



State of Connecticut
Department of Administrative Services
Division of Construction Services
Office of Education and Data Management

*Office of Education and Data Management
Spring 2017 Career Development Series*

Construction Documents

Presented by
Milton Gregory Grew, AIA
Architect, Building Official and Code Consultant

CONSTRUCTION DOCUMENTS - What Are They and Who Can Prepare Them?

Presented by
Milton Gregory Grew, AIA
Architect – Building Official – Codes Consultant

*Prepared for
CT DAS/DCS Office of Education & Data Management
February 2017*

Areas we will discuss:

- ◆ What are Construction Documents?
- ◆ Who can (*or are required to*) prepare them?
- ◆ What should you expect to provide in them?
- ◆ Electronic submissions
- ◆ Requirements per:
 - 2016 Connecticut State Building Code
 - ◆ 2012 International Building Code
 - ◆ 2012 International Residential Code
 - ◆ State Amendments

Terms Used in the Codes

- ◆ CONSTRUCTION DOCUMENTS
- ◆ DESIGN (*or designed*)
- ◆ SHOP DRAWINGS
- ◆ DESIGN PROFESSIONAL
- ◆ ENGINEERING

These terms should alert you to expect to provide written or graphic information

Construction Documents

◆ Definition:

Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project **necessary** for obtaining a building permit.

– 2012 IBC Sect. 202.0 Definitions

- ◆ Should a plan reviewer have to guess or figure out whether a project complies with code?

Design

◆ Term not defined in code:

To plan by making a preliminary sketch, outline or drawing... To create or execute in an artistic or highly skilled manner

– Webster's Dictionary

Design

◆ Example of usage:

1607.8 Loads on handrails, guards, grab bars, seats and vehicle barriers. Handrails, *guards*, grab bars, accessible seats, accessible benches and vehicle barriers shall be designed and constructed to the structural loading conditions set forth in this section.

1607.8.1 Handrails and guards. Handrails and *guards* shall be designed to resist a linear load of 50 pounds per linear foot (plf) (0.73 kN/m) in accordance with Section 4.5.1 of ASCE 7. Glass handrail assemblies and *guards* shall also comply with Section 2407.

Shop Drawings

◆ Term not defined in code:

Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the work.

– AIA General Conditions

Shop Drawings

- ◆ Commonly used for:
 - Prefabricated wood or metal framing (*trusses*)
 - Sprinkler systems
 - Concrete reinforcement
 - Structural steel fabrication & erection (*framing, stairs, etc.*)
 - Guardrail systems
 - Curtainwalls
 - “Deferred design” or “designed by others”

Design Professional

- ◆ Definition of “Registered Design Professional”:

*An **architect, engineer or interior designer**, registered or licensed to practice professional architecture, engineering or interior design, as defined by the statutory requirements of the professional registration laws of the State of Connecticut, and acting within the scope of his or her practice.*

– 202.0 Definitions (CT amend.)

Engineering

Term not defined in codes.

Example

2308.4 Design of elements. Combining of engineered elements or systems and conventionally specified elements or systems is permitted subject to the following limits:

Who can prepare construction documents?

- ◆ Building owner, homeowner?
- ◆ Contractor, builder?
- ◆ Drafting service, unlicensed designer?
- ◆ Licensed architect?
- ◆ Professional Engineer?
- ◆ Registered Interior Designer?

Any unlicensed person can prepare construction documents when...

- ◆ Under 5,000 SF (*exterior dimensions*)
 - New construction (*with exceptions*)
 - Additions (*with exceptions*)
 - Alterations
- ◆ 1 & 2 Family Dwellings of 24,000 SF or less (*IRC*)
- ◆ Agricultural Building

Reference: CGS 20-298

An architect is required when...

- ◆ Project 5,000 SF or more (*exterior dimensions*)
CGS Section 20-298
- ◆ New construction or additions of Use Groups A, E, I, H or R-1, regardless of size
 - Includes shop dwgs review & construction observation
CGS 29-276c & SBC Section 107.6
- ◆ 3 stories or more or over 30,000 SF total gross area of Use Groups B, F, M & S
 - Includes shop dwgs review & construction observation
SBC Section 107.6
- ◆ Nontransient dwellings units, more than 16 units or 24,000 SF total gross area
 - Includes shop dwgs review & construction observation
CSBC Section 107.6

What does an architect do?

◆ “Practice of architecture” defined:

...rendering or offering to render service by consultation, investigation, evaluations, preliminary studies, plans, specifications and coordination of structural factors concerning the aesthetic or structural design and contract administration of building construction or any other service in connection with the designing or contract administration of building construction...

-CGS Section 20-288

What can an engineer do?

◆ Engineering is defined as:

...rendering or offering to render to clients any professional service such as consultation, investigation, evaluation, planning, design or responsible supervision of construction, in connection with any public or privately-owned structures, buildings, machines, equipment, processes, works or projects in which the public welfare or the safeguarding of life, public health or property is concerned or involved...

-CGS 20-299

◆ Can perform **minor** architectural work:

The practice of engineering by a professional engineer licensed under the provisions of chapter 391, and the performance by such professional engineer of architectural work for which such professional engineer is qualified by education and experience and which is incidental to such professional engineer's engineering work

-CGS 20-298

-Attorney General's Opinion 08/02/1991

What can an engineer do?

Attorney General's Opinion - August 2, 1991

To: Board of Examiners for Professional
Engineers and Land Surveyors

In your letter, dated February 5, 1991, you requested our opinion concerning whether there are any limitations on a licensed professional engineer's authority to design buildings. You have noted the overlap of practices between architecture and professional engineering with regard to design of buildings and have asked us to review this matter.

The answer to your inquiry is that state regulations and statutes limit an engineer's authority to design buildings.

What can an engineer do?

Under the State's licensing mechanism, the issuance by the Board of examiners of a professional engineer's license does not automatically limit the use of that license to a particular discipline within professional engineering. At present, the Board offers examinations in fourteen such disciplines.

The Board's Code of Ethics restricts the nature of projects a licensee may undertake. The professional engineer may undertake assignments "only when qualified by education or experience in the specific technical field of professional engineering" involved. Reg. Conn. Agencies, D.C.P., § 20-300-12(a)(2). Whereas a structural engineer may be familiar with many aspects of building design and construction, this may not be true of an electrical engineer. Licensees have an ethical responsibility to limit their practice to those professional services for which they are qualified by education or experience.

What can an engineer do?

While we recognize the overlap in the practice of architecture and engineering, we also recognize the limitations on engineers set forth in the architect's chapter. Conn. Gen. Stat. § 20-298 of the architectural chapter exempts "the practice of engineering by a professional engineer licensed under the provisions of chapter 391, and the performance by such professional engineer of architectural work for which he is qualified by education and experience and which is incidental to his engineering work." (Emphasis added). This exemption section specifically limits such cross practice to situations where the practice of architecture is "incidental" to work being performed by the engineer. Therefore, for example, to be permitted to perform architectural design, an engineer must first be working on an engineering project. See Conn. Op. Atty. Gen. 382 (1987) (Letter to Anthony Masciarelli), dated October 20, 1987.

.....

What can an engineer do?

Ultimately, it is the local building official who is empowered to "accept or approve" only those plans or specifications that are sealed by a licensed architect or a licensed professional engineer. Conn. Gen. Stat. § 20-293. Under Section 110.1 of the Connecticut State Building Code, it is the responsibility of the building official to "pass upon any question relative to the mode, manner of construction or materials to be used in" building construction. Reg. Conn.. Agencies, Public Safety, § 29-252-1a(110.1). Applying these statutory and regulatory guidelines, the building official may determine, for example, that the engineer lacks the education and experience to perform that architecture or that the architectural design work is not "incidental" to engineering work being performed by the engineer.

What can an engineer do?

In conclusion, a professional engineer's authority to design buildings may be limited by: 1) his lack of education or experience in that particular phase of engineering; 2) the fact that the design work being performed is not incidental to engineering work; or 3) the determination of a local building official that an architect's seal is required on the plans.

Very truly yours,

RICHARD BLUMENTHAL
ATTORNEY GENERAL

Neil G. Fishman
Assistant Attorney General

What can a registered interior designer do?

◆ CGS 20-377k (I.D. title law):

...prepares plans and specifications for non-load-bearing interior construction, materials, finishes, space planning, reflected ceiling plans, furnishings, fixtures and equipment relative to the design of interior spaces in order to enhance and protect the health, safety and welfare of the public.

◆ Certificate of Registration

- *No Seal*

◆ Doesn't qualify where codes or statutes specify Licensed Architect or Engineer

What can a registered interior designer do?

- ◆ They are “Registered Design Professionals” per building code definition.
- ◆ Attorney General’s Opinions
 - 01/24/1994
 - 05/19/1998

Why BO’s must look for the seal...

◆ CGS Section 20-293 (Architect’s seal):

Except for plans for buildings or structures under the provisions of section 20-298, no official of this state or of any city, town or borough therein, charged with the enforcement of laws, ordinances or regulations relating to the construction or alteration of buildings or structures, shall accept or approve any plans or specifications that are not stamped with the seal of a licensed architect or a licensed professional engineer.

Architect Seal

◆ Licensed Individual



◆ Corporation



Architect Seal – Paper Submission

◆ DCP Regs. Section 20-289-7(c)

An embossing seal, rubber stamp or electronic seal conforming to the above figures as applicable may be used by the licensee.

Architect Seal – Electronic Submission

◆ DCP Regs. Section 20-289-7(d)

An electronic seal shall be permitted on electronic documents if all the following criteria are met:

- (1) It is unique to the architect;
- (2) It is verifiable;
- (3) It is under the architect's direct and exclusive control;

Architect Seal – Electronic Submission

- (4) It is linked to the electronic document in such a manner that causes changes to be easily determined and visually displayed if any data in the electronic document file is changed subsequent to the electronic seal having been affixed to the electronic document;
- (5) Any attempt to change the electronic document after the electronic seal is affixed shall cause the electronic seal to be removed or altered significantly enough to invalidate the electronic seal; and
- (6) Any time the electronic document is to be electronically transmitted, the electronic document shall be converted to a read-only format.

Must construction documents be signed?

◆ CGS Section 20-293 (Architect's seal):

*Except for plans for buildings or structures under the provisions of section 20-298, no official of this state or of any city, town or borough therein, charged with the enforcement of laws, ordinances or regulations relating to the construction or alteration of buildings or structures, shall accept or approve any plans or specifications that are not **stamped** with the seal of a licensed architect or a licensed professional engineer.*

Must construction documents be signed?

- ◆ Architect – Only seal is required.
- ◆ Professional Engineer – Seal or sign & seal engineering documents
- ◆ Land Surveyor – Sign & seal survey maps
- ◆ Registered Interior Designer – Seal or signature optional.

Per DCP Regulations

Construction Documents for 1 & 2 Family Dwellings & Townhouses

◆ 2012 IRC Section R106 – Construction Documents

R106.1.1 Information on construction documents.

Construction documents shall be drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official. Where required by the building official, all braced wall lines, shall be identified on the construction documents and all pertinent information including, but not limited to, bracing methods, location and length of braced wall panels, foundation requirements of braced wall panels at top and bottom shall be provided.

Construction Documents for 1 & 2 Family Dwellings & Townhouses

2012 IRC Section R106 – Construction Documents

R106.2 Site plan or plot plan. The *construction documents* submitted with the application for *permit* shall be accompanied by a site plan showing the size and location of new construction and existing structures on the site and distances from *lot lines*. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. The *building official* is authorized to waive or modify the requirement for a site plan when the application for permit is for alteration or repair or when otherwise warranted.

Construction Documents for 1 & 2 Family Dwellings & Townhouses

2012 IRC Section R106 – Construction Documents

R106.3.3 Phased approval. The *building official* is authorized to issue a *permit* for the construction of foundations or any other part of a building or structure before the *construction documents* for the whole building or structure have been submitted, provided that adequate information and detailed statements have been filed complying with pertinent requirements of this code. The holder of such *permit* for the foundation or other parts of a building or structure shall proceed at the holder's own risk with the building operation and without assurance that a *permit* for the entire structure will be granted.

Construction Documents for 1 & 2 Family Dwellings & Townhouses

2012 IRC Section R106 – Construction Documents

R106.4 Amended construction documents. Work shall be installed in accordance with the *approved construction documents*, and any changes made during construction that are not in compliance with the *approved construction documents* shall be resubmitted for approval as an amended set of *construction documents*.

Construction Documents for 1 & 2 Family Dwellings & Townhouses

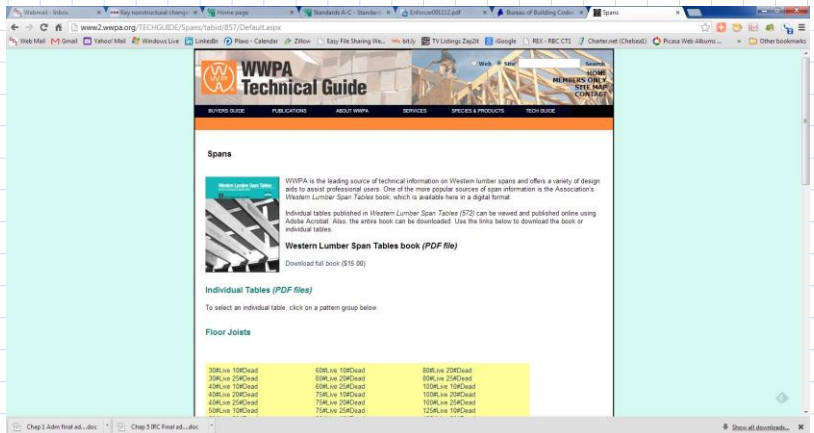
2012 IRC Section R301 – Design Criteria

R301.1.3 Engineered design. When a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the *International Building Code* is permitted for all buildings and structures, and parts thereof, included in the scope of this code.

Who's the structural designer?

- ◆ Code phrase:
 "Accepted engineering practice"
- ◆ Accepted formulae
- ◆ Recognized calculations
- ◆ Software calculations
- ◆ Tables from recognized sources

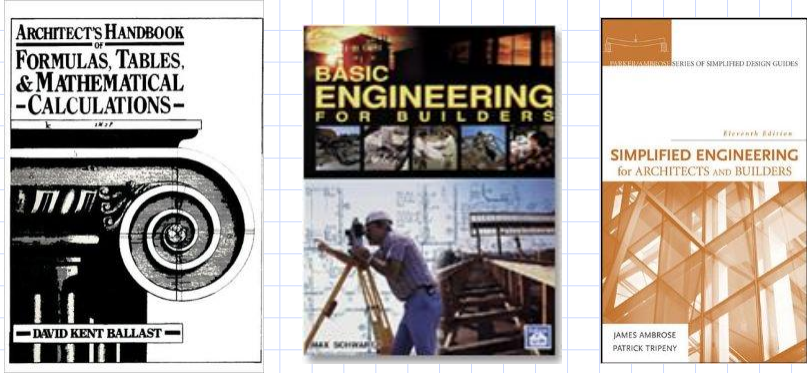
Accepted Engineering Practice



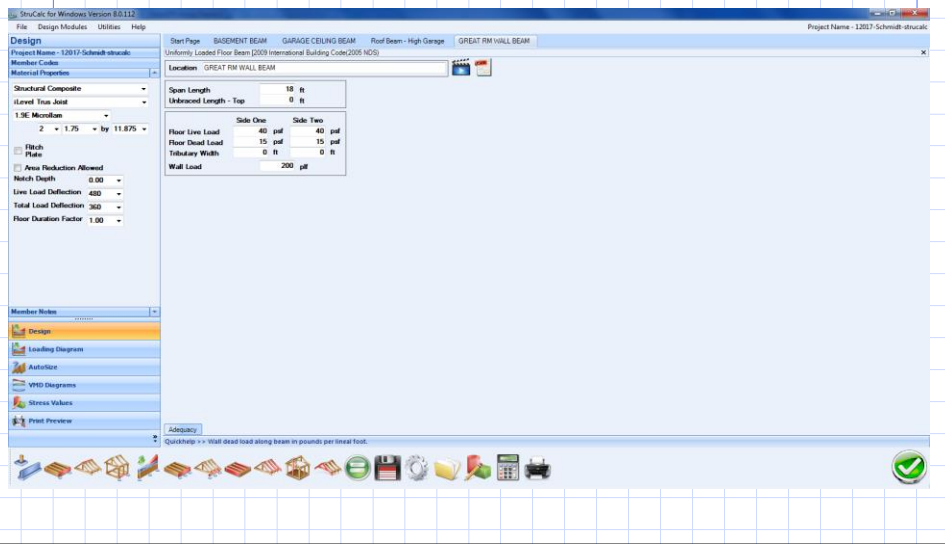
Accepted Engineering Practice



Accepted Engineering Practice



Accepted Engineering Practice



Engineered Design

SECTION R301.6
IRC Interpretation No. 17-06
2003 Edition
Issued: 10-11-2006

R301.6 Roof load. Roof shall be designed for the live load indicated in Table R301.6 or the snow load indicated in Table R301.2(1), whichever is greater.

• • • • •

Q: When calculating the roof snow load for an engineered design, does the "GROUND SNOW LOAD" established by the local jurisdiction and provided in Table R301.2(1) require consideration of additional snow loads, such as drifting and sliding snow?

A: Yes. When engineering design is required for a building or structure the design roof snow load must be determined in accordance with accepted engineered practice. This will require consideration of, but not be limited to, the importance factor, roof exposure, roof thermal conditions, roof slope, partial loading, unbalanced loads, snow drifts on lower roofs and sliding snow as applicable.

The IRC has considered all applicable snow load factors *within the scope of the prescriptive provisions*. For example, the prescriptive provisions of the IRC are for a simple rectangular building with a gable or hip roof. There are no prescriptive provisions for lower roofs; therefore, drifting and sliding on lower roofs is not applicable. However, in the case of the wood frame rafter tables, unbalanced roof snow load has been considered and controls the design.

The prescriptive provisions of the IRC do not require a calculation of the roof snow load. All prescriptive provisions in the IRC use the ground snow load for ease of reference, but that does not imply that the design roof snow load is equal to the ground snow load.

Construction Documents for 1 & 2 Family Dwellings & Townhouses

2012 IRC Chap. 11 – Energy Conservation

N1101.5 (R101.5.1) Compliance materials. The *building official* shall be permitted to approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code.

Construction Documents for 1 & 2 Family Dwellings & Townhouses

2012 IRC Chap. 11 – Energy Conservation Section N1101.8 – Information on Construction Documents:

- Insulation materials & R-values
- Fenestration U-factors & SHGC's
- Area-weighted U-factor & SHGC calculations
- Mechanical system design criteria
- Mechanical & service water heating system & equipment types, sizes & efficiencies
- Economizer description
- Equipment & systems controls
- Fan motor HP & controls
- Duct sealing, duct & pipe insulation
- Lighting fixture schedule w/ wattage & control narrative
- Air sealing details

What is an acceptable set of construction documents for a residential project?

- ◆ "Builder's Set"? What is that anyway?
- ◆ IRC breakdown:
 - 40% is M/P/E.
 - 35% is structural.
 - 25% is general planning.
- ◆ What do your construction documents show?

Construction Documents for Commercial-type Projects (*IBC buildings*)

◆ Definition (202.0):

Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit...

Construction Documents (2012 *IBC*)

◆ Section 107 – Submittal Documents

107.1 General.

Submittal documents consisting of construction documents, statement of special inspections, geotechnical report and other data shall be submitted in two or more sets with each permit application. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the building official is authorized to require additional construction documents to be prepared by a registered design professional.

Exception: The building official is authorized to waive the submission of construction documents and other data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that review of construction documents is not necessary to obtain compliance with this code.

Construction Documents (2012 IBC)

107.2 Construction documents.

107.2.1 Information on construction documents.

Construction documents shall be dimensioned and drawn upon suitable material. Electronic media documents are permitted to be submitted when approved by the building official. Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and relevant laws, ordinances, rules and regulations, as determined by the building official.

Construction Documents (2012 IBC)

107.2 Construction documents.

107.2.2 Fire protection system shop drawings. (CT Amendment)

Fire sprinkler system shop drawings. Shop drawings for fire sprinkler system(s) shall be submitted to indicate conformance to this code and the construction documents and shall be approved prior to the start of system installation. Shop drawings shall contain all information as required by the referenced installation standards in Chapter 9. Such documents shall be accompanied by evidence of licensure by the state pursuant to section 29-263a of the Connecticut General Statutes.

Licensed Automatic Fire Sprinkler System Layout Technician or P.E.

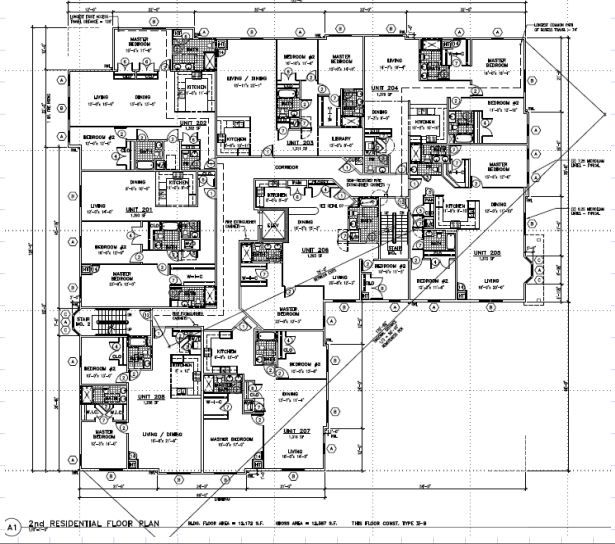
Construction Documents (2012 IBC)

107.2.3 Means of egress.

The construction documents shall show in sufficient detail the location, construction, size and character of all portions of the means of egress including the path of the exit discharge to the public way in compliance with the provisions of this code. In other than occupancies in Groups R-2, R-3, and I-1, the construction documents shall designate the number of occupants to be accommodated on every floor, and in all rooms and spaces.

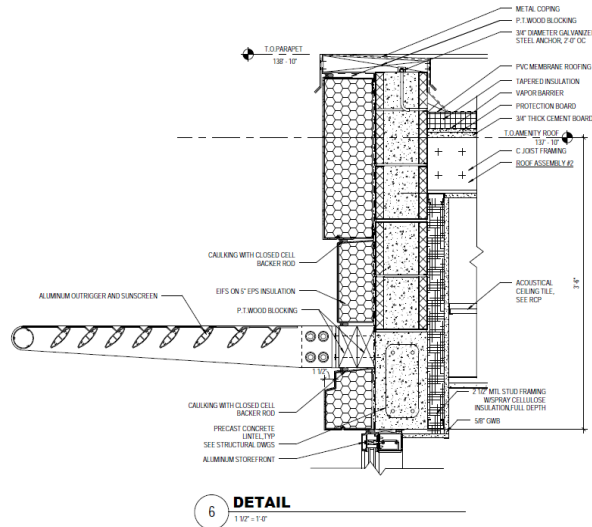
Construction Documents (2012 IBC)

107.2.3 Means of egress.



Construction Documents (2012 IBC)

107.2.4 Exterior wall envelope.



Construction Documents (2012 IBC)

107.2.5 Site plan.

The construction documents submitted with the application for permit shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, distances from lot lines, the established street grades and the proposed finished grades and, as applicable, flood hazard areas, floodways, and design flood elevations; and it shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of existing structures and construction that are to remain on the site or plot. The building official is authorized to waive or modify the requirement for a site plan when the application for permit is for alteration or repair or when otherwise warranted.

107.2.5.1 Design flood elevations.

Where design flood elevations are not specified, they shall be established in accordance with Section 1612.3.1.

Construction Documents (2012 IBC)

703.2 Fire-resistance ratings. The *fire-resistance rating* of building elements, components or assemblies shall be determined in accordance with the test procedures set forth in ASTM E 119 or UL 263 or in accordance with Section 703.3. Where materials, systems or devices that have not been tested as part of a fire-resistance-rated assembly are incorporated into the building element, component or assembly, sufficient data shall be made available to the *building official* to show that the required *fire-resistance rating* is not reduced. Materi-

Construction Documents (2012 IBC)

907.1.1 Construction Documents (Fire Alarm & Detection Systems)

Construction documents for fire alarm systems shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and the State Fire Safety Code as determined by the code official.

(2016 CT Amend.)

[F] **907.1.2 Fire alarm shop drawings.** Shop drawings for fire alarm systems shall be submitted for review and approval prior to system installation, and shall include, but not be limited to, all of the following:

1. A floor plan that indicates the use of all rooms.
2. Locations of alarm-initiating devices.
3. Locations of alarm notification appliances, including candela ratings for visible alarm notification appliances.
4. Location of fire alarm control unit, transponders and notification power supplies.
5. Annunciators.
6. Power connection.
7. Battery calculations.
8. Conductor type and sizes.
9. Voltage drop calculations.
10. Manufacturers' data sheets indicating model numbers and listing information for equipment, devices and materials.
11. Details of ceiling height and construction.
12. The interface of fire safety control functions.
13. Classification of the supervising station.

Construction Documents (2012 IBC)

1603.1 Construction Documents (Structural)

- *Structural members of each floor level: size, section & location*
- *Columns: Dimensional locations*
- *Design Loads*
- *Floor Live Load*
- *Roof Live Load*
- *Roof Snow Load Data (CT amended 1603.1.3)*
- *Wind Design Data*
- *Earthquake Design Data*
- *Geotechnical Information (Soil load-bearing values)*
- *Flood Design Data*
- *Special Loads*
- *Systems & Components Requiring Special Inspections for Seismic Resistance*

Construction Documents (2012 IBC)

1803.6 Reporting (Soils & Foundations)

Where geotechnical investigations are required, a written report of the investigations shall be submitted to the building official by the owner or authorized agent at the time of permit application. This geotechnical report shall include, but need not be limited to, the following information....

- *Boring logs*
- *Water table*
- *Recommendation for foundation type or design criteria*
- *Expected settlement*
- *Etc*

Construction Documents (2012 IBC)

1901.3 Construction Documents (Concrete Const.)

- *Compressive strength*
- *Reinforcement grade & strength*
- *Size & location of structural elements, reinforcement & anchors*
- *Provisions for dimensional changes resulting from creep, shrinkage & temperature*
- *Anchorage length of reinforcement & location & length of lap splices*
- *Type & location of mechanical & welded splices of reinforcement.*
- *Details & location of contractor or isolation joints specified for plain concrete*
- *Data & details regarding prestressed, posttensioned or slabs on grade used as seismic diaphragm.*

Construction Documents (2012 IBC)

2101.3 Construction Documents (Masonry Const.)

- *Reinforcement, anchors & wall ties: size, grade, type, locations*
- *Reinforcing bars to be welded & welding procedure*
- *Size & location of structural elements*
- *Provisions for dimensional changes resulting from elastic deformation, creep, shrinkage, temperature & moisture.*
- *Loads used in the design of masonry.*
- *Compressive strength of masonry.*
- *Details of anchorage of masonry to structural members, frames, etc.*
- *Size & permitted location of conduits, pipes & sleeves.*
- *Testing & inspection per Chapter 17.*

2101.3.1 Fireplace Drawings

Construction Documents (2012 IBC)

3103.2 Construction Documents (Temporary Structures)

3103.2 Construction documents. A *permit* application and *construction documents* shall be submitted for each installation of a temporary structure. The *construction documents* shall include a site plan indicating the location of the temporary structure and information delineating the *means of egress* and the *occupant load*.

Written documents

◆ Specifications

Examples:

- 07840 – Firestopping
- 09511 – Suspended Acoustical Ceilings
- 15072 – Vibration Isolation and Seismic Restraint

◆ Notes on Drawings

- Code compliance table
- Outline specifications
- Soils report

SECTION 07 84 13 PENETRATION FIRESTOPPING	
<p style="font-size: 24pt; color: purple;">Specs</p>	<p>PART 1 - GENERAL</p> <p>1.01 RELATED DOCUMENTS</p> <p>A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.</p> <p>1.02 SUMMARY</p> <p>A. This Section includes through-penetration firestop systems for penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items.</p> <p>B. Related Sections include the following:</p> <ol style="list-style-type: none"> 1. Divisions 21 and 22 Sections specifying piping penetrations. 2. Divisions 23 Sections specifying duct penetrations. 3. Divisions 25, 26 and 27 Sections specifying cable and conduit penetrations. <p>1.03 PERFORMANCE REQUIREMENTS</p> <p>A. General: For penetrations through fire-resistance-rated constructions, including both empty openings and openings containing penetrating items, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated.</p> <p>B. Rated Systems: Provide through-penetration firestop systems with the following ratings determined per UL 1479:</p> <ol style="list-style-type: none"> 1. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated. 2. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas: <ol style="list-style-type: none"> a. Penetrations located outside wall cavities. b. Penetrations located outside fire-resistance-rated shaft enclosures. 3. L-Rated Systems: Where through-penetration firestop systems are indicated in smoke barriers, provide through-penetration firestop systems with L-ratings of not more than 3.0 cfm²/sq. ft (0.01524cu. m² x sq. m) at both ambient temperatures and 400 deg F (204 deg C). <p>1.04 SUBMITTALS</p> <p>A. Product Data: For each type of product indicated.</p> <p>B. Through-Penetration Firestop System Schedule: Indicate locations of each through-penetration firestop system, along with the following information:</p> <ol style="list-style-type: none"> 1. Types of penetrating items.

<p style="font-size: 24pt; color: purple;">Specs</p>	<ol style="list-style-type: none"> 2. Types of constructions penetrated, including fire-resistance ratings and, where applicable, thicknesses of construction penetrated. 3. Through-penetration firestop systems for each location identified by firestop design designation of qualified testing and inspecting agency. <p>1.05 QUALITY ASSURANCE</p> <p>A. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, through one source from a single manufacturer.</p> <p>B. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in Part 1 "Performance Requirements" Article:</p> <ol style="list-style-type: none"> 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction. <p>1.06 DELIVERY, STORAGE AND HANDLING</p> <p>A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer, date of manufacture, lot number, shelf life if applicable, qualified testing and inspecting agency's classification marking applicable to Project, curing time, and mixing instructions for multi-component materials.</p> <p>B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.</p> <p>1.07 PROJECT CONDITIONS</p> <p>A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.</p> <p>B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.</p> <p>1.08 COORDINATION</p> <p>A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.</p> <p>B. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until each installation has been examined by building inspector, if required by authorities having jurisdiction.</p>
------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<p style="font-size: 24pt; color: purple;">Specs</p>	PART 2 - PRODUCTS	
	2.01	FIRESTOPPING, GENERAL
	A.	<p>Compatibility: Provide through-penetration firestop systems that are compatible with one another; with the substrate; forming openings; and with the stems, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.</p> <p>Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with Part 1 "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by qualified testing and inspecting agency for firestop systems indicated.</p>
	2.02	MANUFACTURERS
	A.	<p>Products: Subject to compliance with requirements, provide one of the through-penetration firestop systems indicated for each application that are produced by one of the following manufacturers:</p> <ol style="list-style-type: none"> 1. AD Fire Protection Systems Inc. 2. Grace, W. R. & Co. - Conn. 3. Hilt, Inc. 4. Johns Manville. 5. Nelson Firestop Products. 6. NUCCO Inc. 7. Specified Technologies Inc. 8. 3M, Fire Protection Products Division. 9. Tremco; Sealant/Weatherproofing Division. 10. USG Corporation.
	2.03	MIXING
	A.	<p>For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.</p>
	PART 3 - EXECUTION	
	3.01	EXAMINATION
	A.	<p>Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating stems, substrates, and other conditions affecting performance of work.</p> <ol style="list-style-type: none"> 1. Proceed with installation only after unsatisfactory conditions have been corrected.

<p style="font-size: 24pt; color: purple;">Specs</p>	3.02	PREPARATION
	A.	<p>Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with firestop system manufacturer's written instructions and with the following requirements:</p> <ol style="list-style-type: none"> 1. Remove from surfaces of opening substrates and from penetrating stems foreign materials that could interfere with adhesion of through-penetration firestop systems. 2. Clean opening substrates and penetrating stems to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation. 3. Remove lantance and form-release agents from concrete. <p>Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.</p> <p>Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.</p>
	3.03	THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION
	A.	<p>General: Install through-penetration firestop systems to comply with Part 1 "Performance Requirements" Article and with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.</p>
	B.	<p>Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.</p> <ol style="list-style-type: none"> 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
	C.	<p>Install fill materials for firestop systems by proven techniques to produce the following results:</p> <ol style="list-style-type: none"> 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating stems as required to achieve fire-resistance ratings indicated. 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating stems. 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
	3.04	IDENTIFICATION
	A.	<p>Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (152 mm) of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating stems or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhesive type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material,</p>

Graphic Documents

◆ Construction Drawings

- ◆ Site
- ◆ Structural
- ◆ Architectural
- ◆ Mechanical
- ◆ Plumbing
- ◆ Electrical
- ◆ Special Systems

◆ Shop Drawings

- ◆ Prefabricated structural
- ◆ Fire protection
- ◆ Seismic restraint
- ◆ Ductwork

Pictorial Documents

◆ Product technical literature

- ◆ Fire alarm system devices
- ◆ Door hardware
- ◆ Tested assemblies literature
- ◆ Sprinkler system devices
- ◆ Proprietary fire resistance rated barriers

Contact

Milton Gregory Grew, AIA

Mobile (203) 217-1074

Email mggrew@grewdesign.com

Web www.CTbuildingcodes.com