16 DEPARTMENT OF PUBLIC SAFETY

219 OFFICE OF STATE FIRE MARSHAL

STATE OF MAINE STANDARD FOR THE DESIGN AND INSTALLATION OF LIFE-SAFETY SPRINKLER SYSTEMS

DESIGN AND INSTALLATION OF LIFE-SAFETY SPRINKLER SYSTEMS

CONTENTS

Preface

Section 1 General Information 3

1-1 Application 3
1-2 Scope 3
1-3 Levels of Protection 3
1-4 Purpose 5
1-5 Definitions 5

Section 2 Installation 7

2-1 Devices and Materials 7
2-2 Acceptance Tests 7

Section 3 Water Supply 9

3-1 General Provisions 9
3-2 Water Supply Sources 9
3-3 Combined Piping Systems 9
3-4 Water Utility 10

Section 4 System Components 10

4-1 Valves and Drains 10
4-2 Pipe and Fittings 11
4-3 Piping Support 11
4-4 Sprinklers 11
4-5 Alarms 12
4-6 Spare Sprinklers 12
4-7 Fire Department Connection 12
4-8 Electrical Wiring 12
4-9 Electrical Supervision/Pump Motor 12

Section 5 System Design 13

5-1 Design Criteria 13
5-2 System Types 14
5-3 Pipe Sizing 14
5-4 Piping Configurations 14
5-5 Location of Sprinklers 14
5-6 Drawings and Calculations 14

Section 6 Maintenance 15

Section 7 Referenced Publications 16

PREFACE

The intent of this design guide is to de fine an alternative sprinkler system installation which offers an enhanced level of life-safety to occupants evacuating a structure during the first minutes of a detected fire. The system design is not primarily intended to adequately protect the structure itself from fire loss or damage. A complete sprinkler system designed and installed in accordance with NFPA #13 may offer superior protection to the structure and contents.

GUIDE FOR THE DESIGN AND INSTALLATION OF LIFE-SAFETY SPRINKLER SYSTEMS

NOTICE: An asterisk following the number or letter designating a subdivision indicates explanatory material on that subdivision (if so included). Information on referenced publications can be found in Section 7.

SECTION 1 GENERAL INFORMATION

1-1 Application

1-1.1 The sprinkler system herein described is an alternative design subject to permission for its use by the office of State Fire Marshal exclusively. The system will ordinarily be permitted in buildings up to four stories in height, which will fall into the following categories: apartment buildings, condominiums, hotels, motels, inns, low-rise office buildings, small boarding homes, existing or new class "C" places of assembly, class "C" mercantile and other similar occupancies. The lack of a water supply of sufficient capacity to support the normally installed NFPA #13 sprinkler system may be the determining factor in obtaining permission to use this alternative design. Approval may also be required in those municipalities who have adopted sprinkler system requirements.

1-1.2 It is advisable to obtain permission for the use of the sprinkler system described herein directly from the State Fire Marshal's Office prior to preparation of plans and hydraulic calculations.

1-2 Scope

This standard deals with the alternative design and installation of automatic sprinkler systems as permitted by the State Fire Marshal,

1-3 Levels of Protection

1-3.1 Various levels of fire safety are available to dwelling occupants to provide life safety and property protection.

This standard recommends, but does not require, sprinklering of all areas in a dwelling; it permits sprinklers to be omitted in certain areas. These areas are the ones shown by NFPA statistics (see following table A-1-3) to be the ones where the incidence of life loss from fires in dwellings is low. Such an approach produces a reasonable degree of fire safety. Greater protection to both life and property may be achieved by sprinklering all areas.

1-3.2 This standard assumes that one or more smoke detectors will be installed in accordance with the appropriate standard for the installation, maintenance and use of fire warning equipment.

Table A-1-3

Casual Factors in One- and Two-Family Dwelling Fires Which Caused One or More Deaths

	Area of Origin	
Living Room	41%	
Bedroom	27%	
Kitchen	15%	Based on 6066 incidents
Storage Area	4%	where area of origin was
Heating Equipment Room	3%	reported
Structural Area	2%	
Other Areas	8%	
Form of Material		
Furniture	27%	
Bedding	18%	
Combustible Liquid or Gas	13%	
Interior Finish	9%	
Structural Member	9%	Based on 5080 incidents
Waste, Rubbish	4%	where form of material
Clothing, on a Person	3%	ignited was reported
Cooking Materials	3%	
Electrical Insulation	2%	
Curtains, Drapery	2%	
Other	10%	
Form of Heat Ignition		
Smoking Materials	36%	
Heat from Fuel - Fire or Powered Object	25%	
Heat from Miscellaneous Open Flame (Including Match)	15%	Based on 5016 incidents where form of heat
Heat from Electrical Equipment Arcing or Overload	14%	ignition was reported
Hot Objects Including Properly Operating Electrical Equipment	7%	
Other	3%	
Total number of incidents reported	10,194	

Source: FIDO Data Base 1973 to 1982. NFPA Fire Analysis Dept.

1-4 Purpose

1-4.1 The purpose of this standard is to provide a sprinkler system that will aid in the detection and control of fires in occupancies where the quantity and/or combustibility of contents is low and fires with relatively low rates of heat release are expected, An operating sprinkler system installed in accordance with this standard is expected to prevent flashover (total involvement) in the room of fire origin, and increase the chances for occupants to escape or to be evacuated,

1-5 Definitions

Approved. Acceptable to the "authority having jurisdiction."

Authority Having Jurisdiction. The State Fire Marshal shall be the authority having jurisdiction.

Backflow Prevention Device. A device that does not allow liquid to flow back to the supply and thus cause contamination.

Check Valve. A valve that allows flow in one direction only.

Control Valve. A valve employed to control (shut off or turn on) a supply of water to a sprinkler system.

NOTE: System control valves should be of the indicating type, such as plug valves, ball valves, butterfly valves, or OS and Y valves.

Density. The quantity of water discharged by automatic sprinklers over a specific area expressed as gallons per minute per square foot (GPM/FT^2).

Design Area. An area expressed in sq. ft. having a number of sprinklers, all flowing at or above the minimum required application rate.

Fire Department Connection. A threaded inlet connection located on the exterior of a building, arranged to enable the Fire Department to pressurize and supply the sprinkler system, bypassing the system control valves and supply main.

Labeled. Equipment or materials which has attached a label, symbol or other identifying mark of an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Listed. Equipment or materials included in a list published by an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or material and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

NOTE: The means used for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. The "authority having jurisdiction" should utilize the system employed by the listing organization to identify a listed product.

Pre-engineered System. A packaged sprinkler system including all components, designed to be installed according to pretested limitations.

Pump. A mechanical device that transfers and/or raises the pressure of a fluid (water).

Residential Sprinkler Head. An automatic sprinkler specifically listed for use in residential occupancies.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

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 listed sprinklers which automatically initiate water discharge over a fire area. This Design Guide requires sprinkler systems to include a control valve and a device for actuating an alarm upon system operation.

Standard. A document containing only mandatory provisions using the word "shall" to include requirements. Explanatory material may be included only in the form of "fine print", italic notes, footnotes, or in appendix.

Supply Pressure. Pressure within the water supply system (i.e., city or private water source),

System Pressure. Pressure within the sprinkler system (i.e., above the check valve or other backflow prevention device).

Water Flow Alarm. An electrical sounding device activated by a water flow detector arranged to sound an alarm audible in all living areas over background noise levels with all intervening doors closed.

Wet System. A system employing automatic sprinklers attached to a piping system filled with water and connected to a water supply so that water discharges immediately from sprinklers opened by fire.

SECTION 2 INSTALLATION

2-1 Devices and Materials

2-1.1 Only listed new residential sprinklers shall be employed in the installation of life-safety sprinkler systems. Standard sprinklers or fast-response sprinklers of intermediate or high temperature rating may be installed in areas of high ambient temperature. Sprinklers shall be listed.

2-1.2 Only listed and approved materials and devices shall be used in sprinkler systems.

Exception: Listing may be waived for tanks, hangers, water flow detection devices and water control valves. All electrical components must be U.L. listed.

2-1.3 Pre-engineered systems shall be installed within the limitations which have been established by the testing laboratories where listed.

2-2 Acceptance Tests

2-2.1 The installer shall perform all required acceptance tests,, complete the Contractor's Material and Test Certificate(s), and forward the certificates to the "authority having jurisdiction", prior to asking for approval of the installation.

2-2.l.l When the "authority having jurisdiction" desires to be present during the conducting of acceptance tests, the installer shall give advance notification of the- time and date the testing will be performed.

2-2.2 Underground mains and lead-in connections to system risers shall be flushed before connection is made to sprinkler piping, in order to remove foreign materials that may have entered the underground piping during the course of the installation. For all systems, the flushing operation shall be continued until water is clear.

2-2.2.1 Underground mains and lead-in connections shall be flushed at the hydraulically calculated water demand rate of the system,

2-2.2.2 To avoid property damage, provision shall be made for the disposal of water issuing from test outlets.

2-2.3 All aboveground piping shall be hydrostatically tested at 200 p.s.i. for two hours, in accordance with N.F.P.A. #13, Standard for the Installation of Sprinkler Systems.

2-2.4 It is suggested, but not required, that all underground supply piping from the water utility shut-off to the sprinkler system connection be hydrostatically tested at 50 p.s.i. above the expected static pressure for two hours, to ensure the reliability of the materials and installation.

CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR ABOVE GROUND PIPING - GENERAL INFORMATION

DELUGE & PREACTION VALVES

OPERATION [ ] PNEUMATIC [ ] ELECTRIC [ ] HYDRAULIC				
PIPING SUPERVISED [ ] YES [ ] NO		DETECTING MEDIA SUPERVISED [ ] YES [ ] NO		
DOES VALVE OPERATE FROM THE MANUAL TRIP AND/OR REMOTE CONTROL STATIONS? [ ] YES [ ] NO				
IS THERE AN ACCESSIBLE FACILITY IN EACH CIRCUIT FOR TESTING? [ ] YES [ ] NO		IF NO, EXPLAIN		
MAKE	MODEL	DOES EACH CIRCUIT OPERATE SUPERVISION LOSS ALARM? [ ] YES [ ] NO	DOES EACH CIRCUIT OPERATE VALVE RELEASE? [ ] YES [ ] NO	MAXIMUM TIME TO OPERATE RELEASE MIN./SEC

TEST DESCRIPTION

HYDROSTATIC: Hydrostatic tests shall be mad at not less than 200 psi (18.6 bars) for two hours or 50 psi (3.4 bars) above static pressure in excess of 150 psi (1.07 bars) for two hours. Differential dry-pipe valve clappers shall be left open during test prevent damage. All aboveground piping leakage shall be stopped.
FLUSHING: Flow the required rate until water clear as indicated by no collection of foreign material burlap bags at outlets such as hydrants and blow-offs. Flush at flows not less than 400 GPM (1514 L/min) for 4-inch pipe, 600 GPM (2271 L/min) for 5-inch pipe, 750 GPM (2833 L/min) for 6-inch pipe, 1000 GPM (3785 L/min) for 8-inch pipe, 1500 GPM (5678 L/min) for 10-inch pipe and 200 GPM (7570 L/min) for 12-inch pipe. When supply cannot produce stipulated flow rate obtain maximum available.
PNEUMATIC: Establish 40 psi (2.7 bars) air pressure and measure drop which shall not exceed 1 % psi (0.1 bars) in 24 hours. Test pressure tanks at normal water level and air pressure and measure air pressure drop which shall not exceed 1% psi (0.1 bars) in 24 hours.

TESTS

ALL PIPING HYDROSTATICALLY TESTED AT _____ PSI FOR _____ HRS. DRY PIPING PNEUMATICALLY TESTED [ ] YES [ ] NO EQUIPMENT OPERATE PROPERLY [ ] YES [ ] NO		IF NO, STATE REASON
DRAIN TEST	READING OF GAGE LOCATED NEAR WATER SUPPLY TEST CONNECTION: _____ PSI	RESIDUAL PRESSURE WITH VALVE IN TEST CONNECTION OPEN WIDE _____PSI
Under ground mains and lead in connection to system risers flushed before connection made to sprinkler piping.: verified by copy of the U FORM NO. 85B [ ] YES [ ] NO Flushed by installer of underground sprinkler piping [ ] YES [ ] NO		Other Explain

BLANK TESTING GASKETS

Number Used	Locations	Number Removed

WELDING

Welded Piping [ ] YES [ ] NO If yes answer questions below, if no skip this section.

DO YOU CERTIFY AS THE SPRINKLER CONTRACTOR THAT WELDING PROCEDURES COMPLY WITH THE REQUIREMENTS OF AT LEAST AWS D10.9, LEVEL AR-3 ? [ ] YES [ ] NO

DO YOU CERTIFY THAT THE WELDING WAS PERFORMED BY WELDERS QUALIFIED IN COMPLIANCE WITH THE REQUIREMENTS OF AT LEAS AWS D10.9, LEVEL AR-3 ? [ ] YES [ ] NO
DO YOU CERTIFY THAT WELDING WAS CARRIED OUT IN COMPLIANCE WITH A DOCUMENTED QUALITY CONTROL PROCEDURE TO INSURE THAT ALL DISCS ARE RETRIEVED, THAT OPENING IN PIPING ARE SMOOTH, THAT SLAG AND OTHER WELDING RESIDUE ARE REMOVED, AND THAT INTERNAL DIAMETERS OF PIPING ARE NOT PENETRATED?
[ ] YES [ ] NO

CUTOUTS (DISCS)

DO YOU CERTIFY THAT YOU HAVE A CONTROL FEATURE TO ENSURE THAT ALL CUTOUTS (DISCS) ARE RETRIEVED?
[ ] YES [ ] NO

HYDRAULIC DATA NAMEPLATE

NAME PLATE PROVIDED? [ ] YES [ ] NO	IF NO, EXPLAIN

REMARKS

DATE LEFT IN SERVICE WITH ALL CONTROL VALVES OPEN:

SIGNATURES

NAME OF SPRINKLER CONTRACTOR:

TEST WITNESSED BY

FOR PROPERTY OWNER (SIGNED)	TITLE	DATE
FOR SPRINKLER CONTRACTOR (SIGNED)	TITLE	DATE

ADDITIONAL EXPLANATION AND NOTE:

SECTION 3 WATER SUPPLY

3-1 General Provisions

3-1.1 Every automatic sprinkler system shall have at least one automatic water supply.

3-2 Water Supply Sources

3-2.1 The following water supply sources are acceptable:

3-2.1.1 A connection to a reliable water-works system.

3-2.1.2 An elevated tank.

3-2.1.3 A pressure tank installed in accordance with NFPA #13, Standard for the Installation of Sprinkler Systems, and NFPA #22, Standard for Water Tanks for Private Fire Protection.

3-2.1.4 A stored water source with an automatically operated pump on a dedicated circuit of proper size and capacity, Pumps shall not cycle on and off during minimum flow situations, i.e., one sprinkler flowing.

3-2.2 All stored water sources shall have an automatic filling mechanism set to regulate the available water supply volume from a minimum low water level equal to 110% of the calculated volume to a minimum high water level of 125% of the calculated volume, or, an audible water level alarm set to give a steady signal when the water level falls below 125% of the calculated volume. Tanks shall be covered and protected against freezing. When stored water is used as the sole source of supply, the minimum calculated volume shall equal the water required to flow 3 sprinklers for 10 minutes (see 5-1,3)

3-3 Combined Piping System

3-3.1 A piping system serving both sprinkler and domestic needs shall be acceptable when:

3-3.1.1 A demand flow of 5 gal/min is included for domestic use. The domestic use shall be added to the sprinkler system in determining the size of common piping and the size of the total water supply requirement. In multiple occupancies, 2.5 GPM for each living unit up to a maximum of 50 GPM shall be added to the calculated system demand.

3-3-1.2 All piping in the system conforms to the piping specifications of this standard.

3-3.1.3 Permitted by the local plumbing or health authority.

3-4 Water Utility

3-4.1 Every Life-Safety Sprinkler System supplied by a water utility shall be provided with the following:

3-4.1.1 A State Department of Human Services approved and local utility accepted backflow prevention device arranged to prevent non-potable water from entering the domestic water supply of the distribution system. Connection for fire protection to city mains is often subject to local regulation concerning metering and backflow prevention requirements. The flow characteristics of the meter and/or backflow prevention device must be included in the hydraulic calculation of the system.

3-4.1.2 An approved pressure reducing valve in those locations where water utility pressure exceeds 120 p.s.i.

3-4.2

3-4.2.1 A service line to support a Life-Safety Sprinkler System shall be installed to the utilities specifications.

3-4.2.2 The local water utility shall comply with the local fire department requirements concerning notification of the disruption of water service to properties protected by Life Safety Sprinkler Systems, The local water utility and local fire department will be notified by the State Fire Marshal's Office of any Life Safety Sprinkler System installed within their jurisdictions

SECTION 4 SYSTEM COMPONENTS

4-1 Valves and Drains

4-1.1 Each system shall have a control valve. Control valve shall be an indicating type, locked, electrically monitored or sealed in the open position.

4-1.2 Each sprinkler system shall have a 1/2" or larger drain and test connection with valve on the system side of the control valve and flow alarm device. The test orifice size shall be equal to the sprinklers installed. Drain shall discharge to the atmosphere or to a suitable interior sanitary drain with air gap, as required by local/state plumbing codes.

4-1.3 A pressure gage shall be installed on the system side of the check valve or backflow prevention device, in an accessible and visible-location.

4-2 Pipe and fittings

4-2.1 Pipe or tube used in sprinkler systems shall be as permitted by NFPA #13. The use of Chlorinated Poly Vinyl Chloride and Polybutylene tube capable of withstanding a working pressure of 175 p.s.i. shall be permitted provided that all such tubes are completely shielded from the occupied space by a minimum thickness of 1/2" gypsum board or equivalent fire-resistive materials as determined by the Fire Marshal.

4-2.2 CPVC listed for exposed systems may be installed with the following restrictions:

4-2.2.1 Listed residential sprinklers shall be used in conjunction with exposed CPVC pipe and fittings.

4-2.2.2 Exposed CPVC piping shall only be installed under flat ceiling construction.

4-2.2.3 Deflectors of sprinklers in systems with exposed CPVC pipe and fittings shall be located in accordance with Section 5-1.5 or special listing limitations, but never more than eight inches below the ceiling.

4-2.3 Whenever- the word pipe is used in this standard, it shall be understood to also mean tube.

4-2.4 Fittings used in sprinkler system shall be as permitted by NFPA #13.

4-2.5 Joints for the connection of copper tube may be soldered when used for wet pipe systems. Solder used shall conform to local plumbing codes.

4-2.6 Fittings for CPVC or Polybutylene tubing shall be compatible with, and capable of withstanding the same working pressure as the tubing being joined.

4-3 Piping Support

4-3.1 Piping shall be supported from structural members. This standard contemplates hanging methods comparable to those used in local plumbing codes.

4-3.2 Piping laid on open joists or rafters shall be secured to prevent lateral movement.

4-4 Sprinklers

4-4.1 Only residential/commercial quick response sprinkler heads tested and listed by a recognized testing agency shall be used.

4-4.2 The sprinklers shall have fusing temperatures not less than 35 degrees F above maximum expected ambient temperature.

4-4.3 Fused, damaged or painted sprinklers shall be replaced with sprinklers having the same performance characteristics as original equipment.

4-5 Alarms

4-5.1 Local water flow alarms shall be provided on all sprinkler systems. (See section 1-5 for definition of water flow alarm.)

4-6 Spare Sprinklers

4-6.1 At least 3 spare sprinklers of each type, temperature rating and orifice size used in the system should be kept on the premises. When fused sprinklers are replaced by the owner, Fire Department, or others, care should be taken to assure that the replacement sprinkler has the same operating characteristics.

4-7 Fire Department Connection

4-7.1 Each system shall include either a single or siamese 2 1/2" Fire Department Connection with threads acceptable to local fire officials. Such connection shall be installed in accordance with NFPA #13 and readily visible and accessible. The pipe connecting to the sprinkler system shall be the same size as the system main riser and control valve.

4-8 Electrical Wiring

4-8.1 All electrical wiring for pump motors, magnetic contactors, switches, circuit breakers, alarms, etc. shall be in accordance with all applicable Local, State and National codes. Pump motor bases shall be at least 6" above the floor. Starting loads and operating loads of pump motors must be considered in determining sizing of electrical feeds, breakers and starting devices.

4-9 Electrical Supervision/Pump, Motor

4-9.1 The pump power circuit shall be monitored.

4-9.2 Methods of monitoring the pump power circuit condition include, but are not limited to, the following:

4-9.2.1 Installation of a power alarm relay connected to the pump power circuit and to a separately controlled power circuit, in such a manner as to activate an audio/visual alarm in the event of interruption of the pump power circuit, which will be promptly noticed.

4-9.2.2 Interconnection of a frequently used light or appliance with the pump power circuit, so that interruption of the pump power circuit will be promptly noticed.

4-9.3 NOTE: In all cases the pump power failure alarm should be wired so that an alarm indicator must remain "ON" until the pump power is restored. A silencing switch which deactivates an audible alarm, but simultaneously activates a visual indicating light until the pump power is restored, is one means of accomplishing this objective.

SECTION 5 SYSTEM DESIGN

5-1 Design Criteria

5-1.1 Design Discharge. The system shall provide a discharge of not less than 13 gal/min per sprinkler to three operating sprinklers in the design area.

5-1.2 Number of Design Sprinklers. The number of design sprinklers shall be 3. If a compartment contains more than 3 sprinklers, only 3 must be calculated and those sprinklers must be adjacent to one another.

5-1.2.1 The design area shall be that compartment or section of the building which is most hydraulically remote from the water supply.

5-1.2.2 The definition of compartment for use in determining the number and location of design sprinklers, is a space which is completely enclosed by walls and a ceiling. The compartment enclosure may have openings to an adjoining space if the openings have a minimum lintel depth of 8" below the ceiling.

5-1.3 Water Demand. The water demand for the system shall be determined through hydraulic calculation of the 3 most hydraulically demanding adjacent sprinklers, in accordance with section 5-1,2.

5-1.4 Sprinkler Coverage, Residential sprinklers shall be spaced so that the maximum area protected by a single sprinkler does not exceed 144 sq. ft.

5-l.4.1 Maximum distance between sprinklers shall not exceed 12 ft. on or between pipe lines and the maximum distance to a wall or partition shall not exceed 6 ft. The minimum distance between sprinklers within a compartment shall be 8 ft.

5-1.4.2 The minimum operating pressure of any sprinkler shall be in accordance with the listing information of the sprinkler and provide the minimum flow rates specified in 5-1.1. Application rates, design areas, areas of coverage, and minimum design pressures other than those specified may be used with special sprinklers which have been listed for such specific installation conditions.

5-1.5 Position of Sprinkler. Sprinklers shall be positioned so that deflectors are within 4 in. of a ceiling.

Exception: Special residential sprinklers shall be installed in accordance with listing limitations.

5-1.5.1 Sprinklers shall be positioned so that the discharge is not obstructed by beams, light fixtures or other obstructions. When tests are performed which show that sprinklers are positioned so that the discharge is not obstructed, sprinklers may be installed in accordance with the test results.

5-2 System Types

5-2.1 Wet-Pipe Systems. A sprinkler system which is filled with water at all times and protected against freezing.

5-2.2 Dry Systems. Not allowed on Life Safety systems.

5-3 Pipe Sizing

5-3.1 Piping shall be sized hydraulically in accordance with the methods described in NFPA #13.

5-3.2 The minimum pipe size shall be 3/4" on all systems using copper, CPVC and polybutylene and shall be 1" for steel.

5-4 Piping Configurations

5-4.1 Piping configurations may be looped, gridded, straight run or combinations thereof.

5-5 Location of Sprinklers

5-5.1 Sprinklers shall be installed in all areas.

Exception No. 1: Sprinklers may be omitted from all closets where the least dimension does not exceed 3 ft. and the area does not exceed 24 sq. ft. and the walls and ceilings are surfaced with non-combustible materials.

Exception No. 2: Sprinklers may be omitted from open attached porches.

Exception No. 3: Sprinklers may be omitted from carports, garages and similar structures.

Exception No, 4: Sprinklers may be omitted from attics and accessible crawl spaces which are not used or intended for living purposes or storage.

Exception No, 5: Sprinklers may be omitted from entrance foyers which are not the only means of egress.

Exception No. 6: Sprinklers may be omitted from walk-in refrigerators, freezers, coolers and similar unheated areas.

5-6 Drawings and Calculations

5-6.1 Scaled and dimensioned drawings showing building and system layout, pipe sizing, ceiling heights and similar construction features shall be signed and submitted along with hydraulic calculations and manufacturers data on sprinklers and plastic piping products to the State Fire Marshal for review and approval prior to installation. Pump performance data and manufacturers' data shall be included in submittal.

5-6.2 Drawings and calculations shall be signed by a person holding at least a Level III certification with the National layout of sprinkler systems, or equivalent competency as evidenced by a nationally recognized organization. Certification or registration numbers of the science shall be included with each submittal. Submittals shall bear the wording:

> Reviewed and Submitted By Date of Review N.I.C.E.T. Certification Number Other Certification Type and Applicable Registration.

5-6.3 Proof of certification or registration shall be submitted to, and kept on file at, the State Fire Marshal's Office, Expiration dates shall be clearly indicated on submitted documents. Drawings and calculations signed by a person whose submitted qualification has expired will be rejected without review.

SECTION 6 MAINTENANCE

6-1 The responsibility for properly maintaining a sprinkler system is the obligation of the owner, who should understand the sprinkler system operation. A minimum monthly maintenance program should include the following:

6-1.1 Visually inspect all sprinklers to ensure against obstruction of spray.

6-1.2 Inspect all valves to assure that they are open.

6-1.3 Test all water flow devices.

6-1.4 The alarm system installed shall be tested.

NOTE: When it appears likely the test will result in the response of the Fire Department, notification to the Fire Department shall be made prior to test.

6-1.5 Pumps, where employed, should be operated weekly. (See NFPA #20, Standard for Installation of Centrifugal Fire Pumps). Pumps shall be operated by causing a pressure drop by opening the Test Connection or a system drain valve fully for a minimum pump running time of two minutes.

6-1.6 The pressure of air used with pressurized water tanks shall be checked.

6-1.7 Water level in tanks shall be checked.

6-1.8 Care shall be taken to see that sprinklers are not painted either at the time of installation or during subsequent redecoration. When painting sprinkler piping or painting in areas next to sprinklers, the sprinklers may be protected by covering with a bag which shall be removed immediately after painting has been finished.

6-1.9 For further information see NFPA #13A, Recommended Practice for the Care and Maintenance of Sprinkler Systems.

6-1.10 All sprinkler systems shall be tested at least once a year by means of the Test Connection. Certification as required by NFPA #13A shall be filed with the State Fire Marshal.

6-1.11 The property owner shall notify the local fire department anytime that the sprinkler system as been temporarily or permanently turned off.

SECTION 7 REFERENCED PUBLICATIONS

7-1 The following documents or portions thereof are referenced within this document and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of issuance of this document.

7-1.1 NFPA Publications, The following publications are available from the National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269.

NFPA 13 - 1987 - Standard for the Installation of Sprinkler systems

NFPA 13A - 1987 - Recommended Practice for the Inspection, Testing and Maintenance of Sprinkler Systems

NFPA 20 - 1987 - Standard for the Installation of Centrifugal Fire Pumps

NFPA 22 - 1987 - Standard for Water Tanks for Private Fire Protection

NFPA 101 - 1984 - Life Safety Code