Office of Education and Data Management
Fall 2018 Career Development Seminar

October 2018

Special Inspections and Tests

Presented by
Milton Gregory Grew, AIA
Director of Inspections and Permits, Town of East Hartford

Objectives

- What are special inspections?
- What are the requirements for special inspections?
- Who can perform special inspections & tests?
- Who have responsibilities and roles to play?
- What is the building official's role?

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What are special inspections?

[BS] SPECIAL INSPECTION. Inspection of construction requiring the expertise of an *approved special inspector* in order to ensure compliance with this code and the *approved construction documents*.

Continuous special inspection. Special inspection by the *special inspector* who is present when and where the work to be inspected is being performed.

Periodic special inspection. Special inspection by the *special inspector* who is intermittently present where the work to be inspected has been or is being performed.

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What are special inspections?

- Verify work that is considered critical to life safety and property protection is constructed according to approved construction documents.
- In addition to building official's inspections.
- Monitoring construction that requires special expertise.

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Requirements in 2015 IBC

15 major categories of requirements:

1. Special cases.
2. Steel construction.
3. Concrete construction.
4. Masonry construction.
5. Wood construction.
6. Soils.

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Requirements in 2015 IBC

7. Driven deep, cast-in-place & helical pile foundations.
8. Special inspection for wind resistance.
9. Special inspection for seismic resistance.
10. Testing for seismic resistance.

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Requirements in 2015 IBC

11. Sprayed fire-resistant materials.
12. Mastic & intumescent fire-resistant coatings.
13. Exterior insulation & finish systems (EIFS).
14. Fire-resistant penetrations & joints.
15. Testing for smoke control.

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Special Cases (1705.1.1)

- Unusual work in the opinion of the building official.
- Alternate materials & systems.
- Unusual design applications.
- Manufacturer's instructions have additional requirements beyond the code or referenced standards.

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General Exceptions (1704.2)

- Construction of a minor nature.
- As warranted by conditions in the jurisdiction.
- Group U, accessory to R (garages, sheds…)
- Cold-formed steel light frame construction per 2211.7.
- Conventional light frame wood construction per 2308.

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Steel Construction (1705.2)

- **Steel fabrication process** is subject to special inspections (1704.2.5) unless they DON'T perform welding, thermal cutting or heating operations in the fabrication, in which case, they must keep records of material specs & grades, & mill test reports must be identifiable if required by construction documents.

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Steel Construction (1705.2)

- **1705.2.1 Structural Steel**:

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Steel Construction (1705.2)

- **1705.2.1 Structural Steel**:
- Special inspections & nondestructive testing per AISC 360.
- Railing systems w/ structural steel only need inspection of welds at the base of cantilevered rail posts.

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Steel Construction (1705.2)

- AISC 360 – Specification for Structural Steel Buildings

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Steel Construction (1705.2)

- **1705.2.2 Cold-formed steel deck**:
- Special inspections & qualification of welding special inspectors per SDI QA/QC.

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Steel Construction (1705.2)

- **1705.2.2 Cold-formed steel deck**:

Commentary: "*…prepared Specifically for providing Requirements for Special Inspections as required by Chapter 17 of the IBC…*"

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Steel Construction (1705.2)

- **1705.2.3 Open-web steel joists & joist girders**:
- Per Table 1705.2.3

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Steel Construction (1705.2)

- **1705.2.3 Open-web steel joists & joist girders**:

TABLE 1705.2.3
REQUIRED SPECIAL INSPECTIONS OF OPEN-WEB STEEL JOISTS AND JOIST GIRDERS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[a]
1. Installation of open-web steel joists and joist girders.			
a. End connections – welding or bolted.	—	X	SJI specifications listed in Section 2207.1.
b. Bridging – horizontal or diagonal.	—		
1. Standard bridging.	—	X	SJI specifications listed in Section 2207.1.
2. Bridging that differs from the SJI specifications listed in Section 2207.1.		X	

For SI: 1 inch = 25.4 mm.
a. Where applicable, see also Section 1705.12, Special inspections for seismic resistance.

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Steel Construction (1705.2)

- **(CT Amd) 1705.2.4 Cold-formed steel trusses spanning 30 ft or greater**:
- Permanent bracing

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Steel Construction (1705.2)

- **(CT Amd.) 1705.2.4 Cold-formed steel trusses - spanning 60 ft or greater**:
- Temporary bracing
- Permanent bracing

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Steel Construction (1705.2)

1705.2.5 Cold-formed steel light-frame construction:

- *Special inspections*
  - Prefabricated structural elements and assemblies shall be in accordance with Section 1704.2.5.
  - Site-built structural elements and assemblies shall be in accordance with this section and Table 1705.2.5.
  - Exceptions
    - Risk category I (agri / temp / minor storage)
    - Risk category II; wind exp B or C; 3 stories or less

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Steel Construction (1705.2)

(Add) **TABLE 1705.2.5 REQUIRED SPECIAL INSPECTIONS OF COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION**

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	IBC REFERENCE
1. Inspect Material *Grade* and Thickness		X	
2. Inspect Framing and Details			
a. Framing layout, member sizes and bearing lengths		X	
b. Blocking, bridging and web stiffeners		X	
c. Holes[a]		X	
3. Inspect Connections			
a. Bolted and screwed connections, including diameter, length, spacing and edge distance		X	
b. Welded connections		X	
c. Proprietary hangers and framing anchors, including fastener sizes and quantities		X	
d. Tie-down anchors, including anchor rod sizes and fastener sizes and quantities		X	
4. Inspect Shear Walls and *Diaphragms*			
a. Panel *grade* and thickness[b]		X	
b. Steel strapping size, *grade* and thickness		X	
c. Fastener size, length and spacing		X	
d. Framing member sizes at panel edges		X	
e. Blocking at panel edges		X	
5. Inspect Cold-Formed Steel Trusses			
a. Temporary installation restraint/bracing for truss spanning 60 feet or more		X	*1705.2.4*
b. Permanent individual truss member restraint/ bracing for trusses spanning 30 feet or more		X	*1705.2.4*

a. *Inspections of holes to be performed after electrical, mechanical and plumbing rough-in inspections.*
b. *Includes wood structural panels, steel sheet panels and gypsum board panels.*

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Concrete Construction (1705.3)

- Per Table 1705.3

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Concrete Construction (1705.3)

TABLE 1705.3
REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[a]	IBC REFERENCE
1. Inspect reinforcement, including prestressing tendons, and verify placement.	—	X	ACI 318 Ch. 20, 25.2, 25.3, 26.5.1-26.5.3	1908.4
2. Reinforcing bar welding: a. Verify weldability of reinforcing bars other than ASTM A 706; b. Inspect single-pass fillet welds, maximum $^5/_{16}$"; and c. Inspect all other welds.	— X	X X	 AWS D1.4 ACI 318: 26.5.4	—
3. Inspect anchors cast in concrete.	—	X	ACI 318: 17.8.2	—
4. Inspect anchors post-installed in hardened concrete members.[b] a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads. b. Mechanical anchors and adhesive anchors not defined in 4.a.	 X	 X	 ACI 318: 17.8.2.4 ACI 318: 17.8.2	—
5. Verify use of required design mix.	—	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X	—	ASTM C 172 ASTM C 31 ACI 318: 26.4.5, 26.12	1908.10

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Concrete Construction (1705.3)

TABLE 1705.3
REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD[a]	IBC REFERENCE
7. Inspect concrete and shotcrete placement for proper application techniques.	X	—	ACI 318: 26.4.5	1908.6, 1908.7, 1908.8
8. Verify maintenance of specified curing temperature and techniques.	—	X	ACI 318: 26.4.7-26.4.9	1908.9
9. Inspect prestressed concrete for: a. Application of prestressing forces; and b. Grouting of bonded prestressing tendons.	 X X	 — —	 ACI 318: 26.9.2.1 ACI 318: 26.9.2.3	—
10. Inspect erection of precast concrete members.	—	X	ACI 318: Ch. 26.8	—
11. Verify in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.	—	X	ACI 318: 26.10.2	—
12. Inspect formwork for shape, location and dimensions of the concrete member being formed.	—	X	ACI 318: 26.10.1(b)	—

For SI: 1 inch = 25.4 mm.

a. Where applicable, see also Section 1705.12, Special inspections for seismic resistance.

b. Specific requirements for special inspection shall be included in the research report for the anchor issued by an approved source in accordance with 17.8.2 in ACI 318, or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to the commencement of the work.

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Concrete Construction (1705.3)

- **Exceptions:**
- Isolated spread concrete footings of buildings 3 stories or less, fully supported on earth or rock.
- Continuous footings, buildings 3 stories or less, fully supported on earth or rock where:
  - Walls of light-frame construction.
  - Footings designed per Table 1809.7.

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Concrete Construction (1705.3)

- **Another Exception:**
- Continuous footings, buildings 3 stories or less, fully supported on earth or rock where:
  - Walls of light-frame construction.
  - Footings designed per Table 1809.7.
  - Structural design of footings based on Fc of 2,500 psi max. (regardless of what's used)

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Concrete Construction (1705.3)

- **More Exceptions:**
- Nonstructural slabs on grade.
- Foundation walls constructed per Table 1807.1.6.2.
- Patios, driveways & sidewalks on grade.

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Concrete Construction (1705.3)

- **1705.3.1 Welding of reinforcing bars:**
  - AWS D1.4 for special inspections
  - AWS D1.4 for special inspector qualifications

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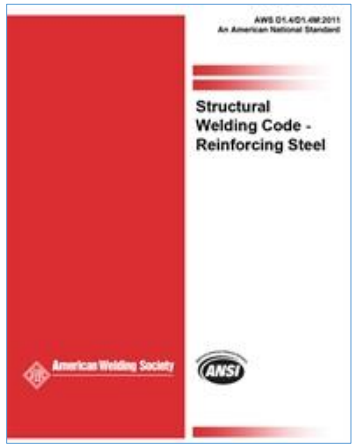
Concrete Construction (1705.3)

- **1705.3.1 Welding of reinforcing bars:**
  - AWS D1.4-2011



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Concrete Construction (1705.3)

- **1705.3.2: Material tests:**
  - Testing of materials per ACI 318 if there is insufficient data or documentation about the quality standards of the materials being used.

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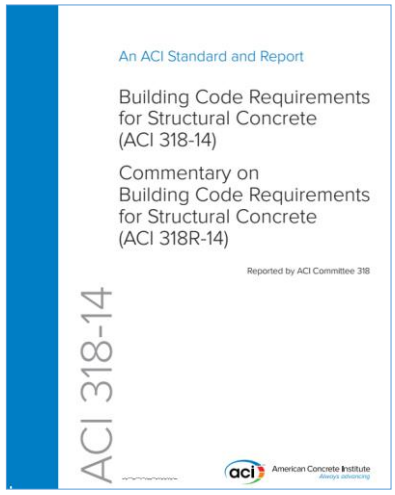
Concrete Construction (1705.3)

- **1705.3.2: Material tests:**
- ACI 318-2014



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Masonry Construction (1705.4)

- Special inspections & tests in accordance with the quality assurance program requirements of TMS 402 / ACI 530 / ASCE 5 and TMS 602 / ACI 530.1 / ASCE 6.

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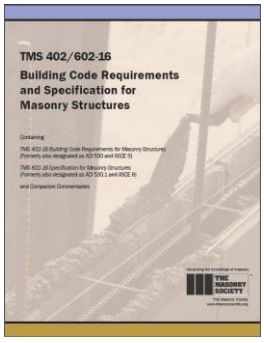
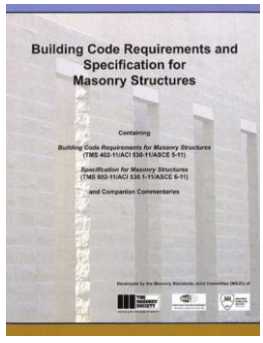
Masonry Construction (1705.4)

- TMS 402 / ACI 530 / ASCE 5 and TMS 602 / ACI 530.1 / ASCE 6.





Section 1.14 – Quality Assurance Program

Requirements vary by facility function.

3 Levels of testing, submittals & inspections.

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Masonry Construction (1705.4)

- Exceptions:

Exception: *Special inspections* and tests shall not be required for:

1. Empirically designed masonry, glass unit masonry or masonry veneer designed in accordance with Section 2109, 2110 or Chapter 14, respectively, where they are part of a structure classified as *Risk Category* I, II or III.
2. Masonry foundation walls constructed in accordance with Table 1807.1.6.3(1), 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4).
3. Masonry fireplaces, masonry heaters or masonry chimneys installed or constructed in accordance with Section 2111, 2112 or 2113, respectively.

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Masonry Construction (1705.4)

- **1705.4.1 Empirically designed masonry glass unit masonry and masonry veneer in Risk Category IV.**
  - TMS 402/ACI 530/ASCE 5, Level B Quality Assurance

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Masonry Construction (1705.4)

- TMS 402/ACI 530/ASCE 5, Level B Quality Assurance

Table 1.14.2 — Level 2 Quality Assurance

MINIMUM TESTS AND SUBMITTALS	MINIMUM INSPECTION
Certificates for materials used in masonry construction indicating compliance with the contract documents Verification of f'_m prior to construction, except where specifically exempted by this Code	As masonry construction begins, verify the following are in compliance: • proportions of site-prepared mortar • construction of mortar joints • location of reinforcement, connectors, and prestressing tendons and anchorages • prestressing technique Prior to grouting, verify the following are in compliance: • grout space • grade and size of reinforcement, prestressing tendons, and anchorages • placement of reinforcement, connectors, and prestressing tendons and anchorages • proportions of site-prepared grout and prestressing grout for bonded tendons • construction of mortar joints Verify that the placement of grout and prestressing grout for bonded tendons is in compliance Observe preparation of grout specimens, mortar specimens, and/or prisms Verify compliance with the required inspection provisions of the contract documents and the approved submittals

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Masonry Construction (1705.4)

- **1705.4.2 Vertical masonry foundation elements.**
  - Per 1705.4

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Wood Construction (1705.5)

- **Prefabricated** wood structural elements and assemblies per 1704.2.5
  - Special inspections conducted at fabricator's shop

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Wood Construction (1705.5)

- **Exceptions** to shop inspections (1704.2.5):
  - Fabricator has approved quality control procedures. Building official approves the procedures and does periodic inspections of fabrication practices.

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Wood Construction (1705.5)

- **Exceptions** to shop inspections (1704.2.5):
  - Special inspections can be reduced or eliminated when approved by RDP. Shop QC must be audited by approved special inspection agency. Approved fabricators include:
    - Certified by TPI QA Program
    - Certified by AITC

    Certificate of compliance to building official stating work complies with construction documents.

(part of 1704.2.5.1 CT AMD)

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Wood Construction (1705.5)

- **Site-Built** wood structural elements and assemblies per CT (Add) Table 1705.5.
  - **Exceptions**
    - Risk category I (agri / temp / minor storage)
    - Risk category II; wind exp B or C; 3 stories or less

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Wood Construction (1705.5)

(Add) **TABLE 1705.5 REQUIRED SPECIAL INSPECTIONS OF WOOD CONSTRUCTION**

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	IBC REFERENCE
1. Inspect Grading of Wood Materials: a. Sawn lumber framing b. Structural composite lumber c. Wood structural panels		X X X	
2. Inspect Framing and Details a. Framing layout, member sizes and bearing lengths b. Blocking and bridging c. Holes and notches[a]		X X X	
3. Inspect Connections a. Bolted and screwed connections, including diameter, length, spacing and edge distance b. Nailed connections, including diameter, length, type and spacing of nails c. Proprietary hangers and framing anchors, including fastener sizes and quantities d. Tie-down anchors, including anchor rod size and fastener sizes and quantities		X X X X	
4. Inspect Shear Walls and *Diaphragms* a. Panel *grade* and thickness[b] b. Fastener size, length and spacing. c. Framing member sizes at panel edges d. Blocking at panel edges e. Field gluing f. High-load *diaphragms*	X	X X X X X	*1705.5.1*
5. Inspect Metal-Plate Connected Wood Trusses a. Temporary installation restraint/bracing for truss spanning 60 feet or more b. Permanent individual truss member restraint/ bracing for trusses spanning 30 feet or more c. Multi-ply truss connections.		X X X	*1705.5.2* *1705.5.2*

a. *Inspections of holes and notches to be performed after electrical, mechanical and plumbing rough-in inspections.*
b. *Applies to wood structural panels and gypsum board panels.*

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Wood Construction (1705.5)

- **High-load diaphragms (1705.5.1):**
  - Inspect sheathing, framing & fastening

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Wood Construction (1705.5)

- **Metal-plate-connected wood trusses (1705.5.2 CT amd):**
- 30’ span: Permanent bracing
- 60’ span: Temporary & permanent bracing

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Soils (1705.6)

TABLE 1705.6
REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	—	X
2. Verify excavations are extended to proper depth and have reached proper material.	—	X
3. Perform classification and testing of compacted fill materials.	—	X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	X	—
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.	—	X

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Driven deep foundations (1705.7)

TABLE 1705.7
REQUIRED SPECIAL INSPECTIONS AND TESTS OF DRIVEN DEEP FOUNDATION ELEMENTS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Verify element materials, sizes and lengths comply with the requirements.	X	—
2. Determine capacities of test elements and conduct additional load tests, as required.	X	—
3. Inspect driving operations and maintain complete and accurate records for each element.	X	—
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element.	X	—
5. For steel elements, perform additional special inspections in accordance with Section 1705.2.	—	—
6. For concrete elements and concrete-filled elements, perform tests and additional special inspections in accordance with Section 1705.3.	—	—
7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	—	—

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Driven deep foundations (1705.7)

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Cast-in-Place Deep Foundations (1705.8)

TABLE 1705.8
REQUIRED SPECIAL INSPECTIONS AND TESTS OF CAST-IN-PLACE DEEP FOUNDATION ELEMENTS

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. Inspect drilling operations and maintain complete and accurate records for each element.	X	—
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes.	X	—
3. For concrete elements, perform tests and additional special inspections in accordance with Section 1705.3.	—	—

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Helical Pile Foundations (1705.9)

Continuous special inspections:

- Equipment used
- Pile dimensions
- Tip elevations
- Final depth
- Final torque
- Per RDP

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Fabricated Items (1705.10)

Per 1704.2.5.:

1704.2.5 Special inspection of fabricated items. Where fabrication of structural, load-bearing or lateral load-resisting members or assemblies is being conducted on the premises of a fabricator's shop, *special inspections* of the *fabricated items* shall be performed during fabrication.

Exceptions:

1. *Special inspections* during fabrication are not required where the fabricator maintains *approved* detailed fabrication and quality control procedures that provide a basis for control of the workmanship and the fabricator's ability to conform to *approved construction documents* and this code. Approval shall be based upon review of fabrication and quality control procedures and periodic inspection of fabrication practices by the building official.
2. Special inspections are not required where the fabricator is registered and *approved* in accordance with Section 1704.2.5.1.

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Fabricated Items (1705.10)

(Amd) **1704.2.5.1 Fabricator approval.** *Special inspections* required by Section 1705 shall be permitted to be reduced or eliminated when approved by the *registered design professional in responsible charge* where the work is done on the premises of a fabricator registered and *approved* to perform 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. *Approved* fabricators shall include:

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Fabricated Items (1705.10)

1. A fabricator of structural steel certified by the American Institute of Steel Construction Inc.'s Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures.
2. A manufacturer of metal building systems accredited by the ICC International Accreditation Service (IAS) in accordance with accreditation criteria IAC-AC-472.
3. A manufacturer of K-, LH-, or DLH-Series Joist or Joist Girders who is a member of the Steel Joist Institute and has completed the Institute's examination of complete engineering design details and calculations of joists, bridging and accessories for which standards have been adopted; provided data is obtained from physical tests of joists to verify conclusions from analysis of the applicant company's engineering design, details and calculations; and an initial plant inspection and subsequent periodic inspections are required to ensure that the applicant/member company possesses the facilities, equipment and personnel required to properly fabricate joists.
4. A fabricator of precast *concrete* certified by the Precast/Prestressed Concrete Institute's Plant Certification Program, commercial category.
5. A fabricator of cold-formed steel trusses certified by the Truss Plate Institute's Quality Assurance Program.
6. A fabricator of wood trusses certified by the Truss Plate Institute's Quality Assurance Program.
7. A fabricator of structural timber components and assemblies certified by the American Institute of Timber Construction's AITC 115 – Standard for Fabricated Structural Glued Laminated Timber Components and Assemblies.

At the 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*.

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Special Inspections for Wind Resistance (1705.11)

1705.11 Special inspections for wind resistance. *Special inspections* for wind resistance specified in Sections 1705.11.1 through 1705.11.3, unless exempted by the exceptions to Section 1704.2, are required for buildings and structures constructed in the following areas:

1. In wind Exposure Category B, where V_{asd} as determined in accordance with Section 1609.3.1 is 120 miles per hour (52.8 m/sec) or greater.
2. In wind Exposure Category C or D, where V_{asd} as determined in accordance with Section 1609.3.1 is 110 mph (49 m/sec) or greater.

Nominal wind Speed in App. N

No towns in CT

16 towns at Risk Cat. III-IV

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Special Inspections for Wind Resistance (1705.11)

1705.11.1 Structural wood. *Continuous special inspection* is required during field gluing operations of elements of the main windforce-resisting system. *Periodic special inspection* is required for nailing, bolting, anchoring and other fastening of elements of the main windforce-resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.

Exception: *Special inspections* are not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other elements of the main windforce-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

1705.11.2 Cold-formed steel light-frame construction. *Periodic special inspection* is required for welding operations of elements of the main windforce-resisting system. *Periodic special inspection* is required for screw attachment, bolting, anchoring and other fastening of elements of the main windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

Exception: *Special inspections* are not required for cold-formed steel light-frame shear walls and diaphragms, including screwing, bolting, anchoring and other fastening to components of the windforce resisting system, where either of the following applies:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

These paragraphs deleted for CT

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Special Inspections for Wind Resistance (1705.11)

1705.11.3 Wind-resisting components. *Periodic special inspection* is required for fastening of the following systems and components:

1. Roof covering, roof deck and roof framing connections.
2. Exterior wall covering and wall connections to roof and floor diaphragms and framing.

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Special Inspections for Seismic Resistance (1705.12)

1705.12 Special inspections for seismic resistance. *Special inspections* for seismic resistance shall be required as specified in Sections 1705.12.1 through 1705.12.9, unless exempted by the exceptions of Section 1704.2.

Exception: The *special inspections* specified in Sections 1705.12.1 through 1705.12.9 are not required for structures designed and constructed in accordance with one of the following:

1. The structure consists of light-frame construction; the design spectral response acceleration at short periods, S_{DS}, as determined in Section 1613.3.4, does not exceed 0.5; and the *building height* of the structure does not exceed 35 feet (10 668 mm).
2. The seismic force-resisting system of the structure consists of reinforced masonry or reinforced concrete; the design spectral response acceleration at short periods, S_{DS}, as determined in Section 1613.3.4, does not exceed 0.5; and the *building height* of the structure does not exceed 25 feet (7620 mm).
3. The structure is a detached one- or two-family dwelling not exceeding two *stories above grade plane* and does not have any of the following horizontal or vertical irregularities in accordance with Section 12.3 of ASCE 7:
   - 3.1. Torsional or extreme torsional irregularity.
   - 3.2. Nonparallel systems irregularity.
   - 3.3. Stiffness-soft story or stiffness-extreme soft story irregularity.
   - 3.4. Discontinuity in lateral strength-weak story irregularity.

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Special Inspections for Seismic Resistance (1705.12)

1705.12.1 Structural steel. *Special inspections* for seismic resistance shall be in accordance with Section 1705.12.1.1 or 1705.12.1.2, as applicable.

1705.12.1.1 Seismic force-resisting systems. *Special inspections* of structural steel in the seismic force-resisting systems of buildings and structures assigned to *Seismic Design Category* B, C, D, E or F shall be performed in accordance with the quality assurance requirements of AISC 341.

Exception: *Special inspections* are not required in the seismic force-resisting systems of buildings and structures assigned to *Seismic Design Category* B or C that are not specifically detailed for seismic resistance, with a response modification coefficient, *R*, of 3 or less, excluding cantilever column systems.

1705.12.1.2 Structural steel elements. *Special inspections* of *structural steel elements* in the seismic force-resisting systems of buildings and structures assigned to *Seismic Design Category* B, C, D, E or F other than those covered in Section 1705.12.1.1, including struts, collectors, chords and foundation elements, shall be performed in accordance with the quality assurance requirements of AISC 341.

Exception: *Special inspections* of *structural steel elements* are not required in the seismic force-resisting systems of buildings and structures assigned to *Seismic Design Category* B or C with a response modification coefficient, *R*, of 3 or less.

1705.12.2 Structural wood. For the seismic force-resisting systems of structures assigned to *Seismic Design Category* C, D, E or F:

1. *Continuous special inspection* shall be required during field gluing operations of elements of the seismic force-resisting system.
2. *Periodic special inspection* shall be required for nailing, bolting, anchoring and other fastening of elements of the seismic force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.

Exception: *Special inspections* are not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other elements of the seismic force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

These paragraphs deleted for CT

57

Special Inspections for Seismic Resistance (1705.12)

1705.12.3 Cold-formed steel light-frame construction

1705.12.4 Designated seismic systems

1705.12.5 Architectural components

1705.12.6 M/E/P components

1705.12.7 Storage racks

1705.12.8 Seismic isolation systems

1705.12.9 Cold-formed steel special bolted moment frames

58

Testing for Seismic Resistance (1705.13)

1705.13.1 Structural steel

Seismic force-resisting systems

Structural steel elements

1705.13.2 Nonstructural components

1705.13.3 Designated seismic systems

1705.13.4 Seismic isolation systems

59

Sprayed fire-resistant materials (1705.14)

- Special inspections & tests
- Floor, roof & wall assemblies
- Structural members
- Fire-resistance design in construction documents
- After all mechanical/electrical & ceiling suspension has been installed

60

Sprayed fire-resistant materials (1705.14)

1705.14.1 Physical & visual tests

- Substrate
- Thickness
- Density
- Bond strength
- Condition of finished application

61

Sprayed fire-resistant materials (1705.14)

1705.14.2 Structural member surface condition

1705.14.3 Application

1705.14.4 Thickness

Minimum allowable thickness

(*determined per ASTM E 605*)

Floor, roof & wall assemblies

Steel decks

Structural members

62

Sprayed fire-resistant materials (1705.14)

1705.14.5 Density (*ASTM E 605*)

1705.14.6 Bond strength (*150 psf per ASTM E736*)

Floor, roof & wall assemblies

Structural members

Primer, paint & encapsulant bond tests

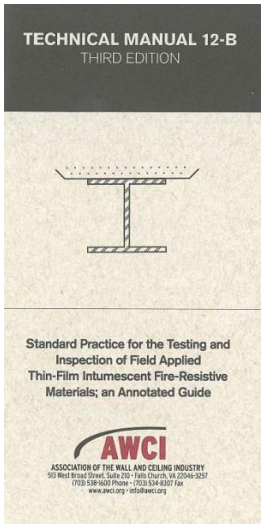
63

Mastic & intumescent fire-resistant coatings (1705.15)

- Special inspections & tests performed in accordance with AWCI 12-B
- Structural elements & decks
- Fire-resistance design in construction documents

64

Mastic & intumescent fire-resistant coatings (1705.15)



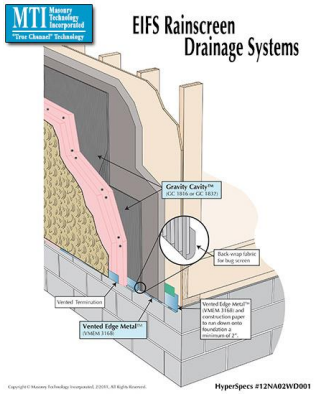
65

Exterior insulation & finish systems (EIFS) (1705.16)

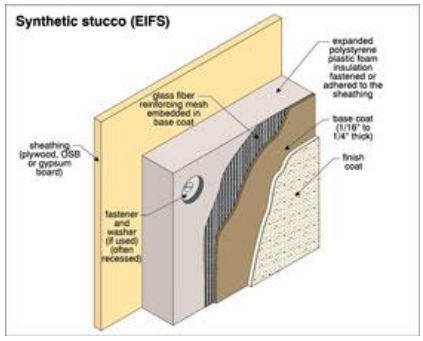
- Special inspections required, except:
  - EIFS over water-resistive barrier w/ drainage
  - EIFS over masonry or concrete walls

66

Exterior insulation & finish systems (EIFS) (1705.16)



Drainage system: SI not required



Barrier system: SI required

67

Exterior insulation & finish systems (EIFS) (1705.16)

- **Water-resistive barrier coating (1705.16.1)**
  - Material complying with ASTM E 2570 requires special inspection when installed over a sheathing substrate.

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Fire-resistant penetrations & joints (1705.17)

- Special inspections required in:
  - High-rise buildings, or
  - Risk category III or IV
- Through-penetrations
- Membrane penetration firestops
- Fire-resistant joint systems
- Perimeter fire barrier systems

69

Fire-resistant penetrations & joints (1705.17)

- Penetration firestops shall be conducted by an approved agency per ASTM E 2174

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Fire-resistant penetrations & joints (1705.17)

- Fire-resistant joint systems shall be conducted by an approved agency per ASTM E 2393

71

Testing for smoke control (1705.18)

- Smoke control systems shall be tested by a special inspector.
- Smoke control systems (909) required in
  - Atriums (404.5)
  - Covered malls w/ atriums (402.7.2)
  - Underground buildings (405.5)
  - Windowless I-3 buildings (408.9)
  - Performance stages (410.3.7.2)

72

Testing for smoke control (1705.18)

- 1705.2 Testing scope:
  1. During erection of ductwork and prior to concealment for the purposes of leakage testing and recording of device location.
  2. Prior to occupancy and after sufficient completion for the purposes of pressure difference testing, flow measurements and detection and control verification.

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Testing for smoke control (1705.18)

- Purpose of testing:

[F] 909.3 Special inspection and test requirements. In addition to the ordinary inspection and test requirements that buildings, structures and parts thereof are required to undergo, smoke control systems subject to the provisions of Section 909 shall undergo *special inspections* and tests sufficient to verify the proper commissioning of the smoke control design in its final installed condition. The design submission accompanying the *construction documents* shall clearly detail procedures and methods to be used and the items subject to such inspections and tests. Such commissioning shall be in accordance with generally accepted engineering practice and, where possible, based on published standards for the particular testing involved. The special inspections and tests required by this section shall be conducted under the same terms in Section 1704.

74

Testing for smoke control (1705.18)

- 1705.18.2 Qualifications

  Approved agencies for smoke control testing shall have expertise in fire protection engineering, mechanical engineering and certification as air balancers.

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Special Inspections of Proprietary Products

- Some proprietary products have special inspection requirements within their evaluation reports. Although the IBC does not contain specific provisions for this, the SSI should include any requirements stated in evaluation reports.

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Special Inspections of Proprietary Products

- **Example:** ICC-ES ESR-1545 – Hilti HSL-3 Carbon Steel Heavy Duty Expansion Anchors for Cracked and Uncracked Concrete
  - 5.0 Conditions of Use
    - 5.13 Special inspection must be provided in accordance with Section 4.4 of this report.
  - 4.4 Special Inspection:
    - Periodic special inspection is required**...**

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Who is a Special Inspector?

- ***Special Inspector*** defined in 202:

  "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."

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Who is a Special Inspector?

- ***Approved Agency*** defined in 202:

  "An established and recognized agency that is regularly engaged in conducting tests or furnishing inspection services, where such agency has been approved by the building official."

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Who Hires a Special Inspector?

- 1704.2:

  "…the owner or the owner's authorized agent, other than the contractor, shall employ one or more approved agencies to provide special inspections and tests during construction on the types of work specified in Section 1705…"

- Exception #4:

  "The contractor is permitted to employ the approved agencies where the contractor is also the owner. "

- Exception #5: *(CT Addition)*

  "The contractor is permitted to employ the approved agencies for the verification of the temporary installation restraint/bracing.."

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Qualifications of a Special Inspector

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.

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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Qualifications of a Special Inspector

INTERNATIONAL ACCREDITATION SERVICE®

Inspection Agencies

ISO/IEC Standard 17020
AC98®

IAS accredits inspection agencies to ISO/IEC Standard 17020. This accreditation process involves an assessment of the agencies competence for performing inspections and the consistency of their inspection activities. IAS accredits agencies that perform inspections of materials, products, installations, processes or services.

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Qualifications of Testing Agencies

INTERNATIONAL ACCREDITATION SERVICE®

Testing Laboratories
ISO/IEC Standard 17025
AC89®

IAS accredits testing laboratories to ISO/IEC Standard 17025 and industry specific standards. This accreditation demonstrates to the marketplace and to regulators that the laboratories have met the IAS accreditation requirements and are periodically monitored for compliance.

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Qualifications of a Testing Agency

NVLAP®

NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP)

HTTPS://WWW.NIST.GOV/NVLAP

The National Voluntary Laboratory Accreditation Program (NVLAP) provides third-party accreditation to testing and calibration laboratories in response to legislative actions or requests from government agencies or private-sector organizations. NVLAP-accredited laboratories are assessed against the management and technical requirements published in the International Standard, ISO/IEC 17025:2017.0

10 firms in Connecticut

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Statement of Special Inspections (SSI) (1704)

- Submitted as a condition for permit issuance (1704.2.3).
- Prepared by registered design professional in responsible charge (1704.3).
- Prepared by an approved qualified person if project not required to have design professional (1704.3 exception).

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Content of SSI (1704.3.1)

- Materials, systems, components & work required to have special inspections
- Type & extent of each special inspection.
- Type & extend of each test.
- Additional requirements for seismic or wind.
- Whether continuous, periodic or performed according to a referenced standard.

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Statement of Special Inspections

Project:

Location:

Owner:

Design Professional in Responsible Charge:

This *Statement of Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Special Inspection services applicable to this project as well as the name of the Special Inspection Coordinator and the identity of other approved agencies to be retained for conducting these inspections and tests. This *Statement of Special Inspections* encompass the following disciplines:

☐ Structural ☐ Mechanical/Electrical/Plumbing
☐ Architectural ☐ Other: _____

The Special Inspection Coordinator shall keep records of all inspections and shall furnish inspection reports to the Building Official and the Registered Design Professional in Responsible Charge. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Design Professional in Responsible Charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official and the Registered Design Professional in Responsible Charge.

A *Final Report of Special Inspections* documenting completion of all required Special Inspections, testing and correction of any discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

Interim Report Frequency: or ☐ per attached schedule.

Prepared by:

(type or print name)

Signature Date

Design Professional Seal

Owner's Authorization:

Signature Date

Building Official's Acceptance:

Signature Date

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Schedule of Inspection and Testing Agencies

This Statement of Special Inspections / Quality Assurance Plan includes the following building systems:

☐ Soils and Foundations
☐ Cast-in-Place Concrete
☐ Precast Concrete
☐ Masonry
☐ Structural Steel
☐ Cold-Formed Steel Framing
☐ Spray Fire Resistant Material
☐ Wood Construction
☐ Exterior Insulation and Finish System
☐ Mechanical & Electrical Systems
☐ Architectural Systems
☐ Special Cases

Special Inspection Agencies	Firm	Address, Telephone, e-mail
1. **Special Inspection Coordinator**		
2. Inspector		
3. Inspector		
4. Testing Agency		
5. Testing Agency		
6. Other		

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work.

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1704.3.2

1704.3.3

1704.4

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Quality Assurance Plan

Quality Assurance for Seismic Resistance

Seismic Design Category

Quality Assurance Plan Required (Y/N)

Description of seismic force resisting system and designated seismic systems:

Quality Assurance for Wind Requirements

Basic Wind Speed (3 second gust)

Wind Exposure Category

Quality Assurance Plan Required (Y/N)

Description of wind force resisting system and designated wind resisting components:

Statement of Responsibility

Each contractor responsible for the construction or fabrication of a system or component designated above must submit a Statement of Responsibility.

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Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official. The credentials of all inspectors and testing technicians shall be provided if requested.

Key for Minimum Qualifications of Inspection Agents:

When the Registered Design Professional in Responsible Charge deems it appropriate that the individual performing a stipulated test or inspection have a specific certification or license as indicated below, such designation shall appear below the *Agency Number* on the Schedule.

PE/SE	Structural Engineer – a licensed SE or PE specializing in the design of building structures
PE/GE	Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination

American Concrete Institute (ACI) Certification

ACI-CFTT	Concrete Field Testing Technician – Grade 1
ACI-CCI	Concrete Construction Inspector
ACI-LTT	Laboratory Testing Technician – Grade 1&2
ACI-STT	Strength Testing Technician

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector
AWS/AISC-SSI	Certified Structural Steel Inspector

American Society of Non-Destructive Testing (ASNT) Certification

ASNT	Non-Destructive Testing Technician – Level II or III.

International Code Council (ICC) Certification

ICC-SMSI	Structural Masonry Special Inspector
ICC-SWSI	Structural Steel and Welding Special Inspector
ICC-SFSI	Spray-Applied Fireproofing Special Inspector
ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector

National Institute for Certification in Engineering Technologies (NICET)

NICET-CT	Concrete Technician – Levels I, II, III & IV
NICET-ST	Soils Technician - Levels I, II, III & IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III & IV

Exterior Design Institute (EDI) Certification

EDI-EIFS	EIFS Third Party Inspector

Other

_____ _____

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Soils and Foundations

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Item	Agency # (Qualif.)	Scope
1. Shallow Foundations	PE/GE	*Inspect soils below footings for adequate bearing capacity and consistency with geotechnical report.* *Inspect removal of unsuitable material and preparation of subgrade prior to placement of controlled fill*
2. Controlled Structural Fill	PE/GE	*Perform sieve tests (ASTM D422 & D1140) and modified Proctor tests (ASTM D1557) of each source of fill material.* *Inspect placement, lift thickness and compaction of controlled fill.* *Test density of each lift of fill by nuclear methods (ASTM D2922)* *Verify extent and slope of fill placement.*
3. Deep Foundations	PE/GE	*Inspect and log pile driving operations. Record pile driving resistance and verify compliance with driving criteria.* *Inspect piles for damage from driving and plumbness.* *Verify pile size, length and accessories.* *Inspect installation of drilled pier foundations. Verify pier diameter, bell diameter, lengths, embedment into bedrock and suitability of end bearing strata.*
4. Load Testing		
4. Other:		

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Cast-in-Place Concrete

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Item	Agency # (Qualif.)	Scope
1. Mix Design	ACI-CCI ICC-RCSI	*Review concrete batch tickets and verify compliance with approved mix design. Verify that water added at the site does not exceed that allowed by the mix design.*
2. Material Certification		
3. Reinforcement Installation	ACI-CCI ICC-RCSI	*Inspect size, spacing, cover, positioning and grade of reinforcing steel. Verify that reinforcing bars are free of form oil or other deleterious materials. Inspect bar laps and mechanical splices. Verify that bars are adequately tied and supported on chairs or bolsters.*
4. Post-Tensioning Operations	ICC-PCSI	*Inspect placement, stressing, grouting and protection of post-tensioning tendons. Verify that tendons are correctly positioned, supported, tied and wrapped. Record tendon elongations.*
5. Welding of Reinforcing	AWS-CWI	*Visually inspect all reinforcing steel welds. Verify weldability of reinforcing steel. Inspect preheating of steel when required.*
6. Anchor Rods		*Inspect size, positioning and embedment of anchor rods. Inspect concrete placement and consolidation around anchors.*
7. Concrete Placement	ACI-CCI ICC-RCSI	*Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated.*
8. Sampling and Testing of Concrete	ACI-CFTT ACI-SIT	*Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064).*
9. Curing and Protection	ACI-CCI ICC-RCSI	*Inspect curing, cold weather protection and hot weather protection procedures.*
10. Other:		

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Precast Concrete

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Item	Agency # (Qualif.)	Scope
1. Plant Certification / Quality Control Procedures ☐ Fabricator Exempt	*ACI-CCI ICC-RCSI*	*Review plant operations and quality control procedures.*
2. Mix Design	*ACI-CCI ICC-RCSI*	*Inspect concrete batching operations and verify compliance with approved mix design*
3. Material Certification		
4. Reinforcement Installation	*ACI-CCI ICC-RCSI*	*Inspect size, spacing, position and grade of reinforcing steel. Verify that reinforcing bars are free of form oil or other deleterious materials.*
5. Prestress Operations	*ICC-PCSI*	*Inspect placement, stressing, grouting and protection of prestressing tendons*
6. Connections / Embedded Items		
7. Formwork Geometry		
8. Concrete Placement	*ACI-CCI ICC-RCSI*	*Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated .*
9. Sampling and Testing of Concrete	*ACI-CFTT ACI-STT*	*Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064).*
10. Curing and Protection	*ACI-CCI ICC-RCSI*	*Inspect curing, cold weather protection and hot weather protection procedures.*
11. Erected Precast Elements	*PE/SE*	*Inspect erection of precast concrete including member configuration, connections, welding and grouting.*
12. Other:		

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Masonry

Required Inspection Level: ☐ 1 ☐ 2

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Item	Agency # (Qualif.)	Scope
1. Material Certification		
2. Mixing of Mortar and Grout	*ICC-SMSI*	*Inspect proportioning, mixing and retempering of mortar and grout.*
3. Installation of Masonry	*ICC-SMSI*	*Inspect size, layout, bonding and placement of masonry units.*
4. Mortar Joints	*ICC-SMSI*	*Inspect construction of mortar joints including tooling and filling of head joints.*
5. Reinforcement Installation	*ICC-SMSI* *AWS-CWI*	*Inspect placement, positioning and lapping of reinforcing steel.* *Inspect welding of reinforcing steel.*
6. Prestressed Masonry	*ICC-SMSI*	*Inspect placement, anchorage and stressing of prestressing bars.*
7. Grouting Operations	*ICC-SMSI*	*Inspect placement and consolidation of grout. Inspect masonry clean-outs for high-lift grouting.*
7. Weather Protection	*ICC-SMSI*	*Inspect cold weather protection and hot weather protection procedures. Verify that wall cavities are protected against precipitation.*
9. Evaluation of Masonry Strength	*ICC-SMSI*	*Test compressive strength of mortar and grout cube samples (ASTM C780).* *Test compressive strength of masonry prisms (ASTM C1314).*
10. Anchors and Ties	*ICC-SMSI*	*Inspect size, location, spacing and embedment of dowels, anchors and ties.*
11. Other:		

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Structural Steel Page of

Item	Agency # (Qualif.)	Scope
1. Fabricator Certification/ Quality Control Procedures ☐ Fabricator Exempt	*AWS/AISC-SSI ICC-SWSI*	*Review shop fabrication and quality control procedures.*
2. Material Certification	*AWS/AISC-SSI ICC-SWSI*	*Review certified mill test reports and identification markings on wide-flange shapes, high-strength bolts, nuts and welding electrodes*
3. Open Web Steel Joists		*Inspect installation, field welding and bridging of joists.*
4. Bolting	*AWS/AISC-SSI ICC-SWSI*	*Inspect installation and tightening of high-strength bolts. Verify that splines have separated from tension control bolts. Verify proper tightening sequence. Continuous inspection of bolts in slip-critical connections.*
5. Welding	*AWS-CWI* *ASNT*	*Visually inspect all welds. Inspect pre-heat, post-heat and surface preparation between passes. Verify size and length of fillet welds.* *Ultrasonic testing of all full-penetration welds.*
6. Shear Connectors	*AWS/AISC-SSI ICC-SWSI*	*Inspect size, number, positioning and welding of shear connectors. Inspect studs for full 360 degree flash. Ring test all shear connectors with a 3 lb hammer. Bend test all questionable studs to 15 degrees.*
7. Structural Details	*PE/SE*	*Inspect steel frame for compliance with structural drawings, including bracing, member configuration and connection details.*
8. Metal Deck	*AWS-CWI*	*Inspect welding and side-lap fastening of metal roof and floor deck.*
9. Other:		

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Cold-Formed Steel Framing Page of

Item	Agency # (Qualif.)	Scope
1. Member Sizes		
2. Material Thickness		
3. Material Properties		
4. Mechanical Connections		
5. Welding		
6. Framing Details		
7. Trusses		
8. Permanent Truss Bracing		
9. Other:		

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Spray-Applied Fire Resistant Material

Page of

Item	Agency # (Qualif.)	Scope
1. Material Specifications		
2. Laboratory Tested Fire Resistance Design	ICC-SFSI	*Review UL fire resistive design for each rated beam, column, or assembly.*
3. Schedule of Thickness	ICC-SFSI	*Review approved thickness schedule.*
4. Surface Preparation	ICC-SFSI	*Inspect surface preparation of steel prior to application of fireproofing*
5. Application	ICC-SFSI	*Inspect application of fireproofing.*
6. Curing and Ambient Condition	ICC-SFSI	*Verify ambient air temperature and ventilation is suitable for application and curing of fireproofing.*
7. Thickness	ICC-SFSI	*Test thickness of fireproofing (ASTM E603). Perform a set of thickness measurements for every 1,000 SF of floor and roof assemblies and on not less than 25% of rated beams and columns.*
8. Density	ICC-SFSI	*Test the density of fireproofing material (ASTM E605).*
9. Bond Strength	ICC-SFSI	*Test the cohesive/adhesive bond strength of fireproofing ASTM E736). Perform not less than one test for each 10,000 SF.*
10. Other:		

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Wood Construction

Page of

Item	Agency # (Qualif.)	Scope
1. Fabricator Certification/ Quality Control Procedures ☐ Fabricator Exempt		*Inspect shop fabrication and quality control procedures for wood truss plant.*
2. Material Grading		
3. Connections		
4. Framing and Details		
5. Diaphragms and Shearwalls		*Inspect size, configuration, blocking and fastening of shearwalls and diaphragms. Verify panel grade and thickness.*
6. Prefabricated Wood Trusses		*Inspect the fabrication of wood trusses.*
7. Permanent Truss Bracing		
8. Other:		

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Exterior Insulation & Finish Systems (EIFS)

Page of

Item	Agency # (Qualif.)	Scope
1. Material Submittals		
2. Condition of Substrate		
3. Application of Foam Plastic Board		
4. Application of Coatings		
5. Application of Mesh		
6. Ambient Condition and Curing		
7. Flashing and Joint Details		
8. Sealants/Caulks		
9. Other:		

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Mechanical & Electrical Systems

Page of

Item	Agency # (Qualif.)	Scope
1. Smoke Control		
2. Mechanical, HVAC & Piping		
3. Electrical System		
4. Other:		

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Architectural Systems

Page of

Item	Agency # (Qualif.)	Scope
1. Wall Panels & Veneers		
2. Suspended Ceilings		
3. Access Floors		
4. Other:		

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Special Cases

Page of

Item	Agency # (Qualif.)	Scope

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Instructions – Preparation of the Statement of Special Inspections

1. Who Prepares the Form:
   The program of inspection and testing for a project should be prepared by the Registered Design Professional (RDP) that is in responsible charge of the building system requiring inspections and testing. The Structural Engineer of Record (SER) should prepare the sections required for the structural elements such as foundations, concrete, structural steel, etc. The Architect and MEP Engineer of Record should prepare the corresponding sections of the SSI for the building systems that they are responsible for. For further explanation, please refer to the "Guide to Special Inspections and Quality Assurance".

2. The Front Page:
   - 2-1. At the top of the page indicate the project name and location as they appear on the Contract Documents, provide the Owner's name (individual, private company, municipality, government agency, etc.), and indicate the Design Professional In Responsible Charge. This should be the RDP in responsible charge of the building systems for which this Statement of Special Inspections is being prepared. See explanation in item 1 above.
   - 2-2. Next, read the first paragraph and check the box below indicating the discipline(s) that this SSI will encompass (Structural, Architectural, Mechanical/Electrical/Plumbing, or Other).
   - 2-3. After reading the remaining paragraphs, the RDP must indicate the frequency of "Interim Reports" required from the Special Inspection Coordinator for the project. This can be indicated directly on the page, i.e. "weekly", or the adjacent box can be checked to attach a more specific schedule.
   - 2-4. Near the bottom of the page, the RDP must print, sign, and date the form, and stamp the form with their professional seal in the box provided.
   - 2-5. The Owner or Owner's agent must sign and date the front page after the SSI has been completed by the RDP.
   - 2-6. The Building Official must sign and date the form upon acceptance.

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3. Page 2 – Schedule of Inspection and Testing Agencies:
   - 3-1. The top of the page lists all of the categories of building systems with a box next to each. The RDP must check the boxes for only the building systems that are going to be covered in this SSI. A completed inspection program page must be attached for each building system that is checked off. (See instruction #5 below.)
   - 3-2. The chart below is where the members of the Special Inspection Program are listed. Their names, addresses, telephone numbers, and emails should be filled out in the appropriate boxes. If the Inspectors and Testing Agencies have not been determined yet, the RDP can fill in the boxes with "To Be Determined".

4. Page 3 – Quality Assurance Plan:
   - 4-1. The RDP must review sections 1705 and 1706 in Chapter 17 of the IBC to determine if the project requires a Quality Assurance Plan for the seismic force and wind force resisting systems and components.
   - 4-2. The RDP must indicate whether or not a Quality Assurance Plan is required by filling in the information requested on the page. It is only necessary to provide descriptions of the seismic and wind force resisting systems if it is determined that a Quality Assurance Plan is required.

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5. Inspection Program Pages For Each Building System:

5-1. There is a page attached for each building system where the RDP identifies the inspection requirements of each system. Fill out the pages for only the building systems included in this SSI. Do not include blank pages for building systems not covered under this SSI.

5-2. Indicate the inspection or testing firm (Agency #) that will perform each inspection task. The Agency # is the number listed next to the Inspector or Testing Laboratory on the chart on page 2 of the SSI.

5-3. Indicate the required qualifications of the Inspector for each inspection. A list of qualifications of Inspectors and testing technicians is provided on page 4 of the SSI for reference. The RDP may require additional qualifications beyond the ones listed if they feel it is appropriate. Suggested qualifications have been included for consideration. The RDP must determine what qualifications are appropriate for the particular project and confirm that the selected agency employs individuals with the specified qualifications.

5-4. The scope of each inspection must be filled in by the RDP. The editable text provided in italics reflects the code mandated minimum inspection requirements designated in section 1704 of IBC Chapter 17. The editable text does not include the inspections requirements for seismic and wind resisting systems listed in sections 1705 through 1708. The RDP must determine if the project falls under the requirements of sections 1705 to 1708 and add the required inspections to the building systems. The final scope of the inspections required for the project must be determined by the RDP.

5-5. Descriptions of all inspections must include the required frequency of each inspection or test.

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pennsylvania
DEPARTMENT OF LABOR & INDUSTRY
BUREAU OF OCCUPATIONAL & INDUSTRIAL SAFETY

File No.: _____
Permit No.: _____
Date: _____

Uniform Construction Code

SPECIAL INSPECTIONS AND OBSERVATIONS STATEMENT

This statement must accompany permit applications for all construction for which special inspections and observations are required in Chapter 17 of the ***International Building Code 2015*** *(IBC)*	
Project name:	
Project address:	
Owner:	Telephone:

This is to certify that all the inspections and observations that I have checked on pages 2-3 **and** on page 4 of this statement are required for the project named above and will be performed by the designated individuals or firms. By signing this statement, I also acknowledge that:

- these inspections and observations must be performed by competent individuals in accordance with the requirements of the IBC Chapter 17 (as applicable) and that the construction work must comply with the department-approved plans and specifications and all applicable provisions of the uniform construction code;
- records of all required special inspections and testing observations (including any discrepancies and methods of correction of these discrepancies) will be retained and made available to department representatives, upon request; and,
- the final report section of this statement must be signed by me and a copy of this statement submitted to the department inspector, at the time that the final inspection is performed and before a certificate of occupancy is issued.

_____
Name of Design Professional in Responsible Charge

Affix Seal Here

_____
Signature of Design Professional in Responsible Charge

_____ _____/_____/_____
PA License Number Date signed (Month/day/year)

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CHECK EACH THAT APPLIES	TYPE OF SPECIAL INSPECTION OR OBSERVATION	NAME AND ADDRESS OF INDIVIDUAL AND/OR FIRM PERFORMING INSPECTION OR OBSERVATION	CREDENTIALS (Enter acronym from page 4. If "Other," please specify special training or basis for competency to perform work.)
☐	Inspection of Steel Construction Section 1705.2		
☐	Inspection of Concrete Construction Section 1705.3		
☐	Inspection of Masonry Construction Section 1705.4		
☐	Inspection of Wood Construction Section 1705.5		
☐	Inspection of Soil Conditions Section 1705.6		
☐	Inspection of Driven Deep Foundations Section 1705.7		
☐	Inspection of Cast-in-Place Deep Foundations Section 1705.8		
☐	Inspection of Helical Pile Foundations Section 1705.9		

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CHECK EACH THAT APPLIES	TYPE OF SPECIAL INSPECTION OR OBSERVATION	NAME AND ADDRESS OF INDIVIDUAL AND/OR FIRM PERFORMING INSPECTION OR OBSERVATION	CREDENTIALS (Enter acronym from page 4. If "Other," please specify special training or basis for competency to perform work.)
☐	Inspection of Fabricated Items Section 1705.10		
☐	Inspection for Wind Resistance Section 1704.6; 1705.11		
☐	Inspection and Testing for Seismic Resistance Section 1704.6;1705.12;1705.13		
☐	Inspection of Sprayed Fire-Resistant Materials Section 1705.14		
☐	Inspection of Mastic and Intumescent Fire-Resistant Coatings Section 1705.15		
☐	Inspection of Exterior Insulation and Finish System (EIFS) Section 1705.16		
☐	Inspection of Fire-Resistant Penetrations and Joints Section 1705.17		
☐	Testing for Smoke Control Section 1705.18		

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FINAL REPORT	Required special inspections or observations:

☐ Inspection of Steel Construction
☐ Inspection of Concrete Construction
☐ Inspection of Masonry Construction
☐ Inspection of Wood Construction
☐ Inspection of Soil Conditions
☐ Inspection of Driven Deep Foundations
☐ Inspection of Cast-in-Place Deep Foundations
☐ Inspection of Helical Pile Foundations
☐ Inspection of Fabricated Items
☐ Inspection for Wind Resistance
☐ Inspection and Testing for Seismic Resistance
☐ Inspection of Sprayed Fire-Resistant Materials
☐ Inspection of Mastic and Intumescent Fire-Resistant Coatings
☐ Inspection of Exterior Insulation and Finish System (EIFS)
☐ Inspection of Fire-Resistant Penetrations and Joints
☐ Testing for Smoke Control

I certify that I have reviewed the report on each of the inspections or observations checked above. These reports indicate that the covered work is in compliance with the department-approved plans and specifications and all applicable provisions of the uniform construction code.

Signature of Design Professional in Responsible Charge:

_____

Date signed:

_____/_____/_____
(Day/month/year)

KEY for use in **CREDENTIALS** column:
(on pages 2, 3 and 4)

ACI	American concrete institute certified concrete field testing technician
AWS	American welding society certified welding inspector
ASNT	American society of non-destructive testing
AWCI	Association of wall and ceiling industries
MCA	Model code agency (ICC, BOCA, SBCCI, ICBO) special inspection certification
PA	Professional architect (currently licensed)
PE	Professional engineer (currently licensed)
OTHER	Specialized training coursework or other basis for competency deemed acceptable

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Reports of Special Inspections & Tests (1704.2.4)

- Approved agencies shall keep records.
- AA shall submit reports to the BO & RDP.
- Reports indicate pass/fail.
- Discrepancies brought to immediate attention of contractor for correction.
- If not corrected, BO & RDP notified before that phase completed.

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Reports of Special Inspections & Tests (1704.2.4)

Materials Testing Lab, LLC

Client: **Date:** 06/15/2018
Project: **Report No.:** C 13
CT **Inspector:**

CONCRETE FIELD AND LAB REPORT

Cylinders	Truck No.	Batch Time	Sample Time	Finish Time	Slump (in)	Air (%)	Temp. (°F)	Design Strength (psi)
1~5	107	01:20 PM	02:05 PM	02:20 PM	6	7	74	4000

Location(s): Stem walls along lines 3, 4 and 12

Exact Location of Samples:
Set #1: Same as above **Supplier:**
Set #2: **Weather:** Overcast
Set #3: **Temperature:** 57 °F AM 71 °F PM
Curing Temp: Min 70 °F Max 77 °F **Curing Box** X YES NO
Curing Method: Initial: Curing Box Final: Curing Room
Remarks: Concrete Mix #F40346A – 4000 psi – 3/4" Trap – Air Entrained .46
Low 28 days results, 2 cylinders for 56 days breaks.

Cylinder ID	Date Tested	Age	Dia (in)	Area (in²)	Unit Weight	Load (lbs)	Strength (psi)	Fracture	Complies
18-701-1A	06/22/2018	7	4.0	12.56	143.5	31,500	2510	2	---
18-701-1B	07/13/2018	28	4.0	12.56		44,500	3540	2	No
18-701-1C	07/13/2018	28	4.0	12.56		42,700	3400	2	
18-701-1D	08/10/2018	56							
18-701-1E	08/10/2018	56							

Correction Required

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Reports of Special Inspections & Tests (1704.2.4)

Materials Testing Lab, LLC

Client: **Date:** 06/25/
Report No.: WP-02
Project: **Technician:**

WINDSOR PROBE REPORT

Per our Clients request, we were dispatched to the above mentioned location to perform a Windsor Probe Test on cast in place concrete structure.

TEST LOCATION: See Below

TEST METHOD: ASTM C803 / C803M - 03(2010) Standard Test Method for Penetration Resistance of Hardened Concrete

APARATUS:
- A recently calibrated Windsor Probe System by NDT James Instruments
- Silver Probes.

PROCEDURE: (3) Silver probes in a triangular fashion shot at Standard Power using Mohs 5.

RESULTS:

LOCATION	Probe 1		Probe 2		Probe 3		Average (PSI)
	Depth	Strength	Depth	Strength	Depth	Strength	
2.5/T Wall	1.750	4150	1.800	4500	1.775	4325	4330
2/L 5 Wall	1.700	3775	1.775	4500	1.725	3950	4080
2.5/C Wall	1.875	5050	1.800	4500	1.850	4875	5050
17/C Wall	1.825	4700	1.800	4500	1.850	4874	4700
18.5/C Wall	1.750	4150	1.775	4325	1.725	3950	4150
18.5/H Wall	1.775	4325	1.725	3950	1.800	4500	4260

REMARKS:
- Concrete placement dates are unknown

REVIEWED BY: PE

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Reports of Special Inspections & Tests (1704.2.4)

INSPECTION REPORT

Project: (Project No.)
CT

Date: 06/02/
2:00 p.m.

Weather: 73 deg F; some clouds

Area of Inspection: Wall sheathing; blocking and nailing of shear wall panels

Work observed: Underlayment on sloping roofs
Start of installation of drainable moisture barrier

Comments: Today is a re-inspection. Previous inspection on 5/20 did not pass due to insufficient nailing on sheathing panels edges at shear walls.

All wall sheathing has been installed properly.
Nailing patterns and spacing area in accordance with design including at panel edges in shear wall areas.
Horizontal blocking properly installed at shear wall panels.

Wall sheathing is ready for installation of moisture barrier.

Report by:

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Reports of Special Inspections & Tests (1704.2.4)

SPECIAL INSPECTION REPORT

Date: 06/25/2014

Project: Woodbury Green South
787 Main St S, Woodbury, CT

Element: Prefabricated wood roof trusses – Building B

Observations:

1. Diagonal permanent bracing was installed and appears to be adequate.
2. There is no truss placement plan so I assumed trusses were installed in correct locations.
3. Most of the 60' trusses do not have mechanical connections at the rear wall or steel beams, about 50 trusses as required in the truss designs.
4. Some of the common trusses do not have mechanical connections on the front wall as required in the truss designs.
5. Although I did not check every one of them, it appears that Simpson H10 connectors were typically used. Those were the appropriate type in Building A but the truss designs for this building specify H15, H16 and others.
6. All built-up 2 or 3-ply girder trusses do not have the mechanical connectors specified in the truss designs.
7. The porch roofs have been covered so the bearing points were not visible to inspect. In Building A all of the trusses in the exterior porch roofs are fastened with only toe nails. According to the engineered designs all of the trusses are required to have connectors to resist uplift. It would reasonable this is the case in this building unless removal of soffit in some random locations proves otherwise.
8. The trusses on the top of the cupola and the mono-pitch trusses that frame its perimeter are lacking connectors.
9. The flat girder truss G12 has no connectors at its bearing locations, however, the truss designs requires uplift resistance of about 7,800 and 7,700 lbs.
10. The truss designs for 44', 60' and built-up girders in this building all require that studs line up under the connector of the truss. In probably 2/3 of the trusses this does not occur. This was not a requirement of the designs for Building A but is for this building.

Inspection performed by:

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Final Report of Special Inspections & Tests (1704.2.4)

- Documents required special inspections & tests performed.
- Documents correction of discrepancies previously noted in reports.
- Submitted at a point in project agreed up prior to start of work.

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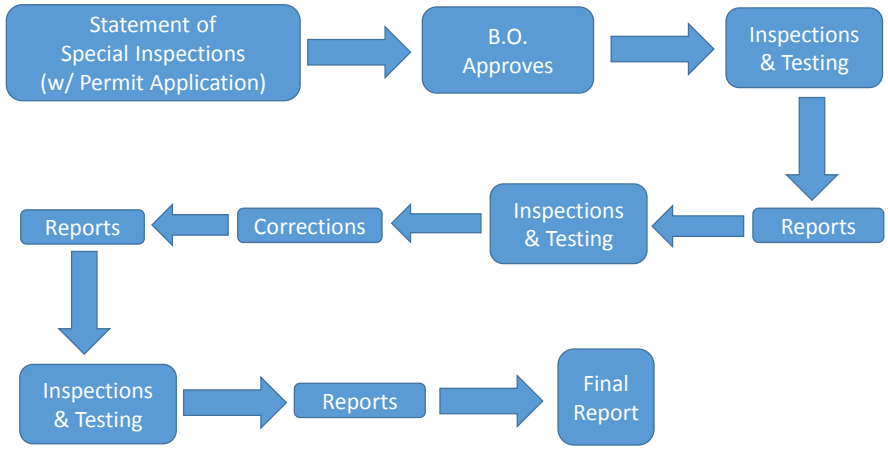
Flow Chart



Building official's required inspections not shown for clarity.

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Responsibility of Owner

- Hire special inspectors and testing agencies.
- Owner or owner's agent submits permit application along with Statement of Special Inspections and qualifications of the proposed special inspectors and testing agencies.

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Responsibility of Registered Design Professional in Responsible Charge

- Determine which special inspections and tests are required by the building code and others that they may require.
- Prepare Statement of Special Inspections.
- Option of being a special inspector of their design based on qualifications.
- Review reports & note discrepancies.
- Verify that discrepancies are corrected by contractor.
- Prepare final report.

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Responsibility of Special Inspector, Testing Agencies, & Approved Agencies

- Possess the qualifications for their inspections and/or tests.
- Conduct the inspections & testing when required before work is concealed.
- Note discrepancies and notify contractor immediately.
- Verify that discrepancies are corrected by contractor.
- Prepare report of inspections & tests for BO & RDP.

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Responsibility of Contractor

- Notify special inspectors and testing agencies of schedule and when work is ready.
- Allow access to the site.
- Promptly correct discrepancies in the work.
- Allow for re-inspections or re-testing.

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Responsibility of Building Official

- Verify which special inspections & tests are required by the building code based on the scope of work in the construction documents.
- Review & approve qualifications.
- Review & approve Statement of Special Inspections.
- Review submitted reports.
- Take note of discrepancies.
- Verify that discrepancies are corrected.
- Review and approve final report.

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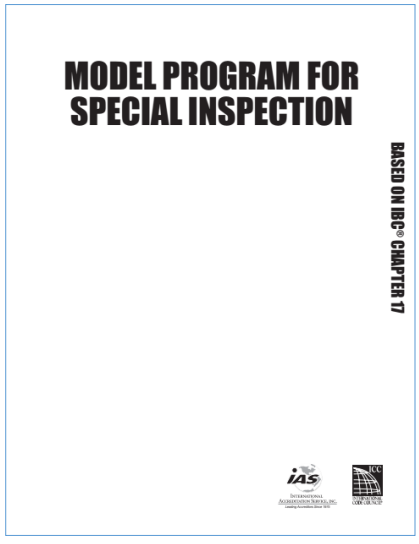
ICC Resources



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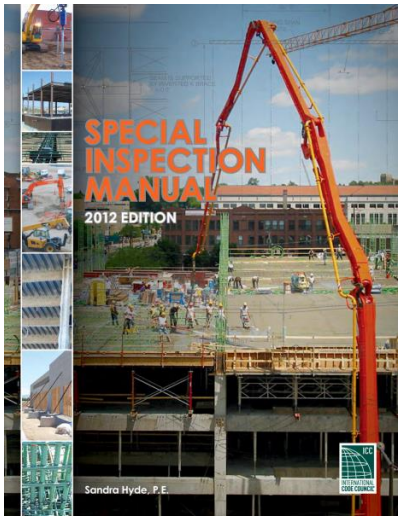
ICC Resources



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ICC Resources

- Free download of editable forms that go along with ICC Special Inspections Manual.
- https://www.iccsafe.org/content/special-inspection-manual/

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Milton Gregory "Greg" Grew, AIA
Licensed Architect
Building Official
Codes Consultant

Town of East Hartford
Department of Permits & Inspections
740 Main St, East Hartford, CT 06108
Tel (860) 291-7345
Email mggrew@easthartfordct.gov

Connecticut Code Consultants
241 Main St South, Woodbury, CT 06798
Tel (203) 217-1074
Email: mggrew@grewdesign.com
www.ctbuildingcodes.com

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