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| **HELPFUL TIPS FOR USING THIS AUDIT GUIDE**   1. This Audit Guide is provided as a reference tool for performing internal audits, recording the audit evidence, and audit results. 2. When using this tool for internal audits, be sure to record the dates of the audit(s) and the names of the auditor(s) performing the activity. 3. This audit guide combines the criteria from the AISC Building (BU), Bridge (SBR/IBR/ABR/FCE), Highway Component (CPT), and Complex Coatings (SPE) Standards into a single guide. The base critieria is the Building standard with the additional standards being color-coded. 4. This audit guide can be customized by deleting the additional criteria outside of the scope you wish to audit. (i.e. If you only need CPT, then you can delete the Bridge and Complex Coatings criteria.) 5. This audit guide does **NOT** include the criteria listed in the governing Program Requirements for each certification program. Be sure your internal audit includes the specific Program Requirements. 6. You may find it helpful to add a column to your audit table for recording the location of the specific requirement within your QMS documentation. 7. Within this guide the following color coding is used:    1. **BLACK** = the criteria that apply from the AISC *Certification Program for Structural Steel Fabricators - Standard for Steel Building Structures – 2006*    2. **BLUE** = (B.S.) Additional criteria from AISC *Certification Program for Steel Bridge Fabricators - Standard for Steel Bridges – 2011*    3. **PURPLE** = (P.S.) Additional criteria from *SPE/QP3 Certification Standard for Shop Application of Complex Protective Coating Systems – 2010*    4. **ORANGE** = (C.S.) Additional criteria from AISC *Certification Program for Bridge and Highway Metal Component Manufacturers - Standard for Bridge and Highway Metal Component Manufacturers – 2008* 8. This audit guide can be used for the AISC Hydraulic Structures Program by following the Program Requirements and using the additional Bridge Standard criteria. | | |
| **5. Management Responsibility**  Management shall define and adopt a commitment to quality and shall direct and lead the Fabricator to assure continuous progress toward achieving the objectives of the commitment. The Fabricator’s Executive Management is responsible to develop and maintain a Quality Management System to meet the specific requirements of this Standard, industry and government regulations, and contract requirements. |  | □ |
| **5.1 Policy for Quality and Quality Goals**  Executive Management shall adopt, document, and maintain a policy for quality. The policy shall define:   * A commitment to quality that includes a commitment to meet contract requirements. * Quality Management System objectives that provide a framework for establishing and reviewing quality goals of the Fabricator’s organization.   Management shall ensure that the policy for quality is understood, implemented, and maintained at appropriate levels of the Fabricator’s organization.  Executive Management shall direct the development of systems necessary and establish measurable quality goals to achieve the objectives of the Fabricator’s policy for quality. Executive Management will document and demonstrate that:   * There is a minimum of one specific measurable quality goal related to Structural Steel Fabrication * **BS** There are measurable quality goals related to steel bridge *fabrication.* * Specific measurements related to goals are being recorded * Current goal achievement levels are known relative to a previous measurement or baseline   As quality goals are achieved, new goals shall be set that demonstrate commitment to continuous improvement. New goals can be a new level of achievement of a previous goal, or a new goal that has not been previously examined.  **PS 5.1 Policy**  Executive management shall adopt and document a policy defining the Firm’s quality goals related to coating operations. The policy shall include the commitment to meeting contract requirements. Executive management shall ensure that the policy is understood, implemented and maintained at appropriate levels of the Firm’s organization. The Firm shall document a minimum of one specific measurable goal related to coating application process quality. Executive management shall record and know the current level of that goal. There shall be a plan to work to the achievement of the goal. |  | □ |
| **5.2 Direction and Leadership**  Executive Management and the Executive Management Team shall review the Fabricator’s Quality Management System at planned intervals, but not less than annually. Records from management reviews shall be maintained. Management review requirements will be defined by the Fabricator and include a specific method to obtain, appropriately assess and analyze,  and then report the following:   * Results of internal, external, and AISC audits * Opportunities for improvement of product quality * **BS** *Corrective action* activity and resolution based on internal and external findings**.** * Need for changes to the Quality Management System * Customer feedback, for example; surveys, letters of recognition, personal interviews, requests for Corrective Action and complaints * The level of qualification and Training of personnel * Channels for communication to address and resolve all quality issues including customer complaints * Process performance. Processes are the means, methods, practices that produce the product. * **PS** Effectiveness of means, methods, and practices. Performance measures may include surface preparation and coating process errors, shipping delays, improper treatment of nonconformances, external audit corrective action reports not closed in time, or failure to conduct management review or other meetings in accordance with established procedures * **BS** Process performance, which is the effectiveness of the means, methods and practices that produce the prod­uct. Process performance may be monitored with mea­sures and data that include: process *nonconformance* records (e.g., errors in following documented weld­ing, bolting or *detailing* procedures), shipping delays, improper disposition of nonconformances, AISC audit corrective action requests not closed in time, failure to conduct management review or other meetings per *documented procedure*. * Performance measures monitor the effectiveness of those processes, for example; detailing process errors, shipping delays, improper treatment of Nonconformances, AISC audit Corrective Action Requests not closed in time, failure to conduct management review or other meetings per Procedure * Product Nonconformance. Attributes of manufactured product (in process or final) that do not meet requirements. Product is nonconforming when it does not meet acceptance criteria, for example; errors measured in welding, bolting and coating, and dimensional errors * Results from previous management reviews   The output from the management review shall include the record and implementation of any decisions and actions related to:   * Improvement of the effectiveness of the Quality Management System and its processes * Improvement of product quality * Resource needs |  | □ |
| **5.3 Management Representative**  Executive Management shall appoint a member of management who may or may not be the chief executive—and who, regardless of other responsibilities, shall have ability, responsibility, and authority to:   * Ensure that Procedures needed for the Quality Management System are established, implemented and maintained in accordance with this Standard. * Report to Executive Management on the performance of the Quality Management System and any need for improvement. * Ensure the promotion of awareness of customer requirements throughout the Fabricator’s organization. * Review the Quality Management System at defined intervals sufficient to ensure the stability of the Quality Management System and its effectiveness in satisfying this Standard. * Communicate with external parties on matters relating to the Quality Management System. * **BS** Promote awareness of contract requirements through­ out the fabricator’s organization. |  | □ |
| **5.4 Resources**  The Fabricator shall have the resources needed to comply with contract specifications. Resources shall include, but are not limited to, the resources described in the subsections of 5.4.  **PS 5.3 Resources**  The Firm shall have the resources needed to achieve conformity to contract specifications. Resources shall include, but not be limited to, those described in the sub-articles of this section. Resources can include coating consultants, technical societies, trade associations, and researchers. |  | □ |
| **5.4.1 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 5.6.  Personnel performing defined functions shall have the required qualifications and the ability to successfully perform the function. Objective Evidence of qualification may be demonstrated through biographies, resumes, training records, and individual licenses or certifications.  Personnel can be assigned to more than one task, provided they are qualified and able to perform fully the duties of each position. Individual(s) responsible for Quality Assurance or Quality Control management who also serve as production management shall report directly to (or be) Executive Management.  Individual(s) responsible for Quality Assurance or Quality Control management who report to production management shall also report directly to Executive Management. A qualified Executive Management Team shall be assigned to manage the functions detailed in Sections 5 through 19 of this Standard and shall include as a minimum:   * Management Representative * Detailing management * Purchasing management * Fabrication process management * Quality Assurance management * Quality Control management   Members of the Executive Management Team shall be aware of the requirements for the management review detailed in Section 5.2 and be aware of the results of the most recent review.  **PS 5.3.1 Personnel**  Personnel responsible for determining inspection requirements, oversight of inspection activities, acceptance criteria and disposition of nonconformities shall be identified. Personnel responsible for coating preparation and application, surface preparation and coating inspection shall also be identified. Executive management identifies and records the top individual at the facility with technical knowledge of the coating process. This individual shall have a minimum of one year experience in surface preparation and application of complex coating systems or their components. |  | □ |
| **BS 5.4.1 Personnel**  Qualification requirements:   * For production and *QA* management functions: at least five years steel fabrication experience or train­ing. * For *QC* and purchasing management functions and for detailing *checkers*: at least three years steel fab­rication experience or training.   Personnel and management can be assigned to more than one task, provided they are qualified and able to fully perform the duties of each position. Individual(s) responsible for quality assurance or for *quality control* management (including the Management Representa­tive for Quality) may not serve as or report to produc­tion management.  Production supervisors shall be familiar with the requirements of applicable *specifications*.  Qualified management shall be assigned to the func­tions detailed in Sections 5 through 19 of this standard and shall include as a minimum the Management Rep­resentative for Quality and positions that manage:   * Detailing * Purchasing * Fabrication operations * Quality assurance * Quality control   Management at all levels shall be aware of the requirements for the management review detailed in Section 5.2 and the results of the most recent review.  The fabricator shall have the following personnel on staff or available under contract, certified in accor­dance with ASNT-TC-1A:   * at least one Certified Level III *NDT* administrator for each NDT method performed in the shop. * at least one Certified Level II technician for each NDT method performed in the shop.   The fabricator shall have documented procedures for certifying and updating NDT personnel.  The fabricator shall have enough AWS Certified Welding Inspectors (or other personnel as permitted by AASHTO/AWS D1.5 clause 6.1.3, “Inspection Per­sonnel Qualification”) to monitor all shifts on which welding is performed.  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. |  | □ |
| **5.4.2 Buildings, Workspace, 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 areas and buildings shall be conducive to achieving consistent quality work.  **BS** The areas and buildings (including housekeeping, ventilation and clean air supply, and electrical sup­ply) shall be conducive to achieving consistent quality work.    **PS 5.3.2 Buildings, Workspace and Associated Utilities**  The Firm shall have a location at which surface preparation, coating, and curing is conducted. The Firm shall also provide protection of stored coating materials, blast-cleaning products, and curing products from deterioration or damage. Regardless of whether the Firm has two distinct areas for cleaning and coating operations, or one single area for the entire coating process, the Firm shall be able to demonstrate methods used to control the ambient conditions in these areas, and prevent surface contamination during the cleaning, application and curing processes. |  | □ |
| **5.4.3 Fabrication Process Equipment**  The Fabricator shall have under their control the equipment and software necessary to perform the functions common to fabrication consistent with the specifications and standards common to the work.  **BS** The fabricator shall have under their control the equip­ment and software necessary to perform fabrication consistent with the contract documents.  **PS 5.3.3 Process Equipment**  The Firm shall own or control coating and blast-cleaning equipment suitable for applying complex coating systems. The required equipment shall be present at the facility and must be operable during the onsite audit at the facility that holds the certification. Equipment shall include, but not be limited to:   * Blast cleaning equipment, which includes conventional abrasive blast equipment * Power tools or hand tools for surface preparation * Compressors, line driers and oil separators * Conventional or airless spray equipment * Power agitators * Lifting equipment * Provisions for loading and blocking   **5.4.3 Process Equipment (both hardware and software)**  The *manufacturer* shall have under their control the equipment necessary to perform the functions common to their *manufacturing* process and consistent with the specifications and standards common to the work. Equipment shall be maintained to produce the required quality. |  | □ |
| **BS 5.4.4 Inspection Equipment**  The fabricator shall have the inspection equipment necessary to verify conformance with the require­ments of the contract documents.  **PS 5.3.4 Inspection, Measuring, and Test Equipment**  The Firm shall control and have located at their facility operable equipment for inspecting, measuring and testing for surface preparation, coating application and curing, and for verifying the calibration of measuring equipment in accordance with Section 14.  Surface preparation and application measuring or evaluation equipment shall include equipment in good working order that provides a means to measure:   * Surface profile * Surface cleanliness (conformance to specified surface preparation standards) * Surface temperature * Ambient conditions (air temperature, relative humidity, dew point) * Wind direction/speed (if coating in an area exposed to the wind) * Coating temperature * Wet film thickness * Dry film thickness |  | □ |
| **5.5 Internal Communication**  Executive Management shall ensure that appropriate communication processes are established within the Fabricator’s organization and that communication takes place regarding the effectiveness of the Quality Management System.  **BS**  Drawing, material and production due dates shall be scheduled by suitable areas or sequences, and schedules shall be disseminated to appropriate personnel.  Drawing, material and production schedules shall be kept current.  Operational quality meetings among fabrication man­agement, quality management and others, as necessary, shall be held on a regular basis. The meetings should include discussions of quality problems and countermea­sures to prevent future quality problems. These meetings should be held at least quarterly. |  | □ |
| **5.6 Documentation Requirements**  **5.6.1 General Requirements**  Quality Management System documentation shall include:   * A Quality Manual * Statements of a quality policy and quality objectives (as described in 5.1) * Procedures and their associated Quality Records required by this Standard * Documents needed by the organization to ensure the effective planning, operation, and control of its processes   The extent of the Quality Management System documentation can differ from one organization to another due to: the size of organization, the type of activities, the complexity and interaction of processes.  **PS 5.4 Document Requirements**  The following is a list of required documents for the Firm’s quality management system. These documents shall be maintained within a quality manual or within other appropriate systems in the Firm. Reference Docs (Section 3):   * SSPC-PA 1, SSPC-PA2, SSPC-VIS 1 * Product Data Sheets, Technical Bulletins * ASTM D 3276 “Standard Guide for Painting Inspectors” |  | □ |
| **5.6.2 Quality Manual**  The Fabricator shall establish and maintain a Quality Manual stating the quality policy and describing the Quality Management System implemented in the Fabricator’s organization.  The documented Quality Manual shall satisfy all of the requirements of this Standard, as well as applicable reference documents, industry and government regulations, codes, and contract requirements. Requirements may be satisfied in a single document called the Quality Manual or may be satisfied in separate documents referenced by the Quality Manual. |  | □ |
| **5.6.2.1 Organization**  The Quality Manual shall include a page showing the current revision date and the name and location of the Fabricator.  The Quality Manual shall include or reference documents that include:   * Policies and organizational description * Organizational chart describing responsibility, authority, and the interrelationship of functional positions that manage, perform, and verify work affecting quality * Job descriptions and required qualifications for Key Positions/Functions * Qualification evidence and biographies for individuals in Key Positions/Functions * **BS** Job descriptions and required qualifications for executive management and functional positions that manage, perform and verify work affecting quality. * A Facility Plan * An Equipment List * Established Documented Procedures * Description of the interaction and communication between the processes of the Quality Management System used by the Fabricator to produce products of the required quality   **BS** Documented procedures may be issued separately or be an integral part of the Quality Manual. The Fabricator’s management determines the level of detail in the Quality Manual and Procedures. At a minimum, these documents shall be detailed enough to adequately describe the Quality Management System used by the Fabricator to assure the production of products of the required quality.  **BS** Management of relevant functions shall define what additional documented procedures, drawings, or other documents are required beyond the minimum requirements set by this standard to meet the needs of the fabricator’s organization and its customers.  **PS 5.4.4 Equipment List**  An equipment list showing the Firm’s equipment used for cleaning, surface preparation, coating mixing and application, and material handling shall be documented and maintained. |  | □ |
| **PS 5.4.1 Organizational Chart**  The organizational chart shall show lines of authority within the organization as well as define positions and reporting relationships. At a minimum, the positions that are responsible for coating preparation and application, surface preparation, coating inspection, purchasing, inventory and the management of those functions shall be identified.  **PS 5.4.2 Job Descriptions, Qualifications, and Biographical Information**  The Firm shall document and maintain job descriptions and qualifications and a brief summary of relevant experience for key personnel. Key personnel shall include, at a minimum, the following functions: **management, purchasing, quality control, surface preparation, application and inspection**. Responsibilities and authorities for positions that manage these functions shall be defined.  Qualifications and biographical information for key positions shall include, at a minimum: name, titles, years of experience performing complex coating operations, internal or external training, and professional certifications and registrations.  **PS 5.4.3 Facility Plan**  A facility plan detailing the general layout of the surface preparation, application and curing areas as well as general location of equipment critical to production shall be documented and maintained. |  | □ |
| **PS 5.4.5 Project List**  An up to date project listing that shows a representative 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:   * Project name, Project size (e.g., tons, square feet, etc.), Dates work was performed, Surface preparation * Coating system information (e.g., three coat epoxy or two coat urethane).   Firms seeking initial certification (or re-certification after a lapse in certification) to this Standard shall demonstrate an acceptable level of compliance to the Standard during the audit on existing work in-house, on a test panel similar to that detailed in ASTM D 4228, or on a demonstration piece or pieces that appropriately reflect the nature of the proposed work as approved by the qualifying agency. |  | □ |
| **5.6.2.2 Approval**  Executive Management shall approve the Quality Manual. At a minimum, the Quality Manual shall be signed and dated by the highest ranking individual responsible for the facility. |  | □ |
| **6. Contract and Project Specification Review and Communication**  The Fabricator shall develop a Documented Procedure for contract and project specification review. The Procedure shall require that a contract and project specification review be completed for each structural steel project performed. The review shall begin no later than the Fabricator’s acceptance of responsibility for performing the work. Ideally, the review should begin during the project estimation or bid process.  The review shall identify, determine, plan, and record the specific project requirements as well as define distribution of the recorded specific project requirements to the responsible individuals in the Fabricator’s organization. This review will consider any issue that affects the Fabricator’s capability to perform the work.  The Procedure shall provide for review of the original Contract Documents, revised Contract Documents and changes received through clarification (e.g. requests for information or other sources) to assure that the Fabricator fully understands the contract requirements.  Evidence of contract review can take the form of technical summaries, signoffs, change orders, schedules and allocation of adequate resources. Such evidence shall indicate consideration of pertinent Elements of this Standard managed by the functions listed in Section 5.4.1 and other critical project requirements that, if missed, will have a major impact on project quality.  **PS**  The record of contract review can include technical summaries, signoffs, change orders, schedules and allocation of adequate resources. The record shall show the consideration by management, purchasing, coating process control, inspection, quality assurance, and quality control functions. The record will also show other critical project requirements to consider that, if missed, would have a major impact on project quality. |  | □ |
| **7. Detailing**  **7.1 Detailing Procedures**  **7.1.1 Preparation of Shop Drawings and Erection Drawings**  The Shop and Erection Drawings produced shall incorporate all Customer requirements, specifications, codes, and relevant standards to adequately procure materials, fabricate, and erect the Structural Steel frame.  **BS** The shop and *erection framing drawings* produced shall incorporate all contract requirements, *specifi­cations*, codes and relevant standards to adequately procure materials, fabricate the steel bridge, and pro­vide instructions to the erector for location of *ship­ping pieces* in the completed structure.  To ensure and verify this, a Documented Procedure for preparation of Shop and Erection Drawings shall be developed, which describes:   * How project requirements are reviewed and incorporated. * How the Fabricator coordinates, clarifies, resolves, and tracks information with the Customer (e.g., construction change documents, Requests for Information [RFI]) and how the associated resolutions are tracked and controlled).   **PS**  **7. Coating System Communication**  Written documents (e.g., drawings, travelers, or quality plans) shall be used to communicate throughout the organization:  • Surface preparation (including specification of surface finish), Coating type, Dry film thickness requirements  • Step backs, Masking, No-coating or reduced-DFT zones  **7.2.1 Preparation of Manufacturing Drawings**  The *manufacturing* drawings produced shall incorporate all *customer* requirements, specifications, codes and relevant standards to adequately procure materials, *manufacture* and install the *component*. To ensure this, a *documented procedure* for preparation of *manufacturing shop and installation drawings* shall be developed, which describes:   * How project requirements are reviewed and incorporated. * How the *manufacturer* coordinates, proposes changes, and tracks information with the *customer* (e.g., change documents, *requests for information* [*RFI*]) and how the associated resolutions are tracked and controlled.   How the manufacturer includes owner-required information on each drawing (e.g., route, section, county, contract number, and structure identification). |  | □ |
| **7. Design and Detailing**  **7.1 Design Procedure**  Where *component* design is provided by the *manufacturer*, the design process shall be defined by a *documented procedure*. The *procedure* shall describe steps in the design development, review and verification phases of the process. The *procedure* shall:   * Define methods for determining *component* product requirements from:   + *Contract documents*   + *Customer* and industry input   + Regulatory and code requirements   + Similar component designs. * Define a design review process to identify and propose solutions for *nonconformances* with product requirements. Identify the individuals responsible and keep records of the design review process. * Define methods to identify, document, evaluate, and approve design changes before implementation. Keep records of all documents. * 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. |  | □ |
| **7.1.1 Professional Engineer Review of Design for Standard Components**  For products that are 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 stamped by a professional engineer to signify that the designed product meets the current applicable code requirements for its intended use. Any design tables or design processes published with the product literature shall also be reviewed and stamped by a professional engineer. *Shop drawings* for these *components* shall include a statement that the *component* details are based on designs that have been reviewed and stamped by a professional engineer and are on file with the *manufacturer*. |  | □ |
| **7.1.2 Professional Engineer Review of Design for Non-Standard Components**  For products that are job-specific, the *manufacturer* shall retain the services of a professional engineer to review and stamp the site-specific design of the *component*. The engineer shall also review the *shop drawings* produced for the *component* and verify their consistency with the design. The results of this review shall be indicated on the *component shop drawings*. |  | □ |
| **7.1.2 Detailing Standards**  The Fabricator will prepare and utilize Detailing standards describing technical preferences and requirements customarily used in the shop. These standards will show special information required on advance bills such as allowances for cuts, camber, or supplementary requirements. The Detailing standards will include how mill order lists are prepared which, at a minimum, include:   * Sizes and quantities **(BS)** * Appropriate ASTM specification references * Special ordering information * Any allowances or tolerances   The Detailing standards shall describe the Fabricator’s preferred methods of drawing layout, including but not limited to:   * Sections and Views **(BS)** * Title block information * The method of designating of shipping sequences **(BS)** * Piece marking system * Dimensional preferences * Commonly used shop abbreviations * Showing bolt placement lists (including bolt type and installation requirements) * Information required on weld symbols including any special NDT requirements   The Detailing standards shall describe the Fabricator’s preferred method for:   * Selection of connection geometry and material (including sizes and specifications) * Detailing holes, fasteners, washers, cuts, and copes * Assignment of appropriate welding symbols (shop and field welds) * Selecting bolt type and installation method * Showing surface preparation (including specification of surface finish) * Designating coating requirements (including coating materials and dry film thickness) * Showing any necessary special instructions to fabricate and erect the structural steel frame or steel bridge **(BS)** |  | □ |
| **7.2.2 Detailing Standards**  The *manufacturer* will prepare and utilize *detailing* standards describing technical preferences and requirements customarily used in the *manufacturing* facility. These standards will show special information required on advance bills such as allowances for cuts or supplementary requirements. The standards will include how bills of material are prepared which, at a minimum, include:   * Sizes * Appropriate ASTM or AASHTO specification references * Special ordering information * Any allowances or tolerances.   The *detailing* standards will illustrate the *manufacturer’s* preferred methods of *shop and installation drawing* layout, including:   * Views * Title block information * The method of designating shipping sequences * The piece marking system * Dimensional preferences * Commonly used shop abbreviations * Assembly and installation requirements.   If applicable, illustrate information to be included on weld symbols and the preferred way to designate surface preparation and *coating* requirements. |  | □ |
| **7.1.3 Shop and Erection Drawings**  The Fabricator shall develop a Documented Procedure to provide for Checking of all Shop and Erection Drawings and to describe the approval method used for Shop Drawings.  **BS**  The fabricator shall develop a documented proce­dure to provide for *checking* of all shop and erection framing drawings and to describe the method used to release *shop drawings* for *fabrication*.  **7.2.3 Shop and Installation Drawings**  The *manufacturer* shall develop a *documented procedure* to provide for *checking* of all *shop and installation drawings* and to describe the approval method used for *shop and installation drawings*. The *manufacturer* may describe *checking* and approval in a single *procedure* or separately in two or more documents. |  | □ |
| **7.1.3.1 Checking of Shop and Erection (BS-Framing) Drawings**  The documented procedure for Checking of Shop and Erection Drawings shall describe the method by which the Fabricator or its Subcontractor performs and records final check of Shop and Erection Drawings to ensure compliance with Contract Documents before release for fabrication and erection. Such methods may include signatures, stamps, logs, files, or lists. Records shall provide means for identification of the individual Checker who performed the final check of each Shop or Erection Drawing.  **BS**  For computer-generated shop drawings and *manufacturing models*, the documented procedure shall identify the data, variables, graphics, calculat­ing formulas, and other output that are checked to determine that the software is functioning correctly, and shall include provisions for verifying accuracy of input.  When Detailing is performed by a Subcontractor, the Procedure will define the extent of review by Detailing management and Checking of received Detailing products before release for fabrication.  **BS**  The documented procedure for checking shop drawings, manufacturing models, and erection framing drawings shall include comparing those documents and models to project requirements that include, but are not limited to:   * Geometry. * Use of the correct connections. * Proper notes. * Proper material usage. * Assignment of complete welding symbols. * Proper coatings and preparation. * Proper representation on erection framing draw­ings including the notation of any necessary instructions and depiction of details necessary to conduct the work in the field.   **7.2.3.1 Checking of Shop and Installation Drawings**  The *procedure* for *checking* of *shop and installation drawings* shall describe the method used by the *manufacturer* or its *subcontractor* to perform and record the final check of *shop and installation drawings* to ensure compliance with *contract documents* before release for *manufacture* and installation. Evidence of the effective implementation of such methods may include signatures, stamps, logs, files or lists. Records shall provide means for identification of the individual *checker* who performed the final check of each *shop or installation drawing*.  For computer-generated *shop drawings*, the *procedure* will identify the data, variables, graphics, calculating formulas and other output that are checked to verify the accuracy of the software.  When *detailing* is performed by a *subcontractor*, the *procedure* will define the extent of review by *detailing* management and *checking* of received *detailing* products before release for *manufacture* and installation. |  | □ |
| **7.1.3.2 Approval of Shop Drawings**  The Procedure for Checking of Shop and Erection Drawings shall describe the method used to document approval of Shop Drawings released for fabrication. Such methods may include signatures, stamps, logs, files, or lists.  The method shall have provisions for recording Owner’s Designated Representatives for Design and Construction approval of Shop Drawings—whether produced in house or by a Subcontractor.  The Procedure shall require that waiver of approval from the Owner’s Designated Representative for Design or from the Owner’s Designated Representative for Construction be in writing.  **BS**  The documented procedure for release of shop and erection framing drawings shall describe the method used to document owner approval of shop drawings released for fabrication, whether produced in-house or through a subcontractor. Such methods may include signatures, stamps, logs, files or lists.  **7.2.3.2 Approval of Shop and Installation Drawings**  The *procedure* for approval of *shop and installation drawings* shall describe the method used to document the approval of *shop and installation drawings* released for *manufacture* and installation. Such methods may include signatures, stamps, logs, files or lists.  The method shall have provisions for recording approval of *shop drawings*, whether produced in house or through a *subcontractor*, by the *owner’s designated representatives for design and/or construction*.  The procedure shall require that any waiver of approval from the *owner’s designated representative for design* or from the *owner’s designated representative for construction* be in writing. |  | □ |
| **7.1.3.3 Customer-Supplied Shop Drawings**  When the Fabricator receives Shop Drawings from the Customer, a Documented Procedure shall define the method of receipt, revision, and control of those drawings.  **BS**  When the fabricator receives shop drawings from the owner or another fabricator, a documented pro­cedure shall define the method of receipt, revision and control of those drawings. |  | □ |
| **7.2 Detailing Function Resources**  **7.2.1 References (required library)**  The Fabricator shall maintain as a minimum, a library of the required references listed in Section 3 as follows:   * AISC *Steel Construction Manual,* which includes the following specifications, codes, and standards: * AISC Specification for Structural Steel Buildings * RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts * AISC Code of Standard Practice for Steel Buildings and Bridges * ANSI/AWS D1.1 Structural Welding Code–Steel * AISC Selected ASTM Standards for Structural Steel Fabrication   **7.3.1 References (required library)**  The manufacturer shall maintain as a minimum, a library of the required references listed in element 3 as follows:   * AISC *Selected ASTM Standards for Structural Steel Fabrication* * AASHTO/ASTM standards applicable to the *component manufacturers* product and/or *contract documents* (for verification purposes) * AWS D1.1 *Structural Welding Code – Steel*, AWS D1.2 *Structural Welding Code* – *Aluminum*, or AASHTO/AWS D1.5 *Bridge Welding Code*. (Welding codes shall be applicable to *manufacturer’s* product and *contract documents*. At least one welding code shall be available.) * AWS A2.4 *Symbols* * AWS A3.0 *Terms and Definitions* * AISC *Code of Standard Practice for Steel Buildings and Bridges1* * SSPC Steel Structures Painting Manual, Volume I, Good Painting Practice * SSPC Steel Structures Painting Manual, Volume II, Systems and Specifications * *Owners’ specifications* for all projects in progress or proposed. |  | □ |
| **7.2.2 Detailing Personnel**  The Fabricator shall employ staff personnel assigned to Detailing management. Connection consultation and other Detailing functions may either be performed by employed staff personnel or by Subcontractors. |  | □ |
| **7.2.2.1 Detailing Management**  Responsibilities for Personnel performing Detailing management shall include:   * Overseeing the production of Shop and Erection Drawings * Liaising with designers * Scheduling * Developing and maintaining company Detailing standards and Detailing Procedures * Transmittals related to Owner’s Designated Representative for Design and Construction approvals and connection consultation subcontracting * Coordinating and incorporating construction requirements * Training Detailers and Checkers   Qualification requirements for Detailing management personnel shall include one or more of the following:   * Experience in Detailing and Checking Shop and Erection Drawings that have met the approval of the Owner’s Representative for Design for a variety of structures representative of projects the company provides. The Fabricator shall determine and describe a way to demonstrate competence. * Graduate engineer with experience related to Structural Steel fabrication. * Licensed P.E. or S.E., with experience related to Structural Steel fabrication.   **BS**  The fabricator shall determine and describe methods to demonstrate competence.  Detailing management shall be familiar with the requirements of pertinent codes and specifications. |  | □ |
| **7.2.2.2 Detailing Functions**  Personnel who perform Detailing and/or Checking of Shop and Erection Drawings shall have experience in drawing projects typical of the projects the company provides.  Detailers in training shall work under the supervision of a trained Detailer or Checker.  A qualified Checker shall check all Shop Drawings before release for fabrication. Qualification requirements for Checkers shall be defined and documented as required in Section 5.4.1 and include Training and experience in connection selection. Competency of staff-employed and subcontracted individuals performing final checks shall be verifiable.  **BS**  Demonstrated competency of employed and subcontracted individu­als performing final checks shall be documented by detailing management. |  | □ |
| **7.2.2.3 Connection Consultation**  Qualification requirements for personnel providing connection development guidance to Detailers performing connection detailing shall include one or more of the following:   * Experience in connection development and in Detailing and Checking of Shop and Erection Drawings for steel that have met the approval of the Owner’s Representative for Design for a variety of structures representative of projects the company provides. The Fabricator shall determine and describe a way to demonstrate competence. * Graduate Engineer with experience related to Structural Steel fabrication. * Licensed P.E. or S.E., with experience related to Structural Steel fabrication. |  | □ |
| **7.2.3 Subcontract Services**  In lieu of employed staff personnel, Subcontractors may be used for the following functions: Detailing, connection consultation, Checking of Shop and Erection Drawings, training of Detailers and Checkers. However, the Fabricator retains the responsibility for compliance with the requirements of this Standard.  The Fabricator shall define and document the qualification and selection process for choosing Subcontractors as required in Section 10.2**.** |  | □ |
| **8. Document and Data Control**  The Fabricator shall develop a Documented Procedure to control documents and data affecting quality including:   * The Quality Manual * Contract Documents **BS** (dissemination and revision control) * Shop and Erection ( BS- Framing) Drawings * Detailing standards * All Documented Procedures |  | □ |
| **8.1 Review and Approval**  Documents affecting (PS coating) quality shall be reviewed and approved by authorized management. Revisions to the Quality Manual and other Quality Management System documents shall be reviewed for adequacy and approved by the same function and authority level that authorized the original document. The Procedure for document and data control shall describe the frequency and requirements established by management for review and updating and establish a method to identify changes. |  | □ |
| **8.2 Customer Requirements**  The Fabricator shall develop a Documented Procedure to receive and document Customer requirements and Fabricator originated changes as they occur throughout the fabricating and detailing process. Customer requirements may be received in original Contract Documents, or subsequent telecommunications, letters, transmittals related to product requirements.  The 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 Shop Drawings and Erection Drawings to all necessary departments and personnel at the Fabricator’s facility and necessary external organizations, Subcontractors, or Suppliers.  **8.2 Customer Requirements**  The *procedure* shall define methods for receipt and documentation of *customer* requirements and corresponding *manufacturer* originated changes for compliance as they occur throughout the *manufacturing* and *detailing* process.  *Customer* requirements may be received in original *contract documents*, or subsequent telecommunications, letters, transmittals related to product requirements, and construction changes or contract addenda.  The *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 *shop drawings* and *installation drawings* to all necessary departments  and personnel at the *manufacturer’s* facility and necessary external organizations, *subcontractors*, or *suppliers*. |  | □ |
| **8.3 Revision Control**  The revision shall be clearly identifiable on all documents and data controlled by the Procedure and there shall be a method for monitoring and identifying the latest revision. The Fabricator shall establish a method to ensure identification of changes to the Quality Manual or referenced Procedures from previous revisions. Documents shall remain legible and easily identifiable. |  | □ |
| **8.4 Access**  Relevant and current Procedures and policies pertinent to an area of operation or management shall be available and readily accessible to all personnel responsible for performing work affecting the product quality. |  | □ |
| **8.5 Obsolescence and Transmittal**  The Procedure shall describe methods to prevent inadvertent use of controlled documents that are obsolete in the fabrication or erection process.  A method shall be established and maintained showing the latest revisions and location of:   * The Quality Manual and other Quality Management System documents * Contract Documents including Design Drawings * Shop and Erection Drawings   A transmittal system will be established to record the distribution of drawings, documents, and specifications to Customers, Subcontractors, and Suppliers. The records shall indicate the status of approval and release to fabrication or erection. |  | □ |
| **9. Control of Quality Records**  The Fabricator shall develop a Documented Procedure for Quality Records that provides for:   * Identification, Collection, Storage, Maintenance, Retention, Disposition.   All Quality Records shall be legible and shall be stored and retained in such a way that they are retrievable from facilities that provide a suitable environment to prevent damage, deterioration or loss. Quality Records typically include, but are not limited to:   * Inspection records, NDT reports, Drawing logs, MTRs, C of Cs, Design changes, RFIs (BS- with owner responses) * BS - Contract review, Contract clarifications, Design change records, including contract construction changes and addendums * Mill and consumable purchase orders, Records or summaries of Nonconformance reports * Corrective Action Requests, Training records, Subcontractor and Supplier evaluations * Internal and external Quality Management System audits   **PS**  **9.3 Minimum Required Quality Records**  • Contract document review, Contract clarifications (RFIs), Documented training  • Internal audit record, Certificate of Conformance for system components  • Qualification and ongoing evaluation of subcontractors and suppliers  • Requests (and responses to requests) for deviation from contract requirements (DFSs)  • Surface preparation records, Application records  • Documentation of nonconformities, Waivers from the owner for nonconforming product, Corrective action as defined in section 4, Final inspection, Management Review records |  | □ |
| **9.1 Retention of Quality Records**  Retention times shall be established and recorded for records retained for any purpose. The retention periods will be at least long enough to permit evaluation of the records during the course of project construction.  **PS**  **9.2 Retention**  Retention times shall be established and recorded for records retained for any purpose related to the quality of surface preparation and coating application. The retention periods shall be at least long enough to permit evaluation of the records and until final acceptance by the owner, or longer if stipulated by the contract documents. The Firm shall make quality records available for the customer’s and/or owner’s review and evaluation during the retention period. |  | □ |
| **9.2 Availability of Quality Records**  Specific Quality Records required by contract or regulation, shall be made available for review and evaluation by the Fabricator for the required time period. |  | □ |
| **10. Purchasing**  The Fabricator shall develop a Documented Procedure to ensure that Subcontractors and Suppliers provide materials, products, and services conforming to project requirements. Responsibility for quality of the subcontracted products and services remains with the Certified Fabricator. Purchasing documents, Subcontractor and Supplier qualification records, and records of the periodic evaluation of Subcontractors and Suppliers shall be maintained. |  | □ |
| **10.1 Purchasing Data**  The Fabricator shall clearly describe subcontracted work and the purchased products, materials, and services ordered in written purchasing documents. This shall include but not be limited to:   * The type of service, material, class, grade, and other unique identification. * The applicable specifications, drawings, process requirements, and inspection instructions and any witness points. * Delivery instructions and date. * Required C of Cs, MTRs, and NDT reports.   Purchasing documents for materials furnished to ASTM specifications shall include the information required in the “Order Information” section of the ASTM Standard.  **PS**  **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:  • The type of service, material and other unique identification  • The applicable specifications, drawings, process requirements, inspection instructions and any witness points  • Delivery instructions  • Certificates of Compliance, Conformance, or Analysis  • Coating manufacturers’ product data sheets (for coating products)  • Testing requirements as applicable |  | □ |
| **10.2 Selection of Subcontractors and Suppliers**  The Fabricator shall evaluate and select Subcontractors and Suppliers on the basis of their ability to meet subcontract requirements, the Fabricator’s Quality Management System, the requirements of this Standard, project requirements, and any specific inspection requirements.  A Documented Procedure shall be developed that describes how the Fabricator conducts initial and ongoing evaluation of all Subcontractors and Suppliers. Management shall determine:   * Evaluation criteria * Re-evaluation interval * Personnel involved in the evaluation process   The Fabricator will evaluate Subcontractors and Suppliers via an audit or documented acceptable past experience. As a minimum, quality of the finished products and timely, proper delivery of services or products shall be part of the evaluation Procedure. |  | □ |
| **PS 10.4 Qualification and Evaluation of Suppliers**  Firms shall qualify and evaluate suppliers using a suitable method defined by the Firm. The method employed should include consideration of these qualification and evaluations means:  • Contract documents  • Consistent ease of application (applies to suppliers of coating)  • Curing time (applies to suppliers of coating)  • Delivery  • Product quality  • Customer or owner preference  • Availability and suitability of the supplier’s technical support staff  The frequency of periodic evaluation shall be established in the purchasing procedure. Records of the evaluation of suppliers and subcontractors shall be maintained. |  | □ |
| **10.2.1 Fabrication Subcontractors**  The Structural Steel Fabricator selected as a Subcontractor shall have the required AISC Certification on projects requiring AISC Certification.  A written waiver shall be obtained from the Owner’s Representatives for Design and Construction for any subcontracted Fabricator that is not an AISC Certified Fabricator on projects requiring AISC Certification.  **BS**  **10.3 Fabrication Subcontractors**  Subcontractors performing welding, bolting or assembly shall have the applicable AISC Certification on projects requiring AISC Certification. |  | □ |
| **10.2.2 Detailing Subcontractors**  The Fabricator’s Procedure defines the methods used for initial and ongoing evaluation of Detailing Subcontractors and may include direct or third party review of one or more of the following:   * Drawing products and other work to assess ability to perform the specific type of work the Fabricator is subcontracting. * Implementation and effectiveness of procedures to track RFIs. * Employment experience records for individual Detailers and Checkers. * For ongoing evaluation, Detailing error frequency and severity from Fabricator records.   The Fabricator’s Procedure shall define Detailing Subcontractor evaluation criteria that include how the following information is identified on or incorporated into drawings:   * Material requirements and special conditions * Coating requirements * Contract Document special conditions * Inspection requirements * Conformance to the Fabricator’s Detailing standard * Drawing check complete * Identification of Checkers   When the Fabricator awards Detailing Subcontracts in advance of evaluation, the Fabricator’s Procedure shall include methods to assess the “pre-evaluation” level of risk to meeting:   * Subcontract requirements * The Fabricator’s Quality Management System * The requirements of this Standard * Project requirements * Specific inspection requirements   The Fabricator’s Procedure shall require a full initial evaluation of “award in advance of evaluation” Detailing Subcontractors during the performance of the subcontracted work. Ongoing evaluation as required in the Procedure shall be conducted if the Detailing Subcontractor is to be considered as a source for future work.  **10.2.2 Design Subcontractors**  The *manufacturer’s procedure* defines the methods used for initial and ongoing evaluation of design *subcontractors* and may include direct or third party review of one or more of the following:   * Design products and other work to assess ability to perform the specific type of work the manufacturer is subcontracting * Implementation and effectiveness of procedures to identify, document, evaluate, and approve design changes * Employment experience records, education, and licensing for individual engineers and designers * For ongoing evaluation, design error frequency and severity from manufacturer records. |  | □ |
| **10.3 Verification of Purchased Product, Materials, and Services**  The Fabricator’s Procedure for purchasing shall define the extent of control necessary to conform to the project requirements. This may be dependent upon the type of product, the impact of subcontracted product on the quality of the final product or the records available for the demonstrated capability and performance of previous projects. Test reports, C of Cs, or other evidence of Quality Control shall be kept on file as defined in the Fabricator’s Procedure required by Element 9. |  | □ |
| **10.4 Customer Verification of Fabricated Product**  The Customer or the Customer’s representative shall be allowed the right to verify the conformance of the final product to the project requirements at the Fabricator’s premises. |  | □ |
| **10.5 Control of Customer-Supplied Material**  If materials are supplied by the Customer; the Fabricator shall verify, store, and maintain materials in an appropriate fashion. Verification shall include confirmation that the material is what is required and meets the quality requirements. Customer-supplied material shall be protected to prevent use in other than its intended purpose. Any such product that is lost, damaged, or is otherwise unsuitable for use shall be recorded and reported to the Customer. |  | □ |
| **11. Material Identification**  The Fabricator shall develop a Documented Procedure for identification of material. The Procedure shall provide for identification of Structural Steel material as stated in the AISC *Code of Standard Practice for Steel Buildings and Bridges* and in Contract Documents.  MTRs, manufacturers’ test reports, and C of Cs for base materials, bolts, welding consumables, and coatings provide minimum material identification. In the absence of special contract requirements, these records shall constitute sufficient evidence that product satisfies material order requirements. Records that provide a basis for material identification shall be filed and retained as defined in the Fabricator’s Procedure required by Element 9.  **BS**  **11.1 Material Identification**  The documented procedure shall describe how the fab­ricator marks or maintains the identification of base materials from the point of receipt to the point of the first fabricating operation (or beyond, if required; see Section 11.2) to assure incorporation of the correct materials into the product.   * Structural steel material shall be identified as stated in *contract documents*. * Welding consumables shall be identified in accordance with the appropriate ANSI/AWS specification. * 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. * Metallic coatings shall be identified by, at a minimum, composition and the appropriate ASTM specification, including hot dip or mechanical galvanizing and met­allizing. * Fasteners shall be stored in containers clearly identified by type, grade, size and lot number(s).   Records that provide a basis for material identifica­tion (e.g., *MTRs* and *C of Cs* for base materials, fasteners, welding consumables, and coatings) shall be filed and retained as defined in the fabricator’s documented proce­dure required by Section 9.  **PS**  **11.1 Container**  Material identification on the coating 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 coating in container, date of manufacture and manufacturer’s name and address. |  | □ |
| **11. Material Identification**  The *manufacturer* shall develop a *documented procedure* for identification of material and material traceability.  **11.1 Material Identification**  The *procedure* will describe how the *manufacturer* marks or maintains the identification of base materials from the point of receipt to the point of the first *manufacturing* operation to assure incorporation of the correct materials into the product.   * Structural Steel material shall be identified as stated in the AISC *Code of Standard Practice for Steel Buildings and Bridges* and in *contract documents*. * Welding consumables shall be identified by the appropriate ANSI/AWS specification. * *Coating* materials (excluding metallic *coating*) for *components* shall be identified by *coating* specification (for each coat if multiple coats), manufacturer, and manufacturer’s product name. * Metallic *coatings* for *components* shall be identified by composition and the appropriate ASTM specification, including hot dip or mechanical galvanizing and metalizing. * Fasteners for *components* shall be stored in containers clearly identified by type, grade, size and lot number(s).   *MTRs*, manufacturer’s test reports, and *C of Cs* for base materials, adhesives, fasteners, welding consumables, and *coatings* provide minimum material identification. In the absence of special contract requirements, these records shall constitute sufficient evidence that the material satisfies the purchase order requirements. Records that provide a basis for material identification shall be filed and retained as defined in the *manufacturer’s procedure* required by *element* 9. |  | □ |
| **BS 11.2 Material Traceability**  The fabricator shall develop a documented procedure to maintain traceability of materials from the point of receipt and throughout the course of *fabrication*. The fab­ricator may use a marking method that identifies material type and grade or use a method that provides traceability through piece, assembly or group numbering. Material traceability to corresponding heat numbers is necessary only when specifically required by contract or by supple­mental requirements of this standard.  **11.2 Material Traceability**  From the point of receipt and during the course of *manufacture*, materials shall maintain traceability. The *manufacturer* may use a marking method that identifies material type and grade or use a method that provides traceability through piece, *assembly*, or group numbering. Material traceability to corresponding *MTRs* is necessary only when specifically required by contract. |  | □ |
| **PS 11.2 Storage**  Materials shall be stored in protected areas under conditions (including temperature) per manufacturers’ recommendations. Coating with expired shelf life shall be segregated from current material or specifically marked as “expired” by the Firm. Materials with expired shelf life are nonconforming and treatment is defined in the Procedure for Control of Nonconformities required by this Standard. |  | □ |
| **PS 11.3 Certificate of Conformance for Coating - Requirements**  This quality record shall validate that the specific batches of coating and thinner or reducers satisfy the contract documents and recommendations on the manufacturer’s product data sheets. This includes the components provided by the coating manufacturer such as the vehicle, catalyst/activator, and zinc dust, and those supplied by the shop such as thinner. Certificates of Conformance shall address requirements established by the coating manufacturer and applicable contract documents including composition and testing for the specific coating. At a minimum, the Certificate of Conformance issued by the manufacturer on the manufacturer’s stationery shall contain:  • The name of the manufacturer, The product name, 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.  The Certificate of Conformance shall be retained by the Firm as part of its quality records. |  | □ |
| **12. Fabrication Process Control**  The Fabricator shall develop Documented Procedures for process control necessary to produce a consistent acceptable level of quality of the furnished product in accordance with the applicable codes or specifications. Fabrication processes include: thermal and mechanical cutting, fitting and assembly, welding, drilling, bolting, milling, and coating. The Fabricator will include additional “special Procedures” that cover fabrication processes done at the facility (e.g., cambering).  **BS**  *Fabrication* pro­cesses include but are not limited to thermal and mechanical cutting, fitting and assembly, welding, drilling, punching, bolting, shearing, milling, sweep and camber, bending and straightening, heating operations, and coating.  Regardless if these processes are routinely performed at the facility, effective implementation of the following Documented Procedures are required as a minimum: |  | □ |
| **12.1 Welding**  The Fabricator’s welding Procedure shall include:   * WPSs * Preheat requirements * PQRs (when required) * Welder, welding operator, and tack welder Qualifications and Qualification Test Records * Welder, welding operator, and tack welder performance records - to provide Objective Evidence that the “period of effectiveness” has not been exceeded for welder, welding operator, and tack welder qualifications   **BS**   * Storage (including ovens) and identification require­ments for welding consumables. * Welder, welding operator, and tack welder qualifications and qualification test records, in accordance with AASHTO/AWS D1.5. * Traceability of welds to the welders who produce them.   Approved WPSs shall be in close proximity to and used by the welders. |  | □ |
| **12.2 Bolt Installation**  The Fabricator’s bolting Procedure shall include pre-installation verification, installation, and inspection of fastener assemblies for snug-tightened, pretensioned, and slip-critical joint types. The fabricator’s documented bolting procedure shall include storage, rotational capacity testing, pre installa­tion verification, installation, and inspection of fastener assemblies for snug-tightened, pretensioned and slip-crit­ical joint types. The documented procedure shall meet the requirements of the RCSC *Specification for Structural Joints Using High-Strength Bolts*.(BS) |  | □ |
| **BS 12.3 Material Preparation for Application of Coatings**  The fabricator’s documented procedure shall support achievement of cleanliness and surface profile required by coating manufacturer recommendations and product data sheets, and by project specifications.  **12.3 Material Preparation for Application of Coatings**  The *manufacturer’s procedure* shall support achievement of cleanliness and surface profile required by *coating* manufacturer recommendations and product data sheets and by project *specifications*.  **PS**  **12.1 Surface Preparation**  Surfaces to be coated shall be prepared and cleaned in accordance with contract documents, coating manufacturer recommendations, and other nationally or internationally recognized standards or guidelines. Procedures shall be effective in controlling open-nozzle abrasive blast-cleaning and other airborne materials to the degree that the quality of other coating application or curing operations is not affected. (Also see Section 5.3.2.) |  | □ |
| **BS 12.4 Coating Application**  The fabricator’s documented procedure shall support application and curing of coatings in accordance with manufacturer recommendations and product data sheets, and with project specifications.  **12.4 Coating Application**  The *manufacturer’s procedure* shall support application and curing of *coatings* in accordance with manufacturer recommendations and product data sheets and with project *specifications*.  **PS**  **12.2 Coating Mixing and Application**  The mixing and application of coating shall be in accordance with contract documents and the coating manufacturer’s recommendations. The procedure shall be effective in demonstrating that:   * Required conditions are maintained during mixing and application; * Coating areas are free of air-blown dust, blast media, or other debris that can be detrimental to the quality of the coating during application; * Required areas are masked to protect no-coating areas. |  | □ |
| **PS 12.2.1 Application Records**  As part of the application process for complex coating systems, the following shall be recorded for **each coat** at a minimum:   * Verification of conforming surface condition * Verification of required surface and coating temperature * Coating product applied (e.g., name, number, color) * Shelf life expiration date * Coating batch numbers from base and any mixed components * Ambient temperature, relative humidity and dew point at time of application * Verification that the coating (prior to application) is free from visually evident defects * Verification that the paint was properly proportioned, thoroughly mixed and properly agitated (if required) prior to application * Thinner/reducer added (quantity and type) * Induction (sweat-in) time period (beginning and ending) where applicable * Verification that the coating was mixed and applied within the manufacturer’s specified pot life * Coating application equipment used, including pressure, coating spray gun type and tip size as applicable * Period of time elapsed since application of previous coat in multi coat systems. * Start time and finish time * Dry film thickness (DFT)   Pertinent piece marks shall be properly transferred, and heat numbers shall be transferred when required by contract documents. |  | □ |
| **12.5 Equipment Maintenance**  The Fabricator shall develop a Documented Procedure defining an equipment maintenance program to produce the required quality. The Procedure shall define preventative maintenance for, at minimum, equipment critical to product quality and delivery requirements.  **PS**  **12.2.2 Equipment**  A documented preventative maintenance procedure shall be implemented for major equipment, including but not limited to:  • Blast cleaning equipment, which includes nozzle blast equipment, centrifugal blast equipment, and dust collectors  • Compressors, line driers, and oil separators  • Conventional or airless spray equipment  • Lifting equipment |  | □ |
| **13. Inspection and Testing**  The Fabricator shall develop a Documented Procedure for inspection and testing activities to verify that the product quality meets the project requirements.  The inspection and testing Procedure shall define receipt, in-process, and final inspection of all product furnished to a project.  Product determined during inspection and testing to be nonconforming shall be addressed by the Fabricator’s Nonconformance Procedure required in Element 15.  For each type of inspection less than 100 percent, the Procedure shall describe the methods for establishing sampling plans and for adjusting the level and frequency of inspection to assure expected contract quality. The Fabricator’s methods will adjust the level and frequency of inspection at any time the required level of quality is not met. The level or frequency of an inspection sampling plan shall not be zero where a Nonconformance has been identified and Corrective Action has not been fully implemented and verified as effective.  **PS**  The Firm shall conduct 100% inspection for visible coating defects. At a minimum, the Firm shall conduct dry film thickness measurement in accordance with SSPC-PA 2 (see below 13.2), unless otherwise specified in the contract documents. The sampling plan should identify the unique problem areas created by the part or piece geometry. The Firm shall enforce its procedures for control of nonconformities (see Section 15) when product is found nonconforming. |  | □ |
| **13.1 Assignment of QC Inspections and Monitoring**  The inspection Procedure shall define inspection and testing and the required records to meet the project requirements and shall assign QC inspection and QC monitoring duties.  Qualification requirements for QC inspectors shall be defined and documented as required in Section 5.4.1. QC inspectors shall be assigned on the basis of qualification, evidenced by experience, training, and education. Qualification Standards and Certifications granted by recognized industry organizations related to Structural Steel Fabrication can be used as a basis for qualification. QC inspectors shall be periodically monitored by QA (either by repeating the QC duties or by witnessing their work).  Production personnel shall be assigned to QC inspection duties under the following conditions:   * 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. * Their inspections are monitored by qualified QC personnel. |  | □ |
| **PS 13.1 Assignment of Inspection of Surface Preparation and Application of Coating**  Inspectors shall be assigned on the basis of their qualifications to perform inspection of coating systems. Production personnel can be assigned to inspection duties under the following conditions:   * They are trained both in knowledge and practice of proper inspection methods and acceptance criteria specified for the material they are inspecting. This capability can be demonstrated by their knowledge of the acceptance criteria for the part of the process for which they have inspection responsibility. * They are aware of and have adequate time to perform their inspection responsibilities. * 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.   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.) |  | □ |
| **13.2 Inspection Procedure**  The Fabricator’s Procedure shall include provisions for the following:  **13.2.1 Material Receipt Inspection**  Materials received shall be compared to the purchase order requirements. The receiver shall identify the material, grade, and quantity and look for visible shipping damages. The receiver shall inspect shapes and plates for obvious deviations from the requirements of purchase order specifications.  **BS**  Materials received shall be checked for conformance with the purchase order requirements. The receiver shall identify the material, grade, size and quantity and look for visible shipping damage.  *MTRs* and *C of Cs* for base materials, fasteners, welding consumables, coatings, and any other product which becomes part of the shipped component shall be checked for compliance with the purchase order requirements.  If materials are supplied by the *owner*; the fabri­cator shall verify that the material meets the require­ments of the *contract documents*. |  | □ |
| **13.2.2 In-Process Inspection**  The Fabricator shall conduct in-process inspection. In-process inspection plans and practices will provide a level of compliance assurance for specified process requirements and inspection acceptance criteria that are not verifiable at final inspection or that can hinder assembly. In-process inspection is appropriate for: welds that will be hidden or out of reach during the final inspection, visual examination of fit-up tolerances that will not be visible after welding, areas requiring coatings that will not be accessible during final inspection.  Materials shall be inspected for specification and grade, workmanship, and tolerances using appropriate codes, standards, or a documented plan before Fabrication begins. Compliance with documented bolting Procedures and welding Procedures (WPSs, preheat and welding personnel qualifications) shall be monitored.  Under the conditions described in Section 13.1, production personnel shall be capable of inspecting the product or subassembly before sending it to the next process. |  | □ |
| **13.2.3 Final Inspection**  The Fabricator shall conduct final inspection. QC inspectors qualified and responsible for final inspection shall perform the final inspection of Structural Steel products after the fitting, welding, and coating operations, but prior to delivery.  Qualification requirements for personnel performing final inspection shall be defined and documented as required in Section 5.4.1. Competency of staff-employed and subcontracted individuals performing final inspection shall be verifiable and evidenced by experience, training, and education.  **13.2.4 Inspection Records**  The inspection 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.  Final inspections shall be documented. The Quality Records produced shall be filed and retained as defined in the Fabricator’s Procedure required by Element 9. Inspection records shall clearly show the products and product aspects that were inspected and who performed the inspection. |  | □ |
| **PS 13.2 Inspection Records**  Records shall be maintained for complex coating systems showing what parameters were inspected, who performed the inspections, the date of inspections, what pieces were inspected and disposition of any nonconformances. The Firm shall document every final complex coating inspection that is conducted. Documentation requires retrievable records that are retained for an appropriate period related to contract requirements (see Section 9). The scope of the final coating inspection is per the Firm's plan for meeting the minimum requirements (see Section 13), and which may be dictated by contract requirements. Inspection reports and test results shall be consistent with customer and owner requirements. At a minimum, the following inspections shall be recorded:  • Surface Preparation (degree of cleanliness achieved; surface profile achieved; condition of surface immediately prior to beginning coating application)  • Dry film thickness (DFT) including any specific data required by SSPC-PA 2 or contract documents.  • Visual inspection for visible coating defects (recording by exception only does not meet this requirement)  • DFT gage accuracy verification record (see element 14) |  | □ |
| **14. Calibration of Inspection, Measuring, and Test Equipment**  The Fabricator shall develop a Documented Procedure to control, calibrate, and maintain inspection, measuring, and test equipment used to demonstrate the compliance of products and processes to the specified requirements. Tools with devices for measuring properties of fabricated pieces or process variables are included in this requirement when they are used to demonstrate the compliance of products and processes to the specified requirements.  The documented 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 whenever the accuracy of the meter is in question and at a minimum every twelve months.  Inspection, measuring and test equipment shall be used in a manner consistent with the required measurement. The precision capability of the equipment used shall support reliable determination of compliance with acceptance criteria. When specifically required, technical data pertaining to the measurement equipment shall be made available for verification that the measuring equipment is performing properly.  For inspection, measuring, and test equipment used to demonstrate the compliance of products and processes to the specified requirements, the documented procedure shall include:   * An equipment list that provides a means for unique identification of each piece of equipment * Service use for each piece of equipment including the required precision for the types of inspections, measurements or tests made * Handling, preservation, and storage of inspection, measuring, and test equipment to maintain accuracy and fitness for use * Calibration frequency for each piece of equipment based upon: service use, requirements of this Standard, manufacturer’s recommendations, project requirements, specification requirements * 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 * The calibration procedure for each piece of equipment calibrated at the Fabricator’s facility * The calibration accuracy acceptance criteria for each piece of equipment * **BS** The action to be taken when equipment does not meet the calibration requirements. This action includes disposition of the measuring device and an evaluation of the impact to product that was measured using the device. * Calibration Quality Record maintenance as defined in the Fabricator’s Procedure required by Element 9 * Method of preventing inadvertent use of equipment that is not calibrated where calibrated equipment is required |  | □ |
| **15. Control of Nonconformances**  The Fabricator shall develop a Documented Procedure to identify and control Nonconformances. These Nonconformances may be identified by the Fabricator’s inspection program, process monitoring, and during internal and external audits, which are then addressed by the Corrective Action Procedure required by Element 16 and reviewed during the management review (Section 5.2).  **BS**  *QC* inspectors finding nonconforming work shall have authority to stop the work and responsibility to inform the operating supervisor of the nonconformance. |  | □ |
| **15.1 Nonconforming Process**  Nonconformances related to the performance of the Quality Management System shall be documented to the detail level described by this Procedure.  **BS**  **15.1 Nonconformance with the Quality Management System**  Nonconformances are not limited to nonconforming product. A nonconformance related to the performance of the *quality management system* shall be documented to the detail level described by the documented procedure. |  | □ |
| **15.2 Nonconforming Product**  Nonconforming product shall be documented to ensure that final product not conforming to specified requirements is prevented from reaching the Customer. This Procedure shall provide for identification, documentation, evaluation, segregation (when practical), treatment of nonconforming product, and for notification of the relevant functions concerned.  Nonconforming product shall be clearly 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 responsibility for review, authority, and required qualifications for the personnel selecting treatment of nonconforming product shall be defined by the Procedure. If the treatment is rework or repair, the result will be inspected per drawing, specification, project requirements, and the Fabricator’s inspection Procedure. The treatment of nonconforming product may be:   * Reworked * Repaired * Use as is (after more detailed analysis or acceptance by the Fabricator’s engineering or management) * Customer-approved nonconforming product * Scrapped   Approval from the Owner’s Designated Representatives for Design and Construction may be required by contract for treatment of Nonconformances. These approvals shall be in writing for treatments resulting in ”use as is,” “repaired,” or ”reworked.” |  | □ |
| **16. Corrective Action**  The Fabricator shall develop a Documented Procedure for Corrective Action. Any Corrective Action taken shall be to the degree appropriate to the magnitude of problems and commensurate with the risks to product quality.  The Corrective Action 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. Corrective Action may be applied when:   * There is a Nonconformance that is repetitive in nature. This can be identified by periodically reviewing Nonconformance reports or summaries for negative trends. * Process Nonconformances are found during the internal and external quality audits indicating that the Quality Management System may not be implemented and functioning as stated in the Quality Manual. * Nonconformance with the Quality Management System is found during the day-to-day execution of the system. * Nonconformance is unacceptable due to cost or severity. * A customer complaint has been received. * A complaint has been received from an *owner*, general contractor or erector. **(BS)**   The Corrective Action Procedure shall address these steps:   1. 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 Corrective Action Procedure shall define the functional positions authorized to issue a CAR and initiate the Corrective Action process. 2. Assign responsibility and establish a timeframe for the response to a CAR. 3. Investigate and document the scope of the Nonconformance, root causes, Corrective Measures taken, and list the actions to be taken to prevent recurrence. 4. Communicate the Corrective Action Request and resolution to the Management Team and appropriate members of the organization. 5. Follow up the Corrective Action taken with periodic monitoring to assure the Corrective Action is implemented and is effective. |  | □ |
| **17. Handling, Storage and Delivery of Product and Materials**  Material shall be stored, loaded, and shipped to avoid damage and deterioration. Material shall be marked with its identification and shall be listed on a manifest or shipping documents.  Delivery instructions and any shipping agreements (e.g., sequencing that complies with erection needs) between the Fabricator, the Customer, the Fabricator’s Subcontractors, or the Fabricator’s Suppliers shall be included in written purchasing documents as required in Section 10.1 of this Standard. Shipments by Subcontractors and Suppliers shall be coordinated and monitored for compliance with shipping and delivery instructions as required in Section 10.3 of this Standard.  **BS**  Owner-supplied material or material paid for as “mate­rial on hand” before *fabrication* shall be protected to prevent use in other than its intended purpose. Any such product that is lost, damaged, or is otherwise unsuitable for use shall be recorded and reported to the owner.  **PS 15. Control of Nonconformities**  Materials with expired shelf life are nonconforming. Such materials may be “used as is” with authorization from the manufacturer as described in Section 5.1.5 of SSPC-PA 1, “Shop, Field, and Maintenance Painting of Steel.” The manufacturer’s extension of the shelf life is evidenced by a replacement Certificate of Conformance. Alternatively, materials with expired shelf life may be used as “owner-approved nonconforming product” with documentation of approval from the Owner. Records shall be kept of the nonconforming materials and pieces affected, the nature of the nonconformance, the disposition selection, authorization and inspection results. |  | □ |
| **18. Training**  Inspection personnel performing final inspection of the product and personnel responsible for functions that affect quality shall receive initial and periodic Documented Training. Personnel receiving initial and periodic Training shall include: project managers, detailers, inspectors, welding personnel, fitters, and painters.  Personnel providing Training shall have training or experience in the subject they are teaching. Training course outlines include the subject and the key points. Evaluation of student comprehension of course material is desirable. |  | □ |
| **PS 18.1 Qualification and Training of Production Personnel**  Production personnel shall demonstrate and be capable of inspecting their own work as an in-process inspection. The **Firm shall implement a written program to:**   * Assess the skills and general training needs of newly hired craft workers and qualify them for their assigned tasks * Verify the qualifications of existing craft workers * Train inexperienced craft workers (trainees) as necessary * Evaluate the performance of craft workers at least once per calendar year and provide additional training as necessary * Ensure compliance with contract specific worker training/qualification requirements. |  | □ |
| **PS 18.2 Qualification and Training of Inspection Personnel**  Personnel involved in inspection of surface preparation and coating application and curing shall be qualified by training and experience as defined by the Firm. Experience shall include the inspection of complex coating systems 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 coating processes shall be documented and shall include experience and training in surface preparation and coating application and in inspection and testing of these processes. The competency of inspectors shall be assessed and then documented. The competency of inspectors without experience or inspectors at new Firms shall be documented. Qualification standards and certifications granted by recognized industry organizations can be used to establish the basis for qualification. Training for inspectors may be provided and documented by qualified in-house instructors or by external sources. At a minimum, the training shall include these “body of knowledge” items as described in ASTM D 3276:   * Surface Preparation (mill scale; surface profile; chemical cleaning; solvent vapor cleaning; hand and power tool cleaning; abrasive blast cleaning; pressurized water cleaning; steel surfaces, galvanized surfaces) * Coating Storage and Handling (storage of coating and thinner; mixing; thinning; initial samples of coating and thinner; heating of coating) * Weather Considerations (drying; low temperature; high temperature, moisture; wind) * Coating Application (residual contaminants; quality assurance; film defects; brush application; roller application; spray application; miscellaneous methods; rate of application) * Additional Considerations (ventilation; shop coat repair; coating schedule; recoat time; coating system failure) * Inspection Equipment (general; surface profile gage; adhesion of existing coating; portable pull off adhesion; drying and curing times; thermometers; relative humidity and dew point; coating consistency cups; weight per gallon cup; wet film thickness; interchemical gage; notched gage; dry film thickness gages; non destructive film thickness gages; magnetic type gages; current type gages; holiday detectors; Tooke gage; * Comparison of Surface Preparation (specifications) * Inspection Checklist |  | □ |
| **19. Internal Audit**  The Fabricator shall perform an internal audit of each Element of the Quality Management System at least once a year to evaluate their compliance and the effectiveness of implementation.  **BS** Different parts of the quality management system may be audited at different times and different frequencies, as long as all ele­ments of the quality management system are audited annu­ally. Audits shall be scheduled based on the importance of the area being audited.  The Management Representative or a qualified individual, independent of the function being audited, shall perform the audit and provide a written record of the audit result from each Element. |  | □ |

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| **Coating Category Definitions**  **Enclosed Shop**  An enclosed shop is a facility, enclosure or building (four continuous walls or partitions to grade or floor with a roof) at the firm’s location for certification where surface preparation, coating, curing, and coating storage are conducted in a controlled environment with fixed or portable ventilation systems. Ambient conditions such as temperature, humidity, dew point and airborne contaminants are controlled and maintained to meet contract requirements. The work environment is protected from adverse outdoor weather conditions and outdoor airborne contaminants, so that the surface preparation, coating, and curing activities are not jeopardized. |  | □ |
| **Covered Shop**  A covered shop is located at a site at the firm’s location for certification with a roof but is not required to have walls, heating, or humidity control. Surface preparation, coating, and curing activities are performed under ambient conditions with fixed or portable ventilation systems. The structure provides limited protection from exposure to outdoor weather and airborne contaminants. Coating storage areas have either fixed or portable heating or cooling equipment. A method of control for this shop descriptor may be to suspend coating operations until ambient conditions are acceptable. |  | □ |
| **Open (Exposed) Shop:**  An open shop is a permanent or semi-permanent site at the firm’s location for certification open to all ambient conditions. The area is exposed to outdoor weather conditions and airborne contaminants. The site provides no controls of temperature, humidity, or ventilation in the blast or coating areas. Drying and curing of coated items takes place under ambient conditions. Coating storage areas have either fixed or portable heating or cooling equipment. A method of control for this shop descriptor may be to suspend coating operations until conditions are acceptable. |  | □ |

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| **I. Requirements for Fabricators of Intermediate Bridges**  **I2. Program Scope and Fabricator Eligibility**  To be certified under this standard, the *fabricator* shall have:   * supplied plate girder spans with field splices for high­way or railroad bridges within the last five years, **or** * 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. |  | □ |
| **I5.4.3 Fabrication Process Equipment**  Equipment shall include automatic, mechanized or semi­automatic welding equipment. |  | □ |
| **I7.1.2 Detailing Standards**  The *detailing* standards shall define the fabricator’s method for presenting information on shop assembly (blocking) drawings. |  | □ |
| **I7.2.2 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. |  | □ |
| **I12. Laydown/Assembly**  The fabricator’s *documented procedure* for shop assem­bly of field connections shall include, at a minimum, the following items:   * provisions for control of assembled dimensions for both vertical and horizontal geometry. * provisions for control of accuracy of drilling and reaming of field connections. * documented procedures, including reference draw­ings, for match-marking shop-assembled pieces. * provisions for assuring the accuracy of numerically controlled equipment, if *contract documents* permit the use of such equipment in lieu of physical assem­bly. |  | □ |
| **A. Requirements for Fabricators of Advanced Bridges**  **A2. Program Scope and Fabricator Eligibility**  To be certified under this standard, the *fabricator* shall have:   * supplied advanced bridges for highway or railroad applications within the last five years, **or** * supplied intermediate bridges for highway or railroad use, 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.   Fabricators of advanced bridges shall meet the sup­plemental requirements for fabricators of intermediate bridges.  Users of this standard are encouraged to evaluate fab­ricator capability on a project-specific basis. |  | □ |
| **A6. Contract and Project Specification 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:   * shop assemblies. * dimensional control and verification. * welding. * *NDT.* * high-performance materials. * erection considerations. * other atypical or special job requirements.   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 6 and 8. |  | □ |
| **A12.1 Welding**  The fabricator’s documented procedure for welding shall include a distortion control program. |  | □ |

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| **F. Requirements for Fabricators of Bridges with Fracture-Critical Members**  **F2. Program Scope and Fabricator Eligibility**  To be certified under this standard, the *fabricator* shall have:   * supplied fracture-critical bridges in accordance with AASHTO/AWS D1.5 within the last five years, **or** * supplied non-fracture-critical intermediate or advanced bridges, 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. |  | □ |
| **F5.6.2.1 Organization:**  The *quality manual* shall include or reference a writ­ten Fracture Control Plan meeting the requirements of AASHTO/AWS D1.5. |  | □ |
| **F7.1.3. 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. |  | □ |
| **F10.1 Purchasing Data**  The fabricator’s written purchasing documents shall iden­tify material to be used for fracture-critical applications. |  | □ |
| **F11.2 Material Traceability**  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. |  | □ |
| **F12.1 Welding**  The fabricator’s documented procedure for welding shall include:   * *PQRs.* * fracture-critical provisions for welding procedure qualification, preheat, and storage of consumables. |  | □ |
| **F13.2 Inspection Procedure**  The fabricator’s documented procedure shall include pro­visions for inspection of fracture-critical welds. |  | □ |
| **F15.2 Nonconforming Product**  The fabricator’s documented procedure shall include provisions for *repair* of critical and non-critical fracture-critical welds in accordance with AASHTO/AWS D1.5. |  | □ |