

North Carolina Building Code
Chapter 17
SPECIAL INSPECTIONS AND TESTS
SECTION 1703
APPROVALS
ACI Proposed Code Change

Section 1703.1.3: Add new section 1703.1.3.1 as follows:

1703.1.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising, and evaluating tests and *special inspections*.

1703.1.3.1 Concrete Testing Personnel. Individuals with current credentials as provided in Table 1704.2 or equivalent credentials approved by the building official shall be considered qualified for sampling and testing of concrete.

Revise as follows:

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 when the documented experience or training is related in complexity to the same type of *special inspection* activities for projects of similar complexity and material qualities. The special inspector shall be qualified in accordance with Table 1704.2 or demonstrate equivalent qualifications for approval by the building official. These qualifications are in addition to qualifications specified in other sections of this code.

Add new Table 1704.2:

<u>TABLE 1704.2 MINIMUM SPECIAL INSPECTOR QUALIFICATIONS</u>			
<u>Category of Testing and Inspection</u>	<u>Minimum Qualifications (refer to key at end of Table)</u>		
	<u>Shop Testing or Inspection</u>	<u>Field Testing or Inspection</u>	<u>Review Testing, Certification, & Lab Reports</u>
<u>1704.2.5 Inspection of Fabricators</u>			
Pre-cast concrete	A, C, E		
Structural steel construction	C, F, G		
Wood construction	A		
Cold formed metal construction	A		
<u>1705.2, 1705.10, 1705.11 & 1705.12 Steel Construction</u>			
Verification of welding consumables, filler metals, procedure specifications, procedure qualification records and personnel performance qualification records			C, F
Nondestructive testing of welding	G	G	
Inspection of welding	C, F	C, F	
Verification of fabricator and erector documents as listed in AISC 360, chapter N, paragraph 3.2			A, C
Material verification of weld filler materials			C, F
Inspection of high strength bolting and steel frame joint Details		A, C	
Inspection of embedments		A, C, F	

<u>Inspection of steel elements of composite construction</u>		<u>A, C, F</u>	
<u>Verification of reinforcing steel, cold formed steel deck and truss materials</u>			<u>A, C, F</u>
<u>Inspection of reinforcing steel, cold formed steel deck and trusses</u>		<u>A, C</u>	
<u>TABLE 1704.2 MINIMUM SPECIAL INSPECTOR QUALIFICATIONS, continued</u>			
<u>Category of Testing and Inspection</u>	<u>Minimum Qualifications (refer to key at end of Table)</u>		
	<u>Shop Testing or Inspection</u>	<u>Field Testing or Inspection</u>	<u>Review Testing, Certification, & Lab reports</u>
<u>1705.3 & 1705.12 Concrete Construction</u>			
<u>Reinforcing placement, cast-in-place bolts, post installed anchors concrete and shotcrete placement and curing operations. Inspection of formwork for shape, location and dimensions</u>		<u>A, C, H</u>	
<u>Precast concrete fabrication</u>	<u>N</u>		
<u>Pre-stressing steel installation</u>		<u>A, C, D, E, I</u>	
<u>Erection of pre-cast concrete members</u>		<u>A, C, H, I</u>	
<u>Concrete field sampling and testing</u>		<u>A, J, T</u>	
<u>Review certified mill reports</u>			<u>A, C</u>
<u>Laboratory testing, any</u>		<u>A, O</u>	<u>A or B</u>
<u>Laboratory strength testing</u>		<u>A, O, P, T</u>	<u>A or B</u>
<u>Verify use of required design mix</u>		<u>A, I, J, H, C, I</u>	
<u>Pre-stressed (pre-tensioned) concrete force application</u>	<u>A, C, E, I</u>		
<u>Post-tensioned concrete force application</u>		<u>A, C, D, I</u>	
<u>Review of 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</u>		<u>A, C, D, H, I</u>	
<u>Reinforcing steel weldability, reinforcing welding, weld filler material</u>		<u>C, F</u>	
<u>Testing of welding of reinforcing steel</u>		<u>G</u>	
<u>Post -tensioned concrete anchor inspection</u>	<u>A, Q</u>	<u>A, Q, I</u>	
<u>Shotcrete installation inspection</u>		<u>A or R</u>	
<u>1705.4 Masonry</u>			
<u>Verification of f'_m and f'_{AAC}</u>		<u>A, C, L or M,</u>	
<u>Mortar joint construction, grout protection and placement, materials proportion, type/size/location of reinforcement, structural elements, anchorage, and connectors</u>		<u>A, C, K</u>	
<u>Observe preparation of masonry prisms for testing of compressive strength of masonry, f'_m and f'_{AAC}</u>		<u>A, C, K, L or M, S</u>	
<u>Inspection of welding of reinforcing steel</u>		<u>C, F</u>	
<u>Testing of welding of reinforcing steel</u>		<u>G</u>	
<u>1705.6 & 1804 Soils</u>			
<u>Observe site preparation, fill placement testing of compaction for compliance with the construction documents for the project</u>		<u>A, C, I, L</u>	
<u>Observe test bearing materials below shallow foundations for ability to achieve design bearing capacity</u>		<u>A, C, L, I (Level III)</u>	
<u>Review compaction testing for compliance with the construction documents for the project</u>			<u>A</u>
<u>1705.5, 1705.10, 1705.11 & 1705.12 Wood Construction</u>			

<u>Observe structural panel sheathing, size of framing members, nail or staple diameter and length, number of fastener lines, and spacing of fastener lines and fasteners for compliance with construction documents for the project</u>		<u>A</u>	
<u>Observe temporary and permanent truss member restraint/bracing, field gluing of elements. Observe bolting, anchoring or other fastening of: shear walls, diaphragms, drag struts, braces and hold-downs</u>		<u>A</u>	
<u>1705.7, 1705.8, 1705.9 & 1810 Pile and Pier Foundations</u>			
<u>Observe installation</u>		<u>A, L</u>	
<u>Observe load tests</u>		<u>A</u>	

<u>TABLE 1704.2 MINIMUM SPECIAL INSPECTOR QUALIFICATIONS, continued</u>			
<u>Category of Testing and Inspection</u>	<u>Minimum Qualifications (refer to key at end of Table)</u>		
	<u>Shop Testing or Inspection</u>	<u>Field Testing or Inspection</u>	<u>Review Testing, Certification, & Lab Reports</u>
<u>1705.13 Sprayed Fire-Resistant Materials</u>			
<u>Observe surface conditions, application, average thickness and density of applied material, and cohesive/adhesive bond</u>		<u>A, C</u>	
<u>1705.14 Mastic and Intumescent Fire-Resistant Coatings</u>			
<u>Observe application compliance with AWCI 12-B</u>		<u>A, C</u>	
<u>1705.15 Exterior Insulation and Finish Systems</u>			
<u>Inspect EIFS systems</u>		<u>A, B, C, or M</u>	
<u>1705.1 Special Cases</u>			
<u>Work of unusual or special nature</u>		<u>A, B, or M</u>	
<u>1705.16 Fire-Resistant Penetrations and Joints</u>	<u>See Requirements of IBC Sections 1705.16.1 and 1705.16.2</u>		
<u>1705.17 Smoke Control</u>	<u>See Requirements of IBC Section 1705.17.2</u>		
<u>1705.10, 1705.11 & 1705.12 Seismic and Wind Resistance</u>			
<u>Periodic inspection of fabrication, installation and/or anchorage of building systems and components</u>		<u>A</u>	

KEY:

- A. Professional Engineer (PE) competent in the specific task area or graduate of accredited engineering/engineering technology program under the direct supervision of a PE.
- B. Registered Architect (RA) or graduate of accredited architecture/architecture technology program under the direction of a RA.
- C. International Code Council (ICC) Special Inspector Certification specific to the particular material and testing methodology applicable to each Category of Testing and Inspection listed in the table.
- D. Post-tensioning Institute (PTI) Certification, Level 2, bonded or unbonded as applicable.
- E. Pre-stressed Concrete Institute (PCI) Certified Inspector.
- F. American Welding Society (AWS) Certified Welding Inspector (CWI) or AWS Certified Associate Welding Inspector working under the direct on-site supervision of a CWI.
- G. American Society for Nondestructive Testing (ASNT) Level II certification, or a Level III certification if previously certified as a Level II in the particular material and testing methodology applicable to each Category of Testing and Inspection listed in the table.
- H. American Concrete Institute (ACI) Concrete Construction Special Inspector.
- I. National Institute for Certification in Engineering Technologies (NICET) Level II or higher certification specific to the particular material and testing methodology applicable to each Category of Testing and Inspection listed in the table.
- J. ACI Concrete Field-Testing Technician with Grade 1 certification.
- K. ICC/The Masonry Society Masonry (TMS) Construction Inspector Certification.
- L. NICET Certified Engineering Technologist (CT).

M. Other Qualified Special Inspector as approved by the Building Official.
N. Precast/Prestressed Concrete Institute Plant Certification Program personnel requirements
O. American Concrete Institute Concrete Laboratory Testing Technician – Level 1 or American Concrete Institute Concrete Laboratory Technician – Level II.
P. American Institute Concrete Strength Testing Technician.
Q. American Institute Post-Installed Anchor Installation Inspector.
R. American Concrete Institute Shotcrete Inspector.
S. American Concrete Institute Masonry Program.
T. American Concrete Institute Concrete Quality Technical Manager.

Reason Statement: This proposal addresses the need to better ensure proper sampling, testing, and inspection of structural concrete. Improper testing and inspection may result in deficiencies regarding the performance of structural concrete. Concrete is one of the few structural materials that is not in its final form and condition until after being placed on the construction site. It is important that sampling, testing, and inspection are conducted by qualified individuals to ensure proper performance. Improper sampling and testing can lead to costly additional testing and construction delays. In some instances, unnecessary removal and replacement of concrete. The latter may result in challenges to ensure proper structural integrity and load paths.

This proposal adds provisions for individuals qualified through ACI and ICC programs to conduct sampling, testing and inspections. The intent of this proposal is to assist the building official in identifying qualified personnel. The existing provisions of the code are not preempted by this proposal. Any individual approved as qualified by the building official remains permitted to conduct inspections and tests.

By citing specific certification programs which are regularly accepted in the construction industry, this proposal establishes a baseline for qualifications of individuals for consideration by the building official when approving individuals to conduct sampling, testing and special inspection.

Other authorities having jurisdiction are adding these requirements to their codes. For example, the Georgia Building Code now includes certified inspectors. See pages 11 through 15 of the attached Georgia Building Code. https://dca.ga.gov/sites/default/files/2014_ibcamendments.pdf

The Pennsylvania Structural Technical Advisory Committee has modified the Georgia table and will be making a recommendation to their Review and Advisory Committee.

The American Concrete Institute as a professional society whose mission includes working to facilitate the use and adoption of current concrete technology to assure the desired performance for the benefit of the public, encourages the committee to approve of this code change as submitted.

The ACI requirements are provided in the attachment files as follows:

Concrete Special Inspector:

CPP-630.1-15 https://www.concrete.org/Portals/0/Files/PDF/cpp_6301-15.pdf

Concrete Laboratory Testing Technician Level 1 and Level 2:

CPP 620.1-19 https://www.concrete.org/Portals/0/Files/PDF/cpp_6201-19.pdf

Concrete Strength Testing Technician:

CPP 620.2-19 https://www.concrete.org/Portals/0/Files/PDF/cpp_6202-19.pdf

Concrete Field Testing Technician – Grade I

CPP 610.1-18 https://www.concrete.org/Portals/0/Files/PDF/cpp_6101-18.pdf

ICC certification requirements can be found at: <https://www.iccsafe.org/certification-exam-categories/national-certification-exams/>

Cost Impact: The code change proposal will not increase or decrease the cost of construction.

ACI 318-19 Building Code Requirements for Structural Concrete, already include requirements for qualified individuals performing tests and inspections. Section 26.12.1.1(d) states “Certified laboratory technicians shall perform required laboratory tests.” and Section 26.13.1.2 states “Inspection of concrete construction shall be conducted by the licensed design professional responsible for the design, a person under the supervision of the licensed design professional, or a qualified inspector.” This proposal increases the ease for the building official to determine the qualifications of individuals conducting sampling, testing and inspection of structural concrete.