3M Fire Protection Products

Fire Tests of 3M Fire Barrier Moldable Putty, FS-195 Wrap/Strips, and CS-195 Composite Sheet For Two Hour Rated Concrete Applications Covering High Pair Count Riser Cables and PVC Fiber Optic Cable with Inner Duct – Large Opening

3M

Title:

FIRE ENDURANCE TEST (ASTM E814-83)
DESIGNS 3M FT 90-134

Summary:

This was a fire endurance test of two firestop systems in a concrete floor assembly. The firestops included: FT 90-134a — multiple, high pair count, riser-rated trunk cables and FT 90-134b — multiple PVC jacketed fiber optic cable/PVC inner duct. Each firestop involved the penetrating items through a rectangular opening (240 square inches).

The installation of both firestop assemblies was witnessed by a representative from Factory Mutual Research Corporation. The fire tests of both assemblies were witnessed by representatives from Factory Mutual Research Corporation and Underwriters Laboratories.

The objective of this test program was to investigate the fire endurance properties of each firestop construction. Each test was conducted in accordance with the "Standard Method of Fire Tests of Through-Penetration Firestops," ASTM E814-83.

Fire Tests:

Fire tests for determining the fire endurance of the firestops was conducted at the 3M Fire Test Center located at 3M Chemolite, Bldg. 66, Cottage Grove, MN. Fire tests were conducted on the Ceramic Materials Department large scale, top loading, propane gas fired furnace. Each light-floor assembly containing the firestops was normal weight concrete 70 in. x 56 in. x 4 1/2 in. (1,78m x 1,42m x 114,3mm). Furnace pressure was positive during the fire tests.

A sketch of each firestop construction is shown in the illustrations.

Test Data:

Each floor containing the firestops was subjected to fire exposure. The furnace followed the Standard Time-Temperature Curve as specified in ASTM E814. The fire exposure continued for 2 hours followed by a hose stream test. The water stream pressure of the hose stream was 30 psi, and it continued for 41 seconds uniformly over the area of the floor containing the fire stops.

Conclusion:

Firestop FT 90-134a and FT 90-134b each satisfied the fire endurance and hose stream requirements of ASTM E814 for a 2 hour F rating. Coverage of FT 90-134b should include 900 pair-22 AWG, 1800 pair-24 AWG, 3600 pair-26 AWG.

The firestops tested achieved T ratings based on the transmission of heat through the firestops during the rating period. The T rating is determined by the temperature rise on the unexposed surface of the firestop or any penetrating item. The temperature cannot exceed 325°F (163°C) above the ambient starting temperature.

The ASTM E814 rating achieved by each firestop is listed below:

Fire Stop	**T Rating**
FT 90-134a	1/2 hr.
FT 90-134b	0 hr.

The firestops also achieved Factory Mutual (FM) approval ratings based on the transmission of heat through the firestops during the rating period. The FM rating is determined by the temperature rise on the unexposed surface of the firestop material 1 inch from the penetrating item. The temperature rise cannot exceed 325°F (163°C) above the ambient starting temperature.

The FM rating achieved by each firestop is as listed below:

Fire Stop	**FM Rating**
FT 90-134a	1/2 hr.
FT 90-134b	0 hr.

The results of these tests will be listed in a formal approval report, issued by Factory Mutual Research Corporation and also listed in the UL Fire Resistance Directory.

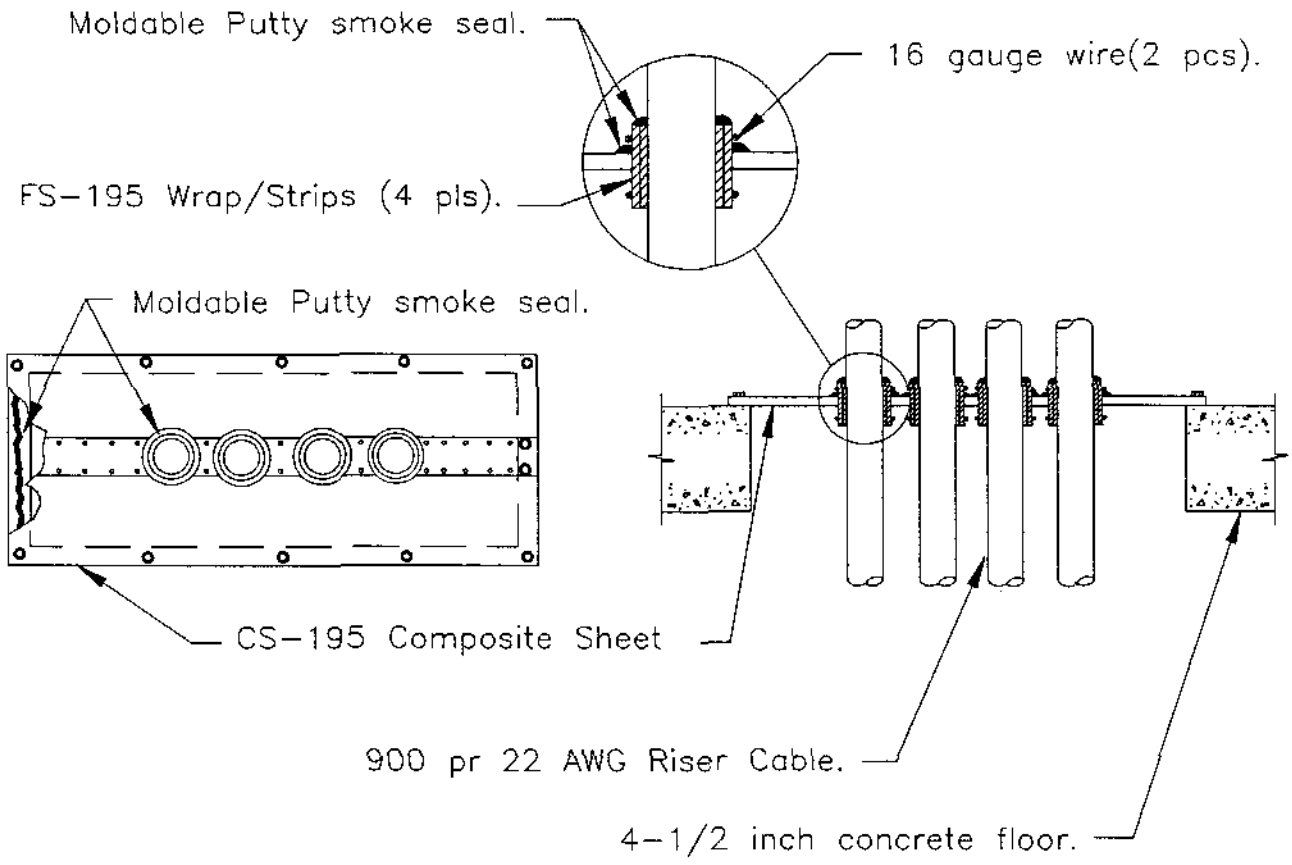
Procedure:

FT 90-134a (Multiple Trunk Cables): Wrap each cable with 2 layers of FS-195 and secure with 16-gauge wire — midpoint of Wrap/Strips approximately even with floor level. Cut and fit 2 pieces of CS-195 Composite Sheet so that they overlap the concrete by at least 2 inches and fit "snugly" to the Wrap/Strips at their midpoints. Install a bead of Moldable Putty as a smoke seal to the parameter of the CS-195 Sheet and mechanically fasten it to the concrete. (UL System No. 447)

FT 90-134b (Multiple Inner Duct/Fiber Optic Cable (rect.) Opening: Wrap each PVC Inner Duct (containing the fiber optic cables) with one layer of FS-195 and secure with 16-gauge wire — midpoint of Wrap/Strip to be approximately even with floor level. Cut and fit two pieces of CS-195 Composite Sheet so that they overlap the concrete at least 2 inches on all sides and fit "snugly" to the Wrap/Strips. Apply putty to the perimeter of the CS-195 and Wrap Strips/Inner Ducts as a smoke seal. (UL System No. 448)

NOTE: Always refer to the manufacturer's data or witnessing organizations' report for complete installation details.

Multiple Riser Cable through a large opening in concrete



UL #447

ISSUE	DATE	REV.	CH.
1	10-21-91		

COM I.D.	SUPPLEMENTS
IC22	
DR. KAJ	APP. GKK
DWG. I.D. 5300-IC22	

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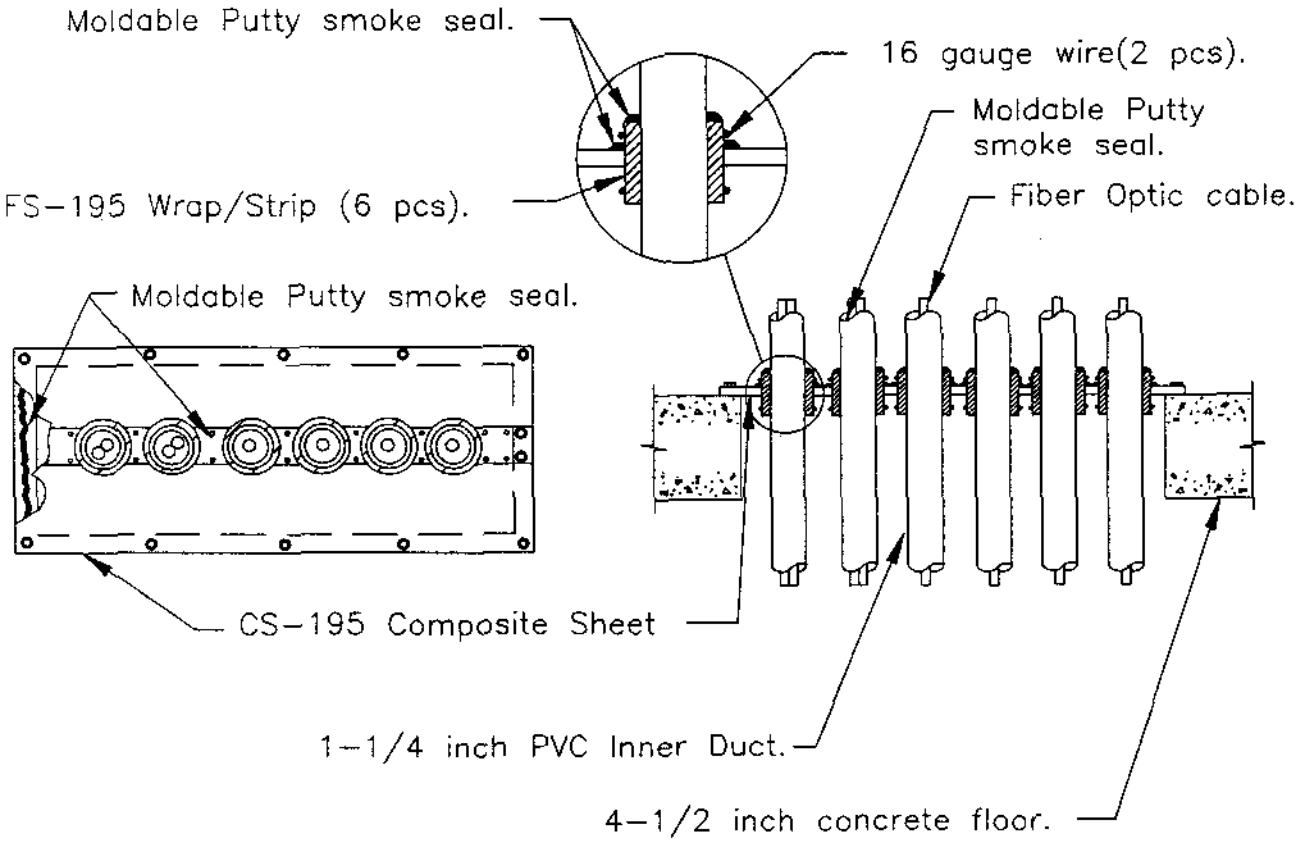
Fire Protection Products
Multiple Riser Cable through a large opening in concrete floor or wall
Moldable Putty

2 Hr F rating page 1 of 2

Multiple Fiber Optic Cable/Inner Duct through a large opening in concrete



UL #448

ISSUE	DATE	REV.	CH.
1	11-06-91		

COM I.D.	SUPPLEMENTS
IC23	
DR. KAJ	APP. GKK
DWG. I.D. 5300-IC23	

3M / St. Paul

Fire Protection Products
Multiple Fiber Optic Cable/ Inner Duct through a large opening in concrete
Moldable Putty

2 Hr F rating page 1 of 2

3M Materials Used:

3M Fire Barrier Moldable Putty Pads 10 each per box	4 in. x 8 in. x 1/8 in. (102,6mm x 204,2mm x 3,17mm)
3M Fire Barrier CS-195 Composite Sheet	41 in. x 36 in. (1,04m x 914,4mm)
3M Fire Barrier FS-195 Wrap/Strip 10 each per box	2 in. x 24 in. (50,8mm x 609,6mm)

Features of the 3M System include:

- Specifically designed for the Telecommunications industry.
- UL Classified and FMRC Approved materials.
- Easy to re-enter and re-seal.
- No dust.
- Low installed cost.

Plus - 3M engineering, field support and fire test capability.

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Statements or recommendations not contained herein shall have no force or effect unless in an agreement signed by an officer of seller and manufacturer.

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Electrical Circuit Protective Materials
Classified By
Underwriters Laboratories Inc.®
For Use in Electrical Circuit Protective Systems
System Nos. 2, 3, 4, 6, 7, 8, 9

Fill, Void or Cavity Material
Classified By
Underwriters Laboratories Inc.®
For Use in Through-Penetration
Firestop System Nos. 61, 64, 82, 93, 99, 102, 105, 136, 138, 139, 159, 160
See UL Building Materials Directory

CLASSIFIED UL®

FILL, VOID OR CAVITY MATERIALS
CLASSIFIED BY
UNDERWRITERS LABORATORIES INC.®
FOR USE IN THROUGH-PENETRATION
FIRESTOP SYSTEM NOS 202, 203, 204
9009
SEE UL BUILDING
MATERIALS DIRECTORY

Factory Mutual System

Approved

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Litho in U.S.A.

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