Technical Data Sheet: MX8514 ESFR Pendent Sprinkler K28.0

1. DESCRIPTION

Minimax Specific Application Early Suppression Fast Response (ESFR) Pendent Sprinkler MX8514 incorporates the capability to suppress specific high-challenge fires. The larger K-Factor allows protection of higher hazard commodities at greater ceiling heights with lower end-head pressures. K28.0 sprinklers can:

- Provide flexibility of fire protection designs.
- Eliminate the use of in-rack sprinklers when protecting high piled storage of certain specified materials up to:

UL (Refer to Table 4): 43 ft. (13.1 m) with ceilings up to 48 ft. (14.6 m)*

FM (Refer to Table 5): 50 ft. (15,2 m) with ceilings up to 55 ft. (16,76 m)
OR
45 ft. (13,5 m) with ceilings up to 50 ft. (15,2 m)*

Minimax MX8514 ESFR Pendent Sprinklers are primarily intended to protect the following types of storage, which tend to produce severe-challenge fires: palletized and solid pile storage and single, double, and portable open rack storage (no open-top containers or solid shelves). The MX8514 is listed to utilize a minimum aisle width of 6'-0" (UL - 43' storage or FM - 45' storage) or 8'-0" (FM - 50'. storage).

Minimax ESFR Pendent MX8514 Sprinklers provide protection of most common storage materials, including:

- Encapsulated or unencapsulated Class I, II, III, and IV commodities*.
- UL Listed for protection of cartoned nonexpanded** Group A plastic commodities*.
- FM Approved for protection of cartoned unexpanded** Group A plastic commodities.*

* Refer the Approval Chart and Commodity Selection and Design Criteria Overview for Listing and Approval requirements that must be followed.

**The terms nonexpanded and unexpanded are equivalent.

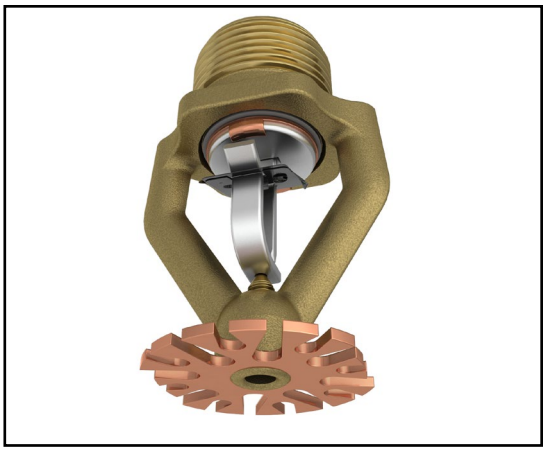

TABLE 1
SPRINKLER GENERAL INFORMATION

Item	Description
Sprinkler Identification Number (SIN)	MX8514
K-factor, gpm/psi^{½} (lpm/bar^{½})	28.0 (404)
Thread Size	1" NPT
Sprinkler Orientation	Pendent
Maximum Working Pressure	175 psi (12 bar)

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

2. LISTINGS AND APPROVALS

UL Listed: Category VNWH (Listed as a Specific Application ESFR Sprinkler)

FM Approved: Class 2035

* Refer the Approval Chart and Commodity Selection and Design Criteria Overview for Listing and Approval requirements that must be followed.

3. PATENT INFORMATION

Please refer to PATMFP.COM for all appropriate patents and patent information pertaining to the Model MX8514 ESFR Sprinkler.

4. TECHNICAL DATA

Specifications:
Maximum Working Pressure: 175 psi (12 bar). Factory tested hydrostatically to 500 psi (34.5 bar).
Thread size: 1" NPT
Nominal K-Factor: 28.0 U.S. (404 metric*)

* Metric K-factor measurement shown is in bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

Overall Length: 3-3/16" (81 mm)
Deflector Diameter: 1-3/4" (45 mm)

Material Standards:
Frame Casting: Brass UNS-C84400
Deflector: Phosphor Bronze UNS-C51000
Seat: Copper UNS-C11000 and Stainless Steel UNS-S30400
Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape
Compression Screw: Stainless Steel UNS-S31603
Trigger and Support: Stainless Steel UNS-S31600
Fusible Element Assembly: Beryllium Nickel, coated with black epoxy paint.

Ordering Information: (Refer to Table 2.)

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5. INSTALLATION

NOTICE

These sprinklers are manufactured and tested to meet rigid requirements of the approving agencies. The sprinklers are designed to be installed in accordance with recognized installation standards or FM Global Loss Prevention Data Sheets. System design must be based on ESFR design guidelines described in the latest edition of the applicable FM Global Loss Prevention Data Sheet, the latest NFPA Standards, the Authorities Having Jurisdiction, and also with the provisions of governmental codes, ordinances, and standards whenever applicable. Deviation from the standards or any alteration to the sprinkler after it leaves the factory including, but not limited to: painting, plating, coating, or modification, may render the sprinkler inoperative and will automatically nullify the approval and any guarantee made by us.

A. Sprinklers must be handled with care. They must be stored in a cool, dry place in their original shipping container. Never install sprinklers that have been dropped or damaged in any way. Such sprinklers should be destroyed immediately. The sprinklers must be installed after the piping is in place to prevent mechanical damage. Before installing, be sure to have the appropriate sprinkler model and style, with the correct orifice size, temperature rating, and response characteristics.

B. With the sprinkler contained in the plastic protective cap, apply a small amount of pipe-joint compound or tape to the male threads only, while taking care not to allow a build-up of compound in the sprinkler orifice.

C. Use ONLY sprinkler wrench 13635WB (shown in Figure 1) for installing ESFR Sprinkler MX8514. With the sprinkler contained in the protective cap, install the sprinkler onto the piping by applying the sprinkler wrench to the sprinkler wrench flats only, while taking care not to damage the sprinkler operating parts.

- DO NOT use any other type of wrench, as this could damage the unit.
- DO NOT use the sprinkler deflector or fusible element to start or thread the sprinkler into a fitting.
- DO NOT exceed 50 ft. lbs. of torque (hand tight plus approximately 2 full turns with the wrench). Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

D. After installation, the entire sprinkler system must be tested. The test must be conducted to comply with the Installation Standards. Make sure the sprinkler has been properly tightened. If a thread leak occurs, normally the unit must be removed, new pipe-joint compound or tape applied, and then reinstalled. This is due to the fact that when the joint seal is damaged, the sealing compound or tape is washed out of the joint. Immediately replace any damaged units, using the special sprinkler wrench only.

E. After installation and testing and repairing of all leaks, remove the protective caps from the sprinklers. Do NOT use any type of tool to remove the cap. Remove the cap by hand: turn it slightly and pull it off the sprinkler. When removing caps, use care to prevent dislodging or damaging sprinkler fusible element. THE CAPS MUST BE REMOVED FROM SPRINKLERS BEFORE PLACING THE SYSTEM IN SERVICE.

6. OPERATION

During fire conditions, the heat-sensitive fusible element assembly disengages, releasing the seat and belleville spring assembly to open the waterway. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to suppress the fire.

7. 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.

NOTE: Wet pipe systems must be provided with adequate heat.

A. The sprinklers must be inspected on a regular basis for corrosion, mechanical damage, obstructions, paint, etc. The frequency of inspections may vary due to corrosive atmosphere, water supplies, and activity around the device.

B. Sprinklers that have been painted or mechanically damaged must be replaced immediately. Sprinklers showing signs of corrosion shall be tested and/or replaced immediately as required. Installation standards require sprinklers to be tested and, if necessary, replaced after a specified term of service. For ESFR Pendent Sprinklers, refer to the Installation Standards (e.g., NFPA 25) and the Authorities Having Jurisdiction for the specified period of time after which testing and/or replacement is required. Sprinklers that have operated cannot be reassembled or reused, but must be replaced. When replacing sprinklers, use only new sprinklers.

C. The sprinkler 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 sprinklers installed.

D. When replacing existing sprinklers, the system must be removed from service. Refer to the appropriate system description and/or valve instructions. Prior to removing the system from service, notify all Authorities Having Jurisdiction. Consideration should be given to employment of a fire patrol in the affected area.

E. Remove the system from service, drain all water, and relieve all pressure on the piping.

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F. Using the special sprinkler wrench, remove the old sprinkler and install the new unit. Care must be taken to ensure that the replacement sprinkler is the proper model and style, with the correct orifice size, temperature rating, and response characteristics. A fully stocked spare sprinkler cabinet should be provided for this purpose.
G. Place the system back in service and secure all valves. Check the replaced sprinklers and repair all leaks.
H. Sprinkler systems that have been subject 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. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced. Refer to the Authorities Having Jurisdiction for minimum replacement requirements.

8. AVAILABILITY

The Model MX8514 Sprinkler is available through a network of domestic and international distributors. See The web site for the closest distributor or contact us.

9. GUARANTEE

For details of warranty, refer to the current list price schedule or contact us directly.

TABLE 2: ORDERING INFORMATION
Instructions: Using the sprinkler base part number,
(1) add the suffix for the desired Finish
(2) add the suffix for the desired Temperature Rating.

Sprinkler Base Part No.	Size		1: Finishes		2: Temperature Ratings[1]				
	NPT Inch	BSPT mm	Description	Suffix	Nominal Rating	Frame Paint Color	Temperature Classification	Max. Ambient Ceiling Temperature[2]	Suffix
61331	1	--	Brass	A	165 °F (74 °C)	None	Ordinary	100 °F (38 °C)	C
61986	1	--			205 °F (96 °C)	White	Intermediate	150 °F (65 °C)	E

Example: 61331AC = MX8514 with Brass Finish and 165 °F (74 °C) Nominal temperature rating. This sprinkler is to be installed into an area with a maximum ambient temperature of 100 °F (38 °C) meaning if the area will experience temperatures above the maximum ambient rating, you shall use a higher temperature-rated sprinkler.

Accessories

Sprinkler Wrenches (see Figure 1):
Standard Wrench: Part No. 13635WB (double-ended wrench - Use Side B ONLY.)
Sprinkler Cabinet:
Up to 6 sprinklers: Part number 61414

Footnotes

1. The sprinkler temperature rating is stamped on the deflector.
2. Based on NFPA 13, NFPA 13R, and NFPA 13D. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

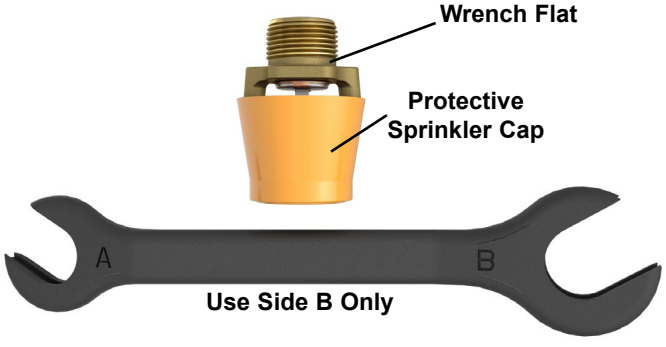


Figure 1:
ESFR Pendent Sprinkler Wrench 13635WB

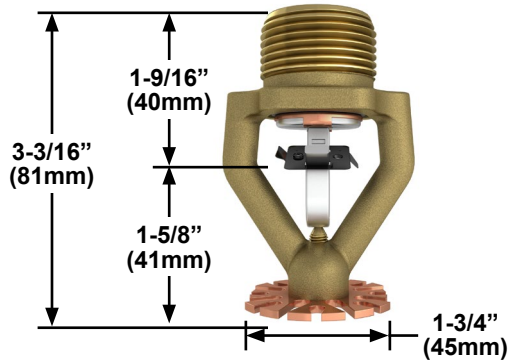
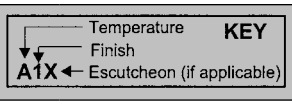


Figure 2:
ESFR Pendent Sprinkler MX8514 Dimensions

Approval Chart

ESFR Pendent Sprinkler MX8514
Maximum 175 PSI (12 bar) WWP



Base Part Number[1]	SIN	Thread Size	Nominal K-Factor		Overall Length		Listings and Approvals[3,4] (Refer also to Tables 3 and 4.)	
		Inches	U.S.	metric[2]	Inches	mm	UL[5]	FM[6]
61331	MX8514	1” NPT	28.0	404	3-3/16	81	A1	--
61986	MX8514	1” NPT	28.0	404	3-3/16	81	A1	A1

Approved Temperature Ratings	Approved Finish
A - 165 °F (74 °C) and 205 °F (96 °C)	1 - Brass

Footnotes

1. Base part number shown. For complete part number, refer to the price list.
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 chart shows listings and approvals available at the time of printing. Other approvals may be in process.
4. Refer to the latest standards of NFPA 13.
5. Listed by Underwriters Laboratories Inc. for use in the U.S. as a Specific Application ESFR Sprinkler (refer to the deflector position requirements).
6. FM Approved as a quick response pendent Non-Storage sprinkler and also FM Approved as a quick response pendent Storage sprinkler. Refer toTables 3 & 5.

TABLE 3:
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR MODEL MX8514 ESFR PENDENT SPRINKLERS

Storage Type	NFPA	FM
Sprinkler Type	ESFR	Storage
Response Type	ESFR	QR
System Type	Wet Pipe system only	Wet Pipe system only
Temperature Rating(s) ºF (ºC)	165 ºF (74 ºC) and 205 (96 ºC)	165 ºF (74 ºC) and 205 (96 ºC)
Open Frame Single, Double, or Portable Rack Storage of Class I-IV and Group A or B Plastics	Refer to NFPA 13.	Refer to FM 2-0 and 8-9.
Solid Pile or Palletized Storage of Class I-IV and Group A or B Plastics	Refer to NFPA 13.	Refer to FM 2-0 and 8-9.

IMPORTANT: Always refer to Bulletin Form No. FX_091699 - Care and Handling of Sprinklers. Minimax Fire Protection ESFR Pendent Sprinklers are to be installed in accordance with the latest edition of Minimax Fire Protection technical data, the latest standards of NFPA, FM Global and any other Authorities Having Jurisdiction, and also with provisions of governmental codes, ordinances, and standards whenever applicable.

TABLE 4: COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR MODEL MX8514 SPECIFIC APPLICATION LISTING - UL	
Description	**48 ft. (14.6 m) Ceilings**
Sprinkler Type	ESFR
Temperature Rating	165 ºF (74 ºC) and 205 (96 ºC)
Response Type	ESFR
Sprinkler Position	Pendent, frame arms aligned with pipe, deflectors parallel with ceiling or roof
System Type	Wet Pipe System only
Maximum Area of Coverage	100 ft^2 (9,3 m^2)
Minimum Area of Coverage	64 ft^2 (5,9 m^2)
Maximum Ceiling Slope	2 in 12
Maximum Spacing	10 ft. spacing (3,0 m)
Minimum Spacing	8 ft. spacing (2,4 m)
Deflector Distance from Walls	Minimum of 4 in. (102 mm) from walls but no more than 1/2 the allowable distance permitted between sprinklers
Deflector to Top of Storage	Minimum of 36 in. (914 mm)
Deflector to Ceiling Distance	For all building heights: 6–14 in. (152–356 mm).
Maximum Ceiling Height	48 ft. (14,6 m)
Maximum Storage Height	43 ft. (13,1 m)
Storage Arrangement**	Single- and double-row rack storage (no open top containers or solid shelves) and palletized and solid pile storage (no open top containers or solid shelves).
Commodity	Class I-IV commodities encapsulated or nonencapsulated and cartoned, nonexpanded Group A plastics.
Sprinkler System Design	NFPA 13 for ESFR Sprinklers based upon 35 psi (2,4 bar) design pressure 166 gpm (628,4 lpm) with 12 sprinkler remote area (4x3)
Obstruction Critera	Refer to NFPA 13 Chapter 8.
Minimum Aisle Width	6 ft. (1,8 m)
Hose Stream Allowance and Water Supply Duration	250 gpm (946 lpm) for 60 minutes
* The maximum coverage area must not exceed 100 ft^2 (9,29 m^2). **Does not include the protection of multiple-row racks.	

TABLE 5:
COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW FOR MODEL MX8514
SPECIFIC APPLICATION LISTING - FM

Description	FM APPROVED 50 Ft. (15,2 m) Ceilings	FM APPROVED 55 Ft. (16,76 m) Ceilings
Sprinkler Type	QR Storage	QR Storage
Temperature Rating	165 ºF (74 ºC) and 205 (96 ºC)	165 ºF (74 ºC) and 205 (96 ºC)
Response Type	QR	QR
Sprinkler Position	Pendent, frame arms aligned with pipe, deflectors parallel to floor.	Pendent, frame arms aligned with pipe, deflectors parallel to floor.
System Type	Wet Pipe System only	Wet Pipe System only
Maximum Area of Coverage*	100 ft^2 (9,29m^2) Refer to FM 2-0, Table 17	100 ft^2 (9,29m^2) Refer to FM 2-0, Table 17
Minimum Area of Coverage	64 ft^2 (5,9 m^2) Refer to FM 2-0, Table 17	64 ft^2 (5,9 m^2) Refer to FM 2-0, Table 17
Maximum Ceiling Slope	Up to 10° Refer to FM 2-0, Section 2.2.1.6	Up to 10° Refer to FM 2-0, Section 2.2.1.6
Maximum Spacing	10 ft. (3,0 m)	10 ft. (3,0 m)
Minimum Spacing	8 ft. (2,4 m)	8 ft. (2,4 m)
Deflector Distance from Walls	Refer to FM 2-0, Section 2.2.3.3	Refer to FM 2-0, Section 2.2.3.3
Deflector to Top of Storage	Minimum of 36 inches (914 mm) Refer to FM 2-0 Section 2.2.2.1 and FM 8-9, Section 2.2.6	Minimum of 36 inches (914 mm) Refer to FM 2-0 Section 2.2.2.1 and FM 8-9, Section 2.2.6
Ceiling Sprinkler Installation Guidelines	As per FM 2-0 (DS 2-0), *Installation Guidelines for Automatic Sprinklers* with the following exception: Vertical distance from underside of the ceiling to the centerline of the sprinkler's thermal element - no more than 13 inches (325 mm)	As per FM 2-0 (DS 2-0), *Installation Guidelines for Automatic Sprinklers* with the following exception: Vertical distance from underside of the ceiling to the centerline of the sprinkler's thermal element - no more than 13 inches (325 mm)
Maximum Ceiling Height	50 ft. (15,2 m)	55 ft. (16,76 m)
Maximum Storage Height	45 ft. (13,5 m)	50 ft. (15,2 m)
Storage Arrangement**	Solid-piled, palletized, shelf, bin-box, as well as single-row and double-row racks that qualify as open-frame	Solid-piled, palletized, shelf, bin-box, as well as single-row and double-row racks that qualify as open-frame
Storage Aisles Between Racks	Minimum 6 ft (1,8 m) wide	Minimum 8 ft (2,4 m) wide
Commodity	Class 1-4 Cartoned unexpanded plastics	Class 1-4 Cartoned unexpanded plastics
Sprinkler System Design	QR Storage Sprinkler based upon 10 @ 40 psi (2.8 bar) design pressure @177 gpm (670 Lpm) with 9 sprinkler remote area (3x3) on 3 branchlines and 1 sprinkler on 1 branchline. Exception: a sprinkler design of 9 (3x3) @ 40 psi (2.8 bar) design pressure @177 gpm (670 Lpm) when the water supply can also provide a design of 4 (2x2) @ 80 psi (5.5 bar) design pressure @250 gpm (950 Lpm)	QR Storage Sprinkler based upon 9 @ 80 psi (5.5 bar) design pressure with 250 gpm (950 Lpm) with 9 sprinkler remote area (3x3) on 3 branchlines.
Obstruction Criteria	Refer to FM 2-0 Section 2.2	Refer to FM 2-0 Section 2.2
Hose Stream Allowance and Water Supply Duration	250 gpm (950 Lpm) for 60 minutes	250 gpm (950 Lpm) for 60 minutes

* The maximum coverage area must not exceed 100 ft^2 (9,29 m^2).

**Does not include the protection of multiple-row racks.