Housekeeping

- Polling
- Post-webinar assessment
- Ask questions
- Chat window
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2. Attendee must attend the entire online session (monitored by polling and the host)
3. Attendee must actively participate in classroom discussions via polling and chat
4. Attendee must achieve a passing score of 70% or higher on the final assessment (within 24 hrs.)
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Portfolio of Flagship Brands

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Please Contact Talya Pacheco
training@tycofp.com
401-781-8220 ex 0500
1467 Elmwood Avenue
Cranston, RI 02910
Objectives

- Identify components and recognize common fire protection industry terminology
- Classify the different types of sprinklers
- Differentiate between various sprinkler types/categories

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NFPA 13, 2019 Edition

TFPP Website: Tyco-fire.com
How does an Automatic Sprinkler Fight a Fire?

Three things must be present at the same time in order to produce fire:

- Some sort of **fuel** or combustible material
- Enough **heat** to raise the material to its ignition temperature
- Enough **oxygen** to sustain combustion

Key Terms*

- **LH - Light Hazard**
  - Quantity and/or combustibility of contents is low & fires with low heat release rates are expected.

- **OH - Ordinary Hazard**
  - Group I - combustibility is low, quantity of combustibles is moderate, stockpiles of combustibles do not exceed 8’ (2.4m) & fires with moderate heat release rates are expected.
  - Group II - the quantity & combustibility of contents are moderate to high, stockpiles of contents with moderate heat release rates do not exceed 12’ (3.66m) & stockpiles of contents with high heat release rates do not exceed 8’ (2.4m).

- **EH - Extra Hazard**
  - Group I - The quantity and combustibility of contents is very high and dust, lint, or other materials are present, introducing the probability of rapidly developing fires with high rates of heat release but with little or no combustible or flammable liquids.
  - Group II - Moderate to substantial amounts of flammable or combustible liquids or occupancies where shielding of combustibles is extensive.

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Design Discharge Density

Density / Area Method (19.3.3.1.1 (13:2019))

Automatic Sprinkler Components

- Installation Orientation
- Deflector
- Frame & Orifice
- Operating Element
Sprinkler Styles / Orientation

Upright

Pendent

Sidewall

Orifice & Thread Size

<table>
<thead>
<tr>
<th>Nominal K-factor</th>
<th>K-factor Range</th>
<th>Nominal Orifice Size (in)</th>
<th>% of K-5.6 Discharge</th>
<th>Thread Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
<td>1.3–1.5</td>
<td>.25</td>
<td>25</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>1.9</td>
<td>1.8–2.0</td>
<td>.33</td>
<td>33.3</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>2.8</td>
<td>2.6–2.9</td>
<td>.38</td>
<td>50</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>4.2</td>
<td>4.0–4.4</td>
<td>.48</td>
<td>75</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>5.6</td>
<td>5.3–5.8</td>
<td>.5</td>
<td>100</td>
<td>1/2&quot; NPT</td>
</tr>
<tr>
<td>8</td>
<td>7.4–8.2</td>
<td>.53</td>
<td>140</td>
<td>3/4&quot; NPT or 1/2&quot; NPT</td>
</tr>
<tr>
<td>11.2</td>
<td>11.0–11.5</td>
<td>.64</td>
<td>200</td>
<td>3/4&quot; NPT or 1/2&quot; NPT</td>
</tr>
<tr>
<td>14</td>
<td>13.5–14.5</td>
<td>.7</td>
<td>250</td>
<td>3/4&quot; NPT</td>
</tr>
<tr>
<td>16.8</td>
<td>16.0–17.6</td>
<td>.78</td>
<td>300</td>
<td>3/4&quot; NPT</td>
</tr>
<tr>
<td>19.6</td>
<td>18.6–20.6</td>
<td>—</td>
<td>350</td>
<td>1&quot; NPT</td>
</tr>
<tr>
<td>22.4</td>
<td>21.3–23.5</td>
<td>—</td>
<td>400</td>
<td>1&quot; NPT</td>
</tr>
<tr>
<td>25.2</td>
<td>23.9–26.5</td>
<td>.95</td>
<td>450</td>
<td>1&quot; NPT</td>
</tr>
</tbody>
</table>

Copyright © NFPA 13 (2019) – Table 7.2.2.1

\[ Q = K \left( \sqrt[2]{P} \right) \]

\[ Q = \text{Flow (gpm)} \]

\[ K = \text{K-factor (gpm/psi}^{1/2}) \]

\[ P = \text{Pressure (psi)} \]
Pressure Comparison at 100 sq. ft. Spacing

Operating Element

- Thermal sensitivity - A measure of the rapidity with which the thermal element operates as installed in a specific sprinkler or sprinkler assembly.

- One measure of thermal sensitivity is the response time index (RTI) as measured under standardized test conditions.
  - Fast Response Sprinklers have a thermal element with an RTI of 50 (m-s)$^{1/2}$ or less.
  - Special Response Sprinklers have an RTI of 50 (m-s)$^{1/2}$ to 80 (m-s)$^{1/2}$
  - Standard Response Sprinklers have a thermal element with an RTI of 80 (m-s)$^{1/2}$ or more.

Examples of RTI for various operating elements:
- Center Strut – 125 m-s$^{1/2}$
- Glass Bulb (5mm) - 105 m-s$^{1/2}$
- Glass Bulb (4mm) - 65 m-s$^{1/2}$
- Glass Bulb (3mm) - 36 m-s$^{1/2}$
- Fusible Link – 26 m-s$^{1/2}$
Center Strut Sprinkler

- **Operation (Pellet in a Horizontal Tube)** -
  - A copper tube sealed by two stainless steel balls holds a fusible alloy.
  - When the rated temperature is reached, the alloy melts, the balls are forced toward each other releasing the tension mechanism, allowing the sprinkler to operate.

- **Operation (Vertical Tube)** -
  - A fusible alloy is sealed into a bronze actuating rod (center strut) by a stainless steel ball.
  - When the alloy melts at its rated temperature, the ball is forced upward into the center strut, releasing the two ejectors and operating the sprinkler.

- **RTI of Center Strut** – 125 m-s$^{1/2}$

Center Strut Upright Sprinkler
Fusible Link Sprinklers

Operation:

- The fusible link (heat collector) assembly is comprised of two halves that are joined together by a thin layer of solder.
- When the rated temperature is reached, the solder melts and the two link halves separate, allowing the sprinkler to operate.

- RTI of Fusible Link – 26 m-s$^{1/2}$

Fusible Link Pendent Sprinkler
Glass Bulb Sprinklers

- **Operation** -
  - The glass Bulb contains a fluid which expands when exposed to heat.
  - When the rated temperature is reached, the fluid expands sufficiently to shatter the glass Bulb, allowing the sprinkler to activate and water to flow.

- **5mm Bulb (Glycerin Antifreeze)**
  - RTI of 5mm Glass Bulb – 105 m-s\(^{1/2}\)

- **3mm Bulb (Tetrachloroethylene)**
  - RTI of 3mm Glass Bulb – 35 m-s\(^{1/2}\)

Concealed Sprinklers

- **Operation** -
  - A Cover Plate, which is normally soldered to the Retainer Ring at three points, falls away to expose the Sprinkler Assembly.
  - The sprinkler deflector may be fixed or supported by the Guide Pins that allow the deflector to drop down to its operational position.
  - When the rated temperature of the sprinkler is reached, the sprinkler activates allowing water to flow.
Concealed Pendent Sprinkler

How Decorative Escutcheons & Concealed Cover Plates Affect Sprinkler Sensitivity

- Recessed sprinklers:
  - Equivalent to pendent sprinklers having a similar thermal response sensitivity installed 8” (200 mm) below smooth unobstructed ceilings
- Concealed sprinklers:
  - Equivalent to pendent sprinklers having a similar thermal response sensitivity installed 12” (300 mm) below smooth unobstructed ceilings
Temperature Rating

<table>
<thead>
<tr>
<th>Maximum Ceiling Temperature</th>
<th>Temperature Rating</th>
<th>Temperature Classification</th>
<th>Color Code</th>
<th>Glass Bulb Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>°F</td>
<td>°C</td>
<td>°F</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>38</td>
<td>135–170</td>
<td>57–77</td>
<td>Ordinary</td>
</tr>
<tr>
<td>150</td>
<td>66</td>
<td>175–225</td>
<td>79–107</td>
<td>Intermediate</td>
</tr>
<tr>
<td>225</td>
<td>107</td>
<td>250–300</td>
<td>121–149</td>
<td>High</td>
</tr>
<tr>
<td>300</td>
<td>149</td>
<td>325–375</td>
<td>165–191</td>
<td>Extra high</td>
</tr>
<tr>
<td>375</td>
<td>191</td>
<td>400–475</td>
<td>204–266</td>
<td>Very extra high</td>
</tr>
<tr>
<td>475</td>
<td>246</td>
<td>500–575</td>
<td>260–302</td>
<td>Ultra high</td>
</tr>
<tr>
<td>625</td>
<td>329</td>
<td>600</td>
<td>345</td>
<td>Ultra high</td>
</tr>
</tbody>
</table>

Poll #1

Please answer the polling questions that pop up on your screen
Polling questions are considered participation and are required to earn CEUs
Control Mode vs. Suppression Mode Sprinklers

Control Mode Sprinklers
Conventional (Old-Style) Sprinklers

- A sprinkler intended for installation in the upright or pendent position
- Directs from 40 - 60% of the total water initially discharged in the downward direction.
- When installed in the upright position, this discharge covers a 10' (3m) diameter circle, 10' (3m) below the sprinkler, when the sprinkler is discharging water at the rate of 15 gpm (57 lpm).

### Conventional Sprinkler

<table>
<thead>
<tr>
<th>Flow gpm (lpm)</th>
<th>Pressure psi (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 14.6 (55.3)</td>
<td>7 (0.48)</td>
</tr>
<tr>
<td>B 21.3 (80.6)</td>
<td>15 (1.03)</td>
</tr>
<tr>
<td>C 30.1 (113.9)</td>
<td>30 (2.07)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Distance (ft)</th>
<th>Diameter (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10' (3m)</td>
<td>8' (2.4m)</td>
</tr>
<tr>
<td>8' (2.4m)</td>
<td>6' (1.8m)</td>
</tr>
<tr>
<td>6' (1.8m)</td>
<td>4' (1.2m)</td>
</tr>
<tr>
<td>4' (1.2m)</td>
<td>2' (0.6m)</td>
</tr>
</tbody>
</table>

Majority of Water Discharge

Minor Water Discharge
Spray Sprinklers (After 1950’s)

- A sprinkler intended for installation in either the upright or pendent position respectively

- Designed to distribute water downward in an umbrella-shaped pattern.

- The discharge from a 5.6 (80) K-factor spray sprinkler covers a 16’ (4.88m) diameter circle 4’ (1.22m) below the sprinkler, when discharging at 15 gpm (57 lpm)
### Standard Spray Upright & Pendent Sprinklers

<table>
<thead>
<tr>
<th>Flow gpm (lpm)</th>
<th>Pressure psi (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 14.6 (55.3)</td>
<td>7 (0.48)</td>
</tr>
<tr>
<td>B 21.3 (80.6)</td>
<td>15 (1.03)</td>
</tr>
<tr>
<td>C 30.1 (113.9)</td>
<td>30 (2.07)</td>
</tr>
</tbody>
</table>

### Spray vs. Conventional Sprinkler

- **Spray Sprinkler**
- **Conventional Sprinkler**
Water distribution characteristics: Standard Spray Sidewall Sprinklers

- A sprinkler with a deflector designed to discharge most of the water away from the nearby wall in a pattern resembling one-quarter of a sphere, with a small portion of the discharge directed at the wall behind the sprinkler.
- Horizontal Sidewall sprinklers are sidewall sprinklers mounted on a horizontal wall.
- Vertical Sidewall Sprinklers sidewall sprinkler are mounted on the top or bottom of a piping system.

### Standard Spray Sidewall Sprinklers

<table>
<thead>
<tr>
<th>Flow (gpm)</th>
<th>Pressure (psi)</th>
<th>Pressure (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>14.6</td>
<td>55.3</td>
</tr>
<tr>
<td>B</td>
<td>21.3</td>
<td>80.6</td>
</tr>
<tr>
<td>C</td>
<td>30.1</td>
<td>113.9</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height (ft)</th>
<th>Width (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8'</td>
<td>(2.4m)</td>
</tr>
<tr>
<td>6'</td>
<td>(1.8m)</td>
</tr>
<tr>
<td>4'</td>
<td>(1.2m)</td>
</tr>
<tr>
<td>2'</td>
<td>(0.6m)</td>
</tr>
<tr>
<td>7'</td>
<td>(2.1m)</td>
</tr>
</tbody>
</table>
Extended Coverage Pendent Sprinklers

Extended Coverage Sidewall Sprinklers
Extended Coverage Sprinkler Data Sheet

Sprinkler Spray Patterns

Standard Spray

Extended Coverage
Residential Sprinklers

Residential Sprinkler:

- A type of fast-response sprinkler that has been specifically investigated for its ability to enhance survivability in the room of fire origin and is listed for use in the protection of dwelling units.
Prevent Flashover

- The primary focus for residential sprinklers is life-safety.
- Give the occupants 10 minutes to evacuate the occupancy.
- High wall wetting is critical to sprinkler success.

Water distribution characteristics: Residential Sprinklers

28" (711 mm)
Residential Pendant Sprinklers

Residential Sprinkler Data Sheet
Large Drop and Specific Application Control Mode Sprinklers

- **Large Drop Sprinkler.** A type of specific application control mode sprinkler that is capable of producing characteristic large water droplets and that is listed for its capability to provide fire control of specific high-challenge fire hazards.

- **Specific Application Control Mode Sprinkler For Storage Use.** A type of spray sprinkler listed at a minimum operating pressure or density with a specific number of operating sprinklers for a given protection scheme.

- **Design:**
  - Calculate a specific # of sprinklers at a specific pressure
Large Drop and Specific Application Control Mode Sprinklers

- A high challenge fire can have an upward draft equivalent to 30 – 35 mph (50 – 56 km/h)
- The larger K-factors produce larger water droplets at lower pressures
- Large flow rates might be required for some high challenge applications

NFPA 13 (2019)
CMSA Protection Table Example

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Community Class</th>
<th>Maximum Storage Height</th>
<th>Maximum Ceiling Height</th>
<th>K-factor Selection</th>
<th>Type of System</th>
<th>Number of Design Sprinklers</th>
<th>Minimum Operating Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-bayed</td>
<td>Class I or II</td>
<td>10</td>
<td>40</td>
<td>1.1</td>
<td>Upward</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50</td>
<td>60</td>
<td>1.6</td>
<td>Upward</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>120</td>
<td>150</td>
<td>2.5</td>
<td>Upward</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>120</td>
<td>150</td>
<td>2.5</td>
<td>Down</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>120</td>
<td>150</td>
<td>2.5</td>
<td>Down</td>
<td>15</td>
<td>25</td>
</tr>
</tbody>
</table>

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Control Mode Specific Application Data Sheets

Control Mode Sprinklers

- Limiting the size of a fire by distribution of water to control the heat release rate and pre-wet adjacent combustibles, while controlling ceiling gas temperatures to avoid structural damage.

- Sprinkler Types:
  - Control Mode Density Area (CMDA)
    - Conventional / Old Style
    - Standard Spray / Standard Coverage
    - Standard Spray / Extended Coverage
  - Control Mode Specific Application (CMSA)
  - In-Rack (Intermediate Level)
Suppression Mode (SM) Sprinklers

- Vertical fire spread is reversed
- Sprinklers operate quickly, while heat release is small & reduce heat radiation
- High density water delivered direct to the base area of fire
- Fewer sprinklers operate, less water damage
- Design parameters much more critical
- Sprinkler Types:
  - Early Suppression Fast Response (ESFR)
NFPA 13, 2019 Table of Contents

High Piled Storage
Suppression Mode Sprinklers

- Sprinkler Type:
  - 14.0 (200) K Up & Pend
  - 16.8 (240) K Up & Pend
  - 22.4 (326) K Pend
  - 25.2 (360) K Pend

- Max Area of Coverage:
  - 100 sq.ft. (9.3 m²)

- Max Distance Between Sprinklers:
  - 12’ (3.7m) – 30’ (9.1m) Building
  - 10’ (3.01m) – >30’ (9.1m) Building

- Design:
  - Calculate a specific # of sprinklers at a specific pressure

ESFR Sprinklers

Suppression Mode Sprinklers

ESFR Sprinklers
Early Suppression Fast Response (ESFR) Data Sheets

Poll #2

Please answer the polling questions that pop up on your screen
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Intermediate Level Sprinkler/ In-Rack Storage Sprinklers

A sprinkler equipped with integral shields to protect its operating elements from the discharge of sprinklers installed at higher elevations.
In-Rack Sprinklers Data Sheets

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Dry Type Sprinklers

- A sprinkler secured in an extension nipple that has a seal at the inlet end to prevent water from entering the nipple until the sprinkler operates.
Determining the Minimum Dry Type Sprinkler Barrel Length

Table 15.3.1.(a) Exposed Barrel Lengths for Dry Sprinklers
(U.S. customary units)

<table>
<thead>
<tr>
<th>Ambient Temperature Exposed or of Sprinkler (°F)</th>
<th>Minimum Exposed Barrel Length when Exposed to 40°F (in.)</th>
<th>Minimum Exposed Barrel Length when Exposed to 30°F (in.)</th>
<th>Minimum Exposed Barrel Length when Exposed to 60°F (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>9</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>50</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>4</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>8</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>12</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>-10</td>
<td>14</td>
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<td>1</td>
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<tr>
<td>-20</td>
<td>14</td>
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<td>-30</td>
<td>16</td>
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<td>10</td>
<td>5</td>
</tr>
<tr>
<td>-60</td>
<td>20</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Dry Sprinklers (NFPA 13)

NFPA 13 (2019): 15.3.3*
Specific Application Sprinklers

- NFPA 13 states:
  - "...Nothing in this standard is intended to restrict new technologies or alternate arrangements, provided the level of safety prescribed by this standard is not lowered..."

- Special sprinklers: A type of sprinkler that is intended for the protection of specific hazards or construction features and that has been evaluated and listed for performance under the following conditions:
  - Fire tests related to the intended hazard
  - Distribution of the spray pattern with respect to wetting of floors and walls
  - Distribution of the spray pattern with respect to obstructions
  - Evaluation of the thermal sensitivity of the sprinkler
  - Performance under horizontal or sloped ceilings
  - Area of design

Institutional Sprinklers

- Institutional Sprinklers are designed for use in areas such as correctional, detention & mental health care facilities
- The unique features of these sprinklers provide a tamper resistant sprinkler design that helps eliminate the opportunity for individuals to injure themselves or others with the sprinkler components
- These sprinklers are designed so that a suspended load applied to the linkage mechanism will release the sprinkler
High Pressure Sprinklers

- High Pressure Sprinklers – A type of sprinkler with a maximum rated service pressure greater than 175 psi (12,1 bar) used in applications that otherwise would require the use of a pressure control valve to reduce the static pressure to less than 175 psi (12,1 bar).

- One of the most common uses for High Pressure Sprinklers is in the protection of high-rise buildings.

- Limited to use in light & ordinary hazard occupancies.

Poll #3

Please answer the polling questions that pop up on your screen
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- A Pintle is a protrusion (cylinder) extending from a sprinkler deflector indicating a non-standard orifice size
  - Sprinklers with a K-factor less than 5.6 (80) or greater than 8.0 (115) or an 8.0 (115) K-factor with a ½" NPT Pintle

<table>
<thead>
<tr>
<th>UL Control Number</th>
<th>Commercial</th>
<th>Residential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>854A</td>
<td>68H3</td>
</tr>
<tr>
<td>Gem</td>
<td>456A</td>
<td>5368</td>
</tr>
<tr>
<td>Reliable</td>
<td>701A</td>
<td>2387</td>
</tr>
<tr>
<td>Star</td>
<td>722A</td>
<td>4892</td>
</tr>
<tr>
<td>Viking</td>
<td>588A</td>
<td>2431</td>
</tr>
</tbody>
</table>

Modern Sprinkler Identification

- All sprinklers permanently marked with a one- or two-character manufacturer symbol, followed by three or four numbers
- Identifies a unique sprinkler identification for every:
  - Change in orifice size or shape,
  - Deflector characteristic,
  - Pressure rating
  - Thermal sensitivity
Sprinkler Identification Numbers (SIN’s)

- Every Manufacturer will have a unique prefix
  - TFP - TY Reliable - R
  - CSC - C Star - S
  - GEM - G Victaulic - V
  - Globe - GL Viking - VK

- Every Sprinkler type will have a unique identification number

- All Sprinkler Deflectors must be marked with SIN’s by January 1, 2001

The Tyco SIN System

<table>
<thead>
<tr>
<th>K-factor</th>
<th>Style</th>
<th>Response</th>
<th>Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2.8 (3/8)</td>
<td>1 - UP</td>
<td>1 - Strut</td>
<td>1 - Standard Spray</td>
</tr>
<tr>
<td>2 - 4.2 (7/16)</td>
<td>2 - Pend</td>
<td>2 - FR Link</td>
<td>2 - Extended Coverage LH</td>
</tr>
<tr>
<td>3 - 5.6 (1/2)</td>
<td>3 - HSW</td>
<td>3 - 3mm Bulb</td>
<td>3 - Storage</td>
</tr>
<tr>
<td>4 - 8.0 (17/32)</td>
<td>4 - VSW</td>
<td>4 - 2.5mm Bulb</td>
<td>4 - Residential</td>
</tr>
<tr>
<td>5 - 11.2 (5/8)</td>
<td>5 - Conc</td>
<td>5 - 5mm Bulb</td>
<td>5 - Dry (Standard Coverage)</td>
</tr>
<tr>
<td>6 - 14.0 (3/4)</td>
<td>6 - Conv</td>
<td>6 - Heat Fin</td>
<td>6 - ESFR</td>
</tr>
<tr>
<td>7 - 16.8</td>
<td>7 - Fact. Rec.</td>
<td>7 - 7mm/9mm Bulb</td>
<td>7 - Extended Coverage OH</td>
</tr>
<tr>
<td>8 - 19.6</td>
<td>8 - Retro. Up</td>
<td>8 - Special</td>
<td>8 - Extended Coverage EH/Storage</td>
</tr>
<tr>
<td>9 - 25.2</td>
<td>9 - Retro Pend</td>
<td>9 - Special</td>
<td>9 - Dry (Extended Coverage)</td>
</tr>
<tr>
<td>0 - 1.9 (1/4)</td>
<td>0 - Retro Fact. Rec.</td>
<td>0 - Special</td>
<td>0 - Special</td>
</tr>
</tbody>
</table>
What is the SIN?

- **ESFR Pendant**
  - Fast Response Link
  - 25.2 (360) K-factor

- **Standard Spray Upright**
  - 5mm Bulb
  - 5.6 (80) K-factor

- **Dry Pendent**
  - 3mm Bulb
  - 5.6 (80) K-factor

Sprinkler Types Summary

- **Control-Mode Sprinklers**
  - Standard Coverage Spray Sprinklers
  - Extended Coverage Sprinklers
  - Control Mode Specific Application
  - In-Rack

- **Life Safety Sprinklers**
  - Residential Sprinklers

- **Suppression-Mode Sprinklers**
  - ESFR Sprinklers

- **Pilot Line Detectors**
  - Used for detection only

- **Special Sprinklers**
  - Window Sprinklers
  - Attic Sprinklers
  - Combustible Concealed Sprinklers
Match the sprinkler type to the correct description

1. A Sprinkler where roughly half of the water spray is directed upward and half is directed downward  
   a. Extended Coverage Sprinkler

2. A sprinkler with an umbrella shaped pattern where most of the water spray is directed downward  
   b. Residential Sprinkler

3. A sprinkler with high wall wetting designed to enhance survivability  
   c. Spray Sprinkler

4. A sprinkler where the water spray pattern grows larger as the flow/pressure increases  
   d. Conventional Sprinkler

Any Questions?

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