

CERTIFICATION PROGRAMS

AISC 207-23 AUDIT GUIDE

All Fabricator, Manufacturer and Erector Programs and Endorsements

Purpose

This audit guide will help you transition between the *Standard for Certification Programs* (AISC 207-20) and the updated *Standard for Certification Programs* (AISC 207-23). This guide is compliments of QMC.

Scope

This audit guide can be used during internal audits to identify “gaps” between your management systems and the updated standard or as a starting point for implementing management systems to meet the certification requirements. It can also be useful if you are considering adding additional certifications and/or endorsements. This audit guide includes all certification programs and endorsements. **The Governing Requirements for Certification Programs and the program specific Supplemental Requirements are not included but should be reviewed as part of the internal audit to ensure compliance.** For users of the *Certification Standard for Shop Application of Complex Protective Coating Systems* (AISC 420-10/SSPC-QP 3) the additional criteria are included with reference to the general sections of 207-23.

Use Instruction

Explanation of the column layout:

- **Ref#** - identifies the section or subsection of new standard 207-20
- **Criteria** - notes the text from the new standard and each “shall” is required for implementation of the management system(s)
- **MS Ref** - record the reference of the management system which contains these criteria. (procedure number, Quality Manual section, etc.)
- **Audit Findings** - use this space to indicate what was observed, which provides evidence of what was reviewed to determine conformance
- **Results** - use to indicate the result of comparing the evidence observed versus the criteria. A key is provided in the footer of each page.

When a section contains new criteria or of significant change, the revised portion of the criteria will be in **RED** to make identification of potential changes or gaps easy to identify.

Please note the following changes that were included throughout the 207-23 but are **not** highlighted in **red**:

- The word “clearly” was removed as an adjective throughout the standard since it provides no value to the item’s description.
- Use of the word “all” was reviewed to determine appropriateness. Many instances were changed to “the”.
- The glossary contains several revised terms. This should be used as a reference for the internal audit. The Glossary is not included in this guide.
- Many Commentary notes were added to the 207. These are very helpful in understanding how to implement the various requirements. These should be referenced during the internal audit. The Commentary is not included in this guide.

Customize to Your System

If you have multiple certifications and/or endorsements, you may want to copy and paste the criteria from the supplemental Chapters of 207-23 provided in this guide into the row of the associated general section. Criteria that do not apply to your certifications can be deleted making a custom internal audit guide for your company.

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Ref#	Criteria	MS Ref	Audit Findings	Results
1.1	<p>Purpose The purpose of this Standard is to confirm to <i>owners</i>, the design community, the construction industry, and public officials that certified participants who adhere to the requirements in this Standard have the personnel, organization, experience, <i>documented procedures</i>, knowledge, equipment, and commitment to quality to perform <i>fabrication</i>, manufacturing, and/or <i>erection</i> as described in this Standard.</p>			
1.2	<p>Scope The requirements in this Standard shall apply as follows:</p> <ul style="list-style-type: none"> a) Chapters 1 and 2 shall apply to building <i>fabricators</i>, who fabricate and supply the <i>structural steel</i> frames for buildings where elements of the frames are as defined in AISC <i>Code of Standard Practice</i> Section 2.1. b) Chapters 1 and 3 shall apply to metal <i>component manufacturers</i>, who <i>manufacture components</i> that include bracing not designed for primary loads (diaphragms, cross frames, and lateral bracing); camera, light, sign, and signal support structures; bridge rail; stairs; walkways; grid decks; drains; scuppers; expansion joints; bearings; ballast plates; and mechanical movable bridge equipment. <i>Manufacturers</i> of camera, light, sign, and signal support structures; high mast light towers; bridge rail; complex expansion joints; high load multi-rotational (HLMR) bearings; and mechanical movable bridge equipment shall also be required to meet specific supplemental requirements to this Standard. c) Chapters 1 and 4 shall apply to bridge <i>fabricators</i>, who fabricate and supply steel highway or railroad bridges. d) Chapters 1 and 5 shall apply to <i>erectors of structural steel</i>. e) Chapters 1 and 6 shall apply to hydraulic metal structure <i>fabricators</i>. <p>In Chapters 2 through 6, only those subsections that are supplementary to Chapter 1 are indicated.</p> <p>The Glossary is an integral part of this Standard. Nonmandatory Commentaries are provided for background, and the user is encouraged to consult them.</p> <p>NOTE: The terms listed in the Glossary are to be used in addition to those in the AISC <i>Code of Standard Practice for Steel Buildings and Bridges</i>, hereafter referred to as the <i>Code of Standard Practice</i>; some commonly used terms are repeated here for convenience and marked with an †. Where used, terms are italicized to alert the user that the term is defined in this Glossary.</p>			

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1.3	<p>References The reference documents and standards necessary to make personnel aware of work requirements shall be consistent with the requirements of existing contract documents and shall be readily available to those who need them. The ability to work to and meet the requirements of the latest edition of the following documents shall be demonstrated:</p> <ul style="list-style-type: none"> A. ANSI/AISC 303 Code of Standard Practice for Steel Buildings and Bridges B. RCSC Specification for Structural Joints Using High-Strength Bolts C. Selected ASTM Standards for Structural Steel Fabrication, as published for AISC, or equivalent content D. AWS A2.4 Symbols E. AWS A3.0M/A3.0 Terms and Definitions F. AWS D1.1/D1.1M Structural Welding Code—Steel 			
1.4	<p>Definitions As used in this Standard, the words shall, must, or will denote a mandatory requirement. The word should denote a guideline or recommendation. The words may or can denote an opportunity to make a choice.</p>			
1.5	<p>MANAGEMENT RESPONSIBILITY</p>			
1.5.1	<p>Policy for Quality Executive management shall ensure that a policy for quality is communicated, implemented, and maintained. The policy for quality shall include:</p> <ul style="list-style-type: none"> A. A commitment to quality that includes a commitment to meet the requirements in contract documents. B. A quality management system that provides a framework for establishing, communicating, and reviewing the organization's quality goals. <p>Executive management shall establish goals to improve quality. Goals shall be measurable and documented through objective evidence. As quality goals are achieved, new goals shall be set that demonstrate commitment to continuous improvement.</p>			

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1.5.2	<p>Quality Management System</p> <p>The <i>quality management system</i> shall satisfy the requirements of this Standard and the requirements of the <i>contract documents</i> and referenced standards. The <i>quality management system</i> shall include a <i>quality manual</i>, <i>documented procedures</i>, and records. The <i>quality management system</i> must address both <i>quality control</i> and <i>quality assurance</i> as defined in the Glossary of this Standard. <i>Documented procedures</i> shall contain:</p> <ul style="list-style-type: none"> (a) The purpose of the <i>procedure</i>. (b) Process definition that includes steps required for completion. (c) Assignment of responsibility for performance. (d) Assignment of responsibility for review, revision, and/or approval of the <i>procedure</i>. (e) Identification of records that are generated. (f) For inspection activities, frequency of observations or inspections and how those observations or inspections are documented. 			

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1.5.3	<p>Management Review Executive management shall conduct periodic review of the quality management system at planned intervals, but annually at a minimum. Further, at a minimum, management review shall include assessment and documentation of the following:</p> <ul style="list-style-type: none"> A. A summary of previous management reviews. B. Results of any internal and external audits conducted since the previous management review. C. Customer feedback and feedback mechanisms, identifying opportunities for improving quality. D. Work nonconformances. Both the number and severity of nonconformances shall be assessed. E. Process nonconformances, including compliance with the documented procedures comprising the quality management system. F. Effectiveness of the corrective actions taken. G. Results of equipment inspections, including the adequacy of equipment resources. H. Adequacy of the training program with respect to the levels of qualification required as appropriate. I. Proposed or required modifications to the quality management system. <p>The management review record shall include the decisions and actions required for implementation of:</p> <ul style="list-style-type: none"> A. Improvement of the effectiveness of the quality management system and its processes. B. Improvement of quality. C. Resource needs. <p>Records from management reviews shall be maintained in accordance with the <i>documented procedure</i> as required in Section 1.9.</p>			

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1.5.4	<p>Responsible Quality Personnel Executive management shall designate a management representative or representatives for quality who shall report directly to (or be a part of) executive management. The designated management representative(s) for quality may perform other functions within the company, provided that those functions do not conflict with the quality responsibilities. The designated management representative(s) shall have the ability, responsibility, and authority to:</p> <ul style="list-style-type: none"> A. Ensure that documented procedures needed for the quality management systems are established, implemented and maintained in accordance with this Standard. B. Report to executive management on the performance of the quality management system and any need for improvement. C. Communicate with external parties on matters relating to the quality management system. 			
1.5.5	<p>Resource Management Resources necessary to comply with the <i>contract documents</i> shall be available. Resources are applicable to both personnel and non-personnel. The qualification requirements, responsibility, authority, and the interrelation of functional positions that manage, perform, and verify work affecting quality shall be defined as required in Section 1.5.7 and in the industry-specific chapters. Other provisions relating to personnel are found elsewhere in the Standard. See Sections 2.5.4, 3.5.4, 4.5.4, 4.1.5.4, and 5.5.4.3, and 6.5.4.2 for non-personnel, industry-specific resource requirements.</p>			
1.5.6	<p>Internal Communication Executive management shall ensure that appropriate communication processes are established, and that communication takes place on a regular basis regarding the effectiveness of management systems.</p>			
1.5.7	<p>Quality Manual The quality manual shall include a page showing the current revision date and the name and location of the facility or organization. The quality manual shall include or incorporate by reference the following documents at a minimum:</p> <ul style="list-style-type: none"> A. Documented statements of a quality policy and quality objectives as required by this Standard. B. Documented procedures established for the quality management system (or references to them), along with their associated quality records. C. Documents needed by the organization to ensure the effective planning, operation and control of its processes. D. Organizational chart describing the interrelationship of functional positions that manage, perform and verify work affecting quality. E. Job descriptions outlining responsibilities, authority and required qualifications for key positions. F. Qualification evidence for individuals in key positions /functions. <p>Executive management shall define additional documented procedures, drawings or other documents that are required beyond the minimum requirements set by this Standard to meet the needs of the organization and its customers. The highest-ranking member of executive management shall sign and date the quality manual.</p>			

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1.6	<p>Construction Document Review and Communication <i>A documented procedure</i> shall be developed for contract and project specification review. The <i>procedure</i> shall require these reviews for each project, and the review shall begin no later than the acceptance of responsibility for performing the work. Records of this review shall be maintained in accordance with the <i>documented procedure</i> as required in Section 1.9.</p>			
1.7	<p>DETAILING - Section 1.7 does not apply to erectors.</p>			
1.7.1	<p>Detailing Standards The fabricator or manufacturer shall prepare and use detailing standards describing technical preferences and requirements. These standards shall show special information required on advance bills such as allowances for cuts, camber, or supplementary requirements. The detailing standards shall include how bills of material are prepared which, at a minimum, include:</p> <ul style="list-style-type: none"> A. Sizes and quantities. B. Appropriate specification references. C. Special ordering information. D. Any allowances or tolerances. <p>The detailing standards shall describe the fabricator's or manufacturer's methods of drawing layout, including, but not limited to:</p> <ul style="list-style-type: none"> A. Sections and views. B. Title block information. C. The method of designating shipping sequences. D. The piece marking system. E. Commonly used shop abbreviations. F. Fabricators: Showing bolt placement lists (including bolt type and installation requirements). G. Fabricators: Information required on weld symbols including any special NDT requirements. H. Fabricators: The detailing standards shall describe the method for: <ul style="list-style-type: none"> a. Selection of connection type, connection geometry and connection material. b. Detailing holes, fasteners, washers, cuts and copes. c. Assignment of appropriate welding symbols (shop and field welds). d. Selecting bolt installation method (for shop-installed bolts). e. Showing surface preparation (including specification of surface finish). f. Designating coating requirements (including coating materials and dry film thickness). g. Showing any necessary special instructions to fabricate and erect the steel. I. Manufacturers: If applicable, illustrate information to be included on weld symbols and the preferred way to designate surface preparation and coating requirements. 			

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1.7.1.1	<p>Digital Document Production For digital <i>fabrication</i>, manufacturing, <i>erection</i>, and <i>installation documents</i>, the <i>documented procedure</i> for producing these documents shall identify the data, variables, graphics, calculating formulas, and other output as appropriate that are checked to determine that the software is functioning correctly.</p>			
1.7.2	<p>Checking The <i>fabricator</i> shall develop a <i>documented procedure</i> to provide for <i>checking</i> of the <i>fabrication</i> and <i>erection documents</i>. The <i>documented procedure</i> for <i>checking</i> of these documents shall describe the method used by the <i>fabricator</i> or its <i>subcontractor</i> to perform and record the final check to ensure compliance with <i>contract documents</i>. Records shall provide means for identification of the individual <i>checker</i> who performed the final check of each document.</p> <p>When detailing is performed by a subcontractor, the documented procedure shall define the extent of review required by management and the extent of checking required of received prior to submittal for approval.</p> <p>The <i>documented procedure</i> for <i>checking fabrication</i> and <i>erection documents</i> shall include comparison and compliance with project requirements.</p> <p>During the <i>checking</i> process, the following shall be verified:</p> <ul style="list-style-type: none"> (a) Geometry. (b) Use of connections as specified in the contract documents. (c) Appropriate notes are included. (d) Material usage as specified in the contract documents. (e) Shop bills contain all required information. (f) Use of appropriate and complete welding symbols. (g) Use of <i>coatings</i> and surface preparations as specified in the contract documents. (h) Proper representation on <i>erection drawings</i>, including the notation of any necessary instructions and depiction of details necessary to conduct the work in the field. (i) All information is accurately presented and in compliance with the <i>Code of Standard Practice</i> requirements. (j) All steel included in the <i>contract documents</i> has been detailed. 			
1.7.3	<p>Control of Approval Documents A documented procedure shall be developed for the control of approval documents and shall describe the method used to document owner approval of approval documents whether produced in-house or through a subcontractor.</p>			
1.7.4	<p>Shop Drawings Supplied by Others A documented procedure shall be developed for the approval of approval documents and shall describe the method used to document owner approval of approval documents released for fabrication whether produced in-house or through a subcontractor.</p>			

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1.7.5	<p>Management of Detailing The fabricator's staff or manufacturer's staff shall manage detailing. Responsibilities for detailing management shall include:</p> <ul style="list-style-type: none"> A. Overseeing the production of shop and erection drawings, including the work of subcontractors. B. Communicating with owners' representatives for design. C. Scheduling. D. Developing and maintaining company detailing standards and documented detailing procedures. E. Preparing and sending transmittals related to obtaining approval from the owner's designated representative for design or construction. F. Coordinating and incorporating construction requirements. G. Training of employed detailers and checkers. <p>Qualification requirements for detailing management personnel shall include experience in detailing and checking fabrication and erection documents that have been approved for a variety of structures representative of projects the fabricator or manufacturer provides.</p> <p>The fabricator or manufacturer shall determine and describe methods to demonstrate competence of detailing management personnel. Detailing management shall be familiar with the requirements of pertinent codes and specifications.</p>			
1.7.6	<p>Detailing Functions Personnel who perform detailing or checking of shop, manufacturing and erection drawings shall have experience in drawing projects similar to the projects the fabricator or manufacturer provides and shall have knowledge of applicable material specifications and of mill rolling practices as they affect the detailing of structural steel.</p> <p>Detailers in training shall work under the supervision of a trained detailer or checker.</p> <p>A qualified checker shall check the fabrication and erection documents prior to submittal for approval. Qualification requirements for checkers shall be defined and documented and include training and experience in connection selection. Demonstrated experience and competency of employed and subcontracted individuals performing final checks shall be documented by detailing management.</p>			
1.7.7	<p>Subcontract Services Subcontractors may be used for the following functions: detailing, connection shop standards, delegated connection design as applicable; checking of shop, manufacturing, and erection drawings; and training of detailers and checkers. The fabricator or manufacturer shall define and document the qualification and selection process for choosing subcontractors.</p>			
1.8	<p>CONTROL OF MANAGEMENT SYSTEM DOCUMENTS AND PROJECT DOCUMENTS</p>			
1.8.1	<p>Management System Documents A documented procedure shall be developed to control quality management system documents.</p>			

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1.8.1.1	<p>Quality Management System Documents Documents covered by this Section shall include, but not be limited to, the quality manual, and any documented procedures.</p>			
1.8.1.2	<p>Review and Approval Documents shall be reviewed and approved by the same function and authority level that authorized the original document.</p> <p>The function and authority levels that have responsibility for review and approval of internal standards and documented procedures shall be designated.</p> <p>The documented procedure shall describe the frequency and requirements for review and updating and establish a method to identify changes.</p>			
1.8.1.3	<p>Revision Control Revisions to quality management system documents shall be identifiable and there shall be a method for monitoring and identifying the latest revision.</p> <p>Revisions shall be reviewed for adequacy and approved by the same function and authority level that authorized the original document.</p> <p>Quality management system documents shall remain legible and easily identifiable.</p>			
1.8.1.4	<p>Access Documents shall be available and readily accessible to the personnel responsible for performing functions affecting the quality of the completed work.</p>			
1.8.1.5	<p>Communication Changes and revisions shall be communicated to the personnel responsible for performing functions affecting the quality of the completed work.</p>			
1.8.2	<p>Project Documents A documented procedure shall be developed to control project documents. Documents covered by this Section shall include, but not be limited to, contract documents, revised contract documents, shop drawings, erection drawings, RFIs, and any quality assurance documents received.</p>			
1.8.2.1	<p>Tracking Project documents and changes to project documents shall be tracked. Tracking information shall indicate, at a minimum, date of receipt, summary of issue, and ultimate disposition of the change, including distribution of the final decision to the appropriate parties. The documented procedure shall define methods for receipt and documentation of owner and general contractor requirements and fabricator -originated changes as they occur throughout the fabrication and detailing process. Requirements may be received in original contract documents; in subsequent telecommunications, letters, and related transmittals; and in change orders or contract addenda.</p> <p>The documented procedure shall require records (e.g., logs, files or master lists) that show receipt of change data, incorporation, issue, and distribution of approved and revised approval documents to the necessary departments and personnel at the fabricator's facility and necessary external organizations, subcontractors or suppliers.</p>			

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1.8.2.2	<p>Revision Control For project documents that the fabricator, erector or manufacturer produces, revisions shall be identifiable and there shall be a method for monitoring and identifying the latest revision.</p> <p>The documented procedure shall include provisions to prevent inadvertent use of obsolete documents.</p> <p>Project documents shall remain legible and easily identifiable.</p>			
1.8.2.3	<p>Access Project Documents shall be available and readily accessible to the personnel responsible for performing functions affecting the quality of the completed work.</p>			
1.8.2.4	<p>Communication Changes and revisions shall be communicated to the personnel responsible for performing functions affecting the quality of the completed work.</p>			
1.9	<p>MAINTENANCE OF QUALITY RECORDS A documented procedure shall be developed for the maintenance of quality records that provide for record identification, collection, storage and retrieval, retention, and disposition.</p>			
1.9.1	<p>Retention The documented procedure for the maintenance of quality records shall define the retention policy and provisions for the disposition of the records at the end of the retention period.</p>			
1.9.2	<p>Storage Quality records shall be stored in a manner that minimizes damage, deterioration or loss.</p>			
1.9.3	<p>Retrieval Quality records shall be accessible in a reasonable time frame.</p>			
1.10	<p>PURCHASING A documented procedure shall be developed to ensure that subcontractors and suppliers provide contracted services and materials conforming to project requirements.</p>			
1.10.1	<p>Purchasing Data <i>A documented procedure shall be developed that addresses purchasing documents. These documents shall describe subcontracted work, purchased materials and services ordered in written purchasing documents. These documents shall be provided to subcontractors and suppliers.</i> This information shall include, but shall not be limited to:</p> <ul style="list-style-type: none"> A. The type of service, material, class, grade, and other unique identification. B. The applicable specifications, drawings, process requirements, and inspection instructions and any witness points. C. Delivery instructions and date. D. Required quality reports, certified test reports, and certificates of compliance/conformance of purchased materials. 			

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1.10.2	<p>Selection of Subcontractors and Suppliers A documented procedure shall be developed that describes how the certified company conducts initial and ongoing evaluation of its subcontractors and suppliers.</p> <p><i>The procedure for the selection of subcontractors for fabrication, manufacturing, or erection shall include a provision that requires that these entities have current AISC Certification for the type of work that is being subcontracted when certification is required in the contract documents.</i></p> <p><i>The procedure shall also include provisions for obtaining approval to retain a subcontractor who is not certified on a project-specific basis from the owner, owner's designated representative for design, and the owner's designated representative for construction when certification is required in the contract documents.</i></p> <p>Subcontractors and suppliers shall be evaluated and selected on the basis of their ability to meet subcontract requirements, the management system requirements, the applicable requirements of this Standard, and the requirements of the approved construction documents and referenced standards.</p> <p>Management shall determine: A. Evaluation criteria. B. Reevaluation interval. C. Personnel involved in the evaluation process.</p> <p>Subcontractors and suppliers shall be evaluated via an audit or documented acceptable past performance. As a minimum, their quality and timely, proper delivery shall be part of the evaluation.</p>			
1.10.3	<p>Verification of Purchased Product, Materials and Services The documented procedure for verification shall identify the activities necessary for ensuring that purchased products, materials and services meet project requirements.</p>			
1.10.4	<p>Control of Customer-Furnished Work and Material If work or materials are furnished by the customer, the organization shall verify, store, and maintain them in an appropriate fashion. Customer-furnished work or material shall be protected to prevent use for other than its intended purpose. Any such work or material that is lost, damaged, or otherwise unsuitable for use shall be recorded and reported to the customer.</p>			
1.10.5	<p>Purchasing Records Purchasing documents, subcontractor and supplier qualification records, and records of the periodic evaluation of subcontractors and suppliers shall be maintained as required by Section 1.9.</p>			

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1.11	<p>MATERIAL IDENTIFICATION</p> <p>A documented procedure shall be developed for the identification. Records that provide a basis for material identification shall be maintained as required by Section 1.9.</p> <p>Structural steel material shall be identified as stated in the Code of Standard Practice, unless otherwise noted in the contract documents.</p> <p>Welding consumables shall be identified in accordance with the appropriate AWS specification and classification.</p> <p>Coating materials (excluding metallic coating) shall be identified on the container by, at a minimum, color (pigment description and federal standard number, or manufacturer's number), lot/batch number, ID/stock number, quantity of coating in container, date of manufacture, date of expiration, and manufacturer's name and address.</p> <p>Metallic coatings shall be identified by composition and the appropriate ASTM specification, including thermal spray coating.</p> <p>Fasteners shall be stored in containers identified by type, grade, size and lot number(s).</p> <p>Material traceability to corresponding MTRs is necessary only when specifically required by contract. The fabricator or manufacturer shall develop a documented procedure to maintain traceability, when required, of materials from the point of receipt and throughout the course of fabrication.</p>			
1.12	<p>PROCESS CONTROLS</p> <p>Documented procedures shall be developed for the processes necessary to produce a consistent, acceptable level of quality of the completed work in accordance with applicable codes and project requirements.</p> <p>Regardless if these processes are routinely performed, effective implementation of the following documented procedures is required as a minimum.</p>			
1.12.1	<p>Welding</p> <p>The documented procedure for welding shall be developed that addresses the management of:</p> <ul style="list-style-type: none"> A. WPSs. B. Preheat requirements. C. PQRs. D. Storage (including ovens) and identification requirements for welding consumables. E. Welder, welding operator, and tack welder qualifications and qualification test records in accordance with appropriate AWS requirements. F. Welder, welding operator, and tack welder performance records—to provide objective evidence that the “period of effectiveness” has not been exceeded and satisfactory performance is consistently achieved. G. Traceability of welds to the welders who produce them. <p>WPSs shall be in close proximity to and used by the welders, welding operators or tack welders.</p>			

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1.12.2	<p>Bolt Installation A documented procedure shall be developed for bolting. The procedure shall meet the requirements of the RCSC Specification for Structural Joints Using High-Strength Bolts and the requirements of approved construction documents and referenced standards. The documented bolting procedure shall include storage, pre-installation verification, installation, and inspection of fastener assemblies for snug-tightened, pretensioned and slip-critical joint types.</p>			
1.12.3	<p>Material Preparation for Application of Coatings The documented procedure for surface preparation shall support achievement of cleanliness and surface profile required by coating manufacturer recommendations, product data sheets, and contract documents.</p>			
1.12.4	<p>Coating Application The documented procedure shall support application and curing of coatings in accordance with manufacturer recommendations and product data sheets and with contract documents.</p>			
1.12.5	<p>Equipment Maintenance The documented procedure for equipment maintenance shall, at a minimum, define the evaluation of and preventive maintenance for equipment necessary to meet work quality and delivery requirements.</p>			
1.13	<p>INSPECTION AND TESTING A documented procedure for inspection and testing shall be developed to ensure that the completed work meets the requirements of the contract documents.</p> <p>The <i>procedure</i> shall define receipt, in-process, and final inspection of work furnished for a project. Work determined during inspection and testing to be nonconforming shall be addressed following the <i>nonconformance procedure</i> requirements in Section 1.1.5.</p> <p>When inspecting less than 100% of the work, the <i>procedure</i> shall describe the sampling plans for each type of inspection. The plans will adjust the level and frequency of inspection at any time the required level of quality is not met.</p>			
1.13.1	<p>Assignment of QC Inspections and Monitoring Qualification requirements for QC inspectors shall be defined and documented as required in Section 1.5.4. Production personnel may be assigned to QC inspection duties under the following conditions:</p> <ul style="list-style-type: none"> A. They are knowledgeable in proper inspection methods and acceptance criteria specified for the material or work they are inspecting and hold the required certification as applicable. B. They are aware of their responsibilities and are given time to perform them. C. They inspect other's work. D. Their inspections are monitored by qualified quality control personnel. 			

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1.13.2	<p>Receipt Inspection Materials received shall be compared to the purchase order requirements and the receiving documents.</p> <p style="color: red;">The receiver shall identify the material and quantity and check for visible shipping damages.</p>			
1.13.3	<p>In-Process Inspection Materials shall be inspected before the work begins. The fabricator, manufacturer or erector shall employ in-process inspection plans and practices for specified process requirements and inspection acceptance criteria that are not verifiable at final inspection or for which final inspection can hinder subsequent work. In-process inspection is appropriate for processes including, but not limited to, welding, bolting, coating surface preparation, and coating application, as applicable.</p> <p>Compliance with documented process control procedures shall be monitored.</p>			
1.13.3	<p>Final Inspection Final inspection shall be conducted. QC inspectors qualified and responsible for final inspection shall perform the final inspection of structural steel and metal components prior to shipping in the case of fabrication, or after the completion of work in the case of erection. Final inspections shall be recorded and maintained as required by Section 1.9.</p>			
1.13.4	<p>Inspection Records The procedure shall indicate what records and marks are used to document inspections. In-process inspections shall be verifiable until the final inspection of the piece.</p> <p>The quality records produced shall be filed and retained as defined in the procedure required by Section 1.9. Inspection records shall show what was inspected, the result of the inspection, and who performed the inspection.</p>			

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1.14	<p>CALIBRATION OF INSPECTION, MEASURING AND TEST EQUIPMENT</p> <p>A documented procedure shall be developed to calibrate and maintain inspection, measuring and testing equipment. The procedure shall define equipment calibration frequency. However, the volt/amp meters used to verify compliance with WPS parameters (may be welding machine volt and amp meters or auxiliary volt/amp meters) shall be calibrated at a minimum every 12 months, unless a more frequent interval is required. The procedure shall include provisions for:</p> <ul style="list-style-type: none"> A. A unique identifier for each piece of equipment. B. A list of equipment that requires calibration. C. Service use for each piece of equipment, including the required precision for the types of inspections, measurements or tests made. D. Calibration or adjustment instructions in accordance with the manufacturer's recommendations. E. Frequency of calibration or adjustment. F. Tracking calibrations, adjustments and repairs. G. Storage and handling of inspection, measuring, and test equipment to maintain accuracy and fitness for use. H. Identification of standards or certified equipment having a known valid relationship to internationally or nationally recognized standards used to calibrate each listed piece of equipment. Where such standards do not exist, the basis used for calibration shall be documented. I. The action to be taken when equipment does not meet the calibration requirements. This action includes disposition of the equipment and an evaluation of the impact to work that was measured using it. J. Method of preventing inadvertent use of uncalibrated equipment where calibration is required. <p>Calibration and adjustment history shall be available.</p> <p>Rented or borrowed equipment must be accompanied by a valid calibration certificate and is subject to the requirements of this Section. For equipment that is damaged, dropped, knocked over or functioning improperly, the procedure shall include provisions for prominently marking or tagging such equipment to preclude usage and removing the equipment from service until it can be recalibrated, adjusted, or repaired.</p> <p>Whenever the accuracy of inspection, measuring and test equipment is in question, proactive calibration shall occur, independent of the manufacturer's recommendations. The precision required of any piece of equipment shall be sufficient to satisfy the acceptance standards of the project specifications or industry standards.</p> <p style="color: red;">Records of calibration shall be maintained as required by Section 1.9.</p>			
1.15	<p>CONTROL OF NONCONFORMANCES</p> <p>A documented procedure shall be developed to identify and control nonconformances. Records of nonconformances shall be maintained as required by Section 1.9.</p>			
1.15.1	<p>Nonconformance with Management Systems</p> <p>A nonconformance related to the performance of the management system shall be documented to the detail level described by the procedure. These nonconformances may be identified by the management systems during external audits, or by quality assurance inspections.</p>			

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1.15.2	<p>Nonconforming Work The procedure for nonconforming work shall provide for identification, documentation, evaluation, treatment of nonconforming work, and notification of the relevant functions concerned. Nonconforming work may also be identified in a quality assurance inspection report. These reports, when received, become quality assurance inspection records.</p> <p>Nonconforming work shall be marked as soon as practical after it is discovered. Records shall be kept of the pieces affected, the nature of the nonconformance, the treatment selection, authorization, and reinspection results if applicable. The treatment of nonconforming work may include:</p> <ul style="list-style-type: none"> A. Redesign and rework, as approved by the responsible party, and as required in the contract documents. B. Repair, as approved by the responsible party, and as required in the contract documents. C. Use as-is, as approved by the responsible party, and as required in the contract documents. D. Scrap. <p>If the treatment is rework or repair, the result will be inspected per project requirements, as well as per the quality control process.</p>			

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1.16	<p>CORRECTIVE ACTION</p> <p>A documented procedure shall be developed for corrective action to improve quality. Any corrective action taken shall be to the degree appropriate to the magnitude of problems and commensurate with the risks to quality. The documented procedure shall include periodic review of records or summaries of nonconformances and of internal and external quality audit reports for determination and initiation of corrective actions. The documented procedure shall address these steps:</p> <ul style="list-style-type: none"> A. Document a corrective action request (CAR) that includes the nonconformance to be addressed by the corrective action and the requirement that has not been met. The procedure shall define the functional positions authorized to issue a CAR and initiate the corrective action process. B. Assign responsibility and establish a time frame for the response to a CAR. C. Investigate and document the scope of the nonconformance, root causes, corrective measures taken, and list the actions to be taken to prevent recurrence. D. Communicate the corrective action request and resolution to executive management and appropriate members of the organization. E. Follow up the corrective action taken with periodic monitoring to assure the corrective action is implemented and is effective. <p>Corrective action shall be applied when:</p> <ul style="list-style-type: none"> A. There is a nonconformance that is repetitive in nature as identified by periodically reviewing nonconformance reports or summaries for negative trends. B. Process nonconformances are found during the internal and external quality audits indicating that the quality management systems may not be implemented and functioning as stated in the quality manual. C. Nonconformance with the quality management system is found during the day-to-day execution of the system. D. Nonconformance is unacceptable as determined by management. E. A customer complaint has been investigated and corrective action has been determined necessary. <p>Records of corrective actions shall be maintained as required by Section 1.9</p>			
1.17	<p>HANDLING, STORAGE AND DELIVERY OF MATERIALS, FABRICATED WORK, AND COMPONENTS</p> <p>Materials, fabricated work, and components shall be stored, and shipped to avoid damage and deterioration as required by the Code of Standard Practice. Materials, fabricated work, and components shall be protected to prevent use in other than its intended purpose. Any such material that is lost, damaged, or otherwise unsuitable for use shall be recorded and reported as appropriate.</p>			

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1.18	<p>TRAINING Personnel responsible for functions that affect quality, including, but not limited to, project managers, field/shop supervisors, detailers, inspectors, welding personnel, fitters, painters, riggers, signal persons, and crane operators, shall receive appropriate initial and periodic documented training. Personnel providing training shall have appropriate training or experience in the subject they are teaching. Training course outlines include the subject and the key points.</p> <p style="color: red;">Evaluation of trainee comprehension of course material and <i>documentation of successful completion is required.</i></p> <p style="color: red;">Training records shall be maintained as required by Section 1.9.</p>			
1.19	<p>INTERNAL AUDIT A documented procedure shall be developed for the control and management of internal audits. An internal audit of each section of the quality management system shall be performed at least once a year to evaluate the compliance and the effectiveness of implementation. Different parts of the management systems may be audited at different times and different frequencies, provided all sections of the management systems are audited annually. The management representative or a qualified individual, independent of the function being audited, shall perform the audit, and produce a written record of the audit result from each section.</p> <p style="color: red;">Records of Internal audits shall be maintained as required by Section 1.9.</p>			
	<p>CHAPTER 2 BUILDING FABRICATOR REQUIREMENTS</p>			
2.3	<p>References The ability to work to and meet the requirements of the latest edition of the following documents shall be demonstrated:</p> <ul style="list-style-type: none"> (a) ANSI/AISC 360 Specification for Structural Steel Buildings. (b) ASTM F3125/F3125M Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength. 			
2.5.4.2	<p>Buildings, Workspace, Equipment and Associated Utilities A fabrication facility shall consist of areas and buildings that provide space for the routine functions considered to be part of steel fabrication. The work areas and buildings (including housekeeping, ventilation and clean air supply, and electrical supply) shall be conducive to achieving consistent quality work. The fabricator shall have under their control the equipment and software necessary to perform fabrication and inspection consistent with the contract documents.</p>			
	<p>CHAPTER 3 METAL COMPONENT MANUFACTURER REQUIREMENTS</p>			
3.3	<p>References The ability to work to and meet the requirements of the latest edition of the following documents shall be demonstrated:</p> <ul style="list-style-type: none"> A. ANSI/AISC 360 Specification for Structural Steel Buildings B. AASHTO/ASTM standards applicable to the component manufacturer's product and/or contract documents (for verification purposes) 			

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3.5.4.2	<p>Buildings, Workspace, Equipment and Associated Utilities</p> <p>A manufacturing facility shall consist of areas and buildings that provide space for routine functions considered part of component manufacturing. Work areas and buildings shall be conducive to achieving consistent work quality. The manufacturer shall have under their control the equipment and software necessary to perform manufacturing and inspection consistent with the specifications and standards applicable to the work.</p>			
3.7.8	<p>Design Procedure</p> <p>Where component design is provided by the manufacturer, a documented procedure shall be developed to define the design process. The procedure shall describe steps in the design development, review and verification phases of the process. The procedure shall:</p> <ul style="list-style-type: none"> A. Define methods for determining component requirements from contract documents, customer and industry input, regulatory and code requirements, and similar component designs. B. Define a design review process to identify and propose solutions for nonconformances. Identify the individuals responsible and keep records of the design review process. C. Define methods to identify, document, evaluate and approve design changes before implementation. Keep records of all documents. D. Describe a means for validating the function of the resulting component with respect to intended uses and identified component requirements. Identify individuals responsible and keep records of the validation process. 			
3.7.9	<p>Design for Standard Components</p> <p>For standard components not specific to any one project, the manufacturer shall have on file and available to the customer a set of design calculations reviewed and prepared and sealed by a registered design professional to signify that the designed component meets the current applicable code requirements for its intended use. Any design tables or design processes published with the component literature shall also be reviewed and stamped by a registered design professional. Manufacturing documents for these components shall include a statement that the component details are based on designs that have been reviewed and stamped by a registered design professional and are on file with the manufacturer.</p>			
3.7.10	<p>Design for Nonstandard Components</p> <p>For components that are job specific, the manufacturer shall retain the services of a registered professional to prepare and seal the site-specific design of the component. The registered professional shall also review the manufacturing documents produced for the component and verify their consistency with the design. The results of this review shall be indicated on the component manufacturing drawings.</p>			
	<p>CHAPTER 4 BRIDGE FABRICATOR REQUIREMENTS</p>			

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4.2	<p>Scope This Standard establishes three categories of bridges: simple, intermediate and advanced. Fabricators producing intermediate bridges, advanced bridges, or fracture-critical members shall be required to meet supplemental requirements in Chapters 4.I, 4.A and 4.F, as applicable.</p> <p>Bridge Category Descriptions: Simple bridges consist of unspliced rolled sections.</p> <p>Intermediate bridges are typical bridges that do not require extraordinary measures.</p> <p>Advanced bridges are more complex bridge structures than simple or intermediate bridges, and they require a higher level of <i>fabrication</i> expertise.</p>			
4.3	<p>References The ability to work to and meet the requirements of the latest edition of the following documents shall be demonstrated:</p> <ul style="list-style-type: none"> A. AASHTO/AWS D1.5 Bridge Welding Code B. ASTM F3125/F3125M Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength 			
4.5.4.1	<p>Personnel In addition to the requirements in Section 1.5.4, the following additional qualification requirements shall apply:</p> <ul style="list-style-type: none"> A. For production and QA management functions, at least five years steel fabrication experience or training. B. For QC and purchasing management functions and for detailing checkers, at least three years steel fabrication experience or training. <p>The fabricator shall have the following personnel on staff or available under contract, who are certified in accordance with the fabricator's NDT program:</p> <ul style="list-style-type: none"> A. At least one Certified Level III NDT administrator for each NDT method performed in the shop. B. At least one Certified Level II technician for each NDT method performed in the shop. <p>The fabricator shall have documented procedures for certifying and updating NDT personnel. Alternately, the <i>fabricator's documented procedures</i> shall describe how they review the methods and/or written practice of contractors as suitable to subcontract to their organization.</p> <p>The fabricator shall have enough AWS Certified Welding Inspectors (or other personnel as permitted by AWS D1.5 clause 6.1.3, "Inspection Personnel Qualification") to monitor all shifts on which welding is performed.</p> <p>The fabricator shall have a competent welding technician on staff. The welding technician shall have extensive knowledge and experience with or education in welding processes, procedures, and equipment and with the development, preparation, qualification and execution of welding procedure specifications.</p>			

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4.5.4.2	<p>Buildings, Workspace, Equipment and Associated Utilities A fabrication facility shall consist of areas and buildings that provide space for the routine functions considered to be part of steel bridge fabrication. The work areas and buildings (including housekeeping, ventilation and clean air supply, and electrical supply) shall be conducive to achieving consistent quality work. The fabricator shall have under their control the equipment and software necessary to perform fabrication or manufacturing and inspection consistent with the contract documents.</p>			
4.7.8	<p>Preparation of Fabrication and Erection Documents Fabrication and erection documents shall incorporate all contract requirements, specifications, codes and relevant standards to adequately procure materials, fabricate the structure or manufacture the component, and erect the structure. To ensure this, a documented procedure for preparation these documents shall be developed, which describes:</p> <ul style="list-style-type: none"> A. How project requirements are reviewed and incorporated. B. How the fabricator coordinates, proposes changes, and tracks information with the general contractor or owner (e.g., change orders and RFIs), and how the associated resolutions are tracked and controlled. 			
4.11.1	<p>Traceability The <i>fabricator's documented procedures</i> for identification of material and for material traceability shall include provisions for maintaining heat and <i>MTR</i> identity material throughout the <i>fabrication</i> process.</p>			
4.12.2	<p>Bolt Installation The <i>documented procedure</i> for bolting shall meet the S4 supplementary requirement for rotational capacity testing as required by ASTM F3125/F3125M.</p>			
CHAPTER 4.I SUPPLEMENTAL REQUIREMENTS FOR FABRICATORS OF INTERMEDIATE BRIDGES				
4.I	<p>The requirements in Chapter 4.I shall apply in addition to the requirements in Chapter 4, except where noted. Eligible fabricators shall have either:</p> <ul style="list-style-type: none"> A. Supplied plate girder spans with field splices for highway or railroad bridges within the last five years, or B. Established a documented training program for the purpose of communicating intermediate bridge work functions to the work forces, and demonstrated capability to fabricate intermediate bridges. Training shall include detailing, purchasing, and project management functions. 			
4.1.5.4.2	<p>Buildings, Workspace, Equipment and Associated Utilities Equipment shall include automatic, mechanized or semiautomatic welding equipment.</p>			
4.1.7.1	<p>Detailing Standards The detailing standards shall define the fabricator's method for presenting information on shop assembly (blocking) drawings.</p>			
4.1.7.6	<p>Detailing Functions Detailing personnel shall have an understanding of bridge geometry, including, but not limited to, vertical and horizontal alignment, cross-slope, and roadway transitions.</p>			

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4.1.12.6	<p>Laydown/Assembly The fabricator's documented procedure for shop assembly of field connections shall include, at a minimum, the following items:</p> <ul style="list-style-type: none"> A. Provisions for control of assembled dimensions for both vertical and horizontal geometry. B. Provisions for control of accuracy of drilling and reaming of field connections. C. Documented procedures, including reference drawings, for matchmarking shop-assembled pieces. D. Provisions for assuring the accuracy of numerically controlled equipment, if contract documents permit the use of such equipment in lieu of physical assembly. 			
	<p>CHAPTER 4.A SUPPLEMENTAL REQUIREMENTS FOR FABRICATORS OF ADVANCED BRIDGES</p>			
4.A	<p>The requirements in Chapter 4.A shall apply in addition to the requirements in Chapter 4, except where noted. The fabricator shall have either:</p> <ul style="list-style-type: none"> A. Supplied advanced bridges for highway or railroad applications within the last five years, or B. Supplied intermediate bridges for highway or railroad use within the last five years, established a documented training program for the purpose of communicating advanced bridge work functions to the work forces, and demonstrated capability to fabricate advanced bridges. <p>Fabricators of advanced bridges shall also meet the supplemental requirements of Sections 4.1.5, 4.1.7 and 4.1.12.</p>			
4.A.6	<p>Construction Document Review and Communication The fabricator's documented procedure shall include a process for communicating with individuals in the fabricator's organization, the general contractor, and the owner regarding special fabrication -related requirements for advanced bridges, including:</p> <ul style="list-style-type: none"> A. Shop assemblies. B. Dimensional control and verification. C. Welding. D. NDT. E. High-performance materials. F. Erection considerations. G. Other atypical or special job requirements. <p>Decisions made in the process of these communications shall be recorded, approved by the appropriate parties (if applicable), and the record shall be distributed to the appropriate parties. This distribution shall be controlled in accordance with Sections 1.6 and 1.8.</p>			
4.A.12.1	<p>Welding The fabricator's documented procedure for welding shall include a distortion control program.</p>			
	<p>CHAPTER 4.F SUPPLEMENTAL REQUIREMENTS FOR FABRICATORS OF FRACTURE CRITICAL MEMBERS</p>			

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4.F	The requirements in Chapter 4.F shall apply in addition to the requirements in Chapter 4, except where noted. The fabricator shall have either: <ul style="list-style-type: none"> A. Supplied fracture-critical members in accordance with AWS D1.5 within the last five years, or B. Established a documented training program for the purpose of communicating fracture-critical work functions to the work forces, and demonstrated capability to fabricate fracture-critical members. 			
4.F.5.7	Quality Manual The quality manual shall include or reference a written fracture control plan meeting the requirements of AWS D1.5.			
4.F.7.1	Detailing Standards The detailing standards for preparation of bills of material shall include whether the material is to be used for fracture-critical applications. The detailing standards for the fabricator's shop and erection framing drawings shall define the manner of identifying fracture-critical welds.			
4.F.10.1	Purchasing Data The fabricator's written purchasing documents shall identify material to be used for fracture-critical applications.			
4.F.11	Material Identification The fabricator's documented procedures for identification of material and for material traceability shall include provisions for maintaining heat and MTR identity of fracture-critical material throughout the fabrication process. The <i>procedure</i> shall address how fracture-critical material is identified at receipt and throughout <i>fabrication</i> by unique mill piece or plate number. Further, the <i>procedure</i> shall also address how consumables purchased for fracture-critical welding are identified.			
4.F.12.1	Welding The fabricator's documented procedure for welding shall include: <ul style="list-style-type: none"> A. PQRs for fracture-critical WPSs. B. Fracture-critical provisions for welding procedure qualification, preheat, and storage of consumables. 			
4.F.13	Inspection and Testing The fabricator's documented procedure shall include provisions for inspection of fracture-critical welds.			
4.F.15.2	Nonconforming Work The fabricator's documented procedure shall include provisions for critical and noncritical repairs of fracture-critical welds in accordance with AWS D1.5.			
	CHAPTER 5 ERECTOR REQUIREMENTS			

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5.3	<p>References The ability to work to and meet the requirements of the latest edition of the following documents shall be demonstrated:</p> <ul style="list-style-type: none"> (a) ANSI/AISC 360 Specification for Structural Steel Buildings. (b) ASTM F3125/F3125M Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength. 			
5.5.4.3	<p>Erection Tools and Equipment The erector shall have under their control the tools and equipment necessary to perform the work, and the tools and equipment shall be maintained at the level necessary to produce the required quality.</p>			
5.12.3	<p>Material Preparation for Application of Coatings The following requirements apply for <i>erectors</i> in lieu of the requirements provided in Section 1.12.3. When the <i>erector's</i> work includes <i>coating</i> application or touch-up of <i>coatings</i>, the <i>documented procedure</i> for material preparation shall support achievement of cleanliness and the surface profile required by <i>coating manufacturer</i> recommendations, product data sheets, and <i>contract documents</i>, as applicable.</p>			
5.12.4	<p>Coating Application The following requirements apply for <i>erectors</i> in lieu of the requirements provided in Section 1.12.4. When the <i>erector's</i> work includes <i>coating</i> application or touchup of <i>coatings</i>, the <i>documented procedure</i> for <i>coating</i> application shall support achievement of proper application and curing of <i>coatings</i> in accordance with <i>manufacturer</i> recommendations, product data sheets, and <i>contract documents</i>, as applicable.</p>			

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5.12.6	<p>Erection Plan</p> <p>The erector shall prepare an erection plan for every project. The erection plan, in whole or in part, may be described graphically or in text. The erection plan shall include the following information as appropriate for the project:</p> <ul style="list-style-type: none"> A. Project name and location. B. Indication of access for material delivery and equipment delivery, including lay-down, shake-out, and field- assembly areas. C. Sequence of erection. D. Dimensions and locations of cranes or other lifting equipment. E. Required site conditions for the crane location and confirmation of adequate base support for the crane. F. Sizes, model names or numbers, and capacity charts for lifting equipment. G. Information regarding the heaviest lift and its radius; the longest radius and its lift weight; and the boom configuration for each at every location of the lifting equipment. H. Indicate critical lifts, if any, and include the critical lift protocol or procedure. I. Requirements for multi-lift rigging. J. Types of slings to be used and, if more than one type, the locations in which they will be used. K. Rigging information for atypical lifts (weight, geometry, center of gravity, etc.) such as slings and hardware, rated lifting beams, beam clamps (including catalog cuts), as applicable to the lift. L. Designation of crane paths from position to position, indicating load travel paths, swing restrictions, and personnel exclusion zones. M. Designation of space required for field assembly prior to erection. N. Identification of special fastening sequences and/or methods. O. Identification of special or atypical connections. P. Traffic control notes. Q. Identification of specification requirements for erection , such as plumbing tolerances smaller than those stipulated in the Code of Standard Practice. R. The stability of the structure and individual members during erection shall be checked in accordance with Section 7.10.3 of the Code of Standard Practice . S. Falsework requirements and corresponding design calculations. T. Jacking layout and jacking procedure. U. Notation of special problems due to overhead restrictions, underground utilities, barriers to crane tail swing, etc. <p>The erection plan shall be reviewed before the start of erection by the erector’s project management team and be available to all employees assigned to the project. All revisions shall be approved by the site superintendent and communicated to affected personnel at the time of the revision.</p> <p>In accordance with the Code of Standard Practice and contract documents, the erector shall have documentation or other evidence that the required information in Section 7.10 of the Code of Standard Practice has been provided</p>			
SEISMIC ERECTION ENDORSEMENT				

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5.3.1	For the erection of structures requiring the use of ANSI/AISC 341, Seismic Provisions for Structural Steel Buildings, the erector shall have available and demonstrate the ability to work to and meet the requirements of: (a) ANSI/AISC 341 Seismic Provisions for Structural Steel Buildings (b) AWS D1.8 Structural Welding Code—Seismic Supplement			
	METAL DECK INSTALLATION ENDORSEMENT			
5.3.2	When the erector's work includes the installation of metal deck, the erector shall have available and demonstrate the ability to work to and meet the requirements of ANSI/SDI QA/QC Standard for Quality Control and Quality Assurance for Installation of Steel Deck. Instructions for metal deck installation shall be provided in the erection plan. (a) AWS D1.3 Structural Welding Code—Sheet Steel			
	BRIDGE ERECTION ENDORSEMENT			
5.3.3	For the erection of bridges, the erector shall have available and demonstrate the ability to work to and meet the requirements of: (a) AASHTO/AWS D1.5 Structural Welding Code—Bridge Welding Code			
	CHAPTER 6 HYDRAULIC METAL STRUCTURES FABRICATOR REQUIREMENTS			
6.2	Scope This Standard establishes two categories of hydraulic metal structures: standard and advanced. <i>Fabricators</i> producing standard hydraulic metal structures shall be required to meet the requirements in Chapter 6 and may be required to meet supplemental requirements in Chapter 6.F. <i>Fabricators</i> producing advanced hydraulic metal structures shall be required to meet the requirements in Chapter 6 and the supplemental requirements in Chapters 6.A. and 6.F. Hydraulic Metal Structure category descriptions: Standard hydraulic metal structures are those that do not require sophisticated measures such as specialized equipment and techniques for geometric control, machining, welding, and handling. Advanced hydraulic metal structures are those requiring sophisticated measures in <i>fabrication</i> and <i>erection</i> , particularly with regard to size, curvature, plate thickness, distortion, machining, <i>fabrication</i> access, geometric tolerances, and constraint conditions.			
6.3	References The ability to work to and meet the requirements of the latest edition of the following documents shall be demonstrated: (a) ANSI/ASNT CP-189 <i>Standard for Qualification and Certification of Nondestructive Testing Personnel</i> , or ASNT <i>Recommended Practice No. SNTTC-1A Personnel Qualification and Certification in Nondestructive Testing</i> (b) ASTM F3125/F3125M <i>Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength</i>			

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Ref#	Criteria	MS Ref	Audit Findings	Results
6.5.4.1	<p>Personnel</p> <p>The following qualification requirements shall apply:</p> <ul style="list-style-type: none"> (a) For production and QA management functions, at least five years of <i>fabrication</i> experience or <i>training</i>. (b) For QC and purchasing management functions and for <i>detailing checkers</i>, at least three years of <i>fabrication</i> experience or <i>training</i>. <p>The <i>fabricator</i> shall have the following personnel on staff or available under contract that are certified in accordance with the <i>fabricator's</i> NDT program:</p> <ul style="list-style-type: none"> (a) At least one Certified NDT Level III for each NDT method performed in the shop. (b) At least one Certified NDT Level II for each NDT method performed in the shop. <p>The <i>fabricator</i> shall have <i>documented procedures</i> for certifying and updating NDT personnel employed by the <i>fabricator</i>. Alternately, the <i>fabricator's</i> <i>documented procedures</i> shall describe how they review the methods and/or written practice of firms as suitable to subcontract to their organization.</p> <p>The <i>fabricator</i> shall have an individual on staff that has knowledge and experience with:</p> <ul style="list-style-type: none"> (a) Welding processes, <i>procedures</i>, welding equipment, and welder performance qualifications. (b) Development, preparation, qualification, and execution of welding <i>procedure specifications</i>. <p>In addition, the <i>fabricator</i> shall have AWS Certified Welding Inspectors (or other personnel as permitted by AWS D1.1/D1.1M, "Qualification of Inspection Personnel") available to monitor all shifts on which welding is performed.</p>			
6.5.4.2	<p>Buildings, Workspaces, Equipment, and Associated Utilities</p> <p>A <i>fabrication</i> facility shall consist of areas and buildings that provide adequate space for the routine functions considered to be part of hydraulic metal structure <i>fabrication</i>. The work areas and buildings (including housekeeping, ventilation and clean air supply, and electrical supply) shall be conducive to achieving consistent quality work. The <i>fabricator</i> shall have under their control the equipment and software necessary to perform <i>fabrication</i> and inspection consistent with the <i>contract documents</i>.</p> <p>Equipment shall include automatic, mechanized, or semiautomatic welding equipment.</p>			

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Ref#	Criteria	MS Ref	Audit Findings	Results
6.6	<p>Construction Document Review and Communication</p> <p>The <i>fabricator's documented procedure</i> shall include a process for communicating with individuals in the <i>fabricator's</i> organization, the general contractor, and the owner regarding special <i>fabrication</i>-related requirements for hydraulic metal structures, including:</p> <ul style="list-style-type: none"> (a) Shop assemblies (b) Dimensional control and <i>verification</i> (c) Welding (d) <i>NDT</i> (e) High-performance materials (f) <i>Erection</i> and installation considerations (g) Other atypical or special job requirements <p>Decisions made in the process of these communications shall be approved by and distributed to the appropriate parties. This distribution shall be controlled in accordance with Sections 1.6 and 1.8.</p>			
6.7.1	<p>Detailing Standards</p> <p>The <i>detailing</i> standards shall define the <i>fabricator's</i> method for presenting information on shop <i>assembly</i> (blocking) documents or other <i>fabrication documents</i>.</p>			
6.7.6	<p>Detailing Functions</p> <p><i>Detailing</i> personnel shall have an understanding of geometry, machining methods and finishes, dimensioning formats, final tolerances, and materials related to the <i>fabrication</i> of the type of hydraulic projects the <i>fabricator</i> may undertake.</p>			
6.7.8	<p>Preparation of Fabrication Documents</p> <p>Any <i>fabrication documents</i> shall incorporate all contract requirements, <i>specifications</i>, codes, and relevant standards to procure materials and fabricate the structure. To ensure this, a <i>documented procedure</i> for preparation of <i>fabrication documents</i> shall be developed, which describes:</p> <ul style="list-style-type: none"> (a) How project requirements are reviewed and incorporated. (b) How the <i>fabricator</i> coordinates, proposes changes, and tracks information with the general contractor or <i>owner</i> (e.g., change orders and <i>RFIs</i>) and how the associated resolutions are tracked and controlled. 			
6.12.1	<p>Welding</p> <p>The <i>documented procedure</i> for welding shall include welding of dissimilar metals.</p> <p><i>WPSs</i> and supporting <i>PQRs</i> shall be available for the dissimilar metals to be joined, including those not addressed by AWS D1 welding codes.</p>			
	<p>CHAPTER 6.A</p> <p>ADVANCED HYDRAULIC METAL STRUCTURES FABRICATOR REQUIREMENTS</p>			
6.A.3	<p>References</p> <p>The ability to work to and meet the requirements of the latest edition of ASTM F3125/F3125M <i>Standard Specification for High Strength Structural Bolts</i> shall be demonstrated.</p>			

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6.A.5.4.1	Personnel The <i>fabricator</i> shall have AWS Certified Welding Inspectors present to monitor all shifts on which welding is performed. Alternate qualifications described in AWS D1.1, "Qualification of Inspection Personnel," are not permitted for <i>fabricators</i> of advanced hydraulic metal structures.			
6.A.12.1	Welding The <i>fabricator's documented procedure</i> for welding shall include provisions for distortion control.			
6.A.12.2	Bolt Installation The <i>documented procedure</i> for bolting shall meet the S4 supplementary requirements for rotational capacity testing as required by ASTM F3125/F3125M <i>Standard Specification for High Strength Structural Bolts</i> .			
6.A.12.6	Trial Assembly The <i>fabricator's documented procedure</i> for trial assembly of field connections shall include, at a minimum, the following items: (a) Provisions for control of assembled dimensions. (b) Provisions for control of accuracy of drilling and reaming of shop connections. (c) <i>Documented procedures</i> , including reference drawings, for match-marking shop-assembled pieces. (d) Provisions for assuring the accuracy of numerically controlled equipment, if <i>contract documents</i> permit the use of such equipment in lieu of physical assembly.			
6.A.12.7	Machining A <i>documented procedure</i> shall be developed for machining, whether it is performed by the <i>fabricator</i> or a <i>subcontractor</i> .			
	CHAPTER 6.F FABRICATORS OF FRACTURE-CRITICAL MEMBERS OF HYDRAULIC METAL STRUCTURES REQUIREMENTS			
6.F.3	References The ability to work to and meet the requirements of the latest edition of AASHTO/AWS D1.5M/D1.5 <i>Bridge Welding Code</i> shall be demonstrated.			
6.F.5.7	Quality Manual The <i>quality manual</i> shall include or reference a written fracture control plan (FCP).			
6.F.7.1	Detailing Standards The <i>detailing</i> standards for preparation of bills of material shall include how fracture-critical members (FCM) are identified in bills of material. FCM shall be individually identified. The <i>detailing</i> standards shall define the manner of identifying fracture-critical welds.			
6.F.10.1	Purchasing Data The <i>fabricator's</i> written purchasing documents shall identify material to be used for fracture-critical applications.			

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6.F.11	<p>Material Identification</p> <p>The <i>fabricator's documented procedures</i> for identification of material and for material traceability shall include provisions for maintaining heat and <i>MTR</i> identity of fracture-critical material throughout the <i>fabrication</i> process. The <i>procedure</i> shall address how fracture-critical material is identified at receipt and throughout <i>fabrication</i> by unique mill piece or plate number. Further, the <i>procedure</i> shall also address how consumables purchased for fracture-critical welding are identified.</p>			
6.F.12.1	<p>Welding</p> <p>The <i>fabricator's documented procedure</i> for welding shall include:</p> <ul style="list-style-type: none"> (a) Fracture-critical provisions for welding <i>procedure</i> qualification, preheat, and storage of consumables. (b) Provisions for the creation and implementation of a FCP. The FCP shall be in accordance with the requirements of AASHTO/AWS D1.5M/D1.5 <i>Bridge Welding Code</i>, "AASHTO/AWS Fracture-Control Plan (FCP) for Nonredundant Members," with the following modifications: <ul style="list-style-type: none"> 1) All instances of the word "bridge" shall be replaced with "hydraulic structure." 2) The first sentence of the section, Certification and Qualification, shall be omitted. 			
6.F.13	<p>Inspection and Testing</p> <p>The <i>fabricator's documented procedure</i> shall include provisions for inspection and testing of fracture-critical welds.</p>			
6.F.15.2	<p>Nonconforming Work</p> <p>The <i>fabricator's documented procedure</i> shall include provisions for critical and noncritical <i>repairs</i> of fracture-critical welds in accordance with AASHTO/AWS D1.5M/D1.5.</p>			
SPE/QP3	<p>SUPPLEMENTAL REQUIREMENTS FOR SHOP APPLICATION OF COMPLEX PROTECTIVE COATING SYSTEMS – 420-10</p>			
1.5.4 CCE	<p>5.2.2 Buildings, Workspace and Associated Utilities</p> <p>The Firm shall have a location at which surface preparation, painting, and curing is conducted. The Firm shall also provide protection of stored paint, blasted products, and curing products from deterioration or damage. Regardless of whether the firm has two distinct areas, for cleaning and painting operations, or one single area for the entire painting process, the Firm must be able to describe the methods employed to control the ambient conditions in these areas, and prevent contamination of the cleaning, application and curing process.</p>			
1.12.5 CCE	<p>5.2.3 Process Equipment</p> <p>The Firm shall own or control painting and blasting equipment capable of executing the sophisticated painting process. The required equipment must be present at the facility and must be operable during the onsite audit at the facility that holds the endorsement. This does not preclude the endorsement holder from subcontracting sophisticated painting work to a certified SPE or QP3 entity when the Firm's own capacity is engaged.</p>			

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1.5.7 CCE	<p>5.3.5 Project List An up to date project listing that shows a sampling of the most current projects within the last three years shall be documented and maintained. This list shall demonstrate the knowledge level of the Firm by listing the:</p> <ul style="list-style-type: none"> ● Project name ● Project size (e.g., tons, square feet, etc.) ● Dates work was performed. ● Surface preparation (e.g., SP-5, SP-6, SP-7, SP-10) ● Painting system information (e.g., three coat epoxy or two coat urethane). <p>Firms seeking initial certification (or recertification after a lapse in certification) to the Sophisticated Painting Endorsement shall demonstrate capability by painting a steel member or component using a customer specification of their choice on the day of the initial audit. The item can be for a project that may or may not require a sophisticated painting system.</p> <ul style="list-style-type: none"> ● Fabricators shall choose a shape with a minimum length of 20 ft that either has or simulates at least one bolted connection or bolted clip and one stiffener with a snipe. ● Component manufacturers must paint a complete unit. 			
1.6 CCE	<p>7. Coating System Communication A document (e.g., drawings, travelers, or quality plans) shall be used to communicate throughout the organization:</p> <ul style="list-style-type: none"> ● Surface preparation (including specification of surface finish), ● Paint type ● Dry film thickness requirements ● Step backs ● Masking ● No-paint zones. 			
1.10.1 CCE	<p>10.2 Purchasing Data The Firm shall clearly describe subcontracted work and the purchased products, materials and services ordered in purchasing documents. This shall include, but not limited to:</p> <ul style="list-style-type: none"> ● The type of service, material, and other unique identification ● The applicable specifications, drawings, process requirements, inspection instructions and any witness points ● Delivery instructions ● Certificate of Compliance/Conformance/Analysis ● Painting manufacturers' product data sheets (for paint products) 			
1.10.2 CCE	<p>10.3 Quality and Evaluation of Subcontractors The Firm shall evaluate and select subcontractors on the basis of their ability to meet:</p> <ul style="list-style-type: none"> ● Subcontract requirements ● Project requirements ● Specific inspection requirements. <p>When required by the contract, the selected subcontractor shall have either this AISC Sophisticated Painting Endorsement or SSPC-QP3 certification. The Customer or specifier shall approve (in writing) any subcontracted entity that does not have this AISC Sophisticated Painting Endorsement or SSPC-QP3 certification on projects requiring this Endorsement.</p>			

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Ref#	Criteria	MS Ref	Audit Findings	Results
1.11 CCE	<p>11. Material</p> <p>11.1 Container</p> <p>Material identification on the paint container shall be identified as a minimum by color (pigment description and federal standard number, or manufacturer's number), lot/batch number, ID/stock number, and quantity of paint in container, date of manufacture and manufacturer's name and address.</p>			
1.17 CCE	<p>11.2 Storage</p> <p>Materials shall be stored in protected areas under conditions (including temperature) per manufacturers' recommendations. Paint with expired shelf life shall be segregated from current material and/or specifically marked as 'expired' by the Firm. Waivers from customers obtained to use out of date materials shall be documented.</p> <p>Alternatively, expired paint can be retested and used without waiver. In the event the Firm obtains written authorization from the manufacturer to extend the shelf life, the owner shall be notified in writing.</p>			
1.10.3 CCE	<p>11.3 Certificate of Conformance for Paint— Requirements</p> <p>This quality record shall validate the attributes of the specific batch for the attributes in the specification of the paint system. This includes the paint, thinner catalyst/activator, and primer. Attributes address the composition and testing requirements for the specific coating as established by the paint manufacturer and any applicable ASTM requirements. At a minimum, the Certificate of Conformance issued by the manufacturer on the manufacturer's stationery shall contain:</p> <ul style="list-style-type: none"> • The name of the manufacturer • The product name and/or catalog number • The batch number • The date of the manufacture • A statement that the product complies with the specifications contained in the manufacturer's product data sheet based on applicable test methods. <p>The Certificate of Conformance shall be retained by the Firm as part of its quality records.</p>			
1.12 CCE	<p>12. Process Control</p> <p>The Firm shall document procedure(s) necessary to produce a consistent acceptable level of quality of the required painting process. Procedure(s) addressing surface preparation, paint application, equipment maintenance are required. (as described in the sub-elements of this element.)</p>			
1.12.3 CCE	<p>12.1 Surface Preparation</p> <p>Surfaces to be painted shall be prepared in accordance with the paint manufacturer recommendations. The degree of cleaning shall be in accordance with these recommendations, the project specifications, and other nationally/internationally recognized standard or guidelines. There shall be evidence that the procedures have been effective in controlling open nozzle abrasive blasting and other airborne materials to the degree that the quality of other paint application and/or curing operations are not affected. (Also see Paragraph 5.2.2)</p>			

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1.12.4 CCE	<p>12.2 Paint Application The application of paint shall be in accordance with the manufacturer recommendations. The procedure shall be effective in demonstrating that the:</p> <ul style="list-style-type: none"> • Manufacturer's required conditions are maintained during application, and that Painting areas are free of air-blown dust, blast media, or other debris that can be detrimental to the quality of the coating during application, and • Required areas are masked to protect no-paint areas. 			
1.13.4 CCE	<p>12.2.1 Application Records As part of the application process, the applicator shall record for each coat the following at a minimum:</p> <ul style="list-style-type: none"> • Verification of conforming surface condition • Verification of required temperature • Verification that the paint used was within the manufacturer's specified pot life • Paint product applied • Paint batch numbers from base and any mixed components • Ambient temperature, relative humidity and dew point at time of application • Verification that the paint (prior to application) is free from visually evident defects <p>Pertinent piece marks shall be properly transferred, and heat numbers shall be transferred as required by contract documents.</p>			
1.14 CCE	<p>12.2.2 Application Measuring Equipment Surface preparation and application measuring equipment shall include equipment that provides a means to measure:</p> <ul style="list-style-type: none"> • Surface profile • Surface cleanliness (SP value) • Ambient conditions (temperature, humidity) • Wet film thickness • Dry film thickness 			
1.5.4 CCE 1.12.5 CCE	<p>5.3.3, 5.3.4 Process Equipment, Inspection, Measuring and Test Equipment Equipment shall include, but not be limited to:</p> <ul style="list-style-type: none"> • Blast cleaning equipment, which includes conventional abrasive blast equipment • Power tools or hand tools for surface preparation • Compressors • Conventional or airless spray equipment • Power agitators • Lifting equipment • Provisions for loading and blocking <p>12.2.2 Equipment A documented preventative maintenance procedure shall be implemented for major equipment, including but not limited to:</p> <ul style="list-style-type: none"> • Blast cleaning equipment, which includes conventional abrasive blast equipment • Compressors • Conventional or airless spray equipment • Lifting equipment 			

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1.13 CCE	<p>13. Inspection and Testing</p> <p>The Firm shall document a procedure for inspection and testing activities in order to verify that the product quality meets the project requirements. The Firm shall establish in the procedure the inspection sampling plan to assure expected contract quality. This plan shall be adjusted at any time when the required quality level is not met. The inspection procedure shall include assignments of inspection duties, showing the required inspection and testing, and the required records to meet the project requirements. The Firm shall conduct 100% inspection for visible painting defects. At a minimum, the Firm shall identify the dry film thickness sampling plan for steel columns, beams, girders or per component group. The method may identify a sampling plan based on pieces or surface area square footage. The method or plan should identify the unique problem areas created by the part or piece geometry. The Firm shall enforce their nonconformance procedure when product is found nonconforming.</p>			
1.13.1 CCE	<p>13.1 Assignment of Inspection of Surface Preparation and Application of Paint</p> <p>Inspectors shall be assigned on the basis of their qualifications to perform inspections of sophisticated painting on structural steel. Production personnel can be assigned to inspection duties under the following conditions:</p> <ul style="list-style-type: none"> • They shall be trained both in knowledge and practice in proper inspection methods and acceptance criteria specified for the material they are inspecting. • They are aware of their responsibilities and are given time to perform their inspection responsibilities. • They do not inspect their own work. Production personnel shall be capable of inspecting their own work as an in-process inspection, however, that inspection cannot be accepted as the final inspection for product conformity. This capability can be demonstrated by their knowledge of the acceptance criteria for the part of the process for which they have inspection responsibility. • Their inspections are monitored by qualified personnel. Production personnel can perform final inspection of the work of others, provided they are properly trained, and their work is monitored by QC (another QC qualified inspector or QC management.) 			
1.13.4 CCE	<p>13.2 Inspection Records</p> <p>Records shall be maintained showing what parameters were inspected, who performed the inspections, the date of inspections, what pieces were inspected and any nonconformances. The Firm shall document every final painting inspection that is conducted. Documentation requires retrievable records that are retained for an appropriate period related to contract requirements (reference Paragraph 9) The scope of the final paint inspection is per the firm's plan meeting the minimum requirement (see Paragraph 13), and which may be dictated by contract requirements. inspection reports and test results shall be consistent with customer requirements. The following inspections shall be recorded at a minimum:</p> <ul style="list-style-type: none"> • Dry film thickness • Visual inspection for visible painting defects (recording by exception only does not meet this requirement) 			

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1.14 CCE	<p>14. Calibration of Inspection, Measuring, and Test Equipment</p> <p>The only gage required for calibration for this Endorsement is the gage used to demonstrate the final conformance of the painting—measure dry film thickness (DFT). The gage to measure wet film thickness shall be included if any of the Firm's contracts or product manufacturers recommendations use this measurement option as the final acceptance of the painted surfaces. The DFT gage shall be calibrated to a standard (shims or test blocks) that are traceable to a national standard. Calibration shall be per project requirement, per manufacturer's recommendation or specification requirement. The Firm may choose to document a calibration frequency different from the manufacturer's recommendations in the case of infrequent use. However, the requirements of specific codes shall be followed and supersede this option. The calibration method shall be documented and shall address the acceptance criteria used to calibrate the gage(s), and what happens when a gage is found out of calibration. The Firm shall describe what measures and evaluations are in question for items that were inspected with the gage determined out of calibration.</p>			
1.18 CCE	<p>18. Training</p> <p>Personnel involved in application and surface preparation shall receive initial and continuing (as defined by the Firm) documented training appropriate for their job functions. For those personnel, training in surface preparation, painting methods, inspection methods and quality acceptance criteria shall be documented and implemented. Documented training shall be conducted by a qualified (qualifications documented) external source or delivered in-house by a qualified (qualifications documented) internal person. Production personnel shall demonstrate and be capable of inspecting their own work as an in-process inspection. Training is documented with a record of the topics discussed, the course administrator, trainees in attendance, and the training date(s). The course curricula shall relate to the subject and cover the key issues of the subject.</p> <p>Qualification and Training of Inspection Personnel</p> <p>Personnel involved in paint inspection shall be qualified by training and experience as defined by the Firm. Experience shall include the inspection of sophisticated paint applied on a variety of projects. They shall be familiar and proficient with their responsibilities, the use of inspection equipment and the inspection procedures. The basis for qualification of inspectors for painting processes shall be documented. The basis for qualification shall include experience and training in surface preparation and paint application; and in inspection and testing of these processes. The competency of inspectors shall be verifiable. The competency of inspectors without experience or inspectors at new Firms shall be demonstrable. Qualification Standards and Certifications granted by recognized industry organizations related to painting of structural steel fabrication or components can be used to establish basis for qualification. Training for inspectors may be provided and documented by qualified in-house instructors or from external sources. At a minimum, the training shall include these 'body of knowledge' items, the associated inspection methods with inspection equipment:</p> <ul style="list-style-type: none"> ● Surface preparation ● Environmental conditions ● Cleanliness requirements including blast and hand cleaning methods ● Paint application ● Recording inspections ● Visible painting defects ● Dry film thickness. 			

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	DEFINITIONS			
1.4 CCE	<p>4.10 Enclosed A permanent or semi-permanent facility, enclosure or building (four continuous walls to a grade/floor with a roof) where surface preparation and painting activities are conducted in a controlled environment with fixed or portable ventilation systems. The environment is controlled when ambient conditions (temperature, humidity, dew point and the introduction of contaminants) are controlled to meet the manufacturer's requirements. This environment is not subject to outdoor weather conditions and/or blowing dust, or subject to shop related conditions where the surface preparation or painting activities are in jeopardy of contamination. Choosing not to paint on days where the environment is not controlled is not a control option for this category. Surface preparation and/or painting operation occur outside the enclosure only with advanced written authorization from the owner's representative.</p>			
1.4 CCE	<p>4.5 Covered A permanent or semi-permanent facility, enclosure or building having a roof above, under which cleaning and painting activities are performed out of direct exposure to outdoor weather with fixed or portable ventilation systems.</p>			
1.4 CCE	<p>4.13 Exposed (Open) An area with no roof or walls in which cleaning and painting activities are conducted. The area is exposed to outdoor weather conditions and blowing dust. A method of control for this category may be to suspend painting operations until conditions are acceptable.</p>			