BLD18-2129DF01
PC1

Alpha **FIRE SUPPRESSION SYSTEMS INC.**

Engineering, Installation, Inspection Services
Lic. #670313

FIRE SPRINKLER TECHNICAL DATA

EAKLE RESIDENCE
150 DORCHESTER CT.
SANTA ROSA, CA

All Materials shall be new and UL listed and/or FM Approved for Fire Protection Systems. In the event of manufacturer's unavailability Alpha Fire reserves the right to make substitution of equal or greater quality.

2391 Circadian Way, Santa Rosa, CA. 95407
Phone 707-527-6407 Fax 707-527-6197
info@alphafiresystems.com

VIKING®

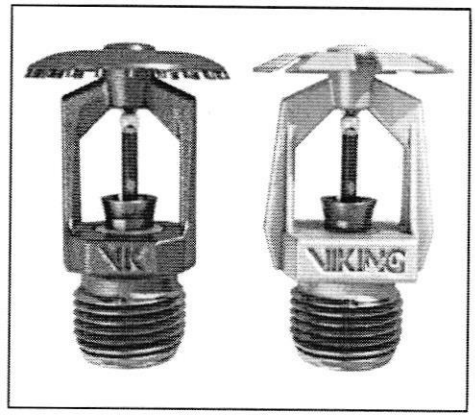
TECHNICAL DATA

MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION

Viking Microfast® and MicrofastHP® Quick Response Upright and Conventional (Old Style) Sprinklers are small, thermosensitive, glass-bulb spray sprinklers available in several different finishes, temperature ratings, and K-Factors to meet design requirements. The special Polyester, Polytetrafluoroethylene (PTFE), and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are cULus listed as corrosion resistant as indicated in Approval Chart 1. (Note: FM Global has no approval classification for PTFE and Polyester coatings as corrosion resistant.)



2. LISTINGS AND APPROVALS

cULus Listed: Category VNIV

FM Approved: Classes 2002 and 2020

NYC Approved: Calendar Number 219-76-SA and MEA 89-92-E, Volume 16

ABS Certified: Certificate 04-HS407984B-PDA

VdS Approved: Certificates G4060054, G4060056, G4880046, G4930039, and G4980020

LPC Approved: Ref. No. 096e/03, TE30401, and TE30872

CE Certified: Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001, 0832-CPD-2003, 0786-CPD-40131, 0786-CPD-40171, and 0786-CPD-40278

MED Certified: Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003 and 0832-MED-1008

NOTE: Other International approval certificates are available upon request.

Refer to Approval Chart 1 and Design Criteria on pages 51c-d for cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria on page 51e for FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Available since 1987.

Minimum Operating Pressure: 7 psi (0.5 bar)*

Maximum Working Pressure: Sprinklers VK315 and VK340 are rated for use with water working pressures ranging from the minimum 7 psi (0.5 bar) up to 250 psi (17 bar) for high-pressure systems. High-pressure (HP) sprinklers can be identified by locating "250" stamped on the deflector. All other Part Nos. not mentioned above are rated to a maximum 175 psi (12 bar) wwp.

Factory tested hydrostatically to 500 psi (34.5 bar)

Testing: U.S.A. Patent No. 4,831,870

Thread size: Refer to the Approval Charts

Nominal K-Factor: Refer to the Approval Charts

Glass-bulb fluid temperature rated to -65 °F (-55 °C)

Overall Length: Refer to the Approval Charts

*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

Viking Technical Data may be found on The Viking Corporation's Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass for Sprinklers 12978, 06766B, 07060, and 12281. Brass UNS-C84400 for all other sprinklers.

Deflector: Brass UNS-C23000 or Copper UNS-C19500 for Sprinklers 12978, 06764B, and 12281. Copper UNS-C19500 for Sprinklers 06665B, 07060, and 14817. Brass UNS-C26000 for all other Sprinklers.

Bushing (for Sprinklers 06719B, 06717B, and 12286): Brass UNS-C36000

Bulb: Glass, nominal 3 mm diameter

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MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

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Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For PTFE Coated Sprinklers: Belleville Spring-Exposed, Screw-Nickel Plated, Pip Cap-PTFE Coated
For Polyester Coated Sprinklers: Belleville Spring-Exposed
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)
Order Microfast® and MicrofastHP® Quick Response Upright and Conventional Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.
Finish Suffix: Brass = A, Chrome-Enloy® = F, White Polyester = M-/W, Black Polyester = M-/B, and Black PTFE = N, ENT = JN
Temperature Suffix (°F/°C): 135°/57° = A, 155°/68° = B, 175°/79° = D, 200°/93° = E, and 286°/141° = G
For example, sprinkler VK300 with a 1/2" thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 12978AB

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

Sprinkler Wrench: Standard Wrench: Part No. 10896W/B (available since 2000)

Sprinkler Cabinets:
A. Six-head capacity: Part No. 01724A (available since 1971)
B. Twelve-head capacity: Part No. 01725A (available since 1971)

4. INSTALLATION
Refer to appropriate NFPA Installation Standards.

5. OPERATION
During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE
Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY
The Viking Microfast® and MicrofastHP® Quick Response Upright and Conventional Sprinklers are available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE
For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Sprinkler Finishes: Brass, Chrome-Enloy®, White Polyester, Black Polyester, Black PTFE, and ENT

Corrosion-Resistant Coatings[3]: White Polyester, Black Polyester, and Black PTFE. ENT in all tempurature ratings except 135 °F (57 °C)

Footnotes

[1] The sprinkler temperature rating is stamped on the deflector.
[2] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.
[3] The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated on pages 51c-e. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, ENT, and PTFE coatings. For ENT coated automatic sprinklers, the waterway is coated.

VIKING®

TECHNICAL DATA

MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 1 (UL)

Microfast® and MicrofastHP® Quick Response
Upright and Conventional Sprinklers
Maximum 175 PSI (12 bar) WWP

KEY: A1X — Temperature, Finish, Escutcheon (if applicable)

Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals[3] (Refer also to Design Criteria on page 51d.)					
		NPT	BSP	U.S.	metric[2]	Inches	mm	cULus[4]	NYC[8]	VdS	LPCB	CE	⎈
Upright-Standard Orifice													
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B4	See Footnote 7.	--	--	--	--
07060	VK345	--	15 mm	5.6	80.6	2-3/16	56	--	--	A2	A2	B2[12]	B2[15]
Conventional-Standard Orifice													
06766B	VK310	1/2"	15 mm	5.6	80.6	2-3/16	56	A2	A2	--	A2	B2[12]	B2[15]
Upright-Large Orifice													
06665B	VK350	3/4"	--	8.0	115.2	2-5/16	59	A1, B4	A1	A2	A2	B2[12]	--
14817	VK350	--	20 mm	8.0	115.2	2-5/16	59	A1, B4	A1	A2	A2	B2[12]	--
06764B	VK350	1/2"	15 mm	8.0	115.2	2-5/16	59	A1, B4	A1	A2	--	A2[13]	--
Conventional-Large Orifice													
06768B	VK354	3/4"	20 mm	8.0	115.2	2-5/16	59	A1	A2	--	A2	B2[12]	--
Upright-Small Orifice[11]													
06717B[11]	VK325	1/2"	15 mm	2.8	40.3	2-3/16	56	A1	A1	--	--	--	--
06719B[11]	VK327	1/2"	15 mm	4.2	57	2-3/16	56	A1	A1	--	--	--	--
06931B[11]	VK327	--	10 mm	4.2	57	2-3/16	56	--	--	A2	--	C3[14]	--

Maximum 250 PSI (17 bar) WWP
Upright-Standard Orifice

Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals[3] (Refer also to Design Criteria on page 51d.)					
		NPT	BSP	U.S.	metric[2]	Inches	mm	cULus[4]	NYC[9]	VdS	LPCB	CE	⎈
12281	VK315	1/2"	15 mm	5.6	80.6	2-3/16	56	A1	A1	--	--	--	--
Upright-Small Orifice[10]													
12286[11]	VK340	1/2"	15 mm	2.8	40.3	2-3/16	56	A1	A1	--	--	--	--

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
C - 155 °F (68 °C)

Approved Finishes

1 - Brass, Chrome-Enloy®, White Polyester[5,6], Black Polyester[5,6], and Black PTFE[5]
2 - Brass, Chrome-Enloy®, White Polyester[5,6], and Black Polyester[5,6]
3 - Brass and Chrome-Enloy®
4 - ENT[5]

Footnotes

[1] Base part number is shown. For complete part number, refer to Viking's current price schedule.
[2] Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
[3] This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
[4] Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
[5] cULus Listed as corrosion resistant.
[6] Other colors are available on request with the same Listings and Approvals as the standard colors.
[7] Meets New York City requirements, effective July 1, 2008.
[8] Accepted for use, City of New York Board of Standards and Appeals, Calendar Number 219-76-SA.
[9] Accepted for use, City of New York Department of Buildings, MEA 89-92-E, Vol. 16.
[10] Listings and Approvals limited to Light Hazard Occupancies where allowed by the installation standards being applied, with hydraulically calculated wet systems only. **Exception:** 4.2K sprinklers may be installed on hydraulically calculated dry pipe systems where piping is corrosion resistant or internally galvanized.
[11] The sprinkler orifice is bushed.
[12] CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001 and 0832-CPD-2003.
[13] CE Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40278.
[14] CE Certified, Standard EN 12259-1, EC-certificate of conformity 0786-CPD-40131.
[15] ⎈ MED Certified, Standard EN 12259-1, EC-certificate of conformity 0832-MED-1003 and 0832-MED-1008.

VIKING®

TECHNICAL DATA

MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 on page 51c)

cULus Listing Requirements:

Microfast® and MicrofastHP® Quick Response Upright and Conventional Sprinklers are cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers, or old style (conventional) sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies *(exception: small orifice sprinklers are limited to Light Hazard where allowed by the installation standards being applied, with hydraulically calculated wet systems only).*
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed. For conventional sprinklers, refer to the installation guidelines for old style (conventional) sprinklers.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

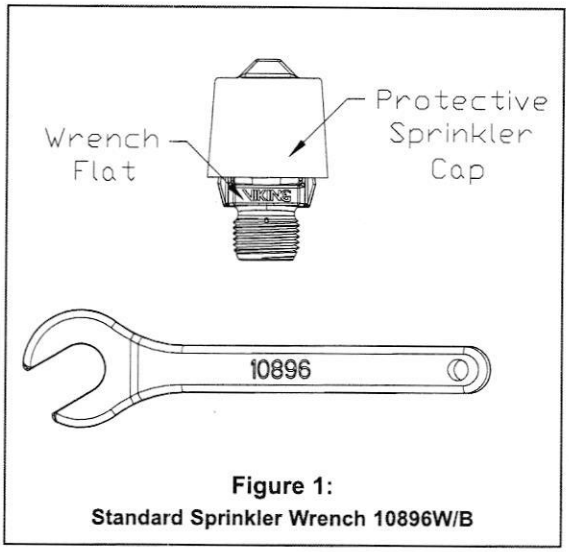

Figure 1:
Standard Sprinkler Wrench 10896W/B

VIKING®

TECHNICAL DATA

MICROFAST® AND MicrofastHP® QUICK RESPONSE UPRIGHT AND CONVENTIONAL SPRINKLERS

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart 2 (FM)

Microfast® Quick Response Upright Sprinklers
Maximum 175 PSI (12 bar) WWP

KEY: A1X ← Temperature, Finish, Escutcheon (if applicable)

Base Part Number[1]	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals[3] (Refer also to Design Criteria below.)
		NPT	BSP	U.S.	metric[2]	Inches	mm	
Standard Orifice								
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A2, B3
07060	VK345	--	15 mm	5.6	80.6	2-3/16	56	A2
Large Orifice								
06665B	VK350	3/4"	--	8.0	115.2	2-5/16	59	A2, B3
14817	VK350	--	20 mm	8.0	115.2	2-5/16	59	A2, B3
06764B	VK350	1/2"	15 mm	8.0	115.2	2-5/16	59	A2, B3
Small Orifice[4]								
06717B[6]	VK325	1/2"	15 mm	2.8	40.3	2-3/16	56	A1

Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)
B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141°C)

Approved Finishes

1 - Brass and Chrome-Enloy®
2 - Brass, Chrome-Enloy®, White Polyester[5], and Black Polyester[5]
3 - ENT

Footnotes

[1] Base part number is shown. For complete part number, refer to Viking's current price schedule.

[2] Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

[3] This table shows the FM Approvals available at the time of printing. Check with the manufacturer for any additional approvals.

[4] FM Approved as quick response **Non-Storage** pendent sprinklers. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0).

[5] Other colors are available on request with the same Approvals as the standard colors.

[6] The sprinkler orifice is bushed.

DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

FM Approval Requirements:

The sprinklers indicated in Approval Chart 2 are FM Approved as quick response **Non-Storage** upright sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

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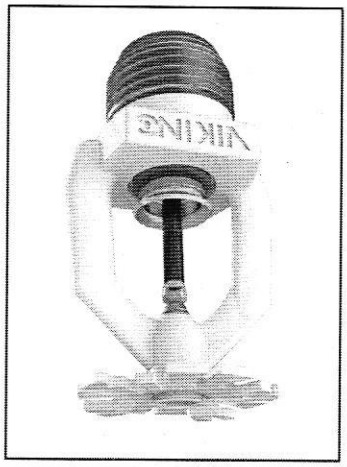
VIKING®

TECHNICAL DATA

FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK470 (K3.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

1. DESCRIPTION



Viking Freedom® Residential Pendent Sprinkler VK470 is a thermosensitive, glass-bulb residential sprinkler available in several different finishes and temperature ratings to meet varying design requirements. The Electroless Nickel PTFE (ENT) coating has been investigated for installation in corrosive atmospheres and is C-UL-US-EU Listed as corrosion resistant as indicated in the Approval Chart. The sprinkler orifice design, with a K-Factor of 3.0 (43.2 metric*), allows efficient use of available water supplies for the hydraulically designed fire-protection system. The glass bulb operating element and special deflector characteristics meet the challenges of residential sprinkler standards.

2. LISTINGS AND APPROVALS

c UL us EU **UL Listed (C-UL-US-EU):** Category VKKW
Refer to the Approval Chart and Design Criteria for C-UL-US-EU Listing requirements that must be followed.

3. TECHNICAL DATA

Specifications:
Avaiilable since 2012.
Minimum Operating Pressure: Refer to the Approval Chart.
Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).
Thread size: 1/2" (15 mm) NPT
Nominal K-Factor: 3.0 U.S. (43.2 metric*)
* Metric K-factor measurement shown is in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 2-1/4" (58 mm)
Covered by the following U.S. Patent: 9,265,981

Viking Technical Data may be found on The Viking Corporation's Web site at http://www.vikinggroupinc.com. The Web site may include a more recent edition of this Technical Data Page.

Material Standards:
Frame Casting: QM Brass
Deflector: Phosphor Bronze UNS-C51000 or Brass UNS-C23000
Bulb: Glass, nominal 3 mm diameter
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Compression Screw: Brass UNS-C36000
Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400
For ENT coated sprinklers: Belleville spring - Exposed, Screw and Pipcap - ENT plated.

Ordering Information: (Also refer to the current Viking price list.)
Sprinkler: Base Part No. 17147
Order Sprinkler VK470 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.
Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN
Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D
For example, sprinkler VK470 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 17147AB.

Available Finishes And Temperature Ratings: Refer to Table 1.

Accessories: (Also refer to the Viking website)

Sprinkler Wrenches:
A. Standard Wrench: Part No. 10896W/B (available since 2000)
B. Wrench for Recessed Sprinklers: Part No. 13655W/B** (available since 2006)
C. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool*** Part No. 15915 (available since 2010.)
**A ½" ratchet is required (not available from Viking).
***Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F_051808.

Sprinkler Cabinets:
A. Six-head capacity: Part No. 01724A (available since 1971)
B. Twelve-head capacity: Part No. 01725A (available since 1971)

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Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Model VK470 Sprinkler is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating[1]	Maximum Ambient Ceiling Temperature[2]	Bulb Color
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow

Sprinkler Finishes: Brass, Chrome, White Polyester, Black Polyester, and ENT

Corrosion Resistant Coatings[3]: ENT

Footnotes

[1] The sprinkler temperature rating is stamped on the deflector.

[2] Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

[3] The corrosion resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Chart. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For ENT coated sprinklers, the waterway is coated. Note that the spring is exposed on sprinklers with ENT coating.

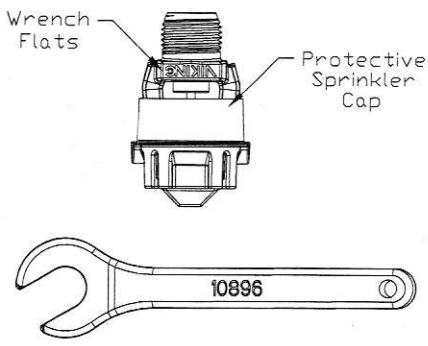


Figure 1: Standard Sprinkler Wrench 10896W/B

VIKING®

TECHNICAL DATA

FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK470 (K3.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Approval Chart
Viking VK470, 3.0 K-Factor Residential Pendent Sprinkler

For systems designed to NFPA 13D or NFPA 13R. For systems designed to NFPA 13, refer to the design criteria. For Ceiling types refer to the current editions of NFPA 13, 13R or 13D

Sprinkler Base Part Number [1]	SIN	NPT Thread Size		Nominal K-Factor		Maximum Water Working Pressure	Overall Length	
		Inches	mm	U.S.	metric [2]		Inches	mm
17147	VK470	1/2	15	3.0	43.2	175 psi (12 bar)	2-1/4	58

Max. Coverage Area [4] Ft.X Ft. (m X m)	Ordinary Temp Rating (155 °F/68 °C)		Intermediate Temp Rating (175 °F/79 °C)		Deflector to Ceiling	Installation Type	Listings and Approvals [3]			Minimum Spacing Ft. (m)
	Flow [4] GPM (L/min)	Pressure [4] PSI (bar)	Flow [4] GPM (L/min)	Pressure [4] PSI (bar)			c UL us [5] EU	NYC	NSF	
12 X 12 (3.7 X 3.7)	8 (30.3)	7.11 (0.49)	8 (30.3)	7.11 (0.49)	1-1/8 to 2 inch	Standard surface-mounted escutch-eons, the Microfast® Model F-1 Adjustable Escutcheon, **or** recessed with the Micromatic® Model E-1, E-2, or E-3 Recessed Escutcheon	See Footnotes 6 and 9	See Foot-note 7	--	8 (2.4)
14 X 14 (4.3 X 4.3)	10 (37.9)	11.11 (0.77)	10 (37.9)	11.11 (0.77)						
16 X 16 (4.9 X 4.9)	13 (49.2)	18.8 (1.29)	13 (49.2)	18.8 (1.29)						

Footnotes

[1] Part number shown is the base part number. For complete part number, refer to Viking's current price schedule.

[2] Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

[3] This chart shows the listings and approvals available at the time of printing. Other approvals may be in process. Check with the manufacturer for any additional approvals. Refer also to Design Criteria.

[4] For areas of coverage smaller than shown, use the "Flow" and "Pressure" for the next larger area listed. Flows and pressures listed are per sprinkler.

[5] Listed by Underwriter's Laboratories, Inc. for use in the U.S., Canada, and European Union.

[6] Approved Finishes are: Brass, Chrome, White Polyester, and Black Polyester [8].

[7] Meets New York City requirements, effective July 1, 2008.

[8] Other paint colors are available on request with the same C-UL-US-EU listings as the standard finish colors.

[9] Approved finish is Electroless Nickel PTFE (ENT). ENT is C-UL-US-EU Listed as corrosion resistant. ENT is available with standard surface-mounted escutcheons or the Micromatic Model E-1 Recessed Escutcheon.

VIKING®

TECHNICAL DATA

FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK470 (K3.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

DESIGN CRITERIA

(Also refer to the Approval Chart.)

UL Listing Requirements (C-UL-US-EU):

When using Viking Residential Pendent Sprinkler VK470 for systems designed to NFPA 13D or NFPA 13R, apply the listed areas of coverage and minimum water supply requirements shown in the Approval Chart.

For systems designed to NFPA 13: The number of design sprinklers is to be the four contiguous most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the following:

- The flow rates given in the Approval Chart for NFPA 13D and NFPA13R applications for each listed area of coverage, **or**
- Calculated based on a minimum discharge of 0.1 gpm/sq. ft. over the "design area" in accordance with sections 8.5.2.1 or 8.6.2.1.2 of NFPA 13.
- Minimum distance between residential sprinklers: 8 ft. (2.4 m).

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Also refer to Form No. F_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA and any other similar Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable. Final approval and acceptance of all residential sprinkler installations must be obtained from the Authorities Having Jurisdiction.

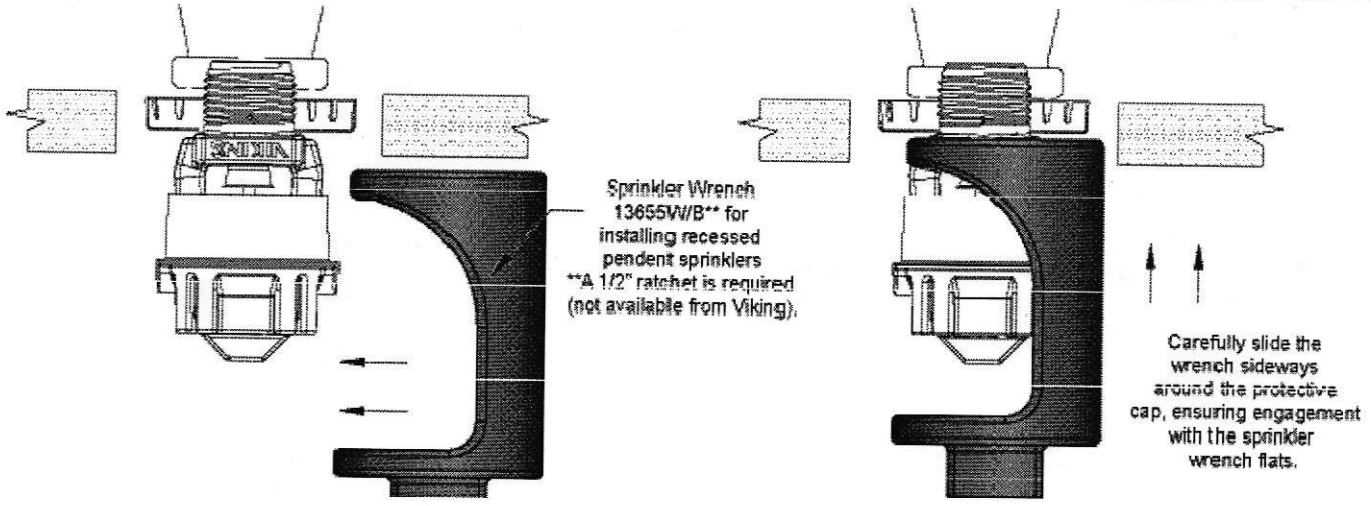


Figure 2: Wrench 13655W/B for Installing Recessed Sprinkler VK470

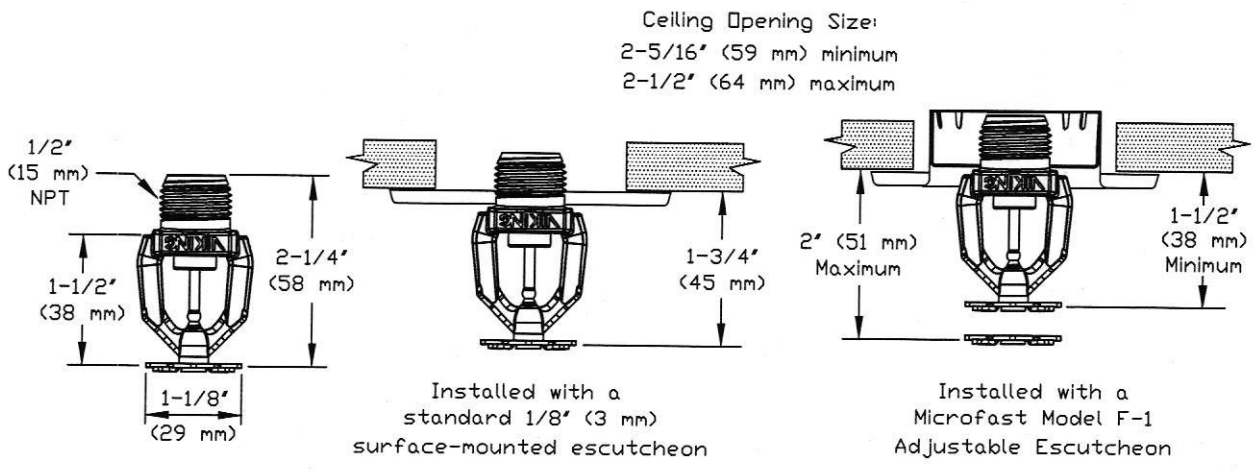


Figure 3: Sprinkler VK470 Dimensions with a Standard Escutcheon and the Model F-1 Adjustable Escutcheon

VIKING®

TECHNICAL DATA

FREEDOM® RESIDENTIAL PENDENT SPRINKLER VK470 (K3.0)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

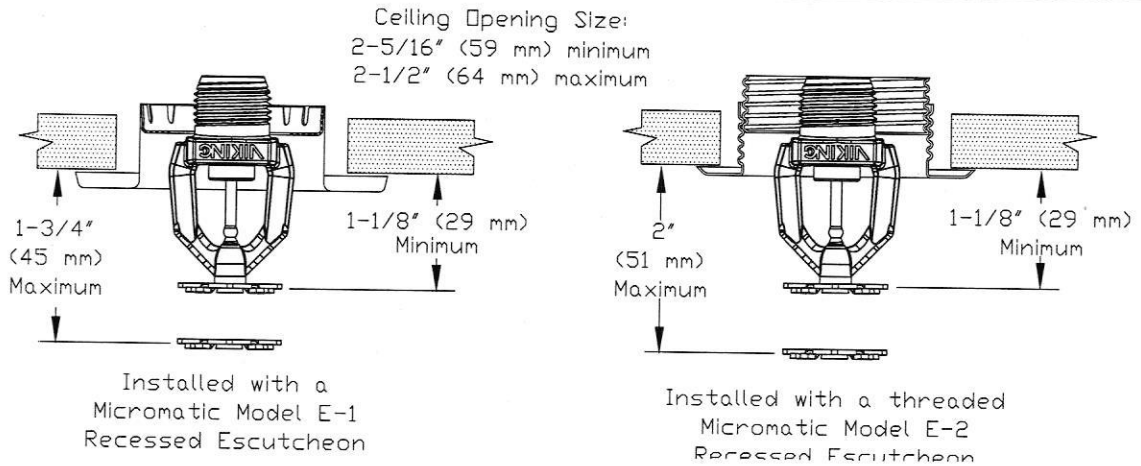
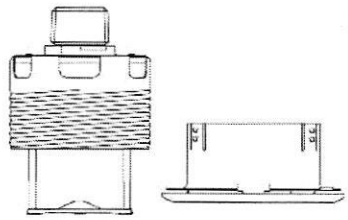


Figure 4: Sprinkler VK470 Dimensions with the Model E-1 and E-2 Recessed Escutcheons

SENJU SPRINKLER CO.,LTD.

Residential Lead Free Flat Concealed Sprinkler, Pendent,
Model: RC-RES, K-Factor: 3.7, SIN: SS8261



GENERAL DESCRIPTION

The Model RC-RES Residential Flat Concealed Sprinklers are automatic sprinklers of the compressed fusible solder type. These are decorative and fast response. The Cover Plate Assembly hides the Deflector, Heat Responsive Element etc., which is in turn concealed above the ceiling. The cover plate has a flat profile, and its diameter is extremely small (2-5/8 inch, 68mm). The push-on and/or thread-on, thread-off design of the concealed cover plate assembly allows easy installation of the cover plate. Therefore, the Model RC-RES should be your first choice when aesthetics is the major consideration for ultimate appeal and unbeatable performance is desired. The Model RC-RES is designed for the residential occupancies and it is perfect for use in homes, hotels and other living quarters.

The Model RC-RES is to be used in wet pipe residential sprinkler systems for One- and Two- Family Dwellings and Manufactured Homes per NFPA 13D; wet pipe residential sprinkler systems for Residential Occupancies up to and Including Four Stories in Height per NFPA 13R; or, wet pipe sprinkler systems for the residential portions of any occupancies per NFPA 13.

The Model RC-RES has a 3.7 (53.3 LPM/bar$^{1/2}$) K-factor that meets the required residential flow rates with minimal residual pressure, which allows for smaller pipe sizes and water supply requirements.
For extended installation flexibility, the Model RC-RES provides 1/2 inch (12.8mm) vertical adjustment. This adjustment in installation decreases the need for precise cutting of the pipe that drops to the sprinkler and allows for a perfect fit with a range of pipe lengths.

The heat sensitivity and water distribution design of Model RC-RES allows for an increased chance of residents' escape or evacuation in case of fire. However, residential fire sprinkler systems are not a substitute for fire safety awareness or fire safety construction required by building codes.

"Lead Free" is defined in the Reduction of Lead in Drinking Water Act (S.3874) endorsed by AWWA's Water Utility Council, and California Assembly Bill #1953 as having less than or equal to a weighted average of 0.25% lead in wetted surface of pipes, plumbing fittings and fixtures.

WARNINGS

The Model RC-RES must be installed and maintained in accordance with the rules stated herein as well as in compliance with the applicable standards of the National Fire Protection Association regulations and the standards of any other authorities having jurisdiction.
In the event of this condition, consult the authorities having jurisdiction for guidance and approval.
Failure to do so may impair the integrity of these devices.

It is the responsibility of the 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 with any related questions.

TECHNICAL DATA

Approvals: **$_{c}UL_{us}$ Listed, NSF-61-G**

Sprinkler Identification Number (SIN): **SS8261**

Maximum Working Pressure: **175psi (12.1bar)**

Discharge Coefficient (Nominal K-Factor):
K=3.7 GPM/psi$^{1/2}$ (53.3 LPM/bar$^{1/2}$)

Temperature Rating:
162℉ (72℃) Sprinkler with 140℉ (60℃) Cover Plate
175℉ (79℃) Sprinkler with 140℉ (60℃) Cover Plate
175℉ (79℃) Sprinkler with 162℉ (72℃) Cover Plate

Color Code (Sprinkler)
162℉ (72℃): Uncolored
175℉ (79℃): White

Color Code (Cover Plate)
140℉ (60℃): No Mark
162℉ (72℃): White-Colored Mark

Vertical Adjustment: **1/2 inch (12.8 mm)**

Cover Plate Finishes:
Standard Finishes-

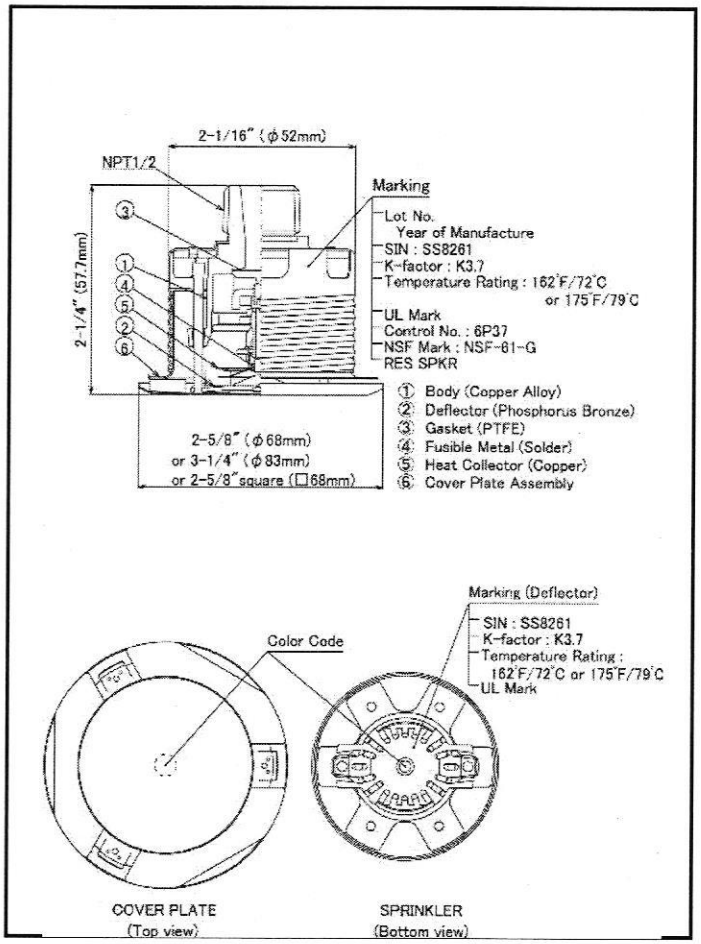
White, Ivory, Beige, Brown, Black, Nickel, Wood Grain

Custom Finishes-

Custom color and custom pattern cover plates are available on special order. Contact a Senju Sprinkler representative with any custom orders.

Please see chart on Page 8 for more detail.

Physical Characteristics: **Ref. Figure 1**



OPERATION

In case of fire, the solder component that holds together the Cover Plate and the Retainer melts. Then, the Cover Plate is released at once. As a result, the Deflector drops down to the intended position. Two Heat Collectors are exposed to fire, and when sufficient heat from the fire is recorded, internal components of the sprinkler to fall apart. This leads to allow the water flow to be distributed on the affected by fire area. (Ref. Figure 2)

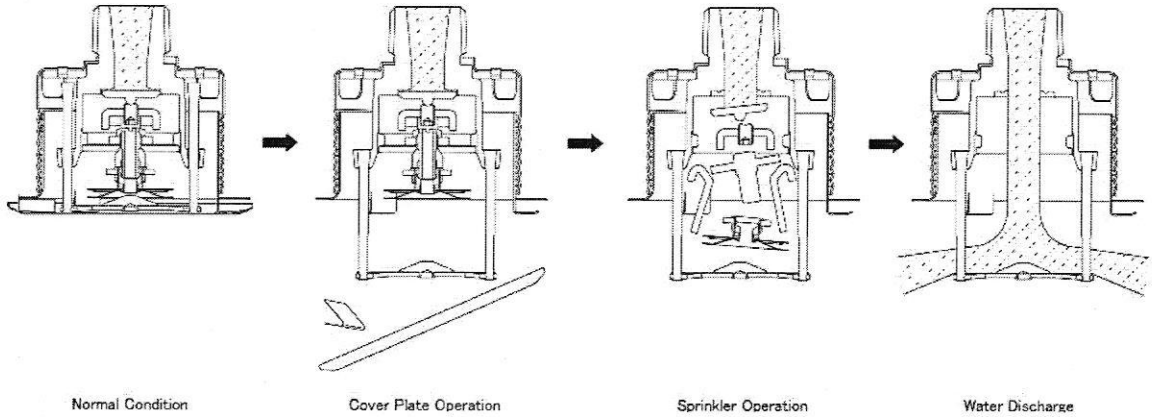


FIGURE 2. OPERATION PROCESS (The figure is for illustrative purpose only)

DESIGN CRITERIA

The herein stated rules for use and installation of Model RC-RES are provided by the manufacturer and must be strictly implemented for safe and full results.

NOTES

Residential Fire Sprinkler Systems should only be designed and installed by individuals who are completely familiar with automatic sprinkler system design, installation procedures, and techniques.

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.

Questions concerning sprinkler installation and usage criteria, which are not coverage by the following instructions, should be submitted to Contact Company. Include sketches and technical details as appropriate.

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, 13D, 13R, or by the authority having jurisdiction.

The Model RC-RES must not be used in applications where the air pressure above the ceiling is greater than that below. Inspect all sprinklers after installation to ensure that both the gap between the cover plate, ceiling and the 6 slots in the cup are open and free from any air flow impediment.

The spray from the sprinkler is distributed radically outward and downward from the sprinkler deflector. Consequently, the sprinklers must be located such that there will be no blind spaces shielded from spray by partitions, room dividers, overhangs or other parts of the dwelling structure.

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

Use only the Cover Plate provided with the Model RC-RES. The sprinkler must be secured in place by firmly fastening the sprinkler system piping to the structure. If the sprinkler is not properly secured in position, reaction forces resulting from sprinkler operation could alter its orientation and its water distribution pattern.

Obstruction to Water Distribution

Locations of sprinklers must follow the obstruction rules of NFPA 13 for Residential Sprinklers.

General Service Conditions

The Model RC-RES must only be utilized in WET PIPE sprinkler systems.

Heat Source Criteria

Refer to NFPA 13D or 13R for the requirements relating to the prevention of possible activation of the Heat Responsive Element of Model RC-RES, due to exposure to a heat sources other than an actual fire.

Available Sprinkler Temperature Ratings			
Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating	Maximum Ambient Ceiling Temperature	Temperature Rating of the Cover Plate Assembly
Ordinary	162℉ (72℃)	100℉ (38℃)	140℉ (60℃)
Intermediate	175℉ (79℃)	150℉ (66℃)	140℉ (60℃) 1)
Intermediate	175℉ (79℃)	150℉ (66℃)	162℉ (72℃)

1) Maximum ambient temperature for the Cover Plate Assembly is 100℉ (38℃).

Precautionary Warnings for Corrosive Environments

The Model RC-RES should not be installed where they may be subjected to a corrosive environment including the following:

(1) Chlorine ion and Chloride environment.

Stress corrosion cracking may be caused by exposure to environments with Chlorine ion and Chloride. Exposure to this environment may result in sprinklers operating under Non-Fire conditions or Not Operating when exposed to an actual fire.

(2) Sprinkler system piping with Copper.

Sprinkler systems should be constructed in compliance with the applicable standards and the requirements for the copper piping when copper piping is used in the sprinkler system. (Reference standards NFPA 13, ASTM B813, B828, and CDA (Copper Development Association) – Solder Joint)

All residual flux must be removed from the interior and exterior of copper piping by thoroughly flushing before installation of the Sprinkler Heads. Otherwise, residues of flux may cause corrosion and leakage in the sprinkler system.

Hydraulic Design Criteria

The minimum required sprinkler flow rates for system designed to NFPA 13D or 13R are given in Table A as a function of temperature rating and the maximum allowable coverage areas. The sprinkler flow rate is the minimum required discharge from the most hydraulically demanding sprinkler from each of the total number of "design sprinklers" as specified in NFPA 13D or 13R.

For systems designed to NFPA 13, the number of designed sprinklers is to be the four most hydraulically demanding sprinklers. The minimum required discharge from each of the four sprinklers is to be the greater of the followings;

- The flow rates given in Table A for NFPA 13D and 13R as a function of temperature rating and maximum allowable coverage area.
- A minimum discharge 0.1GPM/sq.ft. [4.07LPM/sq.m] over the "design area" comprised of the four most hydraulically demanding sprinklers for the actual coverage areas being protected by the four sprinklers.

TABLE A. NFPA 13D & 13R WET PIPE HYDRAULIC DESIGN CRITERIA for Model SS8261

Maximum Coverage Area[a] Ft. × Ft. (m ×m)	Maximum Spacing Ft. (m)	Ordinary Temperature Rating 162℉ (72℃)		Intermediate Temperature Rating 175℉ (79℃)		Deflector to Ceiling	Installation Type	Minimum Spacing Ft. (m)
		Flow[b] GPM (LPM)	Pressure[b] PSI (bar)	Flow[b] GPM (LPM)	Pressure[b] PSI (bar)			
12×12 (3.7×3.7)	12 (3.7)	10 (37.8)	7.3 (0.50)	11 (41.6)	8.8 (0.60)	Smooth Ceilings 3/8 to 7/8 Inches. Beamed Ceilings per NFPA 13D,13R or 13 Installed in beam 3/8 to 7/8 inches below bottom of beam.	Concealed	8 (2.4)
14×14 (4.3×4.3)	14 (4.3)	10 (37.8)	7.3 (0.50)	11 (41.6)	8.8 (0.60)			

(a) For coverage area dimensions less than the above mentioned, it needs to use the minimum required flow for the Next Higher Coverage Area listed.

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

(c) For systems with ceiling types smooth flat horizontal, or beamed, or sloped, in accordance with the 2013 Edition of NFPA 13D, 13R or 13 as applicable.

Sprinkler Spacing Criteria

The minimum spacing between sprinklers is 8 feet (2.4m). The maximum spacing between sprinklers cannot go beyond the coverage area calculated by using the specific hydraulic factors. (Ref. Table A)

INSTALLATION

The Model RC-RES must be installed in accordance with the following instructions.

NOTES

Do not use any sprinklers which have been subjected to potential mechanical damage. Do not use any sprinklers which show deformation or cracking in either the Sprinkler or the Protective Cap.

Prior to installation, sprinklers should be maintained in the original cartons and packaging until used to minimize the potential for damage to sprinklers that would cause improper operation or non-operation.

The Protective Cap must remain on the sprinkler during installation and until the ceiling installation is completed. The Protective Cap must be removed to place the sprinkler in service.

Use a torque of 7 to 14 ft.lbs (9.5 to 19.0Nm) to achieve a 1/2 inch NPT sprinkler joint. If you exceed the recommended maximum torque, this could result in damage to the sprinkler inlet, which may lead to leakage from the sprinkler.

In case of insufficient adjustment in Cover Plate installation, do not try to overly tighten, screw the sprinkler too loosely or make any modification to the cover plate assembly. Readjust the sprinkler fitting for a better fit.

Do not force to rotate the Cap Remover RC to the left when placing the two hook arms into place. The installed sprinkler may become loosened, which may cause water leakage.

Installing Procedure

Step 1

The installation requirements for the sprinkler are as follows: to be installed only in the pendent position with the waterway perpendicular to the ceiling. Install the sprinkler fitting so that the distance from the face of the fitting to the mounting surface will be nominally 2 inch (50.8mm) as shown in Figure 3.

Step 2

With pipe thread sealant applied to the threads, hand tighten the sprinkler into the sprinkler fitting. Then tighten it with the Sprinkler Socket or Wrench & Socket Combination (Ref. Figure 4). The grooves of the Socket must fit perfectly with the grooves on the Sprinkler for proper installation (Ref. Figure 4).

Step 3

If desired the Protective Cap may also be used to locate the center of the clearance hole by gently pushing the ceiling material against the center point of the Protective Cap. Before the installation of the ceiling, the sprinkler installation can be started with the 2-3/8 inch (60mm) diameter clearance hole (Ref. Figure 3). Use the "Tolerance Limit of Ceiling Level" indicator on the Protective Cap to check for proper installation height (Ref. Figure 3).

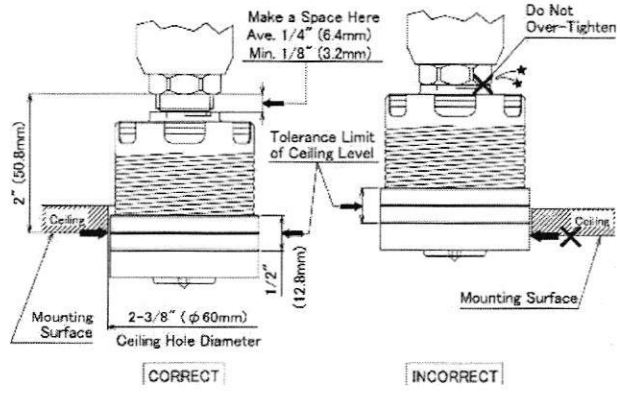


FIGURE 3. INSTALLATION

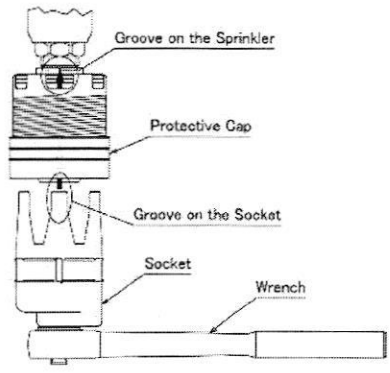


FIGURE 4

Step 4

Use the Cap Remover RC to remove the Protective Cap (Ref. Figure 5), and then push or screw a Cover Plate Assembly on the Cup of the Sprinkler by hand until its flange just comes in contact with the ceiling (Ref. Figure 6 and Figure 7). Stop tightening the Cover Plate Assembly once the flange has come in contact with the ceiling. If the ceiling has been lifted from its normal position in the process of tightening of the Cover Plate Assembly, readjust the cover plate assembly as necessary. If

the flange of the Cover Plate Assembly cannot come in contact with the ceiling sufficiently, readjust the sprinkler fitting as necessary. When properly installed, there is a nominal 1/16 inch (1.6mm) air gap between the lip of the Cover Plate and the ceiling, as shown in Figure 6

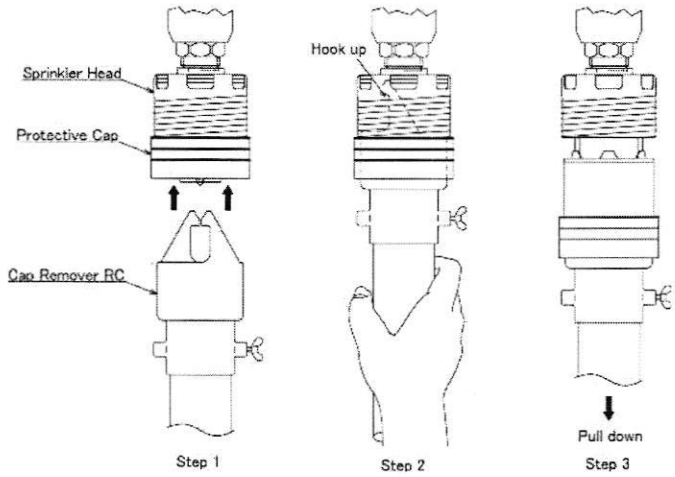


FIGURE 5. PROTECTIVE CAP REMOVAL

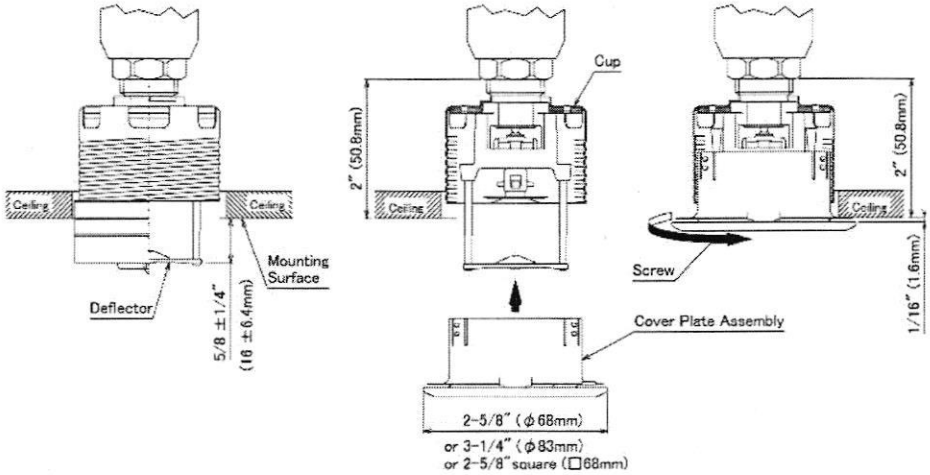


FIGURE 6

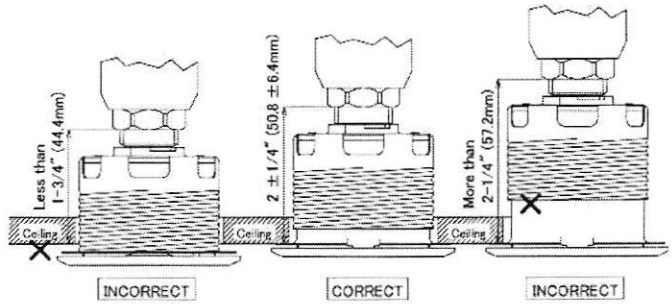


FIGURE 7. INSTALLATION (CORRECT OR INCORRECT)

CARE AND MAINTENANCE

The following instructions must be implemented for the maintenance and service of the Model RC-RES.

NOTES

Wet pipe sprinkler systems must be maintained at a minimum temperature of 40℉/4℃ to prevent freezing and bursting of the pipe and/or sprinklers.

Automatic sprinklers are not to be tested with a heat source. Operation of the heat responsive element can result.

Absence of a Cover Plate Assembly may delay the response time of the sprinkler in case of fire.

Install the cover plate assembly properly, as shown in Figure 6. Improper installation of the cover plate assembly may cause improper operation or non-operation.

If the ceiling is to be repainted after the installation of the Sprinkler, care must be exercised to ensure that the new paint does not seal off any of the air gap.

Factory painted Cover Plates must not be repainted. They should be replaced, if necessary, by factory painted cover plates. Non-factory applied paint may adversely delay or prevent sprinkler operation in case of a fire.

Do not pull the Cover Plate. Separation may result.

In preparation for maintenance of the fire protection system, permission to close the main control valve must be obtained from the proper authorities and all affected by this action parties must be informed before the maintenance session can commence.

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

Do NOT hang anything from the sprinklers.
Do NOT clean 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.

Exercise suitable safety precautions in the use and storage of highly flammable materials. The rapid rate of fire development and spread of these materials can reduce the ability of the sprinkler systems to aid in the control of a fire involving such hazards.

Leaking or corroded sprinklers must be replaced.

Automatic Sprinklers must never be shipped or stored where the temperature exceeds 100℉ / 38℃.

Automatic sprinkler must never be physically altered, such as painted, plated, or coated, once shipped from the factory. If the sprinklers have been in any way modified, they must be replaced.

Great caution must be applied to prevent damage to the sprinklers at all stages - before, during, and after installation. Damaged units, as a result of dropping, hitting, over-tightening, or wrench slippage, must be replaced.

The Model RC-RES 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, and the same or lower flow ratings (as indicated under Table A "Hydraulic Design Criteria").

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

The owner is responsible for the maintenance of the sprinkler system, including inspection and testing, its compliance with this documents, as well as the standards of the National Fire Protection Association (e.g., NFPA 25), and the regulations of any other authorities having jurisdiction. The owner should direct any questions regarding the above rules and regulations to the installing contractors or the sprinkler manufacturer. It is recommended that automatic sprinkler systems be inspected, tested, and maintained by a qualified Inspection Service in accordance with NFPA 25.

ORDER PROCEDURE

When placing an order, please contact a local distributor with the following information (Model Name, Specify, Temp. and Finish).

Sprinkler:

Model: RC-RES

(SIN: SS8261, Residential Flat Concealed Sprinkler, Pendent, K3.7, Temperature: 162℉ (72℃) or 175℉ (79℃))

Cover Plate Assembly:

2-5/8 inch (ϕ 68mm) or 3-1/4 inch (ϕ 83mm) or 2-5/8 inch square (□68mm), Order Separately from Sprinkler
Please refer to the chart below for available sizes, temperature, and finishes.

	Standard Finishes							Custom Finishes	
	White	Ivory	Beige	Brown	Black	Nickel	Wood grain	Custom Color	Custom Pattern
2-5/8" Round, 140°F	O	O	–	–	–	O	–	O	O
3-1/4" Round, 140°F	O	O	O	O	O	O	O	O	O
2-5/8" Square, 140°F	O	–	–	–	–	–	–	O	O
2-5/8" Round, 162°F	O	–	–	–	–	–	–	O	O
3-1/4" Round, 162°F	O	–	–	–	–	–	–	O	O

Tools for Installation of Model: RC-RES

- Socket for Model RC-RES
- Wrench & Socket for Model RC-RES
- Cap Remover RC


1¼" LF009M2QT
WATTS RP
Watts.com
B64.4
Certified to NSF/ANSI 61
1013
SER. NO: 1846
180°F 175 PSI

2" 3 4 5 6 7 8 9 10 11 12 13 14 15