



# **RIO VERDE FIRE DISTRICT STANDARDS**

**INTERPRETATIONS & APPLICATIONS  
OF NFPA 13, 13R, 13D (2010 EDITION)**

**EFFECTIVE DATE: JANUARY 1, 2006**

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## I. GENERAL

These Fire District Interpretations & Applications shall be used in conjunction with the **2003 International Building Code (IBC) and the 2003 International Fire Code (IFC)**, National Fire Protection Association Standards (NFPA) referenced herein, and the adopting Rio Verde Fire District Resolution 2005-3.

Where, in any specific case, different sections of the codes or standards specifically referenced herein specify different materials, methods of construction or other requirements, this Fire Department Interpretations & Applications shall govern. Where there is a conflict in the *IFC* between a general requirement and specific requirement, the specific requirement shall be applicable. When not specified, the most restrictive standard shall apply.

When submitting plans, **a minimum of 3 sets of all working drawings and one set of hydraulic calculations are required.** Approved plans shall be available on the job site before any equipment is installed or remodeled. An approved set of sprinkler plans shall be on the job site at all times and shall be at the structure or part of the structure being tested or inspected. There may be no partial submittals. All new commercial and multifamily system submittals shall include one Maricopa County approved Civil Fire Line Plan as well as a COS Certified Water Flow Test for reference. All residential systems shall be submitted with the approved site plan (accepted for access to the structure and Fire Hydrant placement)

**All submittals shall bear a review certification and signature of a minimum level III NICET Certified Engineering Technician (CET) Automatic Sprinkler Systems.** Any person certified under the NICET umbrella is responsible to maintain their current certification and insure that the quality and integrity of the plan is maintained.

### TENANT IMPROVEMENT SUBMITTALS

#### Commercial Tenant Improvement

**4 heads** or more shall be submitted on regular sized drawing paper through the district with appropriate NICET signature or PE stamp.

- No drawing is required for adding or relocating 3 heads or less
- Field Inspection is required for all projects

**The use of any listed flexible tubing product for tenant improvement will be allowed when the following guidelines are met:**

- Drawings are required anytime this product is utilized
- Hydraulic calculations are required on any installation reflecting correct friction loss

## Residential Tenant Improvement

- **3 heads or more** shall be submitted on regular sized drawing paper through the district with appropriate NICET signature or PE stamp
- **Up to 2 heads** may be submitted by FAXing to the district (480) 471-1821 on 8 ½ x 11 size paper with the appropriate NICET signature, showing the existing riser location and pertinent existing pipe sizes. Hydraulic calculations may be required.

Field Inspection & hydrostatic tests are required for all projects.  
**(i.e. 50 psi over static not to exceed 150 psi for 24 hrs.)**

Residential sloped ceiling modifications for tenant improvement shall always require plans for adding or relocating any amount of heads

State licensing of institutional and care facilities and the underwriters fire insurance rating criteria may vary from National Fire Protection Association, County Codes and Fire District Interpretations & Applications. The Fire Chief will accept more stringent design densities, but in no case will the criteria be below NFPA, local codes or district standards. All engineering will be subject to review and approval by the fire district.

Use of materials and appliances should be verified prior to design by insurance underwriter (if applicable). Penalties may occur with some materials.

When installing CPVC piping the factory issued certification card must be carried by the pipefitter during installation and is to be made available to an inspector upon request. The installer shall follow all manufacturer guidelines for installation.

A re-inspection fee will be assessed for each inspection or re-inspection, not limited to the following:

- When installation is not complete.
- When corrections from previous inspection are not complete
- Advanced notice is required for cancellation 2 hours prior to inspection.

### FIRE SPRINKLER OMISSIONS IN STRUCTURES

The following accessory structures shall be exempt from fire sprinkler requirements:

1. Gazebos and Ramadas for residential and public use.

2. Independent rest room buildings without hazardous storage facilities, that are associated with golf courses, parks and similar uses.
3. Guardhouses for residential and commercial developments.
4. Detached non-combustible carports for residential and commercial developments with covered parking less than 15,000 square feet (1394 m<sup>2</sup>).
5. Barns and agricultural buildings for private, residential, non-commercial use, not exceeding 1,500 square feet (139.35m<sup>2</sup>) with no habitable areas.
6. Detached storage sheds for private, residential, non-commercial use, not exceeding 1500 square feet (139.35m<sup>2</sup>).
7. Detached 1, 2 and 3 car garages not exceeding 1000 sq ft., without habitable spaces in existing R-3 developed parcels which contain existing non-sprinklered subdivision requirements (i.e. 700 foot (213.36m) hydrant spacing
8. For detached fuel dispensing canopies not exceeding 1500 square feet (139.35 m<sup>2</sup>).
9. Open shade horse stalls of non-combustible construction for private, residential, non-commercial use, not exceeding 5,000 square feet (464.52 m<sup>2</sup>) and no storage of combustible products, vehicles, or agricultural equipment.
10. Detached one story accessory building used as tool and storage shed of non-hazardous materials, and not exceeding 200 square feet (11.15 m<sup>2</sup>)."

## II. DEFINITIONS AND ABBREVIATIONS

For the purpose of these sections, unless it is plainly evident from the context that a different meaning is intended, the terms used herein are to have the meaning as set forth in the most recent addition of the **2003 International Building Code** (IBC) and the **2003 International Fire Code** (IFC) as adopted with modifications.

"A"

**AHJ** - Authority Having Jurisdiction/Rio Verde Fire District

**Application Rate** - See Density

**Approved** - Materials and types of construction acceptable by the FIRE CHIEF as a result of investigations or tests conducted or supervised by him, or by reason of tests performed by recognized testing laboratories, national authorities, and technical or scientific organizations.

**Automatic Sprinkler** - A device designed to open automatically by operation of a heat responsive releasing mechanism and to discharge water in a specific pattern over a designated area for the purpose of extinguishment or control of fire.

"B"

**Backflow Preventer** – A backflow preventer is an approved listed double check valve assembly and is a means to prevent backflow into the potable water system.

"C"

**Check Valve** - A valve which allows flow in one direction only.

**COS** - City of Scottsdale

**Control Valve** - An indication, supervised valve employed to control (shut) a supply of water to a sprinkler system.

**Combination Supply** – Water supply for Fire Protection and domestic use.

"D"

**Density** - The quantity of water discharged by an automatic sprinkler over a specific area expressed as gallons per minute per square foot (L/(min)m<sup>2</sup>). (See application rate)

**Design Area** - An area expressed in square feet (m<sup>2</sup>) having a number of sprinklers, all flowing at least a minimum required application rate. A compartment used as a design area is a space completely enclosed by walls and a ceiling, which may have openings

to an adjoining space if the openings have a minimum lintel depth of eight inches (203 mm) from the ceiling.

**Discharge Coefficient** - Coefficient of discharge  $Q$  (gpm)=K times the square root of  $P$ (psi), where  $Q$  = flow and  $P$  = pressure and  $K$  = K factor.

**Dwelling** - Any building which contains one or two "dwelling units" intended to be used, rented, leased, let or hired out to be occupied, or which are occupied for habitation.

**Dwelling Unit** - One or more rooms arranged for the use of one or more individuals living together as in a single housekeeping unit, normally having cooking, living, sanitary and sleeping facilities.

"F"

**Flush- Type Sprinklers** - A sprinkler intended for use where the piping is concealed and where only a minimum of the parts of the sprinkler project is below the ceiling.

**FDC** - Fire Department Connection

"H"

**Heat-Responsive Element** - That portion of a sprinkler operating mechanism which breaks, melts or otherwise functions on exposure to sufficient heat, there by initiating the automatic operation of the device.

"L"

**Leak Point** - The pressure at which leakage of water around the orifice seat occurs at a rate greater than one drop per minute.

**Listed/Listing** - Terms referring to equipment which is shown on a list, published by an approved testing agency, qualified and equipped for experimental testing and maintaining an adequate periodic inspection of current productions and whose listing states that the equipment complies with nationally recognized safety standards. These terms shall also mean equipment or materials accepted by the State Fire Marshal as conforming to the provisions and regulations contained in Title 19, CAC, and which are included in a list published by the State Fire Marshal.

"M"

**Multi-level Building** – Any building that has an occupied structure above or below grade

## "N"

**Network System** – A pre-engineered type of multipurpose system utilizing a common piping system supplying domestic fixtures & fire sprinklers where each sprinkler is supplied by a minimum of three separate paths.

**NICET** - National Institute for the Certification of Engineering Technologies

**NST** - National Standard Thread

## "O"

**Occupancy Classification** - See the *2003 International Building Code (IBC)* and the *2003 International Fire Code* and Fire Department Interpretations & Applications

**Operating Temperatures** - The temperature at which the heat-responsive element of a sprinkler operates when subjected to a one degree F per minute temperature rise in a liquid bath.

## "P"

**Patio Cover** – Any patio, balcony, or exterior landing cover that exceeds 4 feet attached to any structure.

**Pendent Sprinkler** - A standard sprinkler intended for installation in the pendant position (deflector below the pipe).

**Plated Sprinkler** - A sprinkler which has a factory applied plating for decorative purposes.

**Pre-engineered System** - A packaged sprinkler system including all components connected to the water supply designed to be installed according to pre- tested limitations.

## "R"

**Recessed Sprinkler** - An assembly consisting of a standard pendent sprinkler installed in a recessed sprinkler escutcheon, so that the assembly can be recessed in a ceiling installation.

## "S"

**Sprinkler-Automatic** - A fire suppression device which operates automatically when its heat-actuated element is heated to or above its thermal rating allowing water to discharge over a specific area.

**Sprinkler System** - An integrated system of piping connected to a water supply, with approved sprinklers which will automatically initiate water discharge over a fire area. The sprinkler system also includes a control valve and a device that activates an alarm when the system operates.

**Stand-alone Sprinkler System** – A system fed from the domestic supply that is not a part of the plumbing system

**System Pressure** - Pressure contained within the system, above the control valve.

"U"

**Upright Sprinkler** - A standard sprinkler intended for installation in the upright position (deflector above the pipe).

"W"

**Water Flow Alarm** - A audio sounding device activated by a water flow detector or alarm check valve.

**Water Flow Device** - An electrical signaling indicator or alarm check valve actuated by water flow in one direction only.

**Wet System** - A system employing sprinklers attached to a piping system containing water and connected to a water supply so that the water discharges immediately from sprinklers opened by a fire.



### III. MODIFIED 13-D IN R-3 & R-4 STRUCTURES

(IE: ONE AND TWO-FAMILY DWELLINGS AND MOBILE HOMES  
RESIDENTIAL GROUP CARE) (See Appendix B)

**An R-3 Residential occupancy is defined where the occupants are primarily permanent in nature and not classified as R-1, R-2, R-4 or I and where buildings do not contain more than two dwelling units or adult and child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.**

**An R-4 Residential occupancy shall include a building arranged for occupancy as a Residential Care/Assisted Living Facility including more than five but not more than 10 occupants.** Residential group care facilities for ambulatory, non-restrained persons, who may have a mental or physical impairment (each accommodating one to ten clients or residents, excluding staff.) Restraint of any occupants requires a Group I occupancy classification.

This document shall be used in conjunction with the **2003 International Fire Code**, the Rio Verde Fire District Resolution, and the most recent edition of NFPA 13D at the time of adoption.

These guidelines are for the design and installation of Modified 13-D sprinkler systems for R-3 & R-4 structures.

**PURPOSE:** The Rio Verde Fire District has determined that with the installation of quick response life safety sprinkler systems, the loss of life and property can be reduced significantly.

**On November 22, 2005 the Rio Verde Fire Board passed resolution 2005-3,** requiring every commercial, & multi-family building built after January 1, 2006 to be outfitted with a complete fire sprinkler system. The resolution also requires that all newly constructed single family residence, permitted **after January 1, 2006** to be fully outfitted with an approved fire sprinkler system.

This document describes the requirements for the installation of an automatic fire sprinkler system that will contribute to the reduction of loss of life by fire currently experienced in single-family residences by 98.5%, an increase of 48.5% over smoke detectors alone.

The following are exceptions and modifications to the most recent edition of the NFPA 13D at time of adoption.

**4.3** *is amended in its entirety as follows:*

**4.3.3** Tests & Inspections. Upon completion of installation and prior to final framing approval, all modified 13-D sprinkler systems with or without a Fire Dept Connection shall be tested and inspected in the following manner:

**ROUGH INSPECTION:**

1. All tests shall be witnessed by the Rio Verde Fire District.
2. All components of the system shall be in place, secured and connected to the water supply at the time of the test.
3. The system shall be tested using a cold water test / minimum of 175 psi for 24 hours, or above static pressure when static pressure is 150 psi. System must show adequate pressure per approved plans. No visible leakage or pressure reduction is permitted.
4. All fire penetrations should be filled with approved material and nail plates shall be in place at the time of the pressure test. Where metal studs are used piping shall be protected with either a sleeve or grommet.
5. Systems tested with sprinkler heads installed at time of test may have up to 10% of the heads removed for orifice obstruction inspection. (Not required if plugs are used) If solvent glue or other foreign objects are found within the sprinkler head at time of inspection, then the system shall be tested using plugs in lieu of sprinkler heads. The sprinkler contractor will then be required to install all sprinkler systems using plugs in lieu of sprinkler heads for a period of one year from that date for each rough inspection.
6. All sprinkler systems will be subject to site inspection.
7. An approved set of sprinkler plans shall be on the job site at time of test.

**FINAL INSPECTION:**

1. At final inspection all sprinkler system components shall be in place, and the system shall be flowed with activation of the flow switch and the bell.
2. All risers shall have a calculation sticker and appropriate spare heads installed in the riser compartment. See attached detail for calculation sticker (See appendix F)
3. Fire District Inspection form from rough-in inspection must be on the

job site at time of test.

4. Verify manufacturers head tolerance with escutcheon in place and check for paint, obstructions, plaster, etc.

**Section 4.6** *is added as follows:*

**4.6** When submitting plans, a minimum of **two** sets of all working drawings and one set of hydraulic calculations will be required at time of approval. Minimum scale for all residential drawings shall be 3/16". An approved set of the plans shall be available on the job site at the time of installation. The plan shall be at the structure for scheduled inspections, tests and certificate of occupancy.

4.6.1 A slope legend indicating rise & run for all ceilings 2" in 12" or greater shall be added to all plans. Add note stating "no sloped ceilings" if applicable.

4.6.2 All beam depths shall be noted on plans

4.6.3 A site plan shall be submitted and attached to all sets of residential plans. Submit an approved Residential "Civil Grading & Drainage Plan" depicting driveway length, gradient slope, width and materials composition with the Fire Sprinkler submittal package. A copy of the automatic fire sprinkler submittal package shall be on the site at time of inspection.

## **CHAPTER 5      SYSTEM COMPONENTS                      MODIFIED 13D in R-3 & R-4**

**Section 5.2** *is amended by adding section 5.2.2.3 as follows:*

**5.2.2.3** Special Requirements for Plastic Pipe Systems. CPVC shall be joined to other components by solvent plus medium bond cement in accordance with the manufacturer's instructions. No system will be approved by the fire department that has used solvent or cement that is not in accordance with manufacturer's instructions. CPVC installed systems shall meet manufacturers recommendations for cure time between installation of last component and the start of the test.

## **CHAPTER 6      WATER SUPPLY                      MODIFIED 13D in R-3 & R-4**

**Section 6.1.2** *is amended as follows:*

6.1.2 Where stored water is used as the sole source of supply, the minimum quantity of water shall equal the fire sprinkler water demand rate times 15 minutes.

6.1.3 *Deleted in its entirety.*

6.2 Water Supply Sources

Stored water design:

## Combination Domestic/Fire Sprinkler Water Tank

- Low water alarm shall be actuated when the water level drops to the min. quantity specified for the sprinkler system.
- Add a 10% buffer to the fire sprinkler requirement.
- Fire Dept Connection is required
- Manufacturer's information for Bladder Pressure Tank & Booster Pump shall be included with submittal
- A UL or FM listed Backflow Preventer will be required for well water.
- The electrical power to operate the pump shall be supplied by house current & shall not be a dedicated circuit nor a GFI
- See Appendix G, H & J

A Stand alone pump serving fire protection only is not permitted, the pump shall be installed for combination domestic/fire protection only.

Residential Sprinkler Booster Pump design on Rio Verde Utilities Water Supply:

*To be used on systems using Rio Verde Utilities water supply with inadequate pressure*

- A booster pump will ONLY be permitted when all design options prove inadequate for domestic/fire sprinkler demand.
- A Bladder Pressure Tank is required.
- A UL or FM listed Backflow Preventer will be required after the meter.
- Add a 10% buffer to the fire sprinkler requirement.
- Fire Dept Connection is required
- Manufacturer's information for Bladder Pressure Tank & Booster Pump shall be included with submittal
- The electrical power to operate the pump shall be supplied by house current & shall not be a dedicated circuit nor a GFI
- See Appendix G & I

### **6.3 Multipurpose Piping Systems – amended as follows:**

- (1) In common water supply connections 5 gpm shall be added to the sprinkler system demand to determine the size of common piping.
- (4) Piping connected to the system that supplies only plumbing fixtures shall comply with local plumbing and health authority requirements and is required to be listed.
- (7) All multipurpose systems (with or without apparent water treatment and filtration equipment) shall require a listed automatic flow sensing bypass valve be installed in the supply piping that directs all water directly to the system.
- (8) Pumps to augment Rio Verde Utilities water supply are not allowed.
- (9) Water meter verification required.
- (10) All plumbing appliances & fixtures shall be added for water use (using the manufacturers recommended gpm listing) when sizing the system (i.e. lawn sprinkler demand, dishwasher, bathroom faucets, washing machines, etc.)

### **Section 6.5 Stand Alone Systems is added as follows:**

**6.5 (1)** In common water supply connections 5 gpm per dwelling unit shall be added to the sprinkler system demand to determine the size of common piping and the size of the total water supply requirements. See Appendix C

**6.5 (2)** Sprinkler piping shall connect to the domestic supply after the meter and after the domestic shut off valve. Other than the combined shut off valve there shall be no connections for any purpose between the water meter and the sprinkler system tee. All pressure reducing valves are to be installed on the domestic side of the tee.

**6.5 (3)** All meters shall be full flow meters, 3/4" minimum. Insure that sprinklers are calculated to meter size. When 1" meters (or larger) are used, plans must be submitted with meter verification. Provide water meter verification for single family houses less than 3500 sq ft. when using a 1" meter or greater

**6.5 (4)** Domestic water supplies shall be 1" minimum size in new construction.

**Section 7-1** *is amended in its entirety as follows:*

**7-1 Valves and Drains**

**7-1.1 General.** Each stand-alone sprinkler system will consist of a combined domestic control valve, a riser assembly, with a local alarm, an inspectors test valve a fire dept. connection (if required).  
(See Appendix C)

**7-1.2 Control Valve.** Each Stand-Alone system shall have a single above grade control valve arranged to shut off both the domestic and sprinkler systems and may have a separate shut off valve for domestic systems only. Other than the combination shut off valve there shall be no other connections for any purpose between the meter and the sprinkler system tee. Pressure reducing valves are to be installed on the domestic side of the tee.

NOTE: Control valves must be opened and closed slowly to prevent damage to piping by water hammer.

**7-2 Drains & Test Connections**

**7.2.1** The main drain shall be 1/2 inch or larger, located above the check valve and flow switch and shall have a fixed non-adjustable pressure relief "pop off valve" branched off of the main drain that will activate at pressures no lower than 150 psi and no higher than 175 psi.

**7.2.6. The components of a Stand-Alone Riser Assembly** is the aboveground horizontal or vertical pipe between the water supply, the cross mains or feed mains which contain a control valve, a rubber faced check valve, a pressure gauge, a main drain with pressure relief valve, and a supervised electric flow switch.

(a) The water flow alarm switch shall receive power from house circuitry and will Be connected into the electric alarm for on-site device activation reporting. For alarms see **7-6**

(b) The riser shall be constructed within a garage or other secured location as approved by the chief or within a wall cabinet or other acceptable enclosure with an access panel or door suitable for access to all riser components. All riser assemblies shall be braced and secured. Plastic systems shall be protected from damage up to 7 feet from floor level.

### 7.2.7 Inspectors Test Valve.

(a) Each sprinkler system shall have an inspectors test valve and drain connected at the highest most remote possible point in the system. Piping will be the same size as piping to the most remote sprinkler head.

(b) The test valve will have an orifice the same size as the remote sprinkler head and shall be accessible to the fire department in such a place where it will not sustain damage and where water can be flowed without damage to the structure or contents. Discharge shall be above grade and unobstructed. Access to discharge shall be confined to the property

**7.3** A pressure gauge shall be installed on the system side of any system.

### 7.5 Sprinklers

“K” factor, pipe thread connection size, and orifice size shall be per UL listing and manufacturers recommendations. The use of “sloped ceiling” head requirements shall be required in sloped ceilings with a rise of more than 2” per foot (min) per manufacturers recommendations. Calculations shall maintain a 10% safety margin from the field water pressure tests. The pressure used for hydraulic calculations shall not exceed 72 psi.

Sprinklers shall be required in all closets under stairways. If the area beneath the stairway is open to the room, sprinklers shall be required.

Sprinklers shall be required in covered patios when there is liveable space above the patio.

#### 7.5.5 Temperature Ratings

**7.5.5.1 & 7.5.5.2** *are revised in their entirety as follows:*

Ordinary temperature rated residential sprinkler (155° F) min. shall be installed.

**Intermediate temperature rated residential sprinkler (175° F) shall be installed in mechanical rooms, garages and laundry rooms.**

**7.5.8** *is amended as follows:*

Where solvent cement is used as the pipe and fittings bonding agent, sprinklers shall not be installed in the fittings prior to the fittings being cemented in place. **The head adaptor/drop nipple assembly shall be pre-fabricated prior to installation to ensure the sprinkler orifice remains free of obstructions.**

NOTE: See manufacturer's listing for CPVC pipe, for protection requirement.

**Section 7-6** *is revised in its entirety as follows:*

**7.6 Alarm** *is amended as follows:*

7-6 Alarms. Local water flow alarms shall be provided on all sprinkler systems. A 110 volt AC 6 inch minimum size electric bell, shall be supplied by house current and shall not be a dedicated circuit nor a GFI. The bell shall be mounted on the structures exterior, visible from the street and not more than 3 feet from the front. The bell must be at a height to view easily from the street, but no higher than the plane made by the bottom of the eaves. The alarm signal shall be provided by a UL listed local waterflow switch. Color: Red

**7.7 Attics** *is revised to include:*

When nonmetallic piping is installed in attics, adequate insulation shall be provided on the attic side of the piping to avoid exposure of the piping to temperatures in excess of the pipe's rated temperature.

**Attic Pilot Systems: Install non-combustible pipe insulation around the exposed CPVC piping or use copper pipe with freeze protection.**

**7.8 Unsupervised Pipe:** (e) Unsupervised sprinkler pipe in residential structures: Residential sprinkler systems shall not have unsupervised pipe more than four (4) feet in length within a wall adjacent to livable space and/or no more than ten (10) feet in length in a wall that does not have a livable space on either side. The pipe will be measured from the point of entry, both horizontally and vertically, up to the center of the flow switch on the riser

**7.9 Fire Department Connection.**

**Required when system has a booster pump to augment the water supply.**

(a) A fire department connection (FDC) will be installed in an accessible location, as approved by the fire department, on the access side (street side) of the structure on a front wall or no more than 3 feet back from a front wall.

(b) The FDC shall be located directly beneath the alarm bell.

(c) The FDC shall not be smaller than the riser size and in no case smaller than a 1 1/2" single snoot connection.

(d) Threads shall be male NST.



## 7.10 Special Requirements for Copper

Copper pipe shall be joined by brazing or by soldering in accordance with standard plumbing practice (95-5 type solder shall be used). When copper pipe is used an anti-hammer device shall be provided. Not required on partial installations of copper pipe or combination steel & copper installations.

Dissimilar materials see Appendix A.

## CHAPTER 8 SYSTEM DESIGN

## MODIFIED 13D R-3 & R-4

### 8.1.3 Other designs

Residential barns

1501-5000 sq ft barns shall be piped from the domestic service utilizing a two head calculation and commercial QR heads.

5001 sq ft and above shall be piped utilizing a four head calculation (commercial QR heads) and NFPA 13 guidelines including backflow prevention and FDC requirements.

Detached out-buildings ( i.e garage, guest house, etc.) larger than 1500 square feet shall require a separate riser & electric bell.

### 8.2 Position of Sprinklers & design criteria *is amended by adding: 8.2.1.4*

**Follow recommended obstructions rules from NFPA 13 concerning residential sprinklers (see Section 8.10.6 & 8.10.7 (NFPA 13 2002 Edition))**

#### 8.2.1.4 Special Design Approaches:

##### **Ceilings w/ exposed beams**

- Follow manufacturers listing requirements for “beamed ceiling sprinklers”

##### **Ceilings w/decorative non-structural exposed beams (top of beam is below finished ceiling)**

- Center head directly over beam.
- Deflector distance 1” min from top of beam.
- Locate “perimeter” sprinkler heads directly over first beam off wall.
- Maximum head spacing 16 x 16.

## **Coffered Ceilings/Soffits**

- **Locate heads at high point of ceiling.**
- **Follow the obstruction requirements for residential sprinkler heads in NFPA 13 (Sec. 8.10).**

## **Attic Pilot Systems for Limited Fire Dept Access**

**Patio protection is required**

### **Attic Pilot Systems - Pitched Roofs**

- **Locate 1 row of 7/16" orifice QR 200° commercial heads spaced 15' max on center at the ridge line w/ 12" max deflector distance.**
- **Provide min 1" looped supply (from a min of two places from below) to attic head or min 1" sprigs to attic heads fed from 1" supply.**
- **Insulate all exposed CPVC piping with non-combustible insulation**

### **Attic Pilot Systems – Flat Roofs**

- **Locate 7/16" orifice 200° commercial heads spaced 225 sq ft max spacing in all flat roof areas or fill attic completely with approved insulation**  
**or**
- **Min. 1" sprigs to attic heads fed from 1" supply spaced 225 sq ft**

## **Patio Protection for >200' Fire Dept Hose lay (exposure protection only)**

- **Patios w/beams < 5" depth spaced 8'-0" o/c max**
  - ❖ **Center sidewall heads in beam space**
  - ❖ **Deflector distance 1" below beam**
- **Patios w/beams > 5" depth spaced 8'-0" o/c max**
  - ❖ **Drill Beams for head placement**  
**or**
  - ❖ **Center heads in each beam space**

## Section 8-4 Pipe Sizing

### 8.4.3.3 Network Systems is amended as follows:

- (7) The system shall be supplied by Rio Verde Utilities water supply only.
- (10) Piping connected to the system that supplies only plumbing fixtures complies with local plumbing and health authority requirements and is required to be copper pipe or listed pipe.
- (11) In common water supply connections 5 gpm shall be added to the sprinkler system demand to determine the size of common piping.
- (12) All plumbing appliances & fixtures shall be added for water use at the point of connection (using the manufacturers recommended gpm listing) when sizing the system (i.e. lawn sprinkler demand, dishwasher, bathroom faucets, washing machines, etc.)
- (13) All network system piping (with or without apparent water treatment and filtration equipment) shall require a listed automatic flow sensing by-pass valve be installed in the supply piping that directs all water directly to the system
- (14) Water supply for these systems will be from adequate city supply only.
- (15) Piping runs shall be installed per manufacturer's color coding for ease of inspection.

### 8.4.10 is added as follows:

Include pipe, fittings, and devices such as valves, meters, flow switches in pipes 2" or less in size, and strainers. Calculate elevation changes that affect the sprinkler discharge.

### Section 8-6 is revised in its entirety as follows:

#### 8-6 Location of Sprinklers.

8-6.1 Sprinklers shall be installed in all areas including, but not limited to, garages, attached carports, bathrooms, entrance foyers, elevators, water heater closets, utility and mechanical closets, washer-dryer closets and all accessible areas under stairs and landings.

Exception No. 1: Sprinklers may be omitted from small clothes closets, pantries, dumbwaiters, laundry chutes, and storage rooms which do not contain electrical or mechanical equipment and where the least dimension does not exceed 3 feet and the area does not exceed 24 square feet and the walls and ceiling are surfaced with noncombustible or limited combustible materials as defined by NFPA 220, Standard on Types of Building Construction.

Exception No. 2: Sprinklers may be omitted from open attached porches, patios attached to the front of the dwelling, and “drive-thru” style Porte-cocheres.

Exception No. 3: Sprinklers may be omitted from attics, crawl spaces and other concealed spaces that are not used or intended for living purposes or storage.

**See “Sprinkler Omissions” in General Section**

#### **IV. CHAPTER 1 GENERAL INFORMATION MODIFIED 13R**

II. MODIFIED 13R IN R-1& R-2 STRUCTURES (i.e. multi-family two story or less buildings with 15 or less units and multi-family three story or more with 16 or more units.)

**An R-1 Residential occupancy is where the occupants are primarily transient in nature including: boarding houses (transient) hotels (transient) and motels (transient) An R-2 Residential Occupancy contains sleeping units or more than two dwelling units where the occupants are primarily permanent in nature, including: apartment houses, boarding houses (non-transient), convents, dormitories, fraternities, sororities, hotels (non-transient), monasteries, motels (non-transient), and vacation time-share properties.**

This standard shall be used in conjunction with the **2003 International Fire Code**, resolution 2005-3 and the most recent edition of NFPA 13 & NFPA 13R at the time of adoption. The following are exceptions and revisions to the most recent edition (the edition in effect at time of resolution 2005-3 adoption) of the NFPA 13-R standard.

This manual is for the design and installation of Modified 13-R sprinkler systems for R-1 & R-2 structures.

**Section 5.2 Piping** *is amended as follows:*

**5.2.2.2** Special Requirements for Plastic Pipe Systems. CPVC shall be joined to other components by solvent plus medium bond cement in accordance with the manufacturer's instructions. No system will be approved by the fire district that has used solvent or cement that is not in accordance with manufacturers recommendations. CPVC installed systems shall meet manufacturers recommendations for cure time

between installation of last component and the start of the test.

When installing plastic systems, the female threaded coupling at the end of a drop used for the purpose of installing individual sprinkler heads must have brass, metal, or plastic inserts.

NOTE: See manufacturer's listing for CPVC piping.

**Where solvent cement is used as the pipe and fittings bonding agent, sprinklers shall not be installed in the fittings prior to the fittings being cemented in place. The head adaptor/drop nipple assembly shall be pre-fabricated prior to installation to ensure the sprinkler orifice remains free of obstruction.**

### **5.2.2.3 Special Requirements for Copper and Steel Pipe.**

When copper pipe is used an anti-hammer device shall be provided. (Not required on partial installations of copper pipe or combination steel & copper installations.)

Schedule 10 steel pipe may be joined with mechanical groove couplings approved for service with grooves rolled on the pipe by an approved rolling machine.

Dissimilar materials see Appendix A

## **CHAPTER 6 WORKING PLANS DESIGN, INSTALLATION, ACCEPTANCE TESTS, AND MAINTENANCE MODIFIED 13R**

**Section 6.1 is amended as follows:**

**6.1.8** Two sets of working plans, one set of hydraulic calculations, along with pertinent manufacturer's listing sheets for sprinkler heads & backflow preventer shall be submitted, approved and available on the job site before any equipment is installed or remodeled. An approved set of plans shall be at the structure at the time of scheduled inspections and certificate of occupancy for that structure. Deviations from approved plans will require approval of the fire chief.

**6.1.9 Include pipe, fittings, and devices such as valves, meters, flow switches in pipes 2" or less in size, and strainers and calculate elevation changes that affect the sprinkler discharge.**

### **6.1.10 Backflow Prevention**

All fire sprinkler risers shall incorporate a UL listed vertical backflow preventer (double check backflow prevention assembly), to be used as a main control valve and as a system check valve. See Appendix D & E of this document for more clarification.

All backflow preventers installed on firelines shall be installed on the system riser.

System riser vertical backflow preventers shall be UL listed. **Reduced pressure backflow preventers shall only be used as approved by the chief.**

EXCEPTION #1: When the fireline loop is not in a P.U.E. (Public Utility Easement), the backflow preventer shall be installed in the line above ground as it enters the private property.

### **6.3 Acceptance Tests**

#### **6.3.2 Hydrostatic pressure tests *is amended as follows:***

Pressure Test is required upon completion of installation and prior to final framing approval, all Modified 13-R sprinkler systems shall be tested and inspected in the following manner.

#### **ROUGH-IN INSPECTION:**

1. All tests shall be witnessed by the Rio Verde Fire District.
2. All components of the system shall be in place, secured and connected to water supply at the time of test.
3. The system shall be tested using a cold water test of 175 psi for 24 hours. System must show adequate pressure per approved plans. No visible leakage or pressure reduction is permitted.
4. Systems tested with sprinkler heads installed at time of test may have up to 10% of the heads removed for orifice obstruction inspection. (Not required if plugs are used) If solvent glue or other foreign objects are found within the sprinkler head at time of inspection, then the system shall be tested using plugs in lieu of sprinkler heads. The sprinkler contractor will then be required to install all sprinkler systems using plugs in lieu of sprinkler heads for a period of one year from that date for test purposes.
5. All fire penetrations should be filled with approved material and nail plates shall in place at the time of the pressure test. Where metal studs are used, piping shall be protected with either a sleeve or grommet.
6. All sprinkler systems will be subject to site inspection.
7. An approved set of sprinkler plans shall be on the job site at time of all inspections and acceptance tests.

**6.3.3** *is added as follows:*

Final Acceptance Test. Upon final completion of installation an operational test and inspection shall be performed as follows:

**FINAL INSPECTION:**

1. At final inspection all sprinkler system components shall be in place, and the system shall be flowed with activation of the bell.
2. All risers shall have a calculation sticker ( see Appendix F) in the riser compartment and appropriate spare sprinkler heads shall be located in a spare head cabinet with sprinkler head wrench at an approved location by fire inspection personnel.
3. Fire Department Inspection Form from rough-in inspection must be on the job site at time of test.
4. Activation of alarm notification devices by flow test and tamper switch from a trimmed electrical receptacle box.(i.e. digital communicator, AV's, bell etc.)
5. Verify manufacturers head tolerance with escutcheon in place and check for paint, obstructions, plaster, etc.
6. Labels for inspectors test, auxiliary control valves, etc. shall be in place.
7. Dwelling unit identification and/or building diagram shall be in place at each riser.

**6.5 Water Supply** *is amended as follows:*

**6.5.6** is deleted in its entirety

**6.5.7** For multi-family buildings, **3 units or more shall require** a separate fireline sized per the hydraulic calculations. A separate control valve and flow switch is required per floor. **The monitoring requirements will be based upon the total number of sprinklers in the building.**

Building number identification shall be provided at the riser location.

**Sections 6.6.1.1, 6.6.3.1 and 6.6** *are amended in their entirety as follows:*

## 6.6.1 Valves

General. Each sprinkler system will consist of a control valve, a riser assembly, a local alarm, an inspectors test valve and an F.D.C.

**When there are three units or more, the vertical supply riser shall consist of a listed backflow preventer, control valve, and flow switch controlling the total number of sprinkler heads within the building.**

### 6.6.3.2 *is amended as follows:*

Inspector's Test Valve (a) Each sprinkler system shall have an inspectors test valve and drain connected at the highest most remote possible point in the system for one & two floor occupancies. Piping to the test valve will be the same size as piping to the most remote sprinkler head. For multi-floor occupancies, (3 floors or more) the inspectors test connection shall be made at the individual floor remote area and connected into a common drain (located remotely) to allow separate testing of each floor.

(b) The test valve shall have an orifice the same size as the remote sprinkler head and shall be accessible to the fire department in such a place where it will not sustain damage and where water can be flowed without damage to the structure or contents.

Riser Assembly. The aboveground horizontal or vertical pipe between the water supply & the crossmains or feedmains which contain a control valve, a rubber faced check valve, pressure gauge, a main drain with pressure relief valve, and a supervised electric flow switch.

(a) The main drain shall be 1" or larger located above the check valve and flow switch and shall have a non-adjustable type pressure relief "pop off valve" branched off of the main drain that will activate at pressures no lower than 125 psi and no higher than 175 psi.

(c) The water flow alarm switch shall receive power from house circuitry and will be connected into the electric alarm for on-site device activation reporting. **The water flow switch friction loss shall be added to all calculations.**

(d) The riser shall be constructed within a cabinet or other secured location as approved by the authority having jurisdiction, with an access panel or door suitable for access to all riser components. All riser assemblies shall be braced and secured. Plastic systems shall be protected from damage up to 7'0" from floor level.

(e) All fire department connections and main system control valves shall be accessible on the street side (access side) of the building.

(f) A pressure gauge shall be installed on the system side of the check valve.



**Section 6.6.4** *is amended in its entirety as follows:*

**6.6.4.1 & 6.6.4.2** *are deleted.*

(a) A fire department connection (FDC) shall be installed in an accessible location approved by the fire department on the access side (street side) of the structure.

(b) The FDC shall be located directly beneath the alarm bell.

(c) The FDC shall not be smaller than the riser size and in no case smaller than a 1-1/2 inch single connection.

(d) Threads shall be male NST.

**Section 6.6.7 "Sprinklers"** *is amended as follows:*

**6.6.7.1.3. Listed quick response residential sprinklers shall be required in dwelling units. Commercial QR or residential sprinklers are required in corridors, under stairs, and all paths of egress.**

Sprinkler Pipe thread connections for sprinklers shall be a minimum of 1/2 inch National Pipe Thread. "K" factor and orifice size shall be per manufacturers recommendations and UL listing. The use of a **listed sloped ceiling** sprinkler head shall be required in sloped ceilings with a rise of more than 2" per foot (min) per manufacturers recommendations.

**6.6.7.1.4. Temperature Ratings** *amended as follows:*

**6.6.7.1.5.1.** Ordinary temperature rated residential sprinklers (155° F.) shall be installed. **Intermediate temperature rated residential sprinklers (175° F) shall be installed in mechanical rooms, garages and laundry rooms.**

**6.6.8** *is revised in its entirety as follows:*

**Alarms.** A 110 volt a.c. 6" minimum size electric bell shall be supplied by house current and shall not be a dedicated circuit nor a GFI. The bell shall be mounted on the structures exterior and face the street directly above the F.D.C. The bell must be a height to view easily from the street, but no higher than the plane made by the bottom of the eaves. The bell shall remain red in color. The alarm signal shall be provided by a UL listed local waterflow switch.

- **< 100 sprinkler heads**

**Tampered control valve and water flow switch shall ring the bell.**

- **> 100 sprinkler heads**

**Tampered control valve and water flow switch shall ring the bell and be monitored by an approved supervising station.**

## **6.7 System Design**

Calculations shall maintain a 10% safety margin from the field water pressure test. The pressure used for hydraulic calculations shall not exceed 72 psi.

**An approved fire hydrant flow test is required.  
(see appendix K)**

### **6.7.1.1.3 System Design** *is added as follows:*

When there are more than three units per building, follow NFPA 13R requirements or as amended in this document. Hydraulic design for more than three units shall follow NFPA 13R for compartmentalized design area and a 900 square foot design area in the attic. The water supply for more than three units shall be supplied from a separate fireline to be sized per the hydraulic calculations and installed per NFPA 13. All R-1 multi-level structures using a separate water supply are required to have a flow switch and a tampered control valve per floor. All multi-family detached or attached garages will require a two head hydraulic calculation.

**Section 6.8** *is revised in its entirety as follows:*

## **6.8 "Location of Sprinklers".**

Attic protection is required in all R-1 & R-2 occupancies. An automatic sprinkler system in accordance with NFPA 13R and this standard shall be installed throughout every apartment house and every hotel. Convening corridors and all other occupied areas of the building shall require commercial quick response or residential sprinkler heads. Quick response commercial sprinkler heads shall be used to protect the attic with a min. 900 square foot hydraulically calculated area.

There shall be no sprinkler deletions in bathrooms, walk-in closets, mechanical and electrical equipment rooms, foyers, garages, accessible areas under interior stairs or landings, exterior balconies, covered patios, landings or attics.

Exception No. 1: Sprinklers may be omitted from small clothes closets where the least dimension does not exceed 3 feet and the area does not exceed 24 square feet and the walls and ceiling are surfaced with noncombustible or limited combustible materials as defined in NFPA 220, Standard on Types of Building

Constructions. Excluding any accessible area under stairs and landings.

Exception No. 2: Sprinklers may be omitted from crawl spaces and other concealed spaces that are not used or intended for living purposes or storage.

Exception No. 3: Sprinklers may be omitted from non-combustible patios, balconies, and exterior landings less than 48”.

## V. Commercial Systems

## NFPA 13

This standard shall be used in conjunction with the most recent edition of the NFPA 13, including appendices at time of adoption, the *2003 International Fire Code*, and Standards, and the adopting Resolution 2005-3.

The following are exceptions and modifications to the most recent edition of NFPA 13, at time of adoption.

Section 1-1 “**Scope**” is amended by adding subsection (a) as follows:

1-1(a) Hazard classification and design criteria shall be in accordance with codes and standards as listed in **5.1**

**Section 5.1 “Classification of Occupancies”** is amended by adding **5.4.3** (a, b, c & d) as follows:

5.4.3 (a) Hazard classifications and design criteria shall be in accordance with the *2003 International Building Code*, the *2003 International Fire Code* and resolution 2005-3.

(b) When the *2003 International Building Code* and/or the *2003 International Fire Code* have sprinkler system design criteria, they shall take precedence.

(c) When other NFPA standards have developed sprinkler system design criteria, not already specified in the *2003 International Building Code*, the *2003 International Fire Code*, Resolution 2005-3 or Fire District Interpretations & Standards, the NFPA Standards shall be used.

(d) Occupancies classified as R-3/R-4 by the building department are covered in 13D and 13R of these interpretations.

## 6.2 Sprinklers

6.2.1 General *is amended by the following:*

**In existing sprinkler systems, any tenant improvement work that involves removing & relocating the existing sprinkler head location from its original fitting will require a new sprinkler head to be installed.**

**If the existing sprinkler heads are the “glass bulb heads” involved in the voluntary replacement program, it is the responsibility of the installing contractor to inform the owner of this information. Any work permitted shall have the affected sprinkler heads replaced.**

### 6-2.4.2 Sprinklers

6.2.4.3 *is added as follows:*

Sprinkler head coverage for glass partitions in one hour rated corridors

All glass partitions in one hour rated corridors shall be protected by a **listed** quick response sprinkler water curtain installed on the fuel side of the partition **located at** the glass. **Install per manufacturers requirements.**

Section 6.9.6 *is added as follows:*

An alarm device shall include a 10 inch size listed electric alarm bell located street side or driveway.

## **CHAPTER 8 INSTALLATION REQUIREMENTS**

8.1 .1 (4) *is deleted.*

Section 8.2 "Systems" *is amended by adding subsections 8.2.4 and 8.2.5 as follows:*

High piled storage. Commodity, storage arrangement and storage height shall be limited to and maintained within the perimeters of the sprinkler system design capabilities in accordance with applicable NFPA standards. The owner will provide all information regarding storage to the fire department and the sprinkler subcontractor.

The sprinkler system shall be designed to reflect the proper commodity classification and be sized according to full height storage capabilities of the building.

8.3.3.2 *is amended as follows:*

**Occupancies requiring intermediate or ordinary temperature sprinkler heads shall be quick response.**

**Existing standard response sprinkler heads within the tenant space shall be changed out to quick response when work has been contracted to add and/or relocate 50% or more of the sprinkler heads.**

**Modifications exposing existing intermediate temperature sprinkler heads to air conditioned space shall be changed out to quick response ordinary temperature sprinkler heads.**

8.3.3.3 *is deleted in its entirety*

8.14.7 & 8.14.7.2 Exterior Roofs and Canopies *is amended by adding:*

- (a) **All gated & limited access buildings will require sprinklers in all outside canopies.**
- (b) **All mercantile occupancies having an attached canopy exceeding 4' in width shall be sprinklered.**
- (c) **Point-of-egress sprinklers shall be installed under all exterior roofs or canopies exceeding 4'-0" in width if more than 30' in length. For those walkways that do not exit directly away from the building, fire sprinklers shall be provided for the entire egress path.**
- (d) **Fabric type shade canopies that bear a flame spread rating of Class A (0-25) are not required to be sprinklered.**

8.14.7.3. *Deleted in its entirety.*

8.14.8.1.1 *is deleted in its entirety.*

**There shall be no sprinkler deletions in bathrooms.**

**8.15 Piping Installation**

**8.15.1.1.1.1** shall be amended by adding the following:

A sprinkler system that serves two or more levels shall incorporate tampered sectional floor control valves and flow switches per floor. A mezzanine that covers more than 1/3 of the building footprint shall require separate control valves.

**8.15.1.1.3.5** shall be deleted in its entirety.

**8.15.1.1.8** is amended to add the following:

Fire Riser Assembly Valves in a structure when in a room or closet, shall be labeled "Riser Room" with minimum of 3" height letters in contrasting color.

**8.15.3.1.4** is added as follows:

**Protection of piping against freezing.** All outdoor piping exposed to climatic conditions of the desert shall have exposure protection for piping.

**8.16.4.6 Backflow Devices** is amended by adding the following:

#### **8.16.4.6.3 Backflow Prevention**

All fire sprinkler risers shall incorporate a UL & FM listed vertical backflow preventer (double check backflow preventer assembly) to be used as a main control valve and as a system check valve. **The use of butterfly valves as part of the assembly shall be listed for such use.** See Appendix D & E of these interpretations & applications for more clarification.

All backflow preventers installed on firelines shall be installed on the system riser on all projects. See exception #1 & #2

Exception #1 Firelines supplying multiple buildings shall have (1) one backflow preventer installed in the line above ground exterior of the building.

Exception #2 When supplying multiple risers, interior of the building, the backflow preventer may be installed horizontally or vertically.

**8.16.5.1** shall be deleted in its entirety.

#### **8.16.5.2 Hose Connections for Fire Department Use.**

Add 2 1/2" hose valves if floor area exceeds 10,000 square feet per floor level and/or if fire department access is limited to less than 360 degrees. **Size the FHV by hydraulically calculating 250 GPM, using 150 psi Fire Dept pump-in from the street.**

**In multi-level buildings, hydraulically calculate 250 gpm from the highest most**

**remote FHV (stairway) and 250 gpm consecutively from the next highest most remote FHV (stairway) for a total of 500 gpm per building, using 150 psi Fire Dept pump-in from the street.**

Single story structures are not required to have hose connections, except in those interior portions of the building that exceed 150 feet of travel from an emergency access road

All 2 ½" Fire Hose Valves (NSHT) shall be located within the building for all hose to reach 100' with 30' of water throw.

**8.16.1** *is amended in its entirety as follows:*

Listed local waterflow alarms shall be provided on all sprinkler systems.

**8.16.2.2 "Fire Department Connections"** *is amended as follows:*

A fire department connection shall be provided on all systems as described in this section and in accordance with SRC.

A remote FDC is a fire department connection fed from the interior fire sprinkler riser.

Systems may have a wall mounted FDC only on Light and Ordinary Hazard Group I systems, when there are no structural openings or combustible overhangs within 15 feet horizontally or vertically from the inlet connection. In a mixed occupancy, ( i.e. Light Hazard & Ordinary Group II ) the wall mounted FDC is permitted on the Light Hazard occupancy.

An FDC that is located on the building shall be 15'-0" clear of openings, combustible overhangs or obstructions (i.e. parking, walls, landscaping). A remote FDC shall be required when a surface mounted FDC can not meet the requirements for 15' clear of openings.

An FDC shall be located within 350' of a fire hydrant, except H occupancies.

An FDC for an H occupancy shall be located within 150' of a fire hydrant.

All lines connecting the fire department inlet connection shall have a check valve at the fire department inlet to maintain a wet FDC line.

The remote fire department inlet connection shall be located from 4'0" to 8'0' back from the curb or sidewalk.

**8.16.2.3. (4) "Size"** *is amended by:*

In no case may the inlet connection be less than a double 2 1/2" inch connection.

**8.16.2.4.6** *is added as follows:*

**8.16.2.4.6** Each system on a multiple feed fireline shall have an individual FDC connection for each building.

#### **8.16.4.2 "Wet Pipe Systems"**

**8.16.4.2.1** *is amended as follows:*

##### **Inspector's Test Valve**

- (a) Each sprinkler system shall have an inspectors test valve and drain connected a the highest most remote possible point in the system for one & two floor occupancies. Piping to the test valve will be the same size as piping to the most remote sprinkler head. For multi-floor occupancies, (3 floors or more) the inspectors test connection shall be made at the individual floor remote area and connected into a common drain (located remotely) to allow separate testing of each floor.
- (b) The test valve orifice size shall match the smallest sprinkler head in the system and shall be accessible to the Fire Department in such a place where it will not sustain damage and where water can be flowed without damage to the structure or contents.

**9.3 Protection of piping against earthquakes** *is entirely amended as follows:*

Because the Rio Verde Fire District is not in an earthquake zone (per the *International Building Code*) no earthquake bracing will be required.

Four way bracing is required at the top of all risers is adequate for Fire Dept. operational pumping of the Fire Dept connection.

Directional Bracing is required on systems with Fire Pumps. All bulk mains more than 100 feet in length will require directional bracing at 40' spans. The bracing shall be a 45° angle sway brace. No seismic calculations are required.

## **CHAPTER 11      DESIGN APPROACHES      NFPA 13**

**11.2.3.2.3** *is deleted in its entirety.*

#### **11.2.3.3.5 Room Design Method**

**This method shall only be used with pre-approval from the authority having jurisdiction.**



### **11.2.3.10 Special Design Approaches**

**11.2.3.10.1** Protection systems that are designed and developed based on full scale tests performed at an approved test facility shall be considered an acceptable alternative to the protection criteria set forth in this section.

#### **11.2.3.10.2 Design criteria for Shell Buildings**

##### **Shell Office Buildings**

- Space at 130 – 225 sq ft maximum - depending on the construction
- No extended coverage heads allowed
- 1" bushed outlets are required
- 29.6 gpm min from each outlet
- Quick response sprinkler heads are required
- Electronic approved shell building sprinkler plans & calcs must be on file with the Fire Prevention Office to obtain rough-in inspection

##### **Shell Mercantile Buildings**

- Space at 130 sq ft maximum
- No extended coverage heads allowed
- 1" bushed outlets are required
- Hydraulic calculations required at Tenant Improvement
- Quick response sprinkler heads are required
- Electronic approved shell building sprinkler plans & calcs must be on file with the Fire Prevention Office to obtain rough-in inspection

##### **Shell Warehouse**

- Unspecified warehouses with a clear height storage capability with over 12' shall meet a density requirement of .45/3000 sq ft

All other shell buildings shall be spaced per NFPA 13 requirements, minimum 1" bushed outlets (for obvious tenant improvement) and hydraulically calculated per NFPA 13 requirements.

#### **11.2.3.10.3 Design Criteria for Tenant Improvement Areas**

When tenant improvement sprinkler heads are installed in buildings, the fire department may require hydraulic calculations to prove the area demonstrates proper coverage. The calculations shall be proven back to the pressure stated on the fire sprinkler riser.

#### **11.2.3.10.4 Design Criteria for Paint Spray Booths**

All paint spray booths shall be calculated to a .40 density requirement for the entire area. Each booth shall have an indicating gate valve with tamper switch and separate electric bell.

#### **11.2.3.10.5 Design Criteria for H occupancies**

H-4 occupancies Extra Hazard I .30 / 2500 square feet

H-7 occupancies Extra Hazard II .40 / 2500 square feet

#### **11.2.3.10.6 Design Criteria for shell warehouse buildings**

Unspecified warehouses with a clear height storage capability with over 12 feet shall meet a density requirement of .45/3000 square feet.

#### **11.2.3.10.7 Design Criteria for limited use Sales Trailers:**

Business occupancies (light hazard) QR commercial sprinkler heads fed off the domestic supply with a two head flow calculation.

### **CHAPTER 14 PLANS & CALCULATIONS**

**14.1.4.3** is amended by adding (45), (46), (47), (48), (49), and (50), as follows:

- (45)** Site plan shall include all applicable county notes including the design review number .
- (46)** One current County approved civil fire line plan shall be submitted for reference.
- (47)** All systems shall be reviewed and signed by a minimum level III NICET Certified Engineering Technician (CET) Automatic Sprinkler System
- (48)** Phone number of contractor and/or designer needed on plans with instructions whom to call to pick up plans.
- (49)** Calculations shall maintain a 10% safety margin from the field water pressure test. The pressure used for hydraulic calculations shall not exceed 72 psi.
- (50)** The permitted Certified Fire Hydrant Flow test paperwork is required at time of submittal. (See Appendix K)

**14.1.4** *is amended as follows:*

The working plan submittal shall include manufacturers catalog cut sheets showing all design criteria for the all types of sprinkler heads used on the plan, Backflow Preventer Catalog cut shall show model and friction loss chart. All hanger details and deflector position details shall be located on the plan, along with pertinent structural framing information for adequate plan review by the authority having jurisdiction.

**14.4.4.4.2** *Delete in its entirety.*

**14.4.4.4.3** *Deleted in its entirety.*

**14.4.4.4.4** *Deleted in its entirety.*

**14.5** *is amended as follows:*

The pipe schedule method shall not be permitted for use in any occupancy for new sprinkler systems, existing systems or extensions to existing systems.

**CHAPTER 15            WATER SUPPLIES            NFPA 13**

**15.1.3.3** *is added as follows:*

All fireline piping shall be listed for fire protection service and installed per NFPA 24, except as amended by the following:

Thrust blocks shall be mandatory on firelines at any vertical change in elevation. Restraining joints shall be required at all other changes in direction. Thrust blocks may be used in conjunction with restraining joints.

All firelines entering a building must enter the building within 36 inches of the inside face of the interior wall. The bottom of the pipe flange shall terminate a minimum of 6" above the finished floor. All firelines entering the building through the floor slab shall be sleeved or set for adequate clearance. ( 2" min & 3" max amount of clearance around pipe as it enters the building)

There will be no underground pipe fittings allowed under the building footer.

**ROUGH-IN INSPECTION INCLUDES:**

1. All underground piping shall be hydrostatically tested @ 200 psi in accordance with NFPA 24 requirements for two hours.
2. All underground fittings shall be visible at time of rough-in.

3. "Center loading" of piping is acceptable to prevent pipe movement during hydrostatic test.
4. The ability to provide the clearance around the fireline piping ( i.e. sonotube in place and plumb, etc.) as it enters the building will be in place at time of rough-in inspection.
5. The flushing of the underground piping shall be done at the same time as the visual and pressure inspection.

#### **On-Site Piping Requirements:**

Pipe used in fireline service on-site shall be ductile iron pipe (class 350) or PVC C-900 (class 200). All piping under driveways shall be ductile iron pipe (class 350) All ferrous metal pipe used for underground fire lines shall be wrapped per M.A.G. Standard Spec 610 & A.W.W.A "C" – 150. For firelines less than 4" in size, use Copper pipe (type K) or PVC Schedule 40 ASTM 2875 pipe sized per hydraulic calculations

#### **Off-site Piping Requirements:**

Pipe used in fireline service off-site shall be ductile iron pipe (class 350).

### **CHAPTER 16      SYSTEM ACCEPTANCE      NFPA 13**

**16.2.1** *is amended as follows:*

**16.2.1.4.** When an addition or modification is made to an existing system totaling 15 heads or more, the new installation shall be tested at 150 lbs or 50 lbs over static for 2 hours.

**16. 2.1.6** *Delete in its entirety*

**16.4 (3)** *is added as follows:*

#### **(3) As-Built Cabinet**

Provide an as-built metal cabinet for approved drawings & hydraulic calculations. Min size of cabinet shall hold a set of 36" x 24" rolled plans.

## APPENDIX

### **2003 INTERNATIONAL FIRE CODE** and Resolution 2005-3 policy Interpretations.

**The purpose** for these individual interpretations within this appendix is an attempt, by the Fire District, to let the users of these construction Interpretations & Applications have a clear idea of what is expected by the Rio Verde Fire District .

## APPENDIX A

### FIRE SPRINKLER SYSTEM SPECIFICATION

REFERENCES: **2003 International Fire Code**

#### **2003 International Plumbing Code**

Dissimilar metallic parts which promote galvanic action shall not be joined together

All materials used in the water supply system, except valves and similar devices, shall be of like material, except where otherwise approved by the administrative authority

## APPENDIX B

### QUALIFICATIONS FOR INSTALLATION OF SYSTEMS

#### **RESIDENTIAL SYSTEMS: (single family detached homes & multi-family units)**

1. Contractors are required to possess a C-16, K-16 or a C-37 State of Arizona Contractors license to install residential sprinkler systems.
2. All installers are required to attend a class in the installation methods of CPVC piping. (per manufacturers recommendations) They shall have a certificate on their person at all times, showing satisfactory completion of such class, to be shown to any fire prevention personnel upon request.
3. A current Certificate of Insurance for one million dollars minimum for the installation of Fire Sprinkler Systems is required to be filed with the fire department.

## **COMMERCIAL SYSTEMS:**

1. Contractors are required to possess an L-16 or K-16 State of Arizona Contractors license to install commercial fire sprinkler systems.
2. A current Certificate of Insurance for one million dollars for the installation of wet pipe automatic sprinkler systems is required to be on file with the fire department.

NOTE: For more information contact:

Registrar of Contractors  
State of Arizona  
1818 W. Adams  
Phoenix, Az.  
(602) 255-1525

## **WORKING DRAWINGS FOR A MODIFIED 13D SYSTEM SHALL INCLUDE:**

1. Three sets of working drawings, hydraulic calculations, meter verification sheet if applicable, and manufacturers sprinkler head catalog cut sheets.
2. Piping plan showing location of sprinkler heads, changes in ceiling elevations (including coffered ceilings), ceiling legend placard (stating sloped or flat ceilings), room identification, pipe size reflecting hydraulic calculations, heat producing devices as clarified in NFPA 13D, soffits, beams, etc. A hydraulic calculation placard stating system demand at the bottom of the riser (for each area calculated) shall be on the plan and that placard shall match the placard physically attached to the riser door of the system.
3. A diagram depicting the riser configuration and all components for the riser
4. A sprinkler head legend showing all heads being installed.
5. Current flow test information.
6. **NICET minimum level III** Certified Engineering Technician (Automatic Sprinkler System Layout certification signature, re-certification issue date if applicable, NICET #, and date of signature.

**WORKING DRAWINGS FOR A COMMERCIAL NFPA 13 ,13R SYSTEM SHALL INCLUDE:**

1. Three sets of working drawings, one set of hydraulic calculations, one 3 ½" IBM compatible floppy disk of working drawings, manufacturer's catalog cut sheets for all heads used, manufacturer's catalog cut of backflow preventer showing friction loss.
2. Hydraulic Calculation placards for each area calculated.
3. NICET minimum level III Certified Engineering Technician (Automatic Sprinkler System Layout) certification signature, re-certification issue date, NICET #, and date of signature.
4. Site plan shall include all applicable County notes including the design review number .
5. One current County approved civil fire line plan shall be submitted for reference.
6. Phone number of contractor and/or designer needed on plans with instructions whom to call to pick up plans.
7. Calculations shall maintain a 10% safety margin from the field water pressure test. The pressure used for hydraulic calculations shall not exceed 72 psi.
8. Approved Fire Hydrant Flow test paperwork is required at time of submittal.