31st Annual State Construction Conference

March 22nd, 2012

2012 SCO Fire Sprinkler Guideline Update

Tom Galdi,P.E.

SCO Fire Sprinkler Guidelines

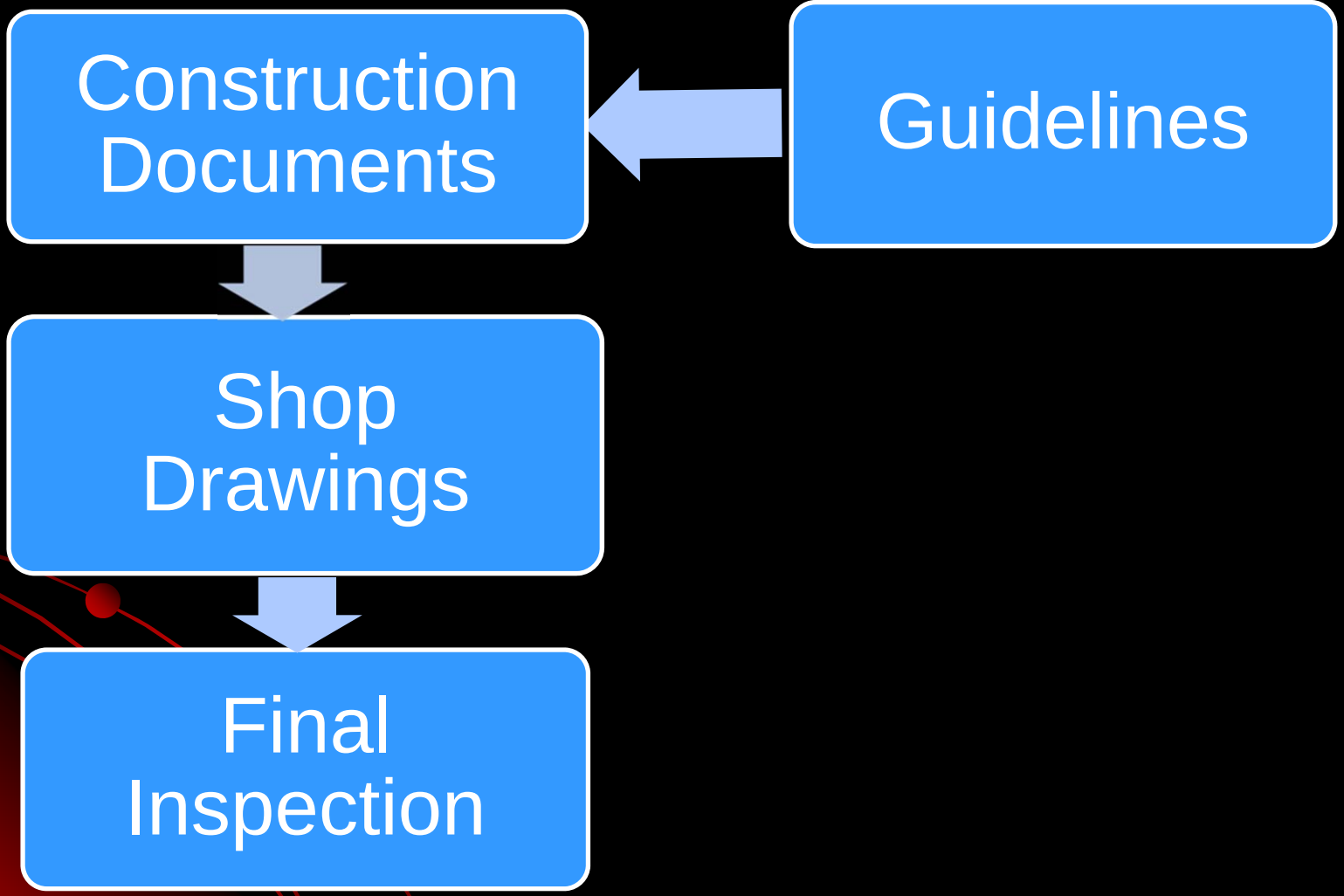
PURPOSE OF FIRE SPRINKLER GUIDELINES

- ASSIST DESIGN ENGINEER
- CLARIFICATIONS
- ADDITIONAL REQUIREMENTS
- PROCEDURES

APPLICABILITY

- ALL STATE PROPERTIES AS DEFINED IN NC GS 425
- DOES NOT INCLUDE COMMUNITY COLLEGES (though can be used)
- INCLUDES ‘CODE ONLY’ PROJECTS

ROLE OF GUIDELINES



EARLIEST ALLOWABLE EDITIONS

- NFPA 13 – 2007
- NFPA 14 – 2007
- NFPA 20 – 2007
- NFPA 24 - 2007
- EDITION USED SHOULD BE IDENTIFIED ON CONSTRUCTION DOCUMENTS

NFPA 13 Chapters

2002

- 12 Storage
- 13 Special Occupancy Requirements
- 14 Plans and Calculations
- 15 Water Supplies
- 16 System Acceptance
- 17 Marine Systems
- 18 Inspection, Testing and Maintenance

2007

- 12 General Requirements for Storage
- 13 Miscellaneous Storage
- 14 Prot. of Class I to IV Commodities
- 15 Prot. of Plastic and Rubber comm…
- 16 Prot. of Class 1 through IV comm…
- 17 Prot. Of Plastic and Rubber comm – racks
- 18 Prot. Of Rubber Tire Storage.
- 19 Prot. Of Roll Paper
- 20 Special Designs of Storage protection
- 21 Special Occupancy Requirements
- 22 Plans and Calculations
- 23 Water Supplies
- 24 System Acceptance
- 25 Marine Systems
- 26 Inspection, Testing and Maintenance

CONSTRUCTION DOCUMENTS

- Floor Plan Layout (riser locations)
- Rated walls identified, Penetration instructions
- System Types (wet, dry, preaction)
- Design Requirements (occupancy hazard)
- Utility Plan
  - (PIV, FH, BFP, FDC)
  - Method of joint restraint

    (see chpt 10 of NFPA 13)

DESIGN REQUIREMENTS

- Has Been Ordinary Hazard Group I Minimum
  - 0.15 GPM/SF (50% increase)
- Why? From Earlier Guidelines:
  - Safety factor for changes in bldg use
  - Possible deterioration of water supply
  - Rapid suppression more probable; can protect plastic pipe
  - Modest safety factor prudent when owner self insured.

Additional reasons

- *corrosion of internal piping surfaces over time (50 year buildings)*
- *Human error*

DESIGN REQUIREMENTS

- Inherent Safety Factors:
  - Most remote area is basis for design
  - Size of design area
  - Initial sprinklers to operate will discharge at a considerably higher rate than design.
  - Hose allowance is available to sprinklers in early stages

DESIGN REQUIREMENTS

- Issues with a minimum OH Grp 1 classification as safety factor:
  - LH requirements in NFPA 13 can be specific to expected type of fuel loading (e.g. quick response heads)
  - No safety factor for systems that are OH Grp 1 per NFPA 13
  - Historical confusion over use of LH spacing. Currently granted (typically) for residence halls. It's all about the density. More rejected submittals.

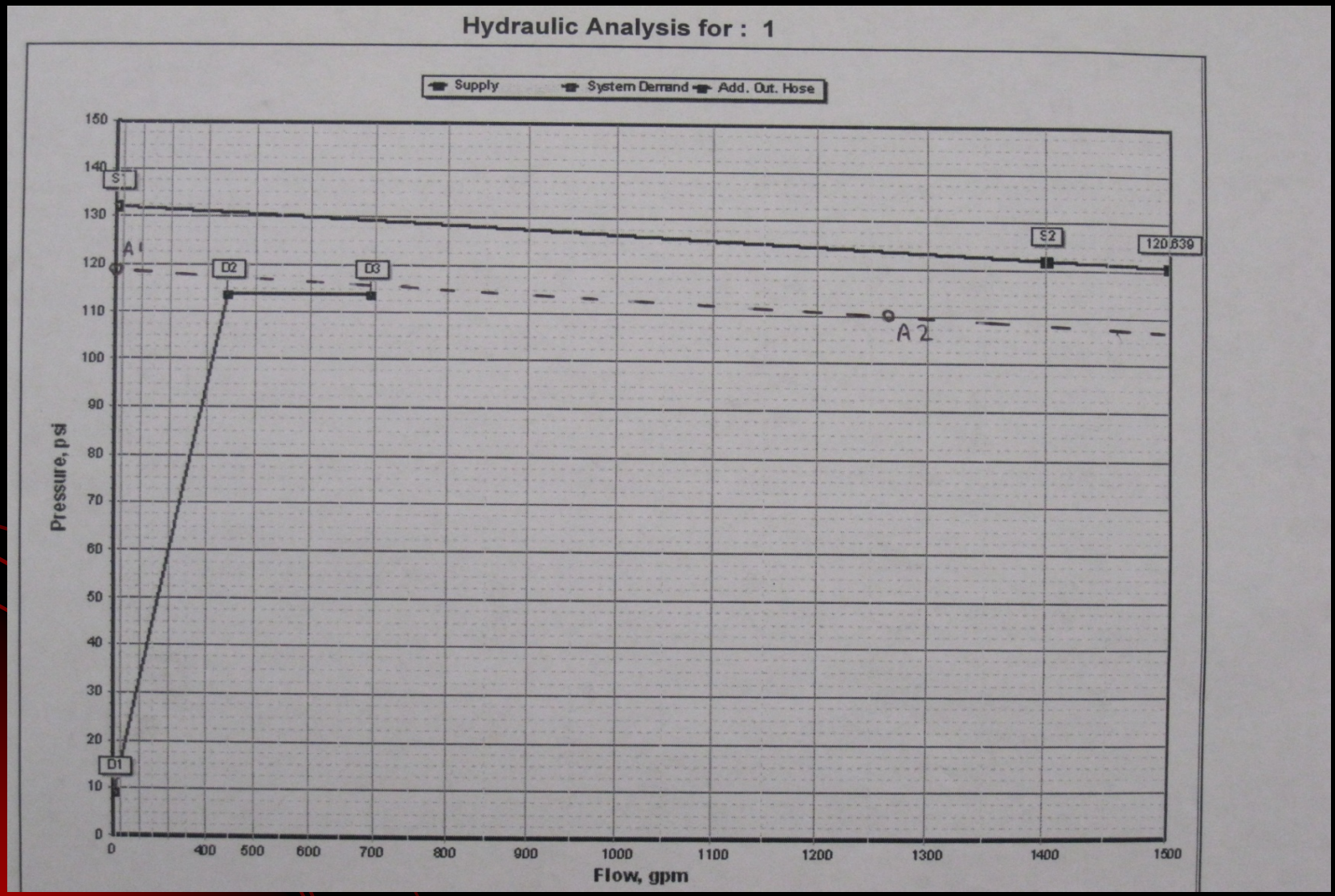
DESIGN REQUIREMENTS

- Use Occupancy classifications and density per NFPA 13. Including light hazard.
- AHJ *safety factor* will be via modified reduction in water supply requirements
- Unusual or abnormal fuel loading considerations should be weighed in selection

WATER SUPPLY TESTS

- Include current available water supply data with CD's.
- A water flow test per NFPA 13 (using two hydrants) will be required for every project. Specify that the FS Contractor obtain this and submit a copy of the hydrant flow test.
- Include requirement to adjust water flow:
  - **10 psig less static pressure; 10% less residual flow; 10 psig less residual pressure**

WATER SUPPLY REDUCTION



MINIMUM DESIGN REQUIREMENTS

- Residence Halls
  - NFPA 13R, only privately funded projects (up to 4 floors).
  - Should consider use of ordinary hazard density (abnormal fuel loading documented in previous editions of guideline)
  - CPVC
    - IAW manufacturers listing limitations
      - Protected (3/8” gyp bd or 0.35 lb/sf ceiling tile)
      - Unprotected, e.g. riser in stairwell (more restrictions)

Modification to Existing Systems

- Change in Hazard or Area of Coverage
  - Shop drawings, hydraulic calculations, water test
- No Change in Hazard or Area of Coverage
  - Shop drawings to SCO if more than 10 heads effected

SEISMIC REQUIREMENTS

- Need Seismic Design Category (A,B,C,D)
- Found on BCS
- If A or B, ‘Seismic restraints not required’
- If seismic restraint required, per NFPA 13
- Seismic spec not required.

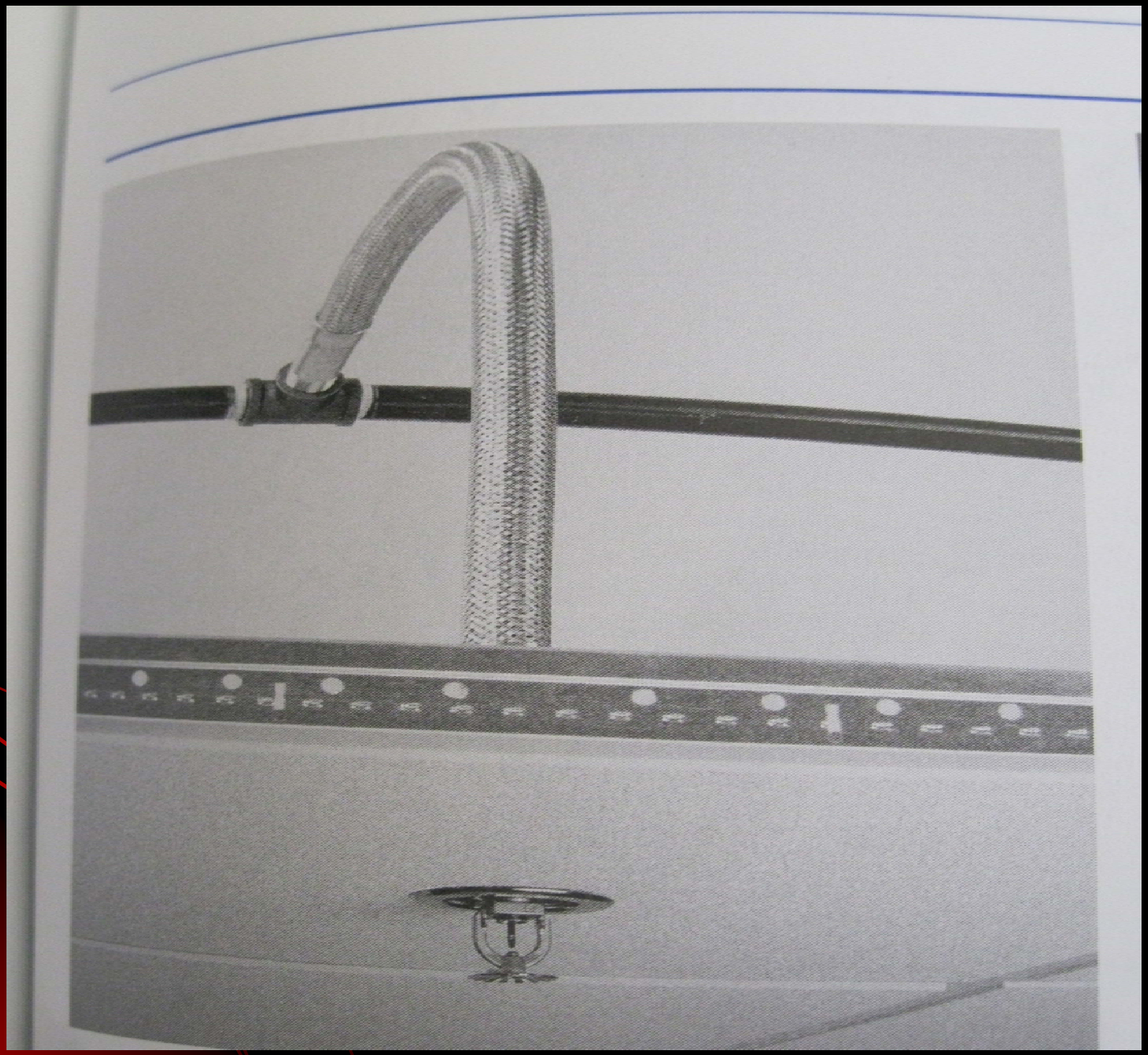
Materials

- **Provide a specification section for materials, SCO guidelines:**
  - Piping/fitting size/schedule guidelines included.
  - Black steel piping should be listed as sprinkler piping and include an FM or UL approved MIC inhibiting coating.
  - Galvanized piping on dry and pre-action systems.

MATERIALS

- Return bends required. Don’t come off bottom of pipe *(SCO Reqt to show detail)*
- Flexible connector restrictions (if allowed)
  - Stainless steel braided jacket *(SCO)*
  - FM 1637 or UL 2443 listed *(SCO)*
  - Man. Installation inst. *Will be enforced (NFPA 13)*
  - If longer than 6’, hangar required *(NFPA 13)*

FLEXIBLE HOSES



MATERIALS

- List of sprinklers installed in facility kept in spare head cabinet. *(New in 2007)*
  - Man., Model, orifice, deflector type, thermal sensitivity, pressure rating.
  - General description
  - Quantity of each type to be kept in cabinet
  - Revision date of list

SPRINKLER COVERAGE

- NFPA 13 Areas Exempt
  - A few restricted exceptions such as concealed limited combustible spaces with no access, some 2 hour rated electrical rooms, etc.
  - 8.15.7 Exterior roofs, canopies, and Porte-cocheres of limited combustible construction with no storage beneath *(Clarified in 2007)*


07/18/2011

SPRINKLER COVERAGE

- 903.3.1.1.1 NC Fire Prevention Code (5 exemptions); requires fire alarm that detects visible or invisible particles of combustion. AHJ Approval required.
  - Space where application of water constitutes a serious hazard
  - Space where sprinklers are undesirable due to nature of contents – when approved by code official.
  - Rooms of non combustible construction with wholly non-combustible contents.
  - Generator/Transformer rooms separated from remainder of building by 2 hour rating (similar to NFPA 13 exemption)
  - Fire Service access elevator machine rooms

AREAS NOT MAINTAINED ABOVE 40 F

- Wet Systems are preferred per NFPA 13
- Anti-freeze systems generally not practical
- Heat tracing is allowed (except at dry valve)
  - Listed for sprinkler systems (heat tracing on branch line specifically listed for branch lines)
  - Monitored by FA system

Dry Systems (Consider Moisture Concerns)

1. UL or FM listed combined compressor/dryer
2. N2 instead of compressed air
3. Compressed air w/hot dipped galvanized pipe.

FLUSHING

FLUSHING

New in 2007

- 8.16.3.1: All sprinkler systems shall be arranged for flushing.
- 8.16.3.2: Readily removable fittings shall be provided at the end of all cross mains
- 8.16.3.3: All cross mains shall terminate in 1 ¼ in. or larger pipe.
- 8.16.3.4: All branch lines on gridded systems shall be arranged to facilitate flushing.

STANDPIPES ON ROOFS

- Fire Code: Where roof has slope less than 4 in 12, each standpipe shall be provided with a hose connection located either on roof or on the highest landing of stairway with stair access to roof.
  - More Restrictive than NFPA 14

- “This section of the code is to support fire fighting efforts. It is clearly acceptable to defer to local fire fighting authority on this.” – ICC informal interpretation

ELEVATOR HOISTWAYS

- Top of Hoistway
  - unless hoistway is non-combustible and car enclosure meets ASME A17.1.
- Bottom of Hoistway
  - Head within 2’ of bottom of pit
  - ***NFPA 13 states shunt trip not required but DOL expects to see smoke and heat detectors and shunt trip***
  - Not req’d if no combustible hydraulic fluids

Elevator Hoistways

Pit

Top

ELEVATOR MACHINE ROOMS

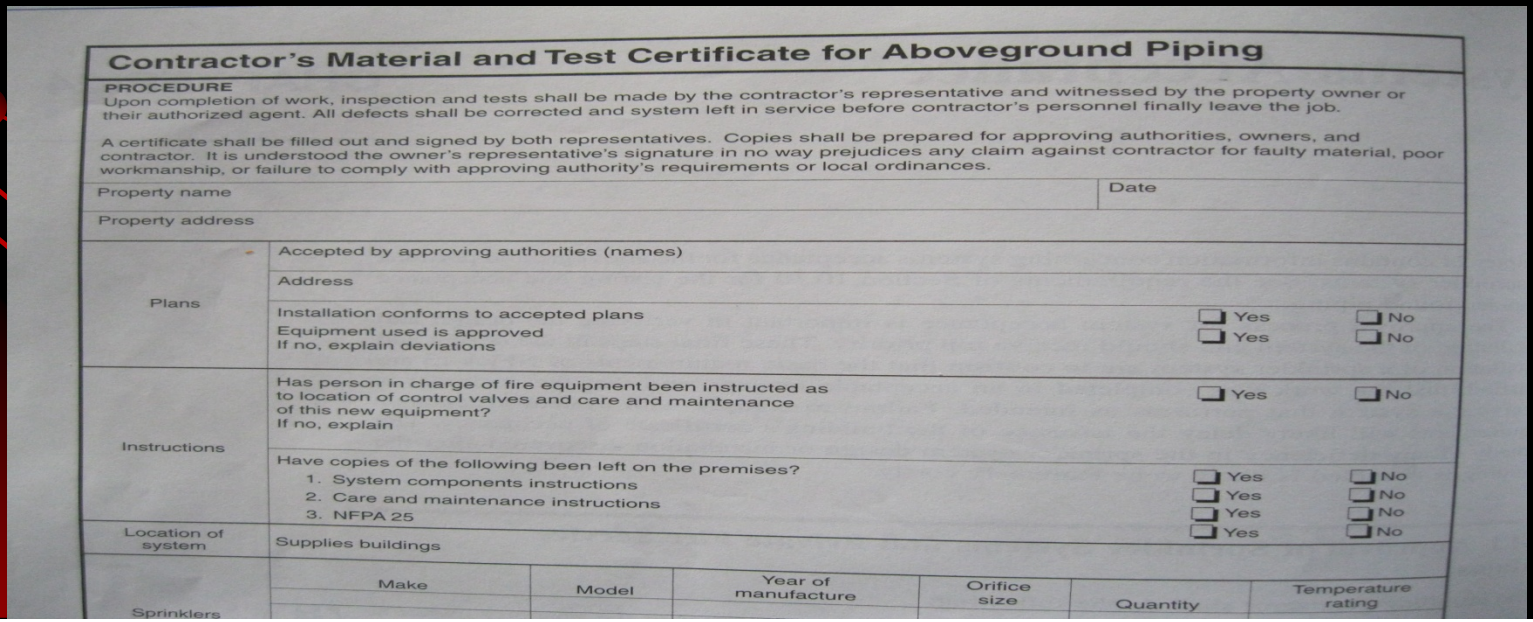
- Sprinklers in elevator machine rooms and at the top of the elevator shaft (if installed) should include means to cut power to the elevator prior to discharge. The preferred method for doing this is:
  - Use of an intermediate temperature sprinkler head along with a heat detector and smoke detector. The smoke detector initiates elevator recall. The heat detector, with a lower actuation temperature than the sprinkler, actuates a shunt trip breaker provided by the electrical contractor to cut power to the elevator.
- Machine room-less Elevator Controller Rooms

ELEVATOR MACHINE ROOMS

FIRE PUMPS

FINAL INSPECTION

- Contractors Material and Test Certifications from NFPA documents. Signed by designer.
- Sprinkler Shop drawings in PVC tube.
- A second set of ‘as built’ shop drawings should be provided to the owner.



Contractor's Material and Test Certificate for Aboveground Piping

PROCEDURE
Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by the property owner or their authorized agent. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

Property name					Date	
Property address						
Plans	Accepted by approving authorities (names)					
	Address					
	Installation conforms to accepted plans				☐ Yes	☐ No
	Equipment used is approved				☐ Yes	☐ No
	If no, explain deviations					
Instructions	Has person in charge of fire equipment been instructed as to location of control valves and care and maintenance of this new equipment?				☐ Yes	☐ No
	If no, explain					
	Have copies of the following been left on the premises?					
	1. System components instructions				☐ Yes	☐ No
	2. Care and maintenance instructions				☐ Yes	☐ No
	3. NFPA 25				☐ Yes	☐ No
Location of system	Supplies buildings				☐ Yes	☐ No
Sprinklers	Make	Model	Year of manufacture	Orifice size	Quantity	Temperature rating


IN CASE OF FIRE
EXIT BUILDING
BEFORE TWEETING
ABOUT IT

Thank you!

Questions?

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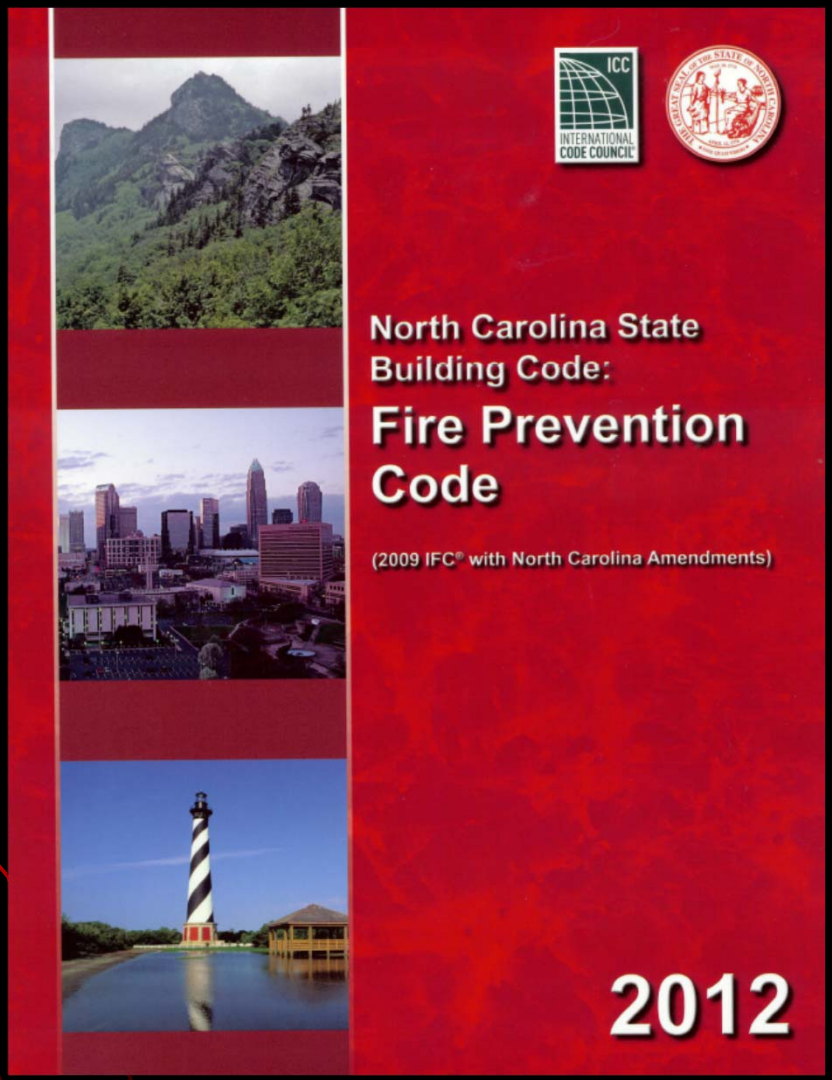
2012 NC Fire Prevention Code Changes

2012 Fire Prevention Code



March 22nd, 2012

2012 Fire Prevention Code

Chapter 2 – Definitions

AMBULATORY HEALTH CARE FACILITY

Buildings . . . used to provide medical, surgical, psychiatric, nursing, or similar care on **less than a 24-hr basis** to individuals who are rendered incapable of self-preservation.

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2012 Fire Prevention Code

Chapter 2 – Definitions

COOPERATIVE INNOVATIVE HIGH SCHOOL PROGRAM

A program in excess of the required curriculum for high school students in attendance at a college, community college, or university.

2012 Fire Prevention Code

Chapter 2 – Occupancy Definitions

Aircraft manufacturing w/ no is repair added to **Group F-1 Mod. Hazard**

Aircraft hangar (storage & repair) is moved from **Group S-2 Low Hazard** to **Group S-1 Mod. Hazard**

March 22nd, 2012

2012 Fire Prevention Code

604.2.14.3 – High-rise connected facilities

Electrically powered fire pumps required to maintain pressure . . . are classified as **emergency** systems and shall operate within **10 seconds** of normal power supply failure . . .

March 22nd, 2012

2012 Fire Prevention Code
Section 606 – Refrigerants

Three changes to Section 606:

- 606.8 – The leak detector shall transmit a signal to an **“approved”** location.
- 606.9.1 – The emergency shut-off shall de-energize **all** equipment in the machinery room.

March 22nd, 2012

2012 Fire Prevention Code
Section 606 – Refrigerants

- 606.13 is reworded to clarify that exhaust ventilation is required when machinery rooms contain **flammable, toxic, or highly toxic refrigerants, other than ammonia**

March 22nd, 2012

2012 Fire Prevention Code
Section 609 – Commercial Kitchen Hoods

- Additional requirements for cleaning and inspecting commercial kitchen hoods
- Hood maintenance requirements have been moved from Chap. 9 to Chap. 6
- **Please review Section 609 in detail before designing per the 2012 NCFPC**

March 22nd, 2012

2012 Fire Prevention Code
NCMC 505 – Domestic Kitchen Exh. Equip't

- Includes domestic range hoods and appliances with downdraft exhaust
- "Domestic Kitchen" = **within a dwelling unit**
- User lives there, so user is likely aware of its use

2012 Fire Prevention Code

NCMC 505 – Domestic Kitchen Exh. Equip't

DOMESTIC RANGE HOOD
IN A DORM SUITE

COMMERCIAL RANGE HOOD IN A
DORMITORY PUBLIC SPACE

March 22nd, 2012

2012 Fire Prevention Code

NCMC Ch. 2 – Commercial Cooking Appliance

- Used in a “commercial” establishment
- Cooking food and producing grease vapors, steam, fumes, smoke or odors
- Deep fat fryers, broilers, griddles, steam-jacketed kettles, hot-top ranges, charbroilers, ovens, barbecues, rotisseries, and “similar appliances”

2012 Fire Prevention Code

NCMC ¶507.2 – Commercial Kitchen Hoods

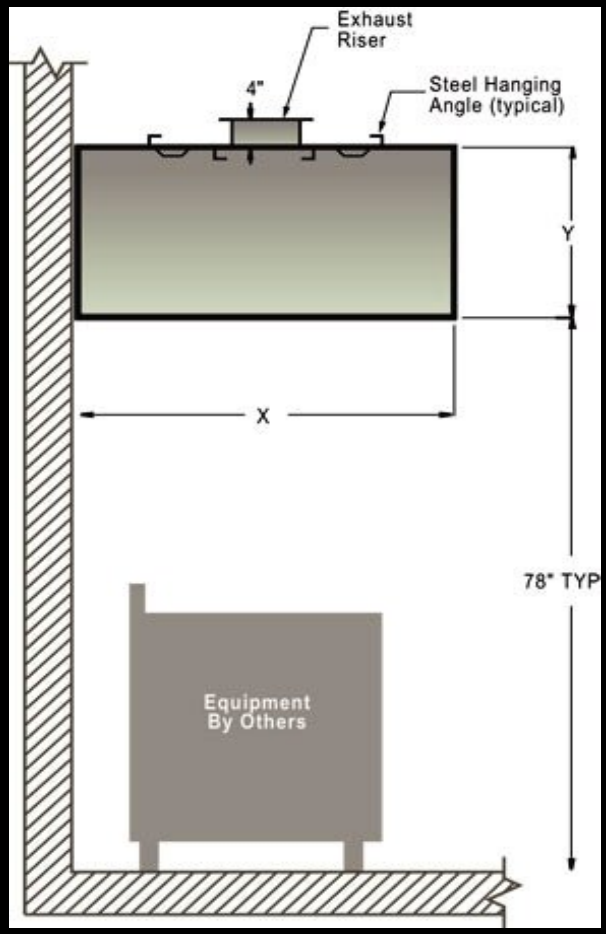
¶507.2.1 – Type I Hood shall be installed where required where cooking appliances produce grease or smoke

March 22nd, 2012

2012 Fire Prevention Code

NCMC ¶507.2 – Commercial Kitchen Hoods

¶507.2.2 – Type II Hood shall be installed over dishwashers and light- and medium- duty appliances that produce heat, moisture, or products of combustion but **no grease or smoke**



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2012 Fire Prevention Code
903.2.1.2 Group A-2

An automatic sprinkler system shall be provided for Group A-2 occupancies where **ONE** of the following conditions exists:

March 22nd, 2012

2012 Fire Prevention Code
903.2.1.2 Group A-2

- the fire area exceeds 5,000 sf;
- 2009 – the fire area has occupant load of 100 or more, and
- the fire area is located on a floor other than the level of exit discharge.

2012 Fire Prevention Code
903.2.1.2 Group A-2

- the fire area exceeds 5,000 sf;
- **2012** – the fire area has occupant load of **300** or more, **except 100 for nightclubs**; and
- the fire area is located on a floor other than the level of exit discharge.

2012 Fire Prevention Code

903.2.2 Group B – Ambulatory Health Care Facilities

An automatic sprinkler system shall be installed throughout all fire areas containing a Group B AHCF occupancy when **EITHER** of the following exists at any time:

March 22nd, 2012

2012 Fire Prevention Code

903.2.2 Group B – Ambulatory Health Care Facilities

- four or more care recipients are incapable of self-preservation; or
- one or more care recipients who are incapable of self-preservation are located at other than the level of exit discharge serving such an occupancy.

2012 Fire Prevention Code

903.2.10 – Group S-2 Enclosed Parking Garages

2009 – An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages i.a.w. Section 406.4 of the NCBC or where located beneath other groups as follows:

March 22nd, 2012

2012 Fire Prevention Code

903.2.10 – Group S-2 Enclosed Parking Garages

2012 – An automatic sprinkler system shall be provided throughout buildings classified as enclosed parking garages i.a.w. Section 406.4 of the NCBC ~~or where located beneath other groups~~ as follows:

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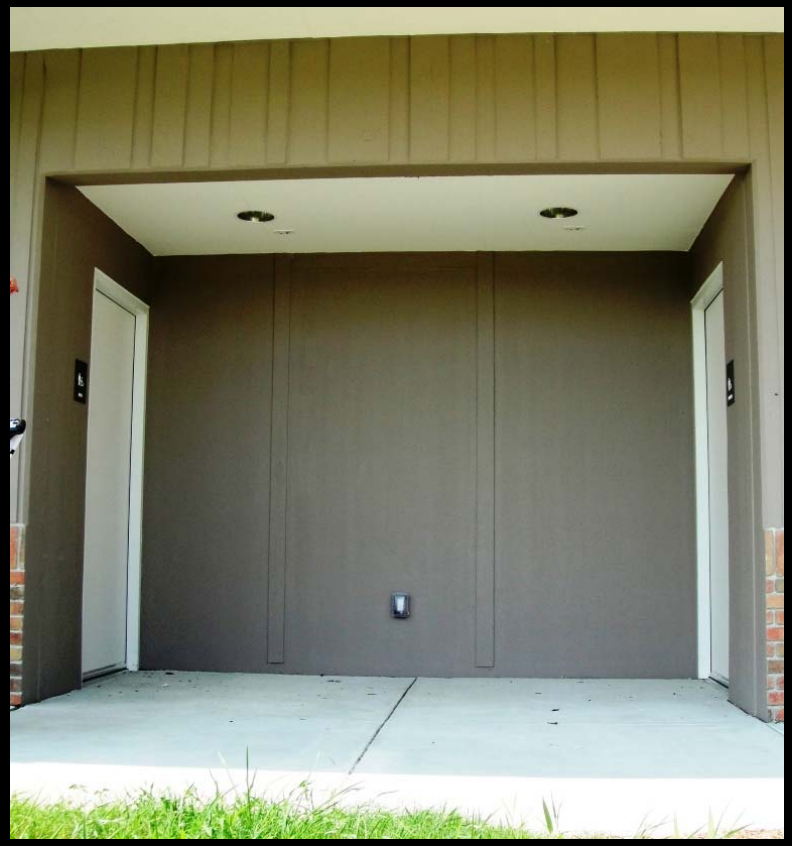
2012 Fire Prevention Code

903.3.1.2.1 – Balconies and Decks

- Sprinklers shall be provided for exterior balconies, decks, and ground floor patios of dwelling units where the building is of Type V construction, . . .

provided there is a roof or deck above.



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2012 Fire Prevention Code

907.2 – Where required – new buildings/structures

New 2nd paragraph: At least one manual pull station shall be provided in an *approved* location to initiate a FA signal for FA systems using automatic fire or water-flow detection devices. Where the Code allows elimination of pull stations for sprinklers, a single pull station shall be installed.

March 22nd, 2012

2012 Fire Prevention Code

907.2 – Where required – new buildings/structures

Exception 2: The manual pull station is not required for Group R-2 occupancies unless required by the fire code official to provide a means for fire watch personnel to initiate an alarm during a sprinkler system impairment event. Where provided, the manual pull station shall not be located in an area that is accessible to the public.

March 22nd, 2012

2012 Fire Prevention Code

913.2.1 – Protection of Fire Pump Rooms

Fire pump rooms shall be separated from all other areas of the building i.a.w. Section 913.2.1 of the NC Building Code, which in turn states . . .

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2012 Fire Prevention Code

NCBC 913.2.1 – Protection of Fire Pump Rooms

- Fire pumps shall be located in rooms that are separated by 2-hr fire barriers i.a.w. NCBC Section 707 or 2-hr horizontal assemblies i.a.w. NCBC Section 712, or both.

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2012 Fire Prevention Code

NCBC 913.2.1 – Protection of Fire Pump Rooms

- Exception 1 – In non-high-rises, 1-hr fire barriers or 1-hr horizontal assemblies or both shall be permitted in buildings equipped throughout with an NFPA13 or NFPA13R sprinkler system.

2012 Fire Prevention Code

913.2.1 – Protection of Fire Pump Rooms

NOTE: Per NCBC Table 508.2.5, Incidental Accessory Occupancies:

TABLE 508.2.5
INCIDENTAL ACCESSORY OCCUPANCIES

ROOM OR AREA	SEPARATION AND/OR PROTECTION
Rooms containing fire pumps in nonhigh-rise buildings	2 hours, or 1 hour and provide automatic sprinkler system throughout the building
Rooms containing fire pumps in high-rise buildings	2 hours

2012 Fire Prevention Code

913.2.1 – Protection of Fire Pump Rooms

Exception 2 – Separation is not required for fire pumps physically separated in accordance with NFPA20.

The term “physically separated” means in a separate building, governed by the separation distances of NCBC Chapter 6.

March 22nd, 2012

March 22nd, 2012

2012 Fire Prevention Code

Thank you for attending today!

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March 22nd, 2012