VIKING®

TECHNICAL DATA

MODEL E SPRAY NOZZLES
VK810 - VK817

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
Visit the Viking website for the latest edition of this technical data page.

1. DESCRIPTION

Viking Model E, 3D Spray Nozzles are open type spray nozzles designed for directional spray applications in fixed fire protection systems. They have an open design only (non-automatic) with an external deflector that discharges a solid uniform cone spray of low- to medium- velocity water droplets. Model E Spray Nozzles are available in multiple orifice sizes and spray angles to meet design application requirements and they include a ½" NPT (DN15) external pipe thread. The base materials are brass, while electroless nickel plating may be applied to the complete assembly for applications requiring corrosion resistance.

The spray angle is the included angle of discharge for each nozzle, and is also marked on the deflector. Figures 1a and 1b illustrate the distribution width at various heights based on testing in the pendent position at 10, 20, and 60 PSI (0.7 bar, 1.4 bar, and 4.1 bar) discharge pressures. Note that the Model E Spray Nozzles are rated for a maximum discharge pressure of 175 PSI (12 bar). At pressures above 60 PSI (4.1 bar), the spray pattern begins to decrease in width due to pull-in of the spray pattern. For exposure protection, see Figures 6a, 6b, and 7 for fixed position angle, distance for included angle spray pattern perpendicular to surface of object at the fixed angle of installation.

For nozzles having nominal U.S. K-Factors of 1.2, 1.8, and 2.3, a bushing is used, flush at the inlet location, to eliminate sharp corner cavity and to prevent debris from collecting. (Nozzles with K-Factors of 3.2, 4.1, 5.6, and 7.2 are machined orifices.) Optional blow-off plugs are available for protection from dust and insect infestation and other accumulation of debris.

WARNING: Cancer and Reproductive Harm- www.P65Warnings.ca.gov

2. LISTINGS AND APPROVALS

cULus Listed: Category VGYZ

FM Approved: Fixed Extinguishing Systems

NYC Approved: MEA 89-92-E, Volume 29

CCCF Approved: Approved by the China Certification Center for Fire Products (CCCF)

Refer to the Approval Chart on page 4 and Design Criteria on page 5 for cULus Listing and FM Approval requirements that must be followed.

3. TECHNICAL DATA

Specifications:

Minimum Operating Pressure: 10 psi (0.7 bar)
Maximum Working Pressure: 175 psi (12 bar)
Thread size: 1/2" (15 mm) NPT
Nominal K-Factor: 7.2 U.S. (103.7 metric*)
5.6 U.S. (80.6 metric)
4.1 U.S. (59.0 metric)
3.2 U.S. (46.1 metric)
2.3 U.S. (33.1 metric)
1.8 U.S. (25.9 metric)
1.2 U.S. (17.3 metric)

Orifice sizes are indicated by the K-Factor, which is marked on the deflector. Refer to the Nominal Discharge Curves on page 10 for each nozzle at various operating residual pressures.

* 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.

Overall Length: 2-7/16" (61 mm)

Material Standards:

Body Casting: Brass UNS-C84400
Splitter: Brass UNS-C36000
Bushing: (for nozzles with 1.2, 1.8, and 2.3 K-Factors): Brass UNS-C36000

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Deflector: Phosphor Bronze UNS-C51000
Screw: Brass UNS-C65100

Ordering Information: (Also refer to the current Viking price list.)
Order Model E Spray Nozzles by first selecting the appropriate base part number for the K-Factor and spray angle desired. Then add the appropriate suffix for the desired finish and the suffix "Z" for open nozzles to the spray nozzle base part number.
Finish Suffix: Brass = A, Electroless Nickel Plated = J
Temperature Suffix: OPEN = Z
For example, spray nozzle VK810 with a K-Factor of 7.2 (103.7 metric) and a Brass finish = Part No. 12867AZ

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

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

Blow-Off Plugs (Optional): Refer to technical data page Form No. F_062104. Blow-off plugs are used to prevent the depositing of foreign materials in the waterway, which could interfere with the discharge of the spray nozzles. The plugs are designed to blow off when the system piping is pressurized. **Note:** The blow-off plugs have no listings or approvals.

4. INSTALLATION

⚠ WARNING

Viking Model E Spray Nozzles are manufactured and tested to meet the rigid requirements of the approving agency. The nozzles are designed to be installed in accordance with recognized installation standards. Deviation from the standards or any alteration to the nozzle after it leaves the factory including, but not limited to: painting, plating, coating, or modification, may render the unit inoperative and will automatically nullify the approval and any guarantee made by The Viking Corporation.

The Approval Chart on page 4 shows listings and approvals of Model E Spray Nozzles for use on water spray systems and water based deluge systems. The chart shows listings and approvals available at the time of printing. Other approvals are in process. Check with the manufacturer for any additional approvals.

A. **Spray nozzles are to be installed in accordance with the latest edition of Viking technical data, the latest published 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. The use of Model E Spray Nozzles may be limited due to occupancy and hazard. Refer to the Authority Having Jurisdiction prior to installation.**
B. Handle Model E Spray Nozzles with care. They must be stored in a cool, dry place in their original shipping container. Never install a spray nozzle that has been dropped or damaged.
C. Corrosion-resistant spray nozzles must be installed when subject to corrosive atmospheres.
D. Spray nozzles must be installed after the piping is in place to prevent mechanical damage.
E. Before installing, be sure to have the appropriate model and style, with the correct K-Factor and spray angle. Spray nozzle deflectors are identified with the VK model number, nominal K-Factor, and spray angle.
   1. Apply a small amount of pipe-joint compound or tape to the external threads of the spray nozzle only, taking care not to allow a build-up of compound inside the inlet.
   2. Install the nozzle on the fixed piping, using the special sprinkler/spray nozzle wrench only. Take care not to over-tighten or damage the spray nozzle. DO NOT use the deflector to start or thread the unit into a fitting.
F. Spray nozzles must be protected from mechanical damage. Where open spray nozzles are used, care must be taken to prevent foreign materials from entering the orifice. Foreign materials may accumulate and restrict or plug the waterway and may prevent proper operation of the spray nozzle.

5. OPERATION

Model E, 3D Spray Nozzles are designed to apply cooling water to exposed vertical, horizontal, curved, and irregular shaped surfaces to allow cooling of objects externally when exposed to an adjacent fire. Cooling is done to prevent objects from absorbing heat that could cause structural damage and possible spread of fire to the protected object. In some applications, Model E Spray Nozzles may be applied to control or extinguish fire of the protected area (depending on water design application density).

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6. INSPECTIONS, TESTS AND MAINTENANCE

NOTICE

The owner is responsible for maintaining the fire protection system and devices in proper operating condition. For minimum maintenance and inspection requirements, refer to the NFPA standard that describes care and maintenance of sprinkler systems. In addition, the Authorities Having Jurisdiction may have additional maintenance, testing, and inspection requirements that must be followed.

A. Spray nozzles must be inspected on a regular basis for corrosion, mechanical damage, obstructions, paint, etc. Where open spray nozzles are installed, verify that foreign materials (such as dust, dirt, etc.) DO NOT restrict or plug the waterspray. The frequency of inspections may vary due to corrosive atmospheres, water supplies, and activity around the device. It is also recommended that outdoor installations of Model E Spray Nozzles with blow-off plugs be periodically inspected, during freezing weather conditions, for the presence of ice buildup from trapped condensate which could effect the proper release of the plugs.

B. Spray nozzles that have been painted or mechanically damaged must be replaced immediately. Nozzles showing signs of corrosion shall be tested and/or replaced immediately as required. When replacing spray nozzles, use only new Model E Spray Nozzles.

1. Using the appropriate wrench, remove the old spray nozzle and install the new unit. Care must be taken to ensure that the replacement spray nozzle has the proper model, style, and K-Factor. Model E Spray Nozzle deflectors are identified with the VK model number, nominal U.S. K-Factor, and spray angle. A cabinet should be provided and stocked with a wrench and extra spray nozzles of each variety used for replacement purposes.

C. The spray nozzle discharge pattern is critical for proper fire protection. Therefore, nothing should be hung from, attached to, or otherwise obstruct the discharge pattern. All obstructions must be immediately removed or, if necessary, additional nozzles installed.

D. Fire protection systems that have been subjected to a fire must be returned to service as soon as possible. The entire system must be inspected for damage and repaired or replaced as necessary. Spray nozzles that have been exposed to corrosive products of combustion or high ambient temperatures, should be replaced. Refer to the AHJ for minimum replacement requirements.

7. AVAILABILITY

Viking Model E Spray Nozzles 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.

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Approval Chart

Model E Spray Nozzles
Maximum 175 PSI (12 bar) WWP
(Refer also to Design Criteria on page 5.)

Base Part Number[1]	SIN[2]	Nominal K-Factor		Angle	Listings and Approvals[4]				Base Part Number[1]	SIN[2]	Nominal K-Factor		Angle	Listings and Approvals[4]			
		U.S.	metric[3]		cULus[5]	NYC[6]	FM	(cULus)[9]			U.S.	metric[3]		cULus[5]	NYC[6]	FM	(cULus)[9]
12867	VK810	7.2	103.7	65°	Yes	Yes	Yes	--	12895	VK814	7.2	103.7	125°	Yes	Yes	Yes	--
12868	VK810	5.6	80.6	65°	Yes	Yes	Yes	--	12896	VK814	5.6	80.6	125°	Yes	Yes	Yes	--
12869	VK810	4.1	59.0	65°	Yes	Yes	Yes	--	12897	VK814	4.1	59.0	125°	Yes	Yes	Yes	--
12870	VK810	3.2	46.1	65°	Yes	Yes	Yes[7]	--	12898	VK814	3.2	46.1	125°	Yes	Yes	Yes[7]	--
12871	VK810	2.3	33.1	65°	Yes	Yes	Yes[7]	--	12899	VK814	2.3	33.1	125°	Yes	Yes	Yes[7]	--
12872	VK810	1.8	25.9	65°	Yes	Yes	Yes[7]	--	12900	VK814	1.8	25.9	125°	Yes	Yes	Yes[7]	--
12873	VK810	1.2	17.3	65°	Yes	Yes	Yes[7]	--	12901	VK814	1.2	17.3	125°	Yes	Yes	Yes[7]	--
12874	VK811	7.2	103.7	80°	Yes	Yes	Yes	--	19886	VK814	5.6	80.6	125°	--	--	--	Yes
12875	VK811	5.6	80.6	80°	Yes	Yes	Yes	--	12902	VK815	7.2	103.7	140°	Yes	Yes	Yes	--
12876	VK811	4.1	59.0	80°	Yes	Yes	Yes	--	12903	VK815	5.6	80.6	140°	Yes	Yes	Yes	--
12877	VK811	3.2	46.1	80°	Yes	Yes	Yes[7]	--	12904	VK815	4.1	59.0	140°	Yes	Yes	Yes	--
12878	VK811	2.3	33.1	80°	Yes	Yes	Yes[7]	--	12905	VK815	3.2	46.1	140°	Yes	Yes	Yes[7]	--
12879	VK811	1.8	25.9	80°	Yes	Yes	Yes[7]	--	12906	VK815	2.3	33.1	140°	Yes	Yes	Yes[7]	--
12880	VK811	1.2	17.3	80°	Yes	Yes	Yes[7]	--	12907	VK815	1.8	25.9	140°	Yes	Yes	Yes[7]	--
19883	VK811	1.2	17.3	80°	--	--	--	Yes	12908	VK815	1.2	17.3	140°	Yes	Yes	Yes[7]	--
12881	VK812	7.2	103.7	95°	Yes	Yes	Yes	--	19887	VK815	2.3	33.1	140°	--	--	--	Yes
12882	VK812	5.6	80.6	95°	Yes	Yes	Yes	--	12909	VK816	7.2	103.7	160°	Yes	Yes	Yes	--
12883	VK812	4.1	59.0	95°	Yes	Yes	Yes	--	12910	VK816	5.6	80.6	160°	Yes	Yes	Yes	--
12884	VK812	3.2	46.1	95°	Yes	Yes	Yes[7]	--	12911	VK816	4.1	59.0	160°	Yes	Yes	Yes	--
12885	VK812	2.3	33.1	95°	Yes	Yes	Yes[7]	--	12912	VK816	3.2	46.1	160°	Yes	Yes	Yes[7]	--
12886	VK812	1.8	25.9	95°	Yes	Yes	Yes[7]	--	12913	VK816	2.3	33.1	160°	Yes	Yes	Yes[7]	--
12887	VK812	1.2	17.3	95°	Yes	Yes	Yes[7]	--	12914	VK816	1.8	25.9	160°	Yes	Yes	Yes[7]	--
19884	VK812	1.8	25.9	95°	--	--	--	Yes	12915	VK816	1.2	17.3	160°	Yes	Yes	Yes[7]	--
12888	VK813	7.2	103.7	110°	Yes	Yes	Yes	--	12916	VK817	7.2	103.7	180°	Yes	Yes	Yes	--
12889	VK813	5.6	80.6	110°	Yes	Yes	Yes	--	12917	VK817	5.6	80.6	180°	Yes	Yes	Yes	--
12890	VK813	4.1	59.0	110°	Yes	Yes	Yes	--	12918	VK817	4.1	59.0	180°	Yes	Yes	Yes	--
12891	VK813	3.2	46.1	110°	Yes	Yes	Yes[7]	--	12919	VK817	3.2	46.1	180°	Yes	Yes	Yes[7]	--
12892	VK813	2.3	33.1	110°	Yes	Yes	Yes[7]	--	12920	VK817	2.3	33.1	180°	Yes	Yes	Yes[7]	--
12893	VK813	1.8	25.9	110°	Yes	Yes	Yes[7]	--	12921	VK817	1.8	25.9	180°	Yes	Yes	Yes[7]	--
12894	VK813	1.2	17.3	110°	Yes	Yes	Yes[7]	--	12922	VK817	1.2	17.3	180°	Yes	Yes	Yes[7]	--
19885	VK813	3.2	46.1	110°	--	--	--	Yes	19888	VK817	4.1	59.0	180°	--	--	--	Yes

Available Finishes: Brass[9] or Electroless Nickel Plated[8]

Footnotes

[1] Base part number is shown. For complete part number, refer to Viking's current price schedule.
[2] The spray nozzle deflector is identified with the VK model number, K-Factor, and spray angle.
[3] Metric K-factor shown is for use when pressure is measured in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
[4] This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.
[5] Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
[6] Accepted for use, City of New York Department of Buildings, MEA Number 89-92-E, Vol. 29.
[7] Orifice diameter is less than 3/8" (9.4 mm) for Model E Nozzles with K-Factors of 3.2, 2.3, 1.8, and 1.2. A pipeline strainer with a 1/8" (3.2 mm) or less perforation is required for FM Approval.
[8] For corrosion resistance.
[9] Brass only.

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DESIGN CRITERIA

(Also refer to the Approval Chart on page 4.)

Nozzle Placement

When the Authority Having Jurisdiction requires direct impingement of water spray of the complete protected surface, the nozzles should be spaced and directed so their spray pattern will completely cover the surface plane of the protected object or area. Use the minimum required average density based on the included angle and the K-Factor based on the residual pressure at the inlet of the nozzles. Figures 1a and 1b indicate the coverage for each nozzle's included spray angle at various heights.

Figures 6a and 6b indicate the distance from the nozzles to the tangent surface of the protected object at various fixed angles. The fixed angle is the included angle from pendent position being zero of spray nozzle position. The spray angle is the included angle of the spray nozzle pattern. The maximum distance is determined where the spray pattern angle is unchanged at the perpendicular position to tangent of fixed angle. The distances indicated are for 20 PSI (1.4 Bar) minimum, to 60 PSI (4.1 Bar) maximum residual pressure at the inlet of the nozzles. When Viking Model E Spay Nozzles are used to protect surfaces of vessels, they should be positioned normal to the surface being protected and approximately 2 ft. (.6 m) from the surface. Using the proper spray angle and K-Factor with this approach will provide the most effective protection and minimize effects of wind or draft conditions on the water spray pattern of the nozzles.

Installation Precaution

As a nozzle is being installed farther from the plane of protection, the centerline that is perpendicular to the plane of protection is potentially offset with the center/target of plane of protection due to installation error. Take extra care when locating a nozzle far from the plane of protection. Recommendation: Overlap spray patterns to provide a safety factor in the installation.

Notes About Pressure Requirements (Figures 6a & 6b)

1. Working pressures of 10 to 60 PSI (.7 to 4.1 Bar) can only be applied for 0° (vertically downward) orientation.

2. Working pressures for orientation angles other than 0° are 20 to 60 PSI (1.4 to 4.1 Bar).

3. However, unless otherwise specified, when the nozzles are axially installed 2 ft. (.6 m) or less from the plane of protection, working pressures of 10 to 60 PSI (.7 to 4.1 Bar) can be applied on all installation angles.

Spray Patterns

The design spray pattern profiles of the Model E Spray Nozzles with included spray angles of 65° to 180° are given in the graph in Figures 1a and 1b for discharge pressures from 10 to 60 PSI (.7 to 4.1 Bar). When discharge pressures above this are applied, the coverage area will decrease because the spray pattern tends to draw inward at higher pressures. When applying discharge pressures higher than 60 PSI (4.1 Bar), consult the Viking Technical Services department.

In Figures 6a and 6b, the maximum axial distance between the nozzle tip and the tangential plane being protected using a fixed installation angle is given. The operating discharge pressures are 20 PSI to 60 PSI (1.4 to 4.1 Bar) for application of this data. It is recommended that overlap be applied when using nozzles for exposure protection in this method.

Pipline Strainers

Orifice diameter is less than 3/8" (9.4 mm) for Model E Nozzles with K-Factors of 3.2, 2.3, 1.8, and 1.2. A pipeline strainer with a 1/8" (3.2 mm) or less perforation is required for FM Approval.

IMPORTANT: Always refer to Bulletin Form No. F_091699 - Care and Handling of Sprinklers. Viking spray nozzles 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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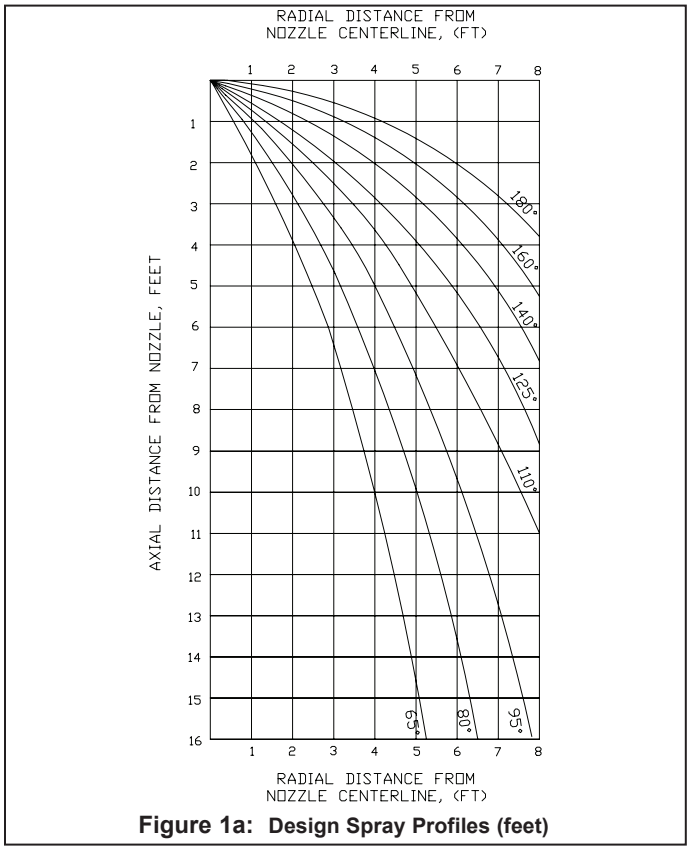

Figure 1a: Design Spray Profiles (feet)

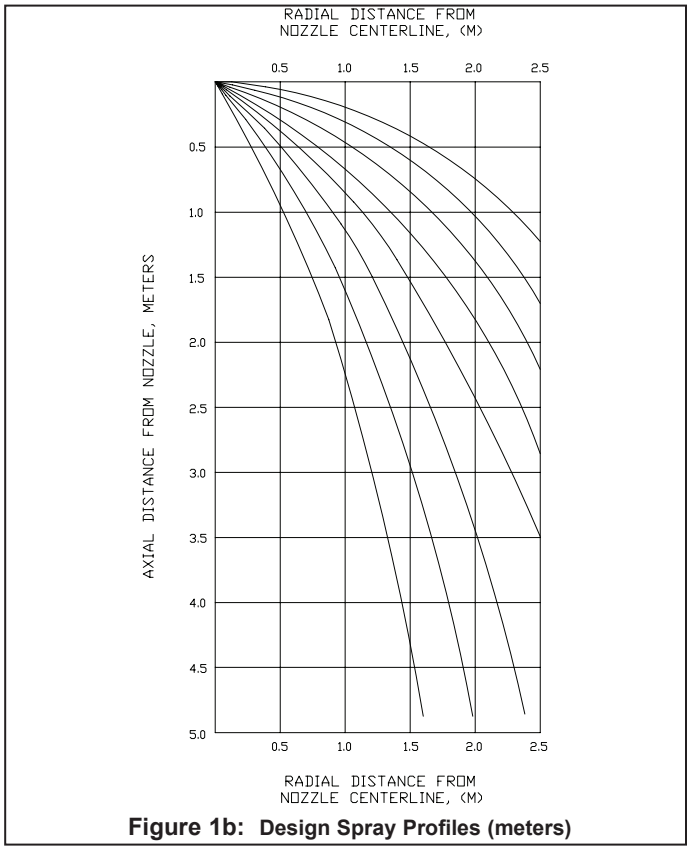

Figure 1b: Design Spray Profiles (meters)

NOTES:
1. Design data was obtained from tests in still air.
2. Design data applies to a residual (flowing) pressure range at the nozzle inlet of 10 to 60 PSI (.7 to 4.1 Bar). For pressures up to 175 PSI (12 Bar), consult the Viking Technical Services department toll free at 1-877-384-5464. Refer to the Authority Having Jurisdiction for their minimum required residual pressure.
3. The shapes of the Design Spray Profiles remain essentially unchanged over the maximum Axial Distances shown on pages 8-9.
4. Maximum Axial Distances shown on pages 8-9 are based on exposure protection.

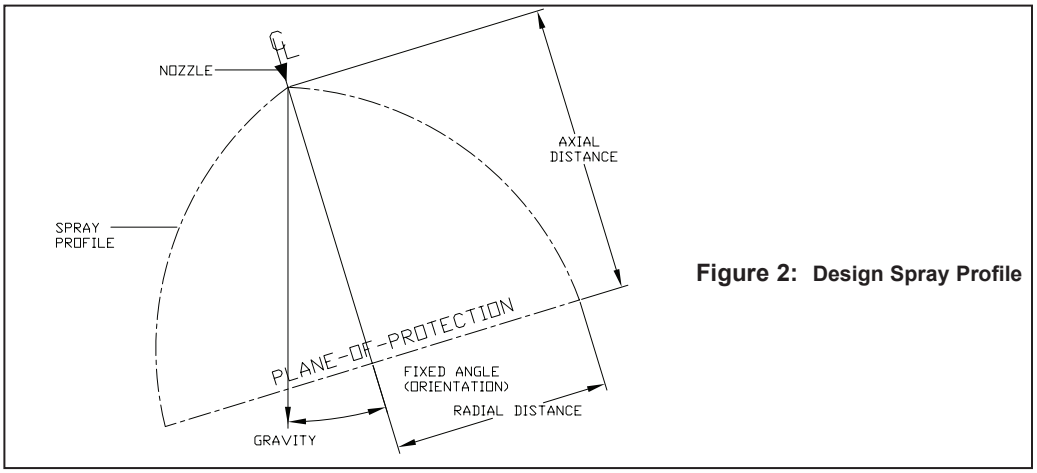

Figure 2: Design Spray Profile

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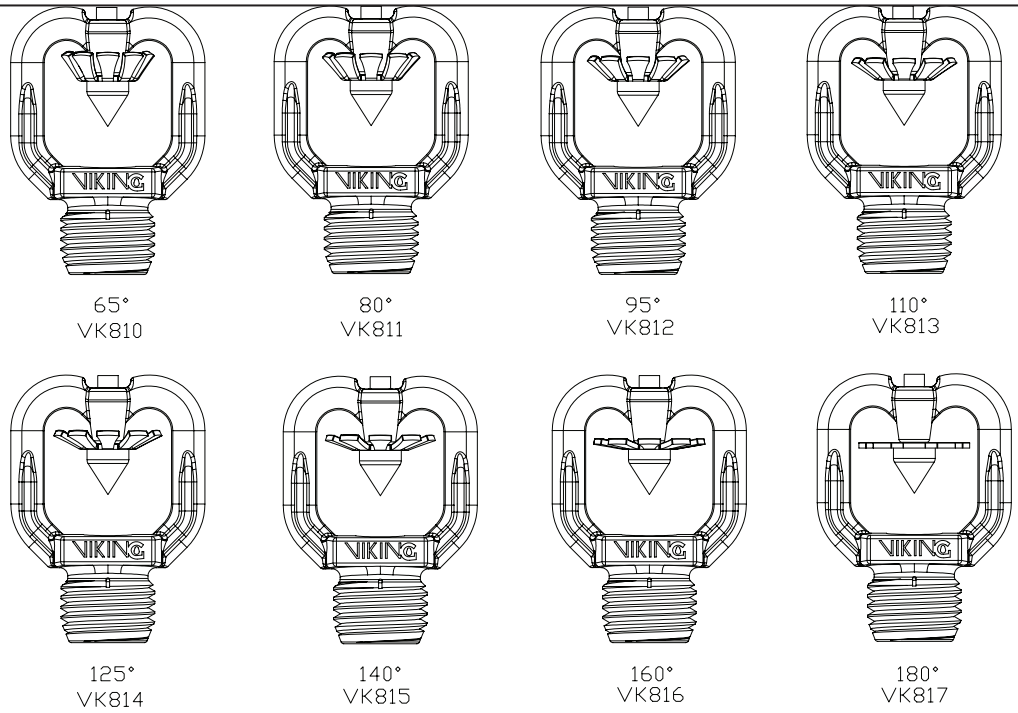

Figure 3: Spray Angles

Nozzles are shown with deflectors in the upright position for clarity.
May be installed in any position to meet design requirements.

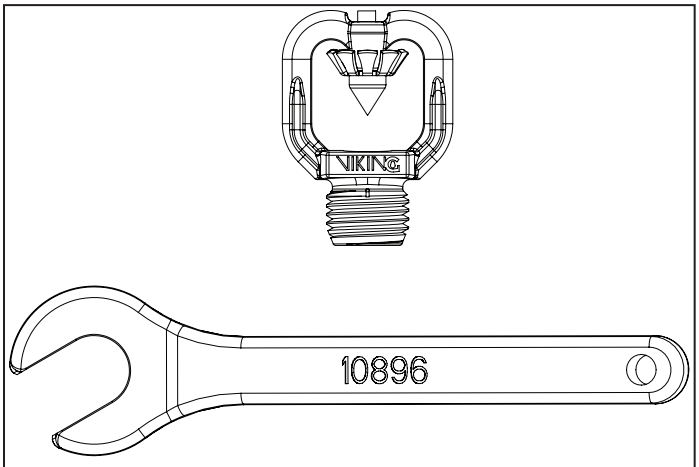

Figure 4: Standard Wrench 10896W/B

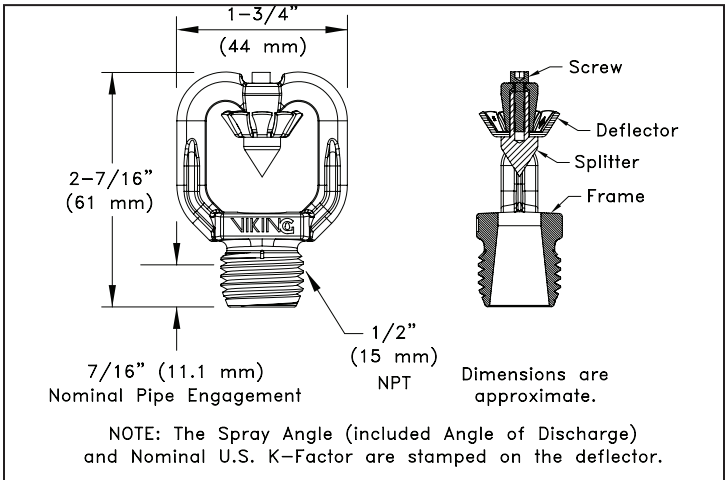

Figure 5: Spray Nozzle Dimensions

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MAXIMUM AXIAL DISTANCE FOR **65°** SPRAY ANGLE IN FEET AND INCHES

FIXED ANGLE	K FACTOR						
	1.2	**1.8**	**2.3**	**3.2**	**4.1**	**5.6**	**7.2**
0°	16-0	16-0	16-0	16-0	16-0	16-0	16-0
30°	10	10-0	10-3	10-6	11-0	11-6	12-0
45°	8-0	8-0	8-3	8-9	9-0	9-6	10-0
60°	7-0	7-0	7-6	8-3	8-6	8-9	9-0
90°	6-6	6-9	7-0	7-6	8-0	8-0	8-6
120°	6-3	6-3	6-6	7-0	7-6	7-6	8-0
135°	6-0	6-0	6-3	6-6	7-0	7-0	7-6
150°	5-9	5-9	6-0	6-0	6-6	6-9	7-0
180°	5-0	5-0	5-3	5-6	6-0	6-6	6-9

MAXIMUM AXIAL DISTANCE FOR **125°** SPRAY ANGLE IN FEET AND INCHES

FIXED ANGLE	K FACTOR						
	1.2	**1.8**	**2.3**	**3.2**	**4.1**	**5.6**	**7.2**
0°	9-0	9-0	9-0	9-0	9-0	9-0	9-0
30°	4-9	4-9	5-3	6-0	7-0	7-3	8-0
45°	4-6	4-6	4-9	5-0	6-0	6-6	7-0
60°	3-6	3-6	3-9	4-0	5-0	5-6	6-0
90°	3-0	3-0	3-3	3-6	4-6	4-9	5-6
120°	2-0	2-0	2-6	3-3	3-9	3-9	4-0
135°	1-9	1-9	2-3	3-0	3-6	3-6	3-9
150°	1-6	1-9	2-3	2-6	3-0	3-3	3-6
180°	1-3	1-6	2-0	2-6	2-9	3-0	3-3

MAXIMUM AXIAL DISTANCE FOR **80°** SPRAY ANGLE IN FEET AND INCHES

FIXED ANGLE	K FACTOR						
	1.2	**1.8**	**2.3**	**3.2**	**4.1**	**5.6**	**7.2**
0°	16-0	16-0	16-0	16-0	16-0	16-0	16-0
30°	9-6	9-6	10-0	10-6	11-0	11-3	11-6
45°	7-6	7-6	8-0	8-3	8-6	9-0	9-9
60°	6-0	6-3	6-6	7-0	7-0	8-0	8-6
90°	5-6	6-0	6-3	6-6	6-9	7-6	8-0
120°	5-0	5-3	5-9	6-0	6-6	6-6	7-0
135°	4-6	5-3	5-6	5-9	6-0	6-3	6-6
150°	4-3	4-6	4-9	5-6	5-9	6-0	6-0
180°	4-0	4-3	4-6	5-3	5-6	5-9	5-9

MAXIMUM AXIAL DISTANCE FOR **140°** SPRAY ANGLE IN FEET AND INCHES

FIXED ANGLE	K FACTOR						
	1.2	**1.8**	**2.3**	**3.2**	**4.1**	**5.6**	**7.2**
0°	7-0	7-0	7-0	7-0	7-0	7-0	7-0
30°	3-6	4-0	4-6	5-0	5-6	5-6	6-0
45°	3-3	3-6	3-9	4-3	4-6	5-0	5-3
60°	2-3	2-3	2-6	3-6	4-0	4-3	4-6
90°	2-0	2-0	2-9	3-0	3-6	3-6	4-0
120°	1-9	1-9	2-3	2-9	3-0	3-3	3-6
135°	1-6	1-6	1-9	2-3	2-6	2-9	3-0
150°	1-3	1-3	1-6	1-9	2-0	2-3	2-6
180°	1-0	1-0	1-6	1-6	1-9	2-0	2-3

MAXIMUM AXIAL DISTANCE FOR **95°** SPRAY ANGLE IN FEET AND INCHES

FIXED ANGLE	K FACTOR						
	1.2	**1.8**	**2.3**	**3.2**	**4.1**	**5.6**	**7.2**
0°	16-0	16-0	16-0	16-0	16-0	16-0	16-0
30°	8-0	8-3	9-0	9-6	10-6	11-0	11-6
45°	7-0	7-0	7-3	7-6	8-0	8-9	9-6
60°	5-0	5-3	5-6	6-3	6-6	7-0	8-0
90°	4-6	5-0	5-3	5-6	6-0	6-6	7-0
120°	4-0	4-3	4-9	5-3	5-6	5-6	6-0
135°	3-6	3-9	4-3	4-9	5-0	5-3	5-6
150°	3-3	3-6	3-6	4-6	4-9	5-0	5-0
180°	3-0	3-3	3-3	4-0	4-6	4-9	4-9

MAXIMUM AXIAL DISTANCE FOR **160°** SPRAY ANGLE IN FEET AND INCHES

FIXED ANGLE	K FACTOR						
	1.2	**1.8**	**2.3**	**3.2**	**4.1**	**5.6**	**7.2**
0°	5-6	5-6	5-6	5-6	5-6	5-6	5-6
30°	4-0	4-0	4-0	4-3	4-9	4-9	5-0
45°	3-0	3-0	3-3	3-6	3-9	3-9	4-0
60°	2-0	2-0	2-0	2-6	3-0	3-3	3-3
90°	1-0	1-3	1-9	2-0	2-6	2-6	3-0
120°	NR	1-0	1-6	1-9	2-0	2-3	2-6
135°	NR	NR	1.0	1-6	1-9	1-9	2-0
150°	NR	NR	NR	1-0	1-2	1-6	1-9
180°	NR	NR	NR	1-0	1-0	1-3	1-6

MAXIMUM AXIAL DISTANCE FOR **110°** SPRAY ANGLE IN FEET AND INCHES

FIXED ANGLE	K FACTOR						
	1.2	**1.8**	**2.3**	**3.2**	**4.1**	**5.6**	**7.2**
0°	11-0	11-0	11-0	11-0	11-0	11-0	11-0
30°	6-6	6-6	7-3	8-3	9-0	9-3	9-6
45°	5-6	5-9	6-6	7-0	7-6	8-0	8-6
60°	4-9	5-0	5-3	5-6	6-0	7-0	7-6
90°	4-0	4-0	4-6	5-0	5-6	6-0	6-6
120°	3-0	3-3	3-9	4-0	4-6	4-9	5-0
135°	2-9	2-9	3-3	3-9	4-3	4-6	4-9
150°	2-6	2-9	3-0	3-6	3-9	4-2	4-6
180°	2-3	2-6	3-0	3-3	3-6	4-0	4-3

MAXIMUM AXIAL DISTANCE FOR **180°** SPRAY ANGLE IN FEET AND INCHES

FIXED ANGLE	K FACTOR						
	1.2	**1.8**	**2.3**	**3.2**	**4.1**	**5.6**	**7.2**
0°	4-0	4-0	4-0	4-0	4-0	4-0	4-0
30°	2-3	2-3	2-6	2-9	3-0	3-0	3-0
45°	2-0	2-0	2-0	2-3	2-6	2-9	2-9
60°	1-6	1-6	1-9	2-0	2-3	2-6	2-6
90°	NR	NR	1-0	1-0	1-6	1-9	2-3
120°	NR	NR	1-0	1-0	1-3	1-6	1-9
135°	NR	NR	NR	1-0	1-0	1-3	1-6
150°	NR	NR	NR	NR	1-0	1-3	1-3
180°	NR	NR	NR	NR	NR	1-0	1-0

NR = Not Recommended

Figure 6a: Maximum Axial Distance Between Nozzle Tip and Plane of Protection for Exposure Protection (ft)

NOTES ABOUT FIGURES 6a AND 6b:

1. Working pressures of 10 to 60 PSI (.7 to 4.1 Bar) can only be applied for 0° (vertically downward) orientation.
2. Working pressures for orientation angles other than 0° are 20 to 60 PSI (1.4 to 4.1 Bar).
3. However, unless otherwise specified, when the nozzles are axially installed 2 ft. (.6 m) or less from the plane of protection, working pressures of 10 to 60 PSI (.7 to 4.1 Bar) can be applied on all installation angles.

VIKING®

TECHNICAL DATA

MODEL E SPRAY NOZZLES
VK810 - VK817

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058
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MAXIMUM AXIAL DISTANCE FOR **65°** SPRAY ANGLE IN METERS

FIXED ANGLE	K FACTOR (METRIC)						
	17.3	25.9	33.1	46.1	59.0	80.6	103.7
0°	4,9	4,9	4,9	4,9	4,9	4,9	4,9
30°	3,0	3,0	3,1	3,2	3,4	3,5	3,7
45°	2,4	2,4	2,5	2,7	2,7	2,9	3,0
60°	2,1	2,1	2,3	2,5	2,6	2,7	2,7
90°	2,0	2,1	2,1	2,3	2,4	2,4	2,6
120°	1,9	1,9	2,0	2,1	2,3	2,3	2,4
135°	1,8	1,8	1,9	2,0	2,1	2,1	2,3
150°	1,8	1,8	1,8	1,8	2,0	2,1	2,1
180°	1,5	1,5	1,6	1,7	1,8	2,0	2,1

MAXIMUM AXIAL DISTANCE FOR **125°** SPRAY ANGLE IN METERS

FIXED ANGLE	K FACTOR (METRIC)						
	17.3	25.9	33.1	46.1	59.0	80.6	103.7
0°	2,7	2,7	2,7	2,7	2,7	2,7	2,7
30°	1,4	1,4	1,6	1,8	2,1	2,2	2,4
45°	1,4	1,4	1,4	1,5	1,8	2,0	2,1
60°	1,1	1,1	1,1	1,2	1,5	1,7	1,8
90°	0,9	0,9	1,0	1,1	1,4	1,4	1,7
120°	0,6	0,6	0,8	1,0	1,1	1,1	1,2
135°	0,5	0,5	0,7	0,9	1,1	1,1	1,1
150°	0,5	0,5	0,7	0,8	0,9	1,0	1,1
180°	0,4	0,5	0,6	0,8	0,8	0,9	1,0

MAXIMUM AXIAL DISTANCE FOR **80°** SPRAY ANGLE IN METERS

FIXED ANGLE	K FACTOR (METRIC)						
	17.3	25.9	33.1	46.1	59.0	80.6	103.7
0°	4,9	4,9	4,9	4,9	4,9	4,9	4,9
30°	3,0	3,0	3,0	3,2	3,4	3,4	3,5
45°	2,3	2,3	2,4	2,5	2,6	2,7	3,0
60°	1,8	1,9	2,0	2,1	2,1	2,4	2,6
90°	1,7	1,8	1,9	2,0	2,1	2,3	2,4
120°	1,5	1,6	1,8	1,8	2,0	2,0	2,1
135°	1,4	1,6	1,7	1,8	1,8	1,9	2,0
150°	1,3	1,4	1,4	1,7	1,8	1,8	1,8
180°	1,2	1,3	1,4	1,6	1,7	1,8	1,8

MAXIMUM AXIAL DISTANCE FOR **140°** SPRAY ANGLE IN METERS

FIXED ANGLE	K FACTOR (METRIC)						
	17.3	25.9	33.1	46.1	59.0	80.6	103.7
0°	2,1	2,1	2,1	2,1	2,1	2,1	2,1
30°	1,1	1,2	1,4	1,5	1,7	1,7	1,8
45°	1,0	1,1	1,1	1,3	1,4	1,5	1,6
60°	0,7	0,7	0,8	1,1	1,2	1,3	1,4
90°	0,6	0,6	0,8	0,9	1,1	1,1	1,2
120°	0,5	0,5	0,7	0,8	0,9	1,0	1,1
135°	0,5	0,5	0,5	0,7	0,8	0,8	0,9
150°	0,4	0,4	0,5	0,5	0,6	0,7	0,8
180°	0,3	0,3	0,5	0,5	0,5	0,6	0,7

MAXIMUM AXIAL DISTANCE FOR **95°** SPRAY ANGLE IN METERS

FIXED ANGLE	K FACTOR (METRIC)						
	17.3	25.9	33.1	46.1	59.0	80.6	103.7
0°	4,9	4,9	4,9	4,9	4,9	4,9	4,9
30°	2,4	2,5	2,7	2,9	3,2	3,4	3,5
45°	2,1	2,1	2,2	2,3	2,4	2,7	2,9
60°	1,5	1,6	1,7	1,9	2,0	2,1	2,4
90°	1,4	1,5	1,6	1,7	1,8	2,0	2,1
120°	1,2	1,3	1,4	1,6	1,7	1,7	1,8
135°	1,1	1,1	1,3	1,4	1,5	1,6	1,7
150°	1,0	1,1	1,1	1,4	1,4	1,5	1,5
180°	0,9	1,0	1,0	1,2	1,4	1,4	1,4

MAXIMUM AXIAL DISTANCE FOR **160°** SPRAY ANGLE IN METERS

FIXED ANGLE	K FACTOR (METRIC)						
	17.3	25.9	33.1	46.1	59.0	80.6	103.7
0°	1,7	1,7	1,7	1,7	1,7	1,7	1,7
30°	4,3	1,2	1,2	1,3	1,4	1,4	1,5
45°	0,9	0,9	1,0	1,1	1,1	1,1	1,2
60°	0,6	0,6	0,6	0,8	0,9	1,0	1,0
90°	0,3	0,4	0,5	0,6	0,8	0,8	0,9
120°	NR	0,3	0,4	0,5	0,6	0,7	0,8
135°	NR	NR	0,3	0,5	0,5	0,5	0,6
150°	NR	NR	NR	0,3	0,4	0,5	0,5
180°	NR	NR	NR	0,3	0,3	0,4	0,5

MAXIMUM AXIAL DISTANCE FOR **110°** SPRAY ANGLE IN METERS

FIXED ANGLE	K FACTOR (METRIC)						
	17.3	25.9	33.1	46.1	59.0	80.6	103.7
0°	3,4	3,4	3,4	3,4	3,4	3,4	3,4
30°	2,0	2,0	2,2	2,5	2,7	2,8	3,0
45°	1,7	1,8	2,0	2,1	2,3	2,4	2,6
60°	1,4	1,5	1,6	1,7	1,8	2,1	2,2
90°	1,2	1,2	1,4	1,5	1,7	1,8	2,0
120°	0,9	1,0	1,1	1,2	1,4	1,4	1,5
135°	0,8	0,8	1,0	1,1	1,3	1,4	1,4
150°	0,8	0,8	0,9	1,1	1,1	1,3	1,4
180°	0,7	0,8	0,9	0,9	1,1	1,2	1,3

MAXIMUM AXIAL DISTANCE FOR **180°** SPRAY ANGLE IN METERS

FIXED ANGLE	K FACTOR (METRIC)						
	17.3	25.9	33.1	46.1	59.0	80.6	103.7
0°	1,2	1,2	1,2	1,2	1,2	1,2	1,2
30°	0,7	0,7	0,8	0,8	0,9	0,9	0,9
45°	0,6	0,6	0,6	0,7	0,8	0,8	0,8
60°	0,5	0,5	0,5	0,6	0,7	0,8	0,8
90°	NR	NR	0,3	0,3	0,5	0,5	0,7
120°	NR	NR	0,3	0,3	0,4	0,5	0,5
135°	NR	NR	NR	0,3	0,3	0,4	0,5
150°	NR	NR	NR	NR	0,3	0,4	0,4
180°	NR	NR	NR	NR	NR	0,3	0,3

NR = Not Recommended

Figure 6b: Maximum Axial Distance Between Nozzle Tip and Plane of Protection for Exposure Protection (m)

NOTES ABOUT FIGURES 6a AND 6b:

1. Working pressures of 10 to 60 PSI (.7 to 4.1 Bar) can only be applied for 0° (vertically downward) orientation.
2. Working pressures for orientation angles other than 0° are 20 to 60 PSI (1.4 to 4.1 Bar).
3. However, unless otherwise specified, when the nozzles are axially installed 2 ft. (.6 m) or less from the plane of protection, working pressures of 10 to 60 PSI (.7 to 4.1 Bar) can be applied on all installation angles.

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TECHNICAL DATA

MODEL E SPRAY NOZZLES
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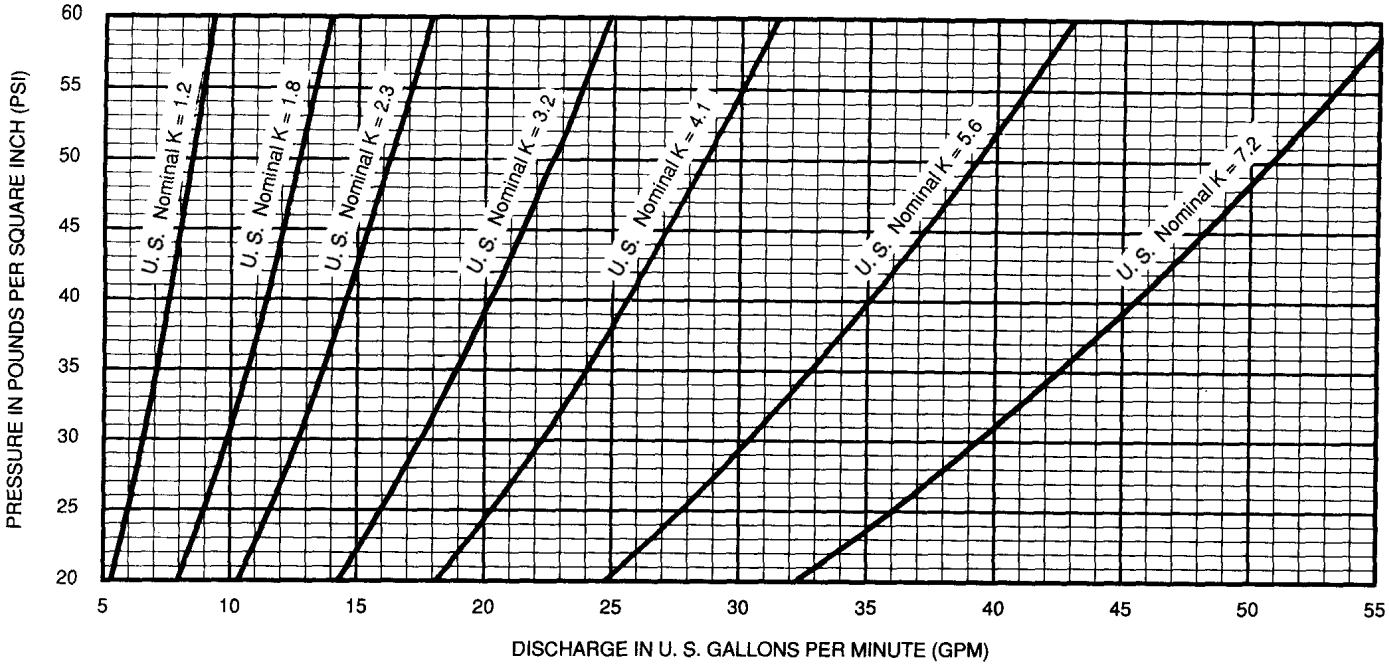
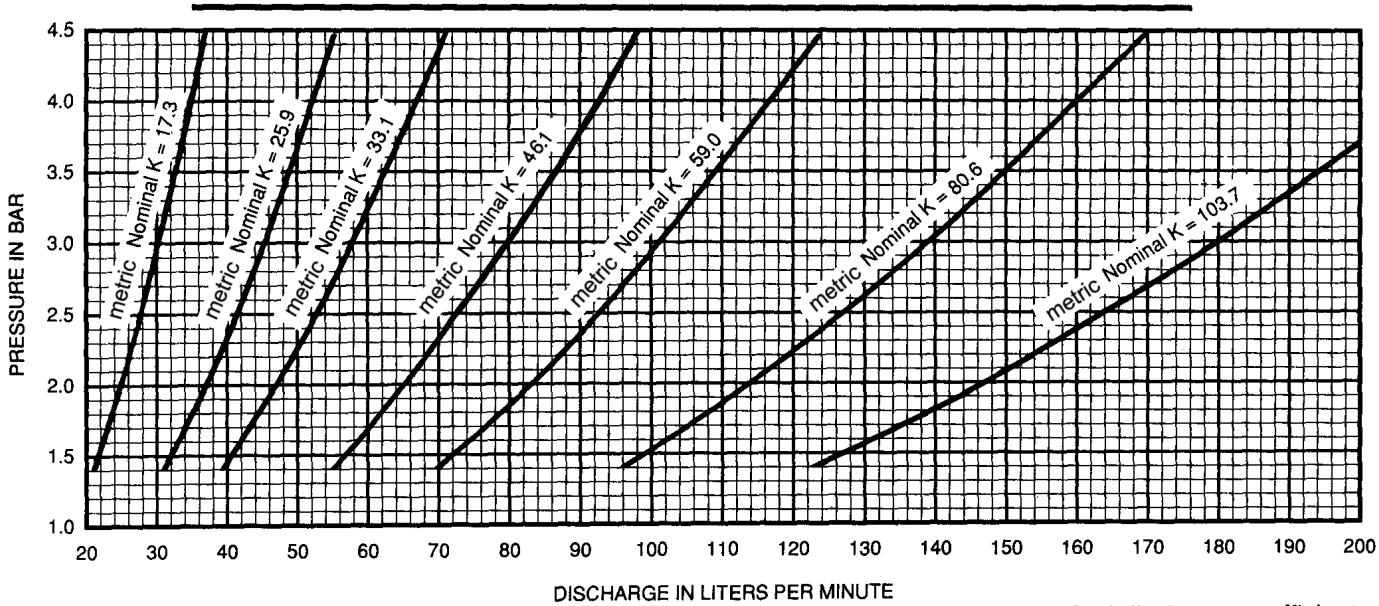


NOTE: $Q = K\sqrt{p}$; where "Q" = flow in U.S. gallons per minute, "p" = pressure in pounds per square inch, and "K" is the nominal discharge coefficient.



NOTE: $Q = K\sqrt{p}$; where "Q" = flow in liters per minute, "p" = pressure in bar , and "K" is the nominal discharge coefficient.

Figure 7: Nominal Discharge Curves
(Refer to the Authority Having Jurisdiction for Their Minimum Required Residual Pressure.)