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ACCEPTANCE CRITERIA FOR FABRICATORS OF STRUCTURAL WELDING

AC172

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PREFACE

Evaluation reports issued by ICBO Evaluation Service, Inc. (ICBO ES), are based upon performance features of the Uniform family of codes and the International family of codes. Section 104.2.8 of the *Uniform Building Code*[™] (UBC), Section 104.11 of the *International Building Code*[®] (IBC) and Section R104.11 of the *International Residential Code*[™] (IRC) are the primary charging sections upon which evaluation reports are issued. Section 104.2.8 of the UBC reads as follows:

The provisions of this code are not intended to prevent the use of any material, alternate design or method of construction not specifically prescribed by this code, provided any alternate has been approved and its use authorized by the building official.

The building official may approve any such alternate, provided the building official finds that the proposed design is satisfactory and complies with the provisions of this code and that the material, method or work offered is, for the purpose intended, at least the equivalent of that prescribed in this code in suitability, strength, effectiveness, fire resistance, durability, safety and sanitation.

The building official shall require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use. The details of any action granting approval of an alternate shall be recorded and entered in the files of the code enforcement agency.

Similar provisions are contained in Sections 104.11 and R104.11 of the IBC and IRC, respectively.

The attached acceptance criteria has been issued to provide all interested parties with guidelines on implementing performance features of the applicable code(s) referenced in the acceptance criteria. The criteria was developed and adopted following public hearings conducted by the Evaluation Committee and is effective on the date shown above. All reports issued or reissued on or after the effective date must comply with this criteria, while reports issued prior to this date may be in compliance with this criteria or with the previous edition. If the criteria is an updated version from a previous edition, solid vertical lines (■) in the outer margin within the criteria indicate a technical change or addition from the previous edition. Deletion indicators (◆) are provided in the outer margins where a paragraph or item has been deleted if the deletion resulted from a technical change. This criteria may be further revised as the need dictates.

ICBO ES may consider alternate criteria, provided the proponent submits valid data demonstrating that the alternate criteria are at least equivalent to the attached criteria and otherwise meet the applicable performance requirements of the codes. Notwithstanding that a material, type or method of construction, or equipment, meets the attached acceptance criteria, or that it can be demonstrated that valid alternate criteria are equivalent and otherwise meet the applicable performance requirements of the codes, if the material, product, system or equipment is such that either unusual care in its installation or use must be exercised for satisfactory performance, or malfunctioning is apt to cause unreasonable property damage or personal injury or sickness relative to the benefits to be achieved by the use thereof, ICBO ES retains the right to refuse to issue or renew an evaluation report.

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1.0 INTRODUCTION

The purpose of this acceptance criteria is to specify a quality assurance program for ICBO ES approved fabricators of structural welding. Fabricators complying with this criteria will have demonstrated that they have the personnel, organization, experience, knowledge and commitment to fabricate in accordance with specified requirements. ICBO ES approved fabricators operate under a documented quality system developed in concert with an ICBO ES accredited quality control agency which conducts unannounced inspections to verify continued compliance with this criteria. This criteria does not cover the fabricated products or the design or performance characteristics of the products.

2.0 REFERENCES

2.1 *Uniform Building Code*™, 1997 edition, published by the International Conference of Building Officials.

2.2 ICBO ES Acceptance Criteria for Quality Control Agency Accreditation.

2.3 ICBO ES Rules of Procedure for Fabricators.

2.4 ANSI/AWS D1.1 Structural Welding Code.

2.5 AISC Quality Certification Program.

2.6 AWS Welding Quality Assurance Guideline for Fabricators.

2.7 RGA 1-75 City of Los Angeles Rules and Requirements of Licensed Fabricators.

2.8 ANSI/ISO/ASQC Q9001-1994, Quality Systems—Model for Quality Assurance in Design, Development, Production, Installation and Servicing.

2.9 Mil-Std-109 Definitions.

3.0 DEFINITIONS

For the purposes of this acceptance criteria, the definitions given in ISO 8402, and the definitions that follow, apply.

3.1 Approved fabricator: An established and qualified person, firm or corporation approved by the building official pursuant to Section 1701.7 of the *Uniform Building Code*.

3.2 Quality assurance: Is defined in Mil-Std-109 as a planned and systematic pattern of all actions necessary to provide adequate confidence that a product will conform to established requirements.

3.3 Quality control: Is defined in Mil-Std-109 as a management function whereby control of the quality of raw or produced material is exercised for the purpose of preventing production of defective articles.

3.4 Product: Result of activities or processes.

NOTES:

- a. A product may include service, hardware, processed materials, software, or a combination thereof.
- b. A product can be tangible (e.g., assemblies or processed materials) or intangible (e.g., knowledge or concepts), or a combination thereof.

3.5 WPS: Welding Procedure Specification.

3.6 PQR: Procedure Qualification Record.

4.0 GENERAL REQUIREMENTS

4.1 Quality system:

4.1.1 The fabricator shall establish and implement a quality system that is fully documented. This documented quality

system must describe the fabricator's procedures for ensuring that fabricated products meet the specified requirements.

4.1.2 The fabricator, in concert with an ICBO ES accredited quality control agency, shall prepare and submit to ICBO ES its documented quality assurance system, including a cross-reference matrix ensuring that the data in Section 5.0, the statements in Section 6.0, and the written procedures noted in Section 7.0 of this acceptance criteria have been included.

4.1.3 The submitted quality assurance document must be signed and dated by an authorized representative of the fabricator.

4.1.4 The submitted quality assurance document must be signed and dated by an authorized representative of an ICBO ES accredited quality control agency, attesting that the agency has reviewed the fabricator's documented quality system.

4.2 Follow-up inspections: The fabricator must obtain the services of an ICBO ES accredited quality control agency, which is accredited for the specified discipline, to conduct, at a minimum, quarterly unannounced inspections (four per year) of the fabrication facility.

4.3 Audit by ICBO ES: Prior to recognition, the fabricator is required to undergo an on-site audit by ICBO ES. This audit will be conducted jointly with the accredited quality control agency. The purpose of this joint audit is to determine compliance of the fabricator with the documented quality system, and to assess the inspection procedures of the quality control agency.

4.4 Quality manager: The fabricator shall designate a quality manager who has responsibility for the following:

4.4.1 Maintaining the fabricator's documented quality assurance system.

4.4.2 Monitoring the effective implementation of the fabricator's documented quality assurance system.

4.4.3 Assuring that periodic internal audits are conducted and documented, and that corrective actions are implemented.

4.4.4 Assuring that annual management reviews are conducted and documented.

4.5 In-house quality control inspector: The fabricator shall designate an in-house quality control inspector who must:

4.5.1 Be a Certified Welding Inspector (CWI) in accordance with the provisions of AWS QC1 or the requirements of the Canadian Standards Association (CSA) Standard W178.2.

4.5.2 Be familiar with codes and specifications which apply to the fabrication work performed.

4.5.3 Be responsible for assuring that only qualified and certified welders are used.

4.5.4 Be responsible for assuring continuity of the welders' qualifications.

4.5.5 Be responsible for overall workmanship and for making sure that weldments are visually inspected.

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

4.5.7 Be responsible for ensuring that the final weldments can be traced back to the incoming raw materials, the quality assurance records and the individual welder.

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

4.6 Welding personnel: The fabricator shall ensure that the following conditions are met:

4.6.1 All welding personnel shall be qualified by the test as described in ANSI/AWS D1.1 by a qualified independent third-party agency. Acceptable third-party qualification may be by certification as an AWS Certified Welding Inspector (CWI) in accordance with the provisions of AWS QC1, *Standard Guide for Qualification and Certification of Welding Inspectors*, or current qualification by the Canadian Welding Bureau (CWB) to the requirements of the Canadian Standards Association Standard W178.2, *Certification of Welding Inspectors*.

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

5.0 REQUIRED DATA

The following information shall be included in the quality system submittal:

5.1 The name, street address and telephone number of the fabrication facility.

5.2 A floor plan of the fabrication facility.

5.3 A list of major production equipment, keyed to the floor plan.

5.4 A list of typical items fabricated (e.g., beams, trusses, towers, signs, etc.).

5.5 A copy of all proposed WPSs for production welding. The WPSs shall be written to include essential and nonessential variables.

5.6 A copy of all PQRs for welding procedures that are to be qualified by testing.

5.7 A list of qualified welders, including their approved welding procedures, positions and identifying marks.

5.8 Evidence that each proposed welder has been certified by an independent third-party CWI in accordance with Section 4.6.1 of this criteria.

5.9 The name and license number of the CWI acting as the in-house quality control inspector.

5.10 The name of the deputy in-house QC person who assumes the position in the absence of the primary in-house QC person.

5.11 An organizational chart of the fabricator, including the names of the responsible quality assurance personnel. This chart must show the relationships among the management, quality manager, in-house quality control inspector, deputy in-house inspector and welding personnel.

5.12 Specifications and means of identification for all incoming raw materials.

5.13 A list of approved vendors, including any testing agencies use to verify a WPS.

5.14 A list of test and measuring equipment used for the quality functions of the fabricator.

6.0 REQUIRED STATEMENTS

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

6.1 A policy statement that includes the following elements:

6.1.1 All activities of the organization shall be directed in such a manner as to ensure that the quality requirements of this criteria will be met.

6.1.2 The elements of the quality assurance program will be disseminated to all responsible personnel.

6.2 The manual shall, at a minimum, be reviewed annually.

6.3 ICBO ES will be notified, in writing, prior to any cancellation of the inspection agreement with the quality control agency.

6.4 Copies of reports of inspections conducted by the quality control agency, if they note major quality control variations, will to be forwarded by the fabricator to ICBO ES within 10 days of the major deficiency's being reported.

6.5 The fabricator will notify the quality control agency when the fabrication facility is to be closed for extended time periods other than for normally scheduled periods for maintenance or vacations. ICBO ES and the agency will be notified prior to resumption of operations.

6.6 ICBO ES will be notified in writing if unannounced, follow-up inspections have not been conducted by the quality control agency.

6.7 The fabricator will promptly investigate and respond to ICBO ES or a building official when apprised of complaints regarding the noncompliance of finished product with stated specifications.

7.0 REQUIRED WRITTEN PROCEDURES:

The fabricator shall submit written procedures for the following:

7.1 Contract review: Review of new work to ensure that the needed resources exist to fulfill the contract requirements.

7.2 Document control: Control of documents and data relating to the quality functions of the fabricator. This control must include the following:

7.2.1 A means of document approval.

7.2.2 A means to ensure that only current, approved documents are used.

7.2.3 A means of ensuring that documents are available at all locations where necessary for the proper functioning of the quality system.

7.3 Purchasing:

7.3.1 Determining that purchased products will conform to specified requirements.

7.3.2 Evaluation of subcontractors for their ability to meet subcontract requirements (if applicable).

7.4 Product traceability: Traceability of the finished product to:

7.4.1 Incoming raw materials.

7.4.2 Responsible welders.

7.4.3 Plans and specifications.

7.4.4 Quality records.

7.5 Process control:

7.5.1 Responsibility for developing WPSs that conform with contract drawings and specifications.

7.5.2 Responsibility for verification of WPSs.

7.5.3 Verification of the following:

7.5.3.1 Dimensional accuracy.

7.5.3.2 Surface preparation for protective coatings.

7.6 Inspection and testing:

7.6.1 Inspection of incoming raw materials and review of mill test reports to ensure compliance with purchasing documents.

7.6.2 Inspection of welds by qualified personnel, including the frequency, methods and number of weldments inspected by the in-house CWI.

7.7 Control of inspection, measuring and test equipment:

7.7.1 The maintenance schedule and calibration procedures for welding equipment.

7.7.2 Ensuring traceability of calibration to nationally recognized standards.

7.8 Control of nonconforming weldments: Methods of identifying, documenting and assigning the disposition of nonconforming weldments.

7.9 Corrective action: Investigating, documenting and correcting nonconformances.

7.10 Handling and storage: Identifying and storing incoming materials and finished products.

7.11 Internal audits: The frequency, method of documentation and the content of internal audits to determine the effectiveness of the quality system.

7.12 Control of quality records: Methods for storing, maintaining and accessing quality control records for a minimum of two years, the records to include:

7.12.1 In-house quality inspection reports, forms, checklists.

7.12.2 Mill test reports and certificates of compliance from vendors, for incoming raw materials.

7.12.3 Copies of inspection reports by the quality control agency.

7.12.4 Records of internal audits.

7.12.5 Training records.

7.12.6 Evaluations of vendors and subcontractors.

7.13 Training:

7.13.1 Procedure for training all personnel who have an effect on the quality of the finished product.

7.13.2 Procedure for maintaining current personnel qualifications.