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Evaluation #

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Safety & Buildings Division
201 West Washington Avenue
P.O. Box 2658
Madison, WI 53701-2658

Wisconsin Building Products Evaluation

Material

TYCO Model EC-17-K-16.8
Extended Coverage and Recessed Pendant Sprinklers

Manufacturer

TYCO Fire and Building Products
451 North Cannon Ave.
Lansdale, PA 19446

SCOPE OF EVALUATION

GENERAL: The Model EC-17-K-16.8 extended coverage pendant and recessed pendant automatic sprinkler head manufactured by TYCO Fire and Building Products was evaluated as a component of a automatic fire sprinkler system, and a component of a automatic fire suppression system.

The **IBC** requirements below in accordance with the current **Wisconsin Amended ICC Code:**

- **Automatic Sprinkler System:** The Model EC-17-K-16.8 extended coverage automatic pendant and recessed pendant sprinkler was evaluated in accordance with **s. IBC 903.1.**

DESCRIPTION AND USE

The Model EC-17-K-16.8 Extended Coverage pendant and recessed pendant sprinklers are "Control-Mode Extended Coverage Sprinklers" having a nominal K-Factor of 16.8. These sprinklers offer maximum coverage areas of 14 feet by 10 feet (140 sq. ft.), and at the spacing (min. / max.) restrictions per the UL listing.

The Model EC-17-K-16.8 Extended Coverage pendant and recessed pendant sprinklers are identified by SIN TY7228. Technical data: maximum working pressure of 175 psi (12, 1 bar). Pipe thread connection: 3/4 inch NPT. The discharge coefficient: $K = 16.8 \text{ GPM/psi}^{1/2}$ (241, 9 LPM/bar^{1/2}). Temperature ratings: 160° F/71° C or 212° F/100° C. The finish is natural brass or white.

The physical characteristic of the Model EC-17-K-16.8 utilizes a brass frame with a phosphor bronze deflector. The strut and hook are monel. The two halves of the fusible link assembly are solder, nickel. The button is made of brass and the compression screw is stainless steel. The frame orifice is sealed with a gasket spring plate (Belleville Seal) consisting of a beryllium nickel disc spring that is sealed on both its inside and outside edges with a Teflon gasket.

EC-17-K-16.8 Extended Coverage pendant and recessed pendant sprinklers were tested under full scale fire test conditions for application in use as an Extended Coverage Suppression Mode type sprinkler for protection of Group A plastics stored up to 12 ft. high on cantilever / solid shelf type racking.

TESTS AND RESULTS

The Model EC-17-K-16.8 Extended Coverage pendant and recessed pendant sprinklers is Underwriter's Laboratories Inc. approved and C-UL listed. Approvals and listings are under the name of Tyco Fire Products. Additional service conditions have been tested and this sprinkler is approved for use only as indicated in the Large-Scale Fire Tests Of Retail Shelf Display And Rack Storage of Cartoned Group A Plastics Utilizing Extended Coverage Sprinklers Having A Nominal K-Factor of 16.8. Prepared by Underwriter's Laboratories Inc. (Project 05CA38526, File NC5756), for the FIRE PROTECTION RESEARCH FOUNDATION, excerpted below:

Series "A" Testing, High Shelf Storage

This was a series of two large-scale test arrangements. It was understood by The Technical Advisory Committee (TAC), that each arrangement was unique enough to require its own individual test, and that the series as a whole would then provide enough data to allow for engineering judgment regarding any future adjustments to those arrangements.

Test Protocol and Conclusions:

- Test #1
 - Storage Height – 12 ft.
 - Ceiling Height – 14 ft.
 - Aisle Width – 5 ft.
 - Ignition Position – Between Four
 - Sprinkler Type - 160°F Central ECOH (K – 16.8 gpm/(psi)^{1/2}) Pendant
 - Sprinkler Spacing – 10 ft. x 14 ft.
 - Sprinkler Position – 1.6 in. Below the Suspended Ceiling

Main Rack Test Array

Commodity – Standard Group A Plastic Test Commodity
Shelf Type – Cantilever Shelving Units having 24 in. deep steel shelves on each side and separated by 3/16 in. cellulosic pegboard. 52 ft. long main shelving array
Shelf Heights – 7, 24, 48, and 78 in.
Shelving – Solid Steel Shelves

Target Rack Array

Commodity – Standard Group A Plastic Test Commodity
Shelf Type – Cantilever Shelving Units having 24 in. deep steel shelves on each side and separated by 3/16 in. cellulosic pegboard. 28 ft. long Target shelving array
Shelf Heights – 7, 24, 48, and 78 in.
Shelving – Solid Steel Shelves

- Test #2
 - Storage Height – 12 ft.
 - Ceiling Height – 20 ft.
 - Aisle Width – 5 ft.
 - Ignition Position – Between Four
 - Sprinkler Type - 160°F Central ECOH (K – 16.8 gpm/(psi)^{1/2}) Pendant
 - Sprinkler Spacing – 10 ft. x 14 ft.
 - Sprinkler Position – 1.6 in. Below the Suspended Ceiling

Main Rack Test Array

Commodity – Standard Group A Plastic Test Commodity
Shelf Type – Cantilever Shelving Units having 24 in. deep steel shelves on each side and separated by 3/16 in. cellulosic pegboard. 52 ft. long main shelving array
Shelf Heights – 7, 24, 48, and 78 in.
Shelving – Solid Steel Shelves

Target Rack Array

Commodity – Standard Group A Plastic Test Commodity
Shelf Type – Cantilever Shelving Units having 24 in. deep steel shelves on each side and separated by 3/16 in. cellulosic pegboard. 28 ft. long Target shelving array
Shelf Heights – 7, 24, 48, and 78 in.
Shelving – Solid Steel Shelves

Where the UL Approval is utilized, it can be noted that the Model EC-17-K-16.8 Extended Coverage pendant and recessed pendant has successfully undergone full-scale fire testing at UL for use under obstructed ceiling conditions for area/density design applications.

LIMITATIONS OF APPROVAL

The **IBC** limitations below are in accordance with the current **Wisconsin Amended ICC Code**:

The Tyco Model EC-17-K-16.8 Extended Coverage pendant and recessed pendant sprinkler head is approved for use as tested (see TESTS AND RESULTS of this evaluation), and per **Section 903** of the current Wisconsin Enrolled Commercial Building Code.

Design criteria for the use of this sprinkler under this specific approval as an Extended Coverage Suppression Mode sprinkler shall be based on the following per the UL Full Scale Fire Test Report:

1. Commodity – Standard Group A Plastic Test Commodity
2. Maximum Storage Height – 12 ft.
3. Maximum Roof Deck Height – 20 ft.
4. Minimum Clearance from Top of storage to Ceiling – 2 ft.
5. Minimum Aisle Width – 5 ft.
6. Shelf type – Solid Steel Shelves (retail cantilever units)

Installation Criteria:

- Maximum protection per sprinkler – 140 sq. ft.
- Minimum area per sprinkler – 80 ft.
- Maximum distance between sprinklers – 14 ft.
- Minimum distance between sprinklers – 8 ft.

Design Criteria:

- Design Area – 12 sprinklers consisting of 4 sprinklers on the 3 most hydraulically remote lines. Design area shall not be less than 960 sq. ft. Where sprinklers are installed above and below obstructions, the discharge of up to two additional sprinklers for one of the levels shall be included with those of the other level in the hydraulic calculations.
- Discharge pressure – Two stage design: First four (4) sprinklers operating at 25 psi; 12 sprinklers operating at 15 psi. Any additional sprinklers required due to above and below obstructions (up to two) shall also be calculated at 15 psi.
- Hose allowance – 250 gpm

The test reports utilized as part of this product evaluation are considered proprietary to TVA Fire & Life Safety, and Telgrian, Inc. The use of this criteria is only valid when design is prepared by TVA Fire & Life Safety, Inc., and / or Telgrian, Inc., or accompanied by a letter of release authorizing to use this design criteria by these firms.

This approval will be valid through December 31, 2012, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Revision Date:

Approval Date: January 24, 2008 By: _____

Lee E. Finley, Jr.
Product & Material Review
Integrated Services Bureau