

FireLock® LP-46 Low Pressure Storage Sprinkler Model V4603, K25.2, Storage Sprinkler



1.0 PRODUCT DESCRIPTION

Style: Upright

Nominal Connection Size: 1" NPT/ 25mm BSPT/ IGS Grooved, reference publication 10.65.

K-Factor: 25.2 Imp./36.8 S.I.¹

Maximum Working Pressure: 175 psi/1200 kPa

Factory Hydrostatic Test: 100% @ 500 psi/3450 kPa

Minimum Working Pressure: 7 psi/48 kPa, NFPA applications; 10 psi/69 kPa FM Global applications.

Temperature Rating: Application specific.

Application: Designed for controlling fires in single, double and multiple row rack storage of up to Cartoned, Unexpanded, Group A plastic commodities stored up to 35ft/10.7m in height under a maximum 45ft/13.7m high ceiling without the need for in-rack sprinklers.

Codes and Requirements: For coverage area and sprinkler placement, refer to NFPA 13, FM Datasheets, or any applicable local requirements.

¹ For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

System No.		Location	
Submitted By		Date	

Spec Section		Paragraph	
Approved		Date	

2.0 CERTIFICATION/LISTINGS



APPROVALS/LISTINGS	Model V4603	
Nominal K Factor Imperial	25.2	
Nominal K Factor S.I. ¹	36.8	
Response	Standard	
Deflector Type	Upright	
Agency	Approved Temperature Ratings	Maximum Exposure Temperature
	F° C°	F° C°
FM	162	100
	72	38
	212	150
	100	66
	286	225
	141	107

¹ For K-Factor when pressure is measured in Bar, multiply S.I. units by 10.

NOTES

- Listings and approval as of printing. Not all temperature rating combinations are Approved or Listed. Check Victaulic for specific combinations.
- All glass bulbs are rated for temperatures from -67°F/-57°C up to those shown in table above.

Temperature Ratings

Use the nominally rated 162°F/72°C sprinkler for all acceptable applications on a wet-type sprinkler system unless the ambient temperature of the protected occupancy requires the nominal temperature rating to be 212°F/100°C. The nominally rated, 286°F/141°C sprinkler is required for all acceptable dry-type applications and can also be used on applicable wet type systems, when required.

Commodity Selection and Design Criteria Overview for Model V4601	
Storage Type	FM
Open Frame (that is, no solid shelves) Single, Double, Multiple-Row, or Portable Rack Storage of Class I-IV and Group A or B Plastics	Datasheet 2-0
Solid Pile or Palletized Storage of Class I-IV and Group A or B Plastics	Datasheet 2-0
Idle Pallet Storage	Datasheet 8-24
Rubber Tire Storage	Datasheet 8-3
Rolled Paper Storage (Refer to the standard.)	Datasheet 8-21
Flammable Liquid Storage (Refer to the standard.)	Datasheet 7-29
Aerosol Storage (Refer to the standard.)	Datasheet 7-31
Refrigerated Storage	Datasheet 8-29

3.0 SPECIFICATIONS – MATERIAL

Deflector: Bronze

Link: Nickel

Lever: Monel

Load Screw: Stainless steel

Cap: Stainless steel

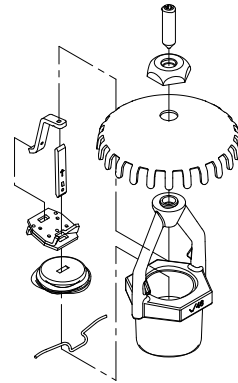
Seal: PTFE tape

Strut: Monel

Frame: Brass

Sprinkler Finishes: Plain brass

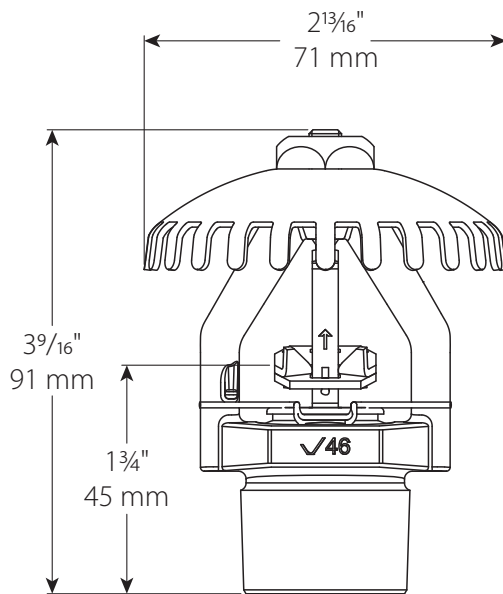
For cabinets and other accessories, refer to separate sheet.



Exaggerated for clarity

4.0 DIMENSIONS

Standard Upright – Model V4603



5.0 PERFORMANCE

System Design and Listing Requirements per FM Global

Loss Prevention Recommendations

For wet systems up to 40 ft/12.2m and dry systems up to 30 ft/9.1m, and dry systems over 30 ft/9.1m, see FM Data Sheet 8-9. Ensure the required pressure is reached and maintained within the time frame mandated by FM Global.

Install the Victaulic V4603 upright automatic sprinkler in accordance with the following guidelines:

LP-46 Pendent (V4603) for Wet Systems Class I – IV and Cartoned Unexpanded Group A Plastic Solid-Piled or Open Frame Rack Storage after arrangements								
Storage	Number of Sprinklers	Discharge Pressure		System Demand		Hose Stream Demand		
		psi	kPa	gpm	lpm	gpm	lpm	min
Up to 40ft/12.2m high ceiling and up to 35ft/10.7m high storage	24 ³	15 ³	103 ³	2342 ³	8865 ³	500	1893	120
Up to 35ft/10.7m high ceiling and up to 25ft/7.6m high storage	15 ³	15 ³	103 ³	1464 ³	5542 ³	500	1893	90
Up to 30ft/9.1m high ceiling and up to 15 ft/4.6m high storage	12	20	138	800	3028	250	9461	60

³ Up to Class III Commodities only

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.

LP-46 Upright (V4603) for Wet Systems Class I – IV and Cartoned Unexpanded Group A Plastic Solid-Piled, or Open Frame Rack Storage Arrangements Without Need for In-Rack Sprinklers								
Storage	Number of Sprinklers	Discharge Pressure		System Demand		Hose Stream Demand		
		psi	kPa	gpm	lpm	gpm	lpm	min
Up to 40ft/12.2m high ceiling and up to 35ft/10.7m high storage	24 ³	15 ³	103 ³	2342 ³	8865 ³	500	1893	120
Up to 30ft/9.1m high ceiling and up to 15 ft/4.6m high storage	12	20	138	1352	5118	250	9461	60

³Up to Class III Commodities only

LP-46 Upright (V4603) for Refrigerated and Freezer Dry/Preaction Systems Class I – III Commodity Storage Solid-Piled, Palletized, Shelf or Bin-Box arrangements without need for in-rack sprinklers								
Storage	Number of Sprinklers	Discharge Pressure		System Demand		Hose Stream Demand		
		psi	kPa	gpm	lpm	gpm	lpm	min
Up to 45ft/13.7m high ceiling and up to 40ft/12.2m high storage	12 ⁴	50 ⁴	345 ⁴	2140 ⁴	8101 ⁴	500	1893	120
Up to 40ft/12.2m high ceiling and up to 35ft/10.7m high storage	24 ⁵	15 ⁵	103 ⁵	2342 ⁵	8665 ⁵	500	1893	90
Up to 35ft/10.7m high ceiling and up to 30ft/9.1m high storage	20	7	48	1333	5046	250	9461	60

⁴ Based upon water delivery of 20 seconds or less

⁵ 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

5.0 PERFORMANCE (CONTINUED)

System Design and Listing Requirements per FM Global

LP-46 Upright (V4603) for Refrigerated and Freezer Dry/Preaction Systems Class I – III Commodity Storage Open Frame Rack Storage after arrangements without need for in-rack sprinklers					
Storage	Number of Sprinklers	Discharge Pressure	System Demand	Hose Stream Demand	
		psi kPa	gpm lpm	gpm lpm	min
Up to 45ft/13.7m high ceiling and up to 40ft/12.2m high storage	12 ⁴	50 ⁴ 345 ⁴	2140 ⁴ 8101 ⁴	500 1893	90
Up to 40ft/12.2m high ceiling and up to 35ft/10.7m high storage	24 ⁵	15 ⁵ 103 ⁵	2342 ⁵ 8665 ⁵	500 1893	120
up to 30ft/9.1m high ceiling and up to 25ft/7.6m high storage	25	10 69	1992 7541	500 1893	120

⁴ Based upon water delivery of 20 seconds or less
⁵ 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

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).

Operating Area and Hose Stream Demand Requirements		
Number of Sprinklers ⁶	Hose Demand	Duration (minutes)
	gpm lpm	
12 ⁷	250 946	60
13-15 ⁷	500 1893	90
16	500 1893	120

⁶ One sprinkler for every 100 sq ft/9.3 sq m
⁷ For ceiling heights above 35 ft/10.7m, up 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 Victaulic V4603 K25.2 (K360) 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 LP-46 K25.2 (K360) Standard Response Upright Sprinkler ⁶
psi kPa	psi kPa
Up to 25	7
Up to 170	48
Over 25/170 up to 50/350	10 69
Over 50/350 up to 75/520	10 69

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

5.0 PERFORMANCE (CONTINUED)

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 Area parallel to the branchline based on the following equation:

$$\text{Number of AS in operating area parallel to branchline} = (\text{shape factor/on-line AS spacing}) \times (\text{Number of AS} \times \text{area spacing of sprinklers})^{0.5}$$

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 this equation 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: 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.

Sprinkler Spacing

Ceiling Height (Up To and Including)	Minimum Linear Distance Between Sprinklers	Maximum Linear Distance Between Sprinklers	Minimum Area of Coverage	Maximum Area of Coverage
ft m	ft m	ft m	ft ² m ²	ft ² m ²
30	8	12	80	100
9.00	2.40	3.60	7.43	9.29
above 30	8	10	80	100
above 9m	2.40	3.00	7.43	9.29

Sprinkler Location from Walls: Locate the automatic sprinkler with respect to walls, measured perpendicular to the wall, as follows:

- Minimum Horizontal Distance: 4"/100mm
- Maximum Horizontal Distance unless indicated otherwise in either the FM Global occupancy specific data sheet or the FM Approval Guide:
 - A. Wall Angle Greater Than 90°: 5ft/1.5m
 - B. Wall Angle Equal to or Less Than 90°: 7ft/2.1m

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

- Minimum Vertical Distance: 2"/50mm for smooth ceilings or 4"/100mm for non-smooth ceilings.
- Maximum Vertical Distance: Standard Response sprinklers or extended coverage sprinklers 12"/300mm for all ceiling heights.

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


5.0 PERFORMANCE (CONTINUED)

Commodity Selection and Design Criteria Overview for Model V4603: FM	
Description	Specification, FM
Sprinkler Type	Standard Response Storage Sprinkler
Temperature Rating	162°F/72°C, 212°F/100°C and 286°F/141°C
K Factor	K25.2/368
Thread Size	1" NPT, 25mm BSPT or IGS grooved
Sprinkler Position	Upright
System Type	Dry
Maximum Area of Coverage	100ft ² /9.1m ²
Minimum Area of Coverage	64ft ² /6m ²
Maximum Slope Ceiling	2 in 12/10.5°
Maximum Spacing	12ft/3.6m for up to 30ft/9.1m ceiling 10ft/3m for over 30ft/9.1m ceiling
Minimum Spacing	8ft/2.4m
Deflector Distance from Walls	4"/100mm
Deflector to Top of Storage	3ft/0.9m
Deflector to Ceiling Distance	2"-12"/50mm-300mm
Maximum Ceiling Height	45ft/13.7m
Maximum Storage Height	40ft/12.2m
Storage Arrangement	Solid-piled, bin-box, palletized and open-frame rack (no solid shelves)
Commodity	Class I-III
Sprinkler System Design	12 A.S @ 50psi 24 A.S.@ 15psi ⁸
Fluid Delivery Time	20 seconds 25 seconds*
Minimum Aisle Width	4ft/1.2m
Hose Stream allowance and Water Supply Duration	500gpm/1893Lpm for 90min 500gpm/1893Lpm for 120min ⁸

⁸ Up to 40ft ceiling only

6.0 NOTIFICATIONS

⚠ WARNING



- Read and understand all instructions before attempting to install any Victaulic products.
- Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.
- Wear safety glasses, hardhat, and foot protection.

Failure to follow these instructions could result in death or serious personal injury and property damage.

- These products shall be used only in fire protection systems that are designed and installed in accordance with current, applicable National Fire Protection Association (NFPA 13, 13D, 13R, etc.) standards, or equivalent standards, and in accordance with applicable building and fire codes. These standards and codes contain important information regarding protection of systems from freezing temperatures, corrosion, mechanical damage, etc.
- The installer shall understand the use of this product and why it was specified for the particular application.
- The installer shall understand common industry safety standards and potential consequences of improper product installation.
- It is the system designer's responsibility to verify suitability of materials for use with the intended fluid media within the piping system and external environment.
- The material specifier shall evaluate the effect of chemical composition, pH level, operating temperature, chloride level, oxygen level, and flow rate on materials to confirm system life will be acceptable for the intended service.

Failure to follow installation requirements and local and national codes and standards could compromise system integrity or cause system failure, resulting in death or serious personal injury and property damage.

7.0 REFERENCE MATERIALS

- [10.65: FireLock™ IGS Installation-Ready™ Style V9 Sprinkler Coupling](#)
- [40.80: FireLock Automatic Sprinkler Wrenches](#)
- [I-40: FireLock™ Automatic Sprinklers Installation Manual](#)
- [I-V9: Installation Instructions FireLock™ Installation-Ready™ Style V9 Sprinkler Coupling](#)

User Responsibility for Product Selection and Suitability

Each user bears final responsibility for making a determination as to the suitability of Victaulic products for a particular end-use application, in accordance with industry standards and project specifications, and the applicable building codes and related regulations as well as Victaulic performance, maintenance, safety, and warning instructions. Nothing in this or any other document, nor any verbal recommendation, advice, or opinion from any Victaulic employee, shall be deemed to alter, vary, supersede, or waive any provision of Victaulic Company's standard conditions of sale, installation guide, or this disclaimer.

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Note

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.

Installation

Reference should always be made to the Victaulic installation handbook or installation instructions of the product you are installing. Handbooks are included with each shipment of Victaulic products, providing complete installation and assembly data, and are available in PDF format on our website at www.victaulic.com.

Warranty

Refer to the Warranty section of the current Price List or contact Victaulic for details.

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