
NONDESTRUCTIVE TESTING (NDT) OF STRUCTURAL WELDS: 2016 and 2013 CBC

Disciplines: Structural**History:**

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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: This Interpretation of Regulations (IR) provides clarification of specific Code requirements relating to the testing laboratories that perform nondestructive testing (NDT) of structural welds for projects under the jurisdiction of DSA.

1. SCOPE: This IR is applicable to the following NDT test methods: liquid penetrant (PT), magnetic particle (MT), ultrasonic (UT) and radiographic (RT). It does not apply to the visual inspection process during the welding operation. NDT is considered a structural test, not a special inspection.

2. REQUIREMENTS: Testing laboratories performing any NDT for projects under DSA jurisdiction shall meet all the following requirements.

2.1 General:

2.1.1 All NDT shall be performed by qualified Level II technicians employed by a laboratory evaluated and approved specifically for that purpose by DSA. A list of accepted laboratories can be viewed on the DSA's [Database and Listings webpage](#) – under *Laboratory Evaluation and Acceptance Facilities*.

2.1.2 The California registered civil engineer charged with engineering managerial responsibility of the laboratory facility (engineering manager) shall be responsible for overall implementation of the NDT program, including but not limited to supervision of the American Society for Nondestructive Testing (ASNT) Level III administrator and all Level II NDT technicians.

2.1.4 The laboratory's engineering manager shall also be responsible for NDT quality system records and overall control of all NDT equipment. See Section 5 below for more information on equipment.

2.1.5 NDT shall be performed in accordance with the DSA-approved construction documents, California Code of Regulations Title 24, The American Welding Society (AWS) D1.1, D1.8, applicable ASTM International standards, and the laboratory of record's (LOR) written procedures.

3. ADMINISTRATIVE

3.1 The NDT program shall be administered by an individual holding valid certification as an NDT Level III by the ASNT. The NDT administrator's Level III certification shall be obtained through the successful completion of an ASNT examination. The NDT administrator's certification must be current and verifiable on the ASNT website. The NDT administrator shall be certified in all NDT test methods for which the laboratory has been accepted, or is seeking acceptance, through the DSA [Laboratory Evaluation and Acceptance program](#). The NDT administrator may be a full-time employee of the laboratory or a contracted individual. The NDT administrator is, at a minimum, responsible for:

- Developing, administering, and grading all general, specific, and practical exams for Level I and II NDT personnel.

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- Creating and maintaining qualification and certification records for all Level I and Level II personnel.
- Supervising and monitoring the NDT work of all Level I and Level II NDT personnel.

4. QUALITY SYSTEM

- 4.1** The NDT program shall meet the requirements of ASTM International Standards E543 and E1212.
- 4.2** The NDT quality system shall include a laboratory specific “certification program” which clearly outlines qualifications and certification of nondestructive testing personnel. The certification program must meet the requirements of ANSI/ASNT CP-189 and be approved by the NDT administrator (see Section 3.1 above) and the laboratory engineer (see Section 2.1.2 above).
- 4.2.1** The laboratory NDT quality system shall include written method-specific procedures applicable to all NDT methods for which the facility is DSA accepted. The written procedures shall meet the requirements of applicable ASTM standards (as listed below) and be approved by the NDT administrator and the laboratories engineering manager.

Test Method	ASTM Standards
Liquid Penetrant (PT)	E165, E1417
Magnetic Particle (MT)	E709, E1444
Ultrasonic (UT)	E114, E164, E587, A898
Radiographic (RT)	E94, E1032, E1742

- 4.2.2** Written procedures that meet the requirements of ANSI/AWS D1.1 Structural Welding Code – Steel and D1.8 Seismic Supplement, shall be required for ultrasonic flaw detection of weldments.

5. EQUIPMENT

- 5.1** All NDT equipment shall be owned and maintained by the DSA accepted testing laboratory performing NDT. The equipment shall be based or housed at that facility and its use strictly controlled by the laboratory engineering manager.
- 5.2** All NDT equipment including but not limited to: UT flaw detectors (scopes), transducers, wedges, calibration blocks, MT yokes and calibrated weight sets shall be incorporated in the laboratory equipment inventory records. These records shall include equipment serial numbers and calibration/verification due dates.
- 5.3** Records of current calibration shall be kept with all NDT equipment and made available to the project inspector and DSA upon request.

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6. PERSONNEL

- 6.1** All NDT shall be performed by qualified personnel employed by a laboratory approved by DSA who hold valid company specific certification as NDT Level II.

Certification records shall include the signature and printed name of both the NDT Level III administrator and the laboratory's engineering manager. Prior to performing NDT, evidence of valid certification shall be presented by the laboratory to the project inspector. Records of certification shall be maintained on site by the project inspector and shall be available for review by the DSA field representative.

7. REPORTING

- 7.1** Each NDT Level II technician shall provide detailed daily test reports that clearly describe all work tested. Each report shall reference the plan sheets and details on the DSA-approved documents used as a basis for testing and shall include a systematic list of accepted and/or rejected welds, parts, or joints. Field test reports shall also document weld locations by structure grid line, elevation or other acceptable means. Reports shall include records of NDT equipment calibration/verification.

All reports shall be transmitted to the project inspector within one day after tests are performed. Any rejected welds, parts, or joints that are not repaired shall be brought to the project inspector's attention immediately.

- 7.2** The California registered civil engineer with engineering managerial responsibility for the laboratory (see Section 2.1.2 above) is responsible for signing and submitting form *DSA 291: Laboratory of Record Verified Report* at the conclusion of the required testing and special inspection. The Laboratory Verified Report shall include all NDT testing.

- 8. FAILURE TO PERFORM:** Failure to perform all required nondestructive testing 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 have serious consequences for the NDT technician and/or the testing laboratory accepted by DSA. These consequences include but are not limited to withdrawal of DSA approval, and/or denial of any future DSA approval to work as an NDT technician on projects under DSA jurisdiction.

REFERENCES:

California Code of Regulations (CCR) Title 24
Part 1: California Administrative Code (CAC)
Sections 4-231, 4-239, 4-335, 4-335.1

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.