
STRUCTURAL WELDING INSPECTION: 2016, 2013, 2010 and 2007 CBC

Disciplines: Structural	History:	Revised 05/08/18	Revised 10/11/11
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Division of the State Architect (DSA) documents referenced within this publication are available on the [DSA Forms](#) or [DSA Publications](#) webpages.

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.

- See *IR 17-2: Nondestructive Testing (NDT) of Structural Welds* for information about nondestructive testing (NDT) of welds.
- See *IR 17-9: High-Strength Structural Bolting Inspection* for information on high strength bolting (HSB) inspection.

SCOPE: This IR is applicable to both shop and field structural welding inspection activities. The welding inspection provisions herein do not apply to “non-structural” welded elements.

1. CONTINUOUS VS. PERIODIC SPECIAL WELDING INSPECTION: The 2016, 2013, 2010 and 2007 California Building Code (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, which is verified as described in Section 3.1.2), 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”, floor and roof deck welds, and reinforcing steel not part of concrete intermediate or special moment frames or shear walls.

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”, floor and roof deck welds, and reinforcing steel not part of concrete intermediate or special moment frames or shear walls. 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 Hold valid certification from the American Welding Society (AWS) as a certified welding inspector (CWI) or senior certified welding inspector (SCWI) as defined by the provisions of ANSI/AWS QC1 or;

Hold valid certification from the Canadian Welding Bureau (CWB) Level 2 or Level 3 as defined by the Canadian Standard Association (CSA) Standard W178.2.

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 will be working on.

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

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

3.1 Prior to Welding:

- 3.1.1** Review and understand the applicable portions of the DSA-approved plans, specifications, field changes and other DSA-approved documents. Approved shop drawings, erection drawings, and referenced codes and standards must also be reviewed and understood. (Note that shop/erection drawings are NOT DSA-approved documents and shall NOT be used as a basis for determining weldment conformance).
- 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 the DSA-approved documents, and that all materials are readily identifiable and traceable to the MTRs. Sample any unidentifiable material for testing by the Laboratory of Record (LOR).
- 3.1.3** For seam welds in hollow structural sections (HSS), 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 edge surfaces for any visible lamination discontinuities.
- 3.1.5** Verify that all applicable welder, welding operator, and tack welder qualifications are available, current, and conform to AWS and project specific requirements.
- 3.1.6** Verify that a written Welding Procedure Specification (WPS) is available on site for each type of weld, that the WPS is in compliance with project and AWS requirements, and that the WPS has been approved if required by the construction documents.
- 3.1.7** Witness any required Procedure Qualification Tests for non-prequalified welds and verify that applicable existing Procedure Qualification Records (PQRs) conform to AWS and project specific requirements.
- 3.1.8** Verify that all welding consumables comply with the DSA-approved documents and the approved WPS. Verify that all electrode materials 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. This equipment shall be owned and maintained by the LOR. Evidence of annual calibration shall be part of the LOR's quality system and available upon request.

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 the DSA-approved documents, WPS, and AWS.
- 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 the 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. Inspector's mark shall include: the special inspector's initials, inspection date, and testing laboratory identification (if applicable).

Note: The special inspector shall attach metal identification tags or suitable marks on completed parts that are specified to be galvanized or paint coated. Tags or marks shall

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include the “inspector’s mark” information above, be durable enough to withstand the coating process, be legible and be traceable to related inspection reports.

3.2.4 If completed welds require testing by nondestructive methods, schedule or notify those responsible for the nondestructive testing (NDT) in a timely manner, after visual inspection and acceptance is complete, and the assembly has cooled. All NDT shall be performed by qualified Level II personnel employed and supervised by a laboratory evaluated and approved for that purpose by DSA. See DSA IR 17-2 for further information regarding NDT.

4. REPORTING:

4.1 Each special inspector shall provide detailed daily inspection reports that clearly describe the work inspected. Each report shall reference the plan sheets and details on the DSA-approved documents used as a basis for inspection and shall include a systematic list of accepted and/or rejected welds, parts, or joints. Field inspection reports shall also document weld locations by structure grid line, elevation or other acceptable means. All reports shall be transmitted to the project inspector within one day of the date the inspections were performed and shall document all inspection duties listed in Section 3 above. Any rejected welds, parts, or joints that are not repaired shall be brought to the project inspector’s attention immediately.

5. FAILURE TO PERFORM: Failure to inspect the work 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. This includes but is not limited to the withdrawal of acceptance or approval to work on any current or future projects under DSA jurisdiction.

References:

- California Code of Regulations (CCR) Title 24
 - Part 1: California Administrative Code (CAC)
 - 2016 & 2013 CAC, Section 4-335
 - 2010 CAC, Section 4-333(d)
 - 2007 CAC, Section 4-333(c)
 - Part 2: California Building Code (CBC)
 - 2016 CBC, Sections 1705A.2, 1705A.2.1, Table 1705A.2.1, 1705A.3.1, 2204A.1
 - 2013 CBC, Sections 1705A.2, 1705A.2.1, 1705A.2.2.1, Table 1705A.2.1, 2204A.1, 2204.1*
 - 2010 & 2007 CBC, Sections 1704A.3.1, Table 1704A.3, 2204A.1, 2204.1*

*Indicates alternative CBC Sections that may be utilized by community colleges per CBC Section 1.9.2.2.

This IR is intended for use by DSA staff and by design professionals to promote statewide consistency for review and approval of plans and specifications as well as construction oversight of projects within the jurisdiction of DSA, which includes State of California public schools (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 subject to revision at any time. Please check DSA’s website for currently effective IRs. Only IRs listed on the webpage at www.dgs.ca.gov/DSA/Publications at the time of project application submittal to DSA are considered applicable.