TECHNICAL DATA

STANDARD RESPONSE UPRIGHT SPRINKLER VK598 (K25.2)

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
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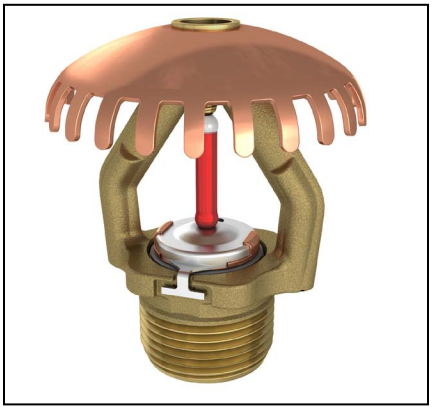
1. DESCRIPTION



Viking Standard Response Upright Sprinkler VK598 is a thermosensitive glass bulb spray sprinkler available in various temperature ratings to meet design requirements. The 25.2 nominal K-Factor provides greater flows at lower pressures to protect higher ceiling and storage heights.

VK598 may be used in the protection of open storage racks, solid piled, palletized, storage commodities, bin box, etc. Provides protection up to Class III commodities at a maximum storage height of 40ft. (12.2m) with ceiling heights of 45ft. (13.7m.). Group A plastics (cartoned, unexpanded) protection to a maximum storage height of 25ft. (7.6m) with ceiling heights of 30ft. (9.1m). For additional storage arrangements and protection schemes refer to applicable FM Global Loss Prevention Data Sheets and the FM tables and charts within this Technical Data Sheet.

2. LISTINGS AND APPROVALS

FM Approved: Class 2029

Refer to Approval Chart 1 and Design Criteria for FM Approval requirements that must be followed.

Approved for use in FM Approved vacuum dry sprinkler systems with a maximum supervisory vacuum pressure of -3 psi (-207 mbar).

3. TECHNICAL DATA

Specifications:

Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).
Thread size: 1” NPT or 25 mm BSP
Nominal K-Factor: 25.2 U.S. (363 metric*)

* 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.

Glass-bulb fluid temperature rated to -65 °F (-55 °C)
Overall Length: 3-1/4” (83 mm)

Material Standards:

Sprinkler Frame: Brass UNS-C84400
Deflector: Phosphor Bronze UNS-C51000
Bulb: Glass, nominal 5 mm diameter
Pip Cap: Copper UNS-C11000 and Stainless Steel UNS-S30400
Compression Screw: Stainless Steeel UNS-S31603 or ENT coated Brass UNSC36000
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape

Ordering Information: (Also refer to the current Viking price list.)

Order Standard Response Upright Sprinkler VK598 by adding the appropriate suffix for the sprinkler temperature rating to the sprinkler base part number.
Finish Suffix: Brass = A
Temperature Suffix: 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, and 286 °F (141 °C) = G
For example, sprinkler VK598 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 19522AB.

Available Finishes And Temperature Ratings:

Refer to Table 1.

Accessories: (Also refer to the Viking website.)

Sprinkler Wrench:
Part No. 13635W/B (double-ended wrench - Use Side B.)
Available since 2006.

Sprinkler Cabinet:

Six-head capacity: Part No. 01731A (available since 1971)

4. INSTALLATION

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Refer to the appropriate FM Global Loss Prevention Data Sheets.

5. OPERATION

During fire conditions, when the temperature around the sprinkler reaches its operating temperature, the heat-sensitive liquid in the glass bulb expands, causing the bulb 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 FM 2-81 for Inspection, Testing and Maintenance requirements.

7. AVAILABILITY

The Viking Model VK598 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

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
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

Available Sprinkler Finish: Brass

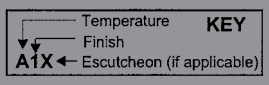
Footnotes

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

[2] Based on FM 2-0. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

Approval Chart (FM)

Standard Response Upright Sprinkler VK598 (K25.2)
Maximum 175 PSI (12 Bar) WWP



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	
19522A	VK598	1”	--	25.2	363	3-1/4	83	A1
19764A	VK598	--	25 mm	25.2	363	3-1/4	83	A1

Approved Temperature Ratings	Approved Finish
A - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)	1 - Brass

Footnotes

[1] Base part number 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. Other approvals may be in process.

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DESIGN CRITERIA- FM

(Also refer to Approval Chart)

FM Approval Requirements:

- Sprinkler VK598 is FM Approved as a standard response **Storage** upright sprinkler as indicated in the FM Approval Guide.
- Sprinkler VK598 is also FM Approved as a standard response **Non-storage** upright sprinkler as indicated in the FM Approval Guide.

For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheets 2-0 and 8-9). 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.

Loss Prevention Recommendations

For wet system and dry system maximum storage information refer to FM Data Sheet 8-9. Ensure the required pressure is reached and maintained within the time frame mandated by FM Global. The Viking VK598 upright automatic sprinkler shall be installed in accordance with the following guidelines:

TABLE ONE
VK598 Upright Sprinkler for Wet Systems Class I - IV and Cartoned Unexpanded Group A Plastic Solid-Piled, Palletized, Shelf or Bin-Box arrangements

Heights		Description	Design Criteria
Ceiling (Up To and Including)	Storage (Up To and Including)		
35ft/10.7m	30ft/9.1m	Number of Sprinklers	15*
		Discharge Pressure (psi/kPa)	7/48*
		System Demand (gpm/lpm)	1001/3789*
		Hose Stream Demand	500gpm(1893lpm)/90min
30ft/9.1m	25ft/7.6m	Number of Sprinklers	12
		Discharge Pressure (psi/kPa)	20/138
		System Demand (gpm/lpm)	1352/5118
		Hose Stream Demand	250gpm(946lpm)/60min

* Up to Class III Commodities only

Data based upon FM Global Loss Prevention Data Sheet 8-910ft x 10ft/3m x 3m sprinkler spacing, 12”/305mm thermal element to ceiling distance

TABLE TWO
VK598 Upright Sprinkler for Wet Systems
Class I-IV and Cartoned Unexpanded Group A Plastic
Solid-Piled, Palletized, Shelf or Bin-Box Arrangements
Open Frame Rack Storage Arrangements Without Need for In-Rack Sprinklers

Heights		Description	Design Criteria
Ceiling (Up To and Including)	Storage (Up To and Including)		
30ft/9.1m	25 ft/7.6m	Number of Sprinklers	12
		Discharge Pressure (psi/kPa)	20/138
		System Demand (gpm/lpm)	1352/5118
		Hose Stream Demand	250gpm(946lpm)/60min

* Up to Class III Commodities only

VIKING	TECHNICAL DATA	STANDARD RESPONSE UPRIGHT SPRINKLER VK598 (K25.2)

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DESIGN CRITERIA- FM

(Also refer to Approval Chart)

TABLE THREE
VK598 Upright Sprinkler for Refrigerated and Freezer Dry/Preaction Systems
Class I - III Commodity Storage
Solid-Piled, Palletized, Shelf or Bin-Box arrangements

Heights		Description	Design Criteria
Ceiling (Up To and Including)	Storage (Up To and Including)		
45ft/13.7m	40ft/12.2m	Number of Sprinklers	12*
		Discharge Pressure (psi/kPa)	50/345*
		System Demand (gpm/lpm)	2140/8101*
		Hose Stream Demand	500gpm(1893lpm)/90min
40ft/12.2m	35ft/10.7m	Number of Sprinklers	24**
		Discharge Pressure (psi/kPa)	15/103**
		System Demand (gpm/lpm)	2342/8865**
		Hose Stream Demand	500gpm(1893lpm)/120min
35ft/10.7m	30ft/9.1m	Number of Sprinklers	20
		Discharge Pressure (psi/kPa)	7/48
		System Demand (gpm/lpm)	1333/5046
		Hose Stream Demand	500gpm(1893lpm)/120min

* Based upon water delivery of 20 seconds or less
** Based upon water delivery of 25 seconds or less
Data based upon FM Global Loss Prevention Data Sheet 8-9
10ft x 10ft/3m x 3m deflector spacing, 12”/305mm thermal element to ceiling distance

TABLE FOUR
VK598 Upright Sprinkler for Refrigerated and Freezer Dry/Preaction Systems
Class I - III Commodity Storage
Open Frame Rack Storage after arrangements without need for in-rack sprinklers

Heights		Description	Design Criteria
Ceiling (Up To and Including)	Storage (Up To and Including)		
45ft/13.7m	40ft/12.2m	Number of Sprinklers	12*
		Discharge Pressure (psi/kPa)	50/345*
		System Demand (gpm/lpm)	2140/8101*
		Hose Stream Demand	500gpm(1893lpm)/90min
40ft/12.2m	35ft/10.7m	Number of Sprinklers	24**
		Discharge Pressure (psi/kPa)	15/103**
		System Demand (gpm/lpm)	2342/8865**
		Hose Stream Demand	500gpm(1893lpm)/120min
30ft/9.1m	25ft/7.6m	Number of Sprinklers	25
		Discharge Pressure (psi/kPa)	10/69
		System Demand (gpm/lpm)	1992/7541
		Hose Stream Demand	500gpm(1893lpm)/120min
25ft/7.6m	20ft/6.1m	Number of Sprinklers	20
		Discharge Pressure (psi/kPa)	7/48
		System Demand (gpm/lpm)	1333/5046
		Hose Stream Demand	500gpm(1893lpm)/120min

* Based upon water delivery of 20 seconds or less
** Based upon water delivery of 25 seconds or less
Data based upon FM Global Loss Prevention Data Sheet 8-9 10ft x 10ft/3m x 3m sprinkler spacing, 12”/305mm thermal element to ceiling distance.
Note: The water delivery time needs to be confirmed via an analysis by Engineering Standards or a software program listed in the Specification Tested Product section of the Approval Guide, an online resource of FM Approvals. If confirmed by the software program, base the sprinkler operation sequence on the simultaneous opening of the four most-remote sprinklers (two sprinklers on two lines).

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DESIGN CRITERIA- FM

(Also refer to Approval Chart)

Operating Area and Hose Stream Demand Requirements		
Operating Sprinklers:	**Hose Demand (gpm/lpm)**	**Duration (minutes)**
12**	250/946	60
13-15**	500/1893	90
16	500/1893	120

* One sprinkler for every 100 sq ft/9.3 sq m

** For ceiling heights above 35 ft/10.7m, to 45ft/13.7m, if using the 12 sprinklers for 50psi/345kPa discharge pressure design criteria, Hose Demand requirement is 500gpm/1893lpm for 90 minutes.

Data based upon FM Global Loss Prevention Data Sheet 8-9

The sprinkler can also be used to protect portable rack storage if the portable racks meet the requirements for them to be considered open-frame racks (see DS 8-9, Storage of Class I - IV and Plastic Commodities). For all storage arrangements, maintain a minimum 3 ft (0.9 m) clearance between the top of storage and the sprinkler deflector.

Commodity Hazards Other Than Class I- IV and Cartoned Plastics: The Viking VK598 upright sprinkler can be used to protect any commodity hazard that can be protected by the K11.2 (K160) upright CMSA sprinkler. Base the design for the K25.2 (K360) upright sprinkler using the same design required for the K11.2 (K160) sprinkler, however base the required pressure using the following chart.

Commodities other than Class I-IV and Cartoned Plastics	
Design Pressure of K11.2 (K160) CMSA Standard Response Upright Sprinkler*	**Corresponding Design Pressure of VK598 K25.2 (K360) Standard Response Upright Sprinkler***
psi/kPa	**psi/kPa**
Up to 25/170	7/48
Over 25/170 to 50/350	10/69

* One sprinkler for every 100 sq. ft/9.29 sq. m

Data based upon FM Global Loss Prevention Data Sheet 8-9

Shape of Operating Area: This sprinkler is not permitted in buildings having a ceiling slope over 10° unless the ceiling sprinkler is supplemented with in-rack sprinkler protection. Base the number of sprinklers in the Operating A rea parallel to the branchline based on the following equation:

Number of AS in operating area parallel to branchline = (shape factor / on-line AS spacing) x $\sqrt{\text{(Number of AS x area spacing of sprinklers)}}$

The shape factor is 1.2 for slope less than or equal to 5°.

The shape factor is 1.4 for slope greater than 5° and up to 10°.

Round these equations to the nearest whole number using standard rounding methods (i.e., round down if the resulting fraction is 0.49 or less, and round up if the resulting fraction is 0.50 or greater).

System Types: For the wet-type sprinkler system designs outlined above, wet-pipe sprinkler systems or pre-action sprinkler systems whose sprinkler protection design can be based on the equivalent of a wet-pipe system are acceptable. For the dry-type sprinkler system designs outlined above, dry-pipe sprinkler systems, pre-action sprinkler systems whose sprinkler protection design can be based on the equivalent of a dry-pipe system or refrigerated area sprinkler systems are acceptable.

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DESIGN CRITERIA- FM

(Also refer to Approval Chart)

Ceiling Height (Up To and Including)	Spacing and Coverage	
30 ft/9.1m	**Minimum Linear Distance Between Sprinklers**	**Maximum Linear Distance Between Sprinklers**
	8 ft/2.4m	12 ft/3.6m
	Minimum Area of Coverage	Maximum Area of Coverage
	80 ft2/ 7.43m2	100 ft2/ 9.29m2
above 30 ft/9.1m to 45 ft/13.7m	**Minimum Linear Distance Between Sprinklers**	**Maximum Linear Distance Between Sprinklers**
	8 ft/2.4m	10 ft/3m
	Minimum Area of Coverage	Maximum Area of Coverage
	80 ft2/ 7.43m2	100 ft2/ 9.29m2

Sprinkler Location from Walls: Locate the automatic sprinklers with respect to walls as follows (measured perpendicular to the wall):

- Minimum horizontal distance: 4 in/100 mm
- Maximum horizontal distance unless indicated otherwise in either the occupancy-specific operating standard or the Approval Guide:

(a) Wall angle equal to or greater than 90°: 5 ft/1.5 m

(b) Wall angle equal to or less than 90°: 7 ft/2.1 m

Sprinkler Location from Ceilings: Locate the centerline of the automatic sprinkler's thermal sensing element with respect to the vertical distance below ceilings as follows:

- Minimum vertical distance: 2 in/50 mm for smooth ceilings or 4 in/100 mm for nonsmooth ceilings
- Maximum vertical distance: 12"/305 mm

Obstructions: For more information, reference FM Data sheet 2-0.

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, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.

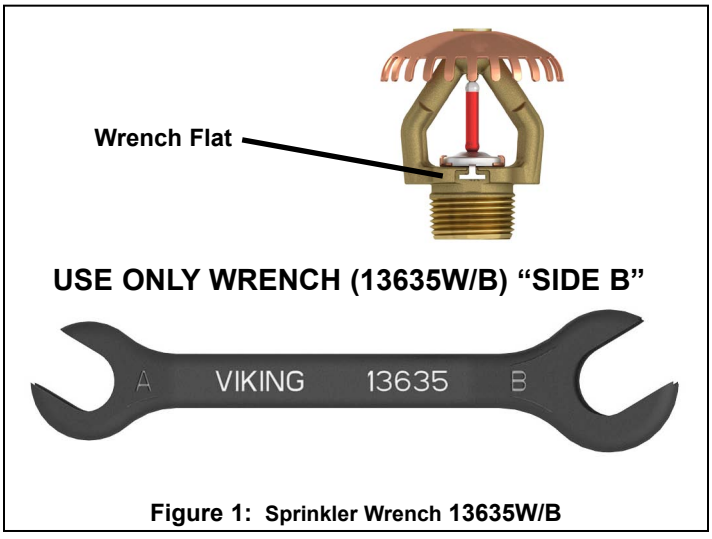

Figure 1: Sprinkler Wrench 13635W/B

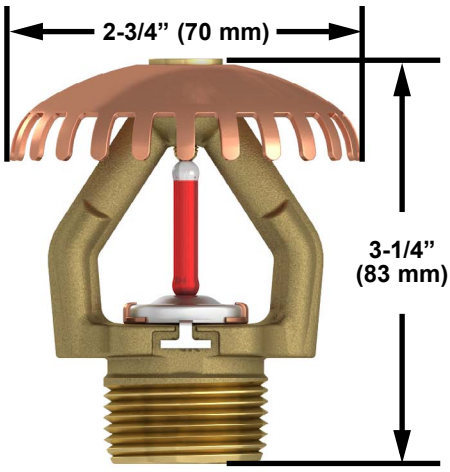

Figure 2: Sprinkler VK598 Dimensions