Series DS-2 Dry-Type Sprinklers
11.2K Pendent
Extended Coverage, Light and Ordinary Hazard

General Description
TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Extended Coverage, Light and Ordinary Hazard (ECLH/ECOH) are decorative glass bulb automatic sprinklers typically used where:

- pendent sprinklers are required on dry pipe systems that are exposed to freezing temperatures (e.g., sprinkler drops from unheated portions of buildings)

- sprinklers and/or a portion of the connecting piping may be exposed to freezing temperatures (e.g., sprinkler drops from wet systems into freezers)

NOTICE
Series DS-2 Dry-Type Sprinklers 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 (NFPA), in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of these devices.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Series DS-2 Dry-Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section.

Sprinkler Identification Number (SIN)
TY5238

Technical Data
Approvals
UL and C-UL Listed
NYC Approved under MEA 173-02-E
Refer to Table A. (These Approvals apply to the service condition indicated in the Design Criteria section.)

Maximum Working Pressure
175 psi (12,1 bar)

Inlet Thread Connections
1 inch NPT or ISO 7-R 1

Discharge Coefficient
Refer to Table D.

Temperature Ratings
Refer to Table A.

Finishes
Sprinkler: Refer to Table E.
Escutcheon: Refer to Table E.

Physical Characteristics
Inlet........................................Copper
Yoke.................................Stainless Steel
Casing..............Galvanized Carbon Steel
Insert .....................Bronze
Bulb Seat..............Bronze
Bulb.............................Glass
Compression Screw ...........Bronze
Deflector.........................Bronze
Frame .........................Bronze
Guide Tube.................Stainless Steel
Water Tube ...............Stainless Steel
Spring.............................Stainless Steel
Plug ..................Copper
Gasketed Spring
Plate Seal ............Beryllium Nickel w/TEFLON
Pin .........................Stainless Steel
Button Spring..............Stainless Steel
Escutcheon .................Carbon Steel

Operation
When TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Extended Coverage, Light and Ordinary Hazard are in service, water is prevented from entering the assembly by the Plug with Gasketed Spring Plate Seal (Ref. Figure 1) in the Inlet of the sprinkler.

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, and the Bulb Seat is released.

The compressed Spring is then able to expand and push the Water Tube as well as the Guide Tube outwards. This action simultaneously pulls inward on the Yoke, withdrawing the Plug with Gasketed Spring Plate Seal from the Inlet allowing the sprinkler to activate and flow water.
TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Extended Coverage, Light and Ordinary Hazard are intended for use in fire sprinkler systems designed in accordance with the extended coverage installation rules recognized by the applicable Listing agency (e.g., UL Listing is based on NFPA 13 requirements). Refer to Table C for coverage and flow rate criteria.

<table>
<thead>
<tr>
<th>Temperature Rating</th>
<th>Bulb Color Code</th>
<th>TY5238 with Flush Escutcheon (Figure 2)</th>
<th>TY5238 with Extended Escutcheon (Figure 4)</th>
<th>TY5238 without Escutcheon (Figure 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>135°F (57°C)</td>
<td>Orange</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>155°F (68°C)</td>
<td>Red</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>175°F (79°C)</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200°F (93°C)</td>
<td>Green</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>286°F (141°C)*</td>
<td>Blue</td>
<td></td>
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</tr>
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</table>

Notes:
1. UL Listed (maximum order length of 48 inches)
2. C-UL Listed (maximum order length of 48 inches)
3. Approved by the City of New York under MEA 173-02-E
* 286°F (141°C) temperature rating applies to installations in Ordinary Hazard Occupancies only.
** Frame and deflector only

**TABLE A**
SERIES DS-2 ECLH/ECOH DRY-TYPE PENDENT SPRINKLERS
LABORATORY LISTINGS AND APPROVALS

**FIGURE 1**
SERIES DS-2 ECLH/ECOH DRY-TYPE PENDENT SPRINKLER ASSEMBLY
UL and C-UL Specific Application Listing Requirements for Installation Under Concrete Tees

TYCO Series DS-2 Dry-Type Pendant Sprinklers (TY5238) have a UL and C-UL Specific Application Listing for use under concrete tees when installed as follows:

- Stems of the concrete tee construction must be spaced at less than 7.5 feet (2.3 m) on center but more than 3 feet (0.9 m) on center. The depth of the concrete tees must not exceed 30 inches (762 mm). The maximum permitted concrete tee length is 32 feet (9.8 m). However, where the concrete tee length exceeds 32 feet (9.8 m), non-combustible baffles, equal in height to the depth of the tees, can be installed to ensure that the space between the tees does not exceed 32 feet (9.8 m) in length.
- Sprinkler deflectors are to be located in a horizontal plane at or above 1 inch (25.4 mm) below the bottom of the concrete tee stems.
- When sprinkler deflectors are located higher than a horizontal plane 1 inch (25.4 mm) beneath the bottom of the concrete tee stems, obstruction to sprinkler discharge criteria requirements of NFPA 13 for extended coverage upright sprinklers applies.

### TABLE B
UL AND C-UL LISTING
COVERAGE AND FLOW RATE CRITERIA

<table>
<thead>
<tr>
<th>Ambient Temperature Exposed to Discharge End of Sprinkler</th>
<th>Temperatures for Heated Area[^1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>40°F (4°C)</td>
<td>40°F (4°C)</td>
</tr>
<tr>
<td>0°F (4°C)</td>
<td>0</td>
</tr>
<tr>
<td>0°F (0°C)</td>
<td>0</td>
</tr>
<tr>
<td>4°F (-20°C)</td>
<td>4</td>
</tr>
<tr>
<td>8°F (-12°C)</td>
<td>8</td>
</tr>
<tr>
<td>12°F (-18°C)</td>
<td>12</td>
</tr>
<tr>
<td>16°F (-23°C)</td>
<td>16</td>
</tr>
<tr>
<td>18°F (-29°C)</td>
<td>18</td>
</tr>
<tr>
<td>20°F (-34°C)</td>
<td>20</td>
</tr>
<tr>
<td>24°F (-40°C)</td>
<td>24</td>
</tr>
<tr>
<td>28°F (-46°C)</td>
<td>28</td>
</tr>
<tr>
<td>32°F (-51°C)</td>
<td>32</td>
</tr>
</tbody>
</table>

**Notes:**
1. Flow rates presented are based on minimum flow in gpm from each sprinkler. The required residual pressure is based on the use of a K-factor derived from Table D.
2. Ordinary Hazard Occupancies may have either “combustible or non-combustible, unobstructed ceiling construction” or “noncombustible obstructed ceiling construction.”
3. Minimum spacing between sprinklers is 12.5 feet (3.8 m).
4. For retrofit applications of projects installed prior to the NFPA Quick Response / Light Hazard requirement.

### TABLE C
EXPOSED SPRINKLER BARRELS IN WET PIPE SYSTEMS
MINIMUM RECOMMENDED LENGTHS

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick</td>
<td>16 x 16 (4.9 x 4.9)</td>
<td>30 (114)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Quick</td>
<td>18 x 18 (5.5 x 5.5)</td>
<td>33 (125)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Standard[^5]</td>
<td>20 x 20 (6.1 x 6.1)</td>
<td>40 (151)</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Quick</td>
<td>14 x 14 (4.3 x 4.3)</td>
<td>—</td>
<td>30 (148)</td>
<td>39 (148)</td>
<td>—</td>
</tr>
<tr>
<td>Standard[^5]</td>
<td>16 x 16 (4.9 x 4.9)</td>
<td>—</td>
<td>39 (148)</td>
<td>51 (193)</td>
<td>—</td>
</tr>
</tbody>
</table>

**Notes:**
1. Requirement is based on minimum flow in gpm from each sprinkler. The required residual pressure is based on the use of a K-factor derived from Table D.
2. Light Hazard Occupancies are limited to a type of unobstructed construction consisting of flat, smooth ceilings.
3. Ordinary Hazard Occupancies may have either “combustible or non-combustible, unobstructed ceiling construction” or “noncombustible obstructed ceiling construction.”
4. Minimum spacing between sprinklers is 12.5 feet (3.8 m).
5. For retrofit applications of projects installed prior to the NFPA Quick Response / Light Hazard requirement.
**FIGURE 2**
SERIES DS-2 DRY-TYPE PENDENT SPRINKLER (ECLH/ECOH)
WITH FLUSH ESCUTCHEON (TY5238)

**TABLE D**
DISCHARGE COEFFICIENTS

<table>
<thead>
<tr>
<th>K-factor LENGTH, Inches (mm)</th>
<th>K-factor, gpm/psi/1/2 (lpm/bar(^{1/2}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-1/2 to 6-1/4 (63 mm to 159 mm)</td>
<td>11.2 (161.3)</td>
</tr>
<tr>
<td>6-1/2 to 10-1/2 (165 mm to 267 mm)</td>
<td>11.1 (159.8)</td>
</tr>
<tr>
<td>10-3/4 to 14-3/4 (273 mm to 375 mm)</td>
<td>11.0 (158.4)</td>
</tr>
<tr>
<td>15 to 18-3/4 (381 mm to 476 mm)</td>
<td>10.9 (157.0)</td>
</tr>
<tr>
<td>19 to 23 (483 mm to 584 mm)</td>
<td>10.8 (155.5)</td>
</tr>
<tr>
<td>23-1/4 to 26-3/4 (591 mm to 679 mm)</td>
<td>10.7 (154.1)</td>
</tr>
<tr>
<td>27-1/4 to 31-1/4 (692 mm to 794 mm)</td>
<td>10.6 (152.6)</td>
</tr>
<tr>
<td>31-1/2 to 35-1/2 (800 mm to 895 mm)</td>
<td>10.5 (151.2)</td>
</tr>
<tr>
<td>35-1/2 to 39-1/2 (902 mm to 1003 mm)</td>
<td>10.4 (149.8)</td>
</tr>
<tr>
<td>39-3/4 to 43-1/2 (1010 mm to 1105 mm)</td>
<td>10.3 (148.3)</td>
</tr>
<tr>
<td>43-3/4 to 48 (1111 mm to 1219 mm)</td>
<td>10.2 (146.9)</td>
</tr>
</tbody>
</table>

**Notes:**
K-factor Length is determined as follows:
- **Flush:** Order Length from Figure 2 plus 1/2 inch (12.7 mm)
- **Recessed:** Order Length from Figure 3 plus 1/4 inch (6.3 mm)
- **Extended:** Order Length from Figure 4 plus 3-1/4 inch (82.6 mm)
- **Without Escutcheon:** Order Length from Figure 5 minus 2-1/4 inches (57.2 mm)

**FIGURE 3**
SERIES DS-2 DRY-TYPE PENDENT SPRINKLER (ECLH/ECOH)
WITH RECESSED ESCUTCHEON (TY5238)
ORDER LENGTHS:
1” to 45-1/4”
(25.4 to 1149.4 mm)
IN 1/4” (6.4 mm)
INCREMENTS

FOR ORDER LENGTHS
< 3-1/4” (82.6 mm):
4-7/8±1/8” (123.8±3.2 mm) *

-OR-

FOR ORDER LENGTHS
≥ 3-1/4” (82.6 mm):
5-5/8±1/8” (142.9±3.2 mm) **

* ESCUTCHEON WILL PERMIT
±5/8” (15.9 mm) ADJUSTMENT

** ESCUTCHEON WILL PERMIT
±1-3/8” (34.9 mm) ADJUSTMENT

FIGURE 4
SERIES DS-2 DRY-TYPE PENDENT SPRINKLER (ECLH/ECOH)
WITH EXTENDED ESCUTCHEON (TY5238)

ORDER LENGTHS:
5” to 48”
(127.0 to 1219.2 mm)
IN 1/4” (6.4 mm)
INCREMENTS

MINIMUM
2-1/4” (57.2 mm)
DEFLECTOR
TO CEILING

FIGURE 5
SERIES DS-2 DRY-TYPE PENDENT SPRINKLER (ECLH/ECOH)
WITHOUT ESCUTCHEON (TY5238)
Sprinkler Fittings
Install 1 inch NPT Series DS-2 Dry-Type Sprinklers in the 1 inch NPT outlet or run of the following fittings:

- malleable or ductile iron threaded tee fittings that meet the dimensional requirements of ANSI B16.3 (Class 150)
- cast iron threaded tee fittings that meet the dimensional requirements of ANSI B16.4 (Class 125)

Do not install Series DS-2 Dry-Type Sprinklers into elbow fittings. The Inlet of the sprinkler can contact the interior of the elbow.

The unused outlet of the threaded tee is plugged as shown in Figure 10.

Sprinkler Fittings
Install 1 inch NPT Series DS-2 Dry-Type Sprinklers connected to CPVC piping, use only the following TYCO CPVC fittings:

- 1" x 1" NPT Female Adapter (P/N 80145)
- 1" x 1" x 1" NPT Sprinkler Head Adapter Tee (P/N 80249)

For dry pipe system installations, use only the side outlet of maximum 2-1/2 inch reducing tee when locating Series DS-2 Dry-Type Sprinklers directly below the branch line. Otherwise, use the configuration shown in Figure 9 to assure complete water drainage from above Series DS-2 Dry-Type Sprinklers and the branchline. Failure to do so may result in pipe freezing and water damage.

NOTICE
Do not install Series DS-2 Dry-Type Sprinklers into any other type fitting without first consulting the Technical Services Department. Failure to use the appropriate fitting may result in one of the following:

- failure of the sprinkler to operate properly due to formation of ice over the Inlet Plug or binding of the Inlet Plug
- insufficient engagement of the Inlet pipe-threads with consequent leakage

Drainage
In accordance with the minimum requirements of the National Fire Protection Association for dry pipe sprinkler systems, branch, cross, and feed-main piping connected to Dry Sprinklers and subject to freezing temperatures must be pitched for proper drainage.

Exposure Length
When using dry sprinklers in wet pipe sprinkler systems to protect areas subject to freezing temperatures, use Table C to determine a sprinkler’s appropriate exposed barrel length to prevent water from freezing in the connecting pipes due to conduction. The exposed barrel length measurement must be taken from the face of the sprinkler fitting to the surface of the structure or insulation that is exposed to the heated area. Refer to Figure 9 for an example.

For protected area temperatures between those given above, the minimum recommended length from the face of the fitting to the outside of the protected area may be determined by interpolating between the indicated values.
Clearance Space
In accordance with Section 8.4.9.2 of the 2010 edition of NFPA 13, when connecting an area subject to freezing and an area containing a wet pipe sprinkler system, the clearance space around the sprinkler barrel of Dry-Type Sprinklers must be sealed. Due to temperature differences between two areas, the potential for the formation of condensation in the sprinkler and subsequent ice build-up is increased. If this condensation is not controlled, ice build-up can occur that might damage the dry-type sprinkler and/or prevent proper operation in a fire situation.

Use of the Model DSB-2 Dry Sprinkler Boot, described in Technical Data Sheet TFP591 and shown in Figure 11, can provide the recommended seal.

Installation
TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Extended Coverage, Light and Ordinary Hazard must be installed in accordance with this section.

General Instructions
Series DS-2 Dry-Type Sprinklers must only be installed in fittings that meet the requirements of the Design Criteria section. Refer to the Design Criteria section for other important requirements regarding piping design and sealing of the clearance space around the Sprinkler Casing. With reference to Figure 7, do not grasp the sprinkler by the deflector. Failure to follow this instruction may impair performance of the device.

Do not install any bulb-type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontally, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 inch (1.6 mm) for the 135°F (57°C) rating to 1/8 inch (3.2 mm) for the 360°F (182°C) rating.

A leak-tight 1 inch NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 20 to 30 ft-lbs. (26.8 to 40.2 Nm). Higher levels of torque may distort the sprinkler Inlet with consequent leakage or impairment of the sprinkler.

Do not attempt to compensate for insufficient adjustment in an Escutcheon Plate by under or over-tightening the Sprinkler. Re-adjust the position of the sprinkler fitting to suit.

Note: Install pendent sprinklers only in the pendent position. The deflector of a pendent sprinkler must be parallel to the ceiling.

Step 1. With a non-hardening pipe-thread sealant such as TEFLO applied to the Inlet threads, hand-tighten the sprinkler into the sprinkler fitting. Do not grasp the sprinkler by the deflector.

Step 2. Wrench-tighten the sprinkler using either:
- a pipe wrench on the Inlet Band or the Casing (Ref. Figure 1)
- a W-Type 17 Sprinkler Wrench on the wrench flat (Ref. Figure 6); apply the wrench recess of the W-Type 17 Sprinkler Wrench to the wrench flat

Note: If sprinkler removal becomes necessary, remove the sprinkler using the same wrenching method noted above. Sprinkler removal is easier when a non-hardening sealant was used and torque guidelines were followed. After removal, inspect the sprinkler for damage.

Step 3. After installing the ceiling and applying a ceiling finish, slide on the outer piece of the Escutcheon until it comes in contact with the ceiling. Do not lift the ceiling panel out of its normal position.

When using the Deep Escutcheon, hold the outer piece in contact with the mounting surface (ceiling or wall). Then rotate the inner piece approximately 1/4 turn with respect to the outer piece, to hold the Deep Escutcheon firmly together.

Care and Maintenance
TYCO Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Extended Coverage, Light and Ordinary Hazard must be maintained and serviced in accordance with this section.

Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, obtain permission to shut down the fire protection systems from the proper authorities and notify all personnel who may be affected by this action.

Absence of the outer piece of an escutcheon, which is used to cover a clearance hole, may delay the time to sprinkler operation in a fire situation.

A Vent Hole is provided in the Bulb Seat (Ref. Figure 1) to indicate if the Dry Sprinkler is remaining dry. Evidence of leakage from the Vent Hole indicates potential leakage past the Inlet seal and the need to remove the sprinkler to determine the cause of leakage, e.g., an improper installation or an ice plug.

Close the fire protection system control valve and drain the system before removing the sprinkler.

Sprinklers which are found to be leaking or exhibiting visible signs of corrosion must be replaced.

Automatic sprinklers must never be painted, plated, coated, or otherwise altered after leaving the factory. Modified sprinklers must be replaced. Sprinklers that have been exposed to corrosive products of combustion, but have not operated, should be replaced if they cannot be completely cleaned by wiping the sprinkler with a cloth or by brushing it with a soft bristle brush.

Care must be exercised to avoid damage to the sprinklers before, during, and after installation. Sprinklers damaged by dropping, striking, wrench twist/slippage, or the like, must be replaced. Also, replace any sprinkler that has a cracked bulb or that has lost liquid from its bulb. (Refer to Installation Section.)

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in compliance with this document, as well as with the applicable standards of the National Fire Protection Association (e.g., NFPA 25), in addition to the standards of any other authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.
**Limited Warranty**

For warranty terms and conditions, visit www.tyco-fire.com.

**Ordering Procedure**

Contact your local distributor for availability. When placing an order, indicate the full product name, including description and Part Number (P/N).

**Dry-Type Sprinkler**

When ordering Series DS-2 Dry-Type Sprinklers, 11.2K Pendent, Extended Coverage, Light and Ordinary Hazard, specify the following information:

- SIN TY5238

**Sprinkler**

- Order Length: Dry-Type Sprinklers are furnished based upon Order Length as measured from the face of the ceiling to the face of the sprinkler fitting (Ref. Figures 2 through 5). After the measurement is taken, round it to the nearest 1/4 inch increment.
- Inlet Connections: 1 Inch NPT (Standard)
- Temperature Rating
- Sprinkler Finish
- Escutcheon Type and Finish, as applicable
- Part Number from Table E

**Sprinkler Boot**

Specify Model DSB-2 Dry Sprinkler Boot, P/N 63-000-0-002

This P/N includes one (1) Boot, two (2) Strap Ties, and 1/3 oz. of Adhesive (a sufficient quantity for installing one boot).

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**Table E**

### SERIES DS-2 EXTENDED COVERAGE DRY-TYPE SPRINKLERS

#### PART NUMBER SELECTION

<table>
<thead>
<tr>
<th>SIN</th>
<th>SPRINKLER FINISH</th>
<th>ESCUTCHEON FINISH(1)</th>
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</thead>
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<tr>
<td>0</td>
<td>CHROME PLATED</td>
<td>SIGNAL WHITE (RAL9003) POLYESTER</td>
</tr>
<tr>
<td>1</td>
<td>NATURAL BRASS</td>
<td>SIGNAL WHITE (RAL9003) POLYESTER</td>
</tr>
<tr>
<td>4</td>
<td>SIGNAL WHITE (RAL9003) POLYESTER</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>NATURAL BRASS</td>
<td>BRASS PLATED</td>
</tr>
<tr>
<td>9</td>
<td>CHROME PLATED</td>
<td>CHROME PLATED</td>
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### TEMPERATURE RATING(2)

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<th>ORDER LENGTH(3)</th>
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<td>055</td>
</tr>
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<td>187</td>
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<td>372</td>
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<tr>
<td>5</td>
<td>480</td>
</tr>
</tbody>
</table>

* Use Prefix "I" for ISO 7-R 1 Connection (e.g., I-61-431-1-372).

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Notes:

1. Escutcheon Finish applies to sprinklers with escutcheons.
2. 286°F (141°C) temperature rating applies to non-recessed sprinkler assemblies.
3. Dry-Type Sprinklers are furnished based upon “Order Length” as measured per Figures 2 through 5, as applicable, and for each individual sprinkler where it is to be installed. After the measurement is taken, round it to the nearest 1/4 inch increment.