1655 Scott Boulevard
Santa Clara, CA 95050-4169
United States Country Code (1)
(408) 985-2400
FAX No. (408) 296-3256
http://www.ul.com

Underwriters Laboratories Inc.®

April 27, 1998 Vol 1 File: R16056
Project 95SC09018
Type R

100 a century of public safety est. 1894

Attention: Mr. Mark Modera
University of California
Lawrence Berkeley Laboratory
Bldg. B90G
1 Cyclotron Rd.
Berkeley, CA 94720

Product CAULKING AND SEALANTS

We have completed our investigation of the subject product and have established Follow-Up Service thereon in accordance with your application

Enclosed is your copy of the Follow-Up Service Procedure which describes your product in detail. The general methods and conditions of this Service are outlined in the Follow-Up Service Agreement which has been signed by an officer of your company. The original copy of this agreement is on file at our Northbrook Office. If there is any phase of this Service which is not entirely clear to you, please let us know.

(INDEPENDENT PROCEDURE/REPORT)

Inspection at your plant will be conducted under the supervision of

Mr. Larry Adkins, Field Supervisor
Underwriters Laboratories Inc.
14675 Midway Drive
Suite 104
Dallas, TX 75244

Telephone: 972-960-2669 (Answering Machine); 972-960-2778
Telefax: 972-960-1022

An invoice covering the cost of our Follow-Up Service will be mailed to the Applicant's address which is shown on the first page of the enclosed Procedure. If you have any special billing instructions, i.e., Purchase Order, individual name, department, address or questions regarding charges, please write to our Santa Clara Office: 1655 Scott Boulevard, Santa Clara, CA 95050-4169, Attn: Progress NAFT.

Please examine this Procedure carefully and notify MR. GARRETT TOM promptly of any inaccuracies or omissions. Kindly file the Procedure where it will be readily accessible for our Representative's use.

Very truly yours,

UNDERWRITERS LABORATORIES INC

HH/GT:lav
Encl.
cc: Representative: Fort Worth
Puma Management & Technical Services Inc

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File R16056
Project 95SC09018

April 27, 1998

REPORT

ON

CAULKING AND SEALANTS

University of California
Lawrence Berkeley Laboratory
Berkeley, California

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GENERAL

The purpose of this investigation was to evaluate the surface burning characteristics of the subject material by establishing the specific classification in accordance with UL Standard "Test for Surface Burning Characteristics of Building Materials," UL 723, Eight Edition.

The surface burning characteristics per UL 723 develops a classification for Flame Spread Index and Smoke Developed Index. The test results are established in comparison with a combustible (red oak lumber) and a noncombustible (inorganic reinforced-cement board).

Various physical and chemical tests were conducted on the finished product and its constituents to establish specifications for use in the Follow-Up Service Program.

This Report includes a description of the inspection and sample selection, the sample preparation and conditioning, the test results and the Follow-Up Service Program.

The Classification Marking of Underwriters Laboratories Inc. attached to the product is the only method provided by UL to identify the material covered by this investigation and Report as produced under the Follow-Up Service Program.

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DESCRIPTION

PRODUCT COVERED:

The product covered by this Report is a sealant designated Ductseal, intended for field application.

USE

The aerosol sealant covered by this Report is intended for use as a building material as authorized by the authorities having jurisdiction.

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TEST METHOD

GENERAL

The tests were conducted in accordance with UL Standard "Test for Surface Burning Characteristics of Building Materials," UL 723, Eight Edition

The test determines the surface burning characteristics of the test material, specifically Flame Spread Index and Smoke Developed Index when exposed to fire. This test provides a basis for comparing the surface burning char-acteristics of different materials. This test evaluates the performance of the product during the test exposure.

TEST DATA

SAMPLE DESCRIPTION

The Ductseal sealant was spray applied onto 1/4 in. inorganic cement board at the manufacturer's recommended coverage rate of 400 sq ft per gal.

Each test consisted of three boards 24 in. wide by 96 in. long. The boards were placed across the tunnel width with their edges resting on the tunnel ledges. Their ends were butt-jointed to form a continuous 24 ft test surface. To complete the 25 ft. tunnel length, a 14 by 24 in. steel plate was placed underneath the sample upstream of the burners. Since the test samples had sufficient rigidity to support themselves, no additional support was used.

Prior to the fire test, the sprayed samples were dried to equilibrium of the test samples, no additional means of support were required.

RESULTS

Surface Burning Characteristics

The data on Flame Spread Index and Smoke Developed Index appear in the following tabulation.

Flame Spread Index

The maximum distance along the sample length to which the flame spreads from the end of the igniting flame was determined by observation. The Flame Spread Index is derived by plotting the progress-on of the flame front on a time-distance basis; no allowance is made for flame front recession. The Flame Spread Index is calculated according to the following:

A. Flame Spread Index = 0.515 A_t When A_t is less than or equal to 97.5 min-ft.

B. Flame Spread Index = 4900/195-A_t When A_t is greater than 97.5 min-ft.

Where A_t = The total area under the time-distance curve expressed in minute-feet.

Material	Maximum Flame Spread ft.	Time of Maximum Flame Spread, min:sec	Calculated Total Area under the Time Distance Curve min-ft	Calculated Value for Flame Spread+
Ductseal sealant	0.5	1:25	4.4	2.3
Ductseal sealant	0.5	1:42	4.3	2.2

+ Flame spread conducted under File MH18751

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Smoke Developed Index

The smoke developed during the test is monitored by a photoelectric circuit operating across the furnace flue. A curve is developed by plotting values of light obscuration as measured in decreased cell output versus time. The Smoke Developed Index is obtained by expressing the area under the curve developed for the sample material as a percentage of the area under the curve developed for untreated red oak.

The Smoke Developed Index is expressed as

$$\text{Smoke Developed Index} = \frac{Am}{Aro \times 100}$$

Where:

Am = The area under the curve for the test material.
Aro = The area under the curve for untreated red oak.

Material	Calculated Value for Smoke Developed Index+
Ductseal Sealant	1.0
Ductseal Sealant	0.3

+ - Smoke developed values determined under File MH18751

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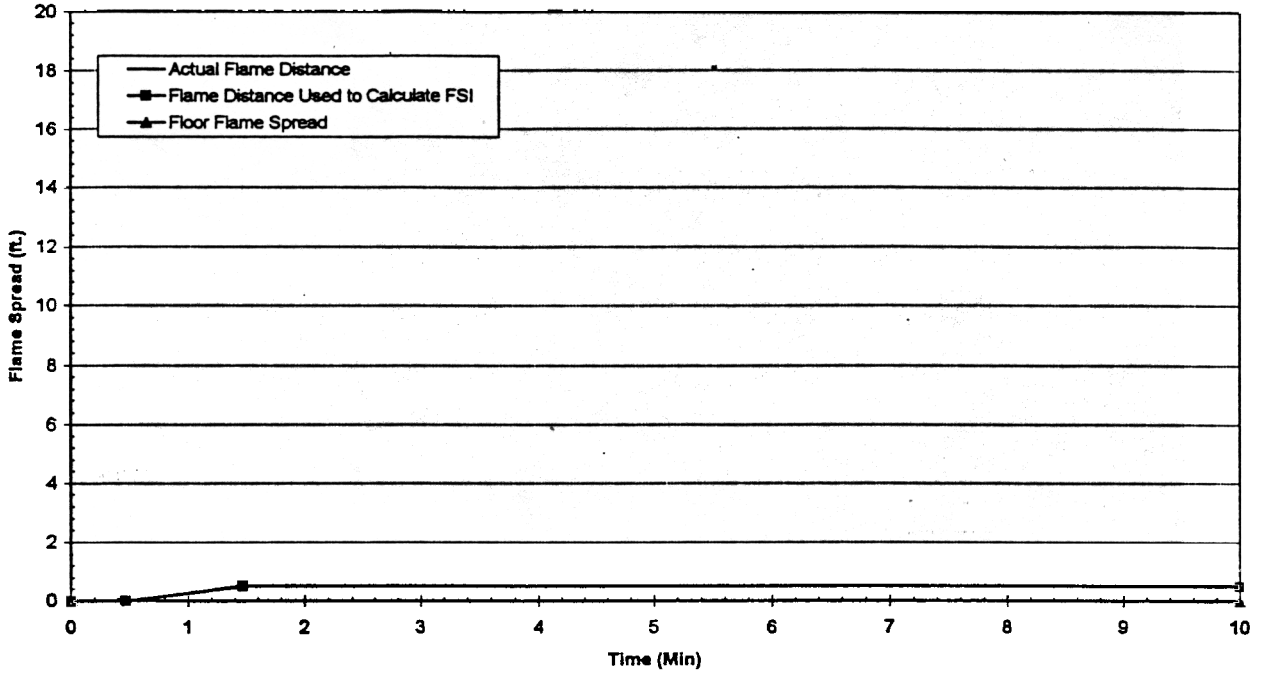
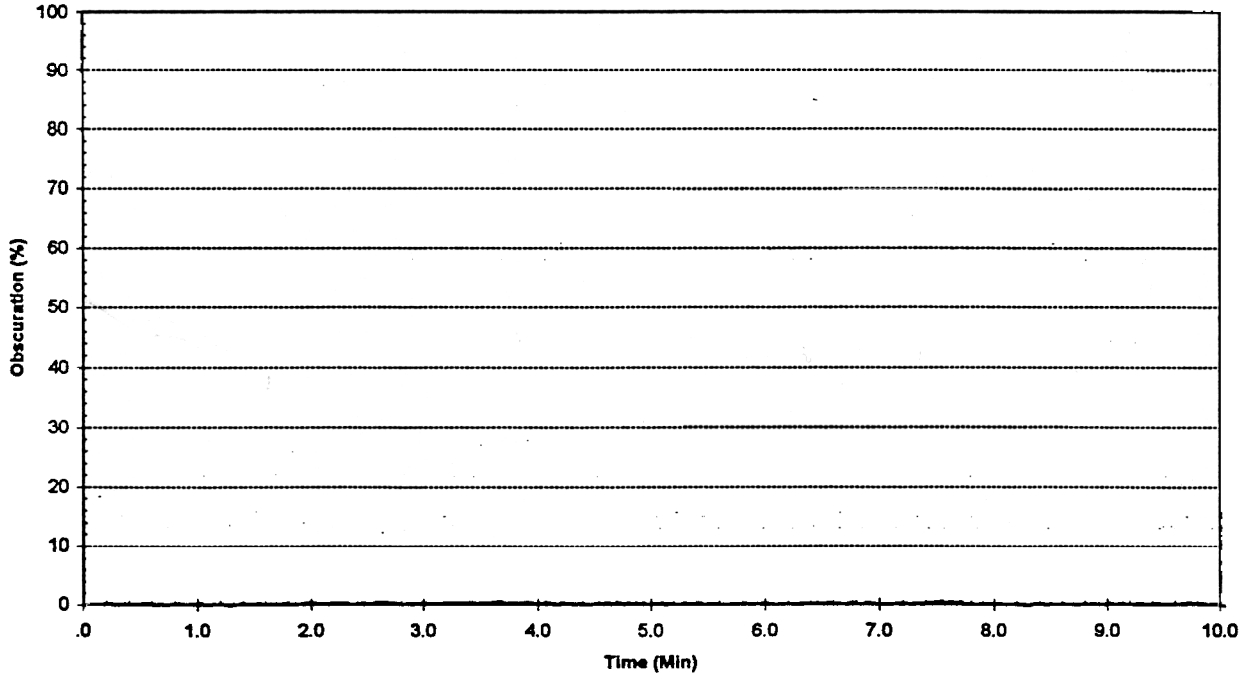
Steiner Tunnel Results
SD-1 SEALANT

Flame Spread Results



Smoke Results

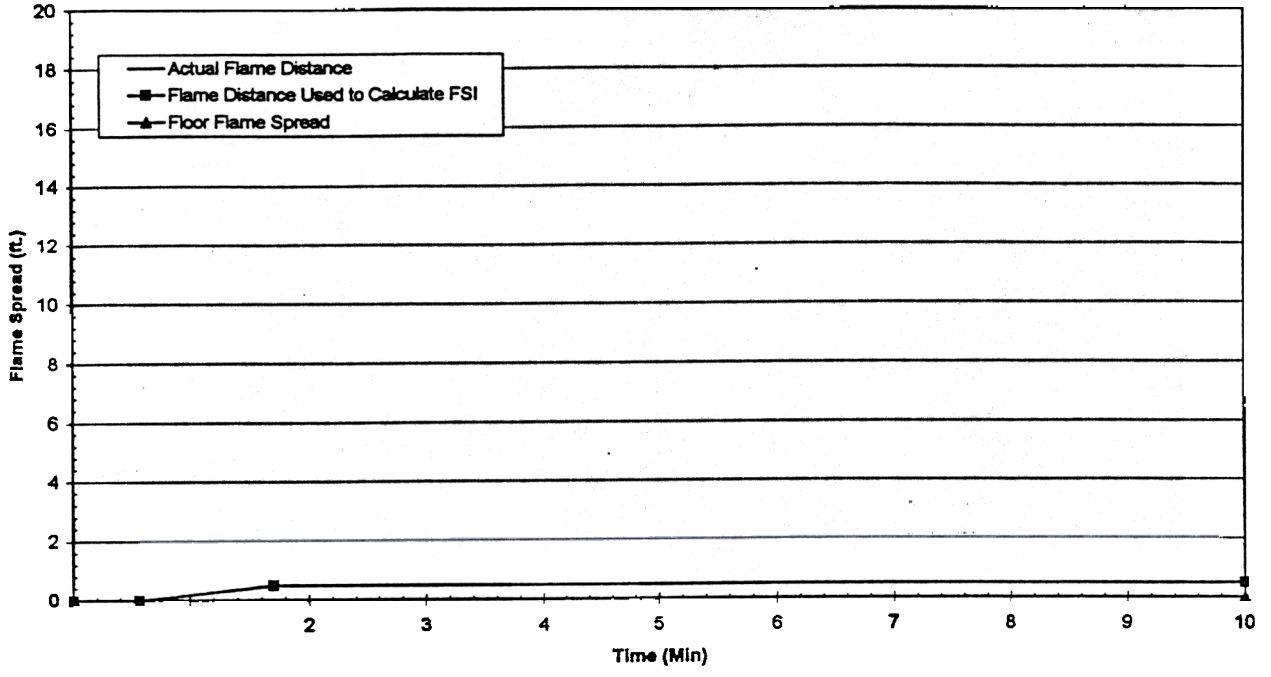


LAWRENCE BERKELEY
Test Code: 11259617.XLS
Test No. 01
Project MH18751/95SC9018

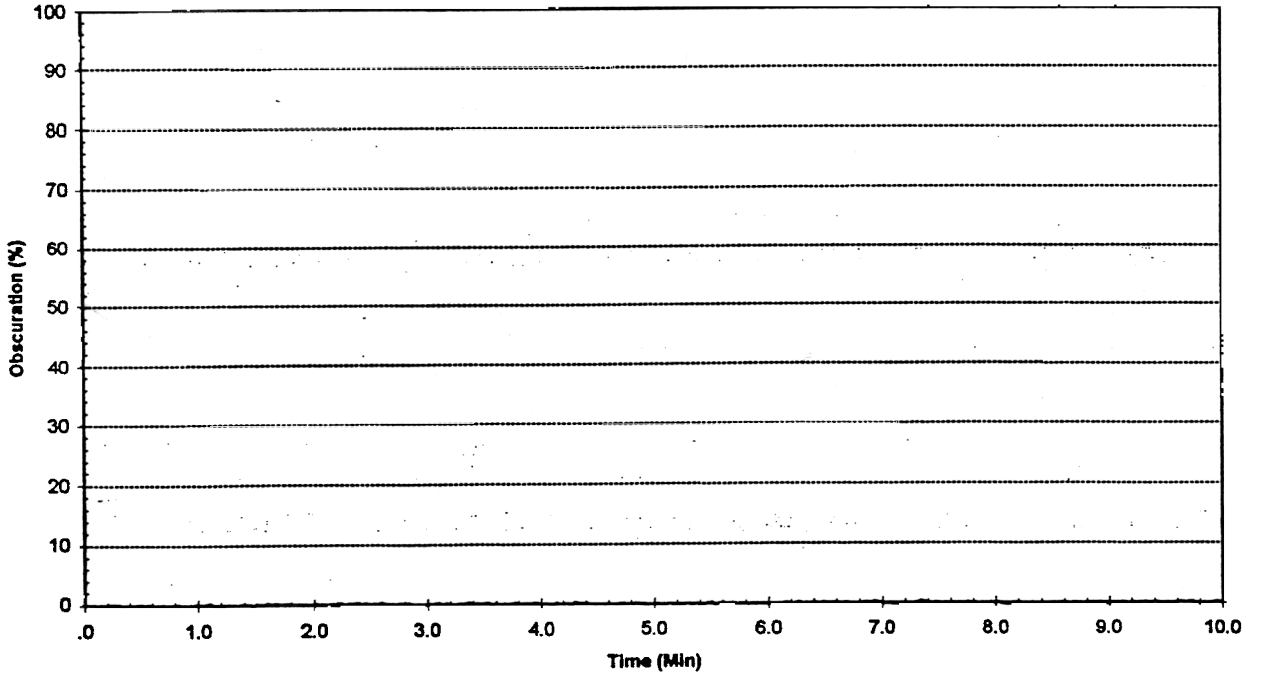
Flame Spread Index = 2.3
Smoke Developed Index = 1.0
Max Flame Spread = 0.5

Steiner Tunnel Results
SD-1 SEALANT

Flame Spread Results



Smoke Results



LAWRENCE BERKELEY
Test Code: 11259618.XLS
Test No. 02
Project MH18751/95SC9018

Flame Spread Index = 2.2
Smoke Developed Index = 0.3
Max Flame Spread = 0.5

CONCLUSION

The following conclusions represent the judgment of Underwriters Laboratories Inc. based on the results of the examination and tests described in this Report as they relate to previously established engineering principles.

CLASSIFICATION:

The following classification is established for the product covered by this Report.

	Surface Burning Characteristics Applied to Inorganic Reinforced Cement Board+
Flame Spread	0
Smoke Developed	0

+ - Tested as applied at a coverage rate of 400 sq ft per gal.

FOLLOW-UP PROGRAM

The product covered by this Report will be placed under the Follow-Up Service Program of Underwriters Laboratories Inc.

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The Classification Marking of Underwriters Laboratories Inc. attached to the product is the only evidence provided by Underwriters Laboratories Inc. that such product has been produced under the Follow-Up Service Program. The Classification Marking will bear the following information:

UNDERWRITERS LABORATORIES INC.®

CLASSIFIED
CAULKING AND SEALANTS

Surface Burning Characteristics

Applied to Inorganic
Reinforced Cement Board+

Flame Spread	0
Smoke Developed	0

+ - Tested as applied at a coverage rate of 400 sq ft per gal

Report by:

H. Hansen/LAV

HANS F. HANSEN
Senior Engineering Associate
Engineering Services

Reviewed by:

G. Tom/LAV

GARRETT TOM
Associate Managing Engineer
Engineering Services

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