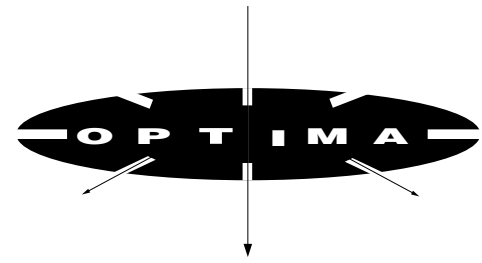


ELO-231

Specific Application .6 Density/2,000 sq. ft.



Manufactured by: Central Sprinkler Company
451 North Cannon Avenue, Lansdale, Pennsylvania 19446



Product Description

The Central Model ELO-231 Automatic Sprinkler is an Extra Large Orifice Sprinkler that has been proven for storage occupancies by full-scale fire testing at Factory Mutual and designed to control high challenge fires in storage occupancies with relatively low required operating pressures. The ELO-231 x 1/2" is now available in a glass bulb design, as well as the traditional center strut design. It is available in the standard 3/4" thread in upright and pendent, and for retrofit use a 1/2" thread is available for upright only.

Through additional full-scale fire tests at Factory Mutual, the ELO-231 has been U.L. Listed and Factory Mutual Approved to reduce the required remote area for Class I through IV commodities and Group A Plastics (see table) to 2,000 sq. ft. This represents up to a 50% decrease in area when using Central's ELO-231 sprinkler. Never has a 5/8" orifice standard spray sprinkler received such recognition for its performance in full-scale fire testing.

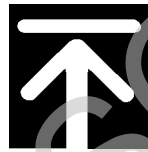
The decrease in remote area, results in a dramatic reduction of the required water flow demand. This, combined with the low operating pressure requirements, results in:

- The ability to store higher when compared to 1/2" and 17/32" standard spray sprinklers at the same flow demand. This is because standard spray sprinklers require higher water flow demands to protect the same height of storage.
- More water pressure is made available by reducing the overall water demand of the system. For example, a .6/4000 sq. ft. demand of NFPA 231C would normally require a minimum of 2,400 GPM. The ELO-231 reduces this area to a .6/2,000 sq. ft. demand or 1,200 GPM. The available water pressure is higher at 1,200 GPM than at 2,400 GPM. Therefore, there is higher available pressure for use in hydraulic calculations.

- Flexibility for spec-occupancies by allowing palletized or rack storage of Class I through IV commodities and Group A plastics up to 20' (see application chart on page 2). This provides owners and tenants great flexibility in allowable storage arrangements, heights and commodities.

The low end head pressures of the 11.4 K-factor, combined with the increase of pressure available by reduced area, results in the ability to:

- **Reduce Pipe Size**
- **Increase Spacing**
- **Eliminate Booster Pumps**
- **Upgrade Existing Densities**



Technical Data

Model: ELO-231 or ELO-231 x 1/2"

Style: Upright or Pendent (*pendent not available in 1/2" thread*)

Orifice Size: 0.64" (16.3 mm) (E.L.O.)

K-Factor: 11.4 (163.02) Nominal

Thread: 3/4" (19.1 mm) or 1/2" (12.7 mm) N.P.T.

Temperature and Color:

Glass Bulb

155°F/68°C - Red

200°F/93°C - Green

286°F/141°C - Blue

Center Strut

165°F/74°C - Uncolored

212°F/100°C - White

286°F/141°C - Blue

Approvals: U.L., U.L.C, F.M.,

*MEA (127-93-E) (*See chart on page 3 for specific temperatures and finishes.*)

*MEA Approved for 165°F & 286°F center strut upright only.

Minimum Operating Pressure:

***10 PSI (68.95 kpa)**

Maximum Working Pressure:

175 psi (12.07 bar)

Factory Hydro Test: 100% at 500 psi (34.48 bar)

Standard Finish: brass, chrome

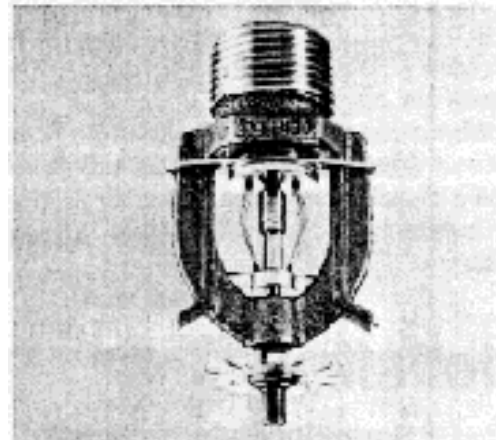
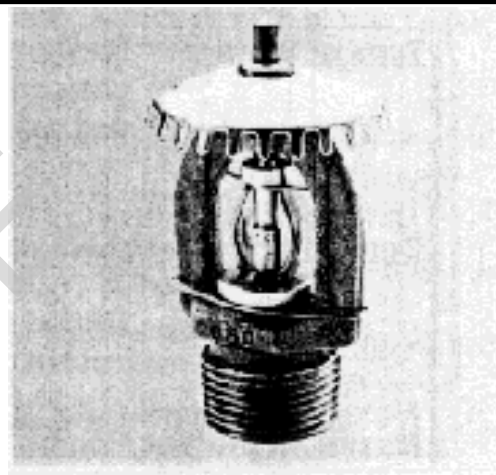
Corrosion Resistant Coatings: See Page 3.

Length: 3 3/16" (8.1 cm)

Width: 1 3/4" (4.5 cm)

Weight: 4.8 oz. (136 grams)

Head Guard: G-2 (*U.L. Listed for Upright only & F.M. Approved for Upright & Pendent*)



ELO-231 .64 Orifice Automatic Sprinkler

NOTE: The ELO-231 is a standard spray sprinkler for use with the area/density curves of the NFPA standards and a specific application sprinkler for reduced area. The following guidelines are only for reduced area applications. These guidelines do not apply if you are not using the ELO-231 for reduced area specific application. For standard applications, see the ELO-231 data sheet not this specific application data sheet.

For projects requiring Factory Mutual Guidelines, consult the Factory Mutual Loss Prevention Data Sheets. Some of their requirements are different.

ELO-231 Specific Application Guidelines

Type of Storage: Single, double, multiple-row and portable rack storage and solid piled or palletized storage.

Commodity: Class I-IV, encapsulated or non-encapsulated. Group A and B plastics - cartoned, expanded or unexpanded as well as exposed, unexpanded.

Maximum Storage Height: 20'

Clearance: 36" minimum from deflector to top of storage.

Max. Ceiling Height in Area of Storage: 25'

Construction Type: All types - deflector distances per NFPA 13.

System Type: Wet or dry

Sprinkler Data: K-Factor 11.4
Orifice 0.64"
Thread Size 3/4" or 1/2" (upright only)

Temperature Rating: 165°F, 212°F, and 286°F.

Hydraulic Design Criteria: End head flow to be determined based on the spacing of the sprinkler, per NFPA spacing criteria for standard spray sprinklers (see section 4-2.2.1), multiplied by the density of .6 gpm per sq. ft. This flow is then used in the formula: pressure = (flow/K-factor)² to determine the minimum end head pressure. At least 10 psi must be used, even if the calculated pressure is less.

Design Area: For wet systems 2000 square feet and for dry systems use the 30% increase for a total of 2600 square feet.

Spacing: NFPA criteria for standard spray sprinklers. Maximum spacing is 100 square feet. Minimum spacing is 6' apart unless separated by baffles.

Obstructions: NFPA criteria for standard spray sprinklers.

Always consult the appropriate Factory Mutual data sheets if Factory Mutual Guidelines Apply.

Figure 1
ELO-231 S. A. Upright Sprinkler

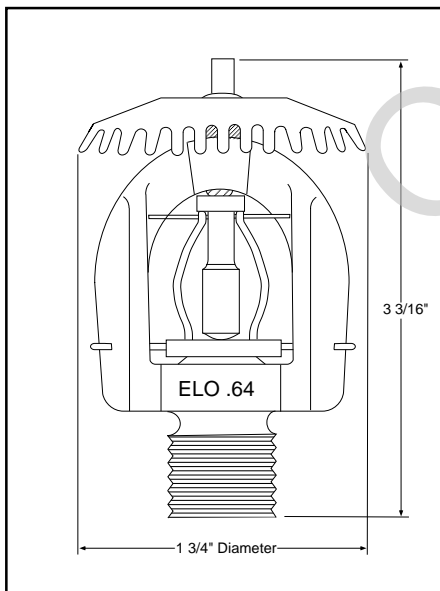
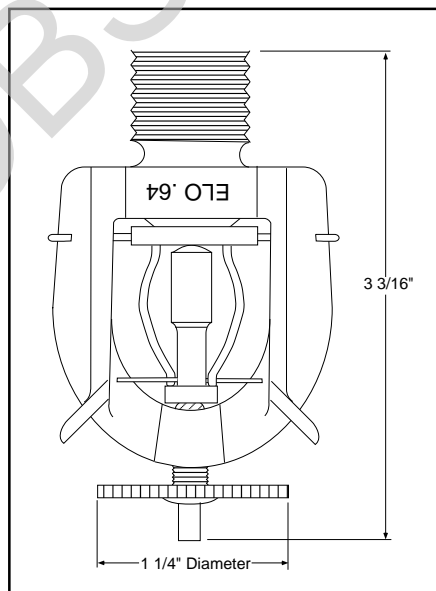


Figure 2
ELO-231 S. A. Pendent Sprinkler



Design Data

The Model ELO-231 Extra Large Orifice Sprinkler is Listed for standard sprinkler placement and standard flow and pressure requirements as specified in NFPA 13, 231, 231C and 231D.

The ELO-231 is not Listed for use as a "large drop" sprinkler nor as an "ESFR" sprinkler.

The following parameters must be incorporated into the design of automatic sprinkler systems utilizing Model ELO-231 Sprinklers for NFPA applications:

1. Minimum sprinkler spacing is 6 feet.
2. Maximum coverage area is 100 sq. ft.
3. Automatic sprinkler systems must be hydraulically calculated using the area/density curves of NFPA Standards.
4. Minimum sprinkler discharge pressure is 10 psi (36 gpm) for NFPA 231, 231C and 231D applications and 7 psi for NFPA 13 applications.

Figure 3
ELO-231 S.A. GB Upright Sprinkler

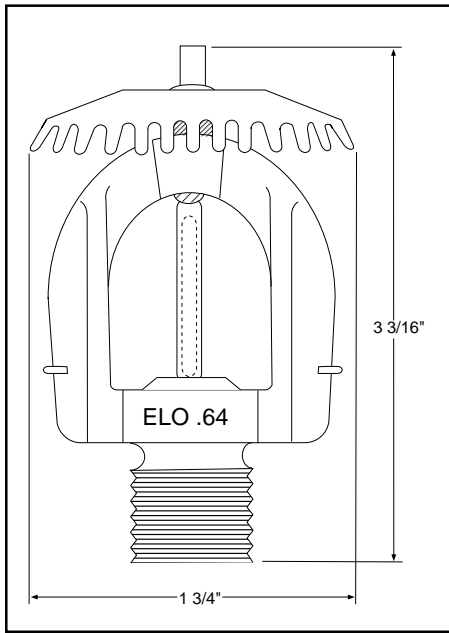
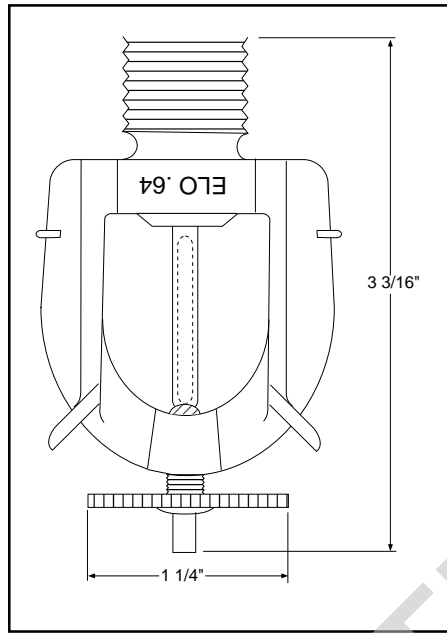


Figure 4
ELO-231 S.A. GB Pendent Sprinkler



5. 1/2" thread must only be used on retrofit applications.

Factory Mutual's Loss Prevention Data Sheets contain the requirements for designs that differ from NFPA.



Product Description

The Model ELO-231 x 1/2" Sprinkler incorporates the "center-strut" actuating assembly or a glass bulb heat responsive element.

Center Strut Operation: A fusible alloy is sealed into a bronze 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. Unlike most other sprinkler designs, the alloy is not exposed to atmospheric conditions that could affect its proper functioning. It is also less susceptible to mechanical damage since there are no protruding elements, extending beyond the sprinkler frame.

Glass Bulb Operation: The Model ELO-231 now incorporates the latest in heat responsive glass bulb technology. The operating mechanism consists of a liquid-filled 5mm diameter frangible capsule that is only 2.0 cm in length. The glass bulb capsule operating mechanism contains a heat sensitive liquid that expands upon application of heat. At the rated temperature, the frangible capsule ruptures thereby releasing the orifice seal, thus operating the sprinkler.

UL & ULC Listings

	Finish					
	Brass	Chrome	White	Wax	Lead	Wax Over Lead
ELO-231 (strut) SSU & SSP 165°, 212°, 286°	x	x		x	x	x
ELO-231 (GB) SSU & SSP 155°, 200°, 286°	x	x	x			

Note: White, wax, lead and wax-over-lead are UL Listed as corrosion resistant.

FM Approvals

	Finish					
	Brass	Chrome	White	Wax	Lead	Wax Over Lead
ELO-231 (strut) SSU 165°, 212°, 286°	x	x		x	x	x
ELO-231 (strut) SSU 165°, 212°, 286°	x	x				
ELO-231 (GB) SSU & SSP 155°, 200°, 286°	x	x	‡x	*x	x	*x

‡ Upright only.

* Available upon special request.



Installation

All Central Model ELO-231 sprinklers must be installed according to current NFPA Standards. Deviations from these requirements and standards or any alteration to the sprinkler itself will void any warranty made by Central Sprinkler Company. In addition, installation must also meet local government provisions, codes, and standards as applicable.

The system piping must be properly sized to insure the minimum required flow rate at the sprinkler. Check for the proper model, style, orifice size, and temperature rating prior to installation. Install sprinklers after the piping is in place to avoid mechanical damage; replace any damaged units.

Wet pipe systems must be protected from freezing.

Upon completion of the installation, the system must be tested per recognized standards.

In the event of a thread leak, remove the unit, apply new pipe joint compound or tape, and reinstall.

Installation Sequence

Step 1. The unit must be installed in the upright or pendent position.

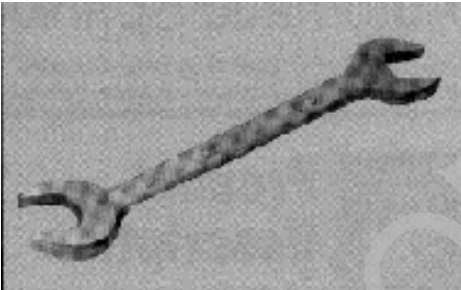
Step 2. Use only a non-hardening pipe joint compound or Teflon* tape. Apply only to the male threads.

*Teflon is a trademark of the DuPont Corp.

Step 3. Hand tighten the sprinkler into the fitting. Use a Central ELO Sprinkler Wrench, to tighten the unit into the fitting. A leak-tight joint requires only 7 to 14 ft.-lbs. of torque; a tangential force of 14 to 28 lbs. delivered through a 6" handle will deliver adequate torque. Torque levels over 21 ft.-lbs. may distort the orifice seal, resulting in leakage.

The sprinkler shall, per NFPA, be oriented so the frame arms are parallel with the branch line pipe.

ELO/ESLO/ESFR Combination Wrench (Part #1073)



Care & Maintenance

Sprinklers must be handled carefully. They should not be transported or stored where ambient temperature may exceed 100°F/38°C. For best results, store them in a dry, cool location in the original shipping package.

Do not install sprinklers that have been dropped or visibly damaged. Sprinklers should never be painted, coated, plated, or altered in any other way from manufactured condition or they may not function properly. Any sprinklers altered in such manner must be replaced.

The owner is responsible for the proper operating condition of all fire protection devices and accessories. The NFPA Standard 25 entitled, "Inspection Testing and Maintenance of Water-Based Fire Protection Systems", contains guidelines and minimum maintenance requirements. Furthermore, the local *Authority Having Jurisdiction* may have additional regulations and requirements for maintenance, testing, and inspection that must be obeyed.

It is advisable to have sprinkler systems inspected regularly by a qualified inspection service. Length of time between such inspections can vary due to accessibility, ambient atmosphere, water supply, and site activity.

Do not attempt to reassemble or otherwise reuse a sprinkler that has operated. Replace any sprinkler exhibiting corrosion or damage; always use new sprinklers of the same type and temperature rating as replacements.

Do not attempt to replace sprinklers without first removing the fire protection system from service. Be certain to secure permission from all *Authorities Having Jurisdiction*, and notify all personnel who may be affected during system shutdown. A fire watch during maintenance periods is a recommended precaution.

To remove the system from service mode, first refer to the system operating guide and valve instruction. Drain the water and relieve pressure in the pipes. Remove the existing unit and install the replacement, using only the special sprinkler wrench. Be certain to match model, style, orifice, and temperature rating.

A fire protection system that has been shut off after an activation should be returned to service immediately. Inspect the entire system for damage and replace or repair as necessary. Sprinklers that did not operate but were subjected to corrosive elements of combustion or excessive temperatures should be inspected, and replaced if need be. The *Authority Having Jurisdiction* will detail minimum replacement requirements and regulations.

Guarantee: Central Sprinkler Company will repair and/or replace any products found to be defective in material or workmanship within a period of one year from the date of shipment. Please refer to the current Price List for further details of the warranty.



Ordering Information

Ordering Information: When placing an order, indicate the full product name. Please specify the quantity, model, style, orifice size, temperature rating, type of finish or coating, and sprinkler wrench.

Availability and Service: Central sprinklers, valves, accessories, and other products are available throughout the U.S. and Canada, and internationally, through a network of Central Sprinkler distribution centers. You may write directly to Central Sprinkler Company, or call (215) 362-0700 for the distributor nearest you.

Patents: Patents are pending.

Conversion Table:

1 inch = 25.400 mm

1 foot = 0.3048 M

1 pound = 0.4536 kg

1 foot pound = 1.36 Nm

1 psi = 6.895 kpa

= 0.0689 bar

= 0.0703 kg/cm²

1 U.S. gallon = 3.785 dm³

= 3.785 liters

Conversions are approximate.

OPTIMA™ is a registered trademark of Central Sprinkler Company.



Central Sprinkler Company

451 N. Cannon Avenue, Lansdale, PA 19446

Phone (215) 362-0700

FAX (215) 362-5385