

**SPECIAL INSPECTION REQUIREMENTS**

**SECTION 1704**  
**SPECIAL INSPECTIONS**

1704.1 General. Where application is made for construction as described in this section, the owner or the registered design professional in responsible charge acting as the owner's agent shall employ one or more special inspectors to provide inspections during construction on the types of work listed under Section 1704. The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the building official, for inspection of the particular type of construction or operation requiring special inspection. These inspections are in addition to the inspections specified in Section 109, Appendix Chapter 1.

1. Special inspections are not required for work of a minor nature or as warranted by conditions in the jurisdiction as approved by the building official.

2. Special inspections are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.

3. Unless otherwise required by the building official, special inspections are not required for occupancies in Group R-3 and occupancies in Group U that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.

1704.1.1 Statement of special inspections. The permit applicant shall submit a statement of special inspections prepared by the registered design professional in responsible charge in accordance with Section 106.1, Appendix Chapter 1, as a condition for permit issuance. This statement shall be in accordance with Section 1705.

1. A statement of special inspections is not required for structures designed and constructed in accordance with the conventional construction provisions of Section 2308.

2. The statement of special inspections is permitted to be prepared by a qualified person approved by the building official for construction not designed by a registered design professional.

1704.1.2 Report requirement. Special inspectors shall keep records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge. Reports shall indicate that work inspected was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon by the permit applicant and the building official prior to the start of work.

1704.2 Inspection of fabricators. Where fabrication of structural load-bearing members and assemblies is being performed on the premises of a fabricator's shop, special inspection of the fabricated items shall be required by this section and as required elsewhere in this code.

1704.2.1 Fabrication and implementation procedures. The special inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards. The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.

1704.2.2 Fabricator approval. Special inspections required by this code are not required where the work is done on the premises of a fabricator registered and approved to fabricate such work without special inspection. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved special inspection agency. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the building official stating that the work was performed in accordance with the approved construction documents.

1704.3 Steel construction. The special inspections for steel elements of buildings and structures shall be as required by Section 1704.3 and Table 1704.3.

1. Special inspection of the steel fabrication process shall not be required where the fabricator does not perform any welding, thermal cutting or heating operation of any kind as part of the fabrication process. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator's ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification, grade and mill test reports for the main stress-carrying elements are capable of being determined.

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.

2.1. Single-pass fillet welds not exceeding 5/16 inch (7.9 mm) 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 framing members such as studs and joists.

2.5. Welding of stairs and railing systems.

1704.3.1 Welding. Welding inspection shall be in compliance with AWS D11. The basis for welding inspector qualification shall be AWS D11.

1704.3.2 Details. The special inspector shall perform an inspection of the steel frame to verify compliance with the details shown on the approved construction documents, such as bracing, stiffening, member locations and proper application of joint details at each connection.

1704.3.3 High-strength bolts. Installation of high-strength bolts shall be periodically inspected in accordance with AISC specifications.

1704.3.3.1 General. While the work is in progress, the special inspector shall determine that the requirements for bolts, nuts, washers and paint; bolted parts and installation and tightening in such standards are met. For bolts requiring pretensioning, the special inspector shall observe the pretensioning testing and calibration procedures when such procedures are required by the installation method or by project plans or specifications; determine that all piles of connected materials have been drawn together and properly snugged and monitor the installation of bolts to verify that the selected procedure for installation is properly used to tighten bolts. For joints required to be tightened only to the snug-tight condition, the special inspector need only verify that the connected materials have been drawn together and properly snugged.

1704.3.3.2 Periodic monitoring. Monitoring of bolt installation for pretensioning is permitted to be performed on a periodic basis when using the turn-of-nut method with match marking techniques, the direct tension indicator method or the alternate design fastener (twist-off ball) method. Joints designated as snug tight need not be inspected on a periodic basis.

1704.3.3.3 Continuous monitoring. Monitoring of bolt installation for pretensioning using the calibrated wrench method or the turn-of-nut method without matchmarking shall be performed on a continuous basis.

1704.4 Concrete construction. The special inspections and verifications for concrete construction shall be required by this section and Table 1704.4.

1. Isolated spread concrete footings of buildings three stories or less in height that are fully supported on earth or rock.

2. Continuous concrete footings supporting walls of buildings three stories or less in height that are fully supported on earth or rock where:

2.1. The footings support walls of light-frame construction;

2.2. The footings are designed in accordance with Table 1805.4.2; or

2.3. The structural design of the footing is based on a specified compressive strength,  $f_c$ , no greater than 2,500 pounds per square inch (psi) (17.2 MPa), regardless of the compressive strength specified in the construction documents or used in the footing construction.

3. Nonstructural concrete slabs supported directly on the ground, including prestressed slabs on grade, where the effective prestress in the concrete is less than 150 psi (1.03 MPa).

4. Concrete foundation walls constructed in accordance with Table 1805.5(5).  
5. Concrete patios, driveways and sidewalks, on grade.

**TABLE 1704.5.1**  
**LEVEL 2 SPECIAL INSPECTION**

INSPECTION TASK	FREQUENCY OF INSPECTION		REFERENCE FOR CRITERIA	
	Continuous during task listed	Periodically during task listed	IBC section	ACI 530/ASCE 5/TMS 402.9 / ACI 530.1/ASCE 6/TMS 602.9
1. As masonry construction begins, the following shall be verified to ensure compliance:	-	-	-	-
a. Proportions of site-prepared mortar.	-	X	-	Art. 2.6A
b. Location of mortar joints.	-	X	-	Art. 3.3B
c. Location of reinforcement, connectors, prestressing tendons and anchorages.	-	X	-	Art. 3.4, 3.6A
d. Prestressing technique.	-	X	-	Art. 3.6B
e. Grade and size of prestressing tendons and anchorages.	-	X	-	Art. 2.4E, 2.4F
2. The inspection program shall verify:	-	-	-	-
a. Size and location of structural elements.	-	X	-	Art. 3.3C
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.	-	X	-	Sec. 12.2(a), 214, 3.16
c. Specified size, grade and type of reinforcement.	-	X	-	Sec. 1.13
d. Welding of reinforcing bars.	X	-	-	Sec. 21.6.7.2, 33.3.4(b)
e. Protection of masonry during cold weather (temperature below 40 °F) or hot weather (temperature above 90 °F).	-	X	-	Art. 1.8C, 1.8D
f. Application and measurement of prestressing force.	-	X	-	Art. 3.6B
3. Prior to grouting, the following shall be verified to ensure compliance:	-	-	-	-
a. Grout space is clean.	-	X	-	Art. 3.2D
b. Placement of reinforcement and connectors and prestressing tendons and anchorages.	-	X	-	Sec. 1.13
c. Proportions of site-prepared grout and prestressing grout for bonded tendons.	-	X	-	Art. 2.6B
d. Construction of mortar joints.	-	X	-	Art. 3.3B
4. Grout placement shall be verified to ensure compliance with code and construction document provisions:	X	-	-	Art. 3.5
a. Grouting of prestressing bonded tendons.	X	-	-	Art. 3.6C
5. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.	X	-	-	Sec. 2105.2.2, 2105.3
6. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.	-	X	-	Art. 1.5

For  $S_f \cdot C \cdot F = F - 30/1.8$ .

a. The specific standards referenced are those listed in Chapter 35.

**TABLE 1704.5.3**  
**LEVEL 2 SPECIAL INSPECTION**

INSPECTION TASK	FREQUENCY OF INSPECTION		REFERENCE FOR CRITERIA	
	Continuous during task listed	Periodically during task listed	IBC section	ACI 530/ASCE 5/TMS 402.9 / ACI 530.1/ASCE 6/TMS 602.9
1. From the beginning of masonry construction, the following shall be verified to ensure compliance:	-	-	-	-
a. Proportions of site-prepared mortar, grout and prestressing grout for bonded tendons.	-	X	-	Art. 2.6A
b. Placement of masonry walls and construction of mortar joints.	-	X	-	Art. 3.3B
c. Location of reinforcement, connectors and prestressing tendons and anchorages.	-	X	-	Art. 3.4, 3.6A
d. Grout space prior to grouting.	X	-	-	Art. 3.2D
e. Placement of grout.	X	-	-	Art. 3.5
f. Placement of prestressing grout.	X	-	-	Art. 3.6C
2. The inspection program shall verify:	-	-	-	-
a. Size and location of structural elements.	-	X	-	Art. 3.3C
b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.	X	-	-	Sec. 12.2(a), 214, 3.16
c. Specified size, grade and type of reinforcement.	-	X	-	Sec. 1.13
d. Welding of reinforcing bars.	X	-	-	Sec. 21.6.7.2, 33.3.4(b)
e. Protection of masonry during cold weather (temperature below 40 °F) or hot weather (temperature above 90 °F).	-	X	-	Art. 1.8C, 1.8D
f. Application and measurement of prestressing force.	X	-	-	Art. 3.6B
3. Preparation of any required grout specimens, mortar specimens and/or prisms shall be observed.	X	-	-	Art. 3.6
4. Compliance with required inspection provisions of the construction documents and the approved submittals shall be verified.	-	X	-	Art. 1.5

For  $S_f \cdot C \cdot F = F - 30/1.8$ .

a. The specific standards referenced are those listed in Chapter 35.

**TABLE 1704.7**  
**REQUIRED VERIFICATION AND INSPECTION OF SOILS**

VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED		PERIODICALLY DURING TASK LISTED	
1. Verify materials before testing or use adequate to achieve the design bearing capacity.	-	-	X	-
2. Verify excavations are extended to proper depth and have reached proper material.	-	-	X	-
3. Perform displacement and testing of controlled fill materials.	-	-	X	-
4. Verify use of proper materials, densities and fill thickness during placement and compaction of controlled soils.	X	-	-	-
5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.	-	-	X	-

**TABLE 1704.8**  
**REQUIRED VERIFICATION AND INSPECTION OF PILE FOUNDATIONS TABLE**

VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED		PERIODICALLY DURING TASK LISTED	
1. Verify pile materials, sizes and lengths comply with the specifications.	X	-	-	-
2. Determine capacities of test piles and conduct additional load tests, as required.	X	-	-	-
3. Observe driving operations and maintain complete and accurate records for each pile.	X	-	-	-
4. Verify pile location, elevation and penetration, confirm pile diameter, ball diameter (if applicable), length, embedment into bedrock (if applicable) and adequate bearing strata capacity.	X	-	-	-
5. For steel piles, perform additional inspections in accordance with Section 1704.3.	-	-	-	-
6. For concrete piles and concrete-filled piles, perform additional inspections in accordance with Section 1704.4.	-	-	-	-
7. For cast-in-place piles, perform additional inspections as determined by the registered design professional in responsible charge.	-	-	-	-
8. For augered cast-in-place piles, perform additional inspections in accordance with Section 1704.4.	-	-	-	-

**TABLE 1704.9**  
**REQUIRED VERIFICATION AND INSPECTION OF PIER FOUNDATIONS**

VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED		PERIODICALLY DURING TASK LISTED	
1. Observe drilling operations and maintain complete and accurate records for each pier.	X	-	-	-
2. Verify pier location, elevation and penetration, confirm pier diameter, ball diameter (if applicable), length, embedment into bedrock (if applicable) and adequate bearing strata capacity.	X	-	-	-
3. For concrete piers, perform additional inspections in accordance with Section 1704.4.	-	-	-	-
4. For augered cast-in-place piers, perform additional inspections in accordance with Section 1704.4.	-	-	-	-

1704.10 Sprayed fire-resistant materials. Special inspections for sprayed fire-resistant materials applied to structural elements and decks shall be in accordance with Sections 1704.10.1 through 1704.10.5. Special inspections shall be based on the fire-resistance design as designated in the approved construction documents.

1704.10.1 Structural member surface conditions. The surfaces shall be prepared in accordance with the approved fire-resistance design and the approved manufacturer's written instructions. The prepared surface of structural members to be sprayed shall be inspected before the application of the sprayed fire-resistant material.

1704.10.2 Application. The substrate shall have a minimum ambient temperature before and after application as specified in the approved manufacturer's written instructions. The area for application shall be ventilated during and after application as required by the approved manufacturer's written instructions.

1704.10.3 Thickness. The average thickness of the sprayed fire-resistant materials applied to structural elements shall not be less than the thickness required by the approved fire-resistance design. Individually measured thickness, which exceeds the thickness specified in a design plus 1/4 inch (6.4 mm) or more, shall be recorded as the thickness specified in the design plus 1/4 inch (6.4 mm). For design thicknesses 1 inch (25 mm) or greater, the minimum allowable individual thickness shall be the design thickness minus 1/4 inch (6.4 mm). For design thicknesses less than 1 inch (25 mm), the minimum allowable individual thickness shall be the design thickness minus 25 percent. Thickness shall be determined in accordance with ASTM E 605. Samples of the sprayed fire-resistant materials shall be selected in accordance with Sections 1704.10.3.1 and 1704.10.3.2.

1704.10.3.1 Floor, roof and wall assemblies. The thickness of the sprayed fire-resistant material applied to floor, roof and wall assemblies shall be determined in accordance with ASTM E 605 by taking the average of not less than four measurements for each 1,000 square feet (93 m<sup>2</sup>) of the sprayed area on each floor or part thereof.

1704.10.3.2 Structural framing members. The thickness of the sprayed fire-resistant material applied to structural members shall be determined in accordance with ASTM E 605. Thickness testing shall be performed on not less than 25 percent of the structural members on each floor.

1704.10.4 Density. The density of the sprayed fire-resistant material shall not be less than the density specified in the approved fire-resistance design. Density of the sprayed fire-resistant material shall be determined in accordance with ASTM E 605.

1704.10.5 Bond strength. The cohesive/adhesive bond strength of the cured sprayed fire-resistant material applied to structural elements shall not be less than 150 pounds per square foot (psf) (7.18 N/m<sup>2</sup>). The cohesive/adhesive bond strength shall be determined in accordance with the field test specified in ASTM E 736 by testing in-place samples of the sprayed fire-resistant material selected in accordance with Sections 1704.10.5.1 and 1704.10.5.2.

1704.10.5.1 Floor, roof and wall assemblies. The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from each floor, roof and wall assembly of the role of not less than one sample for every 10,000 square feet (929 m<sup>2</sup>) or part thereof of the sprayed area in each story.

1704.10.5.2 Structural framing members. The test samples for determining the cohesive/adhesive bond strength of the sprayed fire-resistant materials shall be selected from beams, girders, joists, trusses and columns at the rate of not less than one sample for each type of structural framing member for each 10,000 square feet (929 m<sup>2</sup>) of floor area or part thereof in each story.

1704.11 Mastic and intumescent fire-resistant coatings. Special inspections for mastic and intumescent fire-resistant coatings applied to structural elements and decks shall be in accordance with AWS 12-B. Special inspections shall be based on the fire-resistance design as designated in the approved construction documents.

1704.12 Exterior insulation and finish systems (EIFS). Special inspections shall be required for all EIFS applications.

1704.13 Pier foundations. Special inspections shall be performed during installation and testing of pier foundations as required by Table 1704.8. The approved soils report, required by Section 1802.2, and the documents prepared by the registered design professional in responsible charge shall be used to determine compliance.

1704.14 Pier foundations. Special inspections shall be performed during installation and testing of pier foundations as required by Table 1704.9. The approved soils report, required by Section 1802.2, and the documents prepared by the registered design professional in responsible charge shall be used to determine compliance.

1704.15 Pier foundations. Special inspections shall be performed during installation and testing of pier foundations as required by Table 1704.9. The approved soils report, required by Section 1802.2, and the documents prepared by the registered design professional in responsible charge shall be used to determine compliance.

1704.16 Testing scope. The test scope shall be as follows:

- During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.
- Prior to occupancy and after sufficient completion for the purposes of pressure difference testing, flow measurements and detection and control verification.

1704.17 Qualifications. Special inspection agencies for smoke control shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.

**SECTION 1705**  
**STATEMENT OF SPECIAL INSPECTIONS**

1705.1 General. Where special inspection or testing is required by Section 1704, 1707 or 1708, the registered design professional in responsible charge shall prepare a statement of special inspections in accordance with Section 1705 or submitted by the permit applicant (see Section 1704.1.1).

1705.2 Content of statement of special inspections. The statement of special inspections shall identify the following:

- The materials, systems, components and work required to have special inspection or testing by the building official or by the registered design professional responsible for each portion of the work.
- The type and extent of each special inspection.
- The type and extent of each test.
- Additional requirements for special inspection or testing for seismic or wind resistance as specified in Section 1705.3, 1705.4, 1707, or 1708.

For each type of special inspection, identification as to whether it will be continuous special inspection or periodic special inspection.

1705.3 Seismic resistance. The statement of special inspections shall include seismic requirements for the following cases:

- The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E, or F, in accordance with Section 1613.4.
- Designated seismic systems in structures assigned to Seismic Design Category D, E, or F.
- The following additional systems and components in structures assigned to Seismic Design Category C:
- Heating, ventilating and air-conditioning (HVAC) ductwork containing hazardous materials and anchorage of such ductwork.
- Piping systems and mechanical units containing flammable, combustible or highly toxic materials.
- Anchorage of electrical equipment used for emergency or standby power systems.

1705.4 Wind resistance. The statement of special inspections shall include seismic requirements for the following cases:

- The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E, or F, in accordance with Section 1613.4.
- Designated seismic systems in structures assigned to Seismic Design Category D, E, or F.
- The following additional systems and components in structures assigned to Seismic Design Category C:
- Heating, ventilating and air-conditioning (HVAC) ductwork containing hazardous materials and anchorage of such ductwork.
- Piping systems and mechanical units containing flammable, combustible or highly toxic materials.
- Anchorage of electrical equipment used for emergency or standby power systems.

1705.5 Additional systems and components in structures assigned to Seismic Design Category D:

- Systems required for Seismic Design Category C.
- Exterior wall panels and their anchorage.
- Suspended ceiling systems and their anchorage.
- Access floors and their anchorage.
- Steel storage racks and their anchorage, where the importance factor is equal to 1.5 in accordance with Section 15.5.3 of ASCE 7.

1705.6 Additional systems and components in structures assigned to Seismic Design Category E or F:

- Systems required for Seismic Design Categories C and D.
- Electrical equipment.

Exceptions: Seismic requirements are permitted to be excluded from the statement of special inspections for structures designed and constructed in accordance with the following:

- The structure consists of light-frame construction; the design spectral response acceleration at short periods,  $S_D$ , as determined in Section 1613.5.4, does not exceed 0.5g; and the height of the structure does not exceed 35 feet (10,668 mm) above grade plane; or
- The structure is constructed using a reinforced masonry structural system or reinforced concrete structural system; the design spectral response acceleration at short periods,  $S_D$ , as determined in Section 1613.5.4, does not exceed 0.5g; and the height of the structure does not exceed 25 feet (7620 mm) above grade plane; or
- Detached one- or two-family dwellings not exceeding two stories in height, provided the structure does not have any of the following plan or vertical irregularities in accordance with Section 12.3.2 of ASCE 7:

- Torsional irregularity.
- Nonparalel systems.
- Stiffness irregularity—extreme soft story and soft story.
- Discontinuity in capacity—weak story.

1705.7 Seismic requirements in the statement of special inspections. When Section 1705.3 specifies that seismic requirements be included, the statement of special inspections shall identify the following:

- The designated seismic systems and seismic-force-resisting systems that are subject to special inspections in accordance with Section 1705.3.
- The additional special inspections and testing to be provided as required by Sections 1707 and 1708 and other applicable sections of this code, including the applicable standards referenced by this code.

1705.8 Wind resistance. The statement of special inspections include wind requirements for structures constructed in the following areas:

- In wind Exposure Category B, where the 3-second-gust basic wind speed is 120 miles per hour (mph) (52.8 m/s) or greater.
- In wind Exposure Category C or D, where the 3-second-gust basic wind speed is 110 mph (49 m/s) or greater.

1705.9 Wind requirements in the statement of special inspections. When Section 1705.8 specifies that wind requirements be included, the statement of special inspections shall identify the main windforce-resisting systems and wind-resisting components subject to special inspections as specified in Section 1705.4.2.

1705.4.2 Detailed requirements. The statement of special inspections shall include at least the following systems and components:

- Roof cladding and roof framing connections.
- Wall connections to roof and floor diaphragms and framing.
- Roof and floor diaphragm systems, including collectors, drag struts and boundary elements.
- Vertical windforce-resisting systems, including braced frames, moment frames and shear walls.
- Windforce-resisting system connections to the foundation.
- Fabrication and installation of systems or components required to meet the impact-resistance requirements of Section 1609.1.2.

Exception: Fabrication of manufactured systems or components that have a label indicating compliance with the wind-load and impact-resistance requirements of this code.

SECTION 1706  
CONTRACTOR RESPONSIBILITY

1706.1 Contractor responsibility. Each contractor responsible for the construction of a main wind- or seismic-force-resisting system, designated seismic system or a wind- or seismic-resisting component listed in the statement of special inspections shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:

- Acknowledgement of awareness of the special requirements contained in the statement of special inspections.
- Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the building official.
- Procedures for exercising control with the contractor's organization, the method and frequency of reporting and the distribution of the reports; and
- Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

**SECTION 1707**  
**SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE**

1707.1 Special inspections for seismic resistance. Special