Structural Welding: Special Inspection with the IBC and AISC

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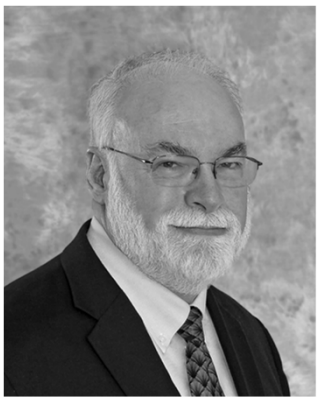

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Structural Welding: Special Inspection with the IBC and AISC

The International Building Code references the AISC Specification and the AISC Seismic Provisions for special inspection. This change took place starting with the 2012 IBC, replacing the previous text and table.

This webinar will look at

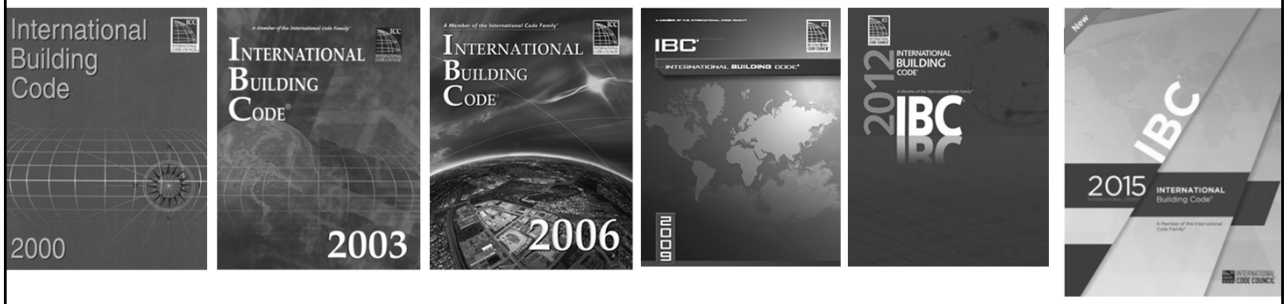
- ties between the IBC requirements and the AISC requirements for structural welding inspection
- inspector qualifications,
- available and submitted documentation,
- specific inspection tasks for both the fabricator/erector and the special inspector, and
- waiver of special inspection.

This webinar will also connect to AWS D1.1 Structural Welding Code – Steel and AWS D1.8 Seismic Supplement requirements.

Structural Welding: Special Inspection with the IBC and AISC

- ❑ guidance for the specification of special inspection of structural welding in contract documents
- ❑ the essential practices for appropriate welding inspection on the project
- ❑ guidance on potential misunderstandings between the application of the IBC and the AISC standards

International Building Code



17. Structural Tests and Special Inspection
22. Steel

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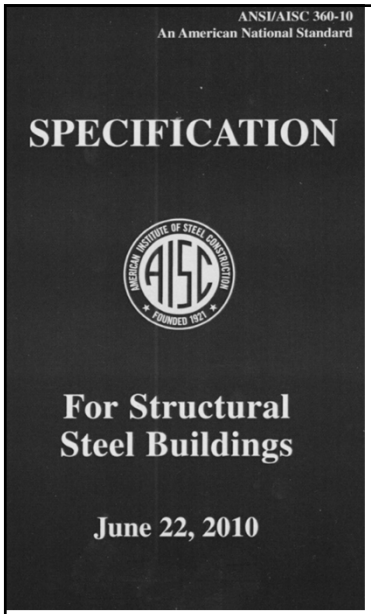

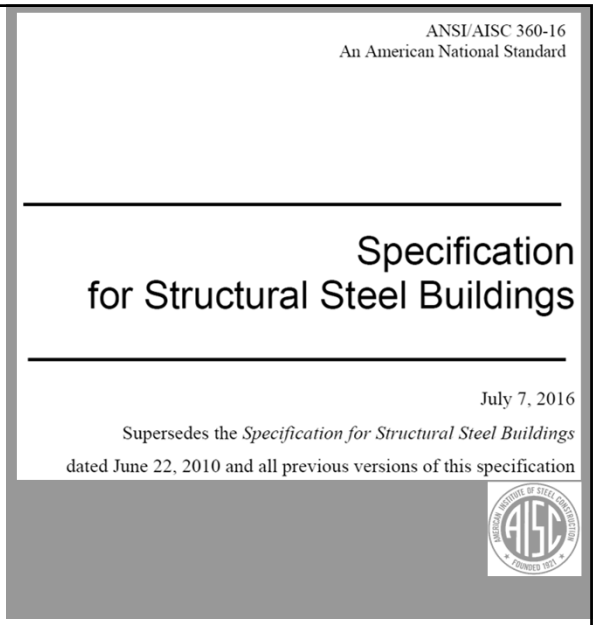

Chapter J - Connections
Chapter N - Quality Control and Quality Assurance

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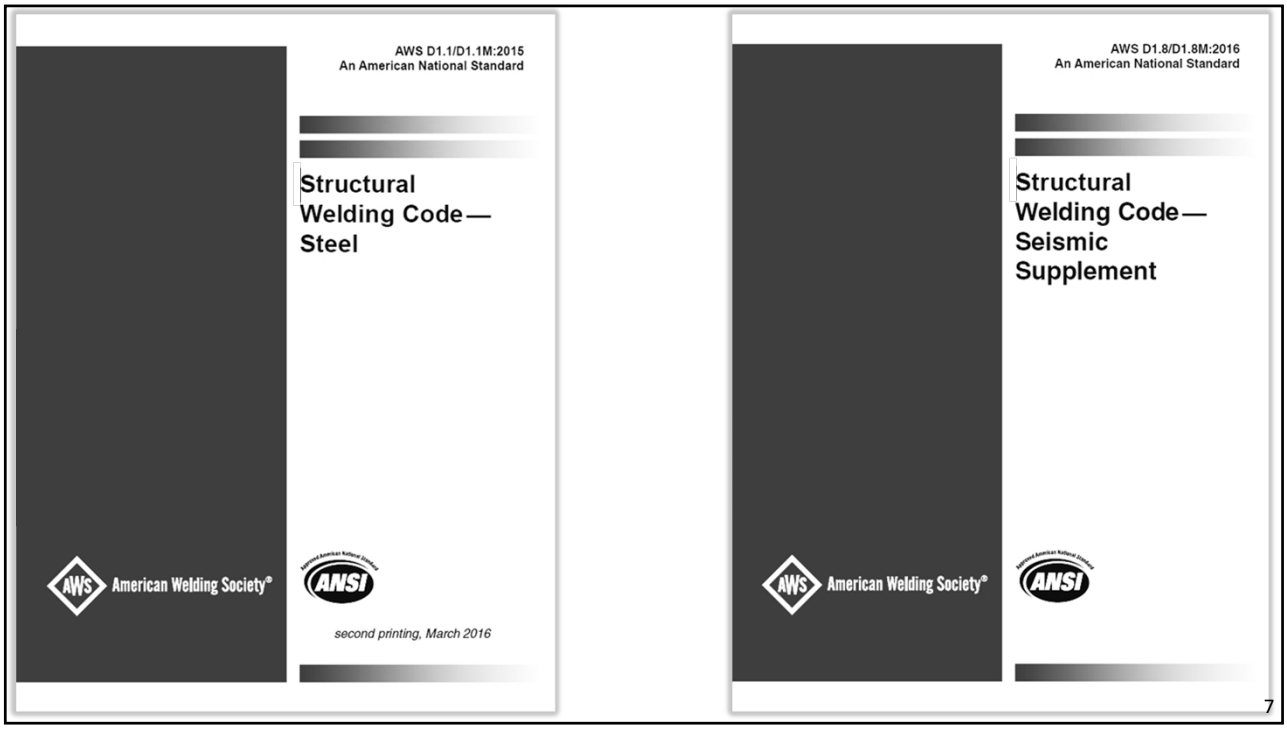

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17 SPECIAL INSPECTIONS AND TESTS
1704 SPECIAL INSPECTIONS AND TESTS, CONTRACTOR RESPONSIBILITY AND STRUCTURAL OBSERVATION
1704.3 Statement of special inspections

1704.3.1 Content of statement of special inspections.
The statement of special inspections shall identify the following:

1. The materials, systems, components and work required to have *special inspection*s or tests by the *building official* or by the *registered design professional* responsible for each portion of the work.
2. The type and extent of each *special inspection*.
3. The type and extent of each test.
4. Additional requirements for *special inspections* or tests for seismic or wind resistance as specified in Sections 1705.11, 1705.12 and 1705.13.
5. For each type of *special inspection*, identification as to whether it will be *continuous special inspection*, *periodic special inspection* or performed in accordance with the notation used in the referenced standard where the inspections are defined.

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Structural Welding: Special Inspection with the IBC and AISC

- **Transition from IBC requirements to AISC requirements**
  - **Inspection tasks**
  - **Available and submitted documentation**
  - **Welding inspection and nondestructive testing**
  - **Added inspection provisions for seismic force-resisting systems**
  - **Special Inspector / Quality Assurance Inspector qualifications**
  - **Statement of Special Inspections**

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1704.3 Steel construction
1704.3.1 Welding

Welding inspection and welding inspector qualification shall be in accordance with this section.

1704.3.1.1 Structural steel
Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1.

1704.3.1.2 Cold-formed steel
Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks shall be in accordance with AWS D1.3.

1704.3.1.3 Reinforcing steel
Welding inspection and welding inspector qualification for reinforcing steel shall be in accordance with AWS D1.4 and ACI 318.

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1704 Special Inspections
1704.3 Steel construction

Exceptions: (2)

The special inspector need not be continuously present during welding of the following items, provided the materials, welding procedures and qualifications of welders are verified prior to the start of the work;

periodic inspections are made of the work in progress;

and a visual inspection of all welds is made prior to completion or prior to shipment of shop welding.

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1704 Special Inspections
1704.3 Steel construction

Exceptions: (2)

2.1 Single pass fillet welds not exceeding 5/16" in size
2.2 Floor and roof deck welding
2.3 Welded studs when used for structural diaphragm
2.4 Welded sheet steel for cold-formed steel members
2.5 Welding of stairs and railing systems

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Table 1704.3
Required Verification and Inspection of Steel Construction

VERIFICATION AND INSPECTION	CONT	PER	REFERENCED STANDARD
4. Material verification of weld filler materials:			
a. identification markings to conform to AWS specification in the approved construction documents	-	X	AISC 360, A3.5 AWS A5 documents
b. manufacturer's certificate of compliance required	-	X	

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Table 1704.3
Required Verification and Inspection of Steel Construction

VERIFICATION AND INSPECTION	CONT	PER	REFERENCED STANDARD
5. Inspection of welding: a. Structural steel and cold-formed steel deck:			
1) CJP and PJP groove welds	X		AWS D1.1
2) multi-pass fillet welds	X		
3) single-pass fillet welds > 5/16"	X		
4) plug and slot welds	X		
5) single pass fillet welds ≤ 5/16"		X	
6) floor and roof deck welds		X	AWS D1.3

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Table 1704.3
Required Verification and Inspection of Steel Construction

VERIFICATION AND INSPECTION	CONT	PER	REFERENCED STANDARD
5. Inspection of welding:			
b. Reinforcing steel			
1) verification of weldability of reinforcing steel other than ASTM A706	-	X	AWS D1.4 ACI 318, 3.5.2
2) reinforcing steel **	X	-	
3) shear reinforcement	X	-	
4) other reinforcing steel	-	X	

** resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement

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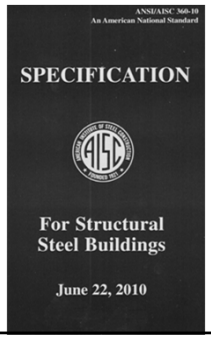
1705 REQUIRED VERIFICATION AND INSPECTION

1705.2 Steel construction
The special inspections for steel elements of buildings and structures shall be as required in this section.

1705.2.1 Structural steel
Special inspection for structural steel shall be in accordance with the quality assurance inspection requirements of **AISC 360**.



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Chapter N

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1705 REQUIRED VERIFICATION AND INSPECTION
1705.2 Steel construction

1705.2.2 Steel construction other than structural steel
Special inspection for steel construction other than structural steel shall be in accordance with Table 1705.2.2 and this section.

1705.2.2.1 Welding
Welding inspection and welding inspector qualification shall be in accordance with this section.

1705.2.2.1.1 Cold-formed steel
Welding inspection and welding inspector qualification for cold-formed steel floor and roof decks shall be in accordance with AWS D1.3.

1705.2.2.1.2 Reinforcing steel
Welding inspection and welding inspector qualification for reinforcing steel shall be in accordance with AWS D1.4 and ACI 318.

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1705 REQUIRED SPECIAL INSPECTIONS AND TESTS

1705.2 Steel construction
The *special inspections* and nondestructive testing of steel construction in buildings, structures, and portions thereof shall be in accordance with this section.

1705.2.1 Structural steel
Special inspections and nondestructive testing of *structural steel elements* in buildings, structures and portions thereof shall be in accordance with the quality assurance inspection requirements of **AISC 360**.

Exception: Special inspection of railing systems composed of *structural steel elements* shall be limited to welding inspection of welds at the base of cantilevered rail posts.

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Chapter N

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Structural Welding: Special Inspection with the IBC and AISC

- ❑ Transition from IBC requirements to AISC requirements
- ➢ **Inspection tasks**
- ❑ Available and submitted documentation
- ❑ Welding inspection and nondestructive testing
- ❑ Added inspection provisions for seismic force-resisting systems
- ❑ Special Inspector / Quality Assurance Inspector qualifications
- ❑ Statement of Special Inspections

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1 General Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

1.4 Responsibilities

1.4.1 Engineer's Responsibilities

- The Engineer shall be responsible for the development of the contract documents that govern products or structural assemblies produced under this code.
- The Engineer may add to, delete from, or otherwise modify, the requirements of this code to meet the particular requirements of a specific structure.
- All requirements that modify this code shall be incorporated into contract documents.
- The Engineer shall determine the suitability of all joint details to be used in a welded assembly.

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1 General Requirements
1.4 Responsibilities
1.4.1 Engineer's Responsibilities

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

- The Engineer shall specify in contract documents, as necessary, and as applicable, the following:
  (1) Code requirements that are applicable only when specified by the Engineer.
  (2) All additional NDT that is not specifically addressed in the code.
  (3) Verification inspection, when required by the Engineer.
  (4) Weld acceptance criteria other than that specified in Clause 6.
  (5) CVN toughness criteria for weld metal, base metal, and/or HAZ when required.
  (6) For nontubular applications, whether the structure is statically or cyclically loaded.
  (7) All additional requirements that are not specifically addressed in the code.
  (8) For OEM applications, the responsibilities of the parties involved.

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1 General Requirements
1.4 Responsibilities

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

1.4.3 Inspector's Responsibilities

1.4.3.1 Contractor Inspection
- Contractor inspection shall be supplied by the Contractor and shall be performed as necessary to ensure that materials and workmanship meet the requirements of the contract documents.

1.4.3.2 Verification Inspection
- The Engineer shall determine if Verification Inspection shall be performed.
- Responsibilities for Verification Inspection shall be established between the Engineer and the Verification Inspector.

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1 General Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

1.5 Approval

- All references to the need for approval shall be interpreted to mean approval by the Authority Having Jurisdiction or the *Engineer*.

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6 Inspection
Part A General Requirements
6.1 Scope

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.1 Information Furnished to Bidders

- When NDT other than visual is to be required, it shall be so stated in the information furnished to the bidders.

- This information shall designate the categories of welds to be examined, the extent of examination of each category, and the method or methods of testing.

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6 Inspection
Part A General Requirements
6.1 Scope

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.2 Inspection and Contract Stipulations

- For the purpose of this code, fabrication/erection inspection and testing, and verification inspection and testing shall be separate functions.

6.1.2.1 Contractor's Inspection.
6.1.2.2 Verification Inspection.

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.2 Inspection and Contract Stipulations

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.2.1 Contractor's Inspection

- This type of inspection and test shall be performed as necessary prior to assembly, during assembly, during welding, and after welding to ensure that materials and workmanship meet the requirements of the contract documents.
- Fabrication/erection inspection and testing shall be the responsibilities of the Contractor unless otherwise provided in the contract documents.

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.2 Inspection and Contract Stipulations

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.2.2 Verification Inspection

- This type of inspection and testing shall be performed and their results reported to the Owner and Contractor in a timely manner to avoid delays in the work.
- Verification inspection and testing are the prerogatives of the Owner who
  - may perform this function or,
  - when provided in the contract,
    - waive independent verification, or
    - stipulate that both inspection and verification shall be performed by the Contractor.

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6 Inspection
Part A General Requirements
6.1 Scope

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.3 Definition of Inspector Categories

6.1.3.1 Contractor's Inspector

- This inspector is the duly designated person who acts for, and in behalf of, the Contractor on all inspection and quality matters within the scope of the contract documents.

6.1.3.2 Verification Inspector

- This inspector is the duly designated person who acts for, and in behalf of, the Owner or Engineer on all inspection and quality matters within the scope of the contract documents.

6.1.3.3 Inspector(s)

- When the term inspector is used without further qualification as to the specific inspector category described above, it applies equally to inspection and verification within the limits of responsibility described in 6.1.2.

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CHAPTER N
QUALITY CONTROL AND QUALITY ASSURANCE

N1 Scope
N2 Fabricator's and Erector's Quality Control Program
N3 Fabricator's and Erector's Documents
N4 Inspection and Nondestructive Testing Personnel

N5 Minimum Requirements for Inspection of Structural Steel Buildings

N6 Minimum Requirements for Inspection of Composite Construction
N7 Approved Fabricators and Erectors
N8 Nonconforming Materials and Workmanship

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.2 Quality Assurance

Quality Assurance (QA) inspection of fabricated items shall be made at the fabricator's plant.

The *Quality Assurance Inspector (QAI)* shall schedule this work to minimize interruption to the work of the fabricator.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.2 Quality Assurance

QA inspection of the erected steel system shall be made at the project site.

The QAI shall schedule this work to minimize interruption to the work of the erector.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.2 Quality Assurance

The QAI shall review the material test reports and certifications as listed in N3.2 for compliance with the *construction documents.*

Construction documents. Design drawings, specifications, shop drawings and erection drawings.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.2 Quality Assurance

QA inspection tasks shall be performed by the QAI, in accordance with Sections N5.4, N5.6 and N5.7.

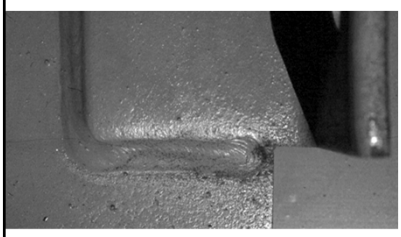
Tasks in Tables N5.4-1 through N5.4-3 and N5.6-1 through N5.6-3 listed for QA are those inspections performed by the QAI to ensure that the work is performed in accordance with the *construction documents.*

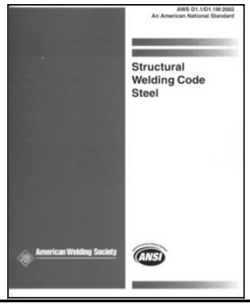
Construction documents. Design drawings, specifications, shop drawings and erection drawings. 33

N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding

Observation of welding operations and visual inspection of in-process and completed welds shall be the primary method to confirm that the materials, procedures, and workmanship are in conformance with the *construction documents.*

For structural steel, all provisions of AWS D1.1/D1.1M *Structural Welding Code – Steel* for statically loaded structures shall apply.





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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding

As a minimum, welding inspection tasks shall be in accordance with Tables N5.4-1, N5.4-2 and N5.4-3. In these tables, the inspection tasks are as follows:

O – **Observe** these items on a random basis. Operations need not be delayed pending these inspections.

P – **Perform** these tasks for each welded joint or member.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-1

Inspection Tasks Prior to Welding	QC	QA
Welding procedure specifications (WPSs) available	P	P
Manufacturer certifications for welding consumables available	P	P
Material identification (type/grade)	O	O
Welder identification system[1]	O	O
Fit-up of groove welds (including joint geometry) - Joint preparation - Dimensions (alignment, root opening, root face, bevel) - Cleanliness (condition of steel surfaces) - Tacking (tack weld quality and location) - Backing type and fit (if applicable)	O	O
Configuration and finish of access holes	O	O
Fit-up of fillet welds - Dimensions (alignment, gaps at root) - Cleanliness (condition of steel surfaces) - Tacking (tack weld quality and location)	O	O
Check welding equipment	O	-

[1] The fabricator or erector, as applicable, shall maintain a system by which a welder who has welded a joint or member can be identified. Stamps, if used, shall be the low-stress type.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-2

Inspection Tasks During Welding	QC	QA
Use of qualified welders	O	O
Control and handling of welding consumables - Packaging - Exposure control	O	O
No welding over cracked tack welds	O	O
Environmental conditions - Wind speed within limits - Precipitation and temperature	O	O
WPS followed - Settings on welding equipment - Travel speed - Selected welding materials - Shielding gas type/flow rate - Preheat applied - Interpass temperature maintained (min/max.) - Proper position (F, V, H, OH)	O	O
Welding techniques - Interpass and final cleaning - Each pass within profile limitations - Each pass meets quality requirements	O	O

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-3

Inspection Tasks After Welding	QC	QA
Welds cleaned	O	O
Size, length, and location of welds	P	P
Welds meet visual acceptance criteria - Crack prohibition - Weld/base-metal fusion - Crater cross-section - Weld profiles - Weld size - Undercut - Porosity	P	P
Arc strikes	P	P
k-area[1]	P	P
Backing removed and weld tabs removed (if required)	P	P
Repair activities	P	P
Document acceptance or rejection of welded joint or member	P	P

[1] When welding of doubler plates, continuity plates, or stiffeners has been performed in the k-area, visually inspect the web k-area for cracks within 3 in. (75 mm) of the weld.

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Commentary

Inspection Tasks Prior to Welding	AWS D1.1/D1.1M References
Welding procedure specifications (WPSs) available	6.3
Manufacturer certifications for welding consumables available	6.2
Material identification (type/grade)	6.2
Welder identification system	6.4 (welder qualification) (identification system not required by AWS D1.1/D1.1M)
Fit-up of groove welds (including joint geometry) - Joint preparation - Dimensions (alignment, root opening, root face, bevel) - Cleanliness (condition of steel surfaces) - Tacking (tack weld quality and location) - Backing type and fit (if applicable)	 6.5.2 5.22 5.15 5.18 5.10, 5.22.1.1
Configuration and finish of access holes	6.5.2, 5.17 (also see AISC J1.6)
Fit-up of fillet welds - Dimensions (alignment, gaps at root) - Cleanliness (condition of steel surfaces) - Tacking (tack weld quality and location)	 5.22.1 5.15 5.18
Check welding equipment	6.2, 5.11

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Commentary

Inspection Tasks During Welding	AWS D1.1/D1.1M References
Use of qualified welders	6.4
Control and handling of welding consumables - Packaging - Exposure control	6.2 5.3.1 5.3.2 (for SMAW), 5.3.3 (for SAW)
No welding over cracked tack welds	5.18
Environmental conditions - Wind speed within limits - Precipitation and temperature	 5.12.1 5.12.2
WPS followed - Settings on welding equipment - Travel speed - Selected welding materials - Shielding gas type/flow rate - Preheat applied - Interpass temperature maintained (min/max.) - Proper position (F, V, H, OH)	6.3.3, 6.5.2, 5.5, 5.21 5.6, 5.7
Welding techniques - Interpass and final cleaning - Each pass within profile limitations - Each pass meets quality requirements	6.5.3, 5.24 5.30.1

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Commentary

Inspection Tasks After Welding	AWS D1.1/D1.1M References
Welds cleaned	5.30.1
Size, length, and location of welds	6.5.1
Welds meet visual acceptance criteria - Crack prohibition - Weld/base-metal fusion - Crater cross-section - Weld profiles - Weld size - Undercut - Porosity	6.5.3 Table 6.1(1) Table 6.1(2) Table 6.1(3) Table 6.1(4), 5.24 Table 6.1(6) Table 6.1(7) Table 6.1(8)
Arc strikes	5.29
k-area	not addressed in AWS
Backing removed and weld tabs removed (if required)	5.10, 5.31
Repair activities	6.5.3, 5.26
Document acceptance or rejection of welded joint or member	6.5.4, 6.5.5

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-1

Inspection Tasks Prior to Welding	QC	QA
Welder qualification records and continuity records	P	O
WPS available	P	P
Manufacturer certifications for welding consumables available	P	P
Material identification (type/grade)	O	O
Welder identification system [a]	O	O
Fit-up of groove welds (including joint geometry) • Joint preparations • Dimensions (alignment, root opening, root face, bevel) • Cleanliness (condition of steel surfaces) • Tacking (tack weld quality and location) • Backing type and fit (if applicable)	O	O

[a] The fabricator or erector, as applicable, shall maintain a system by which a welder who has welded a joint or member can be identified. Stamps, if used, shall be the low-stress type.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-1

Inspection Tasks Prior to Welding	QC	QA
Fit-up of CJP groove welds of HSS T, Y and K joints without backing (including joint geometry) • Joint preparations • Dimensions (alignment, root opening, root face, bevel) • Cleanliness (condition of steel surfaces) • Tacking (tack weld quality and location)	P	O
Configuration and finish of access holes	O	O
Fit-up of fillet welds • Dimensions (alignment, gaps at root) • Cleanliness (condition of steel surfaces)	O	O
Check welding equipment	O	O

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-2

Inspection Tasks During Welding	QC	QA
Control and handling of welding consumables • Packaging • Exposure control	O	O
No welding over cracked tack welds	O	O
Environmental conditions • Wind speed within limits • Precipitation and temperature	O	O

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-2

Inspection Tasks During Welding	QC	QA
WPS followed • Settings on welding equipment • Travel speed • Selected welding materials • Shielding gas type/flow rate • Preheat applied • Interpass temperature maintained (min./max.) • Proper position (F, V, H, OH)	O	O
Welding techniques • Interpass and final cleaning • Each pass within profile limitations • Each pass meets quality requirements	O	O
Placement and installation of steel headed stud anchors	P	P

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-3

Inspection Tasks After Welding	QC	QA
Welds cleaned	O	O
Size, length and location of welds	P	P
Welds meet visual acceptance criteria • Crack prohibition • Weld/base-metal fusion • Crater cross section • Weld profiles • Weld size • Undercut • Porosity	P	P
Arc strikes	P	P

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.4 Inspection of Welding – Table N5.4-3

Inspection Tasks After Welding	QC	QA
k-area [a]	P	P
Weld access holes in rolled heavy shapes and built-up heavy shapes [b]	P	P
Backing removed and weld tabs removed (if required)	P	P
Repair activities	P	P
Document acceptance or rejection of welded joint or member	P	P
No prohibited welds have been added without the approval of the EOR	O	O

[a] When welding of doubler plates, continuity plates or stiffeners has been performed in the k-area, visually inspect the web k-area for cracks within 3 in. (75 mm) of the weld.

[b] After rolled heavy shapes (see Section A3.1c) and built-up heavy shapes (see Section A3.1d) are welded, visually inspect the weld access hole for cracks.

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6 Inspection
Part A General Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1 Scope

6.1.5 Inspector Responsibility

- The Inspector shall ascertain that all fabrication and erection by welding is performed in conformance with the requirements of the contract documents.

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6 Inspection
Part A General Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.2 Inspection of Materials and Equipment

- The Contractor's Inspector shall ensure that only materials and equipment conforming to the requirements of this code shall be used.

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6 Inspection
Part A General Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.3 Inspection of WPSs

6.3.1 Prequalified WPS
- The Contractor's Inspector shall ensure that all prequalified WPSs to be used for the work conform with the requirements of Clauses 3, 5, 9 (if tubular), and the contract documents.

6.3.2 WPSs Qualified by Test
- The Contractor's Inspector shall ensure that all WPSs qualified by test conform with the requirements of Clauses 4, 5, 9 (if tubular), and the contract documents.

6.3.3 WPSs in Production
- The Contractor's Inspector shall ensure that all welding operations are performed in conformance with WPSs that meet the requirements of this code and the contract documents.

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6 Inspection
Part A General Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.4 Inspection of Welder, Welding Operator, and Tack Welder Qualifications

6.4.1 Determination of Qualification

- The Inspector
  - shall allow welding to be performed only by welders, welding operators, and tack welders who are qualified in conformance with the requirements of Clause 4, or Clause 9 for tubulars, or
  - shall ensure that each welder, welding operator, or tack welder has previously demonstrated such qualification under other acceptable supervision and approved by the Engineer in conformance with 4.2.2.1.

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6 Inspection
Part A General Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.5 Inspection of Work and Records

6.5.1 Size, Length, and Location of Welds

- The Inspector shall ensure that the size, length, and location of all welds conform to the requirements of this code and to the detail drawings and that no unspecified welds have been added without the approval of the Engineer.

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6 Inspection
Part A General Requirements
6.5 Inspection of Work and Records

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.5.2 Scope of Examinations

- The Inspector shall, at suitable intervals, observe
  - joint preparation,
  - assembly practice, and
  - the welding techniques, and
  - performance of each welder, welding operator, and tack welder to ensure that the applicable requirements of this code are met.

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6 Inspection
Part A General Requirements
6.5 Inspection of Work and Records

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.5.3 Extent of Examination

- The Inspector shall examine the work to ensure that it meets the requirements of this code. Other acceptance criteria, different from those described in the code, may be used when approved by the Engineer.
- Size and contour of welds shall be measured with suitable gages.
- Visual inspection for cracks in welds and base metal and other discontinuities should be aided by a strong light, magnifiers, or such other devices as may be found helpful.

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6 Inspection
Part A General Requirements
6.5 Inspection of Work and Records

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.5.4 Inspector Identification of Inspections Performed

- Inspectors shall identify with a distinguishing mark or other recording methods all parts or joints that they have inspected and accepted.
- Any recording method which is mutually agreeable may be used.
- Die stamping of cyclically loaded members without the approval of the Engineer shall be prohibited.

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6 Inspection
Part A General Requirements
6.5 Inspection of Work and Records

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.5.5 Maintenance of Records

- The Inspector shall keep a record of
  - qualifications of all welders, welding operators, and tack welders;
  - all WPS qualifications or other tests that are made;
  - and such other information as may be required.

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Structural Welding: Special Inspection with the IBC and AISC

- ❑ Transition from IBC requirements to AISC requirements
- ❑ Inspection tasks
- ➢ **Available and submitted documentation**
- ❑ Welding inspection and nondestructive testing
- ❑ Added inspection provisions for seismic force-resisting systems
- ❑ Special Inspector / Quality Assurance Inspector qualifications
- ❑ Statement of Special Inspections

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CHAPTER N
QUALITY CONTROL AND QUALITY ASSURANCE

N1 Scope
N2 Fabricator's and Erector's Quality Control Program

N3 Fabricator's and Erector's Documents

N4 Inspection and Nondestructive Testing Personnel
N5 Minimum Requirements for Inspection of Structural Steel Buildings
N6 Minimum Requirements for Inspection of Composite Construction
N7 Approved Fabricators and Erectors
N8 Nonconforming Materials and Workmanship

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N3 FABRICATOR'S AND ERECTOR'S DOCUMENTS
N3.2 Available Documents for Steel Construction

The following documents shall be available in electronic or printed form for review by the EOR or the EOR's designee prior to fabrication or erection, as applicable, unless otherwise required in the contract documents to be submitted:

(1) For main structural steel elements, copies of material test reports in accordance with Section A3.1

(2) For steel castings and forgings, copies of material test reports in accordance with Section A3.2

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N3 FABRICATOR'S AND ERECTOR'S DOCUMENTS
N3.2 Available Documents for Steel Construction

(3) For fasteners, copies of manufacturer's certifications in accordance with Section A3.3

(4) For deck fasteners, copies of manufacturer's product data sheets or catalog data. The data sheets shall describe the product, limitations of use, and recommended or typical installation instructions.

(5) For anchor rods and threaded rods, copies of material test reports in accordance with Section A3.4

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N3 FABRICATOR'S AND ERECTOR'S DOCUMENTS
N3.2 Available Documents for Steel Construction

(6) For welding consumables, copies of manufacturer's certifications in accordance with Section A3.5

(7) For headed stud anchors, copies of manufacturer's certifications in accordance with Section A3.6

(8) Manufacturer's product data sheets or catalog data for welding filler metals and fluxes to be used. The data sheets shall describe the product, limitations of use, recommended or typical welding parameters, and storage and exposure requirements, including baking, if applicable.

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N3 FABRICATOR'S AND ERECTOR'S DOCUMENTS
N3.2 Available Documents for Steel Construction

(9) Welding procedure specifications (WPSs)

(10) Procedure qualification records (PQRs) for WPSs that are not prequalified in accordance with AWS D1.1/D1.1M or AWS D1.3/D1.3M, as applicable

(11) Welding personnel performance qualification records (WPQR) and continuity records

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N3 FABRICATOR'S AND ERECTOR'S DOCUMENTS
N3.2 Available Documents for Steel Construction

(12) Fabricator's or erector's, as applicable, written quality control manual, that shall include, as a minimum:
- (i) Material control procedures
- (ii) Inspection procedures
- (iii) Nonconformance procedures

(13) Fabricator's or erector's, as applicable, QC Inspector qualifications

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Structural Welding: Special Inspection with the IBC and AISC

- ❑ **Transition from IBC requirements to AISC requirements**
- ❑ **Inspection tasks**
- ❑ **Available and submitted documentation**
- ➢ **Welding inspection and nondestructive testing**
- ❑ **Added inspection provisions for seismic force-resisting systems**
- ❑ **Special Inspector / Quality Assurance Inspector qualifications**
- ❑ **Statement of Special Inspections**

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6 Inspection
Part D NDT Procedures

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.15 Extent of Testing

- Information furnished to the bidders shall clearly identify the extent of NDT (types, categories, or location) of welds to be tested.

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6 Inspection
Part B Contractor Responsibilities

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.6 Obligations of the Contractor

6.6.4 Specified NDT Other than Visual.

- When NDT other than visual inspection is specified in the information furnished to bidders, it shall be the Contractor's responsibility to ensure that all specified welds shall meet the quality requirements of Clause 6, Part C or Clause 9, Part F for tubulars, whichever is applicable.

6.6.5 Nonspecified NDT Other than Visual.

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6 Inspection
Part B Contractor Responsibilities
6.6 Obligations of the Contractor

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.6.5 Nonspecified NDT Other than Visual.

- If NDT other than visual inspection is not specified in the original contract agreement but is subsequently requested by the Owner, the Contractor shall perform any requested testing or shall allow any testing to be performed in conformance with 6.14.
- The Owner shall be responsible for all associated costs including handling, surface preparation, NDT, and repair of discontinuities other than those described in 6.9, whichever is applicable, at rates mutually agreeable between Owner and Contractor.
- However, if such testing should disclose an attempt to defraud or gross nonconformance to this code, repair work shall be done at the Contractor's expense.

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6 Inspection
Part D NDT Procedures

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.15 Extent of Testing

6.15.1 Full Testing

- Weld joints requiring testing by contract specification shall be tested for their full length, unless partial or spot testing is specified.

6.15.2 Partial Testing

- When partial testing is specified, the location and lengths of welds or categories of weld to be tested shall be clearly designated in the contract documents.

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6 Inspection
Part D NDT Procedures
6.15 Extent of Testing

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.15.3 Spot Testing

- When spot testing is specified, the number of spots in each designated category of welded joint to be tested in a stated length of weld or a designated segment of weld shall be included in the information furnished to the bidders.
- Each spot test shall cover at least 4 in [100 mm] of the weld length.
- When spot testing reveals indications of unacceptable discontinuities that require repair, the extent of those discontinuities shall be explored.

…

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6 Inspection
Part D NDT Procedures
6.15 Extent of Testing

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.15.3 Spot Testing

…

- Two additional spots in the same segment of weld joint shall be taken at locations away from the original spot.
- The location of the additional spots shall be agreed upon between the Contractor and the Verification Inspector.
- When either of the two additional spots show defects that require repair, the entire segment of weld represented by the original spot shall be completely tested.
- If the weld involves more than one segment, two additional spots in each segment shall be tested at locations agreed upon by the Contractor and the Verification Inspector, subject to the foregoing interpretation.

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6 Inspection
Part D NDT Procedures
6.15 Extent of Testing

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.15.4 Relevant Information

- NDT personnel shall, prior to testing, be furnished or have access to relevant information regarding
  - weld joint geometries,
  - material thicknesses, and
  - welding processes used in making the weldment.
- NDT personnel shall be apprised of any subsequent repairs to the weld.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.5 Nondestructive Testing of Welded Joints
N5.5a Procedures

Ultrasonic testing (UT), magnetic particle testing (MT), penetrant testing (PT) and radiographic testing (RT), where required, shall be performed by QA in accordance with AWS D1.1/D1.1M.

Acceptance criteria shall be AWS D1.1/D1.1M for statically loaded structures, unless otherwise designated in the design drawings or project specifications.



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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.5 Nondestructive Testing of Welded Joints
N5.5b CJP Groove Weld NDT

For structures in Risk Category III or IV of Table 1-5, Risk Category of Buildings and Other Structures for Flood, Wind, Snow, Earthquake, and Ice Loads, of SEI/ASCE 7, *Minimum Design Loads for Buildings and Other Structures,* UT shall be performed by QA on all CJP groove welds subject to transversely applied tension loading in butt, T- and corner joints, in materials 5/16 in. thick or greater.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
Commentary

Risk Category IV

Buildings and other structures designated as essential facilities, such as:
- Hospitals and other health care facilities having surgery or emergency treatment facilities
- Fire, rescue, ambulance, and police stations and emergency vehicle garages
- Designated earthquake, hurricane, or other emergency shelters
- Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response
- Power generating stations and other public utility facilities required in an emergency
- Aviation control towers, air traffic control centers, and emergency aircraft hangars
- Water storage facilities and pump structures required to maintain water pressure for fire suppression
- Buildings and other structures having critical national defense functions

Buildings and other structures, the failure of which could pose a substantial hazard to the community.

Buildings and other structures (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, or hazardous waste) containing sufficient quantities of highly toxic substances where the quantity exceeds a threshold quantity established by the authority having jurisdiction to be dangerous to the public if released and is sufficient to pose a threat to the public if released.

Buildings and other structures required to maintain the functionality of other Category IV structures, such as:
- Communication towers
- Fuel storage tanks
- Cooling towers
- Electrical substation structures
- Fire water storage tanks or other structures housing or supporting water, or other fire-suppression material or equipment

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS Commentary

Risk Category III	
	Buildings and other structures, the failure of which could pose a substantial risk to human life, such as: • Buildings and other structures where more than 300 people congregate in one area • Buildings and other structures with daycare facilities with a capacity greater than 150 • Buildings and other structures with elementary school or secondary school facilities with a capacity greater than 250 • Buildings and other structures with a capacity greater than 500 for colleges or adult education facilities • Health care facilities with a capacity of 50 or more resident patients, but not having surgery or emergency treatment facilities • Jails and detention facilities
	Buildings and other structures, not included in Risk Category IV, with potential to cause a substantial economic impact and/or mass disruption of day-to-day civilian life in the event of failure, such as: • Power generating stations • Water treatment facilities • Sewage treatment facilities • Telecommunication centers
	Buildings and other structures not included in Risk Category IV (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing toxic or explosive where the quantity of the material exceeds a threshold quantity established by the authority having jurisdiction and is sufficient to pose a threat to the public if released.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.5 Nondestructive Testing of Welded Joints
N5.5b CJP Groove Weld NDT

For structures in Risk Category II, UT shall be performed by QA on 10% of CJP groove welds in butt, T- and corner joints subject to transversely applied tension loading, in materials 5/16 in. thick or greater.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS Commentary

Risk Category II
All buildings and other structures except those listed in Risk Categories I, III, and IV
Risk Category I
Buildings and other structures that represent a low risk to human life in the event of failure, such as: • Agricultural facilities • Certain temporary facilities • Minor storage facilities

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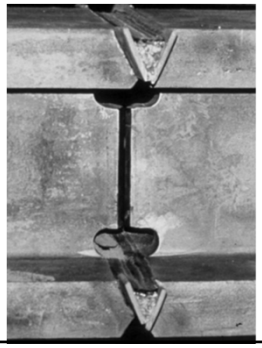
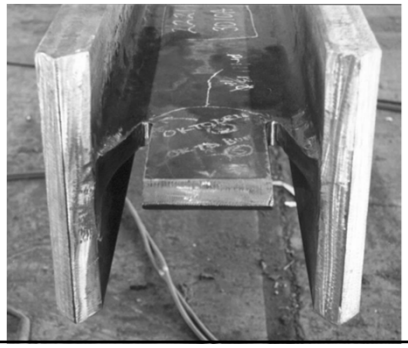
N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.5 Nondestructive Testing of Welded Joints
N5.5c Access Hole NDT

Thermally cut surfaces of access holes shall be tested by QA using MT or PT, when the flange thickness exceeds 2 in. for rolled shapes, or when the web thickness exceeds 2 in. for built-up shapes. Any crack shall be deemed unacceptable regardless of size or location.





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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.5 Nondestructive Testing of Welded Joints
N5.5d Welded Joints Subjected to Fatigue

When required by Appendix 3, Table A-3.1, welded joints requiring weld soundness to be established by radiographic or ultrasonic inspection shall be tested by QA as prescribed.

Reduction in the rate of UT is prohibited.

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.5 Nondestructive Testing of Welded Joints
N5.5e Reduction of Rate of Ultrasonic Testing

The rate of UT is permitted to be reduced if approved by the EOR and the AHJ.

Where the initial rate for UT is 100%, the NDT rate for an individual welder or welding operator is permitted to be reduced to 25%, provided the reject rate, the number of welds containing unacceptable defects divided by the number of welds completed, is demonstrated to be 5% or less of the welds tested for the welder or welding operator. …

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.5 Nondestructive Testing of Welded Joints
N5.5f Increase in Rate of Ultrasonic Testing

For structures in Occupancy Category II, where the initial rate for UT is 10%, the NDT rate for an individual welder or welding operator shall be increased to 100% should the reject rate, the number of welds containing unacceptable defects divided by the number of welds completed, exceeds 5% of the welds tested for the welder or welding operator. …

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N5 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
N5.5 Nondestructive Testing of Welded Joints
N5.5g Documentation

All NDT performed shall be documented.

For shop fabrication, the NDT report shall identify the tested weld by piece mark and location in the piece.

For field work, the NDT report shall identify the tested weld by location in the structure, piece mark, and location in the piece.

When a weld is rejected on the basis of NDT, the NDT record shall indicate the location of the defect and the basis of rejection.

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Structural Welding: Special Inspection with the IBC and AISC

- ❑ Transition from IBC requirements to AISC requirements
- ❑ Inspection tasks
- ❑ Available and submitted documentation
- ❑ Welding inspection and nondestructive testing

➢ **Added inspection provisions for seismic force-resisting systems**

- ❑ Special Inspector / Quality Assurance Inspector qualifications
- ❑ Statement of Special Inspections

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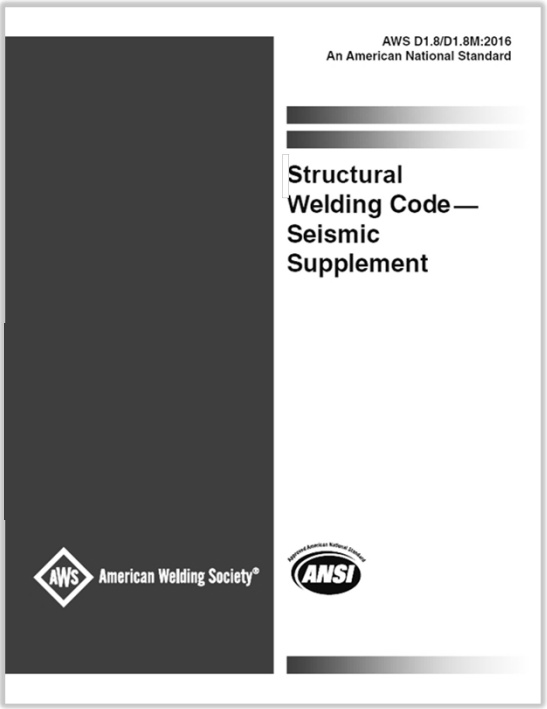

AWS D1.8/D1.8M: 2005

AWS D1.8/D1.8M: 2009

AWS D1.8/D1.8M: 2016

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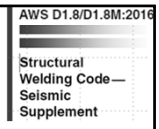
AWS D1.8 — Seismic Supplement



1 General Requirements
2 Reference Documents
3 Definitions
4 Welded Connection Details
5 Welder Qualification
6 Fabrication
7 Inspection

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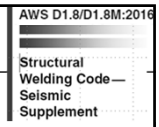
AWS D1.8 — Seismic Supplement



2005	2009 2016	Normative Annex
A	A	WPS Heat Input Envelope Testing of Filler Metals for Demand Critical Welds
B	B	Intermix CVN Testing of Filler Metal Combinations (where one of the filler metals is FCAW-S)
C	D	Supplemental Welder Qualification for Restricted Access Welding
D	E	Supplemental Testing for Extended Exposure Limits for FCAW Filler Metals
E	F	Supplementary Ultrasonic Technician Testing
F	G	Supplementary Magnetic Particle Testing Procedures
G	H	Flaw Sizing by Ultrasonic Testing

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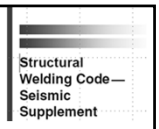
AWS D1.8:2009 — Seismic Supplement



6 Fabrication

6.1 Welding Procedure Specifications (WPSs)
6.2 Welding Processes
6.3 Filler and Weld Metal
6.4 FCAW Electrode Packaging, Storage, and Exposure
6.5 Maximum Interpass Temperature
6.6 Tack Welds to Steel Backing in the Protected Zone
6.7 Removal of Backing and Weld Root Treatment
6.8 Reinforcing Fillet Welds at Removed Weld Backing Locations
6.9 Fillet Welds at Left-in-Place Steel Backing
6.10 Weld Access Holes
6.11 Weld Tabs
6.12 End Dams
6.13 Welder Identification
6.14 Bottom Flange Welding Sequence
6.15 Protected Zone
6.16 Tack Welding Requirements

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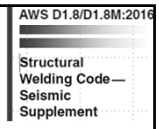
AWS D1.8:2016 — Seismic Supplement



6 Fabrication

Part A — Filler Metal and Weld Metal
6.1 Filler Metal and Weld Metal
Part B — Additional Requirements for Demand Critical Filler Metal and Weld Metal
6.2 Heat Input Envelope
6.3 Production Lot Control
6.4 FCAW Electrode Packaging, Storage, and Exposure
Part C — Welding Procedure Specifications
6.5 Welding Processes
6.6 Welding Procedure Specifications (WPSs)
6.7 Maximum Interpass Temperature
6.8 Heat Input
6.9 Bottom Flange Welding Sequence
6.10 Welder Identification
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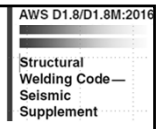
AWS D1.8:2016 - Seismic Supplement



6 Fabrication

…

Part D — Details

6.11 Weld Access Holes
6.12 Tack Welding Requirements
6.13 Removal of Backing and Weld Root Treatment
6.14 Reinforcing Fillet Welds at Removed Weld Backing Locations
6.15 Fillet Welds at Left-In-Place Steel Backing
6.16 Weld Tabs
6.17 End Dams

Part E — Protected Zone

6.18 Protected Zone

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J2 FABRICATOR AND ERECTOR DOCUMENTS
J2.1 Documents to be Submitted for Steel Construction

In addition to the requirements of *Specification* Section N3.1, the following documents shall be submitted for review by the EOR or the EOR's designee, prior to fabrication or erection of the affected work, as applicable:

(a) Welding procedure specifications (WPS)

(b) Copies of the manufacturer's typical certificate of conformance for all electrodes, fluxes and shielding gasses to be used

(c) For demand critical welds, applicable manufacturer's certifications that the filler metal meets the supplemental notch toughness requirements, as applicable. When the filler metal manufacturer does not supply such supplemental certifications, the fabricator or erector, as applicable, shall have the necessary testing performed and provide the applicable test reports

…

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J2 FABRICATOR AND ERECTOR DOCUMENTS
J2.1 Documents to be Submitted for Steel Construction

341 Seismic

In addition to the requirements of *Specification* Section N3.1, the following documents shall be submitted for review by the EOR or the EOR's designee, prior to fabrication or erection of the affected work, as applicable:

…

(d) Manufacturer's product data sheets or catalog data for shielded metal arc welding (SMAW), flux cored arc welding (FCAW), and gas metal arc welding (GMAW) composite (cored) filler metals to be used

(e) Bolt installation procedures

(f) Specific assembly order, welding sequence, welding technique, or other special precautions for joints or groups of joints where such items are designated to be submitted to the engineer of record

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J3 QUALITY ASSURANCE AGENCY DOCUMENTS

341 Seismic

The agency responsible for quality assurance shall submit the following documents to the authority having jurisdiction, the EOR, and the owner or owner's designee:

(a) QA agency's written practices for the monitoring and control of the agency's operations. The written practice shall include:
  (1) The agency's procedures for the selection and administration of inspection personnel, describing the training, experience and examination requirements for qualification and certification of inspection personnel; and
  (2) The agency's inspection procedures, including general inspection, material controls, and visual welding inspection
(b) Qualifications of management and QA personnel designated for the project
(c) Qualification records for inspectors and NDT technicians designated for the project
(d) NDT procedures and equipment calibration records for NDT to be performed and equipment to be used for the project
(e) For composite construction, concrete testing procedures and equipment

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J5 INSPECTION TASKS

341 Seismic

J5.1 Observe (O)

- The inspector shall observe these functions on a random, daily basis.
- Operations need not be delayed pending observations.

J5.2 Perform (P)

- These inspections shall be performed prior to the final acceptance of the item.

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J6 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
J6.1 Visual Welding Inspection – Table J6.1

341 Seismic

Visual Inspection Tasks Prior to Welding Task Document	QC		QA	
	T	D	T	D
Material identification (Type / Grade)	O	-	O	-
Welder identification system	O	-	O	-
Fit-up of Groove Welds (including joint geometry) ✓ Joint preparation ✓ Dimensions (alignment, root opening, root face, bevel) ✓ Cleanliness (condition of steel surfaces) ✓ Tacking (tack weld quality and location) ✓ Backing type and fit (if applicable)	P/O **	-	O	-
Configuration and finish of access holes	O	-	O	-

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J6 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
J6.1 Visual Welding Inspection – Table J6.1

341 Seismic

Visual Inspection Tasks Prior to Welding	QC		QA	
	T	D	T	D
Fit-up of Fillet Welds ✓ Dimensions (alignment, gaps at root) ✓ Cleanliness (condition of steel surfaces) ✓ Tacking (tack weld quality and location)	P/O **	-	O	-

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J6 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
J6.1 Visual Welding Inspection – Table J6.2

341 Seismic

Visual Inspection Tasks During Welding	QC		QA	
	T	D	T	D
WPS followed: ✓ Settings on welding equipment ✓ Travel speed ✓ Selected welding materials ✓ Shielding gas type / flow rate ✓ Preheat applied ✓ Interpass temperature maintained (min / max) ✓ Proper position (F, V, H, OH) ✓ Intermix of filler metals avoided unless approved	O	-	O	-
Use of qualified welders	O	-	O	-

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J6 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
J6.1 Visual Welding Inspection – Table J6.2

341 Seismic

Visual Inspection Tasks During Welding	QC		QA	
	T	D	T	D
Control and handling of welding materials ✓ Packaging ✓ Exposure control	O	-	O	-
Environmental conditions ✓ Wind speed within limits ✓ Precipitation and temperature	O	-	O	-
Welding techniques ✓ Interpass and final cleaning ✓ Each pass within profile limitations ✓ Each pass meets quality requirements	O	-	O	-
No welding over cracked tacks	O	-	O	-

97

J6 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
J6.1 Visual Welding Inspection – Table J6.3

341 Seismic

Visual Inspection Tasks After Welding	QC		QA	
	T	D	T	D
Welds cleaned	O	-	O	-
Size, length and location of welds	P	-	P	-
Welds meet visual acceptance criteria ✓ Crack prohibition ✓ Weld / base metal fusion ✓ Crater cross-section ✓ Weld profiles and size ✓ Undercut ✓ Porosity	P	D	P	D

98

J6 MINIMUM REQUIREMENTS FOR INSPECTION OF STRUCTURAL STEEL BUILDINGS
J6.1 Visual Welding Inspection – Table J6.3

341 Seismic

Visual Inspection Tasks After Welding	QC		QA	
	T	D	T	D
k-area[1]	P	D	P	D
Placement of reinforcing or contouring fillet welds (if required)	P	D	P	D
Backing removed, weld tabs removed and finished, and fillet welds added (if required)	P	D	P	D
Repair activities	P	-	P	D

99

J6 WELDING INSPECTION AND NONDESTRUCTIVE TESTING
J6.2 NDT of Welded Joints
J6.2a CJP Groove Weld NDT

341 Seismic

- Ultrasonic testing (UT) shall be performed on 100% of complete-joint-penetration (CJP) groove welds in materials 5/16 in. (8 mm) thick or greater.
- UT in materials less than 5/16 in. (8 mm) thick is not required.
- Weld discontinuities shall be accepted or rejected on the basis of AWS D1.1/D1.1M Table 6.2.
- Magnetic particle testing (MT) shall be performed on 25% of all beam-to-column CJP groove welds.
- The rate of UT and MT is permitted to be reduced in accordance with Sections J6.2g and J6.2h, respectively.

Exception: For ordinary moment frames in structures in risk categories I or II, UT and MT of CJP groove welds are required only for demand critical welds.

100

J6 WELDING INSPECTION AND NONDESTRUCTIVE TESTING
J6.2 NDT of Welded Joints
J6.2b Column Splice and Column to Base Plate PJP Groove Weld NDT

341 Seismic

- UT shall be performed by QA on 100% of partial-joint-penetration (PJP) groove welds in column splices and column to base plate welds.
- The rate of UT is permitted to be reduced in accordance with Section J6.2g.
- UT shall be performed using written procedures and UT technicians qualified in accordance with AWS D1.8/D1.8M.
- The weld joint mock-ups used to qualify procedures and technicians shall include at least one single-bevel PJP groove welded joint and one double-bevel PJP groove welded joint, detailed to provide transducer access limitations similar to those to be encountered at the weld faces and by the column web.
- Rejection of discontinuities outside the groove weld throat shall be considered false indications in procedure and personnel qualification.
- Procedures qualified using mock-ups with artificial flaws 1/16 in. (1.5 mm) in their smallest dimension are permitted.
- UT examination of welds using alternative techniques in compliance with AWS D1.1/D1.1M Annex Q is permitted.
- Weld discontinuities located within the groove weld throat shall be accepted or rejected on the basis of criteria of AWS D1.1/D1.1M Table 6.2, except when alternative techniques are used, the criteria shall be as provided in AWS D1.1/D1.1M Annex Q.

101

J6 WELDING INSPECTION AND NONDESTRUCTIVE TESTING
J6.2 NDT of Welded Joints
J6.2c Base Metal NDT for Lamellar Tearing and Laminations

341 Seismic

- After joint completion, base metal thicker than 1-1/2 in. (38 mm) loaded in tension in the through-thickness direction in T- and corner-joints, where the connected material is greater than 3/4 in. (19 mm) and contains CJP groove welds, shall be ultrasonically tested for discontinuities behind and adjacent to the fusion line of such welds.

- Any base metal discontinuities found within t/4 of the steel surface shall be accepted or rejected on the basis of criteria of AWS D1.1/D1.1M Table 6.2, where t is the thickness of the part subjected to the through-thickness strain.

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J6 WELDING INSPECTION AND NONDESTRUCTIVE TESTING
J6.2 NDT of Welded Joints
J6.2d Beam Cope and Access Hole NDT

341 Seismic

- At welded splices and connections, thermally cut surfaces of beam copes and access holes shall be tested using magnetic particle testing or penetrant testing, when the flange thickness exceeds 1-1/2 in. (38 mm) for rolled shapes, or when the web thickness exceeds 1-1/2 in. (38 mm) for built-up shapes.

103

J6 WELDING INSPECTION AND NONDESTRUCTIVE TESTING
J6.2 NDT of Welded Joints
J6.2e Reduced Beam Section Repair NDT

341 Seismic

- MT shall be performed on any weld and adjacent area of the reduced beam section (RBS) cut surface that has been repaired by welding, or on the base metal of the RBS cut surface if a sharp notch has been removed by grinding.

104

J6 WELDING INSPECTION AND NONDESTRUCTIVE TESTING
J6.2 NDT of Welded Joints
J6.2f Weld Tab Removal Sites

341 Seismic

- At the end of welds where weld tabs have been removed, MT shall be performed on the same beam-to-column joints receiving UT as required under Section J6.2a.
- The rate of MT is permitted to be reduced in accordance with Section J6.2h.
- MT of continuity plate weld tab removal sites is not required.

105

Structural Welding: Special Inspection with the IBC and AISC

- ➢ **Transition from IBC requirements to AISC requirements**
- ❑ **Inspection tasks**
- ❑ **Available and submitted documentation**
- ❑ **Welding inspection and nondestructive testing**
- ❑ **Added inspection provisions for seismic force-resisting systems**
- ➢ **Special Inspector / Quality Assurance Inspector qualifications**
- ❑ **Statement of Special Inspections**

106

202 Definitions

SPECIAL INSPECTOR

A qualified person employed or retained by an *approved* agency and *approved* by the *building official* as having the competence necessary to inspect a particular type of construction requiring special inspection

107

1704 SPECIAL INSPECTIONS AND TESTS,
CONTRACTOR RESPONSIBILITY AND STRUCTURAL OBSERVATIONS
1704.2 Special inspections and tests

1704.2.1 Special inspector qualifications
Prior to the start of the construction, the *approved agencies* shall provide written documentation to the *building official* demonstrating the competence and relevant experience or training of the *special inspectors* who will perform the *special inspections* and tests during construction.

Experience or training shall be considered relevant where the documented experience or training is related in complexity to the same type of *special inspection* or testing activities for projects of similar complexity and material qualities.

These qualifications are in addition to qualifications specified in other sections of this code.

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1704 SPECIAL INSPECTIONS AND TESTS,
CONTRACTOR RESPONSIBILITY AND STRUCTURAL OBSERVATIONS
1704.2 Special inspections and tests

1704.2.1 Special inspector qualifications
The *registered design professional in responsible charge* and engineers of record involved in the design of the project are permitted to act as the *approved agency* and their personnel are permitted to act as special inspectors for the work designed by them, provided they qualify as special inspectors.

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N4 INSPECTION AND NONDESTRUCTIVE TESTING PERSONNEL
N4.1 Quality Control Inspector Qualifications

Quality control (QC) welding inspection personnel shall be qualified to the satisfaction of the fabricator's or erector's QC program, as applicable, and in accordance with either of the following:

(a) Associate welding inspectors (AWI) or higher as defined in AWS B5.1, *Standard for the Qualification of Welding Inspectors*, or

(b) Qualified under the provisions of AWS D1.1/D1.1M subclause 6.1.4

N4.2 Quality Control Inspector Qualifications

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N4 INSPECTION AND NONDESTRUCTIVE TESTING PERSONNEL
N4.2 Quality Assurance Inspector Qualifications

Quality assurance (QA) welding inspection personnel shall be qualified to the satisfaction of the QA agency's written practice, and in accordance with either of the following:

(a) Welding Inspectors (WIs), or Senior Welding Inspectors (SWIs), as defined in AWS B5.1, *Standard for the Qualification of Welding Inspectors*, except Associate Welding Inspectors (AWIs) are permitted to be used under the direct supervision of WIs, who are on the premises and available when weld inspection is being conducted, or

(b) Qualified under the provisions of AWS D1.1/D1.1M subclause 6.1.4

6 Inspection
Part A General Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1 Scope

6.1.4 Inspector Qualification Requirements

6.1.4.1 Basis for Qualification

- Inspectors responsible for acceptance or rejection of material and workmanship shall be qualified.
- The bases of Inspector qualification shall be documented.
- If the Engineer elects to specify the bases of inspector qualification, it shall be so specified in contract documents.

- The acceptable qualification basis shall be the following: …

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.4.1 Basis for Qualification

- The acceptable qualification basis shall be the following:

(1) Current or previous certification as an AWS Certified Welding Inspector (CWI) in conformance with the provisions of AWS QC1, *Standard for AWS Certification of Welding Inspectors*, or

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements
6.1.4.1 Basis for Qualification

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

AWS QC1: 2016
Specification for AWS Certification of Welding Inspectors

AWS B5.1:2013-AMD1
An American National Standard
Specification for the Qualification of Welding Inspectors

www.aws.org

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AWS B5.1 Specification for the Qualification of Welding Inspectors
2 Terms and Definitions

qualification

- Demonstrated training, skill, knowledge and experience required for personnel to perform the duties of a specific job or function typically demonstrated by passing a performance test.

certification

- The act of determining, verifying and attesting in writing to the qualification of personnel in accordance with specified requirements.

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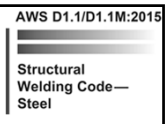
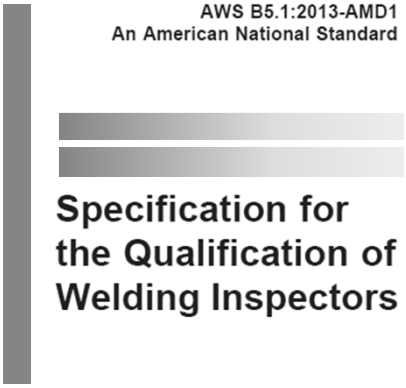
6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements
6.1.4.1 Basis for Qualification



CAWI - Certified Associate Welding Inspector
CWI - Certified Welding Inspector
SCWI - Senior Certified Welding Inspector



AWI - Associate Welding Inspector
WI - Welding Inspector
SWI - Senior Welding Inspector

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements
6.1.4.1 Basis for Qualification

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

- The acceptable qualification basis shall be the following:

(2) Current or previous qualification by the Canadian Welding Bureau (CWB) in conformance with the requirements of the Canadian Standard Association (CSA) Standard W178.2, Certification of Welding Inspectors, or

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements
6.1.4.1 Basis for Qualification

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

Level 1 Welding Inspector
Level 2 Welding Inspector
Level 3 Welding Inspector

www.cwbgroup.org

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements
6.1.4.1 Basis for Qualification

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

- The acceptable qualification basis shall be the following:

(3) An individual who, by training or experience, or both, in metals fabrication, inspection and testing, is competent to perform inspection of the work.

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.4.2 Term of Effectiveness

- The qualification of an Inspector shall remain in effect indefinitely, provided the Inspector remains active in inspection of welded steel fabrication, unless there is specific reason to question the Inspector's ability.

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.4.3 Assistant Inspector

- The Inspector may be supported by Assistant Inspectors who may perform specific inspection functions under the supervision of the Inspector.
- Assistant Inspectors shall be qualified by training and experience to perform the specific functions to which they are assigned.
- The work of Assistant Inspectors shall be regularly monitored by the Inspector, generally on a daily basis.

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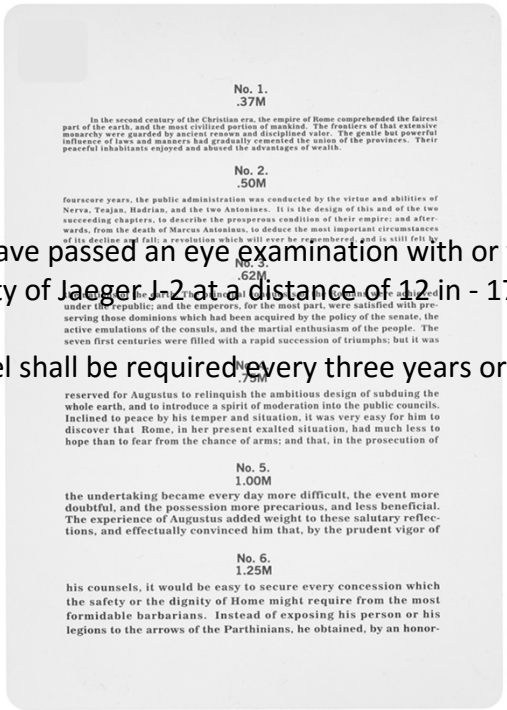
6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.4.4 Eye Examination

- Inspectors and Assistant Inspectors shall have passed an eye examination with or without corrective lenses to prove near vision acuity of Jaeger J-2 at a distance of 12 in - 17 in [300 mm - 430 mm].
- Eye examination of all inspection personnel shall be required every three years or less if necessary to demonstrate adequacy.


No. 1.
.37M

In the second century of the Christian era, the empire of Rome comprehended the fairest part of the earth, and the most civilized portion of mankind. The frontiers of that extensive monarchy were guarded by ancient renown and disciplined valor. The gentle but powerful influence of laws and manners had gradually cemented the union of the provinces. Their peaceful inhabitants enjoyed and abused the advantages of wealth.

No. 2.
.50M

fourscore years, the public administration was conducted by the virtue and abilities of Nerva, Trajan, Hadrian, and the two Antonines. It is the design of this and of the two succeeding chapters, to describe the prosperous condition of their empire; and after-wards, from the death of Marcus Antoninus, to deduce the most important circumstances of its decline and fall; a revolution which will ever be remembered, and is still felt by

No. 3.
.62M

under the republic; and the emperors, for the most part, were satisfied with pre-serving those dominions which had been acquired by the policy of the senate, the active emulations of the consuls, and the martial enthusiasm of the people. The seven first centuries were filled with a rapid succession of triumphs; but it was

No. 4.
.75M

reserved for Augustus to relinquish the ambitious design of subduing the whole earth, and to introduce a spirit of moderation into the public councils. Inclined to peace by his temper and situation, it was very easy for him to discover that Rome, in her present exalted situation, had much less to hope than to fear from the chance of arms; and that, in the prosecution of

No. 5.
1.00M

the undertaking became every day more difficult, the event more doubtful, and the possession more precarious, and less beneficial. The experience of Augustus added weight to these salutary reflec-tions, and effectually convinced him that, by the prudent vigor of

No. 6.
1.25M

his counsels, it would be easy to secure every concession which the safety or the dignity of Home might require from the most formidable barbarians. Instead of exposing his person or his legions to the arrows of the Parthinians, he obtained, by an honor-

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6 Inspection
Part A General Requirements
6.1 Scope
6.1.4 Inspector Qualification Requirements

AWS D1.1/D1.1M:2015
Structural Welding Code—Steel

6.1.4.5 Verification Authority

- The Engineer shall have authority to verify the qualification of Inspectors.

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AWS D1.8 — Seismic Supplement
7 Inspection
7.2 Inspector Qualifications
7.2.3 Quality Control (QC) Welding Inspector Qualifications

AWS D1.8/D1.8M:2016
Structural Welding Code—Seismic Supplement

- QC welding inspection personnel shall be Associate Welding Inspectors (AWI) or higher as defined in AWS B5.1:2003, or otherwise qualified under the provisions of AWS D1.1/D1.1M 6.1.4, and to the satisfaction of the Contractor's QC program.

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AWS D1.8 — Seismic Supplement
7 Inspection
7.2 Inspector Qualifications
7.2.1 QA Welding Inspector Qualifications

AWS D1.8/D1.8M:2016 Structural Welding Code—Seismic Supplement

QA Welding Inspectors shall be qualified in accordance with one or more of the following:

(1) Welding Inspectors (WIs), or Senior Welding Inspectors (SWIs), as defined in AWS B5.1:2003, *Standard for the Qualification of Welding Inspectors*, except Associate Welding Inspectors (AWIs) may be used under the direct supervision of WIs, who are on site and available when weld inspection is being conducted, or

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AWS D1.8 — Seismic Supplement
7 Inspection
7.2 Inspector Qualifications
7.2.1 QA Welding Inspector Qualifications

AWS D1.8/D1.8M:2016 Structural Welding Code—Seismic Supplement

QA Welding Inspectors shall be qualified in accordance with one or more of the following:

(2) Certified Welding Inspectors (CWIs), or Senior Certified Welding Inspectors (SCWIs) in accordance with the requirements of AWS QC1, *Standard for AWS Certification of Welding Inspector*, except Certified Associate Welding Inspectors (CAWIs) may be used under the direct supervision of CWIs, who are on site and available when weld inspection is being conducted.

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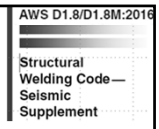
AWS D1.8 — Seismic Supplement
7 Inspection
7.2 Inspector Qualifications
7.2.1 QA Welding Inspector Qualifications



QA Welding Inspectors shall be qualified in accordance with one or more of the following:

(3) Level 2 Welding Inspectors or Level 3 Welding Inspectors, certified in accordance with the requirements of the Canadian Welding Bureau (CWB) in conformance with the Canadian Standard Association (CSA) Standard W178.2, *Certification of Welding Inspectors*, except Level 1 Welding Inspectors may be used under the direct supervision of Level 2 Welding Inspectors, who are on site and available when weld inspection is being conducted.

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AWS B5.1 Specification for the Qualification of Welding Inspectors
Table 1 – Welding Inspection Capabilities Based on Qualification Level

Knowledge and Skills	AWI	WI	SWI
(1) prepare reports	X	X	X
(2) communicate effectively orally and written	X	X	X
(3) understand the fundamentals of SMAW, SAW, OFW, RW, GTAW, FCAW, GMAW, PAW, SW, ESW and Thermal Spraying, Soldering, Mechanical Cutting, Thermal Cutting/Gouging, Brazing/ Braze Welding	X	X	X
(4) understand the fundamentals of VT, MT, UT, PT, ET, RT, LT, quality procedures and quality audits/surveillance	X	X	X
(5) understand the fundamentals of welding metallurgy	-	X	X
(6) understand welding symbols and drawings	X	X	X
(7) interpret drawings	-	X	X

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AWS B5.1 Specification for the Qualification of Welding Inspectors
Table 1 – Welding Inspection Capabilities Based on Qualification Level

AWS B5.1:2013
An American National Standard
Specification for the Qualification of Welding Inspectors

Standards	AWI	WI	SWI
(1) verify base material compliance	X	X	X
(2) verify filler metal compliance	X	X	X
(3) verify filler metal storage/handling compliance	X	X	X
(4) verify inspection records compliance	X	X	X
(5) verify proper documentation compliance	X	X	X
(6) verify base material and filler metal compatibility	-	X	X
(7) certify documented results compliance	-	X	X
(8) verify procedure qualification records compliance	-	X	X
(9) verify welding procedure compliance	-	X	X
(10) verify NDE procedures compliance	-	X	X

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AWS B5.1 Specification for the Qualification of Welding Inspectors
Table 1 – Welding Inspection Capabilities Based on Qualification Level

AWS B5.1:2013
An American National Standard
Specification for the Qualification of Welding Inspectors

Procedure Qualification	AWI	WI	SWI
(1) verify welding equipment appropriateness	X	X	X
(2) verify edge preparation compliance	X	X	X
(3) verify joint geometry compliance	X	X	X
(4) witness procedure qualification	-	X	X
(5) verify welding procedure qualification compliance	-	X	X
(6) review welding procedures for compliance with code and contract requirements	-	X	X
(7) write welding procedures	-	-	X

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AWS B5.1 Specification for the Qualification of Welding Inspectors
Table 1 – Welding Inspection Capabilities Based on Qualification Level

Performance Qualification	**AWI**	**WI**	**SWI**
(1) witness welder performance qualification	-	X	X
(2) verify welder qualification compliance	-	X	X
(3) verify welder qualification records compliance	-	X	X
(4) request welder performance requalification	-	X	X
Production	**AWI**	**WI**	**SWI**
(1) verify welder qualification appropriateness	-	X	X
(2) verify production welding compliance	-	X	X
(3) verify personnel qualifications	-	X	X

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AWS B5.1 Specification for the Qualification of Welding Inspectors
Table 1 – Welding Inspection Capabilities Based on Qualification Level

Inspection	**AWI**	**WI**	**SWI**
(1) perform visual examinations	X	X	X
(2) verify examination procedure compliance	-	X	X
(3) review examination results compliance	-	X	X
(4) develop visual inspection procedures (before, during, and after welding)	-	X	X
(5) provide NDE inspection planning and scheduling (before, during, and after a project)	-	X	X
(6) review welding inspection reports	-	X	X
(7) verify implementation of nondestructive and destructive evaluation methods	-	X	X
(8) prepare visual inspection requirements	-	-	X
(9) prepare NDE requirements	-	-	X
(10) report investigation results of quality inspection disputes	-	-	X
(11) prepare destructive testing requirements	-	-	X

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7.1 WI / AWI Examination

Part A – Fundamentals (150, closed)	%
Definitions and Terminology	12
Welding Processes	12
Symbols - Welding and NDE	10
Weld Examination	10
Welding Performance	9
Test Methods - NDE	8
Heat Control & Metallurgy (carbon and low-alloy steel)	6
Welding Related Calculations	6
Duties and Responsibilities	4
Destructive Tests	3
Cutting	2
	82

Part B - Practical Application (46, open)	%
Welding Inspection and Flaws	34
Procedure and Welder Qualifications	28
Mechanical Test and Properties	8
NDE	8
Utilization of Specification and Drawings	8
	86

Part C - Code Application (46, open)	%
Qualification	25
Fabrication	25
Inspection	25
Reports and Records	5
Material and Design	5
	85

***QC1*:2016** CWI - 72% CAWI - 60%

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3.1 Welding Inspector Specialist
A Welding Inspector Specialist is an individual who has been qualified by the employer as meeting the requirements of the employer's welding inspector qualification program.

3.2 Welding Inspector Assistant
A Welding Inspector Assistant is an individual who has been qualified by the employer as meeting the requirements of the employer's program to assist the Welding Inspector Specialist in performing the defined duties. The Welding Inspector Assistant shall perform inspection duties under the supervision of a Welding Inspector Specialist.

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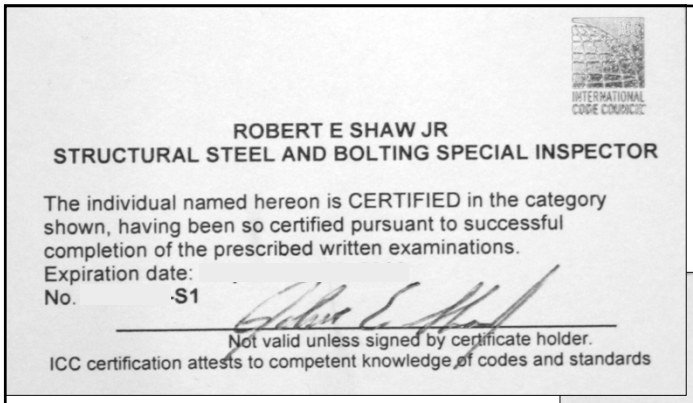
ICC Certified Special Inspector

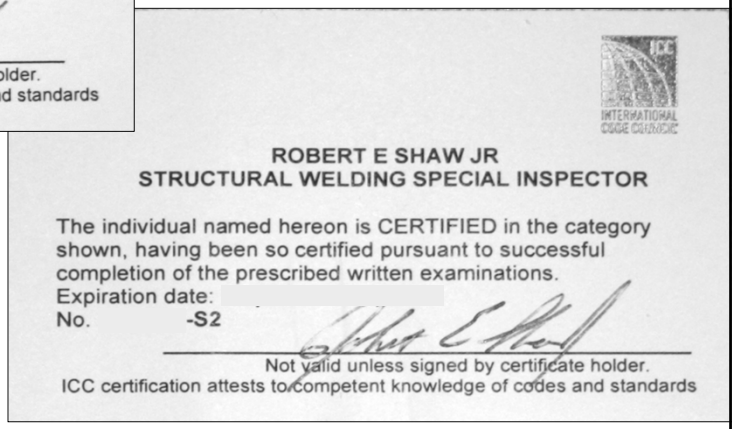
S1 - Structural Steel & Bolting
S2 - Structural Welding



ROBERT E SHAW JR
STRUCTURAL STEEL AND BOLTING SPECIAL INSPECTOR

The individual named hereon is CERTIFIED in the category shown, having been so certified pursuant to successful completion of the prescribed written examinations.
Expiration date:
No. -S1

Not valid unless signed by certificate holder.
ICC certification attests to competent knowledge of codes and standards



ROBERT E SHAW JR
STRUCTURAL WELDING SPECIAL INSPECTOR

The individual named hereon is CERTIFIED in the category shown, having been so certified pursuant to successful completion of the prescribed written examinations.
Expiration date:
No. -S2

Not valid unless signed by certificate holder.
ICC certification attests to competent knowledge of codes and standards

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ICC INTERNATIONAL CODE COUNCIL

People Helping People Build a Safer World™

National Certification Examination Information Bulletin

Computer-based Testing

Published February 27, 2017
This edition supersedes all previous bulletin editions, and is valid only through the dates noted above

This bulletin answers most questions raised by examination candidates. Please read it carefully. You will find it a useful reference throughout your registration and examination process.

http://www.iccsafe.org/wp-content/uploads/National_Certification_EIB-CBT.pdf 136

S2 Structural Welding Special Inspector
Prerequisite Certification:
S1 Structural Steel and Bolting Special Inspector (must be current)

90 multiple-choice questions
Exam fee: $225
Open book—3-1/2-hour time limit

Two-part examination; passing score on both parts is required.

Content Area	% of Total	References
General Requirements	8%	1. 2012 *International Building Code®*
Material Sampling, Testing, and Verification	22%	Store ID: (soft-cover) 3000S12; (M) $98; (N) $131
Structural, Reinforcing, and Sheet Steel Welding	70%	Store ID: (loose-leaf) 3000L12; (M) $111; (N) $148
Total	**100%**	2. 2012 *Special Inspection Manual*
		Store ID: (soft-cover) 4019S12; (M) $39.95; (N) $49.95
Please note: Part 1 of the exam has 60 questions that refer to the codes. Part 2 has 30 questions that refer to plans. Be sure you have the plans before starting the exam. YOU MUST DECIDE HOW TO MANAGE YOUR TIME FOR THE TWO PARTS OF THE EXAM. Once you leave Part 1, you CANNOT go back to it. You will have the remaining time for Part 2. As a guide to you, the exam is designed to require approximately 1-1/2 hours for the plan reading part.		3. AWS Structural Welding Code: — D1.1 (2006 or 2008) - *Steel* Store ID: (soft-cover) 9054S08; (M) $392; (N) $435 — D1.3 (1998 or 2008) - *Sheet Steel* Store ID: (soft-cover) 9052S07; (M) $114; (N) $127 — D1.4 (2005 or 2011) - *Reinforcing Steel* Store ID: (soft-cover) 9053S05; (M) $87; (N) $97 4. ANSI/AWS A2.4-98 or A2.4-2007 *Standard Symbols for Welding, Brazing, and Nondestructive Examination* Store ID: (soft-cover) 9099S07; (M) $144; (N) $160 5. *Steel Construction Manual*, 14th Edition (AISC 325-11) Store ID: (hard-cover) 9206S14; (M) $175; (N) $350

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S2 Structural Welding Special Inspector
Prerequisite Certification:
S1 Structural Steel and Bolting Special Inspector (must be current)

90 multiple-choice questions
Exam fee: $225
Open book—3-1/2-hour time limit

Two-part examination; passing score on both parts is required.

Content Area	% of Total	References
General Requirements	8%	1. 2015 *International Building Code®*
Material Sampling, Testing, and Verification	22%	Store ID: (soft-cover) 3000S15; (M) $101; (N) $135
Structural, Reinforcing, and Sheet Steel Welding	70%	Store ID: (loose-leaf) 3000L15; (M) $114; (N) $152
Total	**100%**	2. 2012 *Special Inspection Manual*
		Store ID: (soft-cover) 4019S12; (M) $39.95; (N) $49.95
Please note: Part 1 of the exam has 60 questions that refer to the codes. Part 2 has 30 questions that refer to plans. Be sure you have the plans before starting the exam. YOU MUST DECIDE HOW TO MANAGE YOUR TIME FOR THE TWO PARTS OF THE EXAM. Once you leave Part 1, you CANNOT go back to it. You will have the remaining time for Part 2. As a guide to you, the exam is designed to require approximately 1-1/2 hours for the plan reading part.		3. AWS Structural Welding Code: — D1.1 (2006 or 2008) - *Steel* Store ID: (soft-cover) 9054S08; (M) $392; (N) $435 — D1.3 (1998 or 2008) - *Sheet Steel* Store ID: (soft-cover) 9052S07; (M) $114; (N) $127 — D1.4 (2005 or 2011) - *Reinforcing Steel* Store ID: (soft-cover) 9053S05; (M) $87; (N) $97 4. ANSI/AWS A2.4-98 or A2.4-2007 *Standard Symbols for Welding, Brazing, and Nondestructive Examination* Store ID: (soft-cover) 9099S07; (M) $144; (N) $160 5. *Steel Construction Manual*, 14th Edition (AISC 325-11) Store ID: (hard-cover) 9206S14; (M) $175; (N) $350

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Structural Welding: Special Inspection with the IBC and AISC

- ❑ Transition from IBC requirements to AISC requirements
- ❑ Inspection tasks
- ❑ Available and submitted documentation
- ❑ Welding inspection and nondestructive testing
- ❑ Added inspection provisions for seismic force-resisting systems
- ❑ Special Inspector / Quality Assurance Inspector qualifications
- ➢ **Statement of Special Inspections**

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17 SPECIAL INSPECTIONS AND TESTS
1704 SPECIAL INSPECTIONS AND TESTS, CONTRACTOR RESPONSIBILITY AND STRUCTURAL OBSERVATION
1704.3 Statement of special inspections

1704.3.1 Content of statement of special inspections.
The statement of special inspections shall identify the following:

1. The materials, systems, components and work required to have *special inspection*s or tests by the *building official* or by the *registered design professional* responsible for each portion of the work.
2. The type and extent of each *special inspection*.
3. The type and extent of each test.
4. Additional requirements for *special inspections* or tests for seismic or wind resistance as specified in Sections 1705.11, 1705.12 and 1705.13.
5. For each type of *special inspection*, identification as to whether it will be *continuous special inspection*, *periodic special inspection* or performed in accordance with the notation used in the referenced standard where the inspections are defined.

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Structural Welding: Special Inspection with the IBC and AISC

- ✓ Transition from IBC requirements to AISC requirements
- ✓ Inspection tasks
- ✓ Available and submitted documentation
- ✓ Welding inspection and nondestructive testing
- ✓ Added inspection provisions for seismic force-resisting systems
- ✓ Special Inspector / Quality Assurance Inspector qualifications
- ✓ Statement of Special Inspections

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Structural Welding: Special Inspection with the IBC and AISC

May 16, 2017

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