

SEE 3.2

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ENGINEERING

## FIRE SPRINKLER SYSTEMS

### \*\*\* INTRODUCTION \*\*\*

#### Purpose

This consensus document is to help assure automatic fire sprinkler systems and standpipes are reliable, maintainable, and have long service life. It was developed with the assistance of sprinkler system designers, manufacturers, and contractors, the Professional Engineers of North Carolina (PENC), the American Council of Engineering Companies (ACEC-NC), the American Fire Sprinkler Association (AFSA), the Society of Fire Protection Engineers (SFPE), and key operations personnel at State agencies and universities. Public hearings are used to seek input from stakeholders for maintaining cost-effective fire sprinkler system criteria.

#### Applicability

This document is offered for **OPTIONAL** use by State agencies and others, in the public interest. Once the owner or the design professional elects to use it, the relevant criteria it contains are invoked by being referenced or incorporated into the specification written by the engineer for that project, and are no longer optional. Although originally developed for use on State of NC construction projects, previous editions have been very widely used by designers in private sector work, and have been adapted by jurisdictions outside NC. **This document alone does not require a fire sprinkler system in any building. It just provides a set of criteria that may optionally be used, when a system is to be provided. Also, it does not constitute a complete design specification and must be supplemented with project-specific requirements written by the design professional. See pages 14, 15.**

#### Revisions and Circulation

The North Carolina Department of Insurance (NCDol), Office of State Fire Marshal (OSFM), Engineering Division -- State Property Plan Review Section, issues this consensus-based document for optional use by designers in writing their specification. Electronic copies are available via e-mail. We always appreciate your comments, questions, or suggestions for improvement in its content. Call us at 919-733-3901 x242 or e-mail: [jroberts@ncdoi.net](mailto:jroberts@ncdoi.net)

This document is revised periodically after obtaining broad input through public hearings and other methods of outreach to the interest groups listed above, and to others. Refer to the Revision Record on page 13 for information on the significant changes in this issue.

NOTE: Fine print paragraphs introduced by "NOTE:" (like this one) contain helpful explanatory material pertaining to a preceding paragraph. They often provide information to help users of this document to understand its technical content or underlying rationale. Some of them reference important requirements of other applicable standards. All of these fine print paragraphs are included for information only.

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**2.7 Fire/Booster Pump, Water Supply, Throttling, and Metering**

The water supply to the sprinkler system must provide at least 150% of pump rated capacity at a positive pressure and also meet the system demand at 20psi minimum. The water supply test shall have been performed within the most recent 12 months.

NOTE: A water supply of 200% of pump capacity is recommended whenever this can be reasonably achieved.

NOTE: If the water supply will meet system demand with a modest safety factor, and the pump is needed only to have a desired pressure at the top of the standpipe, contact the AHJ for possible alternatives.

Per the NC Administrative Code, Title 15A, Subchapter 18C, an automatic pilot-operated throttling valve must be installed on the output side of the booster pump, to maintain required minimum pressure. Suction side control is not permitted, due to possible cavitation. Where permitted by the AHJ, a low pressure shutoff sensing the suction pressure may be substituted if the water supply provides 200% of pump rated capacity at a minimum pressure of 40psi, and an acceptable means is provided to periodically test the calibration of this device in its installed location.

Where pump location does not permit convenient flow testing from the header and play pipes, provide a permanently installed meter for net pump performance testing without water streams. The meter outlet must discharge to a drain or to the suction tank, if provided, or (where permitted by the AHJ) to the suction side of the pump.

**3.0 MATERIALS AND COMPONENTS**

**3.1 Listing/ Approval**

All sprinkler system materials and components must be listed or approved, and installed in strict conformance to the conditions of their listing / approval.

**3.2 Sprinkler Piping**

**Metal:** Only steel pipe shall be used, with a Corrosion Resistance Ratio (CRR) of one (1) or greater. Schedule 5 pipe is *not* permitted, in any size. Schedule 10 steel pipe and the approximately equal "flow" products, sizes 1.5" and larger, are permitted to be used only with listed roll groove end fittings. All dry pipe, deluge, and preaction system pipe must be galvanized, including any fittings exposed to weather. Listed flexible stainless steel piping systems (e.g. FlexHead, Flex Arm) are also permitted.

**Plastic:** Listed CPVC sprinkler pipe is permitted to be used in occupancies other than Institutional-Restrained, when all of the following criteria are met:

1. Pipe and fittings shall be post-chlorinated polyvinyl chloride, UL Listed and FM Approved for sprinkler system use, and fully compliant with ANSI/UL 1821-1994 and ANSI/UL 1887-1996.
2. Base resin, compound, finished pipe, and fittings shall meet all the ASTM criteria specified for Noveon BlazeMaster2000 CPVC, and must be produced in the USA or Canada by an ISO 9002 Certified facility.

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