



DIRECTIONAL SPRAY NOZZLES, OPEN

TYPE D3 LARGE CAPACITY PROTECTOSPRAY® — 1" NPT

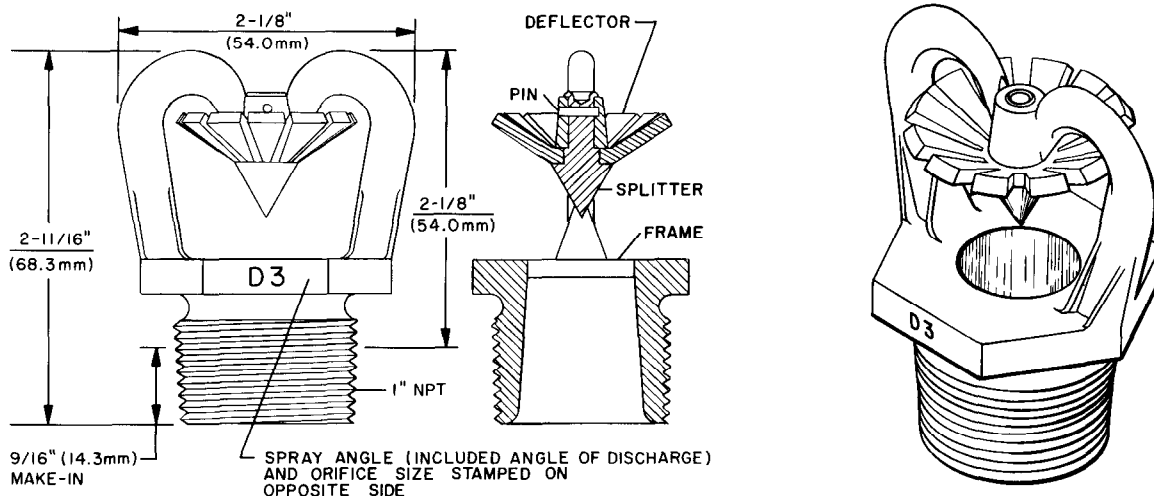


FIGURE A
TYPE D3 LARGE CAPACITY PROTECTOSPRAY NOZZLES

GENERAL DESCRIPTION

The Type D3 Large Capacity Protectospray Nozzles are open (non-automatic) directional spray nozzles and they are designed for use in water spray fixed systems for fire protection applications. The 1 inch NPT Type D3 Large Capacity Nozzles are external deflector type nozzles that discharge a uniformly filled cone of medium velocity water droplets.

They are especially effective in covering exposed vertical, horizontal, curved, and irregular shaped surfaces in a high density cooling spray to prevent excessive absorption of heat from an external fire and to prevent possible structural damage or spread of fire to the protected equipment. In some applications, depending on water design density requirements, they may also be used for fire control and extinguishment.

The Type D3 Large Capacity Nozzles are available in four orifice sizes and a wide variety of spray angles (included angles of discharge) to provide versatility in system design.

Refer to TD620A for information on 1/2 inch NPT Type D3 Protectospray Nozzles with K-factors of 1.2 to 7.2 (17.3 to 103.7) and Technical Data Sheet TD620C for information on 1/2

inch NPT Type D3S Nozzles with individual strainers and K-factors of 1.1 to 2.8 (15.8 to 40.3). Information on automatic Type EA-1 Protectospray Nozzles is given in Technical Data Sheet TD610A.

APPROVALS AND STANDARDS

The natural finish, chrome plated, nickel plated, and lead coated bronze Type D3 Large Capacity Protectospray Nozzles are listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada.

The Type D3 Large Capacity Protectospray Nozzles are also approved by the New York City Board of Standards and Appeals under Calendar Number 334-79-SA.

WARNINGS

The Type D3 Large Capacity Protectospray Nozzles described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of these devices.

The design of individual water spray fixed systems can vary considerably,

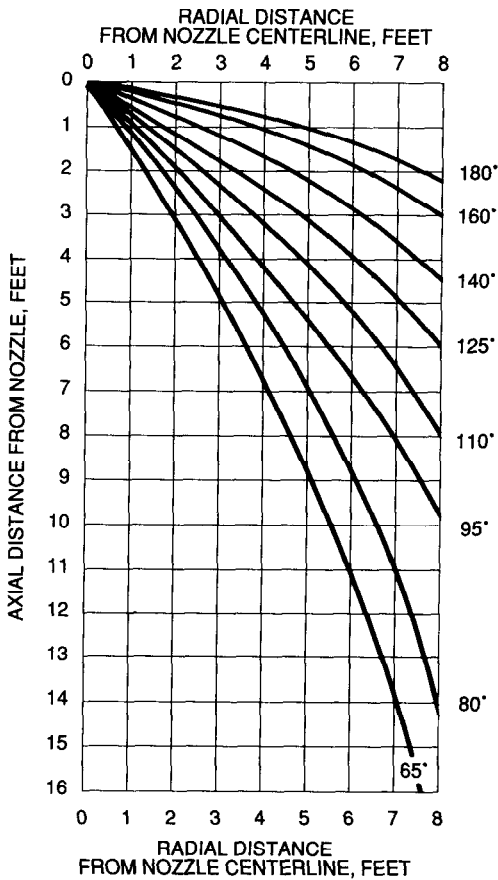
depending on the characteristics and nature of the hazard, the basic purpose of the spraying system, the configuration of the hazard, and wind/draft conditions. Because of these variations as well as the wide range of available nozzle spray characteristics, the design of water spray fixed systems for fire protection must only be performed by experienced designers who thoroughly understand the limitations as well as capabilities of such systems.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted relative to any questions.

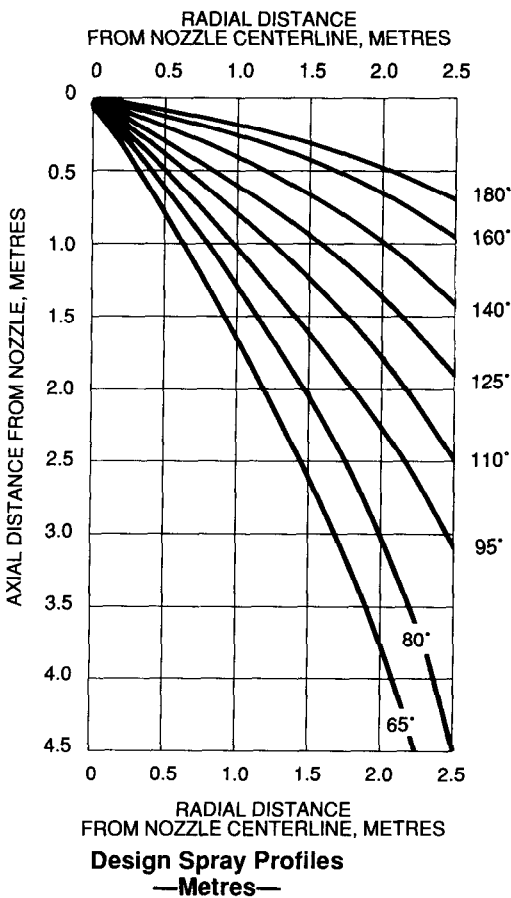
TECHNICAL DATA

The Type D3 Large Capacity Protectospray Nozzles are rated for use at a maximum service pressure of 175 psi (12.1 bar). They are available in natural finish bronze, electroless nickel plated bronze, chrome plated bronze, lead coated bronze, or FEP Teflon[®] coated bronze.

The frame is bronze per ASTM B584 (C83600 or C84400), the Deflector is silicon bronze per ASTM B98 (C66100), the Splitter is brass per

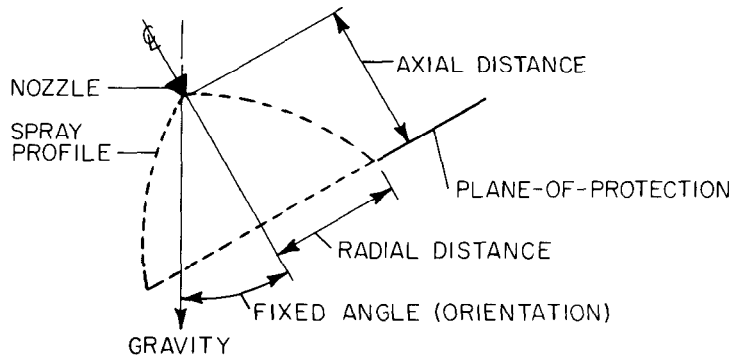


**Design Spray Profiles
—Feet and Inches—**



**Design Spray Profiles
—Metres—**

MAXIMUM AXIAL DISTANCE BETWEEN NOZZLE TIP AND PLANE-OF PROTECTION FOR EXPOSURE PROTECTION								
FEET AND INCHES (METRES)								
FIXED ANGLE	SPRAY ANGLE							
	65°	80°	95°	110°	125°	140°	160°	180°
0°	17-0 (5.2)	16-0 (4.9)	13-6 (4.1)	12-6 (3.8)	11-0 (3.4)	9-0 (2.7)	8-0 (2.4)	7-0 (2.1)
30°	14-3 (4.3)	13-3 (4.0)	12-3 (3.7)	10-9 (3.3)	9-3 (2.8)	7-6 (2.3)	6-6 (2.0)	5-6 (1.7)
45°	13-3 (4.0)	12-6 (3.8)	11-3 (3.4)	10-0 (3.0)	8-6 (2.6)	7-0 (2.1)	5-9 (1.8)	4-9 (1.4)
60°	12-9 (3.9)	12-0 (3.7)	10-9 (3.3)	9-6 (2.9)	8-0 (2.4)	6-0 (1.8)	5-6 (1.7)	4-3 (1.3)
90°	12-0 (3.7)	11-0 (3.4)	10-0 (3.0)	8-6 (2.6)	7-3 (2.2)	5-3 (1.6)	4-6 (1.4)	3-6 (1.1)
120°	10-6 (3.2)	9-0 (2.7)	7-6 (2.3)	6-3 (1.9)	5-0 (1.5)	3-9 (1.1)	3-0 (0.9)	2-0 (0.6)
135°	9-3 (2.8)	8-0 (2.4)	6-9 (2.1)	5-3 (1.6)	4-0 (1.2)	3-3 (1.0)	2-3 (0.7)	1-6 (0.5)
150°	8-3 (2.5)	7-0 (2.1)	5-9 (1.8)	4-6 (1.4)	3-9 (1.1)	2-9 (0.8)	2-0 (0.6)	1-3 (0.4)
180°	7-3 (2.2)	6-3 (1.9)	5-3 (1.6)	4-0 (1.2)	3-6 (1.1)	2-6 (0.8)	1-9 (0.5)	1-0 (0.3)

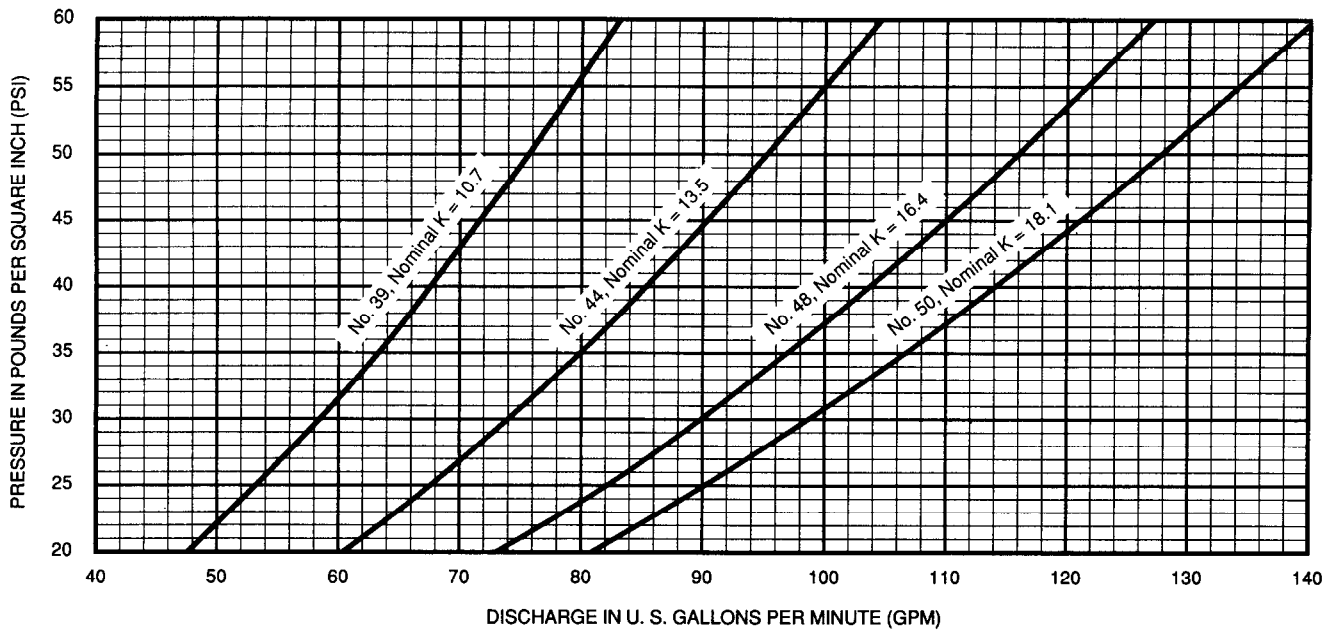


NOTES:

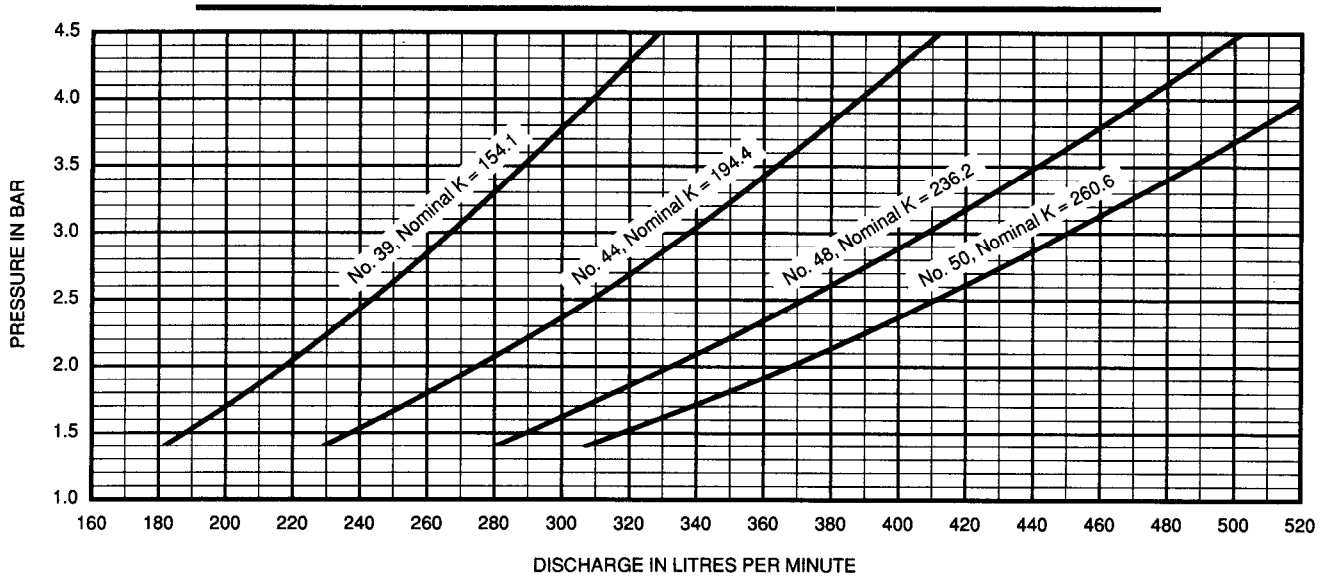
1. Design data obtained from tests in still air.
2. Design data applies to a residual (flowing) pressure range at the nozzle inlet of 20 to 60 psi (1.4 to 4.1 bar). For pressures up to 175 psi (12.1 bar) consult the Technical Data Department.

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 in the table.
4. For axial distances of 2 feet (0.6 meters) and less and for nozzle spray angles of 65° to 140°, the Design Spray Profile is the same as the nominal spray angle.
5. The maximum Axial Distances shown in the table are based on exposure protection.

**FIGURE B
WATER DISTRIBUTION DESIGN DATA**



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 C
NOMINAL DISCHARGE CURVES
 (Refer to the authority having jurisdiction for their minimum required residual pressure.)

Orifice Size	Minimum Diameter	K-factor	
		NFPA (GPM ÷ √psi)	ISO/SI (LPM ÷ √bar)
No. 39	0.604" (15.34mm)	10.7	154.1
No. 44	0.670" (17.02mm)	13.5	194.4
No. 48	0.750" (19.05mm)	16.4	236.2
No. 50	0.787" (19.99mm)	18.1	260.6

TABLE A
SELECTION OF ORIFICE SIZES

65°	125°
80°	140°
95°	160°
110°	180°

TABLE B
SELECTION OF SPRAY ANGLES

ASTM B16 (C36000), and the Pin is phosphor bronze.

Orifice Sizes. Each orifice size has a numerical designation and the available sizes are as shown in Table A.

The nominal discharge curves and K-factors for the various orifice sizes are given in Figure C.

Spray Angles. The nominal spray angles (included angles of discharge) are available as shown in Table B.

Nozzle Placement. Where direct impingement of the water spray onto all of the protected surface is required by the authority having jurisdiction, the nozzles are to be spaced and directed so that their spray patterns will completely cover the plane-of-protection with the minimum required average density; however, it is recommended that indoor nozzle spacings be 12 feet (3.7 metres) or less and that outdoor nozzle spacings be 10 feet (3.0 metres) or less. Where rundown or slippage is planned, e.g. exposure protection of vessels per NFPA 15, the preceding recommended indoor and outdoor spacings also apply.

When used for protecting the surfaces of a vessel, for example, the nozzles are positioned normal to and approximately 2 feet (0.6 metres) from the surface. This approach, in conjunction with a properly selected spray angle, will tend to make more effective use of the spray as well as help minimize the disturbance effects of wind/draft conditions on the water spray pattern.

Spray Patterns. The Design Spray Profiles for the nozzle spray angles of 65° to 180° are as shown in Figure B and apply to discharge pressures of 20 to 60 psi (1.4 to 4.1 bar). Discharge pressures in excess of 60 psi (4.1 bar) will result in a decrease in coverage area since the spray patterns tend to draw inwards at higher pressures. Refer inquiries on higher discharge pressures to the Technical Data Department.

The maximum axial distances between the nozzle tip and plane-of-protection, for exposure protection, are given in the table that appears in Figure B. When the axial distance from the nozzle tip to the plane-of-protection is 2 feet (0.6 metres) or less, the Design Spray Profile is the same as the nominal spray angle for spray angles of 65° through 140°.

NOTES

Refer to the Warning Section for an important notice concerning the design of individual water spray fixed systems.

Inquiries concerning nozzle installa-

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ORIFICE SIZE		SPRAY ANGLE	
39	No. 39	065	65°
44	No. 44	085	85°
48	No. 48	095	95°
50	No. 50	110	110°

FINISH & MATERIAL	
1	Natural Finish Bronze
4	Teflon Coated Bronze
5	Electroless Nickel Plated Bronze
7	Lead Coated Bronze
9	Chrome Plated Bronze

125	125°
140	140°
160	160°
180	180°

**TABLE C
PRODUCT SYMBOL NUMBER SELECTION**

tion and usage criteria, not covered by these instructions, should be mailed to the attention of the Technical Data Department. Include sketches and technical details, as appropriate.

INSTALLATION

The Type D3 Large Capacity Protectospray Nozzles may be installed by using a Crescent type adjustable wrench.

CARE AND MAINTENANCE

Care must be exercised to avoid damage to the nozzles - both before and after installation. Nozzles damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced.

Water spray fixed systems for fire protection service require regularly scheduled care and maintenance by trained personnel. It is recommended that the Protectospray Nozzles be periodically inspected for loading/obstructions, or other evidence of impaired protection. The inspections should be scheduled weekly or as frequently as may be necessary and, corrective action taken to ensure that the nozzles will perform as intended in the event of a fire.

NOTE

Before closing a fire protection system main control valve for maintenance

work on the fire protection system which it controls, permission to shut down the affected fire protection system must be obtained from the proper authorities and all personnel who may be affected by this action must be notified.

It is recommended that water spray fixed systems for fire protection be inspected by a qualified Inspection Service.

WARRANTY

Seller warrants for a period of one year from the date of shipment (warranty period) that the products furnished hereunder will be free from defects in material and workmanship.

For further details on Warranty, see Price List.

ORDERING PROCEDURE

Large Capacity Protectospray Nozzles:

Specify: No. (specify number) orifice, Type D3 Large Capacity Protectospray Nozzle in (specify finish/coating and material) with (specify number) degree spray angle, PSN (specify from Table C).

Contact your local distributor for availability.

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