



# FLUSH PENDENT SPRINKLERS, RESIDENTIAL

## MODEL F990 AQUARIUS®, 4.2 K-FACTOR

### GENERAL DESCRIPTION

The 4.2 K-factor, Model F990 Aquarius Residential Pendent Sprinklers (Ref. Figure A) are automatic sprinklers of the fusible solder type. They are low profile, flush mounting sprinklers which are intended to be used in

- wet pipe residential sprinkler systems for one- and two-family dwellings and mobile homes per NFPA 13D,
- wet pipe residential sprinkler systems for residential occupancies up to four stories in height per NFPA 13R, and
- wet pipe sprinkler systems for the residential portions of any occupancy per NFPA 13.

Small and attractive, the F990 Sprinklers are installed with either a Push-on or Clamp-on Escutcheon Plate and feature a smooth, low profile, flush-style design with an aesthetically pleasing appearance that blends in with all types of surroundings.

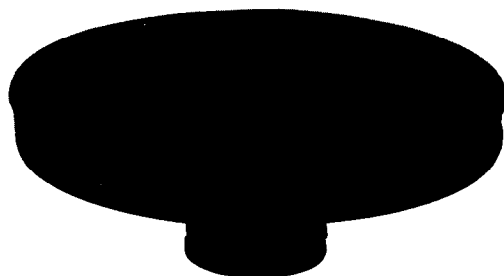
The Push-on Escutcheon Plates, as described in the Technical Data section, are intended primarily for use with steel pipe or copper tubing. The 1/4 inch adjustment provided by the Push-on Escutcheon Plate and the additional 1/4 inch of adjustment that can be obtained by use of the Extension reduces the accuracy to which the sprinklers must be positioned. The 3 inch outside diameter of the Push-on Plate also contributes to the ease of installation by covering offset clearance holes.

Clamp-on Escutcheon Plates, which are designed for use with plastic pipe fire protection systems, are described in Technical Data Sheet TD810.

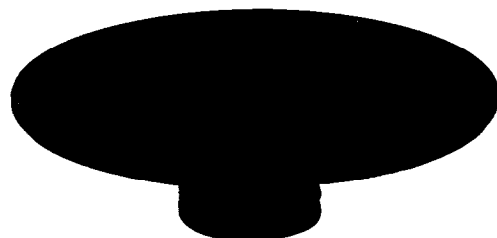
The F990 Sprinklers have been designed to operate with a particular fusible element temperature rating and heat sensitivity characteristic, as well as to discharge water in a specific pattern and quantity per square foot relationship. The combination of the performance characteristics which are associated with the F990 Sprinklers have been proven to help in the control of residential type fires and, therefore, to improve the chance for occupants to escape or be evacuated.

Fire sprinkler systems are not a substitute for intelligent fire safety awareness or construction materials and practices required by building codes.

PUSH-ON  
PLATE  
WITH  
EXTENSION

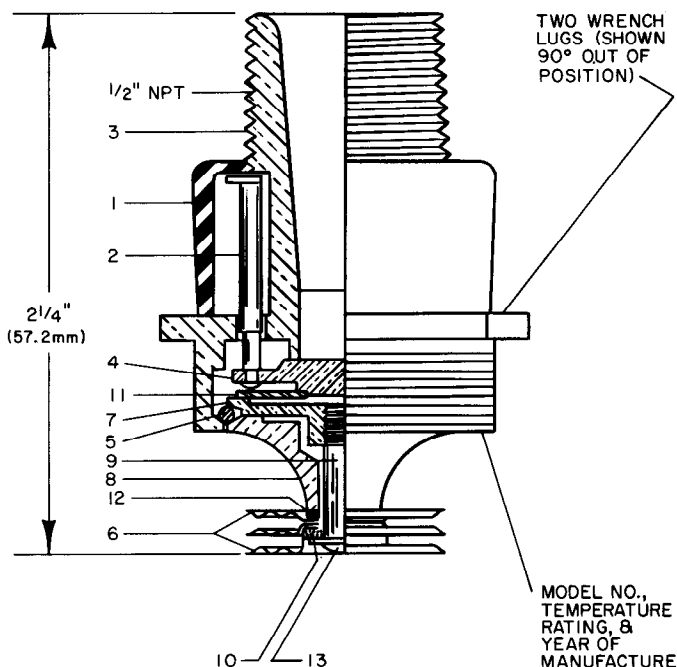


PUSH-ON  
PLATE



### COMPONENTS:

- 1 - Dust Cap
- 2 - Arms
- 3 - Body
- 4 - Gasketed Button-Deflector
- 5 - Retaining Ring
- 6 - Heat Collectors
- 7 - Inner Loading Plate
- 8 - Outer Loading Plate
- 9 - Loading Screw
- 10 - Solder Element
- 11 - Disc Spring
- 12 - Insulating Washer
- 13 - Tamper Resistant Plug



### NOTE:

The Fusible Element Assembly (consisting of Components 5 through 13) falls out of the Body upon sprinkler operation.

**FIGURE A**  
**4.2 K-FACTOR MODEL F990 AQUARIUS RESIDENTIAL**  
**PENDENT SPRINKLERS**

## APPROVALS AND STANDARDS

The 4.2 K-factor, Model F990 Aquarius Residential Pendent Sprinklers are listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada. The listings only apply to the service conditions indicated in the General Technical Data and Residential Design Criteria sections.

The Model F990 Aquarius Sprinklers are approved by the Scientific Services Laboratory (Australia).

The Model F990 Aquarius Sprinklers are accepted by their City of New York under MEA 39-92-M.

Any questions concerning an interpretation of NFPA 13, 13D, or 13R sprinkler system design/installation standards, as well as requests for system design/installation standards not presently covered by NFPA 13, 13D, or 13R, should be addressed to the:

Secretary, Standards Council  
National Fire Protection Association  
Batterymarch Park  
Quincy, MA 02269

## WARNINGS

***The Model F990 Aquarius Residential Pendent Sprinklers described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of these devices.***

***Because of the above cited stipulations and the varied nature of residential type architecture, there will be some compartment designs which cannot be fully sprinklered in accordance with the recommendations of NFPA 13, 13D, or 13R. In the event of this condition, consult the authorities having jurisdiction for guidance and approval.***

***It is the responsibility of an installing contractor to provide a copy of this document to the owner or his representative and, in turn, it is the obligation of the owner to provide a copy of this document to a succeeding owner.***

***The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or sprinkler manufacturer should be contacted relative to any questions.***

## GENERAL TECHNICAL DATA

### Sprinkler Assemblies:

The 4.2 K-factor, Model F990 Aquarius Residential Pendent Sprinklers are available in a 160°F/71°C temperature rating and they are rated for use at a maximum service pressure of 175 psi. They are available with a chrome, white, or bright brass finish. Escutcheon Plates are available with various finishes and are ordered separately, as indicated in the following sub-section.

The F990 is shipped with a plastic Protective Cap covering the outside of the Fusible Element and the lower portion of the Body. The Protective Cap can be left in position while the Sprinkler is being installed and then it is slid off once the ceiling installation is complete and the sprinkler system is ready to be put into service.

The nominal discharge curve for the F990 is plotted in Figure B and it represents the flow "Q" in U.S. gallons per minute (GPM) as determined by the formula:

$$Q = K\sqrt{p}$$

where the nominal sprinkler discharge coefficient "K" = 4.2, and "p" = pressure in pounds per square inch (psi). Listing standards permit the actual value of K to vary from 4.0 to 4.4.

The Body is bronze per ASTM B584 (C83600 or C84400) and the Dust Cap is polyolefin. The Heat Collectors are copper per ASTM B152 (C11000) and the Inner & Outer Loading Plates are brass per ASTM B16 (C36000) or ASTM B140 (C31400 or C31600). The Loading Screw and two Arms are Type 302 stainless steel per ASTM A276 or Type 303 per ASTM A582. The Disc Spring is a chrome plated high strength carbon steel and the Retaining Ring is titanium per ASTM B348 (Grade 5). The Gasketed Button-Deflector consists of a brass button per ASTM B16 (C36000), brass deflector per ASTM B36 (C22000), and a Teflon† gasket.

### Escutcheon Plates:

The following are the three types of escutcheon plates that may be used with the F990 Aquarius Sprinkler:

- Push-on Escutcheon Plate
- Push-on Escutcheon Plate with Extension
- Clamp-on Escutcheon Plate

Figures C and D illustrate typical installations of an F990 using a Push-on Escutcheon Plate and using a Push-on Plate with Extension. The Push-on Es-

cutcheon Plate provides a total of 1/4 inch of vertical adjustment and it is installed by simply slipping it over the F990 Body; however, when it is used in conjunction with the Extension, an additional 1/4 inch of adjustment can be obtained for a total of 1/2 inch of vertical adjustment.

When using the Push-on Plate with Extension, the installer simply determines the approximate distance from the ceiling mounting surface to the bottom of the Heat Collector. The Extension is used when this distance (Ref. "D" in Figure D) is greater than 7/8 inch and, the Extension is discarded for distances of 7/8 inch or less.

The Push-on Escutcheon Plate and Extension are formed from low carbon sheet steel and they are available with a chrome, white, or bright brass finish. Also a color finish other than white can be provided.

The Clamp-on Escutcheon Plates are suitable for use with plastic pipe fire protection systems when they are installed in accordance with the instructions given in Technical Data Sheet TD810.

## NOTE

***The Push-on Escutcheon Plates shown in Figures C and D can NOT be used to hold the F990 in position. The F990 must be secured in position by firmly fastening the sprinkler system piping to the dwelling structure. If the F990 is not properly secured in position, reaction forces resulting from sprinkler operation could alter its orientation and water distribution pattern.***

## RESIDENTIAL DESIGN CRITERIA

The 4.2 K-factor, Model F990 Aquarius Residential Pendent Sprinklers must only be installed and utilized in accordance with the following described criteria which are provided by the manufacturer.

## NOTES

- 1. Residential Fire Sprinkler Systems should only be designed and installed by those competent and completely familiar with automatic sprinkler system design, installation procedures, and techniques.***
- 2. Several criteria may apply to the installation and usage of each sprinkler. Consequently, it is recommended that the sprinkler system designer review and develop a working understanding of the complete***

list of criteria, prior to initiating the design of the sprinkler system.

3. Questions concerning sprinkler installation and usage criteria, which are not covered by the following instructions, should be mailed to the attention of the Technical Data Department. Include sketches and technical details, as appropriate.

4. In some instances, the requirements of this document may concern specifications which are more stringent and which take precedence over those specified in NFPA 13, NFPA 13D, NFPA 13R, or by the authority having jurisdiction.

5. The spray from the F990 is distributed radially outward and downward from the sprinkler deflector. Consequently, the sprinklers must be located such that there will not be any blind spaces shielded from spray by partitions, room dividers, overhangs or other parts of the dwelling structure.

**General Service Conditions.** The F990 Sprinklers must only be utilized in wet pipe sprinkler systems with all interconnecting system piping as well as the sprinklers maintained at a minimum temperature of 40°F/4°C, and with water supplies which are substantially free of contaminants and particles of a size greater than 1/8 inch.

**Hydraulic Design Criteria.** The minimum required single and multiple

sprinkler flow rates are given in Table A for the maximum allowable coverage areas. The single sprinkler flow rate is the minimum required discharge from the most hydraulically demanding single sprinkler and, the multiple sprinkler flow rate is the minimum required discharge from each of the total number of "design sprinklers" (as specified in NFPA 13, 13D, or 13R).

**NOTE**

The number of sprinklers within each compartment (as defined by NFPA 13, 13D, or 13R), must be kept as few as possible. Do NOT use more sprinklers than necessary to cover a particular space.

**Spray Coverage Criteria.** Figures E and F provide spacing rules that must be followed to assure that the F990 Sprinklers will provide their design distribution of water spray. Nominal wetting patterns for the F990 Sprinklers at minimum required flow conditions (Ref. Table A), are illustrated in Figure G, for selected coverage areas.

**Operational Sensitivity Criteria.** For proper operational sensitivity, the F990 Sprinklers must be installed beneath solid ceilings having a smooth or textured surface and in the flush mounted, pendent position with a bottom of Heat Collector (Ref. Fig. A) to ceiling distance of between 5/8 and 4 inches. Figures E and F provide requirements necessary for the proper operational sensitivity of the F990 Sprinklers.

The F990 Sprinklers must NOT be used above or below open-gridded type suspended ceilings; beneath soffits or beams having a depth of more than 3 inches; and, with beams, joists,

or ducts having a height of more than 3 inches located within the sprinkler coverage areas.

**NOTE**

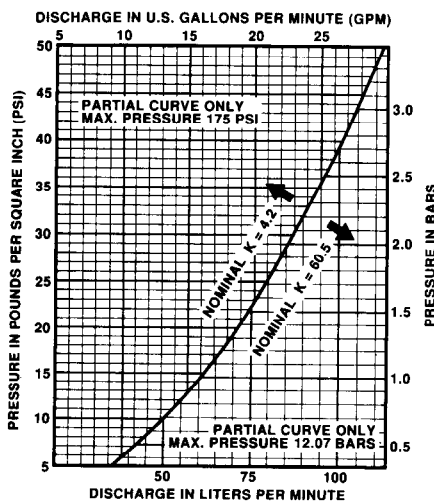
Beams having a height of more than 3 inches may be located with their centerlines along the boundaries separating adjacent sprinkler coverage areas.

It is recommended that as part of the sprinkler system design, the designer review the dwelling plans and, where appropriate, advise the owner or his representative as to the following.

- I. Lintels of at least 3 inches in height and preferably 8 inches should be used over all passageways from one space to another, in order to reduce the possibility of sprinkler operations outside of the fire area.
- II. Beams of at least 3 inches in height should be used to border each of 5 or more adjoining areas of F990 Sprinkler coverage (within the same compartment), in order to decrease the time to first sprinkler operation as well as to reduce the possibility of multiple sprinkler operations.

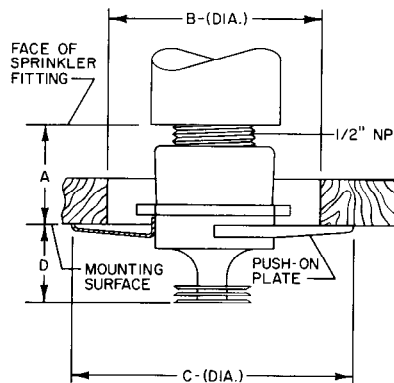
**Cold Soldering Criteria.** Figures E and F provide the minimum spacing requirements necessary for preventing the wetting (i.e., cold soldering) of the Fusible Element Assembly of a non-operated F990 Sprinkler, which is adjacent to one which has operated.

**Heat Source Criteria.** Refer to NFPA 13D for the requirements relating to preventing the weakening followed by the possible release of an F990 Sprinkler Fusible Element Assembly, due to exposure to heat sources other than abnormal fire.



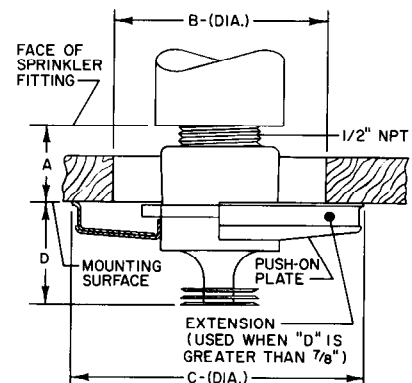
**FIGURE B  
NOMINAL DISCHARGE CURVE**

Dim.	Inches	MM
A - Nom.	1-1/16	27.0
B -	2-1/4	57.2
C -	3	76.2
D - Min.	5/8	15.9
D - Nom.	3/4	19.1
D - Max.	7/8	22.2



**FIGURE C  
PUSH-ON ESCUTCHEON  
PLATE**

Dim.	Inches	MM
A - Nom.	15/16	23.8
B -	2-1/4	57.2
C -	3-1/8	79.4
D - Min.	5/8	15.9
D - Nom.	7/8	22.2
D - Max.	1-1/8	28.6



**FIGURE D  
PUSH-ON ESCUTCHEON  
PLATE WITH EXTENSION**

MAXIMUM COVERAGE AREA <sup>(a)</sup> FT. x FT.	MINIMUM FLOW <sup>(b)</sup> AND RESIDUAL PRESSURE	
	ONE SPRINKLER FLOWING	MULTIPLE SPRINKLERS FLOWING
12 x 12	12 GPM (8.2 PSI)	11.5 GPM (7.5 PSI)
14 x 14	14 GPM (11.1 PSI)	11.5 GPM (7.5 PSI)
16 x 16	16 GPM (14.5 PSI)	12 GPM (8.2 PSI)
18 x 18	18 GPM (18.4 PSI)	14 GPM (11.1 PSI)
20 x 20	22 GPM (27.4 PSI)	18 GPM (18.4 PSI)

(a) For coverage area dimensions less than or between those indicated, it is necessary to use the minimum required flow for the next highest coverage area for which hydraulic design criteria are stated.

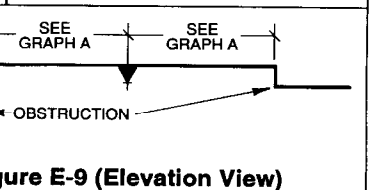
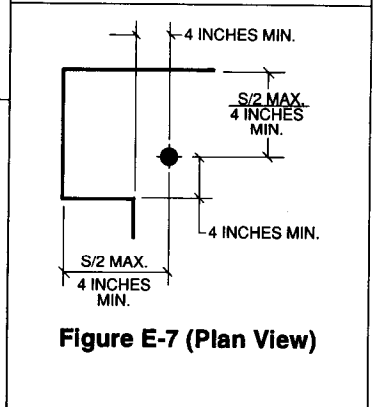
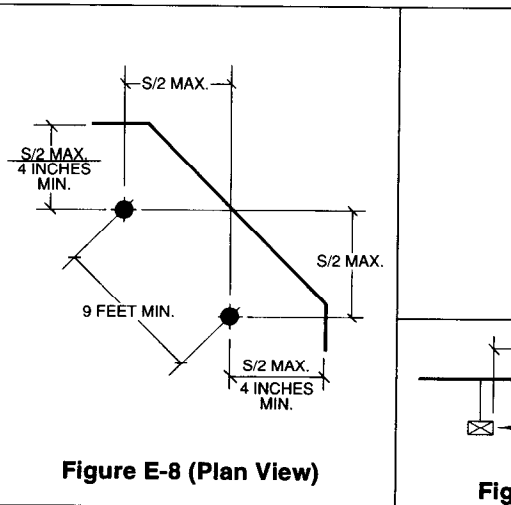
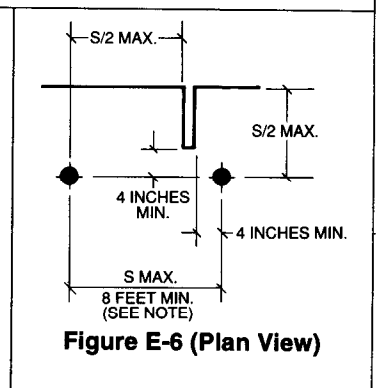
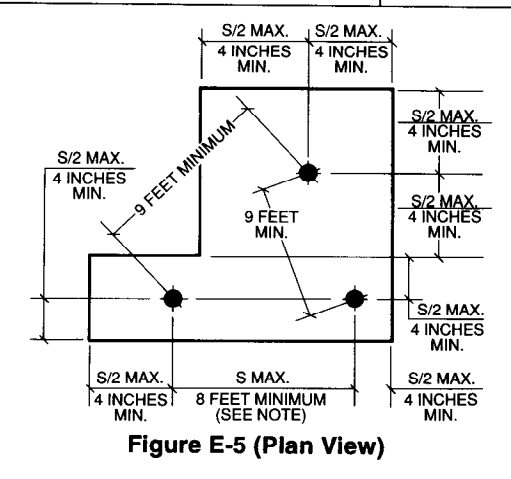
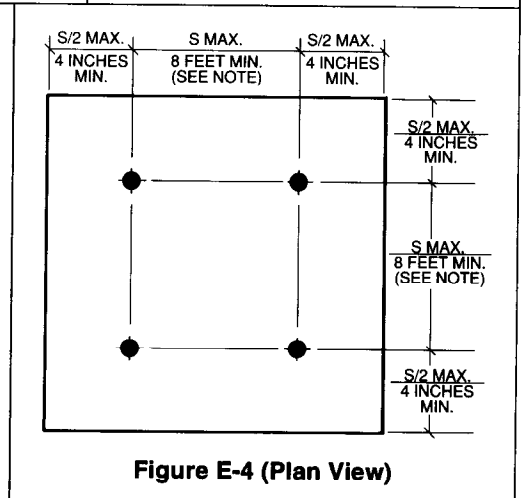
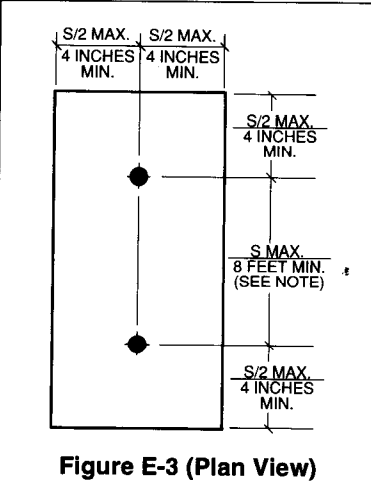
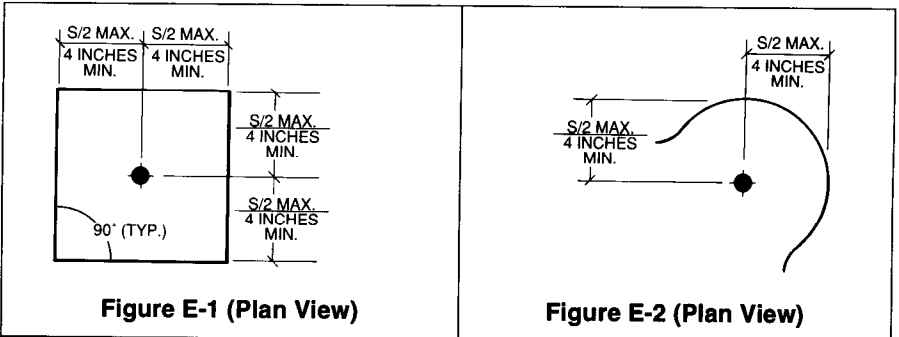
(b) Requirement is based on minimum flow in GPM from each sprinkler. The associated residual pressures are calculated using the nominal K-factor. Refer to Hydraulic Design Criteria Section for details.

**TABLE A  
HYDRAULIC DESIGN CRITERIA**

$S/2$  = ONE-HALF THE LENGTH OF THE COVERAGE AREA BEING HYDRAULICALLY CALCULATED (REF. TABLE A).

$S$  = THE LENGTH OF THE COVERAGE AREA BEING HYDRAULICALLY CALCULATED (REF. TABLE A).

**NOTE:** The 8 foot minimum spacing shown in Figures E-3 through E-6 applies to adjacent sprinklers installed with their wrench lugs either in line or parallel with each other; otherwise, 9 feet is the minimum required spacing.



**FIGURE E  
SPACING RULES UNDER LEVEL CEILINGS**

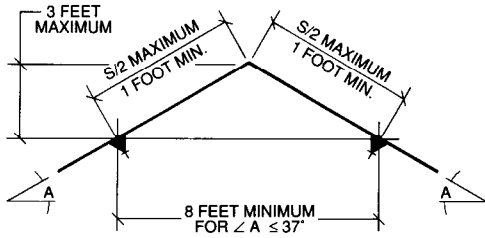


Figure F-1 (Elevation View)

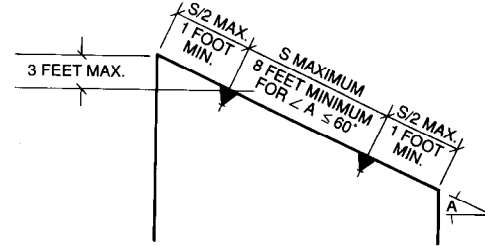


Figure F-2 (Elevation View)

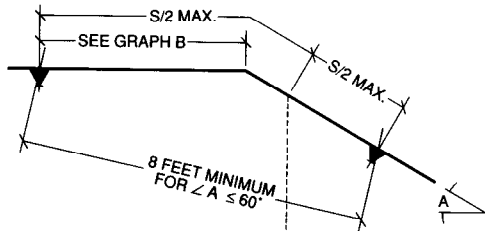


Figure F-3 (Elevation View)

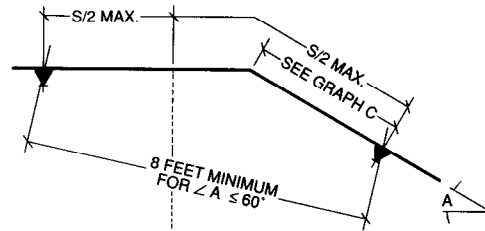


Figure F-4 (Elevation View)

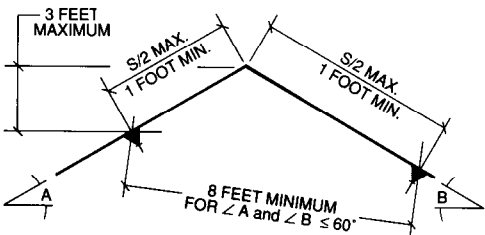


Figure F-5 (Elevation View)

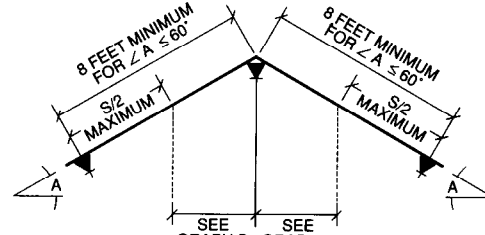


Figure F-6 (Elevation View)

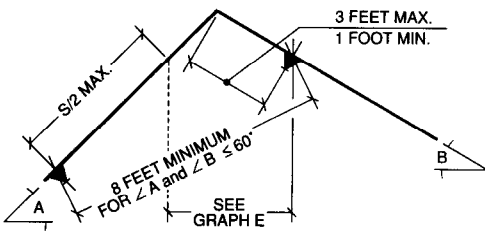


Figure F-7 (Elevation View)

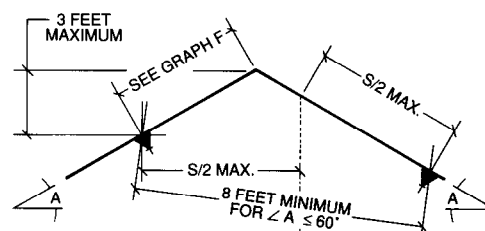


Figure F-8 (Elevation View)

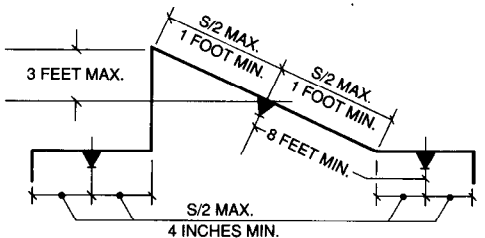


Figure F-9 (Elevation View)

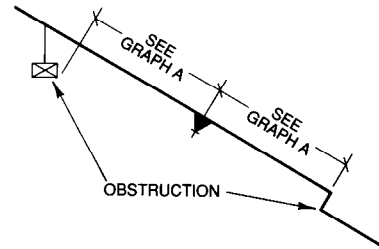


Figure F-10 (Elevation View)

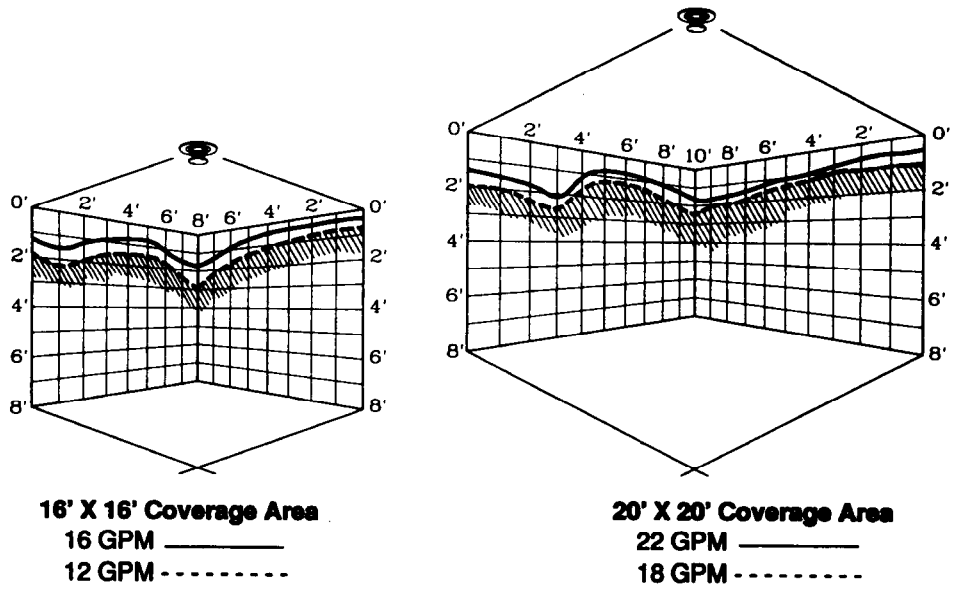
S/2 = ONE-HALF THE LENGTH OF THE COVERAGE AREA BEING HYDRAULICALLY CALCULATED (REF. TABLE A).  
 S = THE LENGTH OF THE COVERAGE AREA BEING HYDRAULICALLY CALCULATED (REF. TABLE A).

NOTES: 1. Figures F-1 through F-9 only apply when:

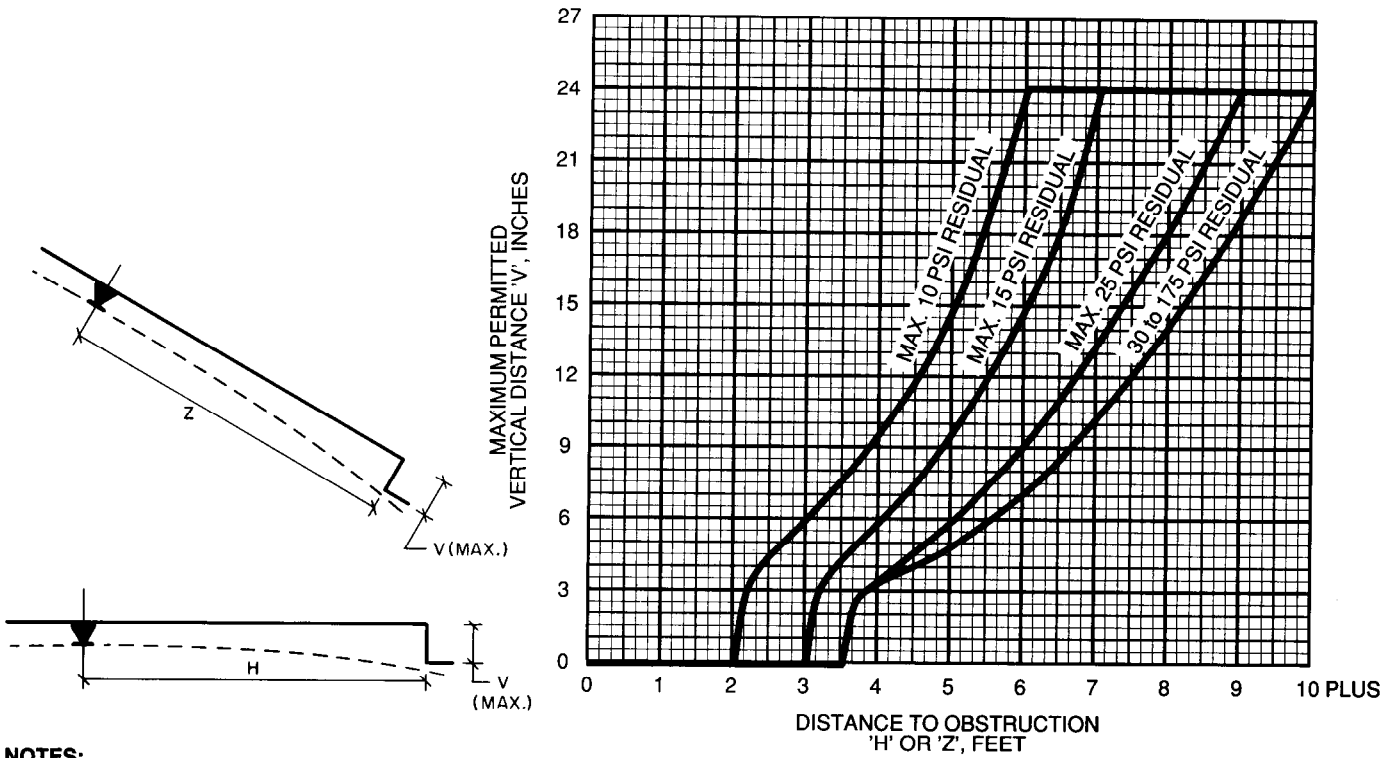
- the ceiling ridge is horizontal;
- the compartment openings to adjoining spaces have minimum lintel depths of 8 inches below the lowest sprinkler;
- any adjacent sprinklers in the direction of the ceiling ridge are to be in a row which runs parallel to the ridge, and the sprinklers are to be spaced a minimum of 8 feet apart;
- the sprinklers are installed with their wrench lugs parallel to the ceiling ridge; and,
- the sprinklers shown in Figures F-1 through F-8 are located in a plane which is perpendicular to the ceiling ridge, and the ceiling angles are within the specified range.

2. Contact the Technical Data Department for questions concerning installations outside the scope of Figures F-1 through F-10.

**FIGURE F, SPACING RULES UNDER PITCHED CEILINGS AND/OR OVERHANGS**

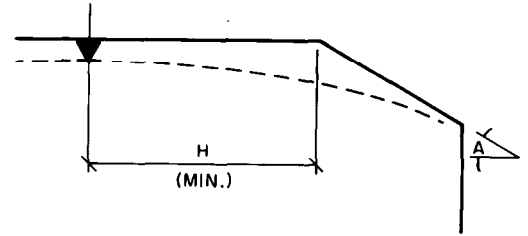
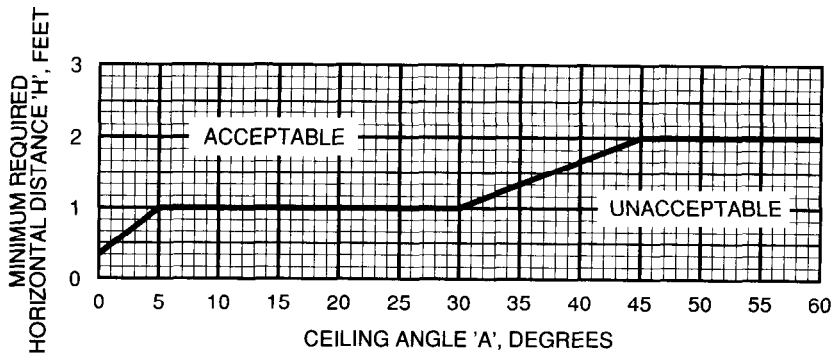


**FIGURE G**  
**NOMINAL WETTING PATTERNS**  
**AT MINIMUM REQUIRED FLOW CONDITIONS**  
**FOR SELECTED COVERAGE AREAS**



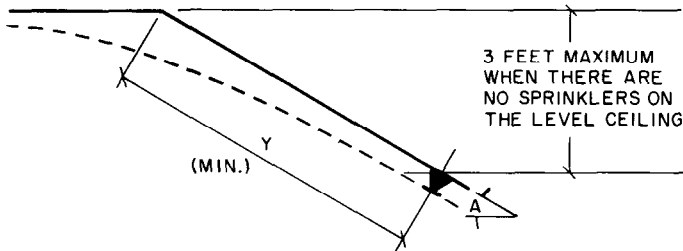
- NOTES:**
1. CEILING OBSTRUCTIONS MUST BE SPACED ON THE BASIS OF USING THE MAXIMUM RESIDUAL PRESSURE WHICH WOULD BE PRESENT FOR A SINGLE SPRINKLER OPERATION.
  2. BEAMS AND/OR OTHER CONTINUOUS OBSTRUCTIONS ARE NOT TO EXCEED A VERTICAL DEPTH 'V' OF MORE THAN 3 INCHES WITHIN THE SPRINKLER COVERAGE AREA.

**GRAPH A**  
**MAXIMUM PERMITTED VERTICAL DISTANCE BETWEEN THE SPRINKLER MOUNTING SURFACE AND**  
**THE BOTTOM OF CEILING MOUNTED OBSTRUCTIONS SUCH AS BEAMS, OVERHANGS, AND LIGHT FIXTURES**  
**WITHOUT UNDULY OBSTRUCTING THE WATER SPRAY DISTRIBUTION**



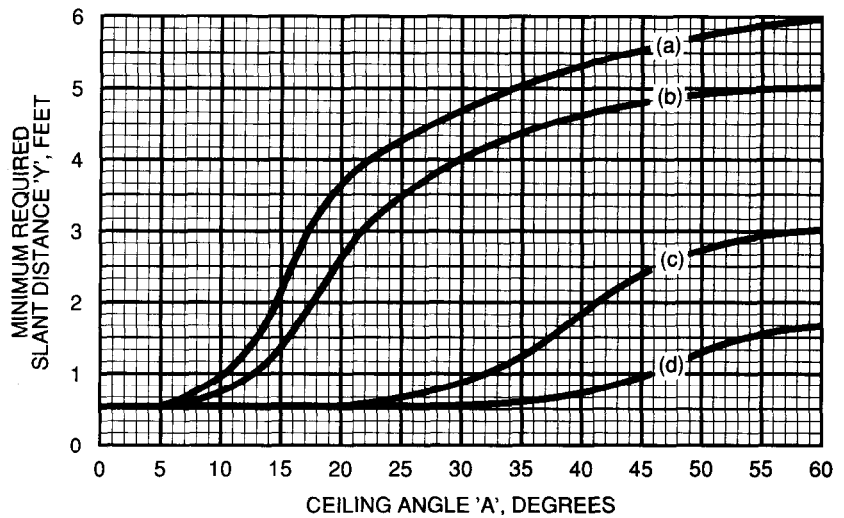
**NOTE:** SPRINKLERS MUST BE INSTALLED WITH THEIR WRENCH LUGS PARALLEL TO THE CEILING RIDGE.

**GRAPH B**  
**MINIMUM REQUIRED HORIZONTAL DISTANCE BETWEEN**  
**A SPRINKLER LOCATED ON A LEVEL CEILING**  
**AND AN INTERSECTING PITCHED CEILING**  
**WITHOUT UNDULY OBSTRUCTING THE WATER DISTRIBUTION**



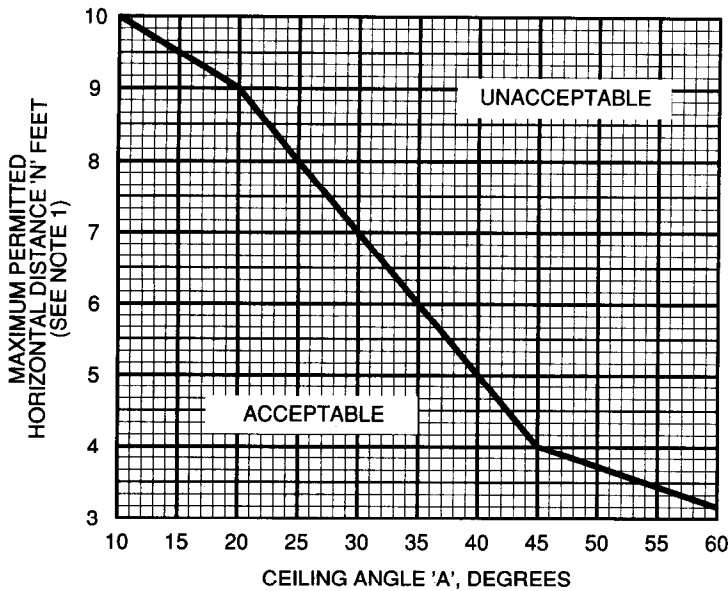
**COVERAGE AREAS:**

- (a) 20' x 20'
- (b) 18' x 18'
- (c) 16' x 16'
- (d) 14' x 14' & 12' x 12'

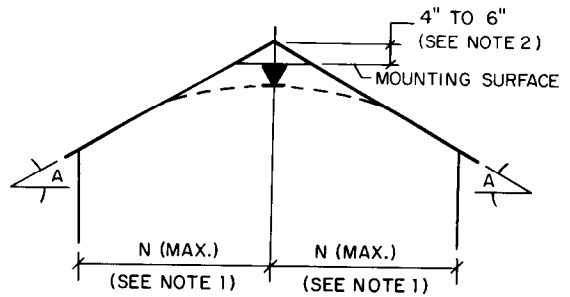


**NOTE:** SPRINKLERS MUST BE INSTALLED WITH THEIR WRENCH LUGS PARALLEL TO THE CEILING RIDGE.

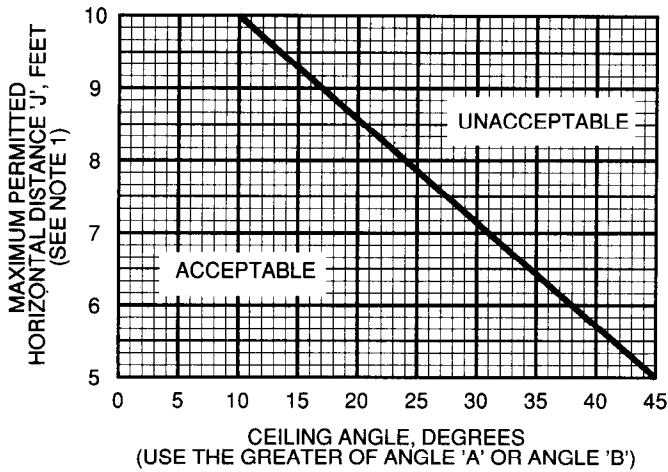
**GRAPH C**  
**MINIMUM REQUIRED SLANT DISTANCE BETWEEN**  
**A LEVEL CEILING AND A SPRINKLER LOCATED ON A PITCHED CEILING**  
**WITHOUT UNDULY OBSTRUCTING THE WATER DISTRIBUTION**



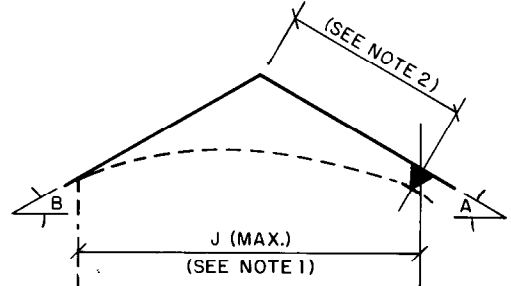
**GRAPH D**  
**MAXIMUM WATER SPRAY DISTRIBUTION WHEN A SPRINKLER IS LOCATED AT A PEAK**



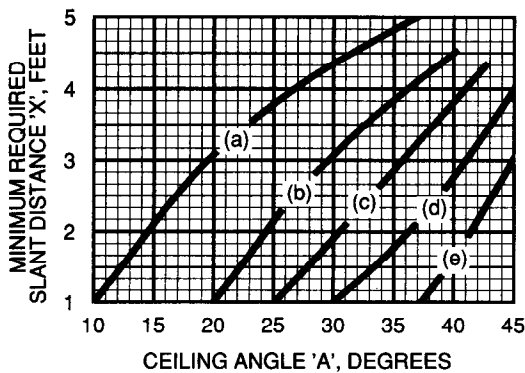
- NOTES:**
- UP TO A MAXIMUM OF ONE-HALF THE LENGTH OF THE COVERAGE AREA BEING HYDRAULICALLY CALCULATED.
  - THE MOUNTING SURFACE MUST BE LOCATED WITHIN 4 TO 6 INCHES OF THE PEAK, IF IT IS NOT CONTINUOUS OVER THE FULL LENGTH OF THE CEILING RIDGE.
  - SPRINKLERS MUST BE INSTALLED WITH THEIR WRENCH LUGS PARALLEL TO THE CEILING RIDGE.



**GRAPH E**  
**MAXIMUM WATER SPRAY DISTRIBUTION WHEN A SPRINKLER IS LOCATED ON A PITCHED CEILING OPPOSITE FROM AN INTERSECTING PITCHED CEILING**

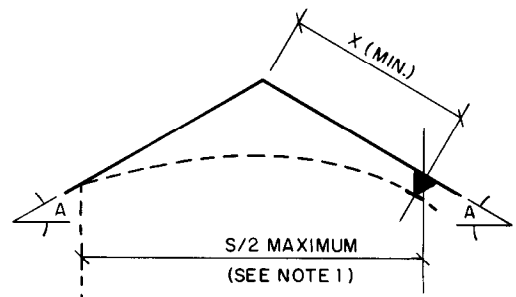


- NOTES:**
- UP TO A MAXIMUM OF ONE-HALF THE LENGTH OF THE COVERAGE AREA BEING HYDRAULICALLY CALCULATED.
  - 3 FEET IS THE MAXIMUM PERMITTED AND 1 FOOT IS THE MINIMUM REQUIRED.
  - SPRINKLERS MUST BE INSTALLED WITH THEIR WRENCH LUGS PARALLEL TO THE CEILING RIDGE.



- COVERAGE AREAS:**
- 20' x 20'
  - 18' x 18'
  - 16' x 16'
  - 14' x 14'
  - 12' x 12'

- NOTES:**
- UP TO A MAXIMUM OF ONE-HALF THE LENGTH OF THE COVERAGE AREA BEING HYDRAULICALLY CALCULATED.
  - SPRINKLERS MUST BE INSTALLED WITH THEIR WRENCH LUGS PARALLEL TO THE CEILING RIDGE.



**GRAPH F**  
**MINIMUM REQUIRED SLANT DISTANCE BETWEEN A RIDGE AND A SPRINKLER WITHOUT UNDULY OBSTRUCTING THE WATER DISTRIBUTION**



## INSTALLATION

### NOTES

**Residential Fire Sprinkler Systems should only be designed and installed by those competent and completely familiar with automatic sprinkler system design, installation procedures, and techniques.**

**The Technical Data Department should be contacted relative to any questions.**

The Model F990 Aquarius Pendent Residential Sprinklers must be installed in accordance with the following instructions:

1. The Sprinkler must only be installed in the pendent, flush mounted position and with the threaded end perpendicular to the mounting surface.
2. When using the Push-on Escutcheon Plate shown in Figure C, the pipe connected to the sprinkler fitting should be cut so that the "A" dimension is between 1 and 1-1/8 inches. When using the Push-on Escutcheon Plate with Extension shown in Figure D, the pipe connected to the sprinkler fitting should be cut so that the "A" dimension is between 13/16 and 1-1/16 inches. In either case, the remaining portion of the adjustment can be used to help compensate for the possible manufacturing variations in the make-in of the Sprinklers and the take-out of the fittings (as permitted by ANSI B1.20.1).

Refer to Technical Data Sheet TD810 for installation information on the Clamp-on Escutcheon Plate which is suitable for securing the Sprinkler to its mounting surface in plastic pipe fire protection systems.

### NOTE

**The Push-on Escutcheon Plates shown in Figures C and D can NOT be used to hold the Sprinkler in position. The Sprinkler must be secured in position by firmly fastening the sprinkler system piping to the dwelling structure. If the Sprinkler is not properly secured in position, reaction forces resulting from sprinkler operation could alter its orientation and water distribution pattern.**

3. Use only a non-hardening type of Teflon<sup>†</sup> based pipe joint sealant and apply it sparingly to the male threads only.

4. Hand tighten the Sprinkler with the

attached Protective Cap (as shipped), into the sprinkler fitting.

5. Using the Model F873 Sprinkler Wrench shown in Figure H, tighten the Sprinkler into the fitting.

The Wrench is slipped over the Protective Cap and can be mounted to a 1/2 inch socket drive ratchet. A radial force of 10 to 18 lbs. applied to a typical 9 inch long ratchet handle will exert the 7 to 14 ft.lbs. of torque required for a leak tight sprinkler joint.

### NOTES

**A maximum of 21 ft.lbs. of torque is to be used to install the sprinkler. Higher levels of torque may distort the sprinkler orifice seat with consequent leakage.**

**All sprinklers installed within compartments in which the sprinklers are only located on a level ceiling must be installed with their wrench lugs aligned parallel to a straight compartment wall.**

**All sprinklers installed within compartments having a pitched ceiling with one or two parallel horizontal ceiling ridges must be installed with their wrench lugs aligned parallel to the ceiling ridges.**

**Failure to properly orientate the sprinkler wrench lugs may result in impaired fire protection due to cold soldering and/or inadequate spray coverage.**

6. Do not remove the Protective Cap at this time. The Protective Cap is intended to help protect the sprinkler until the ceiling finish is complete and the sprinkler system is ready to be put into service.

### NOTE

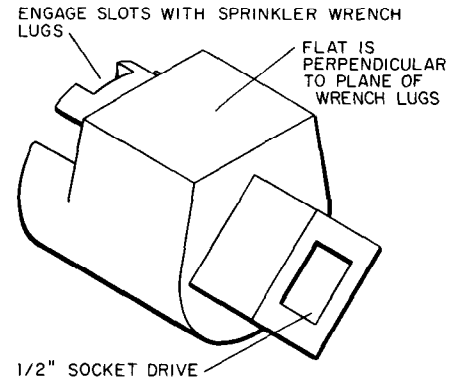
**Failure to use the Protective Cap, while the ceiling installation is being completed, can result in the accidental damage or painting of a sprinkler. Damaged or painted sprinklers must be replaced.**

7. After the ceiling finishing is complete and the sprinkler system is ready to be put into service, slide off the Protective Cap.

### NOTE

**Failure to remove the Protective Cap will prevent proper operation of the Sprinkler.**

8. When using the Push-on Escutch-



**FIGURE H  
MODEL F873  
SPRINKLER WRENCH**

eon Plate alone, align the two slots on the inside edge of the Push-on Escutcheon Plate with the Wrench Lugs on the Sprinkler Body and then push the Escutcheon Plate over the Body of the Sprinkler until its outside edge comes in contact with the mounting surface.

When using the Push-on Plate with Extension, first determine the distance from the ceiling mounting surface to the bottom of the Heat Collector. If the dimension is 7/8 inch or less, discard the Extension and proceed to install the Push-on Plate as indicated above. If the dimension is greater than 7/8 inch, assemble the Extension to the Push-on Plate and then proceed to install the assembly as indicated above.

### NOTE

**Do not attempt to make-up for insufficient adjustment in an Escutcheon Plate by under- or over-tightening the Sprinkler. Readjust the position of the sprinkler fitting to suit.**

**CARE AND MAINTENANCE**

The F990 Sprinklers must never be shipped, stored, or used where their temperature will exceed 100F/38C and they must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified or overheated sprinklers must be replaced.

**NOTE**

*Particular care to prevent overheating must be exercised when storing sprinklers in cars, trucks, trains, or other vehicles on warm, bright sunny days.*

Care must be exercised to avoid damage to the F990 Sprinklers - both before and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced.

**NOTES**

*Absence of an Escutcheon Plate may delay the time to sprinkler operation in a fire situation.*

*Before closing a fire protection system main control valve for maintenance work on the fire protection system which it controls, permission to shut down the affected fire protection systems must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.*

*It is recommended that automatic sprinkler systems be inspected and maintained in accordance with the advice and suggestions given in NFPA 13, 13A, 13D, and 13R, as applicable.*

It is recommended that automatic sprinkler systems be inspected quarterly by a qualified Inspection Service.

The F990 Sprinklers must only be replaced with pendent sprinklers which are listed for residential fire protection service and which have the same nominal K-factor, the same coverage area, the same or lower flow ratings (as indicated under "Hydraulic Design Criteria"), and the same or higher temperature rating.

All residential sprinklers installed within a compartment as defined by the NFPA must be made by the same manufacturer and have the same type of heat responsive element and temperature rating.

**NOTES**

*Wet pipe sprinkler systems must be maintained at a minimum temperature of 40F/4C. Exposure to freezing temperatures can result*

*in bursting of the pipe and/or sprinkler.*

*Do NOT enclose sprinklers within drapes, curtains, or valances.*

*Do NOT hang anything from the sprinklers.*

*Automatic sprinklers are NOT to be tested with a heat source. Weakening or operation of the Fusible Element Assembly can result.*

*Do NOT cleanse the sprinklers with soap and water, detergents, ammonia, cleaning fluids, or other chemicals. Remove dust, lint, cobwebs, cocoons, insects, and larvae by gently brushing with a feather duster or gently vacuuming with a soft bristle (i.e., dusting) brush attachment.*

*The minimum vertical clearance between the tops of free standing partitions, room dividers, cabinets, storage racks, stock piles, etc., and the centerline of the sprinkler waterway is NOT to be less than the clearance given below.*

<i>Horizontal Distance from Sprinkler to Item, ft.</i>	<i>Vertical Clearance In.</i>
--	---------------------------------------

- More than 6 . . . . . 24*
- From 3 to 6 . . . . . 19*
- Between 2 and 3 . . . . . 16*
- From 1 to 2 . . . . . 13*
- Less than 1 . . . . . 10*

*Exercise suitable safety precautions in the use and storage of highly flammable and potentially explosive materials. The rapid rate of fire development and spread which can be caused by such materials can reduce the ability of the sprinkler system to aid in the control of a fire in which they are involved.*

**REMODELING**

When remodeling, such as by adding false beams or light fixtures or changing the location of compartment walls, first verify that the new construction will not violate the installation requirements stated under WARNINGS. Alter the new construction and/or the sprinkler system to suit the requirements of this document.

## ORDERING PROCEDURE

Orders for the Model F990 Aquarius Residential Pendent Sprinklers, Push-on Escutcheon Plates, Push-on Escutcheon Plates with Extensions, and the Sprinkler Wrench must include the description and Product Symbol Number (PSN) where applicable.

Contact your local distributor for availability.

### Sprinkler Assembly:

Specify: Model F990 Aquarius Residential Pendent Sprinkler with (specify type) finish, PSN (specify).

Chrome Plated Finish  
160°F/71°C ..... PSN 58-990-9-160

White Coated Finish  
160°F/71°C ..... PSN 58-990-4-160

Bright Brass Plated Finish  
160°F/71°C ..... PSN 58-990-2-160

### NOTES

*The Escutcheon Plate for the F990 Sprinkler and the Sprinkler Wrench must be ordered separately. The Push-on Escutcheon Plates, which are described below, are primarily intended for use with steel pipe or copper tubing. Refer to TD810 for information on the Clamp-on Escutcheon Plate which is suitable for use with plastic piping.*

*Product Symbol Numbers are not specified when ordering Push-on Escutcheon Plates with a color other than white. It is suggested that a color chip be provided when ordering a special color. Otherwise, responsibility for duplication of the color coated finish cannot be accepted.*

### Push-on Escutcheon Plates:

Specify: (Specify type) finish Push-on Escutcheon Plate for Aquarius Sprinkler, PSN (specify).

White coated finish ..... PSN 56-991-0-003  
Chrome plated finish ..... PSN 56-991-9-003  
Bright brass plated  
finish ..... PSN 56-991-2-003

### Push-on Escutcheon Plates with Extension:

Specify: (Specify type) finish Push-on Escutcheon Plate with Extension for Aquarius Sprinkler, PSN (specify).

White coated finish ..... PSN 56-991-0-013  
Chrome plated finish ..... PSN 56-991-9-013  
Bright brass plated  
finish ..... PSN 56-991-2-013

## LIMITED WARRANTY

The manufacturer warrants for a period of one year from the date of sale (warranty period) that the product(s) sold hereunder are free from defects in material and workmanship. Our obligation under this warranty is limited to repair or replacement, or, at our option, we will repay the price paid for the product(s), plus any transportation charge paid by the purchaser. In the case of replacement, we will pay the transportation charges to the location of the defective product. We must be given the opportunity to inspect any product you believe to be defective. To make a claim under this limited warranty, you should contact our Sales Services Manager at (401) 886-3105.

**THERE ARE NO OTHER WRITTEN OR ORAL WARRANTIES. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE DURATION OF THE LIMITED WARRANTY SET FORTH ABOVE.**

The manufacturer does not assume any other obligation in connection with the sale of the product(s) by purchaser.

This warranty shall not apply to any product(s) which have been installed in violation of written instructions furnished by the manufacturer, repaired or altered, misused or damaged, or not properly maintained.

The manufacturer is not liable for indirect, incidental or consequential damages in connection with the use of the product(s).

Some states do not allow limitations on how long an implied warranty lasts, or exclusion or limitation of incidental or consequential damages, so the above limitations or exclusion may not apply to you.

**THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.**

### Sprinkler Wrench:

Specify: Model F873 Sprinkler Wrench, PSN 56-873-1-001.

Order for NFPA publications should be addressed to the:

Publication Sales Department  
NFPA  
Batterymarch Park  
Quincy, MA 02269

### Replacement Extension:

Specify: (Specify type) finish Extension for Aquarius Sprinkler, PSN (specify).

White coated finish ..... PSN 91-991-0-101  
Chrome plated finish ..... PSN 91-991-9-101  
Bright brass plated  
finish ..... PSN 91-991-2-101

## PATENTS

The following patents are applicable to the Model F990 Aquarius Residential Pendent Sprinklers:

COUNTRY	PATENT NO.
U.S.A.	4,618,002
United Kingdom	2,155,328

## CONVERSION FACTORS

Parenthetical metric conversions cited herein are approximate.

1 inch	=	25.400mm
1 foot	=	0.3048 m
1 pound	=	0.4536 kg
1 ft.lb.	=	1.356 Nm
1 psi	=	6.895kPa
	=	0.0689 bar*
	=	0.0703 kg/cm <sup>2</sup> *
1 U.S. gallon	=	3.785 dm <sup>3</sup>
	=	3.785 litres*

\*Not recognized International System units.

## WEIGHT

The nominal weight of the Model F990 Aquarius Residential Pendent Sprinkler (with Protective Cap) is 4 ounces, the weight of the Push-on Escutcheon Plate is 0.6 ounces, and the weight of the Push-on Escutcheon Plate with Extension is 1.4 ounces.

