International Accreditation Service, Inc.
3060 Saturn Street, Suite 100
Brea, CA 92821 USA
t: 562.364.8201
t: 866.427.4422
www.iasonline.org

October 23, 2020

TO: **IAS- FABRICATORS OF CONTAINER-BASED STRUCTURES AND OTHER INTERESTED PARTIES.**

SUBJECT: Proposed Accreditation Criteria for Approval Program for Fabricators of Container-Based Structures, AC786-202012 (DM)

Hearing Information:
IAS Accreditation Committee
Monday, December 14, 2020
8:30 a.m. (Pacific Standard Time)
WebEx Meeting – Refer to IAS website for details.

Dear Madam or Sir:

IAS is proposing a new Accreditation Criteria for Approval Program for Fabricators of Container-Based Structures, AC785. This criteria and new program are being proposed to help fabricators of container-based structures meet the requirements of the International Building Code's Section 1704.2.5.1 as an Approved Fabricator. These criteria were developed in corporation with the National Portable Storage Association (NPSA) to help their members meet the requirement set forth in the IBC.

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 November 25, 2020. 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 may be postal mailed to the address above or emailed to iasinfo@iasonline.org.

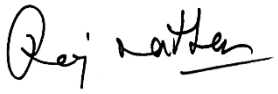
Any written material submitted for committee consideration will be available for public distribution as set forth in the Rules of Procedure for Accreditation Committee Meetings found on the IAS website. Since this is a web meeting, comments for public distribution will be placed on the IAS website prior to 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,



Raj Nathan
President

Enclosures: Proposed Revised AC786

cc: Accreditation Committee

International Accreditation Service, Inc.
3060 Saturn Street, Suite 100
Brea, CA 92821 USA
t: 562.364.8201
t: 866.427.4422
f: 562.699.8031
www.iasonline.org

PROPOSED ACCREDITATION CRITERIA FOR APPROVAL PROGRAM FOR FABRICATORS OF CONTAINER-BASED STRUCTURES

AC786

Proposed December 14, 2020

PREFACE

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

ACCREDITATION CRITERIA FOR APPROVAL PROGRAM FOR FABRICATORS OF CONTAINER-BASED STRUCTURES

1. INTRODUCTION

1.1. **Scope:** These criteria set forth the requirements for obtaining and maintaining International Accreditation Service, Inc. (IAS), Approval Program for Fabricators of Container-Based Structures accreditation. These criteria supplement the IAS Rules of Procedure for Approval Programs for Fabricators of Container-Based Structures accreditation.

1.2. **Overview:** Accredited fabricators complying with these criteria will have demonstrated that they have the personnel, organization, experience, knowledge, quality procedures and commitment to fabricate in accordance with specified requirements. IAS-accredited approval programs for fabricators of Container-Based Structures operate under a documented quality management system. The quality management system includes the fabricator's written fabrication procedures and quality control documentation, which provide a basis for control of materials and workmanship, with a biannual assessment of fabricator's quality control practices by IAS. Although accredited fabricators are evaluated on their performance measures to consistently produce products of the required quality mandated by specified requirements, these criteria do not cover the products, design or performance characteristics of the products.

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

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

1.3.2. AWS QC1, *Standard Guide for Qualification and Certification of Welding Inspectors*

1.3.3. Canadian Standards Association Standard W178.2, *Certification of Welding Inspectors*

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

1.3.5. IAS Rules of Procedure for Accreditation of Approval Programs for Fabricators of Container-Based Structures accreditation.

1.3.6. International Building Code® (IBC), published by the International Code Council.

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

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

1.3.9. American Welding Society: QC1, Standard for AWS Certification of Welding Inspectors.

1.3.10. Canadian Standards Association: W178.2, Certification of welding inspectors.

1.3.11. The American Society for Nondestructive Testing (ASNT): SNT-TC-1A Personnel Qualification and Certification in Nondestructive Testing.

1.3.12. American Institute of Steel Construction (AISC), ANSI/AISC 360 Specification for Structural Steel Buildings.

1.3.13. American Iron and Steel Institute: AISI S100: North American Specification for the Design of Cold-Formed Steel Structural.

1.3.14. ICC G5-2019 Guideline for the Safe Use of ISO Intermodal Shipping Containers Repurposed as Buildings and Building Components.

2. DEFINITIONS

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

2.1. **Approved Fabricator**: An established and qualified person, firm or corporation approved by the building official pursuant to Chapter 17 and Chapter 2 in the *International Building Code*

2.2. **Cold-formed Products**: Products such as cold-formed Z- or C-shaped structural members or roll-formed sheeting or deck designed to resist vertical and/or lateral loads.

2.3. **Container:** A six-sided steel unit originally constructed as a general cargo container used for the transport of goods and materials.

2.4. **Contract Documents**: Documents that describe the Container-Based Structures to be supplied in its entirety for a given project. These documents include work orders, drawings, specifications, and buyer sketches.

2.5. **Corrective Action**: Implemented action necessary to eliminate or reduce the root cause of an identified problem.

2.6. **General Manager**: The person occupying the highest position of authority within a facility's organization.

2.7. **Certificate of Compliance**: A certificate stating that materials and products meet specified standards or that work was done in compliance with approved construction documents. The statement must include that the work was performed in accordance with the approved construction documents

2.8. **Management Review**: A routine evaluation conducted and documented to assure the adequacy and effectiveness of the quality management system.

2.9. **Management System**: A set of interrelated or interacting elements that organizations use to direct, control and coordinate how policies are implemented and objectives are achieved. Previously, this was referred to as Quality Management System.

2.10. **Fabricator**: An entity that may be a company, division, subsidiary or similar organization that fabricates a Container-Based Structures which consists of an integrated set of components and assemblies, including but not limited to the original shipping container structure, any openings cut into the container, steel framing to reinforce the opening and designed to support and transfer loads, and any doors, windows & other components installed into the openings.

2.11. **Nonconformance**: An action employed that renders a design, member, or component unacceptable for the intended use as specified in contract documents or these criteria.

2.12. **PQR**: Procedure Qualification Record in accordance with AWS Standards, as applicable.

2.13. **Procedure**: An implemented and written document that describes who does what, when, where, why and how.

2.14. **Project Documents**: Documents produced for the buyer's use to support the implementation of the project. These documents include permit and drawings, and *certificate of compliance* in accordance with Section 1704.2.5.1 of the IBC.

2.15. **Quality Assurance**: Measurable systematic actions to assure confidence that the implementation of planned activities result in meeting objectives, goals and contract documents.

2.16. **Quality Control**: The act of examination, testing or measurement that verifies processes and services, or that documents conform to specified criteria.

2.17. **Quality Manager**: A quality professional, designated by management who has demonstrated competence in establishing, maintaining and implementing a management system with consistent results. The quality manager shall have direct access to the highest executive level and shall report on the performance of the quality system to the organization's management for use as a basis for improvement of the management

system.

2.18. **Quality Plan**: A written document that describes the procedures and policies implemented to assure product quality meets requirements of specific contract documents. As a minimum, quality plans must meet the requirements of Sections 4.7.1.1 and 4.7.1.2 of these criteria.

2.19. **Repair**: Action taken to render a member or component acceptable for the intended use.

2.20. **Shop Documents**: Documents produced that describe the individual parts and pieces of a container-based structure to be sourced or fabricated in the fabrication facility. These documents include shop details, bills of material, manifests, bills of lading, etc.

2.21. **Specification**: A document that states the obligatory requirements to which the product must conform.

2.22. **Structural Weldments**: Structural framing involving welding, coping, cutting, and drilling of containers, rolled shapes, or cold-formed sections.

2.23. **Subcontractor**: An entity that provides goods or services per stipulated project or shop documents. A subcontractor is hired to perform specific tasks.

2.24. **Vendor**: An entity that provides inventoriable, proprietary buy-out items that are available for sale. These items are typically chosen from a catalogue or list and are finite in terms of available options and quantity. Examples of vendors are bolt manufacturers and steel mills.

2.25. **WPS**: Welding Procedure Specification in accordance with ANSI/AWS D1.1 or AWS D1.3, as applicable.

3. ELIGIBILITY

Accreditation services are available to fabricators of container-based structures that meet the requirements of these criteria.

4. REQUIRED BASIC INFORMATION

4.1. Fabricators of Container-Based Structures must demonstrate compliance with the following requirements:

4.1.1. The requirements of these accreditation criteria;

4.1.2. IAS Rules of Procedure for Accreditation of Approval Programs for Fabricators of Container-Based Structures.

4.2. **General Requirements**

4.2.1. **Quality System**

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

4.2.1.2. A documented quality management system shall be prepared and submitted to IAS. The documentation shall include a cross-reference matrix ensuring that the general requirements in Section 4.2, the personnel requirements in Section 4.3, the data in Section 4.4, the statements in Section 4.5, and the written procedures noted in Section 4.6 of these accreditation criteria have been included.

4.2.1.3. The submitted quality management system must be signed and dated by the highest level of authority within the organization.

4.2.1.4. The submitted documentation must be reviewed by the fabricator's management periodically.

4.3. **Personnel:**

4.3.1. **Quality Manager**: Fabricators accredited under these criteria shall designate a quality manager who has the necessary training and experience to complete the tasks listed in Sections 4.3.1.1 through 4.3.1.5. The quality manager shall report directly to the highest level of authority within the organization. The quality manager shall have the following responsibilities:

4.3.1.1. Maintaining the documented management system in accordance with these criteria.

4.3.1.2. Monitoring the effective implementation of the documented quality management system.

4.3.1.3. Assuring that annual internal audits are conducted and documented, and that corrective actions are implemented.

4.3.1.4. Assuring that annual management reviews are conducted and documented to assure the adequacy and effectiveness of the quality management system. Annual management reviews must produce a summary and a documented plan of action for improvement. Items to be considered during the annual management review must include, but are not limited to,

4.3.1.4.1. the status of action items from previous management review;

4.3.1.4.2. changes that are relevant to the quality management system;

4.3.1.4.3. customer satisfaction and feedback from relevant interested parties;

4.3.1.4.4. the extent to which quality objectives have been met;

4.3.1.4.5. nonconformities and corrective actions;

4.3.1.4.6. internal audit results;

4.3.1.4.7. the performance of external providers;

4.3.1.4.8. the adequacy of resources;

4.3.1.4.9. address risks and opportunities;

4.3.1.4.10. opportunities for improvement.

4.3.1.5. Developing quality plans that meet contract documents and having knowledge of and access to the appropriate documents to meet this requirement.

4.3.1.6. Successfully demonstrate his/her knowledge of the quality management system and technical operations of the fabricator, including an assessment of his/her general, practical and specific knowledge pertinent to the fabricator's current project documents.

4.3.1.7. Demonstrate knowledge through a combination of education, training and experience of the latest editions of established codes and standards as appropriate to the fabrication of structural steel members and their components. Applicable documents may include, but are not limited to, the following:

4.3.1.7.1. *International Building Code* Chapter 17 and Chapter 22 & Chapter 31

4.3.1.7.2. AWS D1.1, AWS D1.3 or AWS D1.8 Standards as applicable for the type of fabrication performed at the facility.

4.3.1.7.3. AWS A2.4, Symbols

4.3.1.7.4. AWS A3.0, Terms and Definitions

4.3.1.7.5. AISC Code of Standard Practice

4.3.1.7.6. SSPC Painting Manual, Volume 1, Good Painting Practice

4.3.1.7.7. SSPC Painting Manual, Volume 2, Systems and Specifications

4.3.1.7.8. AISC Detailing for Steel Construction

4.3.1.7.9. ASTM International (relevant standards).

4.3.1.7.10. Research Council on Structural Connections (RCSC) – Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts

4.3.1.7.11. Project specifications/contract documents for the current fabrication performed at the facility

4.3.1.7.12. AWS A5.18, Specification for Carbon Steel Electrodes and Rods for Gas Shielded Arc Welding

4.3.1.7.13. ISO 1496-1 Series 1 Freight Containers Specification and Testing

4.3.1.7.14. ICC G5-2019 Guideline for the Safe Use of ISO Intermodal Shipping Containers Repurposed as Buildings and Building components

4.3.2. **Quality Control (QC) Inspector**: Fabricators accredited under these criteria shall designate a quality control inspector who, as a minimum, must meet the following requirements or be fulfilled by a qualified third-party contractor:

4.3.2.1. Be a Certified Welding Inspector (CWI) in accordance with the provisions of AWS QC1 or the equivalent requirements of the Canadian Standards Association (CSA) Standard W178.2 or for an ICC Structural Welding Special Inspector (S2).

4.3.2.2. Be familiar with and demonstrate knowledge of codes and specifications, as appropriate, for the scope of work specified in the contract documents.

4.3.2.3. Be responsible for assuring that only qualified and certified welders are used, as specified by contract documents for the welding process and procedures permitted for use.

4.3.2.4. Be responsible for assuring continuity of the welders' qualifications as required by American Welding Society AWS D1.1 or D1.3, as appropriate.

4.3.2.5. Quality control inspector must be responsible for overall workmanship and for ensuring all structural members and weldments are 100 percent visually inspected. Although inspections may be delegated to qualified personnel during the receipt and in-process stages of assembly, it is the responsibility of the quality control inspector to ensure that inspections are performed and documented and that the product meets project requirements. Qualified personnel must demonstrate competence to perform inspections by appropriate training and/or experience in metals fabrication, inspection and testing. The basis for designating qualified personnel shall be documented by

the in-house quality control inspector.

4.3.2.6. Be responsible for ensuring that incoming raw materials are properly identified and inspected for compliance with quality plans and specifications.

4.3.2.7. Be responsible for ensuring and documenting that the final assembly can be traced back to the incoming materials, the quality assurance records and the individual welder.

4.3.2.8. Be responsible for reviewing all Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs) before these are used in production welding operations.

4.3.2.9. Be responsible for ensuring that fabrication of weldments and cold-formed products meet the fabrication tolerances outlined in Table 4.1.

4.3.3. **Welding Personnel**: Fabricators accredited under these criteria shall ensure that the following conditions are met:

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

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

4.4. **Required Data**

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

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

4.4.3. A list of major production equipment, including welding, cutting, burning, lifting and inspection equipment.

4.4.4. A list of typical items fabricated (e.g., vertical and horizontal frames/supports, door frames, window frames, headers, beams, panels, bracing members, etc.).and a list of typical openings. (e.g., windows, doors, utility openings, clear spans)

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

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

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

4.4.8. Evidence that welding personnel are qualified by an independent, third-party CWI, CWB, or ICC Structural Welding Special Inspector in accordance with Section 4.3.3.1 of these criteria.

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

4.4.10. The name of the qualified person who assumes the position in the absence of the QC person.

4.4.11. An organizational chart including the names of the responsible quality personnel. This chart must show the relationships among the CEO, general manager, quality manager, quality control inspector, production manager and welding personnel.

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

4.4.13. A list of tests and measuring equipment.

4.4.13.1. Test and measuring equipment must be calibrated and traceable to a national standard. The equipment list must include sufficient testing instruments to assure quality compliance as appropriate for the items being fabricated. All calibration laboratories must be accredited by IAS or by an accreditation body that is a partner with IAS in an MRA.

4.5. **Required Statements**

The following statements shall be provided in the quality management system documentation submittal:

4.5.1.1. A quality policy statement that includes the following elements:

4.5.1.1.1. All activities of the organization shall be directed in such a manner as to ensure that the quality requirements of AC### will be met.

4.5.1.1.2. The elements of the quality assurance program will be disseminated to all personnel assigned activities that affect the quality of the product.

4.5.1.2. Fabricators accredited under these criteria will notify IAS when the facility is to be closed for extended time periods other than for normally scheduled periods for maintenance or vacations, or for two or more weeks regardless of the circumstances of the closure. IAS will be notified 10 days prior to resumption of operations.

4.5.1.3. IAS must be notified within 30 days of any changes in management personnel. As a minimum, this would include the president, general manager, purchasing manager, production manager or quality manager.

4.6. **Required Written Procedures**

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

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

4.6.2. **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. A document approval procedure.

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

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

4.6.3. **Purchasing**

4.6.3.1. 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.

4.6.3.2. 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. For projects requiring IAS accreditation, fabrication may be subcontracted only to fabrication facilities that are currently IAS-accredited.

4.6.4. **Product Traceability**:

4.6.4.1. **Container:** Shall meet the requirements of any of the following: ICC-ES AC462, ICC G5-2019 or IBC 2021 Chapter 31 Amendment

4.6.4.2. **Structural Members & Other Material** 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, this fabricator 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, certified welders, 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 heat number, unless otherwise required by contract documents, is limited to main members and does not include items such as stiffeners, clips, and bolted end plates. As a minimum, all steel used and incorporated into the final product main members must be traceable to

the type and grade of material.

4.6.5. **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, fitting and welding of the material, cambering and coating. Examples of forms used in the process control procedure are cut lists, standard drawings or detail drawings. The procedure must describe the fabricator's method of communicating and establishing priorities of such operations.

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

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

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

4.6.6.3. All final welds are to be accepted under the direction of the CWI, CWB, or ICC Structural Welding Special Inspector. There must be a record of the final inspection ensuring that receiving, in-process and final inspections

have been performed.

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

4.6.7. **Certificate of Compliance**: Fabricators accredited under these criteria shall have written procedures for the creation of a certificate of compliance. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the owner or the owner's authorized agent for submittal to the building official as specified in Section 1704.5, of the IBC, stating that the work was performed in accordance with the *approved construction documents*.

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

4.6.9. **Control of Nonconforming Workmanship**: Procedures shall be established for identifying, documenting and assigning the disposition of non-conforming items.

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

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

4.6.12. **Internal Audits**: Fabricators accredited under these criteria shall perform periodic audits that cover, but are not limited to, the following items:

4.6.12.1. Welder qualification and training

4.6.12.2. Weld procedures

4.6.12.3. Inspector qualification and training

4.6.12.4. Purchasing and vendor qualification

4.6.12.5. Material traceability

4.6.12.6. Test and Measurement Equipment Calibration

4.6.12.7. Management Review documentation

4.6.12.8. Document Control

4.6.12.9. Non-Conformance and Corrective Actions

4.6.12.10. Audits shall include a summary that compares the most recent audit to the previous audit, and

4.6.12.11. shall include the elements of ACXXX.

4.6.13. **Control of Quality Records**: Fabricators accredited under these criteria must determine methods for storing, maintaining and accessing quality records for a minimum of five years. Quality records must include the following:

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

4.6.13.2. Fabricator test reports and certificates of compliance from vendors, for incoming materials and consumables.

4.6.13.3. Copies of assessment reports by the accreditation body.

4.6.13.4. Records of internal audits.

4.6.13.5. Training records.

4.6.13.6. Evaluations of vendors and subcontractors.

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

4.7. **Control of Required Procedures**

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

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

4.7.2. Quality plans to ensure that fabrication conforms to the most recent project specifications. Quality plans shall include proprietary buy-out items and

subcontract fabrication. Project specifications include design drawings, detail drawings, and other related documents.

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

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

4.7.3.1.1. Origin of materials

4.7.3.1.2. Substitution requirements

4.7.3.1.3. Material test report requirements

4.7.3.2. Workmanship

4.7.3.2.1. Cutting of components

4.7.3.2.2. Drilling or punching of holes

4.7.3.2.3. Edge distance

4.7.3.2.4. Repair of mis-located holes

4.7.3.2.5. Welding requirements

4.7.3.2.6. Welding procedure specifications

4.7.3.2.7. Control consumables

4.7.3.2.8. Cambering, bending, straightening

4.7.3.2.9. Dimensional tolerances (See Table 4.1)

4.7.3.3. **Coating**/Painting

4.7.3.3.1. Surface preparation

4.7.3.3.2. Fabricator and type of coating

4.7.3.3.3. Application of coating

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

4.7.3.4.1. Receiving

4.7.3.4.2. In-process

4.7.3.4.3. Final

4.7.3.4.4. Records and reports

4.7.3.5. Acceptance criteria for inspections required in the contract documents for the

scope of the project.

4.7.3.6. Shipping, packaging, and handling requirements.

4.7. Fabrication Tolerances

4.7.1. **Structural Members**: The fabrication tolerances indicated in Figures 4.1 for structural members are defined in Table 4.1.

4.7.2. **Position of weldments** – in accordance with plans within ¼" of specified location

4.7.3. **Plumb / Level / Square components:**

4.7.3.2. uprights shall be

4.7.3.2.3. dimensioned to match one another within 1/8"

4.7.3.2.4. installed to be within 0.5 degrees of perpendicular to the floor

4.7.3.2.5. as a result, they should be within 3/8" of parallel to a nearby corner post

4.7.3.3. horizontal members shall be

4.7.3.3.3. dimensioned to match one another within 1/8"

4.7.3.3.4. installed to be within ¼" of parallel to the floor or top rail of the container

4.7.3.4. Diagonal measures of the resulting framed opening shall be within the larger of 1/16" of an inch, OR 0.5% of the calculated diagonal of the rectangular opening. Examples:

4.7.3.4.3. 6" x 8" – within 1/16"

4.7.3.4.4. 36"x36" – within ¼"

4.7.3.4.5. 3'x7' – within 7/16"

4.7.3.4.6. 8'x9' – within 11/16"

note, the above roughly matches a 0.5-degree deviation from perpendicular on one side or the other of an opening, which is approximately twice the allowable deviation on the container itself

4.7.4. Materials shall meet ASTM designations per structural design, and with the exception of pre-cambered materials, shall be straight within 1/8" per 8' length

when welded in place.

4.7.5. **Weldment Tolerances**

4.7.5.2. Weldments should not span a gap wider than 3/16”

4.7.5.3. Stitch welds shall meet or exceed designed-for lengths of weld and shall not exceed designed-for spacings by more than 1/8”

5. ADDITIONAL INFORMATION (AS APPLICABLE)

5.1 SSPC, The Society for Protective Coatings.

5.1.1. Steel Structures Painting Manual, Volume I, Good Painting Practice.

5.1.2. Steel Structures Painting Manual, Volume II, Systems and Specifications.

5.2. International Convention for Safe Containers (CSC) http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-Safe-Containers-(CSC).aspx

6. LINKS TO ADDITIONAL REFERENCES

6.1. IAS – www.iasonline.org

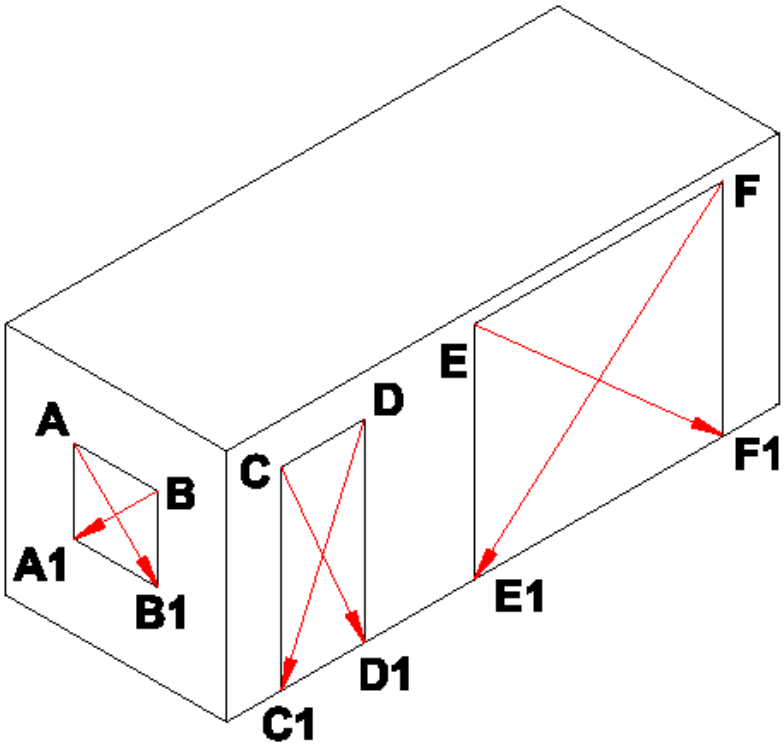
6.2. International Code Council – www.iccsafe.org

6.3. BCAC-IBC Chapter 31 Intermodal Shipping Containers - https://www.iccsafe.org/wp-content/uploads/bcac/BCAC_Ship_Contain_IBC_31_2017_10_27_Draft-DAB.pdf

6.4. ICC-ES AC462 – Structural Building Materials from Shipping Containers - https://icc-es.org/acceptance-criteria/ac462/

6.5. National Portable Storage Association www.npsa.org

Table 4.1
Structural Member



DIAGONAL TOLERANCES			
SIZE OF OPENING		MEASUREMENT	
6" x 8"	NOT SHOWN	+/	1/16"
36" x 36"	A - B1	+/-	1/4"
	B - A1		
3' x 7'	C - D1	+/-	7/16"
	D - C1		
8' x 9'	E - F1	+/-	11/16"
	F - E1		