

## Model K17-231 — 16.8 K-factor Upright and Pendent Sprinklers Standard Response, Standard Coverage

### General Description

The TYCO 16.8 K-factor, Model K17-231, Standard Response, Standard Coverage, Upright and Pendent Sprinklers (Ref. Figure 1) are automatic sprinklers of the frangible bulb type. They are standard response spray sprinklers which produce a hemispherical water distribution pattern below the deflector.

The 16.8 K-factor, K17-231 Sprinklers were subjected to full scale, high-piled storage, fire tests to qualify their use in lieu of 8.0 or 11.2 K-factor standard spray sprinklers for the protection of high-piled storage.

Higher flow rates can be achieved at much lower pressures with the 16.8 K-factor, K17-231 Sprinklers — making their use highly advantageous in high density applications, such as the protection of high-piled storage.

Applications for the 16.8 K-factor, Model K17-231 Pendent and Upright Sprinklers are expanding beyond the current listings/approvals. For information regarding research fire tests which may be acceptable to an authority having jurisdiction, please contact the Technical Services Department.

#### NOTICE

*The 16.8 K-factor, Model K17-231 Upright and Pendent Sprinklers described herein must be installed and maintained in compliance with this document and with the applica-*

#### IMPORTANT

*Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.*

*Always refer to Technical Data Sheet TFP700 for the "INSTALLER WARNING" that provides cautions with respect to handling and installation of sprinkler systems and components. Improper handling and installation can permanently damage a sprinkler system or its components and cause the sprinkler to fail to operate in a fire situation or cause it to operate prematurely.*

*ble standards of the National Fire Protection Association, in addition to the standards of any authorities having jurisdiction. Failure to do so may impair the performance of these devices.*

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

### Sprinkler Identification Number (SIN)

Refer to Table A for sprinkler identification numbers.

### Technical Data

**Approvals**  
UL and C-UL Listed  
FM Approved  
NYC Approved

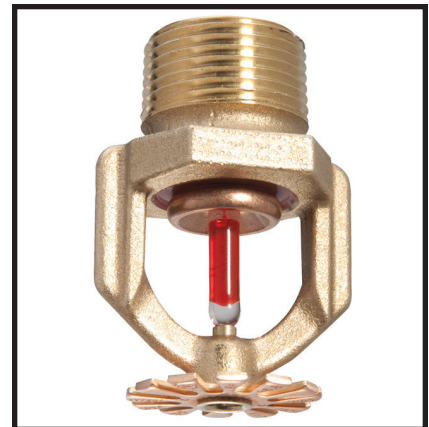
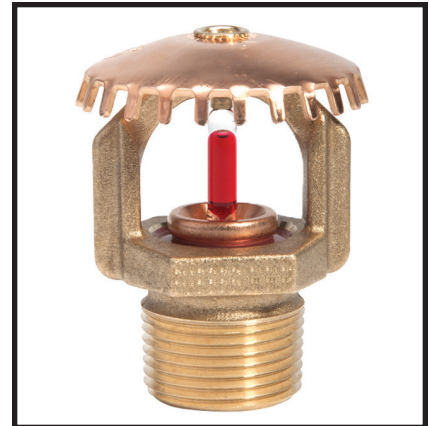
Refer to Table C for specific details on laboratory listings and approvals. The approvals apply to the service conditions indicated in the Design Criteria section.

**Finish**  
Natural Brass

**Physical Characteristics**

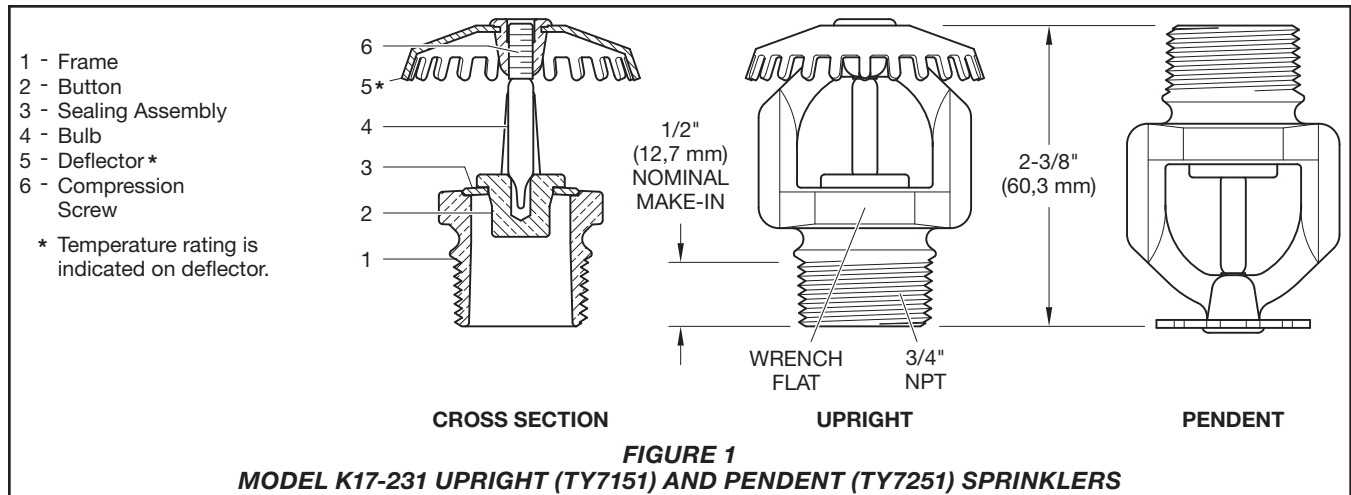
Frame .....	Bronze
Button .....	Bronze
Sealing Assembly ..	Beryllium Nickel w/TEFLON
Bulb (5 mm) .....	Glass
Compression Screw ..	Brass
Deflector .....	Brass

**Additional Technical Data**  
Refer to Table A for additional technical data.



### Operation

The glass bulb contains a fluid that expands when exposed to heat. When the rated temperature is reached, the fluid expands sufficiently to shatter the glass bulb, allowing the sprinkler to activate and flow water.



## Design Criteria

**UL and C-UL Listing Requirements**  
 The TYCO 16.8 K-factor, Model K17-231 Sprinklers may be installed in accordance with NFPA 13 standard sprinkler position and area/density flow calculation requirements for light, ordinary, or extra hazard occupancies with a minimum residual (flowing) pressure of 7 psi (0,5 bar) in wet or dry pipe sprinkler systems, or they may be installed in accordance with NFPA 13 standard sprinkler position and area/density flow calculation requirements for high piled storage occupancies (solid piled, palletized, rack storage, bin box, and shelf storage including but not limited to Class I-IV and Group A plastics) with a minimum residual (flowing) pressure of 7 psi (0,5 bar) for wet or dry pipe systems.

The following two examples are typical of the types of arrangements permitted by NFPA 13. For all combinations of lesser and greater building heights, lesser and greater storage heights, storage arrangements, commodity classifications, and lesser or greater required design densities, refer to NFPA 13 for specifics.

**Example 1:** NFPA 13 provides ceiling only protection (that is, no in-rack sprinklers) criteria using open frame (that is, no solid shelves) single, double, multiple-row, or portable rack storage (without the need for in-rack sprinkler protection) of cartoned unexpanded Group A or B plastics, or, cartoned expanded Group A or B plastics, with:

- a storage height of up to 20 ft (6,1 m);
- a maximum ceiling height of 27 ft (8,2 m);

Item	Description
Sprinkler Identification Number (SIN)	TY7151 TY7251 <small>TY7151 is a redesignation for C7151, G1888, and S8040 TY7251 is a redesignation for C7251, G1889, and S8041</small>
K-factor, (gpm/psi) (lpm/bar)	16.8 gpm/psi <sup>1/2</sup> (241,9 lpm/bar <sup>1/2</sup> )
Temperature Rating °F (°C) <sup>1</sup>	155°F (68°C) <sup>1</sup> 200°F (93°C) 286°F (141°C)
Thread Size	3/4 in. NPT
Sprinkler Orientation	Upright and Pendent
Maximum Working Pressure, psi (bar)	175 psi (12,1 bar)

**Note:**  
 1. Refer to Table C for laboratory listings and approvals.

**TABLE A**  
**MODEL K17-231 UPRIGHT AND PENDENT SPRINKLER TECHNICAL DATA**

- a minimum deflector to top of storage clearance of 18 in. (457 mm);
- a minimum design density of 0.60 gpm/ft<sup>2</sup> (24,4 mm/min);
- a minimum residual (flowing) pressure of 7 psi (0,5 bar);
- a minimum design area of 2000 ft<sup>2</sup> (186 m<sup>2</sup>) for wet systems or 2600 ft<sup>2</sup> (242 m<sup>2</sup>) for dry pipe systems
- a minimum deflector to top of storage clearance of 18 in. (457 mm);
- a minimum design density of 0.80 gpm/ft<sup>2</sup> (32,6 mm/min);
- a minimum residual (flowing) pressure of 7 psi (0,5 bar);
- a minimum design area of 2000 ft<sup>2</sup> (186 m<sup>2</sup>) for wet systems or 4500 ft<sup>2</sup> (418 m<sup>2</sup>) for dry pipe systems

**Example 2:** NFPA 13 provides ceiling only protection (that is, no in-rack sprinklers) criteria using open frame (that is, no solid shelves) single, double, multiple-row, or portable rack storage (without the need for in-rack sprinkler protection) of cartoned unexpanded Group A or B plastics, or, cartoned expanded Group A or B plastics, with:

- a storage height of up to 25 ft (7,6 m);
- a maximum ceiling height of 30 ft (9,1 m);

### FM Approval Requirements

The TYCO 16.8 K-factor, Model K17-231 (TY7151) Upright Sprinklers may be installed in accordance with the applicable control mode density/area guidelines provided by Factory Mutual. (FM guidelines may differ from UL and C-UL Listing criteria.)

Storage Type	NFPA	FM Global (Upright Sprinklers Only)
Sprinkler Type	Standard Coverage	Storage
Response Type	SR	SR
System Type	Wet and Dry	Wet and Dry
Temperature Rating °F (°C) <sup>1</sup>	155°F (68°C) <sup>1</sup> 200°F (93°C) 286°F (141°C)	155°F (68°C) <sup>1</sup> 200°F (93°C) 286°F (141°C)
Open Frame (i.e., no solid shelves) Single, Double, Multiple-Row, or Portable Rack Storage of Class I-IV and Group A or B Plastics	Refer to NFPA 13	Refer to FM 2-0 and 8-9
Solid Pile or Palletized Storage of Class I-IV and Group A or B Plastics	Refer to NFPA 13	Refer to FM 2-0 and 8-9
Idle Pallet Storage	Refer to NFPA 13	Refer to FM 2-0, 8-9, and 8-24
Rubber Tire Storage	Refer to NFPA 13	Refer to FM 2-0 and 8-3
Roll Paper Storage (Refer to the Standard)	Refer to NFPA 13	Refer to FM 8-21
Flammable/Ignitable Liquid Storage (Refer to the Standard)	Refer to NFPA 30	Refer to FM 7-29
Aerosol Storage (Refer to the Standard)	Refer to NFPA 30B	Refer to FM 7-31
Automotive Components in Portable Racks (Control mode only; refer to the Standard)	Refer to NFPA 13	N/A

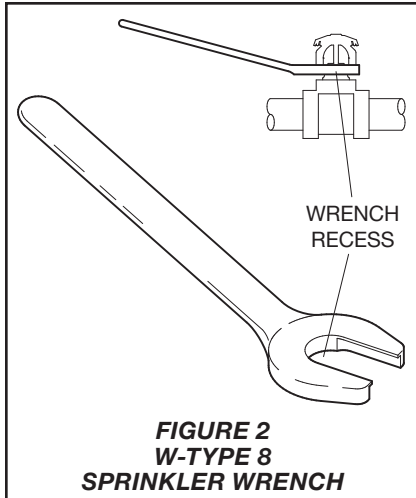
**Notes:**  
1. Refer to Table C for laboratory listings and approvals.  
N/A – Not Applicable

**TABLE B**  
**MODEL K17-231 UPRIGHT AND PENDENT SPRINKLERS**  
**COMMODITY SELECTION AND DESIGN CRITERIA OVERVIEW**

TYPE	TEMPERATURE	BULB LIQUID	SPRINKLER FINISH
			NATURAL BRASS
<b>UPRIGHT K=16.8 (TY7151)</b>	155°F (68°C)	Red	1, 2, 3, 4
	200°F (93°C)	Green	
	286°F (141°C)	Blue	
<b>PENDENT K=16.8 (TY7251)</b>	155°F (68°C)	Red	1, 2, 4
	200°F (93°C)	Green	
	286°F (141°C)	Blue	

**Notes:**  
1. Listed by Underwriters Laboratories, Inc. (UL Listed).  
2. Listed by Underwriters Laboratories, Inc. for use in Canada (C-UL Listed).  
3. Approved by Factory Mutual Research Corporation (FM Approved).  
4. Approved by the City of New York under MEA 177-03-E.

**TABLE C**  
**LABORATORY LISTINGS AND APPROVALS**  
**(Refer To The Design Criteria Section)**



**FIGURE 2**  
**W-TYPE 8**  
**SPRINKLER WRENCH**

## Installation

The TYCO Model K17-231 Sprinklers must be installed in accordance with this section.

### General Instructions

A leak tight 3/4 in. NPT sprinkler joint should be obtained by applying a minimum-to-maximum torque of 10 to 20 lb-ft (13,4 to 26,8 N-m). Higher levels of torque may distort the sprinkler inlet with consequent leakage or impairment of the sprinkler.

Do not install any bulb type sprinkler if the bulb is cracked or there is a loss of liquid from the bulb. With the sprinkler held horizontal, a small air bubble should be present. The diameter of the air bubble is approximately 1/16 in. (1,6 mm).

**Step 1.** With pipe thread sealant applied to the pipe threads, hand tighten the Model K17-231 Sprinkler into the sprinkler fitting.

**Step 2.** Using the W-Type 8 Sprinkler Wrench (Ref. Figure 2) applied to the sprinkler Wrench Flats (Ref. Figure 1), tighten the Model K17-231 Sprinkler into the sprinkler fitting.

## Care and Maintenance

The TYCO Ultra K17 Sprinklers must be maintained and serviced in accordance with this section.

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

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

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

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

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

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

## Limited Warranty

For warranty terms and conditions, visit [www.tyco-fire.com](http://www.tyco-fire.com)

## Ordering Procedure

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

### Sprinkler Assemblies with NPT Thread Connections

Specify: (specify SIN), 16.8 K-factor, Model K17-231, (specify) temperature rating, (specify Pendent or Upright) Sprinkler, P/N (specify):

#### Upright (SIN TY7151)

155°F (68°C) .....	51-888-1-155
200°F (93°C) .....	51-888-1-200
286°F (141°C) .....	51-888-1-286

#### Pendent (SIN TY7251)

155°F (68°C) .....	51-889-1-155
200°F (93°C) .....	51-889-1-200
286°F (141°C) .....	51-889-1-286

### Sprinkler Wrench

Specify: W-Type 8 Sprinkler Wrench, P/N 56-892-1-001