Operating & Maintenance Instructions for FIRE SPRINKLER SYSTEM

2015
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1—Procedure in an Emergency</td>
<td>3</td>
</tr>
<tr>
<td>Section 2—Sprinkler System Description &amp; Technical Data</td>
<td>4-6</td>
</tr>
<tr>
<td>Section 3—Alarms</td>
<td>7</td>
</tr>
<tr>
<td>Section 4—Description of Main Components and Function</td>
<td>8-9</td>
</tr>
<tr>
<td>Section 5—Sprinkler System Operation &amp; Re-commissioning</td>
<td>10</td>
</tr>
<tr>
<td>Section 6—Sprinkler System Routine Maintenance &amp; Testing</td>
<td>11-16</td>
</tr>
<tr>
<td>Level 1 Routines—Weekly</td>
<td></td>
</tr>
<tr>
<td>Level 2 Routines—Quarterly</td>
<td></td>
</tr>
<tr>
<td>Level 3 Routines—Annually</td>
<td></td>
</tr>
<tr>
<td>Level 4 Routines—Three Yearly</td>
<td></td>
</tr>
<tr>
<td>Part B—Clients Responsibilities</td>
<td>17</td>
</tr>
<tr>
<td>Section 7—Items Affecting Sprinkler Operations</td>
<td>18</td>
</tr>
<tr>
<td>Section 8—Drawings</td>
<td>19</td>
</tr>
<tr>
<td>Section 9—Technical Brochures</td>
<td>20</td>
</tr>
</tbody>
</table>
Section 1

OPERATING AND MAINTENANCE INSTRUCTIONS
AUTOMATIC SPRINKLER SYSTEM

PROCEDURE IN AN EMERGENCY

IN A FIRE SITUATION

Go to Fire Sprinkler Valve Set at the main entrance and wait for Fire Brigade to take charge.

THE SYSTEM CANNOT BE MANUALLY OVER-RIDDEN.

Heat or mechanical damage is the only means to set the system off.

IN ACCIDENTAL DAMAGE SITUATION

Firstly check that it is a damage situation and not a fire.

Go to Fire Sprinkler Valve Set and turn off main stop valve 'A' and then open 25mm dia. drain valve fully. Stay at Fire Sprinkler Valve Set until Fire Brigade arrives.
SYSTEM DESCRIPTION

CELSIUS FIRE SERVICES has installed Wet Pipe Sprinkler Systems

The installation of the Fire Sprinkler System is shown on drawings FS-01, FS-02, FS-03, FS-04 and FS-05. The Sprinkler Control Valve Set is located in at the front of the main building to the left of the entrance.

The sprinkler system performs the following functions:

1. It detects an outbreak of fire in its early stages.
2. It releases water at the seat of the fire.
3. It provides an audible warning at the valve station.
4. It gives a remote alarm at the fire station.
5. It will shut down or start up certain mechanical or electrical plant/air conditioning plant/shut down mechanical ventilation.
6. It activates the warning system.
Section 2 Cont...

FIRE INDICATOR PANEL.

THE FIRE SPRINKLER SYSTEM IS CONNECTED TO THE EXISTING FIRE INDICATOR PANEL, LOCATED INSIDE THE MAIN ENTRANCE:
Section 3

ALARMS

The following alarms or indications will be given when the sprinkler system operates or is tested:

A bell will sound at the front of the building.

An alarm will sound at the main Fire Indicator Panel.

The Fire Brigade will be called through the ASE connected to the Fire Indicator Panel.
**Section 4**

**DESCRIPTION OF MAIN COMPONENTS AND FUNCTION**

**ALARM VALVE**

This valve is the heart of the system - when water flows through the valve, the alarms are activated. Normally this valve is closed.

**MAIN STOP VALVE 'A’**

This valve is installed below the alarm valve.

It is used to stop the flow of water to the sprinklers after a fire is out, or used in conjunction with the drain valve to empty the system of water for maintenance or alterations to the system.

It is normally open, with a lock on it.

**25mm DRAIN VALVE**

This valve is installed on the side of the alarm valve.

It is used with the main stop valve to empty the system of water by closing the main stop valve and opening the drain valve.

This valve is normally closed with a strap on it.

**15mm TEST VALVE**

This valve is used for testing the system weekly.

By opening the test valve, the system pressure is allowed to drop and all functions of the system occur automatically as if a sprinkler operated.
Section 4

DESCRIPTION OF MAIN COMPONENTS AND FUNCTION

65mm RESIDENTIAL FIRE SPRINKLER CABINET

DIMENSIONS OF CABINET:
WIDTH: 450 mm
HEIGHT: 780 mm
DEPTH: 400 mm

PAINT COLOUR: MANILLA

COMPONENTS:
FLOW SWITCH: Potter Model YSR-F
ROLL GROOVED CHECK VALVE: UL/ULF approved Waibeg Check Valve
ROLL GROOVED MONITORED BUTTERFLY VALVE: UL/ULF approved Global Safety Butterfly Valve
LOCKABLE TEST AND DRAIN VALVE CABINET: ULF approved
033 Lockable Door
Service Book Holder
Provision for six sprinkler spares

INSTALLATION INSTRUCTIONS:
The incoming and outgoing pipe connections are 65mm roll grooved, and the test drain line is 25mm with a 25mm thread outlet. There can be connected to existing pipe work using 2x 65mm roll grooved couplings and 1x 25mm socket. Please advise at the time of ordering if these additional items are required.

MOUNTING INSTRUCTIONS:
The cabinet is made with 0.9mm zinc which can easily be drilled to your requirements and mounted to the wall using an appropriate fixing.
ANNUBAR WATER SUPPLY TESTING APPARATUS

This is a system of valves and an annubar element, which, with the connection of a portable monometer, allows the pressure/flow condition of the system to be tested. This is usually only done on commissioning and during an Annual test.
SPRINKLER BOOSTER VALVE

A sprinkler booster valve is fitted at the front of the property, located in a box marked “FIRE SPRINKLER BOOSTER” this enables Fire Brigade to boost the system if required.
Section 5

SPRINKLER SYSTEM OPERATION AND RE-COMMISSIONING

Operation under 'Fire Condition' or 'Accidental Damage Condition'

Heat from the fire causes a sprinkler to activate, which allows water to discharge on to the fire. This release of water allows the pressure in the system to fall, which, in turn, allows the alarm valve to open. The following will then occur:

1. Local alarm bell rings.
2. A signal is sent to the Main Fire Panel.
4. Fire Brigade is called.
5. Air-conditioning is shut down.
6. Warning system is activated.

Water will continue to flow through the activated sprinkler until the main stop valve 'A' is closed.

RE-COMMISSIONING

1. Close main stop valve 'A' which stops flow to the activated sprinklers. Open drain valve.
2. Re-set air-conditioning and any other items tripped by the system.
3. Replace activated sprinkler/s; also any additional sprinklers in the area of the fire which could have been affected by the heat of the fire.
4. Check pipe-work and fittings for any damage.
5. Close 25mm-dia. stop valve, open main stop valve 'A' and recharge system. Check area where fire occurred for leaks.
6. Carry out a full test on the system to ensure all functions are working.
7. The system is now ready should a further fire occur.
Section 6

SPRINKLER SYSTEM ROUTINE MAINTENANCE AND TESTING

Testing of the sprinkler system is carried out in accordance with AS 1851 - Maintenance of Fire Protection Equipment - Automatic Fire Sprinkler Systems and should always be in accordance with the latest Amendments of AS 1851.

GENERAL

All sprinkler systems shall be inspected, tested and maintained at the periodic intervals specified in the following clauses:

- Inspection and tests shall be recorded in a logbook kept at the control valve for this purpose.
- Details of all service calls required or undertaken shall be recorded in this logbook.
- Prior to testing, the Fire Brigade, building supervisor, shall be advised that a test is to be conducted.
- On completion of the test, the Fire Brigade shall be contacted to check that the fire call was received and to advise them that the installation has been reset and left in an operative condition.
- Where premises are protected by multiple installations, each individual installation shall be fully checked with the monitoring station before proceeding to the next installation.

Where facilities are installed to enable continuous automatic monitoring of the fire line, the above functions shall be carried out in a manner prescribed by the Fire Brigade/monitoring company.

SCOPE OF WORK

Special attention is drawn to 'Part B - Client's Responsibilities'. For the purpose of this specification, testing, inspection and maintenance routines shall be carried out as defined:

- Level 1 Routines - Weekly
- Level 2 Routines - Quarterly
- Level 3 Routines - Annually
- Level 4 Routines - Three Yearly.
LEVEL 1 ROUTINES - WEEKLY

1. All Wet Pipe Systems
   a) Notify Fire Brigade and building supervisor.
   b) Record readings on all pressure gauges in logbook; isolate shutdowns.
   c) Operate alarm valve by opening the 15mm test valve or by any other approved means.
   d) Check for correct operation of external and direct brigade alarms and record results and response times in logbook.
   e) Close 15mm or other test valve and ensure that the alarm valve has re-seated.
   f) Check that Fire Brigade has received the simulated fire call and record result in logbook.
   g) Restore installation pressure where necessary.
   h) Again record in logbook the readings on all pressure gauges.
   i) Check for correct operation of any facilities installed for the continuous monitoring of stop valves.
   j) Reset and secure all valves in the open or closed position as appropriate. Particular attention shall be given to the main stop valves and alarm cocks.
   k) Check that stop valves on town’s main connections, pump suctions and deliveries, are secured in the fully open position (with the exception of underground and elevated valves - refer Level 2 Routines.)
   l) Check that spare sprinklers and sprinkler spanners are on hand.

2. Requirements where Remote Initiation Facilities are Installed

    Check the initiation facilities to operate remote control functions in accordance with the appropriate Codes.

    It is recommended that where air-handling plant shutdown facilities are provided, these should be operated at least on a quarterly basis. The client, however, shall be notified prior to shutdown and it shall be the responsibility of the client to have qualified personnel in attendance to re-start the plant.
LEVEL 2 ROUTINES - QUARTERLY
Level 2 Routines consist of Level 1 Routines, together with the following:
1. All Wet Pipe Systems
   a. Operate and check to ensure that all street isolating valves on the town's main connection are fully open.
   b. Check to ensure that all water supply non-return valves are correctly seated.
   c. Clean the strainer and oil the external alarm water motor and gong, where necessary.
   d. On electric motor driven pumps, check for the correct rotation of pump.

LEVEL 3 ROUTINES - ANNUALLY
Level 3 Routines consist of Levels 1 and 2 Routines, together with the following:
1. All Wet Pipe Systems
   a. Carry out water supply periodic check test in accordance with the Rules under which the installation was installed.
   b. Check wiring connection to all direct brigade alarm units and that fire line is adequately supported and in good condition.
   c. Physically check all pressure switches to ensure that components are free of corrosion, securely mounted and in working order.
LEVEL 4 ROUTINES - THREE YEARLY
Level 4 Routines consist of Levels 1, 2 and 3 Routines together with the following:

1. **All Wet Pipe Systems**
   a. Renew alarm valve seatings and/or port seating, check and clean annulus groove and outlet ports, polish and lubricate seating spindle/shaft and check operation of compensator valve if fitted.
   b. Renew alarm valve gasket.
   c. Renew drain and test valves washers and examines seatings.
   d. Remove alarm and plug cock barrels, clean, lap-in grease and replace.
   e. Replace pump path cock washers and inspect seatings.
   f. Renew gland packings for path cocks, drain and test cocks, and main stop valve and hand pump.
   g. Clean strainer on local alarms, clear water jet, flush drain, renew gasket, check operation of main spindle and knocker, remove excess grease and lubricate.
   h. Renew water supply check valve seatings and gaskets, check seating and spindle.
   i. Check recordings/gauges against a known tested gauge.

**Note:** Where it is thought that sediment may have collected in the pipe-work, all system pipe-work should be flushed.
Part B—Client’s Responsibilities

It is required that the client assumes the following responsibilities and involvement to enable compliance with Australian Standard AS 1851 - Part 3, 1978.

Drainage

The client is to ensure that all floor, waste and test drains and the like are kept clear of any obstruction and are of adequate capacity to discharge water under all conditions. (Refer Levels 1, 2, 3 and 4 Routines).

Batteries

The contractor allows to replace lead acid control and starter batteries during the Level 4 Routines (ie. three yearly).

If a battery requires replacement prior to or after the Level 4 Routines become due, this shall be subject to a separate quotation and authority by the client. (Refer Level 4 Routines).

Pump Valve Room

The client is to maintain all pump and valve rooms in a clean condition and clear of obstructions. (Refer Level 4 Routines.)

Remote Control Functions

Where initiation facilities to operate remote control functions (such as smoke exhausts, stair pressurisation fans, air-conditioning shutdown, automatic door closers) are installed, it shall be the client’s responsibility to provide qualified personnel to be in attendance to reset this plant. (Refer Level 1 Routines.)

Inspections

The complete water distribution system, including all pipe-work, pipe supports and sprinklers should be examined at least every three years, (in corrosive atmospheres this examination may be required at more frequent intervals) and any defects cleaned, repainted and replaced as required. This shall be subject to a separate quotation and authority by the client.

Alterations

Whenever alterations, change of occupancy or re-arrangement of premises is contemplated, the client should seek the advice of the contractor to report on the effect such alteration/s may have on the sprinkler installation/s.

Notification

a. The Fire Brigade and insurers shall be notified when any portion of the system is isolated for maintenance and likewise when this portion is reconnected.

b. Where required by a relevant Authority, a copy of the Testing Agreement Contract form shall be filed with that Authority.

The Authority shall be notified in the event that the contract is cancelled or lapses.
ITEMS AFFECTING SPRINKLER OPERATION

A number of rules have to be followed for effective operation of the sprinkler system. These are:

1. Any alterations to the internal walls or ceilings could affect the sprinklers’ area of coverage and effectiveness.

   If any alterations are carried out, consult with sprinkler system installer for checking of the Rules.

2. Do not paint sprinkler heads.

3. Do not hang decorations or signs on sprinkler heads.

4. A clear space of 1000mm minimum clearance between the sprinkler heads and top of storage shall always be maintained.

5. If new machinery ducts, platforms, hoods, storage racks are installed; sprinklers may be required in or under such items. Consult with sprinkler system installer.

6. If new materials and/or processes or storage are installed, consult with sprinkler system installer for checking the system.
DRAWINGS

The following drawings are included:

Drawing Register

F01-C Lower Ground
F02-B Ground Floor
F03-B First Floor
Sprinkler Block Plan
Section 9
Technical Data Sheets

Reliable®

Model F1
Residential Sprinklers for Design Density of .10 gpm/ft²

Model F1 Res Sprinklers Listed to meet the minimum design density as required by UL 1628.

Types:
1. F1 Res 30 Pendant
2. F1 Res 30 Recessed F2
3. F1 Res 30 Recessed FP
4. F1 Res 30 CCP Pendant
5. F1 Res 49 Pendant
6. F1 Res 49 Recessed Pendant/F1
7. F1 Res 49 Recessed Pendant/FP
8. F1 Res 49 CCP Pendant
9. F1 Res 58 Pendant
10. F1 Res 58 Recessed Pendant/F1
11. F1 Res 58 Recessed Pendant/FP
12. F1 Res 58 CCP Pendant
13. F1 Res 44 & 58 HSW
14. F1 Res 44 & 58 HSW Recessed HSW/FP
15. F1 Res 58 HSWX
16. KRes58 HSWX
17. F1 Res 44 SWC
18. F1 Res 76 Pendant
19. F1 Res 76 Recessed Pendant/F1
20. F1 Res 76 Recessed Pendant/FP
21. F1 Res 76 CCP Pendant

Listings & Approvals
1. Listed by Underwriters Laboratories Inc. and
   UL Certified for Canada (cULus)
2. NCI MFA 958.05-E

UL Listing Category
Residential Automatic Sprinkler

UL Guide Number
YKWW

Patents
US Patent No. 6,516,090 applies to the Model F1 Res 49 & 50 Pendant Sprinklers
US Patent No. 7,353,002 applies to Model F1 Res 44 & 50 HSW Sprinklers
US Patent No. 7,784,500 applies to Model F1 Res 44 SWC Sprinkler
Patent Pending - Model F1 Res 76 Pendant Sprinkler

Product Description
Model F1 Res Pendant sprinklers (Figs. 1, 2, 3 & 4) combine excellent durability, high sensitivity glass bulb and low profile decorative design.

The Reliable Automatic Sprinkler Co., Inc., 103 Fairview Park Drive, Elmsford, New York 10523

Bulletin 176 Rev C

F1 Res 30, 49, 58 & 76 Recessed Pendant/F1
F1 Res 30, 49, 58 & 76 Recessed Pendant/FP
F1 Res 30, 49, 58 & 76 CCP Pendant
F1 Res 58 HSWX
F1 Res 44 Recessed HSW/FP
F1 Res 44 SWC

The 3mm glass-bulb pendant sprinklers permit the efficient use of residential water supplies for sprinkler coverage in residential fire protection design.

Upon fire conditions, rising heat causes a sprinkler’s heat-sensitive glass bulb to shatter, releasing the waterway for water flow onto the deflector, evenly distributing the discharged water to control a fire.

Technical Data:
- Thermal Sensor: Nominal 3mm glass bulb
- Sprinkler Frame: Brass Casting
- Sprinkler’s Pressure Rating: 175 psi
  Factory Hydrostatically Tested to 500 psi
- Thread Size: ½” NPT (R1½)
- K-Factor: 2.0 (Actual) - F1 Res 20 Pendant Sprinkler
  4.0 (Actual) - F1 Res 40 Recessed Pendant Sprinkler
  5.0 (Actual) - F1 Res 58 Pendant & HSW/HSWX Sprinkler
  7.6 (Actual) - F1 76 Resettled Sprinkler
- Density: Minimum 0.10 gpm/ft²

Celsius Fire Services
Application

Model F1 Res Sprinklers are used for Residential Fire Protection according to UL 1628 Standard. Be sure that orifice size, temperature rating, deflector style and sprinkler type are in accordance with the latest published standards of The National Fire Protection Association or the approving authority having jurisdiction.

When using F1 Residential Sprinklers for systems designed to NFPA 13D or NFPA 13R, use listed area of coverage and minimum flow and pressure requirements shown in Bulletin 13D.

For systems designed to NFPA 13, use information in this bulletin. The number of design sprinklers shall be the most hydraulically demanding sprinklers as required by NFPA 13. Flows and pressures can not be below the baseline flows and pressures.

NFPA 13

For residential sprinkler systems designed to NFPA 13, a minimum density of 0.1 gpm\(\text{ft}^2\) must be provided over the “design area” that includes the four (4) most hydraulically most demanding sprinklers for the actual coverage areas being protected by the 4 sprinklers. The minimum required discharge from each of the four most hydraulically demanding sprinklers shall be the greater of the following:

1. The flow rates given in the Reliable Residential Sprinkler Technical Bulletins referenced in Table A for NFPA 13D and 13R as a function of temperature rating and maximum allowable coverage area (for actual coverage areas less than or between those indicated in the technical bulletin, it is required to use the minimum required flow for the next largest coverage area); or

2. A minimum discharge density of 0.1 gpm\(\text{ft}^2\) applied over the “design area” consisting of the four most hydraulically demanding sprinklers for the actual coverage areas being protected by the four sprinklers. The maximum dimension of the actual coverage area cannot be any greater than the maximum coverage areas indicated in the technical bulletins referenced in Table A.

Design Note: Using the As = \(5 \times L\) method to determine the sprinkler protection area of coverage in accordance with NFPA 13, apply the 0.1 gpm\(\text{ft}^2\) density to this area to determine the minimum required flow. Compare this flow to the minimum 0.05 gpm\(\text{ft}^2\) cULus listed flow for the appropriate coverage area in the technical bulletin for the specific residential sprinkler. If the flow stated in the technical bulletin is less than the calculated 0.1 gpm\(\text{ft}^2\) density flow required, the 0.1 density flow must then be used in the equation \(Q=K\cdot P\) solving for \(P\) to establish the minimum required pressure using the sprinkler K-factor. Note: In many cases the listed flow of individual residential sprinklers may exceed the required minimum 0.05 gpm\(\text{ft}^2\) density. Reliable has available residential sprinklers with larger K-factors (K=5.8 and K=7.8) that will provide lower pressure demands for 0.1 gpm\(\text{ft}^2\) densities in NFPA 13 residential applications.

Example No. 1

Room Size: 12 ft x 20 ft (3.6 m x 6.1 m)
Coverage Area: 12 x 20 = 240 ft\(^2\) (22.3 m2)
Flow @ 0.10 gpm/ft\(^2\) density = 240 x 0.10 = 24 gpm
Using an F1 Fies 49 Pendant Sprinkler, K=4.9
Pressure = \((\frac{243,900}{4.9})\) = 24 psi (1.65 bar)

The baseline flow for a 20 ft x 20 ft (6.1 m x 6.1 m) coverage area using the baseline density of 0.05 gpm\(\text{ft}^2\) will be 20 gpm @ 16.7 psi (75.7 L/min @ 1.14 bar). Therefore, the minimum flow required is 24 gpm @ 24 psi (90.3 L/min @ 1.65 bar).

Example No. 2

Room Size: 8 ft x 20 ft (2.4 m x 6.1 m)
Coverage Area: 8 x 20 = 160 ft\(^2\) (14.9 m2)
Flow @ 0.10 gpm/ft\(^2\) density = 160 x 0.10 = 16 gpm
Using an F1 Fies 49 Pendant Sprinkler, K=4.9
Pressure = \((\frac{164,800}{4.9})\) = 10.7 psi (0.74 bar)

The baseline flow for a 20 ft x 20 ft (6.1 m x 6.1 m) coverage area using the baseline density of 0.05 gpm\(\text{ft}^2\) will be 20 gpm @ 16.7 psi (75.7 L/min @ 1.14 bar). Therefore, the minimum flow required is 20 gpm @ 16.7 psi (75.7 L/min @ 1.14 bar).

Example No. 3

Room Size: 10 ft x 16 ft (3.0 m x 4.91 m)
Coverage Area: 10 x 16 = 160 ft\(^2\) (14.9 m2)
Flow @ 0.10 gpm/ft\(^2\) density = 160 x 0.10 = 16 gpm
Using an F1 Fies 76 Pendant Sprinkler, K=7.6
Pressure = \((\frac{164,800}{7.6})\) = 21 gpm @ 7.6 psi (79.5 L/min @ 0.52 bar). Therefore, the minimum flow and pressure is 21 gpm @ 7.6 psi (79.5 L/min @ 0.52 bar).

Example No. 4

Room Size: 14 ft x 18 ft (4.3 m x 5.5 m)
Coverage Area: 14 x 18 = 252 ft\(^2\) (23.6 m2)
Flow @ 0.10 gpm/ft\(^2\) density = 252 x 0.10 = 25.2 gpm (94.6 L/min)
Using an F1 Fies 76 Pendant Sprinkler, K=7.6
Pressure = \((\frac{252,500}{7.6})\) = 11 psi (0.76 bar)

The baseline flow and pressure of an 18 ft x 18 ft coverage area is 21 gpm @ 7.6 psi (70.5 L/min @ 0.52 bar). Therefore, the minimum flow and pressure is 25.2 gpm @ 11 psi (94.6 L/min @ 0.76 bar).

In general residential sprinklers require flows and pressures as listed for 0.05 densities to achieve the proper spray pattern so the flows and pressures at 0.03 density are the baseline flows and pressures. Flows and pressures below the listed 0.05 density shall not be used.
Installation
Models F1 Res sprinklers are to be installed as shown. Models F1, F2, and FP Escutcheons, illustrated herewith, are the only recessed escutcheons to be used with Model F1 Res sprinklers. Use of any other recessed escutcheon will void all approvals and warranties. For installing Model F1 Res Pendent sprinklers use only the Model D sprinkler Wrench; for installing Models F1 Res Recessed Pendent, CCP sprinklers use only the Model GFF2 sprinkler wrench; for installing Model F1 Res recessed HGW sprinklers use only the Model GFF2 Sprinkler wrench.

Use of wrenches other than those specified may damage these sprinklers.

Note: A “leak tight” sprinkler joint can be obtained with the following torque:
- ½” NPT (R10) – 16-20 ft-lbs (21.9 - 27.1 Nm)
- ½” NPT (R10) – 8-18 ft-lbs (10.8 - 24.4 Nm)

Do not tighten sprinklers over maximum recommended torque. It may cause leakage or impairment of the sprinklers.

- Model F1 Res 30, 49, 58 & 76 Pendent
- Model F1 Res 30, 49, 58 & 76 Recessed Pendent / F1/F2

F1 escutcheon, ½” (19mm) adjustment

Note: See escutcheon table for dimensions.
### Section 9
Technical Data Sheets

#### Technical Data: F1 Res 30 Pendant and Recessed Pendant (SIN R2511)

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice (mm)</th>
<th>Max Pressure psi (bar)</th>
<th>Sprinkler Temp Rating °F °C</th>
<th>Max Ambient Temp °F °C</th>
<th>Actual K Factor</th>
<th>Sprinkler Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>⅝&quot; NPT (Rdr)</td>
<td>½&quot; (13)</td>
<td>155 (10)</td>
<td>105 (73)</td>
<td>85 (59)</td>
<td>3.0</td>
<td>2.25 (57)</td>
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**Baseline flows and pressures for 0.05 density**

<table>
<thead>
<tr>
<th>Max. Coverage area Ft x Ft (m x m)</th>
<th>Max. Spacing Ft (m)</th>
<th>Ordinary Temp. Rating (155°F/100°C)</th>
<th>Flow GPM (L/min)</th>
<th>Pressure PSI (bar)</th>
<th>Intermediate Temp. Rating (175°F/79°C)</th>
<th>Flow GPM (L/min)</th>
<th>Pressure PSI (bar)</th>
<th>Top of Deflector to Ceiling Inch (mm)</th>
<th>Minimum Spacing Ft (m)</th>
</tr>
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<tbody>
<tr>
<td>12 x 12 (3.6 x 3.6)</td>
<td>12 (3.6)</td>
<td>9 (30.5)</td>
<td>7.0 (4.8)</td>
<td>6 (4.2)</td>
<td>10 (37.8)</td>
<td>11 (0.76)</td>
<td>10 (37.8)</td>
<td>11 (0.76)</td>
<td>8 (2.4)</td>
</tr>
<tr>
<td>14 x 14 (4.3 x 4.3)</td>
<td>14 (4.3)</td>
<td>10 (37.8)</td>
<td>11 (0.76)</td>
<td>10 (37.8)</td>
<td>11 (0.76)</td>
<td>10 (37.8)</td>
<td>11 (0.76)</td>
<td>11 (0.76)</td>
<td>8 (2.4)</td>
</tr>
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For Ceiling types refer to NFPA 13, 13R or 12D.
**Calculate for a .10 density but in no case go below the baseline flows & pressures**

#### Technical Data: F1 Res 49 Pendant and Recessed Pendant

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice (mm)</th>
<th>Max Pressure psi (bar)</th>
<th>Sprinkler Temp Rating °F °C</th>
<th>Max Ambient Temp °F °C</th>
<th>Actual K Factor</th>
<th>Sprinkler Identification Number SIN</th>
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<tr>
<td>⅝&quot; NPT (Rdr)</td>
<td>½&quot; (13)</td>
<td>155 (10)</td>
<td>105 (73)</td>
<td>85 (59)</td>
<td>3.0</td>
<td>R016</td>
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**Baseline flows and pressures for 0.05 density**

<table>
<thead>
<tr>
<th>Deflector - to ceiling</th>
</tr>
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<tbody>
<tr>
<td>Maximum 1&quot; (25mm) to 4&quot; (100mm)</td>
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<table>
<thead>
<tr>
<th>Max. Sprinkler Spacing ft</th>
<th>Flow gpm (Lpm)</th>
<th>Pressure psi (bar)</th>
<th>Sprinkler Identification Number SIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.6 x 3.6)</td>
<td>16 (81)</td>
<td>7.6 (0.53)</td>
<td>R016</td>
</tr>
<tr>
<td>14 x 14 (4.3 x 4.3)</td>
<td>16 (81)</td>
<td>7.6 (0.53)</td>
<td>R016</td>
</tr>
<tr>
<td>16 x 16 (4.9 x 4.9)</td>
<td>16 (81)</td>
<td>7.6 (0.53)</td>
<td>R016</td>
</tr>
<tr>
<td>18 x 18 (5.5 x 5.5)</td>
<td>19 (72)</td>
<td>10.8 (0.75)</td>
<td>R016</td>
</tr>
<tr>
<td>20 x 20 (6.1 x 6.1)</td>
<td>22 (83.3)</td>
<td>14.4 (1.0)</td>
<td>R016</td>
</tr>
</tbody>
</table>

**Calculate for a .10 density but in no case go below the baseline flows & pressures**

#### Technical Data: F1 Res 58 Pendant and Recessed Pendant

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice (mm)</th>
<th>Sprinkler Temp Rating °F °C</th>
<th>Max Pressure psi (bar)</th>
<th>Max Ambient Temp °F °C</th>
<th>K Factor</th>
<th>Sprinkler Length (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>⅝&quot; NPT (Rdr)</td>
<td>½&quot; (13)</td>
<td>155 (10)</td>
<td>105 (73)</td>
<td>85 (59)</td>
<td>3.0</td>
<td>2.25 (57)</td>
</tr>
</tbody>
</table>

**Baseline flows and pressures for 0.05 density**

<table>
<thead>
<tr>
<th>Max. Sprinkler Spacing ft</th>
<th>Flow gpm (Lpm)</th>
<th>Pressure psi (bar)</th>
<th>Ceiling-to-Deflector Inch (mm)</th>
<th>Sprinkler Identification Number SIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.6 x 3.6)</td>
<td>16 (81)</td>
<td>7.6 (0.53)</td>
<td>1.4 (25-100)</td>
<td>R013</td>
</tr>
<tr>
<td>14 x 14 (4.3 x 4.3)</td>
<td>16 (81)</td>
<td>7.6 (0.53)</td>
<td>1.4 (25-100)</td>
<td>R013</td>
</tr>
<tr>
<td>16 x 16 (4.9 x 4.9)</td>
<td>16 (81)</td>
<td>7.6 (0.53)</td>
<td>1.4 (25-100)</td>
<td>R013</td>
</tr>
<tr>
<td>18 x 18 (5.5 x 5.5)</td>
<td>19 (72)</td>
<td>10.8 (0.75)</td>
<td>1.4 (25-100)</td>
<td>R013</td>
</tr>
<tr>
<td>20 x 20 (6.1 x 6.1)</td>
<td>22 (83.3)</td>
<td>14.4 (1.0)</td>
<td>1.4 (25-100)</td>
<td>R013</td>
</tr>
</tbody>
</table>

**Calculate for a .10 density but in no case go below the baseline flows & pressures**
Section 9
Technical Data Sheets

Technical Data: F1 Res 78 Pendent and Recessed Pendent

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Sprinkler Temp. (°F)</th>
<th>Max. Pressure psi (bar)</th>
<th>Max Ambient Temp. °F</th>
<th>K Factor</th>
<th>Sprinkler Length Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>¾” NPT (PP)</td>
<td>¾” (19.0)</td>
<td>155</td>
<td>68</td>
<td>175 (79)</td>
<td>60</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>7/8” (22.2)</td>
<td>175</td>
<td>86</td>
<td>175 (79)</td>
<td>60</td>
<td>38</td>
</tr>
<tr>
<td>1”</td>
<td>1” (25.4)</td>
<td>175</td>
<td>86</td>
<td>175 (79)</td>
<td>60</td>
<td>38</td>
</tr>
</tbody>
</table>

*Baseline flows and pressures for 0.05 density

<table>
<thead>
<tr>
<th>Max. Sprinkler Spacing ft (m)</th>
<th>Flow gpm (Lpm)</th>
<th>Pressure psi (bar)</th>
<th>Sprinkler Identification Number (SIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 17 (3.7 x 5.1)</td>
<td>21</td>
<td>7.6 (55.3)</td>
<td>R7861A</td>
</tr>
<tr>
<td>14 x 14 (4.3 x 4.1)</td>
<td>21</td>
<td>7.6 (55.3)</td>
<td></td>
</tr>
<tr>
<td>16 x 16 (4.8 x 4.9)</td>
<td>21</td>
<td>7.6 (55.3)</td>
<td></td>
</tr>
<tr>
<td>18 x 18 (5.5 x 4.9)</td>
<td>21</td>
<td>7.6 (55.3)</td>
<td></td>
</tr>
<tr>
<td>20 x 20 (6.0 x 6.0)</td>
<td>20</td>
<td>9.2 (65.0)</td>
<td></td>
</tr>
</tbody>
</table>

Escutcheon*, F1 or F2, Data:

<table>
<thead>
<tr>
<th>Type</th>
<th>Adjustment Inch (mm)</th>
<th>“A” Inch (mm)</th>
<th>Face of fitting to ceiling Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>¾” (19.0)</td>
<td>¾” (19.0)</td>
<td>¾” to ¾” (4.7 - 24.0)</td>
</tr>
<tr>
<td>F2</td>
<td>¾” (19.0)</td>
<td>¾” (19.0)</td>
<td>¾” to ¾” (4.7 - 17.6)</td>
</tr>
</tbody>
</table>

*Calculate for a 10 density but in no case go below the baseline flows & pressures

- Model F1 Res 30, 49, 58 & 76 CCP Pendent*

- Model F1 Res 30, 49, 58 & 76 Recessed Pendent / FP

FP push-on/thread-off escutcheon

Fig. 3

NOTE: The F1 Res 78 will use a 1” x ½” reducer.

Fig. 4

6.
### Technical Data Sheets

#### Section 9

**Operating & Maintenance Instructions for Fire Sprinkler System**

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Max. Pressure psi (bar)</th>
<th>CCP Assembly Temp. Rating</th>
<th>Max. Ambient Temp.</th>
<th>K Factor</th>
<th>Sprinkler Length Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; NPT (19)</td>
<td>1&quot; (22)</td>
<td>175 (12)</td>
<td>152</td>
<td>37</td>
<td>20</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Baseline flows and pressures for 0.05 density**

<table>
<thead>
<tr>
<th>Max. Coverage area Ft x Ft (m x m)</th>
<th>Max. Spacing Ft (m)</th>
<th>Ordinary Temp. Rating (100°F/38°C)</th>
<th>Pressure psi (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.6 x 3.6)</td>
<td>12 (3.6)</td>
<td>8 (30.3)</td>
<td>7.0 (0.48)</td>
</tr>
<tr>
<td>14 x 14 (4.2 x 4.2)</td>
<td>14 (4.2)</td>
<td>10 (37.8)</td>
<td>12.4 (0.85)</td>
</tr>
</tbody>
</table>

For Ceiling types refer to NFPA 13, 13R or 13D.

*Calculate for a .10 density but in no case go below the baseline flows & pressures.

---

**Technical Data: F1Res 40 CCP Pendant and Recessed Pendant/FP**

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Sprinkler Temp. Rating</th>
<th>CCP Assembly Temp. Rating</th>
<th>Max. Pressure psi (bar)</th>
<th>Max. Ambient Temp.</th>
<th>K Factor</th>
<th>Sprinkler Length Inch (mm)</th>
<th>CCP Options Data:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; NPT (19)</td>
<td>1 1/2&quot; (11)</td>
<td>155</td>
<td>68</td>
<td>135</td>
<td>57</td>
<td>175 (12)</td>
<td>100</td>
<td>38</td>
</tr>
</tbody>
</table>

**Baseline flows and pressures for 0.05 density**

<table>
<thead>
<tr>
<th>Max. Sprinkler Spacing ft (m)</th>
<th>Flow gpm (L/min)</th>
<th>Pressure psi (bar)</th>
<th>Sprinkler Identification Number (SN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.6 x 3.6)</td>
<td>13 (49)</td>
<td>7.0 (0.48)</td>
<td>R3516</td>
</tr>
<tr>
<td>14 x 14 (4.2 x 4.2)</td>
<td>14 (53)</td>
<td>8.2 (0.56)</td>
<td></td>
</tr>
<tr>
<td>16 x 16 (4.8 x 4.8)</td>
<td>18 (65)</td>
<td>13.5 (0.93)</td>
<td></td>
</tr>
<tr>
<td>18 x 18 (5.5 x 5.5)</td>
<td>20 (73.7)</td>
<td>16.7 (1.14)</td>
<td></td>
</tr>
</tbody>
</table>

**Technical Data: F1Res 58 CCP Pendant and Recessed Pendant/FP**

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Sprinkler Temp. Rating</th>
<th>CCP Assembly Temp. Rating</th>
<th>Max. Pressure psi (bar)</th>
<th>Max. Ambient Temp.</th>
<th>K Factor</th>
<th>Sprinkler Length Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; NPT (19)</td>
<td>1 1/2&quot; (13)</td>
<td>155</td>
<td>68</td>
<td>135</td>
<td>57</td>
<td>175 (12)</td>
<td>100</td>
</tr>
</tbody>
</table>

**Baseline flows and pressures for 0.05 density**

<table>
<thead>
<tr>
<th>Max. Sprinkler Spacing ft (m)</th>
<th>Flow gpm (L/min)</th>
<th>Pressure psi (bar)</th>
<th>Sprinkler Identification Number (SN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.6 x 3.6)</td>
<td>16 (61)</td>
<td>7.8 (0.53)</td>
<td>R3513</td>
</tr>
<tr>
<td>14 x 14 (4.2 x 4.3)</td>
<td>18 (68)</td>
<td>7.8 (0.53)</td>
<td></td>
</tr>
<tr>
<td>16 x 16 (4.8 x 4.8)</td>
<td>18 (68)</td>
<td>7.8 (0.53)</td>
<td></td>
</tr>
<tr>
<td>18 x 18 (5.5 x 5.5)</td>
<td>19 (72)</td>
<td>10.3 (0.70)</td>
<td></td>
</tr>
<tr>
<td>20 x 20 (6.1 x 6.1)</td>
<td>22 (83.3)</td>
<td>14.4 (1.0)</td>
<td></td>
</tr>
</tbody>
</table>

*Calculate for a .10 density but in no case go below the baseline flows & pressures.

---

FP Data “A”:

- Max. Recessed: 1 1/4" (11)
- Min. Recessed: 1 1/8" (34)

**Notes:** Sprinklers shown in Fig. 1 and Fig. 4 are not suitable for installation in ceilings which have positive pressure in the spaces above.
Section 9
Technical Data Sheets

### Technical Data: F1 Res 78 CCP Pendant and Recessed Pendant/FP

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Sprinkler Temp Rating °F °C</th>
<th>CCP Temp Assembly Rating °F °C</th>
<th>Max Pressure psi (bar)</th>
<th>Max Ambient Temp °F °C</th>
<th>K Factor</th>
<th>Sprinkler Length Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; NPT (IP)</td>
<td>3/8&quot; (15.8)</td>
<td>156 75</td>
<td>139 57</td>
<td>75 5</td>
<td>100 69</td>
<td>7.6</td>
<td>2.25 (57)</td>
</tr>
</tbody>
</table>

*Baseline flows and pressures for 0.05 density*

<table>
<thead>
<tr>
<th>Max Sprinkler Spacing ft (m)</th>
<th>Flow gpm (Lpm)</th>
<th>Pressure psi (bar)</th>
<th>Sprinkler Identification Number (SN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.66 x 3.66)</td>
<td>21</td>
<td>7.8 (0.55)</td>
<td></td>
</tr>
<tr>
<td>14 x 14 (4.34 x 4.34)</td>
<td>21</td>
<td>7.8 (0.55)</td>
<td></td>
</tr>
<tr>
<td>18 x 18 (4.57 x 4.57)</td>
<td>21</td>
<td>7.8 (0.55)</td>
<td></td>
</tr>
<tr>
<td>20 x 20 (6.10 x 6.10)</td>
<td>26</td>
<td>10.8 (0.74)</td>
<td></td>
</tr>
</tbody>
</table>

*Calculate for a .10 density but in no case go below the baseline flows & pressures

### Model F1 Res 44 & 58 HSW

![Model F1 Res 44 & 58 HSW](image)

### Model F1 Res 44 & 58 HSW/F2

![Model F1 Res 44 & 58 HSW/F2](image)

### Technical Data: F1 Res 44 HSW & HSW/F2

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Sprinkler Temp Rating °F °C</th>
<th>Max Pressure psi (bar)</th>
<th>Max Ambient Temp °F °C</th>
<th>K Factor</th>
<th>Sprinkler Length Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot; NPT (IP)</td>
<td>3/8&quot; (10)</td>
<td>150 85</td>
<td>175 79</td>
<td>100 60</td>
<td>4.4</td>
<td>2.46 (62)</td>
</tr>
</tbody>
</table>

*Baseline flows and pressures for 0.05 density*

<table>
<thead>
<tr>
<th>Max Sprinkler Spacing ft (m)</th>
<th>&quot;A&quot; Ceiling-to-Deflector Inch</th>
<th>Sprinkler Temp Rating °F °C</th>
<th>Flow gpm (Lpm)</th>
<th>Pressure psi (bar)</th>
<th>Sprinkler Identification Number (SN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.66 x 3.66)</td>
<td>4-6 (101-152)</td>
<td>166 (88)</td>
<td>175 (79)</td>
<td>12 (46.4)</td>
<td>7.6 (0.52) R3S31</td>
</tr>
<tr>
<td>14 x 14 (4.34 x 4.34)</td>
<td>165 (88)</td>
<td>175 (79)</td>
<td>10 (43.9)</td>
<td>10.2 (0.71)</td>
<td></td>
</tr>
<tr>
<td>18 x 18 (4.57 x 4.57)</td>
<td>155 (88)</td>
<td>175 (79)</td>
<td>8 (40.6)</td>
<td>13.3 (0.92)</td>
<td></td>
</tr>
<tr>
<td>20 x 20 (6.10 x 6.10)</td>
<td>155 (88)</td>
<td>175 (79)</td>
<td>5 (34.4)</td>
<td>15 (1.04)</td>
<td></td>
</tr>
</tbody>
</table>

*Calculate for a .10 density but in no case go below the baseline flows & pressures

7.

---

Celsius Fire Services

Operating & Maintenance Instructions for Fire Sprinkler System
Section 9
Technical Data Sheets

• Model F1 Res 44 SWC*

* Not listed for corrosion resistance.

Fig. 5

Technical Data: F1 Res 44 SWC

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Sprinkler Temp Rating</th>
<th>Cover Temp Rating</th>
<th>Max. Pressure psi (bar)</th>
<th>Max. Ambient Temp</th>
<th>k Factor</th>
<th>Sprinkler Length Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>½” MPT (16)</td>
<td>3.8 (10)</td>
<td>155</td>
<td>85</td>
<td>135</td>
<td>57</td>
<td>100.00</td>
<td>4.4</td>
</tr>
</tbody>
</table>

*Baseline flows and pressures for 0.05 density

<table>
<thead>
<tr>
<th>Max. Sprinkler Spacing ft (m)</th>
<th>&quot;A&quot; Cabling-to-Deflector Inch (mm)</th>
<th>Flow gpm (Lpm)</th>
<th>Pressure psi (bar)</th>
<th>Sprinkler Identification Number (SIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.66)</td>
<td>4 - 6 (101 - 152)</td>
<td>13 (48.2)</td>
<td>5.7 (0.03)</td>
<td>R3931</td>
</tr>
<tr>
<td>14 x 14 (4.34)</td>
<td>14 (53.5)</td>
<td>10.2 (0.71)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 x 16 (4.44)</td>
<td>16 (66.4)</td>
<td>15.0 (1.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 x 18 (4.90)</td>
<td>18 (71.4)</td>
<td>16.7 (1.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 x 20 (4.86)</td>
<td>19 (79.1)</td>
<td>17.4 (1.23)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 x 22 (6.86)</td>
<td>21 (87.1)</td>
<td>23.4 (1.19)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 x 12 (3.66)</td>
<td>8 - 12 (112 - 152)</td>
<td>14 (52.9)</td>
<td>10.2 (0.71)</td>
<td></td>
</tr>
<tr>
<td>14 x 14 (4.34)</td>
<td>14 (58.7)</td>
<td>11.7 (0.81)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 x 16 (4.44)</td>
<td>16 (68.1)</td>
<td>16.8 (1.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 x 18 (4.90)</td>
<td>18 (75.6)</td>
<td>20.7 (1.42)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Calculate for a .10 density but in no case go below the baseline flows & pressures.
### Technical Data: F1 Res 58 HSW & HSW/F2

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Sprinkler Temp. Rating °F °C</th>
<th>Max. Pressure psi (bar)</th>
<th>Max. Ambient Temp. °F °C</th>
<th>K Factor</th>
<th>Sprinkler Length Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 NPT</td>
<td>1/4 (13)</td>
<td>155 (73)</td>
<td>175 (12)</td>
<td>100 (6.9)</td>
<td>120 (8.3)</td>
<td>2.45 (62)</td>
</tr>
</tbody>
</table>

**Escutcheon, F2, Data:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Adjustment Inch (mm)</th>
<th>Face of Fitting to wall Inch (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2</td>
<td>1/4 (13)</td>
<td>7/32 - 7/32 (4.7 - 17.4)</td>
</tr>
</tbody>
</table>

### Baseline flows and pressures for 0.05 density

<table>
<thead>
<tr>
<th>Max. Sprinkler Spacing ft (m)</th>
<th>Ceiling-to-Deflector Inch (mm)</th>
<th>Sprinkler Temp. Rating °F °C</th>
<th>Flow gpm (Lpm)</th>
<th>Pressure psi (bar)</th>
<th>Sprinkler Identification Number (SIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 x 12 (3.6 x 3.6)</td>
<td>4-6 (101-152)</td>
<td>155 (73)</td>
<td>18 (60.8)</td>
<td>7.8 (0.55)</td>
<td>RS11</td>
</tr>
<tr>
<td>14 x 14 (4.3 x 4.3)</td>
<td></td>
<td>155 (73)</td>
<td>18 (60.8)</td>
<td>7.9 (0.57)</td>
<td>RS12</td>
</tr>
<tr>
<td>16 x 16 (4.9 x 4.9)</td>
<td></td>
<td>155 (73)</td>
<td>21 (73.5)</td>
<td>13.2 (0.91)</td>
<td>RS13</td>
</tr>
<tr>
<td>18 x 18 (4.9 x 5.5)</td>
<td></td>
<td>155 (73)</td>
<td>25 (74.7)</td>
<td>18.8 (1.28)</td>
<td>RS14</td>
</tr>
<tr>
<td>20 x 20 (4.9 x 8.1)</td>
<td></td>
<td>165 (75)</td>
<td>26 (79.8)</td>
<td>25.7 (1.77)</td>
<td>RS15</td>
</tr>
<tr>
<td>12 x 12 (3.6 x 3.6)</td>
<td>8-12 (152-305)</td>
<td>155 (73)</td>
<td>22 (66.3)</td>
<td>14.4 (1.0)</td>
<td>RS16</td>
</tr>
<tr>
<td>14 x 14 (4.3 x 4.3)</td>
<td></td>
<td>155 (73)</td>
<td>22 (66.3)</td>
<td>14.4 (1.0)</td>
<td>RS17</td>
</tr>
<tr>
<td>16 x 16 (4.9 x 4.9)</td>
<td></td>
<td>155 (73)</td>
<td>28 (86.6)</td>
<td>20.1 (1.39)</td>
<td>RS18</td>
</tr>
<tr>
<td>18 x 18 (4.9 x 5.5)</td>
<td></td>
<td>155 (73)</td>
<td>31 (117.4)</td>
<td>28.8 (2.0)</td>
<td>RS19</td>
</tr>
</tbody>
</table>

*Calculate for a .10 density but in no case go below the baseline flows & pressure
### Technical Data Sheets

**Technical Data: F1ReS 58 HSWX (SIN RA3533)**

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice Inch (mm)</th>
<th>Max. Pressure psi (bar)</th>
<th>Sprinkler Temp. Rating</th>
<th>Max. Ambient Temp.</th>
<th>K Factor</th>
<th>Sprinkler Length Inch (mm)</th>
<th>Sprinkler Identification Number (SIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulb</td>
<td>⅜” (11)</td>
<td>175 (12)</td>
<td>155</td>
<td>75</td>
<td>105</td>
<td>60</td>
<td>RA3533</td>
</tr>
</tbody>
</table>

*Baseline flows and pressures for 0.05 density*

<table>
<thead>
<tr>
<th>Max. Coverage Area (Ft x Ft (m x m))</th>
<th>Max. Spacing (Ft (m))</th>
<th>Ordinary Temp. Rating (155°F/68°C)</th>
<th>Intermediate Temp. Rating (175°F/79°C)</th>
<th>Top of Deflector to Ceiling Inch (mm)</th>
<th>Minimum Spacing (Ft (m))</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 x 20 (5.5 x 6.1)</td>
<td>18 (5.5)</td>
<td>30 (114)</td>
<td>26.8 (1.85)</td>
<td>36 (114)</td>
<td>26.8 (1.85)</td>
</tr>
<tr>
<td>20 x 20 (6.1 x 6.1)</td>
<td>20 (6.1)</td>
<td>30 (114)</td>
<td>26.8 (1.85)</td>
<td>36 (114)</td>
<td>26.8 (1.85)</td>
</tr>
<tr>
<td>16 x 24 (4.9 x 7.3)</td>
<td>16 (4.9)</td>
<td>36 (144)</td>
<td>24.2 (1.65)</td>
<td>38 (144)</td>
<td>24.2 (1.65)</td>
</tr>
<tr>
<td>16 x 24 (4.9 x 7.3)</td>
<td>16 (4.9)</td>
<td>36 (144)</td>
<td>24.2 (1.65)</td>
<td>38 (144)</td>
<td>24.2 (1.65)</td>
</tr>
<tr>
<td>14 x 20 (4.3 x 6)</td>
<td>14 (4.3)</td>
<td>42 (160)</td>
<td>25.4 (1.75)</td>
<td>42 (160)</td>
<td>25.4 (1.75)</td>
</tr>
<tr>
<td>16 x 24 (4.9 x 7.3)</td>
<td>16 (4.9)</td>
<td>36 (144)</td>
<td>24.2 (1.65)</td>
<td>38 (144)</td>
<td>24.2 (1.65)</td>
</tr>
<tr>
<td>14 x 20 (4.3 x 6.1)</td>
<td>14 (4.3)</td>
<td>40 (160)</td>
<td>25.4 (1.75)</td>
<td>40 (160)</td>
<td>25.4 (1.75)</td>
</tr>
</tbody>
</table>

For Ceiling types refer to NFPA 13, 13R or 13D

*Calculate for a 0.10 density but in no case go below the baseline floor and pressures.*

---

**Fig. 6**

*Model F1 ReS 58 HSWX (Bulb)*

*Model KReS 58 HSWX (Link)*
### Section 9
Technical Data Sheets

#### Technical Data: KRes58 HSWX (RA3503)

<table>
<thead>
<tr>
<th>Thread Size</th>
<th>Nominal Orifice (inch)</th>
<th>Max. Pressure psi (bar)</th>
<th>Max. Ambient Temp. °F °C</th>
<th>K Factor</th>
<th>Sprinkler Length (inch) mm</th>
<th>Sprinkler Identification Number (SIN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 NPT</td>
<td>1/2 (12)</td>
<td>175 (12)</td>
<td>100 38</td>
<td>5.0</td>
<td>2.45 (62)</td>
<td>RA3503</td>
</tr>
</tbody>
</table>

#### Baseline flows and pressures for 0.05 density

<table>
<thead>
<tr>
<th>Max. Coverage area Ft x Ft (m x m)</th>
<th>Max. Spacing Ft (m)</th>
<th>Ordinary Temp. Rating (100°F/38°C)</th>
<th>Flow GPM (L/min)</th>
<th>Pressure PSI (bar)</th>
<th>Top of Deflector to Ceiling Inch (mm)</th>
<th>Minimum Spacing Ft (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 x 20 (5.5 x 6.1)</td>
<td>15 (5.5)</td>
<td>29 (109)</td>
<td>5 (1.72)</td>
<td></td>
<td>0 (2.4)</td>
<td></td>
</tr>
<tr>
<td>20 x 20 (6.1 x 6.1)</td>
<td>20 (6.1)</td>
<td>30 (114)</td>
<td>28.8 (1.65)</td>
<td></td>
<td>0 (2.4)</td>
<td></td>
</tr>
<tr>
<td>18 x 22 (4.9 x 7.3)</td>
<td>18 (4.9)</td>
<td>33 (125)</td>
<td>32.4 (2.23)</td>
<td></td>
<td>6 to 12 (152 to 305); % (13) Reeded using F2 escutchion</td>
<td></td>
</tr>
<tr>
<td>18 x 24 (4.9 x 7.3)</td>
<td>18 (4.9)</td>
<td>30 (144)</td>
<td>42.9 (2.96)</td>
<td></td>
<td>6 to 12 (152 to 305); % (13) Reeded using F2 escutchion</td>
<td></td>
</tr>
<tr>
<td>14 x 28 (4.3 x 7.9)</td>
<td>14 (4.5)</td>
<td>42 (160)</td>
<td>52.4 (1.57)</td>
<td></td>
<td>6 to 12 (152 to 305); % (13) Reeded using F2 escutchion</td>
<td></td>
</tr>
<tr>
<td>18 x 20 (5.5 x 6.1)</td>
<td>15 (5.5)</td>
<td>35 (133)</td>
<td>36.4 (2.5)</td>
<td></td>
<td>6 to 12 (152 to 305); % (13) Reeded using F2 escutchion</td>
<td></td>
</tr>
<tr>
<td>18 x 22 (4.9 x 7.3)</td>
<td>18 (4.9)</td>
<td>35 (144)</td>
<td>42.9 (2.96)</td>
<td></td>
<td>6 to 12 (152 to 305); % (13) Reeded using F2 escutchion</td>
<td></td>
</tr>
<tr>
<td>16 x 24 (4.9 x 7.3)</td>
<td>18 (4.9)</td>
<td>42 (160)</td>
<td>52.4 (2.8)</td>
<td></td>
<td>6 to 12 (152 to 305); % (13) Reeded using F2 escutchion</td>
<td></td>
</tr>
<tr>
<td>14 x 28 (4.3 x 7.9)</td>
<td>14 (4.5)</td>
<td>48 (174)</td>
<td>62.9 (4.54)</td>
<td></td>
<td>6 to 12 (152 to 305); % (13) Reeded using F2 escutchion</td>
<td></td>
</tr>
</tbody>
</table>

For Ceiling types refer to NFPA 25, 13H or 13D
*Calculate for a 0.10 density but in no case go below the baseline floor and pressures.

### Maintenance

Model F1 Res 30, 49, F1 Res 58 & F1 Res 76 Sprinklers should be inspected and the sprinkler system maintained in accordance with NFPA 25, 13, 13D, and 13F. Do not clean sprinkler with soap and water. Ammonia or any other cleaning fluids. Remove dust by using a soft brush or gentle vacuuming. Remove any sprinkler which has been painted (other than factory applied) or damaged in any way. A stock of spare sprinklers should be maintained to allow quick replacement of damaged or operated sprinklers. Prior to installation, sprinklers should remain in the original cartons and packaging until used. This will minimize the potential for damage to sprinklers that could cause improper operation or non-operation.

**Model F1 Res 30, 49 & 58 Pendent Sprinkler Specifications**

Sprinklers shall be [cULus Listed] [New York City MEA Approved (255-505)] low flow residential pendent sprinklers engineered to provide a minimum design density of 0.10 gpm² ft² over the listed coverage area. Listed flows as specified by the manufacturer’s technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer’s installation guidelines and the applicable installation standard. Where pendent residential sprinklers are installed under sloped ceilings having a pitch from [4:12 to 8:12], the sprinklers shall be listed for such use. Deflector-to-ceiling distance listing shall be 1" to 5" maximum. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2" NPT thread. Water seal assembly shall consist of a Teflon® coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [165°F (79°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 4.9 & 6.6. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish—specify]. Residential pendent sprinklers shall be Reliable Model F1 Res 49 & 58, SIN R5016 & R5013 (Bulletin 135).
Section 9  
Technical Data Sheets

Model F1 Res 30, 49 & 58 Recessed Pendant/F1, Model F1 Res 30, 49 & 58 Recessed Pendant/F2
Model F1 Res 30, 49 & 58 Recessed Pendant/FP

Sprinklers shall be cULus Listed (New York City MEA Approved (256-93-E)) low flow residential recessed pendant sprinklers engineered to provide a minimum design density of 0.10 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer’s installation guidelines and the applicable installation standard. Where pendant residential sprinklers are installed under sloped ceilings having a pitch from [x/12] to [y/12], the sprinklers shall be listed for such use. Deflector-to-ceiling distance listing shall be 10 maximum. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2 NPT thread. Water seal assembly shall consist of a Teflon® coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [150°F (65°C)] [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 4.9 (70). Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish: specify]. Recessed escutcheon assembly shall be a steel, two-piece escutcheon with 1/2 adjustment (Model F2) [with 1/2 adjustment (Model F1)] of push-on and thread off design using 1/2 adjustment (Model F1). Standard finish shall be [Brass] [Bright chrome] [White painted]. Residential recessed pendant sprinklers shall be Reliable (Model F1 Res 49 & 58 Recessed Pendant/F1) (Model F1 Res 49 & 58 Recessed Pendant/F2) (Model F1 Res 49 & 58 Recessed Pendant/FP) (Model F1 Res 58 & CPP) (Bulletin 135).

Model F1 Res 30, 49 & 58 CCP Pendant (Concealed)

Sprinklers shall be cULus Listed (New York City MEA Approved (256-93-E)) low flow residential concealed sprinklers engineered to provide a minimum design density of 0.10 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer’s technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer’s installation guidelines and the applicable installation standard. Where pendant residential sprinklers are installed under sloped ceilings having a pitch from [x/12] to [y/12], the sprinklers shall be listed for such use. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2 NPT thread. Water seal assembly shall consist of a Teflon® coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [150°F (65°C)]. Cover plate temperature rating shall be 135°F (65°C). A plastic protective cap shall be provided and factory installed inside the sprinkler cup to protect the sprinkler from damage, which could occur during construction before the cover plate is installed. Standard cover plate finish: [White] [Custom Color: specify]. Concealed pendant sprinklers shall be Reliable Model F1 Res 49 & 58 CPP, SIN R3531 & R3533 (Bulletin 135).

Model F1 Res 44, F1 Res 58 Horizontal Sidewall, F1 Res 58 HSWX & KRes58 HSWX

Residential Sprinkler Specifications

Sprinklers shall be cULus Listed (New York City MEA Approved (256-93-E)) low flow residential horizontal sidewall sprinklers engineered to provide a minimum design density of 0.10 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer’s technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer’s installation guidelines and the applicable installation standard. Where horizontal sidewall residential sprinklers are installed under sloped ceilings having a pitch from [x/12] to [y/12], the sprinklers shall be listed for such use. Sprinkler frame and deflector shall be of bronze frame construction having a 1/2 NPT thread. Water seal assembly shall consist of a Teflon® coated Belleville spring washer with top-loaded extruded or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of [150°F (65°C)] [175°F (79°C)]. The solder element (Link) version, the water seal consist of a cap with a Belleville spring washer and a temperature rating of 165°F (74°C). The recessed assembly for the HSWX (Bulb & Link) should be a steel two pieces escutcheon with 1/2 adjustment (Model F2) standard finish should be Bright Chrome and white painted. The F1 Res 58 HSW is also available with low lead frame. F1 Res 58 HSWX and HSWX sprinklers shall have a nominal K Factor of 5.0 and F1 Res 44 a nominal K Factor of 4.4. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish: specify]. Residential horizontal sidewall sprinklers shall be Reliable Model F1 Res 44, F1 Res 58, F1 Res 58 HSWX & Model KRes58 HSWX, SIN R3531, RA3533 & RA3535 (Bulletin 135).

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Section 9
Technical Data Sheets

Model F1 Res 44 & 58 Recessed Horizontal Sidewall Sprinkler

Use description for the Model F1 Res 88 horizontal sidewall sprinkler with the following modifications: Replace "horizontal sidewall sprinkler" with "recessed horizontal sprinkler." Add: Recessed escutcheon assembly shall be a steel, two-piece escutcheon with 1/2" adjustment (Model F2). Standard finish shall be [brass] [bright chrome] [white painted] [Special finish—specify]. Recessed horizontal sidewall sprinklers shall be Reliable Model F1 Res 88/P2, SIN R5113 (Bulletin 135).

Model F1 Res 76 Pendent

Sprinklers shall be [ULlus Listed] low flow residential pendant sprinklers engineered to provide a minimum design density of 0.10 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a 3/4" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with machined or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of 155°F (68°C) [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 7.6. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish—specify]. Residential pendant sprinklers shall be Reliable Model F1 Res 76, SIN R7015 (Bulletin 135).

Model F1 Res 76 Recessed Pendent/F1, Model F1 Res 76 Recessed Pendent/F2, Model F1 Res 76 Recessed Pendent/FP

Sprinklers shall be [ULlus Listed] low flow residential recessed pendent sprinklers engineered to provide a minimum design density of 0.10 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a 3/4" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with machined or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of 155°F (68°C) [175°F (79°C)]. Sprinklers shall have a nominal K-factor of 7.6. Standard finish: [Bronze] [Chrome-plated] [White Polyester] [Special finish—specify]. Recessed escutcheon assembly shall be a steel, two-piece escutcheon with 1/2" adjustment (Model F2) [with 3/4" adjustment (Model F1)] [of push-on and thread off design with 1/2" adjustment (Model FP)]. Standard finish shall be [brass] [bright chrome] [white painted].

Residential recessed pendant sprinklers shall be Reliable Model F1 Res 76 Recessed Pendent/F1, Model F1 Res 76 Recessed Pendent/F2, Model F1 Res 76 Recessed Pendent/FP, SIN R7616 (Bulletin 135).

Model F1 Res 76 CCP Pendent (Concealed)

Sprinklers shall be [ULlus Listed] low flow residential concealed sprinklers engineered to provide a minimum design density of 0.10 gpm/ft² over the listed coverage area. Listed flows as specified by the manufacturer's technical data sheets are to be used. Residential sprinklers shall be installed in conformance with the manufacturer's installation guidelines and the applicable installation standard. Sprinkler frame and deflector shall be of bronze frame construction having a 3/4" NPT thread. Water seal assembly shall consist of a Teflon-coated Belleville spring washer with machined or cold head cup with 3 mm glass bulb containing no plastic parts, and having a temperature rating of 155°F (68°C). Cover plate assembly shall consist of a brass cover plate and copper alloy reamer flange. Method of attaching the cover plate to the sprinkler cup shall be a push-on and thread-off design allowing a 3/4" cover plate adjustment. Cover plate temperature rating shall be 155°F (68°C). A plastic protective cap shall be provided and factory installed inside the sprinkler cup to protect the sprinkler from damage, which could occur during construction before the cover plate is installed. Standard cover plate finish: [White] [Custom Color—specify]. Concealed pendant sprinklers shall be Reliable Model F1 Res 76 CCP, SIN R7015 (Bulletin 135).

Table: Finishes

<table>
<thead>
<tr>
<th>Standard Finish</th>
<th>F1, F2, FP Escutcheon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brass</td>
<td>Brass</td>
</tr>
<tr>
<td>Chrome Plated</td>
<td>Bright Chrome Plated</td>
</tr>
<tr>
<td>White Polyester</td>
<td>White Painted</td>
</tr>
</tbody>
</table>

Table: Special Application Finishes

<table>
<thead>
<tr>
<th>Sprinkler</th>
<th>Electroless Nickel</th>
<th>Electroless Nickel</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTFE/Teflon</td>
<td>PTFE/Teflon</td>
<td></td>
</tr>
<tr>
<td>Bright Brass</td>
<td>Bright Brass</td>
<td></td>
</tr>
<tr>
<td>Black Plated</td>
<td>Black Plated</td>
<td></td>
</tr>
<tr>
<td>Oil White</td>
<td>Oil White</td>
<td></td>
</tr>
<tr>
<td>Chrome Dull</td>
<td>Chrome Dull</td>
<td></td>
</tr>
</tbody>
</table>

Note: Other finishes and colors are available on special order. Consult factory for details. ULlus listed Corrosion Resistant.

Ordering Information

Specify:
1. Sprinkler Model
2. Sprinkler Type
3. Temperature Rating
4. Sprinkler Finish
5. Escutcheon Finish

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Section 9
Technical Data Sheets

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- Spray nozzles
- Alarm valves
- Retarding chambers
- Dry pipe valves
- Accelerators for dry pipe valves
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- Electrical sprinkler alarm switches
- Water flow detectors
- Deluge valves
- Detector check valves
- Check valves
- Electrical system
- Sprinkler emergency cabinets
- Sprinkler wrenches
- Sprinkler escutcheons and guards
- Inspectors test connections
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- Control valve seals
- Air maintenance devices
- Air compressors
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Section 9
Technical Data Sheets

PRODUCT DATA SHEET

**Product description:**
Daejin, DJ28B series, stainless 28mm braided flexible sprinkler dropper

Manufacturer:
Daejin Precision Corp, 106-1 Wolmun-ri, Paltan-myeon, Hwaseong-si, Gyeonggi-do, Korea

Supplier's description:
Description
Daejin DJ28B series, 28mm, braided flexible sprinkler dropper consists of a stainless steel flexible metallic hose assembly with a special inlet nipple and a special outlet with a custom-ordered set of support components.

Daejin DJ28B series, 28mm, braided flexible sprinkler dropper is intended to be used where it is desired to provide a convenient and low-cost means of installation and relocation of the sprinkler heads, e.g. in a multi-tenancy rental office building where occasional re-arranging of partition wall layouts is necessary. One of the principal advantages of using the flexible dropper is the substantial cost-saving made by not having to accurately install the fixed pipework.

Daejin’s support components have a special design that allows very easy and convenient installation and re-installation of the flexible dropper. The specific design of the center bracket will allow the installing and re-installing of the flexible dropper. The firmness of the center bracket will also allow the sprinkler head to be installed after the outlet nipple is fixed on the center bracket.

This makes it possible for the installation procedure of the flexible dropper and sprinkler head to take place in various ways.
1. A sprinkler head can be assembled first to the outlet nipple separately on the floor. The outlet nipple with a sprinkler can be assembled to the flexible dropper before installing the flexible dropper to the ceiling structure.

2. The sprinkler can be assembled after the flexible dropper is installed into the ceiling structure.

3. The sprinkler can be disconnected from the flexible dropper which is fixed to the center bracket.

4. The outlet nipple with a sprinkler can be disassembled from the center bracket to correct problems which arise while installing the sprinkler.

Conformance criteria and evaluation

The DAEJIN DJ28B series, stainless 28mm braided flexible sprinkler dropper has been evaluated and verified as conforming with the relevant requirements of the following criteria.

1. FM Approvals, Approval standard for Flexible Sprinkler Hose With Threaded End Fittings, Class Number 1637, March 16, 2011

2. FM Approvals - Evaluation, follow-up services

Limitations/conditions of conformance

Limitations/conditions of conformance, where identified on this Products Listing Data Sheet, are derived from qualifications within the report of the testing agency and/or other related technical documentation. It is recommended that all details with respect to design, assembly and installation instructions and restrictions should be checked against the supplier's/manufacturer's current technical manual/data sheets and the requirements of the Authority having Jurisdiction.

Specified limitations/conditions, determined from the evaluation for conformity, include the following:

1. Manual installation in accordance with the limitations and requirements contained in DAEJIN DJ28B series Data Sheet. Copies of these documents are available from the designated supplier.

2. All DAEJIN DJ28B series installations shall use only the ceiling-grid method of support, as detailed in the provided manufacturer's installation instructions supplied with the DAEJIN DJ28B series hardware.

3. The vertical threaded-rod method of support, shown in the manufacturer's instructions, is not covered by this listing.

4. Rated pressure : 175 psig

5. Maximum ambient temperature : 225 F
## Technical Specifications

The following details are a representative extract of the technical specification for the DAEJIN DJ28B series braided flexible sprinkler dropper and may be subject to change. Complete and current details should be determined from the designated supplier’s/manufacturer’s technical manual/data sheets.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>Hose Assembly length, (meters)</th>
<th>Nominal inlet by outlet size,(meters)</th>
<th>Equivalent length 1&quot;, Schedule 40 pipe (meters)</th>
<th>Max Num. of 90 degree bonds</th>
<th>Min. bend radius (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DJ28B (Inlet size 1 inch)</td>
<td>780</td>
<td>25 X 15</td>
<td>6.9</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25 X 20</td>
<td>4.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>910</td>
<td>25 X 15</td>
<td>10.5</td>
<td>2</td>
<td>230</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25 X 20</td>
<td>8.2</td>
<td></td>
<td></td>
</tr>
<tr>
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Supplementary information:

Daejin has tested its products (DJ28B series) in FM Lab and passed the rigorous Fatigue test (50,000 cycles) with Minimum bend radius of 230mm. This is in stark contrast to the evaluating standards of UL test in which products are subjected to only 100 cycles, thus allowing a smaller bend radius. This fact should be taken into consideration when designing the fire sprinkler system in a building.