document that certifies the design of the metal building system
101		as requir	red by AC472 Section 4.6.3.2.3.
102		2.7. Manage	ment System: A set of interrelated or interacting elements that organizations use to
103		direct, co	ontrol and coordinate how policies are implemented and objectives are achieved.
104		Previous	sly, this was referred to as Quality Management System.
105		2.8. Metal B	uilding Systems Manufacturer: An entity that may be a company, division, subsidiary
106		or simila	r organization that designs and manufactures a metal building system which consists of

107	an integrated set of components and assemblies, including but not limited to frames that are
108	primary structural steel members, secondary members that are cold-formed steel and steel
109	joists, and roof and wall cladding components, specifically designed to support and transfer
110	loads and provide a complete or partial building shell.
111	2.9. Nonconformance: An action employed that renders a design, member, or component
112	unacceptable for the intended use as specified in contract documents or these criteria.
113	2.10. Nondestructive Testing (NDT): The process of inspecting, testing, or evaluating materials,
114	components or assemblies for discontinuities, or differences in characteristics without
115	destroying the serviceability of the part or system.
116	2.11. PQR : Procedure Qualification Record in accordance with AWS Standards, as applicable.
117	2.12. Procedure: An implemented and written document that describes who does what, when,
118	where, why and how.
119	2.13. Product : Result of activities or processes.
120	2.14. Production Engineer: An engineer who performs final designs on projects so that project
121	documents and shop documents can be made.
122	2.15. Project: A process consisting of a set of coordinated and controlled activities undertaken to
123	achieve customer requirements.
124	2.16. Project Documents: Documents produced for the buyer's use to support the implementation
125	of the project. These documents include permit and erection drawings, installation manuals and
126	letters of certification.
127	2.17. Quality Assurance: Measurable systematic actions to assure confidence that the
128	implementation of planned activities result in meeting objectives, goals and contract
129	documents.
130	2.18. Quality Control: The act of examination, testing or measurement that verifies processes and
131	services, or that documents conform to specified criteria.
132	2.19. Quality Manager: A quality professional, designated by management who has demonstrated
133	competence in establishing, maintaining and implementing a management system with
134	consistent results. The quality manager shall have direct access to the highest executive level
135	and shall report on the performance of the quality system to the organization's management for
136	use as a basis for improvement of the management system.
137	2.20. Quality Plan: A written document that describes the procedures and policies implemented to
138	assure product quality meets requirements of specific contract documents. As a minimum,
139	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
140	of these criteria.
141	2.21. Repair: Action taken to render a member or component acceptable for the intended use.

- 142 2.22. Shop Documents: Documents produced that describe the individual parts and pieces of a
 143 metal building system to be fabricated in the fabrication facility. These documents include shop
 144 details, bills of material, manifests, bills of lading, etc.
- 145 2.23. Specification: A document that states the obligatory requirements to which the product must146 conform.
- 147 2.24. Structural Weldments: Structural framing involving welding, coping, cutting, and drilling of
 148 built-up I-shaped sections, rolled shapes, or cold-formed sections.
- 149 2.25. Subcontractor: An entity that provides goods or services per stipulated project or shop
 150 documents. A subcontractor is hired to perform specific tasks. An example of a subcontractor is
 151 a structural steel fabricator.
- 152 2.26. Vendor: An entity that provides inventoriable, proprietary buy-out items that are available for
 153 sale. These items are typically chosen from a catalogue or list and are finite in terms of
 154 available options and quantity. Examples of vendors are bolt manufacturers and steel mills.
- 155 2.27. WPS: Welding Procedure Specification in accordance with ANSI/AWS D1.1 or AWS D1.3, as156 applicable.
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158 **3. ELIGIBILITY**

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

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165 4. REQUIRED BASIC INFORMATION

- 4.1. Fabricator inspection programs for manufacturers of metal building systems must demonstrate
 compliance with the following requirements:
 4.1.1. The requirements of these accreditation criteria;
- 169 4.1.2. IAS Rules of Procedure for Accreditation of Inspection Programs for Manufacturers of170 Metal Building Systems.

172 4.2. General Requirements

- 173 4.2.1. **Quality System**
- 1744.2.1.1. Entities accredited under these criteria shall establish and implement a quality175system that is fully documented. This documented management system must176describe the procedures and quality activities for ensuring that fabricated products177meet the specified requirements.

178	4.2.1.2. A docu	mented management system shall be prepared and submitted to IAS. The
179	docum	entation shall include a cross-reference matrix prepared in concert with an
180	IAS-ac	credited inspection agency ensuring that the general requirements in Section
181	4.2, pe	rsonnel requirements in Section 4.3, data in Section 4.4, the statements in
182	Section	4.5, and the written procedures noted in Section 4.6 of these accreditation
183	criteria	have been included.
184	4.2.1.3. The su	bmitted management system must be signed and dated by the highest level of
185	authori	ty within the organization.
186	4.2.1.4. The su	bmitted quality assurance document must be signed and dated by an
187	authori	zed representative of an IAS-accredited inspection agency, attesting that the
188	inspect	ion agency has reviewed the documented quality system and that it is
189	sufficie	nt to allow scheduling of an onsite joint assessment with IAS.
190	4.2.2. The subn	nitted documentation must be reviewed at least annually.
191	4.2.3. The prog	ram consists of three parts:
192	4.2.3.1. Part A:	Fabrication of structural weldments and cold-formed products requiring
193	welding].
194	4.2.3.2. Part B:	Fabrication of cold-formed products not requiring welding.
195	4.2.3.3. Part C:	Design of metal building systems.
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190 197	4.3. Personnel	
190 197 198	4.3. Personnel 4.3.1. Part A	
190 197 198 199	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality	Manager : Entities accredited under these criteria shall designate a quality
190 197 198 199 200	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag	v Manager : Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed
190 197 198 199 200 201	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect	Manager : Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to
190 197 198 199 200 201 202	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high	Manager : Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have
190 197 198 199 200 201 202 203	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo	Manager : Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have pwing responsibilities:
190 197 198 199 200 201 202 203 204	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.1.	Manager : Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these
190 197 198 199 200 201 202 203 204 205	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.1.	Manager : Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria.
190 197 198 199 200 201 202 203 204 205 206	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.1. 4.3.1.1.2.	Manager : Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria. Monitoring the effective implementation of the documented quality system.
190 197 198 199 200 201 202 203 204 205 206 207	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.1. 4.3.1.1.2. 4.3.1.1.3.	 Manager: Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria. Monitoring the effective implementation of the documented quality system. Assuring that periodic internal audits are conducted and documented, and
190 197 198 199 200 201 202 203 204 205 206 207 208	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.1. 4.3.1.1.2. 4.3.1.1.3.	 Manager: Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria. Monitoring the effective implementation of the documented quality system. Assuring that periodic internal audits are conducted and documented, and that corrective actions are implemented.
190 197 198 199 200 201 202 203 204 205 206 207 208 209	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.2. 4.3.1.1.3. 4.3.1.1.4.	 Manager: Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria. Monitoring the effective implementation of the documented quality system. Assuring that periodic internal audits are conducted and documented, and that corrective actions are implemented. Assuring that annual management reviews are conducted and documented
190 197 198 199 200 201 202 203 204 205 206 207 208 209 210	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.1. 4.3.1.1.2. 4.3.1.1.3. 4.3.1.1.4.	 Manager: Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed tons 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria. Monitoring the effective implementation of the documented quality system. Assuring that periodic internal audits are conducted and documented, and that corrective actions are implemented. Assuring that annual management reviews are conducted and documented to assure the adequacy and effectiveness of the quality system. Annual
190 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.2. 4.3.1.1.3. 4.3.1.1.4.	 Manager: Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria. Monitoring the effective implementation of the documented quality system. Assuring that periodic internal audits are conducted and documented, and that corrective actions are implemented. Assuring that annual management reviews are conducted and documented to assure the adequacy and effectiveness of the quality system. Annual management reviews must produce a summary and a documented plan of
190 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.2. 4.3.1.1.3. 4.3.1.1.4.	 Manager: Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria. Monitoring the effective implementation of the documented quality system. Assuring that periodic internal audits are conducted and documented, and that corrective actions are implemented. Assuring that annual management reviews are conducted and documented to assure the adequacy and effectiveness of the quality system. Annual management reviews must produce a summary and a documented plan of action for improvement. Documents to be considered during the annual
190 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213	4.3. Personnel 4.3.1. Part A 4.3.1.1. Quality manag in Sect the high the follo 4.3.1.1.1. 4.3.1.1.2. 4.3.1.1.3. 4.3.1.1.4.	 Manager: Entities accredited under these criteria shall designate a quality er who has the necessary training and experience to complete the tasks listed ions 4.3.1.1.1 through 4.3.1.1.5. The quality manager shall report directly to nest level of authority within the organization. The quality manager shall have owing responsibilities: Maintaining the documented management system in accordance with these criteria. Monitoring the effective implementation of the documented quality system. Assuring that periodic internal audits are conducted and documented, and that corrective actions are implemented. Assuring that annual management reviews are conducted and documented to assure the adequacy and effectiveness of the quality system. Annual management reviews must produce a summary and a documented plan of action for improvement. Documents to be considered during the annual management review must include, but are not limited to, customer

215	4.3.1.1.5.	Developing quality plans that meet contract documents, and having
216		knowledge of and access to the appropriate documents to meet this
217		requirement.
218	4.3.1.2. In-hou	se Quality Control (QC) Inspector: Entities accredited under these criteria
219	shall de	esignate an in-house quality control inspector who, as a minimum, must meet
220	the follo	owing requirements:
221	4.3.1.2.1.	Be a Certified Welding Inspector (CWI) in accordance with the provisions of
222		AWS QC1 or the equivalent requirements of the Canadian Standards
223		Association (CSA) Standard W178.2 or for an ICC Structural Welding Special
224		Inspector (S2).
225	4.3.1.2.2.	Be familiar with and demonstrate knowledge of codes and specifications, as
226		appropriate, for the scope of work specified in the contract documents.
227	4.3.1.2.3.	Be responsible for assuring that only qualified and certified welders are used,
228		as specified by contract documents for the welding process and procedures
229		permitted for use.
230	4.3.1.2.4.	Be responsible for assuring continuity of the welders' qualifications as
231		required by American Welding Society AWS D1.1 or D1.3, as appropriate.
232	4.3.1.2.5.	Qualified personnel must be responsible for overall workmanship and for
233		ensuring all structural members and weldments are 100 percent visually
234		inspected. Although inspections may be delegated to qualified personnel
235		during the receipt and in-process stages of assembly, it is the responsibility
236		of the in-house quality control inspector to ensure that inspections are
237		performed and documented and that the product meets project requirements.
238		Qualified personnel must meet the requirements of Section 4.3.1.2.1 of these
239		criteria or demonstrate competence to perform inspections by appropriate
240		training and/or experience in metals fabrication, inspection and testing. The
241		basis for designating qualified personnel shall be documented by the in-
242		house quality control inspector as noted in AC472 Section 4.6.1.5.3.
243	4.3.1.2.6.	Be responsible for ensuring that incoming raw materials are properly
244		identified and inspected for compliance with quality plans and specifications.
245	4.3.1.2.7.	Be responsible for ensuring and documenting that the final assembly can be
246		traced back to the incoming materials, the quality assurance records and the
247		individual welder.
248	4.3.1.2.8.	Be responsible for reviewing all Welding Procedure Specifications (WPSs)
249		and Procedure Qualification Records (PQRs) before these are used in
250		production welding operations.

251 4.3.1.2.9. Be responsible for ensuring that fabrication of weldments and cold-formed 252 products meet the fabrication tolerances outlined in Table 4.1 or Table 4.2. 253 4.3.1.3. Welding Personnel: Entities accredited under this criteria shall ensure that the 254 following conditions are met: 255 4.3.1.3.1. All welding personnel shall be qualified by the test as described in 256 ANSI/AWS D1.1 or D1.3, or other accepted country-specific test standard, as 257 appropriate, by a qualified independent third-party agency. Third-party 258 qualification shall be by certification as an AWS Certified Welding Inspector 259 (CWI) in accordance with the provisions of AWS QC1, Standard Guide for 260 Qualification and Certification of Welding Inspectors; or current qualification 261 by the Canadian Welding Bureau (CWB) to the requirements of the Canadian 262 Standards Association Standard W178.2, Certification of Welding Inspectors; 263 or current qualification by approved third-party agencies, such as those 264 accredited by an accreditation body that is an IAS Mutual Recognition 265 Arrangement (MRA) partner, per ISO 9606-1; or by the International Code 266 Council as an ICC Structural Welding Special Inspector (S2). The in-house 267 CWI, CWB, or ICC structural welding special inspector (S2) may administer 268 the welding tests; however, the qualification coupon shall be evaluated by the 269 third party CWI, CWB or ICC Structural Welding Special Inspector. If tensile 270 testing is required for qualification of welding personnel, the test, or test 271 sample, must be sent to an IAS-accredited testing laboratory for examination. 272 Such laboratories must be accredited by IAS or by an accreditation body that 273 is a partner with IAS in an MRA. 274 4.3.1.3.2. All welding personnel shall have and use an identifying number, letter or 275 symbol for the purpose of traceability. 276 4.3.1.4. Nondestructive Testing: Procedures shall be developed as required by the 277 applicable building code and in the project documents. 278 279 If metal building manufacturers include nondestructive testing as an in-house 280 practice, they will receive recognition on the certificate of accreditation. As a 281 minimum, there must be in-house staff certified in accordance with SNT-TC-1A. 282 4.3.2. Part B 283 4.3.2.1. Quality Manager: Entities accredited under these criteria shall designate a quality 284 manager who has the necessary training and experience to complete the tasks listed 285 in Sections 4.3.2.1.1 through 4.3.2.1.5. The quality manager shall report directly to 286 the highest level of authority within the organization. The quality manager shall have 287 the following responsibilities:

288	4.3.2.1.1.	Maintaining the documented management system in accordance with these
289		criteria.
290	4.3.2.1.2.	Monitoring the effective implementation of the documented management
291		system.
292	4.3.2.1.3.	Assuring that periodic internal audits are conducted and documented, and
293		that corrective actions are implemented.
294	4.3.2.1.4.	Assuring that annual management reviews are conducted and documented
295		to assure the adequacy and effectiveness of the management system.
296		Annual management reviews must produce a summary and a documented
297		plan of action for improvement. Documents to be considered during the
298		annual management review must include, but are not limited to, customer
299		complaints, back charges, internal audit results and corrective actions.
300	4.3.2.1.5.	Developing quality plans that meet contract documents, and having
301		knowledge of and access to the appropriate documents to meet this
302		requirement.
303	4.3.2.2. In-hous	se Quality Control (QC) Inspector: Entities accredited under this criteria
304	shall de	esignate an in-house quality control inspector who, as a minimum, must meet
305	the follo	owing requirements:
306	4.3.2.2.1.	Be familiar with and demonstrate knowledge of codes and specifications, as
307		appropriate, for the scope of work specified in the contract documents.
308	4.3.2.2.2.	Be responsible for ensuring that incoming raw materials are properly
309		identified and inspected for compliance with quality plans and specifications.
310	4.3.2.2.3.	Be responsible for ensuring and documenting that the final fabrication
311		assembly can be traced back to the incoming materials and the quality
312		assurance records.
313	4.3.2.2.4.	Be responsible for ensuring that fabrication of cold-formed products meets
314		the fabrication tolerances outlined in Table 4.1.
315	4.3.3. Part C	
316	Engineer	in Responsible Charge: Entities accredited under these criteria shall
317	designate	an Engineer in Responsible Charge who, as a minimum, must meet the
318	following	requirements:
319	4.3.3.1. Be a p	rofessional engineer registered or licensed in the United States to practice
320	enginee	ering or an engineer duly registered or licensed in the country in which the
321	facility i	s located, who has experience with the building code and the design of metal
322	building	systems.
323	4.3.3.2. Have fu	Il authority for the control of engineering performed at the facility as related to
324	technica	al decision making. This person need not be the highest level of authority

325	within the organization of the facility as long as appropriate technical authority has
326	been granted to him/her.
327	4.3.3.3. Assuring that annual management reviews are conducted to assure the adequacy
328	and effectiveness of the quality system. Annual management reviews must produce a
329	documented summary and a documented plan of action for improvement. Documents
330	to be considered during the annual management review must include, but are not
331	limited to, customer complaints, back charges, internal audit results and corrective
332	actions.
333	
334	4.4. Required Data
335	4.4.1. Part A
336	4.4.1.1. The name of the facility, the physical street address, mailing address (if different),
337	information on the person serving as the IAS contact (including the telephone
338	number and e-mail address), and the telephone number of the facility.
339	4.4.1.2. A floor plan of the fabrication facility. The floor plan need not be to scale.
340	4.4.1.3. A list of major production equipment, including welding, burning, lifting and inspection
341	equipment.
342	4.4.1.4. A list of typical items fabricated (e.g., beams, trusses, girders, bracing members,
343	etc.).
344	4.4.1.5. A copy of all WPSs for production welding. The WPSs shall be written to include
345	essential and nonessential variables, in accordance with AWS D1.1 or D1.3, as
346	appropriate for the type of fabrication performed at the facility.
347	4.4.1.6. A copy of all PQRs for WPSs qualified by testing, when required.
348	4.4.1.7. A list of qualified welding personnel, including their approved welding process,
349	limitations on their qualifications and their identification marks.
350	4.4.1.8. Evidence that welding personnel are qualified by an independent, third-party CWI,
351	CWB, or ICC Structural Welding Special Inspector in accordance with Section
352	4.3.1.3.1 of these criteria.
353	4.4.1.9. The name and certification number of the CWI, CWB, or ICC Structural Welding
354	Special Inspector acting as the in-house quality control inspector.
355	4.4.1.10. The name of the deputy in-house QC inspector who assumes the position in the
356	absence of the primary in-house QC person.
357	4.4.1.11. An organizational chart including the names of the responsible quality managers.
358	This chart must show the relationships among the CEO, the Engineer In
359	Responsible Charge, general manager, quality manager, in-house quality control
360	inspector, deputy in-house inspector, production manager and welding personnel.

361	4.4.1.12. A list of approved vendors, including any testing agencies employed to verify a
362	WPS.
363	4.4.1.13. A list of test and measuring equipment.
364	Test and measuring equipment must be calibrated and traceable to a national
365	standard. The equipment list must include sufficient testing instruments to assure
366	quality compliance as appropriate for the items being fabricated.
367	4.4.2. Part B
368	4.4.2.1. The name of the facility, the physical street address, mailing address (if different),
369	information on the person serving as the IAS contact (including the telephone
370	number and e-mail address), and the telephone number of the facility.
371	4.4.2.2. A floor plan of the fabrication facility. The floor plan need not be to scale.
372	4.4.2.3. A list of major production equipment, including burning, lifting and inspection
373	equipment.
374	4.4.2.4. A list of typical items fabricated (e.g., cold formed sections, roof and wall panels,
375	etc.).
376	4.4.2.5. The name of the deputy in-house QC inspector who assumes the position in the
377	absence of the primary in-house QC person.
378	4.4.2.6. An organizational chart including the names of the responsible quality managers.
379	This chart must show the relationships among the CEO, general manager, quality
380	manager, in-house quality control inspector, deputy in-house inspector and
381	production manager.
382	4.4.2.7. A list of approved vendors.
383	4.4.2.8. A list of test and measuring equipment.
384	Test and measuring equipment must be calibrated and traceable to a national
385	standard. The equipment list must include sufficient testing instruments to assure
386	quality compliance as appropriate for the items being fabricated.
387	4.4.3. Part C
388	4.4.3.1. The name of the facility, the physical street address, mailing address (if different),
389	information on the person serving as the IAS contact (including the telephone
390	number and e-mail address), and the telephone number of the facility.
391	4.4.3.2. An organizational chart showing the relationships among the CEO, general manager,
392	Engineer in Responsible Charge, and production engineers.
393	4.4.3.3. A listing of all engineers performing production engineering, along with their years of
394	experience in designing metal building systems.
395	
396	4.5. Required Statements
397	4.5.1. Part A

398	The following statements shall be provided in the quality system submittal:
399	4.5.1.1. A quality policy statement that includes the following elements:
400	4.5.1.1.1. All activities of the organization shall be directed in such a manner as to
401	ensure that the quality requirements of AC472 will be met.
402	4.5.1.1.2. The elements of the quality assurance program will be disseminated to all
403	personnel assigned activities that affect the quality of the product.
404	4.5.1.2. IAS will be notified, in writing prior to any cancellation of the inspection agreement
405	with the accredited inspection agency.
406	4.5.1.3. Copies of reports of inspections conducted by the inspection agency, if they note
407	major quality control variations, will be forwarded to IAS within 10 days of the major
408	deficiency having been reported.
409	4.5.1.4. Entities accredited under these criteria will notify the inspection agency when the
410	facility is to be closed for extended time periods other than for normally scheduled
411	periods for maintenance or vacations, or for two or more weeks regardless of the
412	circumstances of the closure. IAS and the inspection agency will be notified 10 days
413	prior to resumption of operations.
414	4.5.1.5. IAS will be notified in writing by the accredited entity and the inspection agency if
415	unannounced, follow-up inspections have not been conducted by the inspection
416	agency.
417	4.5.1.6. IAS and the accredited inspection agency must be notified within 30 days of any
418	changes in management personnel. As a minimum, this would include the president,
419	general manager, purchasing manager, production manager or quality manager.
420	4.5.2. Part B
421	The following statements shall be provided in the quality system submittal:
422	4.5.2.1. A quality policy statement that includes the following elements:
423	4.5.2.1.1. All activities of the organization shall be directed in such a manner as to
424	ensure that the quality requirements of AC472 will be met.
425	4.5.2.1.2. The elements of the quality assurance program will be disseminated to all
426	personnel assigned activities that affect the quality of the product.
427	4.5.2.2. IAS will be notified, in writing, prior to any cancellation of the inspection agreement
428	with the accredited inspection agency.
429	4.5.2.3. Copies of reports of inspections conducted by the inspection agency, if they note
430	major quality control variations, will be forwarded to IAS within 10 days of the major
431	deficiency being reported.
432	4.5.2.4. Entities accredited under these criteria will notify the inspection agency when the
433	facility is to be closed for extended time periods other than for normally scheduled
434	periods for maintenance or vacations, or for two or more weeks regardless of the

435	circumstances of the closure. IAS and the inspection agency will be notified 10 days
436	prior to resumption of operations.
437	4.5.2.5. IAS will be notified in writing by the accredited entity and the inspection agency if
438	unannounced, follow-up inspections have not been conducted by the inspection
439	agency.
440	4.5.2.6. IAS and the accredited inspection agency must be notified within 30 days of any
441	changes in management personnel. As a minimum, this would include the president,
442	general manager, purchasing manager, production manager, or quality manager.
443	4.5.3. Part C
444	4.5.3.1. A quality policy statement that includes the following elements:
445	4.5.3.1.1. All activities of the organization shall be directed in such a manner as to
446	ensure that the quality requirements of AC472 will be met.
447	4.5.3.1.2. The elements of the quality assurance program will be disseminated to all
448	engineering personnel performing production engineering.
449	4.5.3.2. IAS will be notified, in writing, prior to any cancellation of the inspection agreement
450	with the accredited inspection agency.
451	4.5.3.3. Copies of reports of inspections conducted by the inspection agency, if they note
452	major quality control variations, will be forwarded by the accredited entity to IAS
453	within 10 days of the major deficiency being reported.
454	4.5.3.4. Entities accredited under these criteria will notify the inspection agency when the
455	facility is to be closed for extended time periods other than for normally scheduled
456	periods for maintenance or vacations, or for two or more weeks regardless of the
457	circumstances of the closure. IAS and the inspection agency will be notified 10 days
458	prior to resumption of operations.
459	4.5.3.5. IAS will be notified in writing by the accredited entity and the inspection agency if
460	unannounced, follow-up inspections have not been conducted by the inspection
461	agency.
462	4.5.3.6. IAS and the accredited inspection agency must be notified within 30 days of any
463	changes in management personnel. As a minimum, this would include the president,
464	general manager, or Engineer in Responsible Charge.
465	4.5.3.7. A Letter of Certification will be issued for all projects per the procedure required in
466	Section 4.6.3.2.3.
467	
468	4.6. Required Written Procedures
469	Entities accredited under these criteria shall submit written procedures for the following:
470	4.6.1. Part A

471	4.6.1.1. Docun	nent Control: Control of documents and data relating to the quality functions
472	must b	e provided. This control shall include the following:
473	4.6.1.1.1.	A document approval procedure.
474	4.6.1.1.2.	A procedure to ensure that only current, approved documents are used.
475	4.6.1.1.3.	A procedure to ensure that documents are available at all locations where
476		necessary for the proper functioning of the management system.
477	4.6.1.2. Purch a	asing
478	4.6.1.2.1.	Determining that purchased products will conform to specified requirements.
479		The procedure must include a requirement that the type and grade of
480		material be documented on the purchase order agreement.
481	4.6.1.2.2.	Evaluation of subcontractors for their ability to meet subcontract
482		requirements. Evaluations may contain summaries or logs, but must include
483		a means of quantifying and measuring the ability of the subcontractor or
484		supplier to provide quality products or services consistent with the required
485		shop documents. For projects requiring IAS accreditation, fabrication may be
486		subcontracted only to fabrication facilities that are currently IAS-accredited.
487	4.6.1.3. Produ	ct Traceability: The traceability procedure must describe the method used to
488	ensure	items are traceable as specified in the contract documents. Items that
489	typicall	y require traceability are materials and consumables that are incorporated into
490	the fina	al product. The project documents will determine if full materials traceability is
491	require	d; however, the accredited entity must have a procedure to meet the project
492	needs	for the type of fabrication performed. In addition to project requirement needs,
493	the acc	credited entity, as a minimum, must have in their control traceability of the
494	finishe	d product to incoming materials, certified welders, inspectors, plans and
495	specifi	cations. The procedure must make provision for documentation of this
496	traceat	pility on inspection forms or on a controlled copy of the detail drawing.
497		
498	Materia	al traceability to heat number, unless otherwise required by contract
499	docum	ents, is limited to main members and does not include items such as
500	stiffene	ers, clips, and bolted end plates. As a minimum, all steel used and incorporated
501	into the	e final product must be traceable to the type and grade of material.
502	4.6.1.4. Proces	ss Control: There must be a procedure that identifies how process control is
503	commu	inicated to appropriate personnel. Process control includes procedures such
504	as cutt	ing or saw operations, fitting and welding of the material, cambering and
505	coating	. Examples of forms used in the process control procedure are cut lists,
506	standa	rd drawings or detail drawings. The procedure must describe the accredited
507	entity's	method of communicating and establishing priorities of such operations.

508	4.6.1.5. Inspection and Testing: The inspection procedure shall include provisions for
509	receipt, in-process and final inspections as appropriate to provide a level of
510	assurance that products are fabricated in accordance with contract documents by
511	qualified personnel. Final inspections shall include a record of the results and
512	resolution of nonconformances identified by subsequent inspections. As a minimum,
513	inspection procedures shall include the following:
514	4.6.1.5.1. Receiving inspection of incoming materials to the required specification,
515	including review of mill test reports and certificates of conformance to ensure
516	compliance with contract documents.
517	4.6.1.5.2. In-process inspection for workmanship that can affect subsequent
518	operations. (Examples of in-process inspections are nondestructive testing of
519	welds that will be hidden or out of reach during the final inspection; visual
520	examination of fit-up tolerances that will not be visible after welding; areas
521	requiring coatings that will not be accessible during final inspection;
522	monitoring of welding operations as appropriate; fabrication tolerances per
523	Table 4.1; and monitoring of roll-forming operations for shape tolerances per
524	Figure 4.1.) Welding process inspections on multiple pass welds must ensure
525	that proper preheat and interpass temperatures are maintained and that the
526	finished welds meet the tolerances specified in the contract documents and
527	are of the required size, without rejectable indications such as cracks,
528	undercuts, inclusions or porosity. In the event in-process weld inspections
529	are delegated by the in-house Certified Welding Inspector (CWI), there must
530	be documentation ensuring personnel performing assigned inspections have
531	been trained on the specific tasks that are delegated.
532	4.6.1.5.3. All final welds are to be accepted under the direction of the in-house CWI,
533	CWB, or ICC Structural Welding Special Inspector. There must be a record
534	of the final inspection ensuring that receiving, in-process and final
535	inspections have been performed.
536	Note: All inspectors or assistant inspectors who accept or reject welds must
537	have a current eye exam in accordance with AWS D1.1.
538	4.6.1.6. Control of Inspection, Measuring and Test Equipment: There must be a
539	maintenance schedule, including calibration procedures for testing equipment.
540	Wherever possible, calibration services shall be provided by a calibration laboratory
541	accredited by IAS or by an accreditation body that is a partner with IAS in a mutual
542	recognition arrangement.
543	

544	It is recognized there may not be nationally recognized standards available for
545	unique testing equipment. When such instances exist, calibration procedures must be
546	in compliance with manufacturer's recommendations to the extent that such testing
547	equipment is calibrated to ensure consistency with the required measuring
548	capabilities. It is the accredited entity's responsibility to ensure that such testing
549	equipment is approved prior to use.
550	4.6.1.7. Control of Nonconforming Workmanship: Procedures shall be established for
551	identifying, documenting and assigning the disposition of nonconforming items.
552	4.6.1.8. Corrective Action: The procedure for corrective action shall include investigating,
553	documenting and correcting nonconformances. The procedure must include a
554	provision to preclude repetition.
555	4.6.1.9. Handling, storage and delivery procedures shall include identifying and storing of
556	incoming materials and finished products as appropriate to minimize damage and
557	deterioration.
558	4.6.1.10. Internal Audits: Entities accredited under these criteria shall identify the
559	frequency, method of documentation and the content of internal audits to determine
560	the effectiveness of the quality system. Audits shall include a summary that
561	compares the most recent audit to the previous audit, and shall include the
562	elements of AC472.
563	4.6.1.11. Control of Quality Records: Entities accredited under these criteria must
564	determine methods for storing, maintaining and accessing quality records for a
565	minimum of two years. Quality records must include the following:
566	4.6.1.11.1. Completed in-house quality inspection reports, forms, and checklists.
567	4.6.1.11.2. Manufacturer test reports and certificates of compliance from vendors, for
568	incoming materials and consumables.
569	4.6.1.11.3. Copies of inspection reports by the inspection agency.
570	4.6.1.11.4. Records of internal audits.
571	4.6.1.11.5. Training records.
572	4.6.1.11.6. Evaluations of vendors and subcontractors.
573	4.6.1.12. Training: There must be a procedure for the training of personnel who have an
574	effect on the quality of the finished product. The procedure must include provision
575	for maintaining current personnel qualifications. As a minimum, there must be
576	training requirements established for inspectors, assistant inspectors, machine
577	operators, welders, and fitters.
578	4.6.2. Part B
579	4.6.2.1. Document Control: Control of documents and data relating to the quality functions
580	must be provided. This control shall include the following:

581	4.6.2.1.1.	A document approval procedure.
582	4.6.2.1.2.	A procedure to ensure that only current, approved documents are used.
583	4.6.2.1.3.	A procedure to ensure that documents are available at all locations where
584	I	necessary for the proper functioning of the management system.
585	4.6.2.2. Purchas	sing
586	4.6.2.2.1.	Determining that purchased products will conform to specified requirements.
587		The procedure must include a requirement that the type and grade of
588	I	material be documented on the purchase order agreement.
589	4.6.2.2.2.	Evaluation of subcontractors for their ability to meet subcontract
590		requirements. Evaluations may contain summaries or logs, but must include
591	;	a means of quantifying and measuring the ability of the subcontractor or
592	:	supplier to provide quality products or services consistent with the required
593	:	shop documents.
594		Note: While IAS understands some organizations use the term
595		"subcontractor" synonymously with "supplier," there is a difference, and both
596	:	suppliers and subcontractors are required to be evaluated on an annual
597	l	basis.
598	4.6.2.3. Product	Traceability : The traceability procedure must describe the method used to
599	ensure it	tems are traceable as specified in the contract documents. Items that
600	typically	require traceability are materials and consumables that are incorporated into
601	the final	product. The project documents will determine if full materials traceability is
602	required	; however, the accredited entity must have a procedure to meet the project
603	needs fo	or the type of fabrication performed. In addition to project requirement needs,
604	the accre	edited entity, as a minimum, must have in their control traceability of the
605	finished	product to incoming materials, inspectors, plans and specifications. The
606	procedu	re must make provision for documentation of this traceability on inspection
607	forms or	on a controlled copy of the detail drawing. Material traceability to a heat
608	number,	unless otherwise required by contract documents, is limited to main
609	member	s and does not include items such as clips. However, as a minimum, all steel
610	used and	d incorporated into the final product must be traceable to the type and grade
611	of mater	ial.
612	4.6.2.4. Process	Control : There must be a procedure that identifies how process control is
613	commur	nicated to appropriate personnel. Process control includes procedures such
614	as cuttin	g or saw operations and coating. Examples of forms used in the process
615	control p	procedure are cut lists, standard drawings or detail drawings. The procedure
616	must des	scribe the method of communicating and establishing priorities of such
617	operatio	ns.

618	Note: Manufacturers shall have a written procedure for implementing the Steel			
619	Coalition Lubricant Task Group Final Report dated May 14, 2002, and show evidence			
620	that roll formed roof panels and decking are in conformance with the manufacturer's			
621	written standards with regards to lubricants and labeling.			
622	4.6.2.5. Inspection and Testing: The inspection procedure shall include provisions for			
623	receipt, in-process and final inspections as appropriate to provide a level of			
624	assurance that products are fabricated in accordance with contract documents by			
625	qualified personnel. Final inspections shall include a record of the results and			
626	resolution of nonconformances identified by subsequent inspections. As a minimum,			
627	inspection procedures include the following:			
628	4.6.2.5.1. Receiving inspection of incoming materials to the required specification,			
629	including review of mill test reports and certificates of conformance to ensure			
630	compliance with contract documents.			
631	4.6.2.5.2. In-process inspection for workmanship that can affect subsequent			
632	operations. (Examples of in-process inspections are areas requiring coatings			
633	that will not be accessible during final inspection, fabrication tolerances per			
634	Table 4.1 or Table 4.2, and monitoring of roll-forming operations for shape			
635	tolerances per Figure 4.1.)			
636	4.6.2.5.3. Final inspection includes documented acceptance of all workmanship			
637	performed, including materials and coatings.			
638	4.6.2.6. Control of Inspection, Measuring and Test Equipment: There must be a			
639	maintenance schedule, including calibration procedures for testing equipment.			
640	Wherever possible, calibration services shall be provided by a calibration laboratory			
641	accredited by IAS or by an accreditation body that is a partner with IAS in a mutual			
642	recognition arrangement.			
643				
644	It is recognized there may not be nationally recognized standards available for			
645	unique testing equipment. When such instances exist, calibration procedures must be			
646	in compliance with manufacturer's recommendations to the extent that such testing			
647	equipment is calibrated to ensure consistency with the required measuring			
648	capabilities. It is the accredited entity's responsibility to ensure that such testing			
649	equipment is approved prior to use.			
650	4.6.2.7. Control of Nonconforming Workmanship: Procedures shall be established for			
651	identifying, documenting and assigning the disposition of nonconforming items.			
652	4.6.2.8. Corrective Action: The procedure for corrective action shall include investigating,			
653	documenting and correcting nonconformances. The procedure must include a			
654	provision to preclude repetition.			

655	4.6.2.9. Handling, storage and delivery procedure shall include identifying and storing of			
656	incoming materials and finished products as appropriate to minimize damage and			
657	deterioration.			
658	4.6.2.10. Internal Audits: Entities accredited under these criteria shall identify the			
659	frequency, method of documentation and the content of internal audits to determine			
660	the effectiveness of the quality system. Audits shall include a summary that			
661	compares the most recent audit to the previous audit, and shall include the			
662	elements of AC472.			
663	4.6.2.11. Control of Quality Records: Entities accredited under these criteria must			
664	determine methods for storing, maintaining and accessing quality records for a			
665	minimum of two years. Quality records must include the following:			
666	4.6.2.11.1. Completed in-house quality inspection reports, forms, and checklists.			
667	4.6.2.11.2. Manufacturer test reports and certificates of compliance from vendors, for			
668	incoming materials and consumables.			
669	4.6.2.11.3. Copies of inspection reports by the inspection agency.			
670	4.6.2.11.4. Records of internal audits.			
671	4.6.2.11.5. Training records.			
672	4.6.2.11.6. Evaluations of vendors and subcontractors.			
673	4.6.2.12. Training: There must be a procedure for the training of personnel who have an			
674	effect on the quality of the finished product. The procedure must include provision			
675	for maintaining current personnel qualifications. As a minimum, there must be			
676	training requirements established for inspectors and machine operators.			
677	4.6.3. Part C			
678	4.6.3.1. Contract Review: Review of contract documents to ensure that the needed			
679	resources exist to fulfill the contract requirements. The contract review procedure			
680	must include provisions that assure the review is appropriate, and that the product			
681	and service will meet the specifications. Procedures must include a provision for the			
682	approval of exceptions or change requests. Reviews shall be performed by personnel			
683	who have access to the appropriate information and have adequate knowledge of the			
684	contract requirements. Reviews must be approved by the Engineer in Responsible			
685	Charge.			
686	4.6.3.2. Engineering: Entities accredited under these criteria shall have written procedures			
687	for production engineering that shall include, at a minimum, requirements covering			
688	the information in Sections 4.6.3.2.1 through 4.6.3.2.4.			
689	4.6.3.2.1. Information on how incoming contract documents are to be evaluated and			
690	provided to the design engineer.			

691	4.6.3.2.2.	Information for the preparation and checking of design calculations and
692		erection drawings. Design calculations are to be in conformance with the
693		specified codes and standards.
694	4.6.3.2.3.	A procedure for the creation of a Letter of Certification. All information
695		pertinent to the structural design that is required to be indicated on the
696		construction documents, as noted in Section 1603 of the applicable edition of
697		the International Building $Code^{i\!\!\!/}$, is to be included. The Letter of Certification
698		shall be sealed in accordance with the engineering laws of the appropriate
699		jurisdiction. As a minimum, the letter of certification shall be in accordance
700		with the requirements of the appropriate jurisdiction.
701	4.6.3.2.4.	Information on how detail drawings are prepared and how revisions to project
702		or shop documents and change orders are approved.
703	4.6.3.3. Contro	ol of Quality Records: Entities accredited under these criteria must determine
704	method	ds for storing, maintaining and accessing quality records for a minimum of two
705	years.	Quality records must include the following:
706	4.6.3.3.1.	Order documents
707	4.6.3.3.2.	Contract review documents
708	4.6.3.3.3.	Design calculations and drawings
709	4.6.3.3.4.	Certificate of design conformance
710	4.6.3.3.5.	Training records
711	4.6.3.3.6.	Evaluations of subcontract engineers and detailers.
712	4.6.3.4. Trainir	ng: There must be a procedure for the training of personnel who have an
713	effect o	on the quality of the finished product. The procedure must include provision for
714	mainta	ining current personnel qualifications. As a minimum, there must be training
715	require	ments established for project managers, engineers and detailers.
716	4.6.3.5. Correc	tive Action: The procedure for corrective action shall include investigating,
717	docum	enting and correcting nonconformances. The procedure must include a
718	provisio	on to preclude repetition.
719	4.6.3.6. Interna	al Audits: Entities accredited under these criteria shall identify the frequency,
720	method	d of documentation and the content of internal audits to determine the
721	effectiv	reness of the quality system. Audits shall include a summary that compares
722	the mo	st recent audit to the previous audit, and shall include the elements of AC472.
723		
724	4.7. Control of Requir	red Procedures
725	4.7.1. Part A	
726	Contract	t Review: The quality manager must ensure that contract quality requirements
727	are met.	The quality manager will be responsible for reviewing any instructions and/or

728	procedures relative to activities affecting quality to determine if they are properly			
729	understood and implemented.			
730				
731	As a minimum, the following elements must be documented to ensure that contract			
732	reviews are managed, controlled, and successfully implemented and communicated to			
733	appropriate personnel:			
734	4.7.1.1. Quality plans to ensure that fabrication conforms to the most recent project			
735	specifications. Quality plans shall include proprietary buy-out items and subcontract			
736	fabrication. Project specifications include design drawings, detail drawings, and other			
737	related documents.			
738	4.7.1.2. As a minimum, quality plans shall address the following:			
739	4.7.1.2.1. Material: ASTM Grade and Type, AWS filler metal classification.			
740	4.7.1.2.1.1. Origin of materials			
741	4.7.1.2.1.2. Substitution requirements			
742	4.7.1.2.1.3. Material test report requirements			
743	4.7.1.2.2. Workmanship			
744	4.7.1.2.2.1. Cutting of components			
745	4.7.1.2.2.1.1. Drilling or punching of holes			
746	4.7.1.2.2.1.1.1. Edge distance			
747	4.7.1.2.2.1.1.2. Repair of miss-located holes			
748	4.7.1.2.2.1.2. Welding requirements			
749	4.7.1.2.2.1.2.1. Welding procedure specifications			
750	4.7.1.2.2.1.2.2. Control consumables			
751	4.7.1.2.2.1.2.3. Cambering, bending, straightening			
752	4.7.1.2.2.1.2.4. Dimensional tolerances (See Table 4.2 for built-up section			
753	tolerances)			
754	4.7.1.2.3. Coating/Painting/Galvanizing			
755	4.7.1.2.3.1. Surface preparation			
756	4.7.1.2.3.2. Manufacture and type of coating			
757	4.7.1.2.3.3. Application of coating			
758	4.7.1.2.4. Required inspections and sequence of inspections to verify conformance of			
759	an item or activity to specified requirements. Procedures needed:			
760	4.7.1.2.4.1. Receiving			
761	4.7.1.2.4.2. In-process			
762	4.7.1.2.4.3. Final			
763	4.7.1.2.4.4. Records and reports			
764	4.7.1.2.4.5. Nondestructive testing requirements			

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 4.7.2.2.3.3. Application of coating 4.7.2.2.3.4. Protection of coating 4.7.2.2.3.4. Protections of coating 4.7.2.2.4. Required inspections and sequence of inspections to verify conformance of an item or activity to specified requirements. Procedures needed: 4.7.2.2.4.1. Receiving 	794	4.7.2.2.3.2. Manufacture and type of coating
7964.7.2.2.3.4. Protection of coating7974.7.2.2.4. Required inspections and sequence of inspections to verify conformance of an item or activity to specified requirements. Procedures needed:7994.7.2.2.4.1. Receiving	795	4.7.2.2.3.3. Application of coating
7974.7.2.2.4. Required inspections and sequence of inspections to verify conformance of an item or activity to specified requirements. Procedures needed:7994.7.2.2.4.1. Receiving	796	4.7.2.2.3.4. Protection of coating
798an item or activity to specified requirements. Procedures needed:7994.7.2.2.4.1. Receiving	797	4.7.2.2.4. Required inspections and sequence of inspections to verify conformance of
799 4.7.2.2.4.1. Receiving	798	an item or activity to specified requirements. Procedures needed:
	799	4.7.2.2.4.1. Receiving
800 4.7.2.2.4.2. In-process	800	4.7.2.2.4.2. In-process
801 4.7.2.2.4.3. Final	801	4.7.2.2.4.3. Final

802		4.7.2.2.4.4. Records and reports
803		4.7.2.2.5. Acceptance criteria for inspections required in the contract documents for the
804		scope of the project.
805		4.7.2.2.6. Shipping, packaging and handling requirements.
806		4.7.3. Part C
807		4.7.3.1. Contract Review: The Engineer in Responsible Charge must ensure that contract
808		requirements are met. The Engineer in Responsible Charge will be responsible for
809		reviewing the contract documents relative to requirements affecting engineering to
810		determine if they are properly understood and implemented.
811		4.7.3.2. Design Review: The Engineer in Responsible Charge will be responsible for
812		ensuring that the production engineer reviews the design documents and the shop
813		documents to verify that the contract requirements are met.
814		
815		4.8. Fabrication Tolerances
816		4.8.1. Cold-formed Structural Members: The fabrication tolerances indicated in Figure 4.1
817		for cold-formed structural members are defined in Table 4.1.
818		4.8.2. Built-up Structural Members: The fabrication tolerances indicated in Figures 4.2(a)
819		and 4.2(b) for built-up structural members are defined in Table 4.2.
820		
821	5.	ADDITIONAL INFORMATION (AS APPLICABLE)
822		5.1. AWS Welding Quality Assurance Guideline for Fabricators.
823		5.2. SSPC, The Society for Protective Coatings.
824		5.2.1. Steel Structures Painting Manual, Volume I, Good Painting Practice.
825		5.2.2. Steel Structures Painting Manual, Volume II, Systems and Specifications.
826		5.3. Steel Joist Institute(SJI) Specifications.
827		5.4. SJI K-I.1 Standard Specification for Open Web Steel Joists, K-Series.
828		5.5. SJI LH/DLH-I.1 Standard Specification for Longspan Steel Joists, LH Series and Deep
829		Longspan Steel Joists, DLH Series.
830		5.6. Steel Coalition Lubricant Task Group Final Report, May14, 2002.
831		
832	6.	LINKS TO ADDITIONAL REFERENCES
833		6.1. IAS – <u>www.iasonline.org</u>
834		6.2. International Code Council – <u>www.iccsafe.org</u>
835		6.3. MBMA – <u>www.mbma.com</u>

836	
837 838 839	

Table 4.1Cold-formed Structural Members

Formed Structural Members			
	Dimension	Tolerances	
		+	-
	D	3/16"	3/16"
	В	3/16"	3/16"
Geometry	d	3/8"	1/8"
	θ_1	3°	3°
	θ_2	5°	5°
	E ₁	1/8"	1/8"
	E_2	1/8"	1/8"
	E_3	1/8"	1/8"
Hole	S_1	1/16"	1/16"
Location	S_2	1/16"	1/16"
	F	1/8"	1/8"
	Р	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)	



Table 4.2Built-up Structural Members

Built-up Structural Members				
Dimension			Tolerances	
			+	-
	6	a	3°- 1/4" Max	3°- 1/4" Max
	ł)	1/4"	1/4"
	(f	3/16"	3/16"
	(e	1/8"	1/8"
		0	D/	72"
	1	f	D/	72"
	E	21	1/8"	1/8"
	E	2	1/8"	1/8"
	E	3	1/8"	1/8"
	S	1	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 membe	rs 1/4" x L(ft)/10
	Camber (C)		1/4" x L(ft)/ 10	
	N ₁		1/8"	1/8"
	Ν	\mathbf{V}_2	3/16"	3/16"
	(\mathbf{j}_1	1/16"	1/16"
Splice	G ₂		1/16"	1/16"
Plates		Up to 24"	1/8"	1/8"
	Н	24" to 48"	3/16"	3/16"
		Over 48"	1/4"	1/4"
	J		1/4"	1/4"



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906 These criteria were previously issued April 2008, September 2008, May 2010, April 2011, August 2012, September 2013, February
 907 2015, April 2017 and June 2017.