

UL Solutions Evaluation Report

UL ER643-01

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UL Category Code: ULFE – Fire and Smoke Protection

CSI MasterFormat®

DIVISION: 21 00 00 – FIRE SUPPRESSION

Sub-level 2: 21 10 00 – Water-Based Fire Suppression Systems

Sub-level 3: 21 13 00 – Fire-Suppression Sprinkler Systems

Sub-level 4: 21 13 13 – Wet-Pipe Sprinkler Systems

Company:

**VIKING CORP
210 INDUSTRIAL PARK DR
HASTINGS, MI, 49058-9706 US
www.vikinggroupinc.com**

1. Subject

VK960 and VK962 Window Sprinklers

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2. Scope of evaluation

- 2021, 2018 and 2015 International Building Code ® (IBC)
- 2019 California Building Code (CBC)
- ICC-ES Acceptance Criteria for Special-purpose Sprinklers Used with Fixed Glazed Assemblies to provide an Alternate to a Fire-resistance-rated Wall Assembly (AC385)
- ICC-ES Acceptance Criteria for Quality Documentation (AC10)

The products were evaluated for the following properties:

- Alternate to a fire-resistance rated wall assembly (AC385)

3. Referenced documents

- ANSI/UL 199, Automatic Sprinklers for Fire-Protection Service
- ICC-ES Acceptance Criteria for Special-purpose Sprinklers Used with Fixed Glazed Assemblies to provide an Alternate to a Fire-resistance-rated Wall Assembly (AC385)
- ICC-ES Acceptance Criteria for Quality Documentation (AC10)

4. Uses

The Viking Corp (Viking) special application VK960 and VK962 window sprinklers models are utilized in conjunction with fixed glazed wall assembly to provide an alternate to the code requirements of up to a 2-hour fire-resistance-rated nonload-bearing interior fire assembly (Section 707), fire partition assemblies (Section 708), or exterior wall assemblies (Section 705).

The VK960 and VK962 are automatic fire sprinklers that have been investigated for their ability to control fires as indicated by the design parameters listed on the [VNIV.EX643](#) Listing Card and in the manufacturer's installation and use instructions.

5. Product description

The Viking VK960 and VK962 window sprinklers models are used as a part of a wet-pipe fire suppression system to provide a 2-hour fire resistance rating to exterior wall assemblies consisting of fixed glazing systems, fire partition assemblies, or interior nonload-bearing fire barrier. Activated sprinklers are designed to wet the entire surface of the "fire" side of the fixed glazing, fire barrier, or exterior wall assembly. For exterior glazed wall assemblies, the sprinklers must be located on the interior side of the glazing. For interior glazed assemblies, the sprinklers must be located on both sides of the assembly.

The Viking VK960 pendent vertical sidewall and VK962 horizontal sidewall sprinklers are designed as quick-response (QR) sprinklers that are activated to release water flow at ambient temperatures of 155°F or 200°F (68°C or 93°C). Each of the models have nominal K-factor of 5.6 GPM/psig^{1/2} and an orifice and thread size of ½ inch (12.7mm). The nominal Response Time Index of the sprinkler does not exceed 50 (m•s)^{1/2}.

The glazing used in the fire barrier must be nominal ¼ inch thickness (6.35mm) heat-strengthened or tempered glass complying with ASTM C1048 or Federal Specification DD-G-1403B, installed in single or dual pan. Glazing is held in place by metallic framing with elastomeric seals. Unframed vertical joints between glazing panels are permitted provided joints are connected by butt-joints with silicon sealant or with noncombustible vertical mullions wall assembly. Intermediate horizontal mullions are not permitted as part of the fixed glazed. Glazing surfaces are not to be covered with any films.

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6. Installation

Model VK960 vertical side wall sprinkler, the deflector of the sprinkler head must be installed 4 to 12 inches (102 to 305 mm) from the face of the glazing and 2 to 4 inches (51 to 102 mm) down from the top of the metallic frame.

Model VK962 horizontal side wall sprinkler, the deflector of the sprinkler head must be placed 1/2 to 4 inches (102 to 305 mm) from the face of the glazing and 1 to 3 inches (12.7 to 102 mm) down from the top of the metallic frame.

The minimum distance between window sprinklers is 6 feet (1830 mm) on center unless separated by a vertical mullion as described in the manufacturer's installation instructions. The maximum installation distance for the VK960 is 12 feet (3658 mm) on center. The maximum installation distance for the VK962 is 8 ft (2440 mm) on center.

SIN	Response Type	Fire Risk	Type	Nom K-factor	Distance Between Sprinklers	Min Flow Rate	Temp Rating
VK960	QR	* Note 1	VSW	5.6	6 to 12 feet	15 gpm	155, 200 °F
VK960	QR	* Note 1	VSW	5.6	* Note 2	15 gpm	155, 200 °F
VK962	QR	* Note 1	HSW	5.6	6 to 8 feet	20 gpm	155, 200 °F
VK962	QR	* Note 1	HSW	5.6	* Note 3	20 gpm	155, 200 °F

* Note 1: For use on heat-strengthened or tempered glass windows without horizontal mullions having a maximum height of 13 ft. Combustibles must be maintained at a minimum distance of 2 inches from the glass.

* Note 2: Located between mullions and not greater than 12 ft. apart.

* Note 3: Located between mullions and not greater than 8 ft. apart.

Viking VK960 and VK962 sprinklers are recognized as an alternate method to achieve a fire-resistance rating on fixed glazed wall assemblies in exterior fire-resistance-rated walls only when a minimum 5 ft horizontal fire distance is maintained.

The exposed vertical height of the glass component in the fire wall assembly must not exceed 13 feet (4m).

7. Conditions of use

The Viking Specific Application Window Sprinklers described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 2 of this report, subject to the following conditions:

- 7.1 The assembly must not be used in locations that contain materials that present deflagration or detonation hazards.
- 7.2 Special-purpose fire sprinkler system piping must be designed, sized and installed in accordance with NFPA 13.
- 7.3 Use of the system is limited to wet-type, special purpose fire sprinkler systems and nonload-bearing wall assemblies.
- 7.4 Use of the special-purpose fire sprinkler system in exterior wall applications is limited to installations where the fire separation distance is greater than 10 feet (3048 mm) for the 2021, 2018, 2015 IBC.
- 7.5 The fixed glazing assembly must not have intermediate horizontal mullions that interfere with the uniform distribution of water over the surface of the glazing.

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- 7.6** The assembly is not permitted to incorporate penetrations. Any openings must be protected in accordance with IBC requirements for opening protection.
- 7.7** All combustible materials must be kept a minimum distance of 2 inches (51 mm) from the face of the glass such that complete coverage of the glass by the sprinklers is not impeded. The means by which this is accomplished is by a minimum 36-inch-high (914 mm) knee or “pony” wall at the base of the wall.
- 7.8** The design, with plans and details of the specific installation of the fixed glazed assemblies with special purpose fire sprinklers, must be submitted to the code official for approval. The design must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 7.9** Where approved by the code official, these assemblies, comprised of special-purpose sprinklers with fixed glazing having specific construction requirements, are intended to provide an alternative to a fire-resistance-rated wall assembly. The registered design professional shall provide the code official with documentation outlining the basis of compliance with the criteria specified by the IBC for a code modification in accordance with Section 104.10 or for an alternative method of construction in accordance with Section 104.11.
- 7.10** The assemblies evaluated are not permitted to be used in lieu of firewalls. Where the assemblies are used as an alternative to fire barriers for exit-passageways, horizontal exits, or exit enclosures, the fire area (Section 202 of the IBC) in which the assembly is located shall be fully sprinklered in accordance with Section 903.3.1 of the IBC. The water supply duration for sprinklers, where used, shall be not less than the fire resistance rating that would have been required for a fire barrier. In addition, the registered design professional shall provide the code official with documentation in accordance with Section 104.10 of the IBC for a code modification or Section 104.11 of the IBC for an alternative method of construction that addresses any anticipated impact on the functionality of the means of egress.
- 7.11** The products must be manufactured, identified, and installed in accordance with this report, the manufacturer’s published installation instructions, and the applicable code. If there is a conflict between the manufacturers published installation instructions and this report, this report governs.
- 7.12** For a listing of applicable UL Solutions Certifications for Sprinklers, Automatic and Open, see UL Solution’s Product iQ® for the following categories:
- Sprinklers, Automatic and Open UL Listed in accordance with UL 199 (VNIV).
- 7.13** Viking VK960 and VK962 fire sprinklers are manufactured at the following locations under the UL Solutions Certification and Follow-Up Service Program, which includes audits in accordance with the quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC10.

Manufacturer Name	City, State
Viking Corp	Caledonia, MI

8. Supporting evidence

- 8.1** Data in accordance with ICC-ES Acceptance Criteria for Special-purpose Sprinklers Used with Fixed Glazed Assemblies to provide an Alternate to a Fire-resistance-rated Wall Assembly (AC385).
- 8.2** UL test report on Fire Exposure Test for Window Systems dated February 8, 2022. See UL Product Certification Category, Sprinklers, Automatic and Open (VNIV), File EX643.

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8.3 ICC-ES Acceptance Criteria for Quality Documentation (AC10)

8.4 Manufacturer's product literature and installation instructions

9. Identification

Viking VK960 and VK962, as described in this evaluation report, are identified by a marking bearing the report holder's name (The Viking Corp), the product designation (SIN), the UL Solutions Listing Mark, and the evaluation report number "UL ER643-01". The validity of the evaluation report is contingent upon this identification appearing on the product or on the smallest unit container in which the product is packaged.

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Figure 1 – Model VK960 Pendent Vertical Sidewall Sprinkler



Figure 2 – Model VK962 Horizontal Sidewall Sprinkler

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UL Solutions Headquarters
333 Pfingsten Road
Northbrook, IL 60062-2096 USA
T: 847.272.8800
[UL.com/Solutions](https://www.ul.com/Solutions)