

**STRUCTURAL WELDING INSPECTION: 2007 & 2010 CBC****Disciplines:** Structural**History:** Revised 08-18-14

Revised 03-10-11

Revised 03-19-12

Revised 01-02-08

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**Purpose:** The purpose of this Interpretation of Regulations (IR) is to clarify the minimum requirements and responsibilities for personnel conducting structural welding inspection on projects under Division of the State Architect (DSA) jurisdiction. It is applicable to both shop and field structural welding activities. For projects submitted to DSA for review under the 2001 California Building Code (CBC), see IR 17-3.01.

**1. CONTINUOUS V. PERIODIC SPECIAL WELDING INSPECTION:** While the 2001 CBC required “constant” special inspection of all welding operations (except that “continuous” inspection was permitted for certain weld types) the 2007 and 2010 CBC call for “continuous” and “periodic” inspection. These terms, as applicable to structural welding, are defined below.

**1.1 Continuous:** The welding inspector must be in the area of the work full-time during all phases (except material identification), and shall inspect in a timely manner, before subsequent operations are performed. Continuous inspection is required for all welds except single pass fillet welds less than or equal to 5/16” and floor and deck welds.

**1.2 Periodic:** The welding inspector is present in the area where the work is being or has been performed, and at the completion of the work. Periodic inspection is allowed for single-pass fillet welds less than or equal to 5/16” and floor and roof deck welds. Inspection must be done in a timely manner, before subsequent operations are performed. The inspector must be present at the start of welding, intermittently during welding operations, and at the completion of each welding operation. All inspection duties described in Section 3 below apply without exception.

**2. QUALIFICATIONS:** Welding inspectors shall meet all of the following requirements:

**2.1** Have valid certification as an American Welding Society (AWS) certified welding inspector or senior certified welding inspector as defined in the provisions of ANSI/AWS QC1.

**2.2** Be not less than 25 years of age,

**2.3** Have at least three years experience in construction or inspection work on projects similar to the project for which the inspector is applying, and

**2.4** Must possess knowledge of the administrative requirements of Title 24, Part 1 and special welding inspection requirements of Title 24, Part 2.

**3. INSPECTION DUTIES:** The following duties apply to both continuous and periodic special welding inspection;

**3.1 Prior to Welding:**

**3.1.1** Review and understand the applicable portions of DSA approved plans, specifications, field changes, and other DSA approved documents. Approved shop drawings, erection drawings, and referenced codes and standards must be reviewed and understood. (Note that shop/erection drawings are NOT DSA approved documents and shall NOT be used as a basis for determining compliance.)

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- 3.1.2** Review manufacturer's Material Test Report (MTR). Verify that all materials properties (e.g., grade, type, size, thickness) are as specified by DSA approved documents, and that all materials are readily identifiable and traceable to an MTR. Sample any unidentifiable material for testing. All testing of materials must be performed by a laboratory accepted by the DSA Laboratory Evaluation and Acceptance program.
- 3.1.3** For seam welds in hollow structural sections, conduct a thorough visual examination of the seam weld area for visible discontinuities. Visual examination should include, as a minimum, the exterior of the seam weld and the interior at each end.
- 3.1.4** For structural plate, conduct a thorough visual examination of surfaces for visible lamination discontinuities.
- 3.1.5** Verify that all applicable welder, welding operator, and tack welder qualifications are available, current, and accurate.
- 3.1.6** Verify that a written Welding Procedure Specification (WPS) is available on site for each type of weld, the WPS is in compliance with all requirements, and the WPS has been approved as required by the construction documents.
- 3.1.7** Witness all procedure qualification tests required for non-prequalified welds and verify that procedure qualification records are compliant with all applicable requirements.
- 3.1.8** Verify that all welding consumables comply with DSA approved documents and the approved WPS. Verify that all electrodes are properly stored.
- 3.1.9** Verify that the welding current and voltage are within the WPS parameters by using a calibrated hand-held volt/amp meter. Readings should be taken as near the arc as possible.
- 3.2 During Welding:**
- 3.2.1** Verify that joint preparation, assembly practice, preheat temperatures, interpass temperatures, welding techniques, welder performance, and post-weld heat treatment meet the requirements of DSA approved documents, WPS, and applicable AWS code.
- 3.2.2** Conduct visual inspection of the work. Verify size, length, and location of all welds. Verify that all welds conform to the requirements of the AWS code and DSA approved documents. Weld size and contour shall be measured with suitable gauges.
- 3.2.3** Mark completed welds, parts, and joints that have been inspected and accepted with a distinguishing mark, tag or dye stamp. The inspector's mark shall be placed near the fabricator's piece mark and be visible through the steel erection process. The inspector's mark shall include the special inspector's initials, inspection date, and testing laboratory identification (if applicable).
- 3.2.4** Schedule or notify those responsible for nondestructive testing technicians in a timely manner, after visual inspection and acceptance is complete and the assembly has cooled. See DSA [IR 17-2](#) for further information regarding nondestructive testing.
- 4. REPORTING:**
- 4.1** Provide daily inspection reports that clearly describe the inspection process. The report shall document all inspection duties listed in Section 3 above. Reports shall include a systematic list of accepted and rejected welds, parts, or joints. Reports shall clearly document weld locations by grid line, elevation, or other acceptable means.

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- 4.2 Reports shall reference the details on the DSA approved documents used as a basis for inspection.
- 4.3 Inspection reports must state that the work was inspected in accordance with, and met the requirements of, DSA approved documents. Reports must be submitted as required by 2010 Title 24, Part 1, Section 4-333(d) [Section 4-333(c) in the 2007 Title 24, Part 1]. A sample special inspection form ([DSA-250](#)) is available on the DSA website.
- 4.4 Reports shall be sent to the school district and copied to the architect, structural engineer, project inspector, and DSA within 14 days of the date of the inspection. For field welding, reports shall also be presented to the project inspector on a daily basis. Reports indicating non-compliance shall be submitted immediately.
- 4.5 At the conclusion of the work, the welding inspector that is employed directly by the school district is required to sign and submit a verified report. The verified report shall be made on form [DSA-292](#) available on the DSA website.
5. **FAILURE TO PERFORM:** Failure to inspect in a professional and competent manner, report defective work, file all required reports in a truthful and timely manner, or fulfill any other duties defined by the code may result in withdrawal of DSA acceptance or approval. This includes, but is not limited to, the withdrawal of acceptance or approval to work on any current or future projects under DSA jurisdiction.

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### REFERENCES:

- California Code of Regulations Title 24
  - Part 1, California Administrative Code (CAC)
    - 2007 CAC, Section 4-333(c)
    - 2010 CAC, Section 4-333(d)
  - Part 2, 2007/2010 California Building Code
    - Sections 1704A.3, Table 1704A.3, 2203A.1, 2203.1<sup>1</sup>

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This Interpretation of Regulations (IR) is intended for use by the DSA staff, and as a resource for design professionals, to promote more uniform statewide criteria for plan review and construction inspection of projects within the jurisdiction of DSA which includes State of California public elementary and secondary schools (grades K-12), community colleges and state-owned or state-leased essential services buildings. This IR indicates an acceptable method for achieving compliance with applicable codes and regulations, although other methods proposed by design professionals may be considered by DSA.

This IR is reviewed on a regular basis and is subject to revision at any time. Please check the DSA website for currently effective IRs. Only IRs listed on the Web page at [www.dgs.ca.gov/dsa/Resources/IRManual.aspx](http://www.dgs.ca.gov/dsa/Resources/IRManual.aspx) at the time of plan submittal to DSA are considered applicable.

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<sup>1</sup> Indicates alternative 2010 CBC sections that may be used by community colleges, per 2010 CBC 1.9.2.2